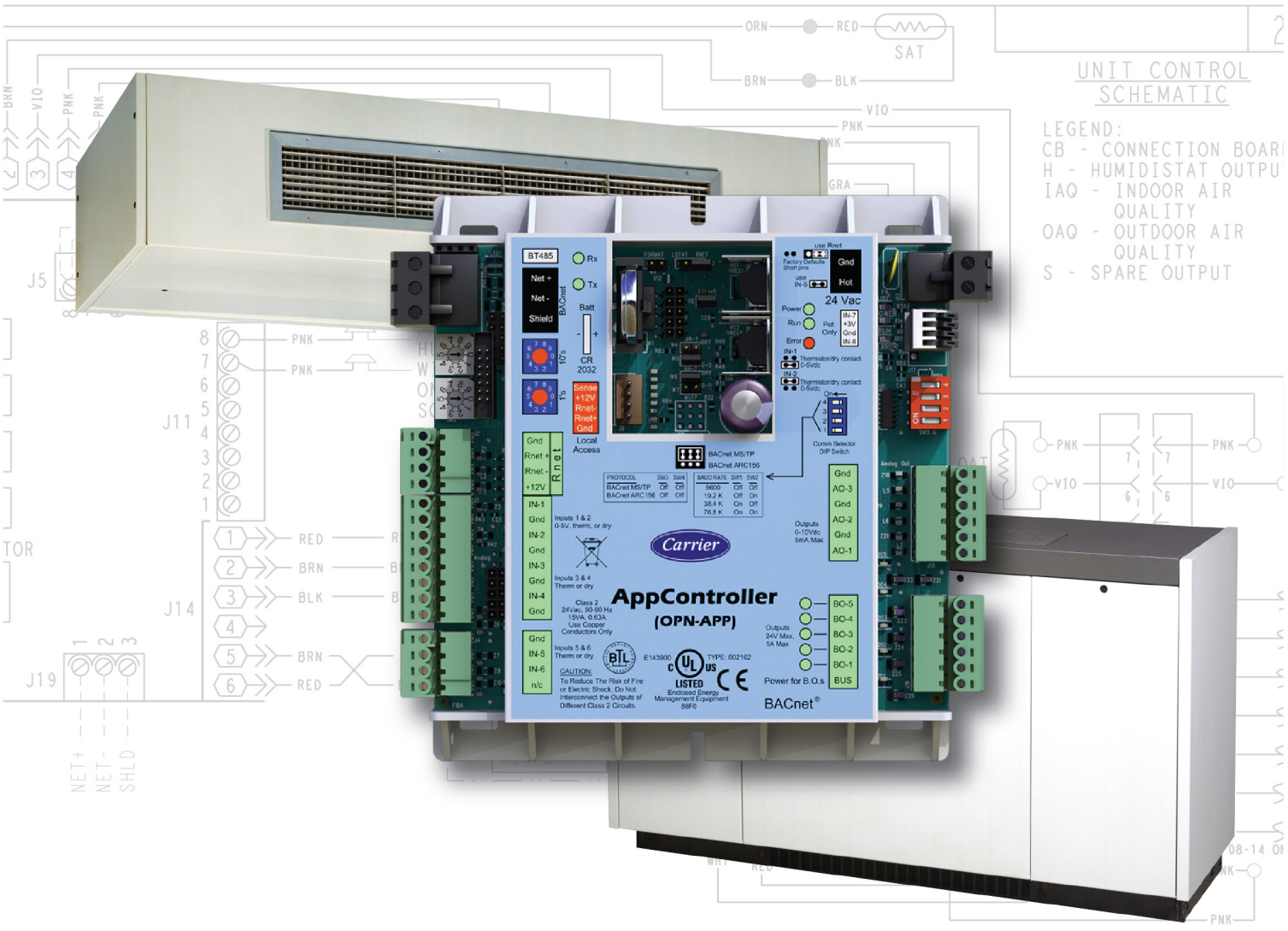
Unit Ventilator
for AppController v2 Installation and Start-up Guide



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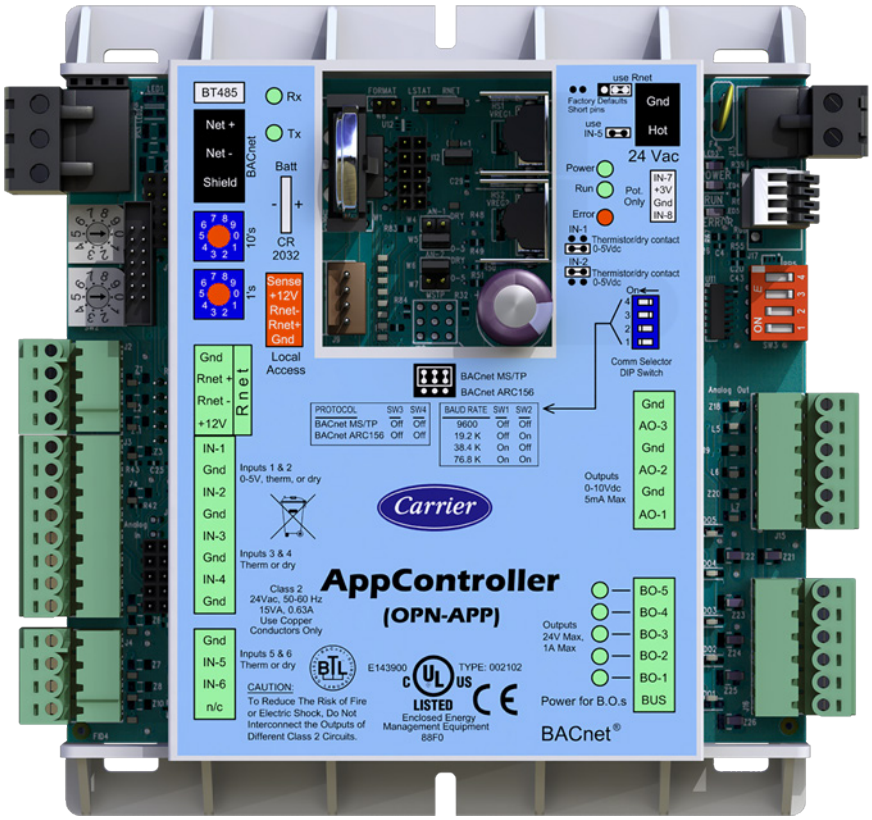
Important changes are listed in **Document revision history** at the end of this document.

Contents

Unit Vent for AppController overview and specifications

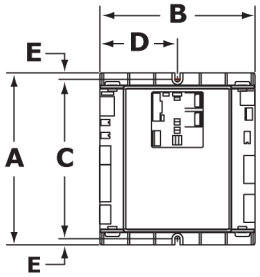
What is the Unit Ventilator for AppController application?

The AppController is a field-installed controller that mounts on a unit ventilator. It is identical to the integrated Unit Vent Open that is shipped from the factory except the Unit Vent for AppController application does NOT support Metric units. The internal application programming provides optimum energy efficiency. This controller allows the unit ventilator to run in 100% stand-alone mode, communicate to an i-Vu® Open Control System, or a BACnet Third Party Building Automation System (BAS).



Specifications

Power	24 Vac ±10%, 50–60 Hz 20 VA power consumption 26 Vdc (25 V min, 30 V max) Single Class 2 source only, 100 VA or less
BACnet Port	For communication with the controller network using BACnet ARC156 (156 kbps) or BACnet MS/TP (9600 bps – 76.8 kbps)
Rnet port	• Supports up to 10 wireless and/or ZS sensors, and one Equipment Touch or TruVu™ ET Display • Supplies 12 Vdc/210 mA power to the Rnet at an ambient temperature of 77°F (25°C) with a 24 Vac nominal power source. NOTE Ambient temperature and power source fluctuations may reduce the power supplied by the Rnet port. **NOTE** If the total power required by the sensors on the Rnet exceeds the power supplied by the Rnet port, use an external power source. The Wireless Adapter, Equipment Touch, or TruVu™ ET Display must be powered by an external power source. See the specifications in each device's Installation and Start-up Guide to determine the power required.
Local Access port	For system start-up and troubleshooting using Field Assistant
Inputs	6 inputs configurable for thermistor or dry contact. 1 and 2 are also configurable for 0–5 Vdc sensors. **NOTES** • 7 and 8 are unused. • Input 5 has a maximum temperature of 140°F (60°C).
Input resolution	10 bit A/D
Analog outputs	3 analog outputs, 0–10 Vdc (5 mA max)
Binary outputs	5 binary outputs, dry relay contacts rated at 1 A max. @ 24 Vac/Vdc. Configured normally open
Output resolution	8 bit A/D, using filtered PWM
Real time clock	Battery-backed real time clock keeps track of time in the event of a power failure
Battery	10-year Lithium CR2032 battery retains the following data for a maximum of 10,000 hours during power outages: control programs, graphics, editable properties, schedules, and trends.
Protection	Built-in surge and transient protection for power and communications in compliance with EN61000-6-1. Incoming power and network connections are protected by non-replaceable internal solid-state polyswitches that reset themselves when the condition that causes a fault returns to normal. The power, network, input, and output connections are also protected against transient excess voltage/surge events lasting no more than 10 msec. **CAUTION** To protect against large electrical surges on serial EIA-485 networks, place a PROT485 at each place wire enters or exits the building.

Status indicators	LEDs indicate status of communications, running, errors, and power.
Environmental operating range	0 to 130°F (-18 to 54°C), 0 to 90% relative humidity, non-condensing
Storage temperature range	-24 to 140°F (-30 to 60°C), 0 to 90% relative humidity, non-condensing
Physical	Rugged GE C2950HF Cycoloy plastic
	
Overall dimensions	A: 5-5/8 in. (14.3 cm) B: 5-1/8 in. (13 cm)
Mounting dimensions	C: 5-1/4 in. (13.3 cm) D: 2-9/16 in. (6.5 cm) E: 3/16 in. (.5 cm)
Panel depth	2 in. (5.1 cm)
Weight	0.44 lbs. (0.20 kg)
BACnet support	Conforms to the BACnet Advanced Application Controller (B-AAC) Standard Device Profile as defined in ANSI/ASHRAE Standard 135-2012 (BACnet) Annex L, Protocol Revision 9
Listed by	UL-916 (PAZX), cUL-916 (PAZX7), FCC Part 15-Subpart B-Class A, CE
Compliance	Europe: CE Mark, UK: UKCA EN50491-5-2:2009; Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light industry environment RoHS Compliant: 2015/863/EU REACH Compliant

Safety considerations

WARNING Disconnect electrical power to the controller before wiring it. Failure to follow this warning could cause electrical shock, personal injury, or damage to the controller.

Installing the controller

1 *Mount the controller* (page 4).

2 *Wire the controller for power* (page 5).

3 *Set the controller's address* (page 6).

4 *Wire the controller to the BACnet MS/TP or BACnet ARC156 network* (page 6).

5 *Wire inputs and outputs* (page 8).

6 *Wire sensors to the controller* (page 13).

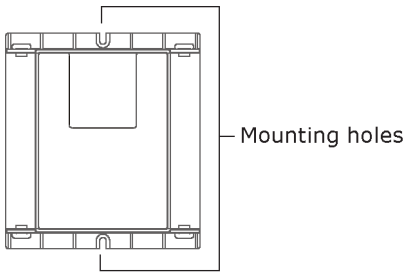
7 *Wire equipment to outputs* (page 22).

Mounting the controller

WARNING

When you handle the controller:
- Do not contaminate the printed circuit board with fingerprints, moisture, or any foreign material.
- Do not touch components or leads.
- Handle the board by its edges.
- Isolate from high voltage or electrostatic discharge.
- Ensure that you are properly grounded.

Screw the controller into an enclosed panel using the mounting slots on the coverplate. Leave about 2 in. (5 cm) on each side of the controller for wiring. Mounting hole dimensions 5 9/16" (14.1 cm) between mounting slot center lines.



Wiring the controller for power

WARNING Do not apply line voltage (mains voltage) to the controller's ports and terminals.

CAUTIONS

- The controller is powered by a Class 2 power source. Take appropriate isolation measures when mounting it in a control panel where non-Class 2 circuits are present.
- Carrier controllers can share a power supply as long as you:
  - Maintain the same polarity.
  - Use the power supply only for Carrier controllers.

To wire for power

1. Remove power from the power supply.
2. Pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **Hot**.
3. Connect the transformer wires to the screw terminal connector.

   NOTE If using a grounded transformer, connect the ungrounded lead to the **Hot** terminal to avoid damaging the transformer.
4. Apply power to the power supply.
5. Measure the voltage at the controller's power input terminals to verify that the voltage is within the operating range of 21.6–26.4 Vac.
6. Insert the screw terminal connector into the controller's power terminals.
7. Verify that the **Power** LED is on and the **Run** LED is blinking.

Addressing the controller

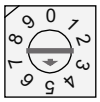
You must give the controller an address that is unique on the network. You can address the controller before or after you wire it for power.

1 If the controller has been wired for power, pull the screw terminal connector from the controller power terminals labeled **Gnd** and **Hot**. The controller reads the address each time you apply power to it.

2 Using the rotary switches, set the controller address. Set the **Tens** (**10's**) switch to the tens digit of the address, and set the **Ones** (**1's**) switch to the ones digit.

EXAMPLE If the controller's address is 25, point the arrow on the **Tens** (**10's**) switch to 2 and the arrow on the **Ones** (**1's**) switch to 5.

10's



1's

CAUTION The factory default setting is **00** and must be changed to successfully install your controller.

Wiring for communications

The controller communicates using BACnet on the following types of network segments:

- MS/TP communicating at 9600 bps, 19.2 kbps, 38.4 kbps, or 76.8 kbps
- ARC156 communicating at 156 kbps

NOTE For more networking details, see the *Open Controller Network Wiring Installation Guide*.

Wiring specifications for BACnet MS/TP and ARC156

Cable:	22 AWG or 24 AWG, low-capacitance, twisted, stranded, shielded copper wire
Maximum length:	2000 feet (610 meters)

WARNING Do not apply line voltage (mains voltage) to the controller's ports and terminals.

To wire the controller to the BACnet network

1. Pull the screw terminal connector from the controller's power terminals labeled **24 Vac** and **Gnd** (**Return**).
2. Check the communications wiring for shorts and grounds.
3. Connect the communications wiring to the controller's screw terminals labeled **Net +**, **Net -**, and **Shield**.

   NOTE Use the same polarity throughout the network segment.
4. Set the communication type and baud rate.

For...	Set Communications Selection jumper to...	Set DIP switches 1 and 2 to...	Set DIP switches 3 and 4 to...
MS/TP	**BACnet MS/TP**	The appropriate baud rate. See the **MS/TP Baud** diagram on the controller.	Off/Off
ARC156	**BACnet ARC156**	N/A. Baud rate will be 156 kbps regardless of the DIP switch settings.	Off/Off

   NOTE Use the same baud rate for all controllers on the network segment.
5. Wire the controllers on a BACnet MS/TP or BACnet ARC156 network segment in a daisy-chain configuration.
6. If the controller is at either end of a network segment, connect a BT485 to the controller.
7. Insert the power screw terminal connector into the controller's power terminals.
8. Verify communication with the network by viewing a Module Status report in the i-Vu® interface.

Wiring inputs and outputs

WARNING Do not apply line voltage (mains voltage) to the controller's ports and terminals.

See *Appendix A* (page 75) to print a blank wire list.

Inputs and outputs table

I/O	Type	I/O Terminal	Gnd Terminal	Point Name/ Function	Hardware/ Signal	Jumper Position of Pins
Zone Temp/ Zone Temp*	AI	Rnet	Gnd	Space Temperature - Prime Variable	Communicating	N/A
RAT or CO_2 Sensor	AI	IN-1	2 - Gnd	Return Air Temperature Optional IAQ sensor	10K Thermistor 0-5 Vdc	IN-1 Top IN-1 Bottom
SAT Sensor	AI	IN-2	4 - Gnd	Supply Air Temperature	10K Thermistor	IN-2 Top
OAT Sensor	AI	IN-3	6 - Gnd	Outdoor Air Temperature	10K Thermistor	N/A
Changeover Temp	AI	IN-4	8 - Gnd	Changeover switch Changeover sensor	Dry Contact Thermistor	N/A
Input Channel #5	BI	IN-5	1 - Gnd	Remote Occ Contact Fan Status	Dry Contact	N/A
Freezestat	BI	IN-6	1 - Gnd	Low Limit Thermostat	Dry Contact	N/A
OA Damper	AO	AO-1	2 - Gnd	Mixed Air Damper	0-10 Vdc 2-10 Vdc	N/A
Valve / F&B	AO	AO-2	4 - Gnd	Face & Bypass Damper Heating Valve 2-Pipe H/C Valve	0-10 Vdc	N/A
Cooling Valve	AO	AO-3	6 - Gnd	Cooling Valve	0-10 Vdc	N/A
Fan High Spd	BO	BO-1*	1 - Pwr	High Speed Fan Stage 2 EH	Relay	N/A
Fan Med Spd	BO	BO-2*	1 - Pwr	Medium Speed Fan Stage 3 EH)	Relay	N/A
Fan G / Low Spd	BO	BO-3	1 - Pwr	Low Speed Fan	Relay	N/A
BO-4	BO	BO-4*	1 - Pwr	2-Pipe/2-Pos Valve (for equip w/F&B) 2-Pos Heating Valve (for equip w/F&B) EH stage 1	Relay	N/A
BO-5	BO	BO-5*	1 - Pwr	2-Pos Cooling Valve (for equip w/F&B) DX stage 1 EH stage 1 (w/2-Pipe/Electric Heat)	Relay	N/A

Legend

AI - Analog Input **AO** - Analog Output
BI - Binary Input **BO** - Binary Output

* These outputs are configurable.

Input wiring specifications

Input	Maximum length	Minimum gauge	Shielding
0–5 Vdc	500 feet (152 meters)	22 AWG	100 feet (30.4 meters) unshielded 100 - 500 feet shielded
Thermistor Dry contact Pulse counter TLO	500 feet (152 meters)	22 AWG	100 feet (30.4 meters) unshielded 100 - 500 feet shielded
ZS sensors Wireless Adapter for wireless sensors Equipment Touch TruVu™ ET Display	See *Wiring devices to the controller's Rnet port* (page 14).		

Inputs

The controller has 6 inputs that accept the following signal types.

These inputs...	Support this signal type...	Description
All	Thermistor	Precon type 2 (10 kOhm at 77°F/25°C) Input voltage for IN-5: 1 to 2.52 Vdc Input voltage for all other inputs: 0.33 to 2.52 Vdc
All	Dry contact	A 3.3 Vdc wetting voltage detects contact position, resulting in a 0.3 mA maximum sense current when the contacts are closed.
IN-1, IN-2	0–5 Vdc	The input impedance of the controller is approximately 30 kOhm.
All	Pulse counter	Pulse counting up to 10 pulses per second. Minimum pulse width (on or off time) required for each pulse is 50 msec.

Binary outputs

The controller has 5 binary outputs. You can connect each output to a maximum of 24 Vac/26 Vdc. Each output is a dry contact rated at 1 A, 24 V maximum and is normally open.

To size output wiring, consider the following:

- Total loop distance from the power supply to the controller, and then to the controlled device

  NOTE Include the total distance of actual wire. For 2-conductor wires, this is twice the cable length.

- Acceptable voltage drop in the wire from the controller to the controlled device
- Resistance (Ohms) of the chosen wire gauge
- Maximum current (Amps) the controlled device requires to operate

Analog outputs

The controller has 3 analog outputs that support voltage. The controlled device must share the same ground as the controller and have the following input impedance:

0–10 Vdc	Minimum impedance 2000 Ohms, max 5 mA
	NOTE Ohm's law: -10V/.005a = 2000 Ohms

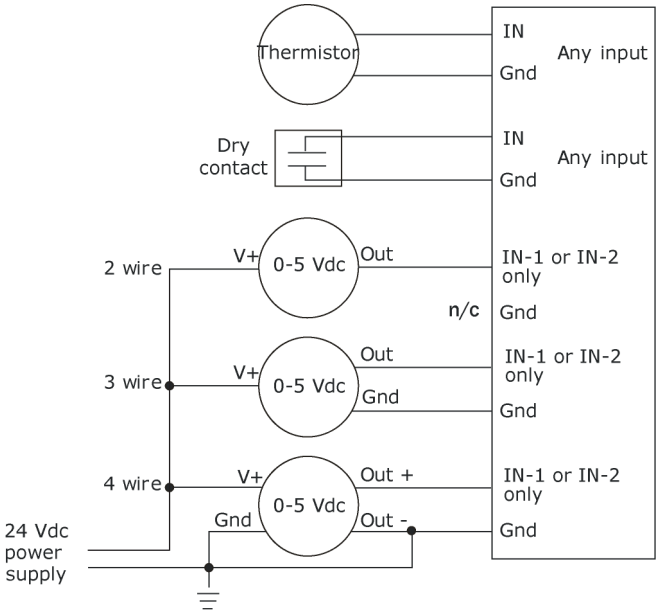
To wire inputs and outputs

Pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **Hot**.

1 Connect the input wiring to the screw terminals on the controller.

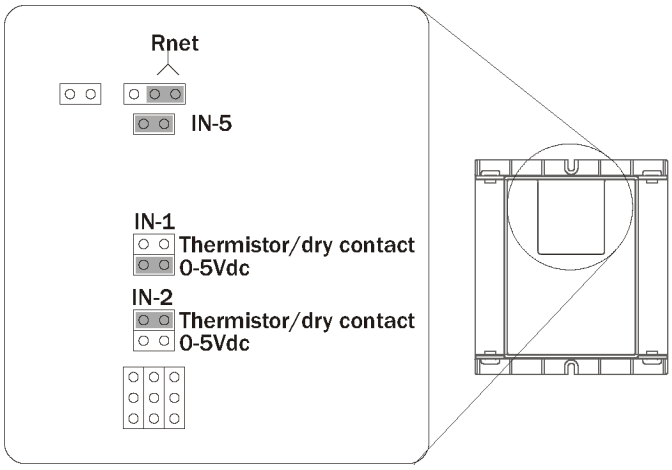
NOTES

- Connect the shield wire to the **GND** terminal with the ground wire.
- **IN-5** and **IN-6** share the **GND** terminal above **IN-5**.

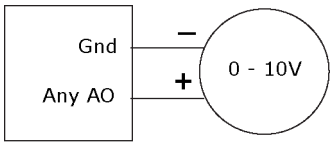


2 Set the appropriate jumpers on the controller.

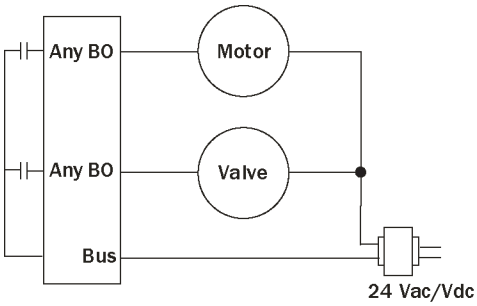
To use...	For...	
IN-1	Thermistor	Set jumpers **IN-1** to the Therm position.
IN-1	0–5 Vdc	Set jumpers **IN-1** to the 0-5 Vdc position.
IN-2	Thermistor/ Dry contact	Set jumpers **IN-2** to the Thermistor/Dry contact position.
All	Thermistor Dry contact	Verify the **IN-5** jumper is on.
Rnet Port	ZS sensors Wireless Adapter for wireless sensors Equipment Touch TruVu™ ET Display	Set the **Rnet** jumper to **Rnet**.



3 Connect the analog output wiring to the screw terminals on the controller and to the controlled device.



4 Connect the binary output wiring to the screw terminals on the controller and to the controlled device.



5 Insert the power screw terminal connector into the controller's power terminals.

Field-supplied sensor hardware

The controller is configurable with the following field-supplied sensors:

Sensor	Part numbers	Notes
Space temperature sensor	33ZCT55SPT	
Space ZS sensors (page 15, page 14) • Temperature • Temperature and CO2 • Temperature and RH Temperature and RH and CO2	See the *ZS Sensors Installation Guide*.	
Carrier wireless sensors	See *Wireless Sensors Installation Guide*.	
Supply air temperature sensor	33ZCSENSAT	
Changeover	33ZCSENGHG	
Outdoor air temperature sensor	33ZCSENOAT	
CO2 sensor	33ZCSPTCO2-01 33ZCSPTCO2LCD-01 33ZCT55CO2	Required only for demand control ventilation - a dedicated 24-Vac transformer is required
Fan status switch	CRSTATUS005A00 or field-supplied	

For specific details about sensors other than ZS or wireless, see the *Carrier Sensors Installation Guide*.

Wiring sensors to the controller

You can wire the following to the controller:

- *CO_2 sensor* (page 19)
- *Remote occupancy sensor* (page 21)
- *Low limit thermostat* (page 21)

NOTE This document gives instructions for wiring the above sensors to the controller. For mounting and wiring the sensors, see the *Carrier Sensors Installation Guide*.

*Details follow for devices that you can connect to the Rnet port.

WARNING Disconnect electrical power to the controller before wiring it. Failure to follow this warning could cause electrical shock, personal injury, or damage to the controller.

CAUTION

- Do not run sensor or relay wires in the same conduit or raceway with Class 1 AC or DC service wiring.
- Do not abrade, cut, or nick the outer jacket of the cable.
- Do not pull or draw cable with a force that may harm the physical or electrical properties.
- Avoid splices in any control wiring

Wiring devices to the controller's Rnet port

The Rnet communicates at a rate of 115 kbps and should be wired in a daisy-chain configuration.

Supports up to

- 10 wireless and/or ZS sensors (5 per control program)
- One Equipment Touch
- One TruVu™ ET Display

NOTE ZS sensors, a Wireless Adapter, and an Equipment Touch can share the Rnet, but not SPT sensors.

Rnet wiring specifications

NOTE Use the specified type of wire and cable for maximum signal integrity.

Description	4 conductor, shielded or unshielded, CMP, plenum rated cable
Conductor	22 AWG (7x0096) bare copper if Rnet has only sensors
Maximum length	500 feet (152 meters)
Insulation	Low-smoke PVC (or equivalent)
Color Code	Black, white, green, red
Shielding	If shielded, Aluminum/Mylar shield (100% coverage) with TC drain wire, terminated at controller
UL temperature rating	32–167°F (0–75°C)
Voltage	300 Vac, power limited
Listing	UL: NEC CL2P, or better

To wire ZS sensors to the controller

ZS Sensors are thermistor-based temperature sensors that may optionally sense humidity, CO_2, or VOC. ZS Sensors are wired to the Rnet port on i-Vu® Open controllers. You can use the following ZS sensors:

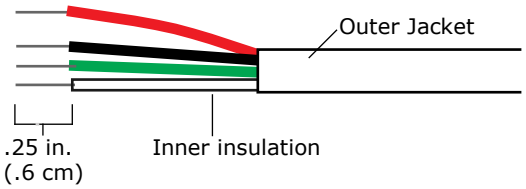
- ZS Standard
- ZS Plus
- ZS Pro
- ZS Pro-F

NOTES

- The ZS CO2 model uses 190 mA during sample period. Use auxiliary 12 Vdc, unless it is the only device on the Rnet port.
- A control program can use no more than 5 ZS Sensors
- SPT sensors cannot share the Rnet with other devices.
- For detailed instructions, see the *ZS Sensor Installation Guide*.

1 Remove power from the controller.

2 Partially cut, then bend and pull off the outer jacket of the Rnet cable(s). Do not nick the inner insulation. Strip about .25 inch (.6 cm) of the inner insulation from each wire.



3 Wire each terminal on the sensor to the same terminal on the controller. See diagram below.

NOTE Carrier recommends that you use the following Rnet wiring scheme:

Connect this wire...	To this terminal...
Red	+12V
Black	Rnet-
White	Rnet+
Green	Gnd

4 Apply power to the controller.

To wire the Wireless Adapter for wireless sensors

WARNING Do not apply line voltage (mains voltage) to the Wireless Adapter.

The Carrier wireless sensors are available in 868, 902, and 928 MHz radio frequency. The sensors are thermistor-based temperature sensors that may optionally sense humidity.

Wireless sensors communicate through a Wireless Adapter, which is wired to the Rnet port of the controller.

REQUIREMENTS

- A v6.5 or later i-Vu® system
- v6-xx-xxx or later controller drivers

To configure the control program for the desired user interaction with the sensor, see the *Wireless Sensors Application Guide*. For detailed instructions, see the *Wireless Sensors Installation Guide*.

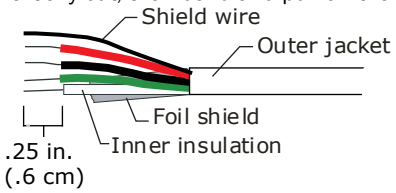
To wire, power, and mount the Wireless Adapter

NOTES

- The Wireless Adapter requires a 24 Vac power supply. It is not powered by the Rnet.
- If the Wireless Adapter will be:
  - Daisy-chained on the Rnet with ZS sensors, an Equipment Touch, or TruVu™ ET Displayuse the standard 4-conductor Rnet wiring.
  - The only device on the Rnet, you can use a 3-conductor cable instead of the standard 4-conductor Rnet cable.

1 Turn off the power to the controller that the Wireless Adapter will be wired to.

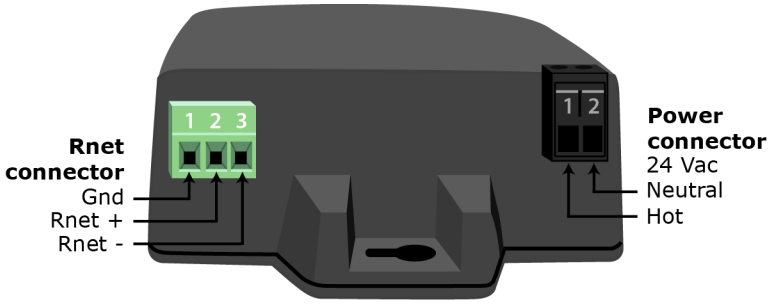
2 Partially cut, then bend and pull off the outer jacket of the Rnet cable(s). Do not nick the inner insulation.



3 Strip about 0.25 inch (0.6 cm) of the inner insulation from each wire.

4 Wire the **Rnet +**, **Rnet -**, and **Gnd** terminals on the controller's **Rnet** port to the terminals of the same name on the Wireless Adapter's Rnet connector.

NOTE If using shielded wire, connect the shield wire and the ground wire to the **Gnd** terminal.



5 Wire the 24 Vac external power supply to the Wireless Adapter's power connector.

6 Mount the Wireless Adapter by inserting 2 screws through the mounting tabs on each end of the Wireless Adapter.

7 Apply power to the external power supply.

8 Verify that the LED on top of the Wireless Adapter is blinking. See "LED" below.

9 Turn on the controller's power.

LED

The blue LED on the top of the Wireless Adapter indicates the following:

If the LED is...	Then the device...
Off	Is not powered or there is a problem.
Blinking	Is working properly.
Steadily on	Has a problem. Do one of the following: • Cycle power to the device. • Insert a small screwdriver or paper clip into the hole next to the LED to reboot the device.

To wire an Equipment Touch to the controller

NOTES

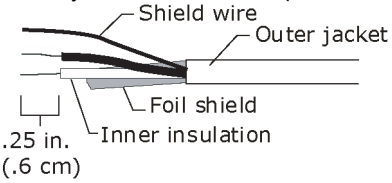
- The Equipment Touch requires a 24 Vac power supply. It is not powered by the Rnet.
- If the Equipment Touch will be:
  - Daisy-chained on the Rnet with ZS sensors or a Wireless Adapter, use the standard 4-conductor Rnet wiring and follow the wiring instructions *To wire ZS sensors to the controller* (page 15).
  - The only device on the Rnet, you can use a 2-conductor cable instead of the standard 4-conductor Rnet cable and follow the instructions below.
- For complete Equipment Touch installation instructions including wiring diagrams, see the *Equipment Touch Installation and Setup Guide.*

CAUTION The controller can share a power supply with the Carrier controller as long as:

- The power supply is AC power.
- You maintain the same polarity.
- You use the power source only for Carrier controllers.

1 Turn **off** the controller's power.

2 Partially cut, then bend and pull off the outer jacket of the cable. Do not nick the inner insulation.



3 Strip about 0.25 inch (0.6 cm) of the inner insulation from each wire.

4 Wire the controller's **Rnet+** and **Rnet-** terminals to the terminals of the same name on the Equipment Touch's connector.

NOTE If using shielded wire, connect the shield wire and the ground wire to the **Gnd** terminal.

5 Turn **on** the controller's power.

6 Turn on the Equipment Touch.

To wire the TruVu™ ET Display

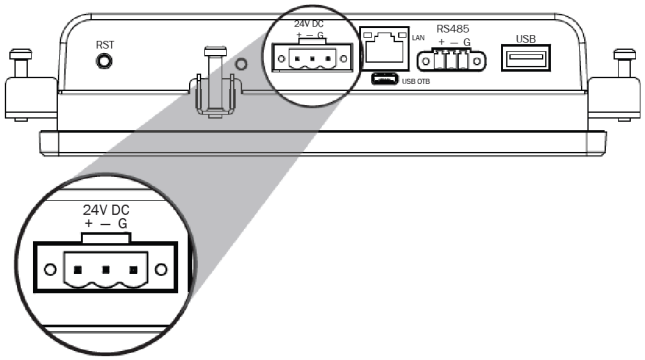
WARNING Do not apply line voltage (main) - 24 Vdc power only.

Wiring power

Wire the TruVu™ ET Display **24V DC** connector to the 24 Vdc power supply using 2-conductor 18 AWG wire. Maximum distance 100 feet (30 meters).

CAUTION The TruVu™ ET Display can share a power supply with the Carrier controller as long as:

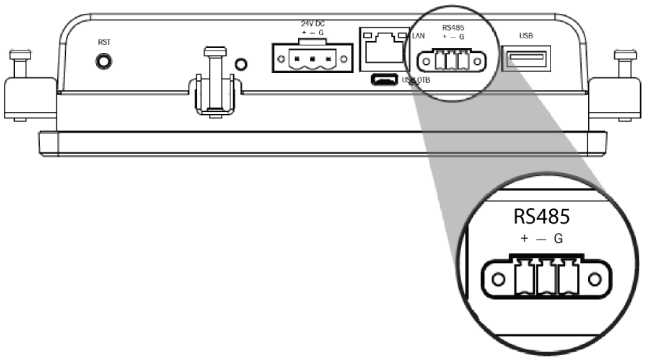
- The power supply is DC power.
- You maintain the same polarity.
- You use the power source only for Carrier controllers.



Wiring communication

1 Turn off the controller's power.

2 Wire the TruVu™ ET Display's **RS485** connector to the controller's **Rnet** port, **G** to **Gnd**, **+** to **Rnet +**, **-** to **Rnet -** using 2-conductor 22 AWG wire with a maximum distance of 500 feet (152 meters).



3 Turn on the controller's power.

For complete TruVu™ ET Display installation instructions, see the *TruVu™ ET Display Installation and Start-up Guide.*

Wiring a CO2 sensor

Part #33ZCSPTCO2LCD-01 (Display model)
Part #33ZCSPTCO2-01 (No display)

Part #33ZCT55CO2 (No display)
Part #33ZCT56CO2 (No display)

A CO_2 sensor monitors carbon dioxide levels. As CO_2 levels increase, the controller adjusts the modulating mixed air damper to increase ventilation and improve indoor air quality. A CO_2 sensor is wall-mounted in the space.

The sensor has a range of 0–2000 ppm. The CO_2 sensor's power requirements exceed what is available. Provide a dedicated 24Vac transformer or DC power supply

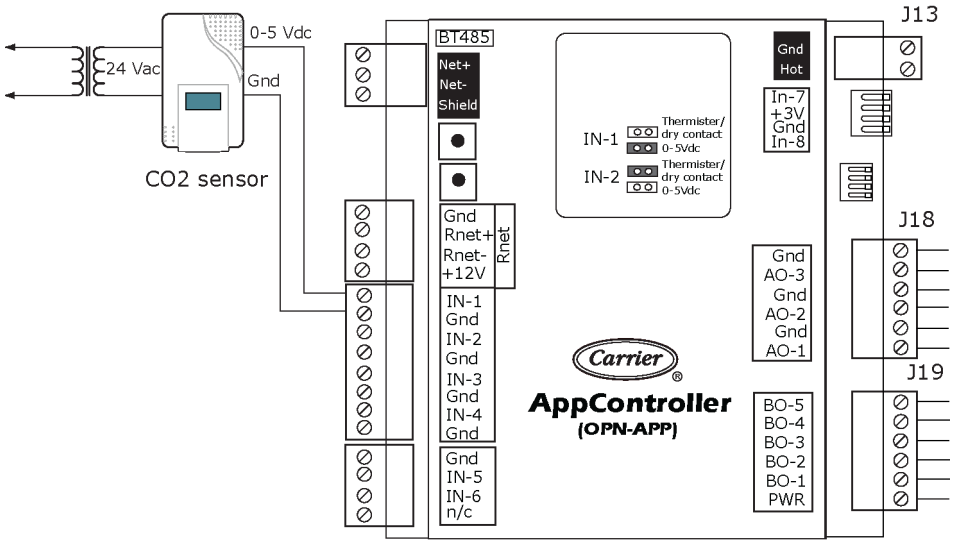
If the CO_2 is used, one of the optional SPT sensors must also be provided to sense the space temperature.

Wiring specifications

Cable from sensor to controller:	If <100 ft (30.5 meters) If >100 ft (30.5 meters)	22 AWG, unshielded 22 AWG, shielded
Maximum length:	500 feet (152 meters)	

To wire the CO2 sensor to the controller

1. Wire the sensor to the controller.
2. Verify IN-1 jumper is in the 0-5 Vdc position.
3. Install a field-supplied dedicated 24 Vac transformer or DC power supply.
4. Apply power and verify sensor readings.



Wiring a dry isolated contact

Isolated dry contact inputs are provided for an occupancy contact and also for a freezestat or LLT.

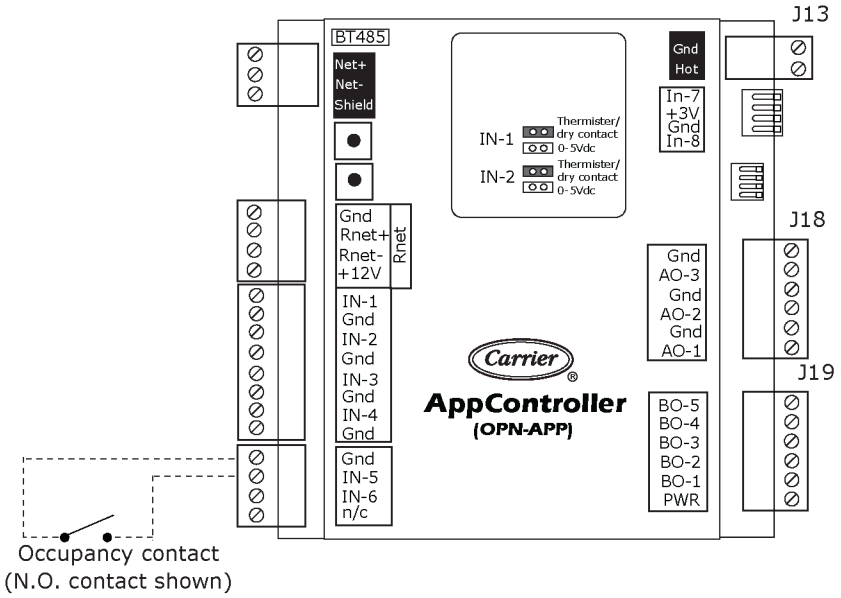
The occupancy contact input is used to monitor the status of a contact originating from a motion detector or other occupancy sensing device and is used to determine the occupancy status of the controller. The normal (unoccupied) state of the contact is configurable and may be either normally open or normally closed.

The freezestat monitors the temperature of the air within the unit and provides a contact closure if a potential coil freeze condition exists. The normal state of the contact is configurable and may be either normally open or normally closed.

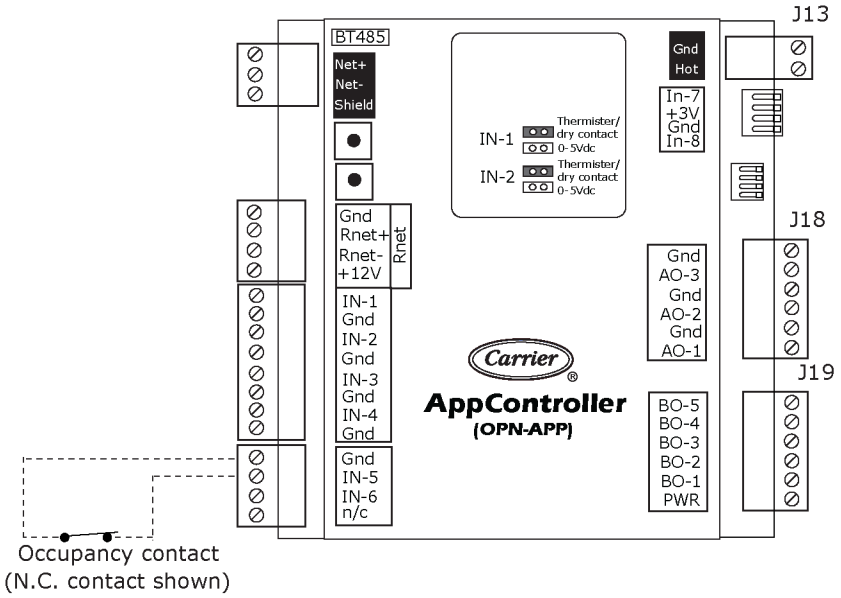
Wiring specifications

Cable from sensor to controller:	If <100 ft (30.5 meters) If >100 ft (30.5 meters)	22 AWG, unshielded 22 AWG, shielded
Maximum length:	500 feet (152 meters)	

To wire a remote occupancy sensor



To wire a low limit thermostat



Wiring equipment to outputs

Use the following wiring diagrams to wire equipment to the controller's outputs:

Wiring specifications

To size output wiring, consider the following:

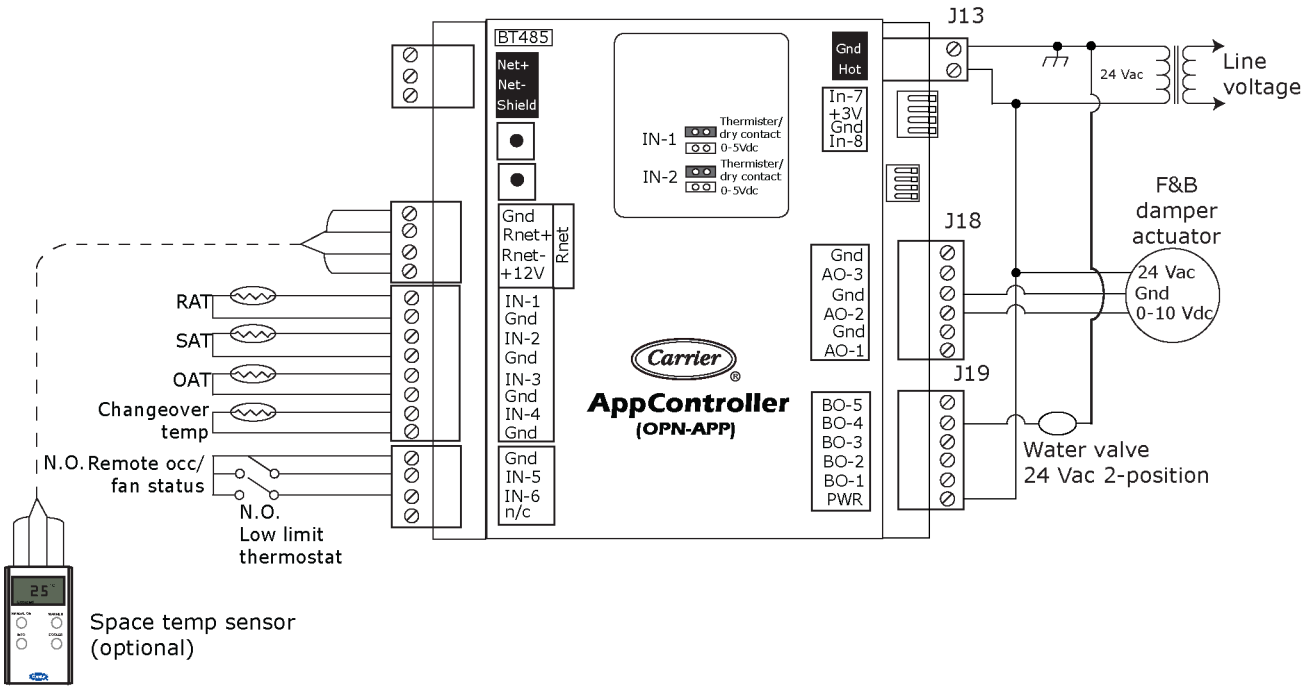
- Total loop distance from the power supply to the controller, and then to the controlled device

  NOTE Include the total distance of actual wire. For 2-conductor wires, this is twice the cable length.
- Acceptable voltage drop in the wire from the controller to the controlled device
- Resistance (Ohms) of the chosen wire gauge
- Maximum current (Amps) the controlled device requires to operate

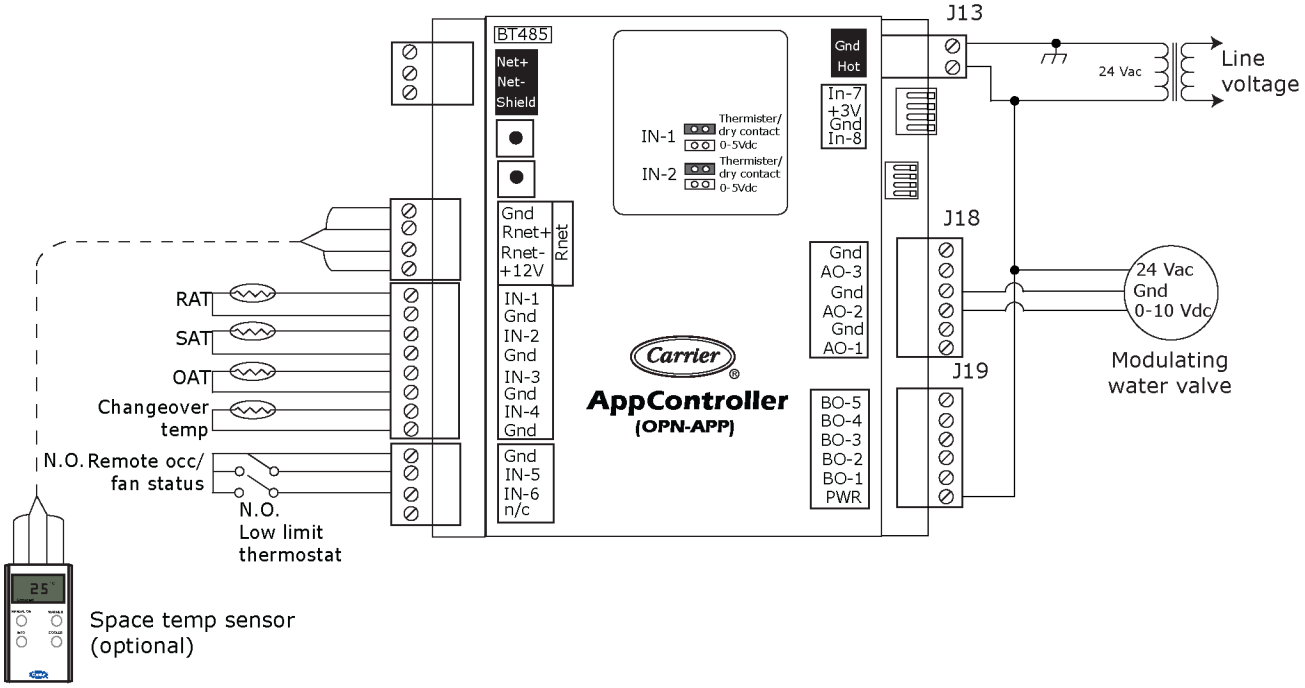
Wiring diagram legend

CCV	=	Cooling coil valve
CHGOVR	=	Changeover temp
DX relay	=	Direct expansion cooling relay
EH relay	=	Electric heat relay
FS	=	Fan Status
Gnd	=	Ground
Hot	=	24 Vac ungrounded power
LLT	=	Low Limit Thermostat (Freezestat)
MAD	=	Mixed air damper
OAT	=	Outdoor air temperature
REMOTE	=	Remote occupancy sensor
RH/CO2	=	Relative humidity sensor/CO_2 sensor
SAT	=	Supply air temperature sensor
SPT	=	Space temperature sensor
RAT	=	Return air temperature
RMT/FS	=	Remote occupancy/Fan status
T55	=	Alternate space temperature sensor
VLV/F&B	=	2-pipe valve/Heating coil valve/F&B damper
n/c	=	No connection
N.C.	=	Normally closed
N.O.	=	Normally open

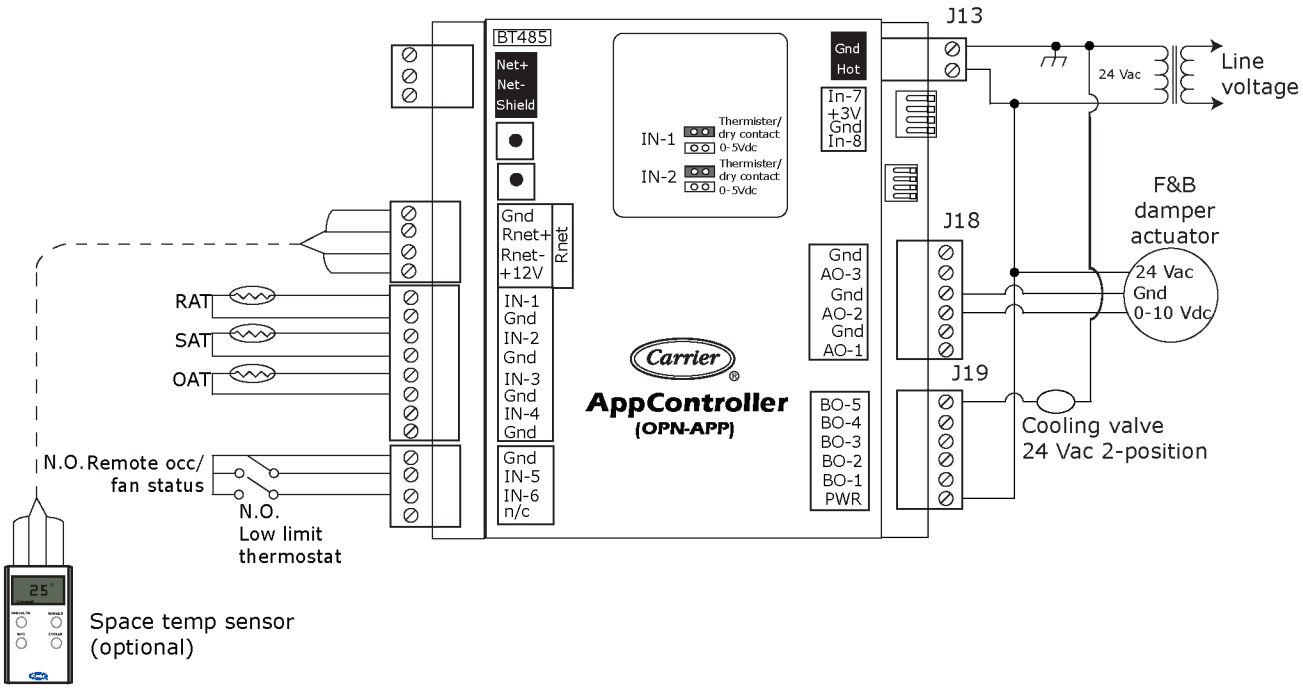
Heating/Cooling: 2-pipe changeover/F&B damper control



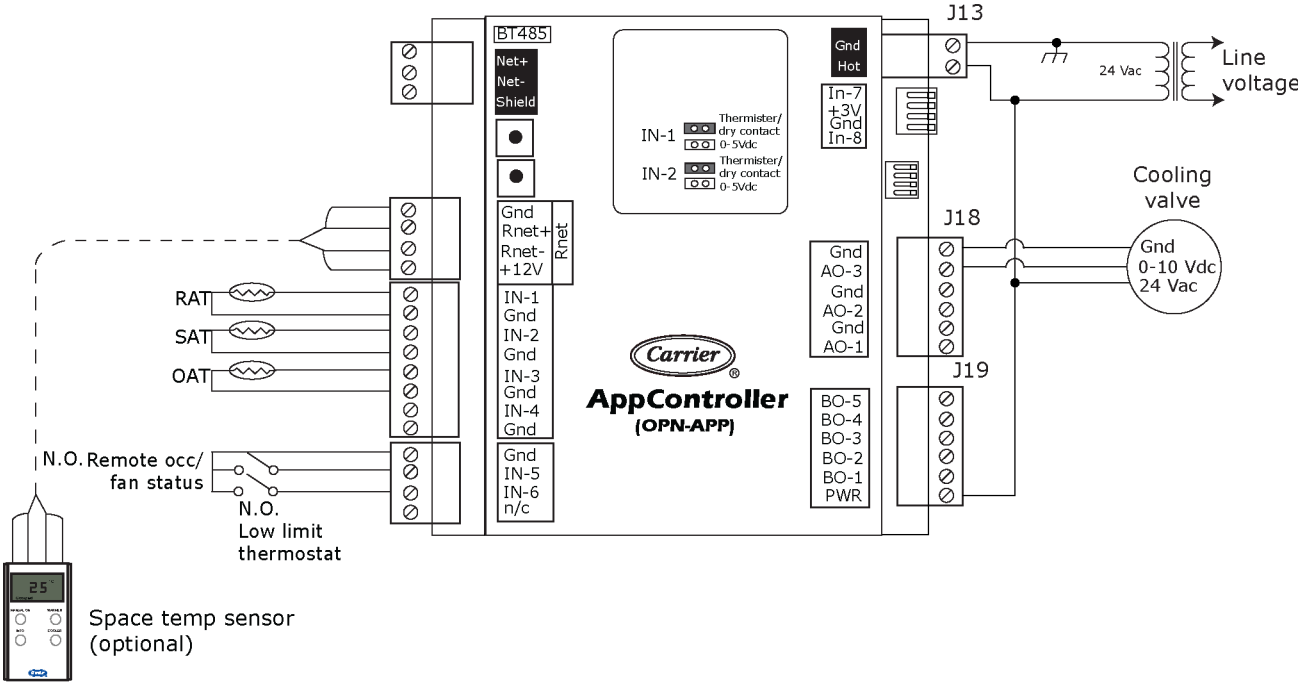
Heating/Cooling: 2-pipe changeover/Modulating water valve



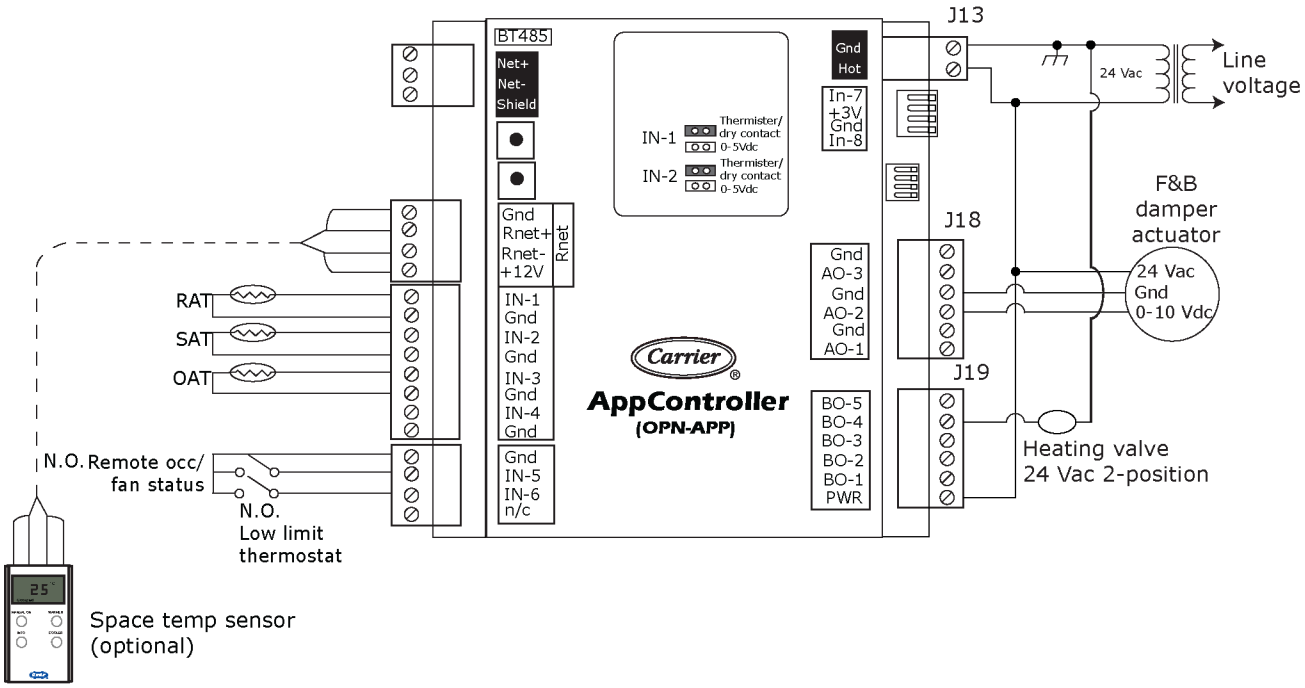
Cooling only: F&B damper control



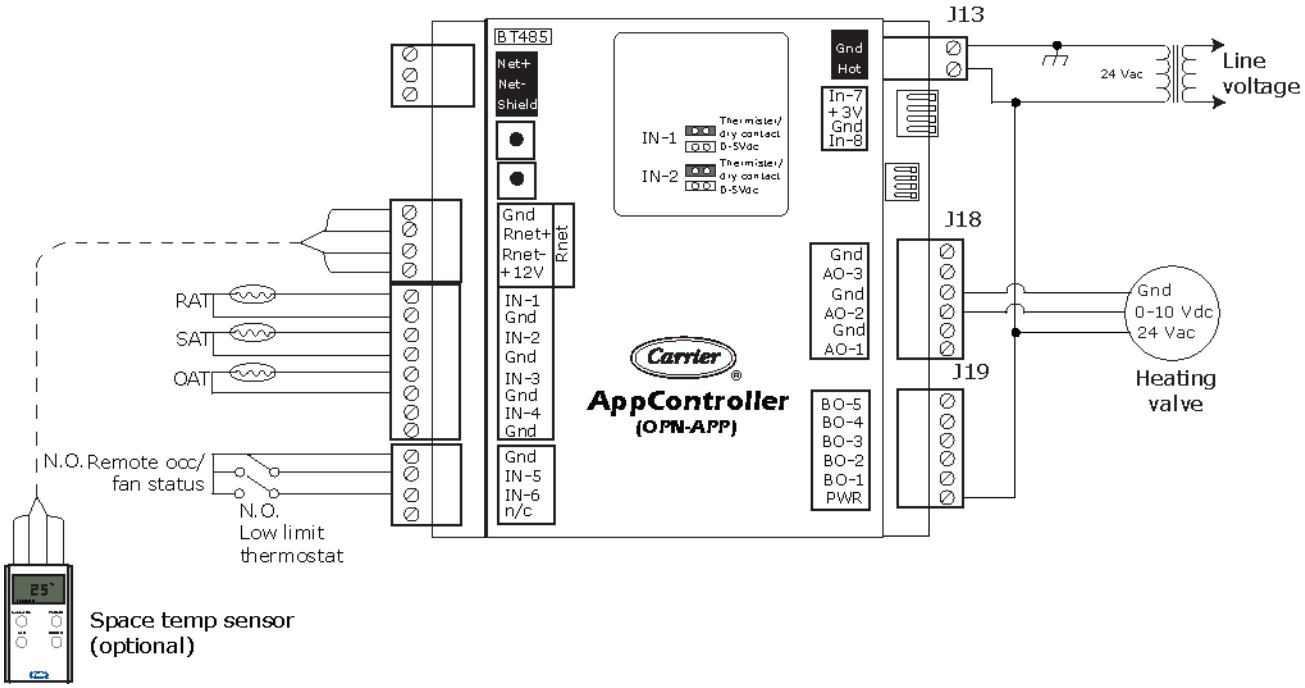
Cooling only: Modulating valve



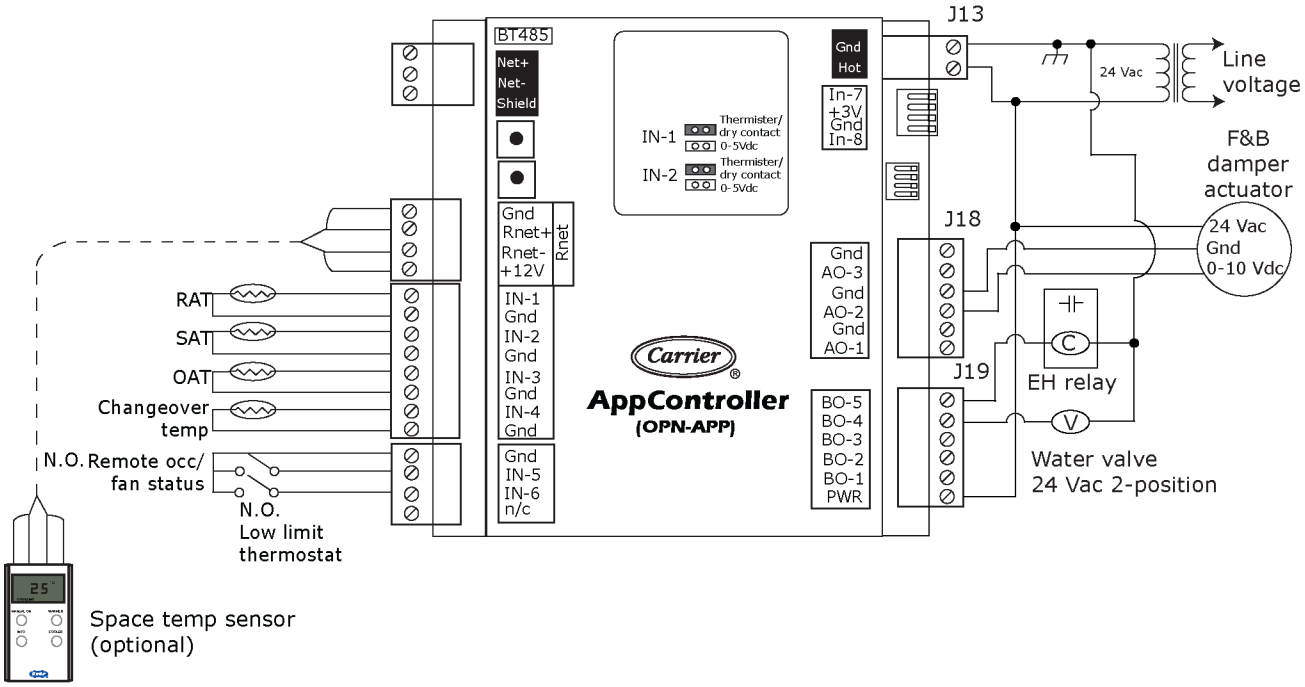
Heating only: F&B damper control



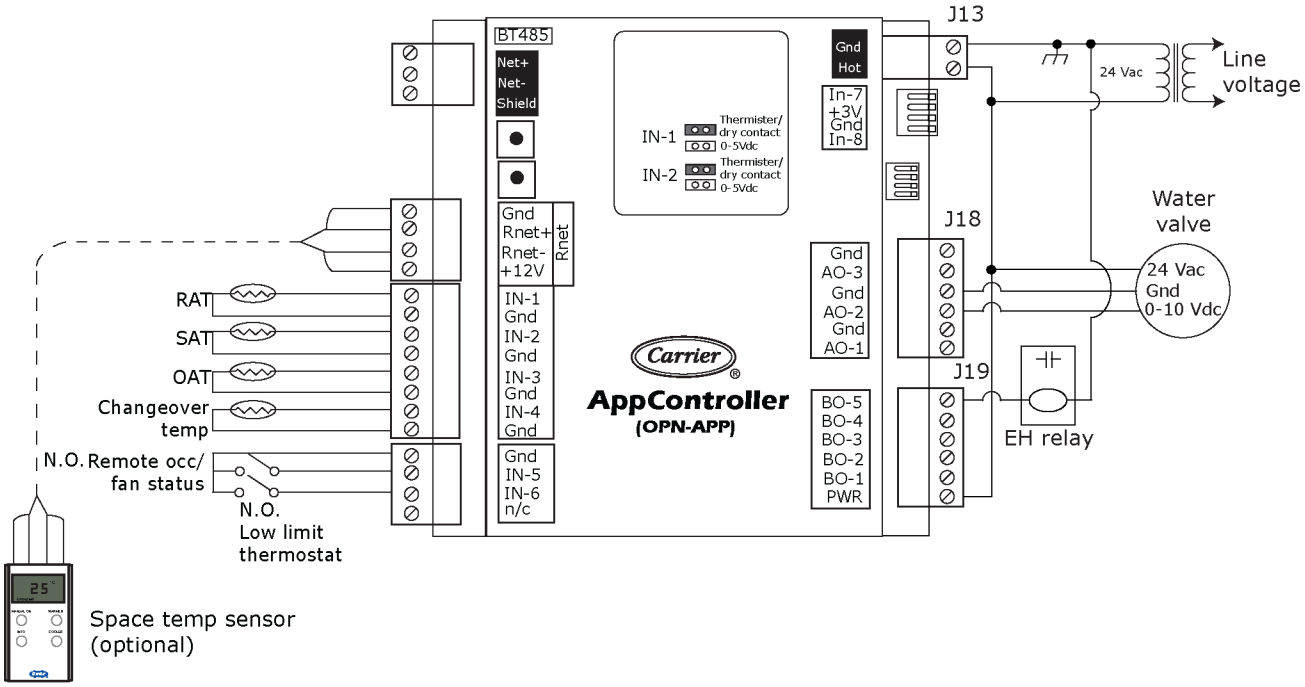
Heating only: Modulating valve



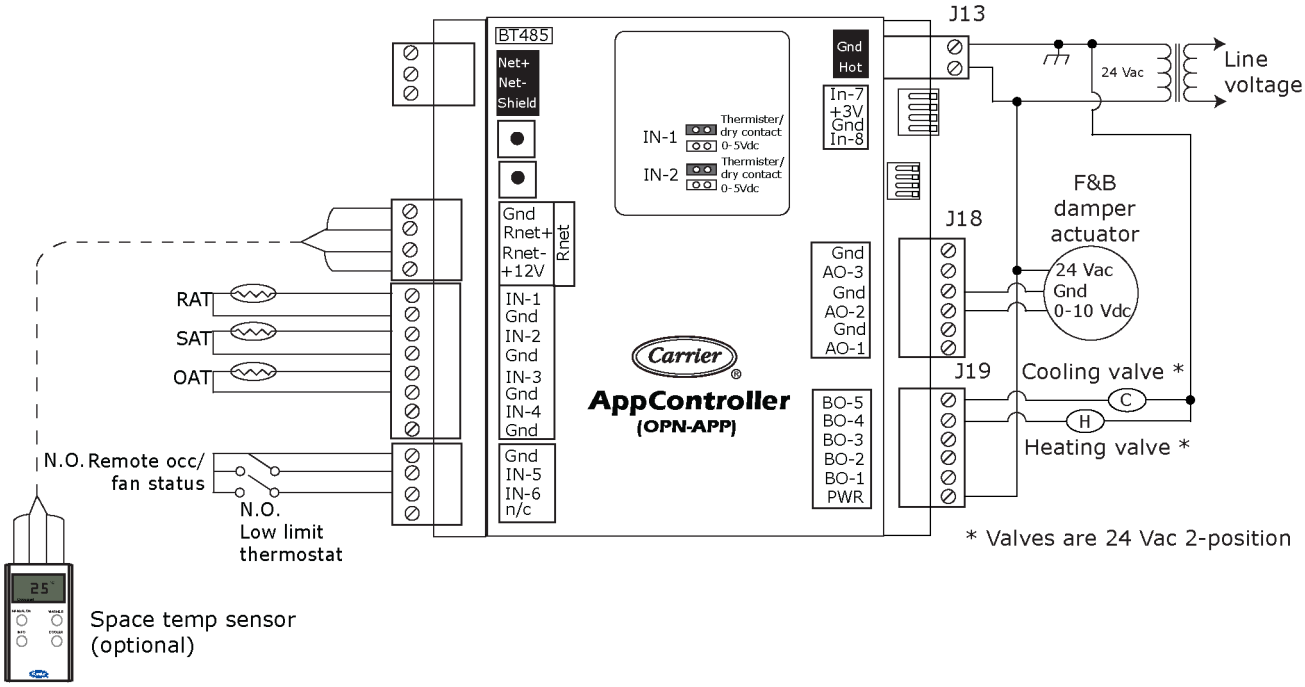
Heating/Cooling: 2-pipe changeover with auxiliary electric heat (F&B damper control)



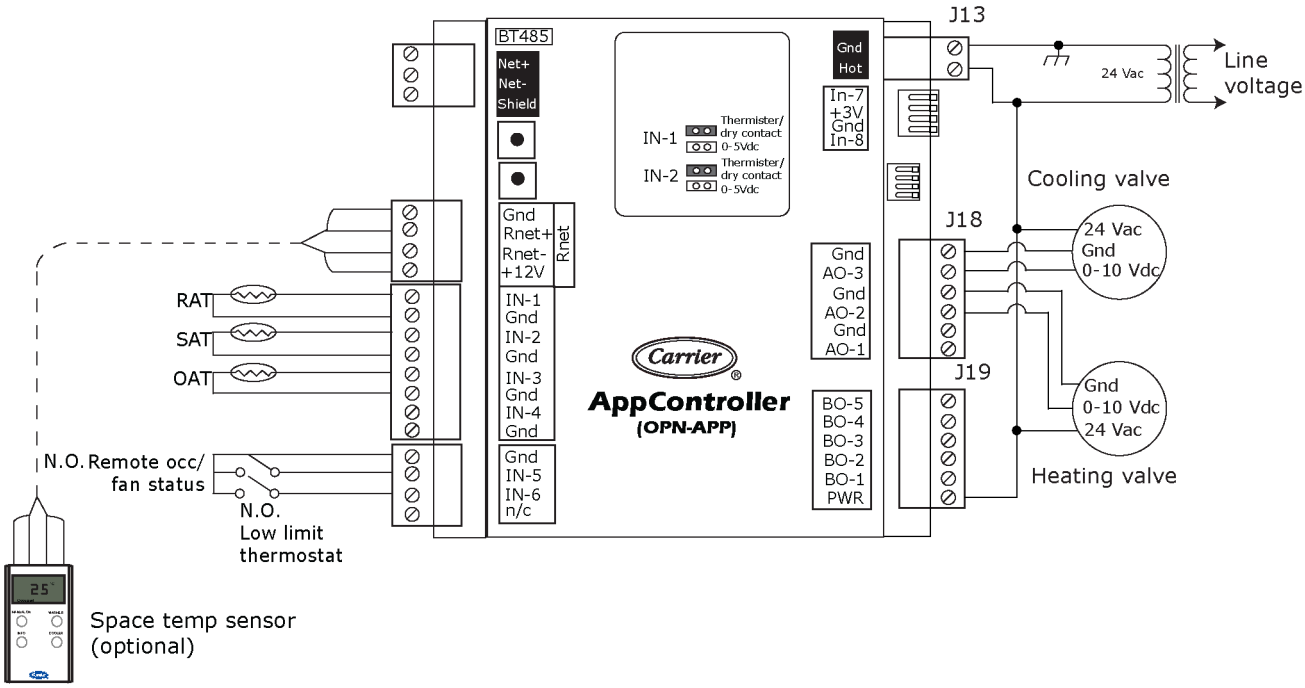
Heating/Cooling: 2-pipe changeover with auxiliary electric heat (Modulating valve)



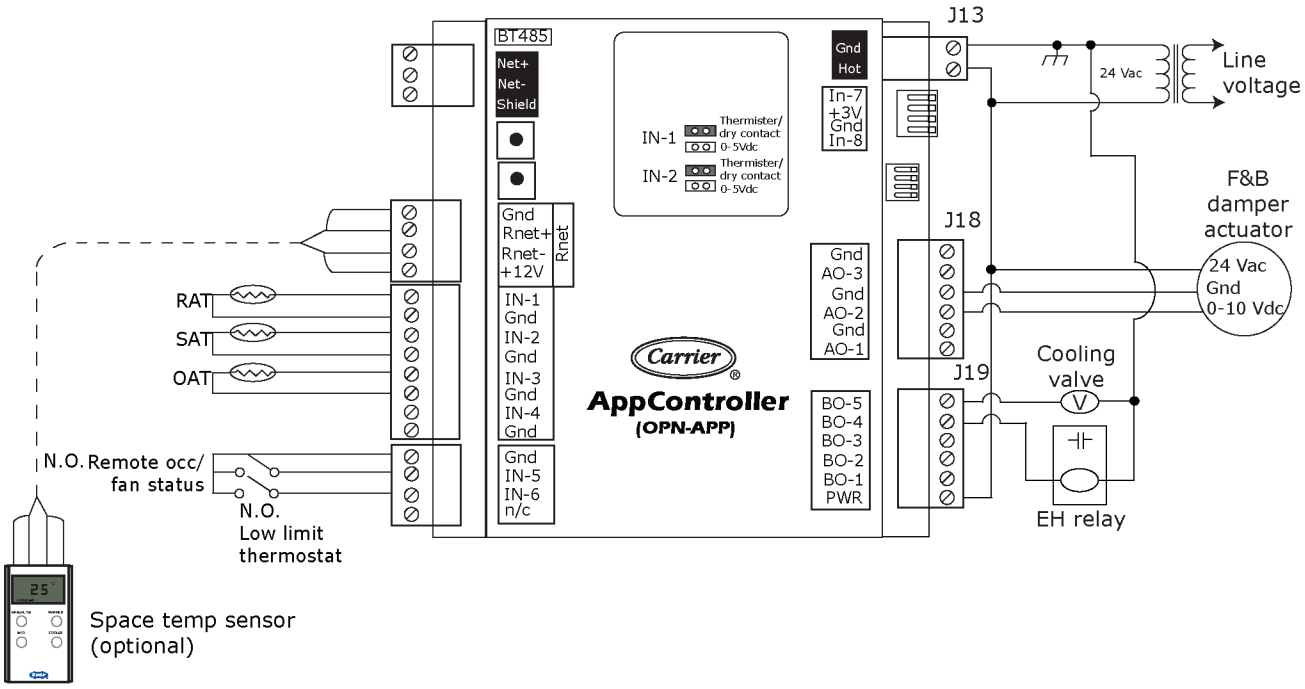
Heating/Cooling: 4-pipe/F&B damper control



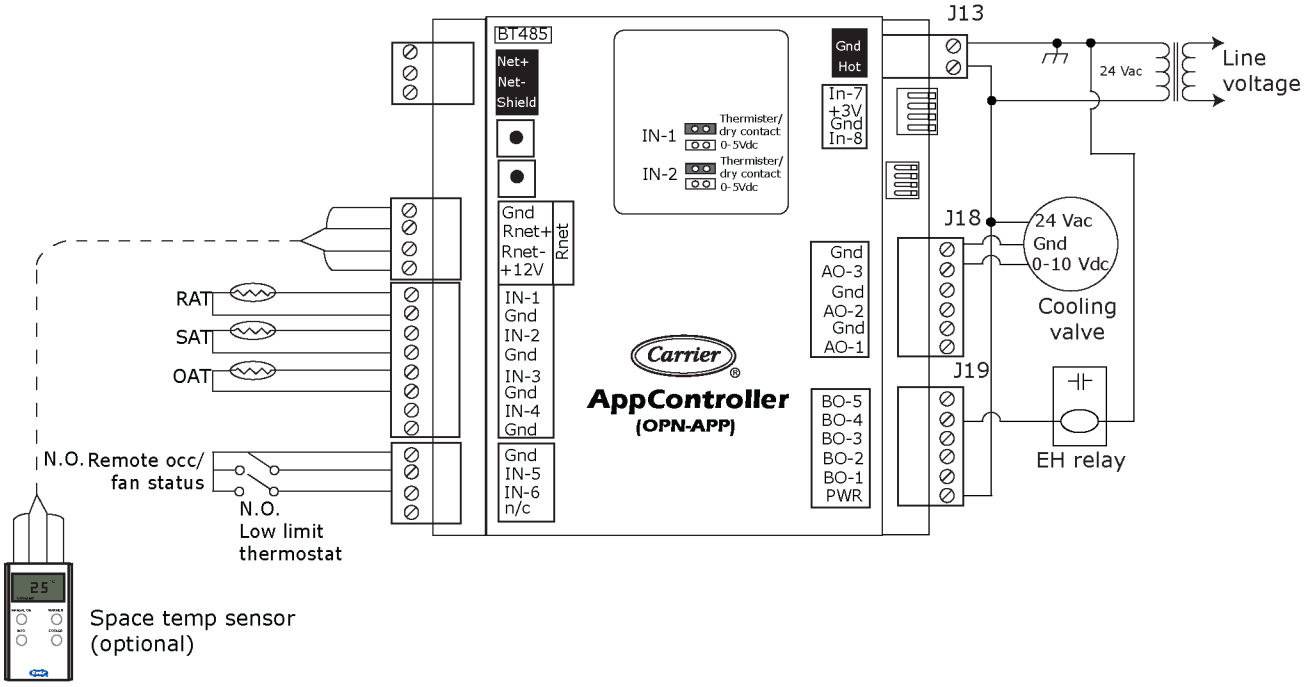
Heating/Cooling: 4-pipe/Modulating valve



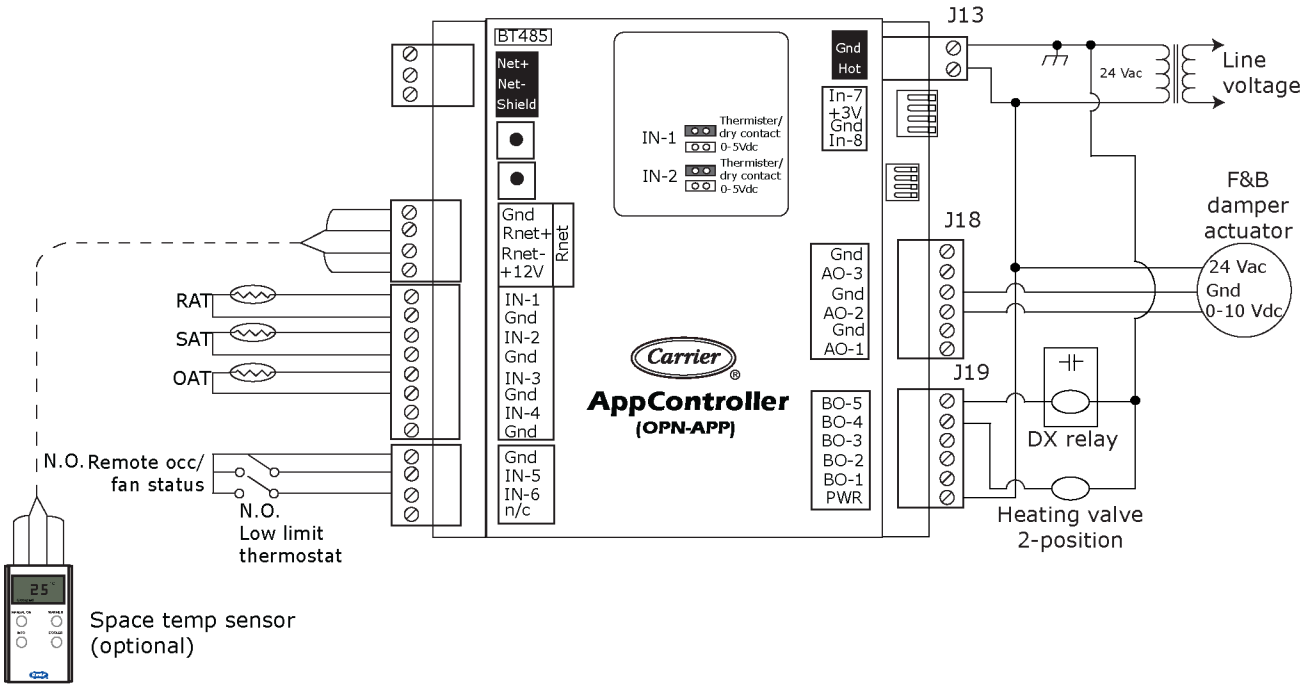
Heating/Cooling: 2-pipe/F&B damper control cooling with total electric heat



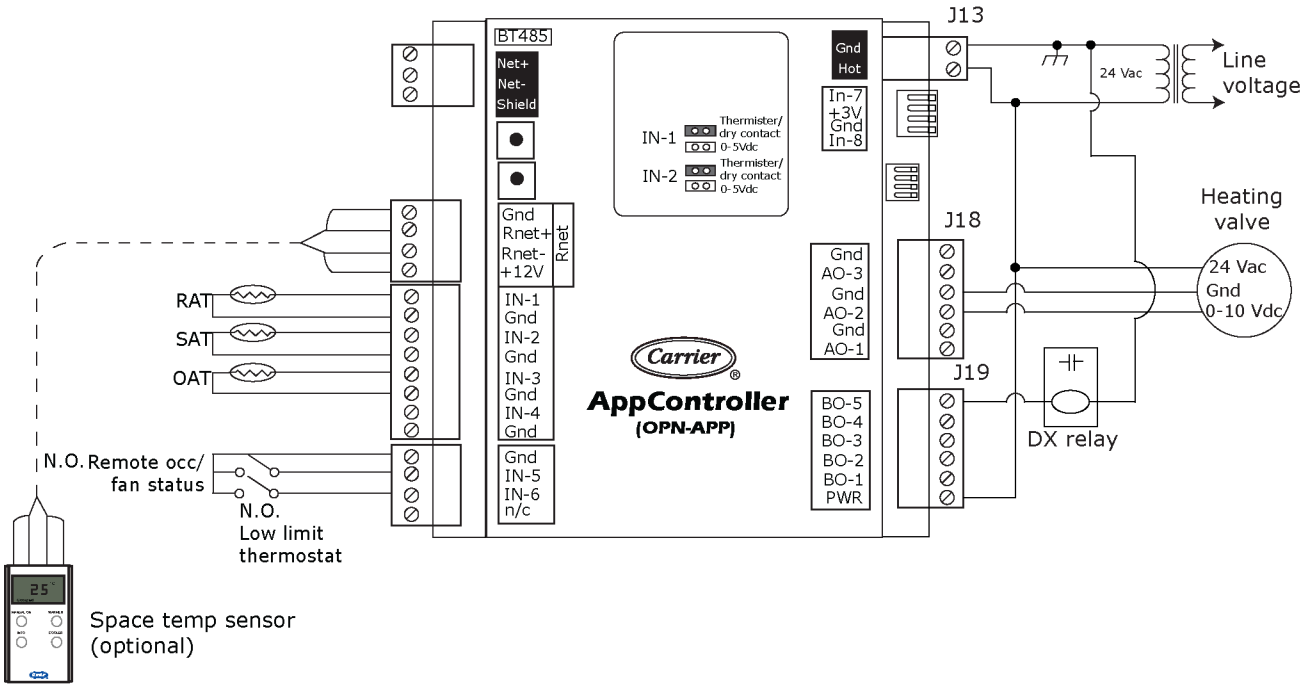
Heating/Cooling: 2-pipe/Modulating valve cooling with total electric heat



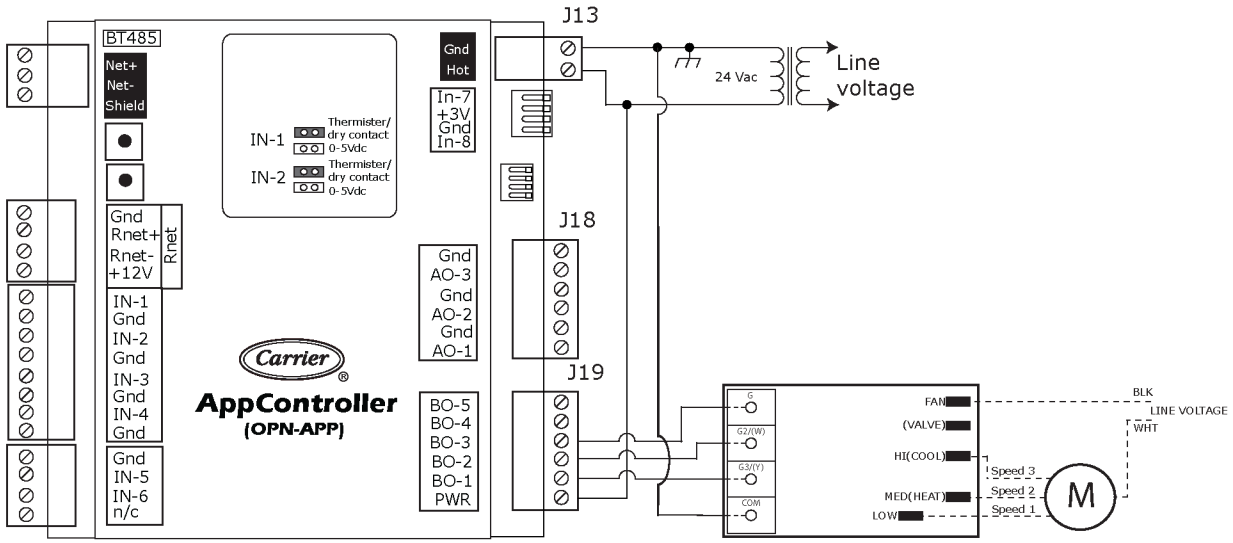
Heating/Cooling: 2-pipe/F&B damper control heating with DX cooling



Heating/Cooling: 2-pipe/Modulating valve heating with DX cooling

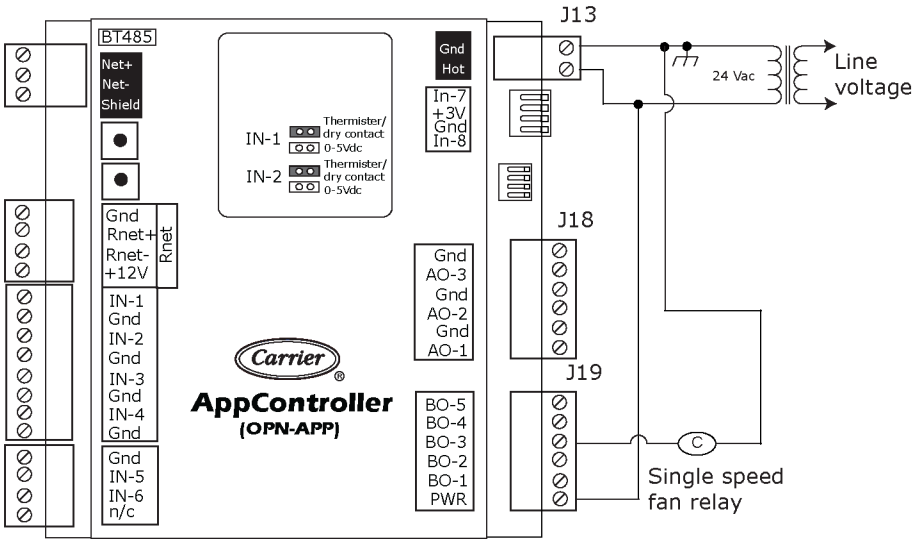


Motor wiring for unit ventilator relay board



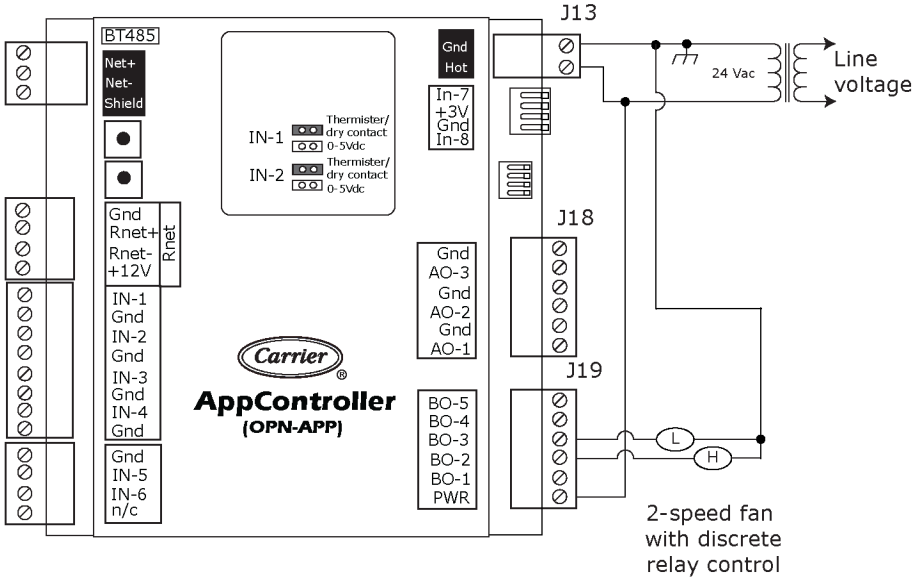
NOTE Configure **Fan (G) Output Type** = **Fan On**.

Motor wiring for single speed field-supplied relay



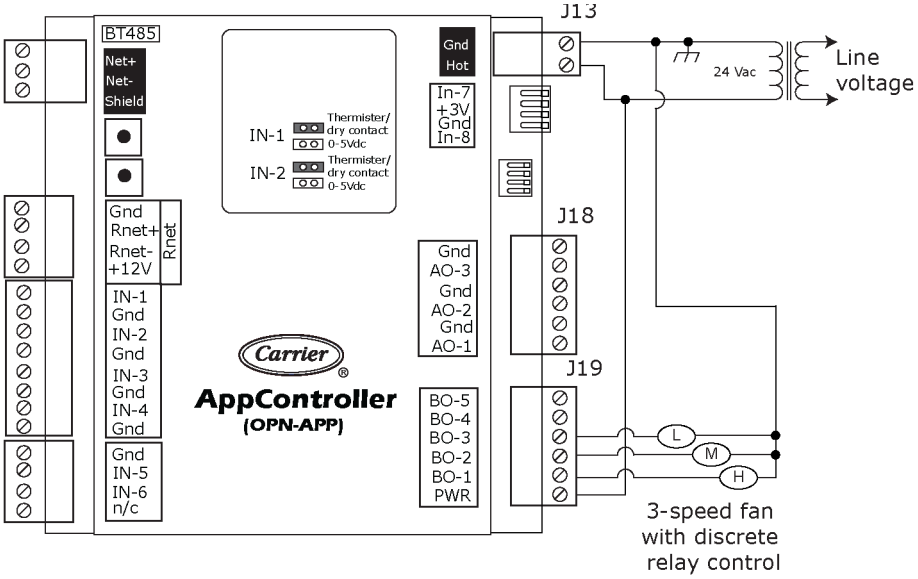
NOTE Configure **Fan (G) Output Type** = **Fan Low**.

Motor wiring for 2-speed field-supplied relay



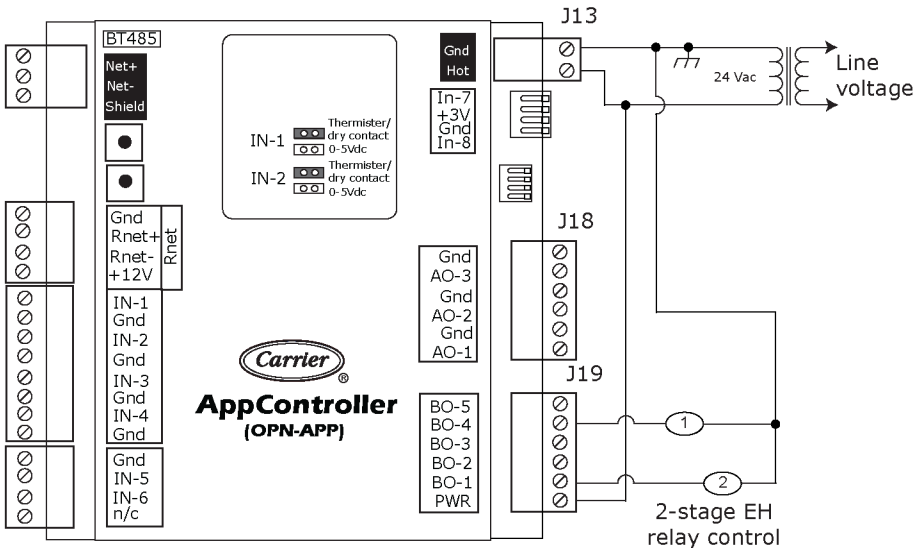
NOTE Configure **Fan (G) Output Type** = **Fan Low**

Motor wiring for 3-speed field-supplied relay



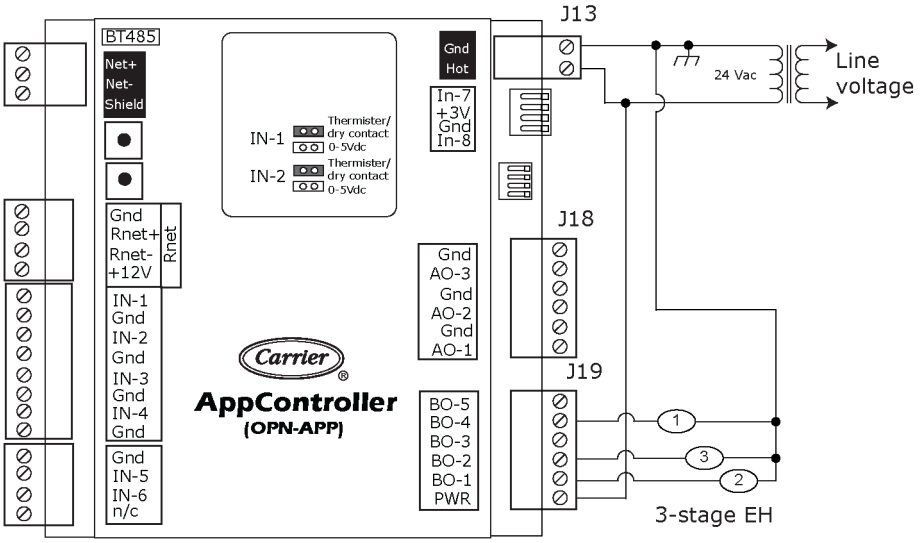
NOTE Configure **Fan (G) Output Type** = **Fan Low**

Wiring for 2-stage electric heat



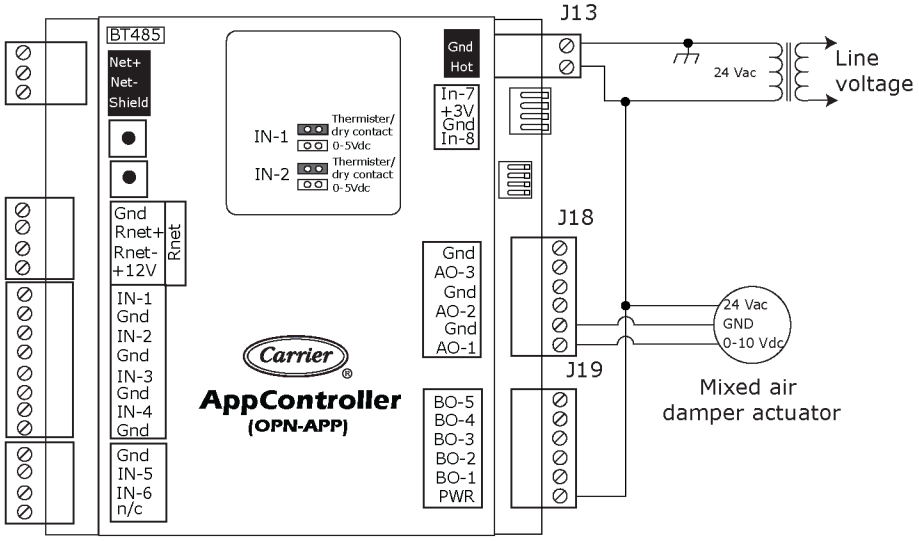
NOTE Only two fan speed are available when 2 EH stages are used. Configure **# of Fan Speeds** = **One** or **Two**.

Wiring for 3-stage electric heat



NOTE Only a single fan speed (on/off) is available when 3 EH stages are used. Configure **# of Fan Speed** = **One**. Refer to Motor Wiring for single speed field-supplied relay for wiring details.

Mixed Air Damper: 2-position or Modulating



Start-up

Use one of the following interfaces to start up, access information, read sensor values, and test the controller.

This interface...	Provides a...
Field Assistant application - Runs on a laptop that connects to controller's Local Access port [1]	Temporary interface
Equipment Touch device - Connects to controller's Rnet port [2]	Temporary or permanent interface
i-Vu® application Available for BACnet systems only	Permanent interface
System Touch device Available only for BACnet MS/TP systems. Wire to a BACnet MS/TP network connector and a 24 Vac power supply [3]	Temporary or permanent interface

[1] Requires a USB Link (Part #USB-L).

[2] See the *Equipment Touch Installation and Setup Guide* for detailed instructions.

[3] See the *System Touch Installation and Setup Guide* for detailed instructions.

CAUTION If multiple controllers share power but polarity was not maintained when they were wired, the difference between the controller's ground and the computer's AC power ground could damage the USB Link and the controller. If you are not sure of the wiring polarity, use a USB isolator between the computer and the USB Link. Purchase a USB isolator online from a third-party manufacturer.

Select or create a custom control program and graphic

The field-installed AppController does not come from the factory with a control program or graphic. You must load a control program and graphic as part of the installation/commissioning of the AppController. You can select a control program and graphic from EquipmentBuilder that has all the configurations that are currently available on a factory-installed Unit Vent for AppController.

After creating your control program, save and download it to the AppController. If desired, create a custom graphic using ViewBuilder. See *ViewBuilder Help* for details.

NOTE Third party integration information for current Carrier PIC products, whether on a factory-installed controller or selected from EquipmentBuilder, can be found on the *Carrier Control Systems Support Site http://www.hvacpartners.com/* under **Support Center** > **Controls Support** > **Controls Product Information**.

Service Test

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Configuration** > **Service Configuration** > **Service Test**

You can use **Service Test** to verify proper operation of cooling, heating, the fan, and the mixed air damper. We highly recommended using **Service Test** at initial system start-up and during troubleshooting. See Appendix C: Points/Properties for more information.

Service Test differs from normal operation as follows:

- Outdoor air temperature limits for cooling and heating are ignored.
- Normal fan delays (delay on) and minimum/maximum run times are ignored. A 15-second delay for electric heat allows the fan to start operating.
- Supply air temperature limits are ignored.
- Alarm statuses are ignored, but all alarms and alerts are still broadcast on the network, if applicable.

You can turn **Service Test** on or off from an Equipment Touch device, Field Assistant, or the i-Vu® application. Select **Default Value** of **Enable** to turn on and **Disable** to turn off. Service Test automatically disables after 1 hour.

NOTES

- **Service Test** allows testing of each controller function.
- We recommend you return every individual **Service Test** variable (**Fan Test**, **Heating Test**, etc.) to **Disable** or **0.00** after testing each function.
- All outputs return to normal operation when **Service Test** is set to **Disable**.

Service Test functions

Service Test enables the test mode and stops the normal operation of the unit. Set **Service Test** to **Enable** before any other test can be performed.

- **Sensor Status Test** - If **Bypass Sensor Test** is set to **No**, this test verifies that the SAT, RAT, and OAT sensors are all properly connected to the controller and are displaying the same temperature +/- 5° F. If this test fails, the fan test below cannot be performed until the problem sensor is corrected. (This is a factory test that SHOULD NOT be performed on an installed unit.)
- **Fan Test** tests the fan operation. The fan test is automatic. Set **Fan Test** to **Enable** to run the fan at the lowest available speed, depending on your configured fan speed. The fan operates at that speed for approximately 60 seconds and then automatically increments to the next higher speed. The process repeats until it reaches the highest speed.
- **Fan Speed** displays the actual operating speed of the fan during the test.
- **Cooling Test** activates the unit's cooling. During cooling test, the appropriate cooling device is activated. If DX cooling is configured, the supply fan output is activated and deactivated in conjunction with this test. (For 2-pipe/electric heat, the water valve output is tested during this test.)
- **Heating Test** activates the unit's heating. During the heating test, the appropriate heating device is activated. If **Electric Heat** is configured, the supply fan output activates and deactivates in conjunction with this test, and if equipped with a F&B damper, the electric heat test is delayed for 30 seconds while the F&B damper moves to the full-face position. (For 2-pipe/electric heat, the electric heat output is tested during this test).

- **Preload OA Damper** drives the mixed air damper actuator output to 7.5% open. The installer should secure the damper shaft to the actuator with the damper in the fully closed position at this time. This provides sufficient preload on the damper seal to insure it fully closes.
- **Open Vent Damper 100%** opens the mixed air damper to the 100% outdoor air. The output increases slowly to drive the damper to the fully open position.

Return all individual variables to **Disable**. Set **Service Test** to **Disable** or cycle power to the controller to return to normal operation.

Configure the Unit Vent for AppController's properties

You must configure certain points and properties. Appendix C is a complete list of all the points and properties, with descriptions, defaults, and ranges. These properties affect the unit operation and/or control. Review and understand the meaning and purpose of each property before changing it.

To start up the controller, configure your necessary points/properties in the following:

- *Unit Configuration* (page 48)
- *Setpoints* (page 81)
- *Service Configuration* (page 53)

Examples of some settings that you need to configure for start-up are the **Occupied** and **Unoccupied Heating** and **Cooling** setpoints, found in the **Setpoints** section of Appendix C.

Sequence of Operation

The Unit Vent for AppController controls mechanical cooling and heating based on its own space temperature input and setpoints. An optional CO_2 (Indoor Air Quality) sensor mounted in the space maximizes occupant comfort when used with the **Modulating Mixed Air Damper** option.

See *Scheduling* (page 38) for occupancy types.

The following sections describe the functionality of the Unit Vent for AppController. All points in this sequence of operation refer to the Equipment Touch, i-Vu®, or Field Assistant interface.

Scheduling

Scheduling

You must configure time periods to schedule the transitions from occupied to unoccupied operation. The time periods control the space temperature to occupied heating and cooling setpoints. The controller operates continuously in the **Occupied** mode until you either configure a **Time Schedule** or a third party control system **Enables/Disables** the **BAS On/Off** point. You must set the local time and date for these functions to operate properly.

The controller is defaulted to control to the occupied setpoints all the time, until either a **Time Schedule** is configured or a third party control system **Enables/Disables** the **BAS On/Off** point. The local time and date must be set for these functions to operate properly.

The occupancy source can be changed to one of the following:

- **Occupancy Schedules**

  The controller is occupied 24/7 until you configure a time schedule using the Equipment Touch, Field Assistant, or the i-Vu® application, or until a third party control system **Enables/Disables** the **BAS On/Off** point. You can disable this by going to **Configuration** > **Unit Configuration** > **Occupancy Schedules** and changing the point from **Enable** to **Disable** and clicking **OK**.

  NOTE You must **Enable** this point in order for the Equipment Touch, Field Assistant, or the i-Vu® application to assign a time schedule to the controller.

- **Schedule**

  The unit operates according to the schedule configured and stored in the unit. The schedule is accessible in the Equipment Touch, Field Assistant, or the i-Vu® application. The daily schedule consists of a start and stop time (standard or 24 hour mode) and seven days of the week, starting with Monday and ending on Sunday.

- **Occupancy Input Contact** (optional)

  If configured for remote occupancy control, the controller uses an external dry contact closure to determine the occupancy status of the unit. Disable the **Occupancy Schedules** in order to use the occupancy contact input.

  NOTE Scheduling can only be controlled from one source.

- **BAS (Building Automation System) On/Off**

  For use with a Building Automation System that supports network scheduling, you must disable the **Occupancy Schedules** so the BAS can control the unit through a network communication and the BAS scheduling function.

  NOTE Scheduling can either be controlled from the unit or the BAS, but not both.

- **System Occupancy**

  Uses the network to obtain an occupancy status value from another controller, which is read over the network and used by this controller. **Occupancy Schedules** MUST be set to **Disable** to use this function.

  NOTE Scheduling can only be controlled from one source.

Supply fan

You can configure the indoor fan to operate in any 1 of 3 **Fan Modes**:

- **Auto** (default) - runs intermittently during both occupied and unoccupied periods
- **Continuous** - runs continuously during occupied periods and intermittently during unoccupied periods
- **Always on** - runs continuously regardless of occupancy

In the **Continuous** mode, the fan is turned on when one of the following is true:

- It is in occupied mode, as determined by its occupancy status
- There is a demand for cooling or heating in the unoccupied mode
- There is a call for ventilation (IAQ override - optional)

When power is reapplied after a power outage, or when transitioning from unoccupied to occupied, you can configure a delay of 5 - 600 (default 60) seconds before starting the fan. Configure as follows:

- **Fan On Delay** defines the delay time (0 - 30 seconds, default 30) before the fan begins to operate after heating or cooling is started and is automatically overridden if electric heat or DX cooling are active.
- **Fan Off Delay** defines the delay time (0 - 180 seconds, default 120) the fan continues to operate after heating or cooling stops.

The fan runs as long as cooling, heating, economizer operation, or DCV is active. If the space temperature failure alarm, condensate overflow alarm, or the test mode is active, the fan shuts down immediately, regardless of occupancy state or demand.

Automatic Fan Speed Control - The Unit Vent for AppController controls up to 3 fan speeds using a Fan Interface board or field-installed relays. The fan motor operates at the lowest speed possible to provide quiet and efficient fan operation with the best latent capability during cooling. The motor increases speed if additional cooling or heating (except for electric heating) is required to reach the desired space temperature setpoint. The motor's speed increases as the space temperature rises above the cooling setpoint or falls below the heating setpoint. The amount of space temperature increase above or below the setpoint that is required to increase the fan speed is configurable. Also, the fan speed increases as the **Supply Air Temperature** approaches the configured minimum or maximum SAT limits if DX cooling or electric heat is active.

Configuring Automatic Fan Speed setpoints – When configured for more than 1 speed, the fan speed selection is based on Space Temperature compared to the Effective Setpoints. For example, if configured for a 3-speed fan, the fan will go to Medium speed when the Space Temp exceeds the Cool 1/ Heat 1 level. The setpoint graph represents this as the yellow and light blue areas. The fan increases to High speed when the Space Temp exceeds Cool 2/ Heat 2 level. These are represented by the orange and dark blue areas. Speed is reduced when the Space Temp passes the same threshold, but includes a non-adjustable Hysteresis (differential) of 0.5Δ°F (.27Δ°C) for both heating and cooling modes. All color bands (yellow, orange, light blue and dark blue) MUST be set to more than 0.5Δ°F (.27Δ°C).

Manual Fan Speed Control - When you use the controller with the optional SPT sensor, the automatic fan speed operation may be overridden from the SPT sensor (if applicable). You can select any available motor speed or automatic operation.

Unoccupied Fan Cycling - When **Unoccupied Fan Cycling** is set to **Enable** (default), the controller operates the equipment's fan for 1 minute every hour during the unoccupied period. The fan operates at the lowest speed

Fan Speed Control - Electric Heat Override - When electric heat is required and active, the control continuously monitors the supply air temperature to verify it does not rise above the configured **Maximum Heating SAT Limit** [90°F (32.2°C) default]. As the SAT approaches the limit minus 10Δ°F (5.5Δ°C), the fan speed increases to ensure the SAT remains below the limit. This provides the most quiet and efficient operation by running the fan at the lowest speed possible.

Fan Speed Control - DX Cooling override - When DX (direct expansion) mechanical cooling is required and active, the control continuously monitors the supply air temperature to maintain the SAT at or above the configured **Minimum Cooling SAT Limit** [50°F (10°C) default] plus 5Δ°F (2.7Δ°C). When the SAT drops below this value, the fan speed increases to prevent the SAT from dropping further. The fan operates at the lowest speed to maximize latent capacity during cooling.

Fan Status (Option) - The optional input can be configured as either an occupancy input or a fan status input. If configured as fan status, the controller compares the status of the fan to the desired commanded state. When the fan is commanded to run (ON), the fan status is checked and verified to match the commanded state. If the fan status is not on, then a fan status alarm is generated after 1 minute and the equipment's MAD is disabled. If the equipment has hydronic heat configured, the heating algorithm maintains the desired fan off setpoint.

Cooling

The Unit Vent for AppController operates mechanical cooling (one stage of DX, a modulating chilled water valve or a F&B damper plus a 2-position water valve) to maintain the desired cooling setpoint. The cooling is controlled by the PI (Proportional-integral) cooling algorithm and integrated with the modulating mixed-air damper control. The required **Cooling Control Setpoint** is calculated by the controller and the cooling device is controlled to maintain the **Supply Air Temperature** at this setpoint. This setpoint is compared to the actual supply air temperature and determines valve or damper operation and staging control for DX.

The following conditions must be true in order for the cooling algorithm to run:

- **Cool Enable** is set to **Enable**
- Space temperature reading is valid
- Supply fan must not be in alarm
- For 2-pipe systems, the water temperature is suitable for cooling
- Heat mode is not active
- For DX, the 5 minute compressor time-guard timer has expired
- **Fire/Smoke Detector** (FSD) is **Normal**
- OAT > damper setpoint plus 3Δ°F (1.6Δ°C)/hr and damper output > 95% for 1 minute, or, OAT is NOT suitable for cooling, or, **Damper Type** is not **Modulating**.
- OAT is greater than the **Cooling Lockout Temperature**
- If occupied, the SPT is greater than the **Occupied Cooling** setpoint
- If unoccupied, the SPT is greater than the **Unoccupied Cooling** setpoint

If all the above conditions are met, cooling is energized as required, otherwise it is disabled. If cooling is active and the SAT approaches the minimum SAT limit, the cooling valve modulates closed. (For DX cooling, if the SAT drops below the configured minimum SAT value, the fan is indexed to a higher speed. If this is insufficient and if the SAT falls below the minimum limit minus 5Δ°F (2.7Δ°C), the DX cooling will be disabled.)

The configuration screens contain **Min Cooling SAT** and **Cooling Lockout** based on outdoor air temperature (OAT). Both can be adjusted to meet various specifications.

For DX cooling, after the compressor is staged off, it may be restarted again after the supply air temperature has increased above the minimum supply air temperature limit. There is a 5 minute minimum off-time for the compressor as well as a 2 minute minimum on-time to prevent oil migration.

Modulating Chilled Water - The control can operate a modulating (0-10 Vdc or 2-10 Vdc) type, NO or NC, chilled water valve connected to the cooling coil of the unit in order to maintain the desired cooling setpoint. The valve modulates to maintain the SAT at the calculated **Cooling Control Setpoint**. The control will also prevent the SAT from exceeding the **Minimum Cooling SAT** limit.

Face & Bypass Chilled Water - The control can operate a modulating (0-10 Vdc or 2-10 Vdc) type F&B damper and an optional 2-position NO or NC chilled water valve to maintain the desired cooling setpoint. The damper modulates to maintain the SAT at the calculated **Cooling Control Setpoint**. The valve opens when cooling is required (and the water is suitable if 2-pipe changeover). The control will prevent the SAT from exceeding the **Minimum Cooling SAT** limit.

Single Stage Direct Expansion (DX) - The control can operate a single stage of DX cooling in order to maintain the desired cooling setpoint. The DX stage is controlled to prevent the SAT from exceeding the **Minimum Cooling SAT** minus 5Δ°F (2.7Δ°C) and also subject to a 2 minute minimum on-time. The compressor output is not energized unless SAT > **Minimum Cooling SAT** limit plus 10Δ°F (5.5Δ°C). Once disabled, the compressor cannot be restarted for at least 5 minutes.

Heating

The Unit Vent for AppController operates mechanical heating (staged electric heat, a modulating hot water/steal valve, or a F&B damper plus a 2-position heating valve, or a combination) to maintain the desired heating setpoint. The heating is controlled by the PI (Proportional-integral) heating algorithm and the heating stage capacity algorithm for electric heat. The desired **Heating Control Setpoint** is calculated by the controller. This setpoint is compared to the actual supply air temperature and determines valve or damper operation and staging control for electric heat.

The following conditions must be true in order for the heating algorithm to run:

- **Heat Enable** is set to **Enable**
- Space temperature reading is valid
- **Supply Fan** must not be in alarm
- For 2-pipe systems, the water temperature is suitable for heating
- Cool mode is not active
- For electric heat, the minimum off timers have expired
- **Fire/Smoke Detector** (FSD) is **Normal**
- OAT is less than the heating lockout temperature
- If occupied, the SPT is less than the occupied heating setpoint
- If unoccupied, the SPT is less than the unoccupied heating setpoint

If all the above conditions are met, the heating outputs are energized as required, otherwise they are de-energized. If the heating is active and the SAT approaches the maximum SAT limit, the heating valve modulates closed, or the F&B damper moves to the coil bypass position. For electric heating, if the SAT rises above the configured Maximum SAT value minus 10Δ°F (5.5Δ°C), the fan is indexed to a higher speed. If this is insufficient and the SAT continues to approach the maximum limit, the EH heating stages are proportionally disabled. After the electric heater stage is turned off, it may be restarted again until after the supply air temperature falls below the maximum supply air temperature limit. There is a minimum off-time for the electric heater stage to protect against excessive cycling.

The configuration screens contain the **Max SAT** parameter as well as **Heating Lockout** based on outdoor air temperature (OAT). Both can be adjusted to meet various specifications.

Modulating Hot Water/Steam Heating - The control can operate a modulating (0-10 Vdc or 2-10 Vdc) type, NO or NC, hot water or steam valve, connected to the heating coil of the unit and supplied by a boiler in order to maintain the desired heating setpoint. The valve is controlled to maintain the **Heating Control Setpoint** during heating and will not exceed the **Maximum Heating SAT** limit. If the fan is off or a fan failure alarm occurs, the valve modulates to maintain the **Supply Air Temperature** at the configured **Fan Off Value**.

Face & Bypass Hot Water/Steam - The control can operate a modulating (0-10 Vdc or 2-10 Vdc) type F&B damper and an optional 2-position NO or NC heating valve in order to maintain the desired heating setpoint. The damper modulates to maintain the SAT at the calculated **Heating Control Setpoint**. The valve opens when heating is required (and the water is suitable if 2-pipe changeover). The control will prevent the SAT from exceeding the **Maximum Heating SAT** limit.

Electric Heat - The control can operate up to 3 stages (1 stage default) of electric heat in order to maintain the desired heating setpoint. The heat stages are controlled to maintain the **Heating Control Setpoint** during heating and will not exceed the **Maximum Heating SAT**. **Stage** cycling is subject to a 2 minute minimum off-time to prevent excessive cycling (30 seconds for stage #1). The number of electric heat stages is limited so that the total number of combined fan speeds and electric heat stages equal 4.

Combination Heating - The control can operate the modulating hot water heat or the Face & Bypass Hot Water heat (with a suitable 2-position valve plus electric heat) in order to maintain the desired heating setpoint. The non-electric heat is used to meet the heating requirements in the space when the changeover mode is heat. The electric heater is used when the changeover mode is cool. If the fan is off and the changeover mode is heat, the non-electric heat is controlled to maintain the **Supply Air Temperature** at the configured **Fan Off Value**.

Mixed air damper (Modulating)

The Unit Vent for AppController operates a mixed air damper to maintain the desired cooling setpoint without mechanical cooling, while also providing the required ventilation. The modulating mixed air damper is controlled by the PI (Proportional-integral) cooling algorithm and integrated with mechanical cooling while also maintaining a minimum OA intake if the optional CO_2 sensor is available. See *Indoor Air Quality* (page 44) for additional information.

The desired **Damper Setpoint** is calculated by the controller when cooling is required. The **Damper Setpoint Override Value** provides the capability to maintain a user-defined fixed supply air temperature when cooling is required and available. It will override the PI temperature control algorithm when the **Damper Setpoint Override Value** is not equal to 0 (and must be greater than 45°F (7.2°C). The **Damper Setpoint** is compared to the actual supply air temperature and used to determine the **Mixed Air Damper** position.

The following conditions must be true in order for the modulating damper (economizer) algorithm to run:

- **Damper Type** is Modulating
- Space temperature reading is valid
- **Supply Fan** must be on and not in Alarm
- OAT is valid
- Heat mode is not active
- **Fire/Smoke Detector** (FSD) is **Normal**
- OAT is less than **Damper Lockout Temperature** limit
- OAT is less than RAT/SPT sensor
- If occupied, the SPT is greater than the **Occupied Cooling** setpoint
- If unoccupied, the SPT is greater than the **Unoccupied Cooling** setpoint

If all the above conditions are met, the mixed air damper will operate as an economizer as required, otherwise it will be disabled and maintain either a closed or minimum damper position.

The configuration screens contain the **Min Cooling SAT** and **Damper Lockout** parameter based on outdoor air temperature (OAT). Both can be adjusted to meet various specifications.

Mixed air damper (2-position)

The control can operate a 2-position (0-10 Vdc or 2-10 Vdc) type minimum outdoor air damper to maintain the desired ventilation during occupied periods. The damper output provides a 10 Vdc signal when the control is occupied or in an occupancy override mode. When the control is unoccupied or the fan is off, the damper output will go to 0 Vdc. To control the maximum amount of outdoor air entering the unit, a mechanical actuator stop must be set.

The following conditions must be true in order for the 2-position damper algorithm to run:

- **Damper Type** is **2-Pos**
- **Supply Fan** must be on and not in alarm
- The unit is in an occupied mode

Changeover mode detection

The Unit Vent for AppController determines the changeover mode for 2-pipe heating/cooling systems. The controller monitors a local changeover thermistor sensor or switch, dependent upon the configuration. For thermistor applications, the heat or cool mode is determined by user-configurable temperature setpoints. When the sensed temperature exceeds the **Changeover Heat Limit**, the system changeover mode is set to heat. When the sensed temperature falls below the **Changeover Cool Limit**, the system changeover mode is set to cool. For applications using a switch, the heat mode is determined when the input is open, while a closed switch indicates cool mode.

Additionally, an Analog Network Input point and a BACnet Analog Value input variable are also provided to allow a network-supplied analog value of the system water temperature to be used to determine the changeover mode. The Analog Network Input point has the highest priority, followed by the BACnet AV point, then the local input if multiple inputs are supplied simultaneously.

Indoor Air Quality

If used with a modulating-type mixed air damper, the controller can provide **Demand Controlled Ventilation** (DCV) to properly ventilate an occupied space. To meet ventilation requirement, the fan must be configured for the **Continuous** or **Always On** mode of operation.

Demand Control Ventilation (DCV) - If the optional CO_2 sensor (or a CO_2 sensor value) is available and a modulating mixed air damper is installed, the controller will increase the minimum damper opening to outdoor air as required by the CO_2 levels within the occupied space. The control provides DCV during occupied periods. The control monitors the CO_2 level and compares it to the configured setpoints and adjusts the minimum damper position as required. The control provides proportional ventilation to meet the requirements of ASHRAE specifications by providing a base ventilation rate and then increasing the rate as the CO_2 level increases. The control begins to proportionally increase ventilation when the CO_2 level rises above the start ventilation setpoint and reaches the full ventilation rate when the CO_2 level is at or above the maximum setpoint.

The configurable **Minimum Damper Pos** insures that proper base ventilation is delivered when occupants are not present. The **DCV Max Vent Damper Pos** (default 60%) limits the maximum amount of outdoor air. An automatic minimum mixed air temperature override control prevents unacceptable mixed air temperatures when the outdoor air is extremely cold. It proportionally resets the maximum amount of outdoor air used for DCV from the configured

DCV Max Vent Damper Pos as the OA drops below the **Minimum Cooling SAT** limit and ends at the **Minimum Damper Pos** when the OAT reaches 10°F (-12.2°C).

If this additional outdoor air being introduced for ventilation causes an unacceptable drop in the supply air temperature or could cause a potential coil freeze-up condition, then the control can be set to temper the supply air during DCV control. The control uses heating to prevent the supply air from falling below the configurable **Min DCV Override** SAT setpoint, when the DCV control is active. The IAQ configurations are accessed on the **Properties** page > **Equipment** tab > **Configuration**.

The following conditions must be true for this algorithm to run:

- **Damper Control** is configured for **Modulating**
- Valid space temperature must be available
- The unit is in an occupied mode
- **Supply Fan** must be on and not in alarm
- IAQ sensor value reading is greater than the **DCV Start Control Setpoint**
- The DCV calculated damper position must be > the economizer position

The configuration screens contain the 5 adjustable setpoints:

- **DCV Start Control** setpoint
- **DCV Maximum Control** setpoint
- **Minimum Damper Position**
- **DCV Maximum Vent Damper Position**
- **Min SAT in DCV Override**

These can be adjusted to meet various specifications.

Demand Limiting

The Unit Vent for AppController accepts 3 levels of demand limit from the network. In response to a demand limit, the unit decreases its heating setpoint and increases its cooling setpoint to widen the range in order to immediately lower the electrical demand. You can change the responding temperature adjustment for both heating and cooling and each demand level. The response to a particular demand level may also be set to 0.

Thermostat Linkage

The controller uses one wall-mounted SPT-type sensor to control multiple units using **Thermostat Linkage**. A single unit is selected as a master and configured for the total number of linked units (including the master). The slave units must be sequentially addressed, below the master's address.

The master sends the setpoints, occupancy status, space temperature, and optional sensor value from the master to the slave units. Each slave then sends its operating mode and supply air temperature. If a local sensor for either RH or CO_2 is provided, the value at the slave unit vent, rather than the value received through **Thermostat Linkage,** is used.

Each slave sends its operating mode and supply air temperature. When using **Thermostat Linkage**, the units do not need to be the same type or have the same coils. Each unit may be independently configured for coil types, fan operation, etc. **Thermostat Linkage** is designed to support a maximum of 8 units operating together, using a single SPT sensor.

To restore defaults

WARNING This erases all archived information and user-configuration settings. You will have to reconfigure all custom settings. It is recommended to restore the factory defaults only under the guidance of Carrier Control Systems Support.

To erase volatile memory data and restore factory default configuration settings:

1. Turn off the controller's power switch.
2. Put the **Factory Defaults** jumper on.
3. Turn on the controller's power switch.
4. Remove the **Factory Defaults** jumper.

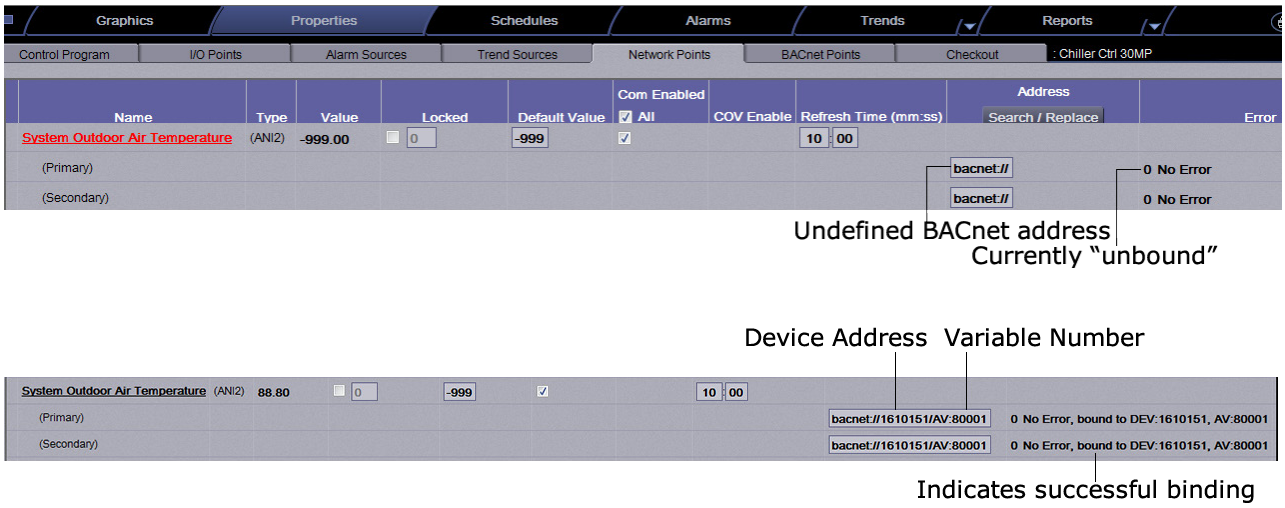
Appendix B: Device Address Binding

Device Address Binding (DAB) allows the controller to receive data from other Open controllers when they are connected by a network. The controller receives data from other Open or BACnet controllers when they are installed as part of an i-Vu® Control System. The data transfer takes the form of DAB, which you must configure.

Currently, the controller implements DAB for the following variables:

- **System Outdoor Air Temperature**
- **System Occupancy**
- **System Fire / Smoke**
- **System Space Temperature**
- **System Water Temperature**
- **System Occupancy**
- **System Cool Demand Level**
- **System Heat Demand Level**

You can implement DAB on network points with an undefined BACnet address, displayed in Field Assistant and the i-Vu® interface on the **Properties** page > **Network Points** tab. See example below.



Status

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Status**

Point Name/Description	Range
System Mode – The controller's current operating mode.	R: Off Fan Only Economize Cooling Heating Cont Fan Test Start Delay Temper SAT Fire Shutdown Shutdown IAQ Override Pre-occ Purge
Space Temperature - Prime Variable – The space temperature value currently used for control.	R: -56 to 245°F (-48.9 to 118.3°C)
Supply Air Temperature – Displays the current supply air temperature.	R: -56 to 245°F (-48.9 to 118.3°C)
Return Air Temperature – Displays the current return air temperature.	R: -56 to 245°F (-48.9 to 118.3°C)

Point Name/Description	Range
Outdoor Air Temperature – The outdoor air temperature used for control.	R: -56 to 245°F (-48.9 to 118.3°C)
Fan / Speed – The commanded state of the supply fan.	R: Off Low Med High On
Supply Fan Status – Displays the current operating status of the fan. (Displayed if the **Input Ch #5 Function** is set to **Fan Status**.)	R: Off/On
Heating Output – Displays the current active heating capacity as a percentage of the total available capacity. (Not displayed if **Heat Type** is equal to **None**.)	R: 0 to 100%
Cooling Output – Displays the current active cooling capacity as a percentage of the total available capacity. (Not displayed if **Cool Type** is equal to **None**.)	R: 0 to 100%
Damper Output – Displays the current position of the damper as a function of the amount of outdoor air. (Not displayed if **Damper Type** is equal to **None**.)	R: 0 to 100%
Changeover Mode – 2-pipe changeover systems only. Displays the available operating mode based on the current water temperature being supplied to the unit. (Displayed for 2-pipe changeover systems.)	R: Cool/Heat
Indoor Air Quality CO2 (ppm) – Displays the current CO_2 sensor value. (Displayed if **CO2 Sensor** is installed.)	R: 0 to 9999 ppm
Shutdown – When **Active**, provides a means to stop heating and cooling in an orderly manner. All alarms are reset and current active alarms are displayed.	R: Inactive/Active

Unit Configuration

4Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Configuration** > **Unit Configuration**

Point Name/Description	Default/Range
Heat Enable – Enables or disables heating operation.	D: Enable R: Disable/Enable
Cool Enable – Enables or disables cooling operation.	D: Enable R: Disable/Enable
Fan Mode – The supply fan's operating mode. Options: **Auto** - The fan cycles on/off in conjunction with heating or cooling. **Continuous** - The fan runs continuously during occupancy and intermittently during unoccupied periods with heating or cooling. **Always On** - The fan runs continuously regardless of occupancy or calls for heating and cooling.	D: Continuous R: Auto Continuous Always On

Fan On Delay – How long the fan should delay starting after heating or cooling starts. Automatically overridden to **0** if configured for DX cooling or electric heat is active.	D: 10 seconds R: 0 to 60 seconds
Fan Off Delay – The number of seconds that the fan continues to run after heating or cooling has ended.	D: 90 seconds R: 0 to 180 seconds
Unoccupied Fan Cycling – When set to **Enable**, the controller cycles the indoor fan on for 1 minute each hour during the unoccupied time period.	D: Enable R: Disable/Enable
Minimum Cooling SAT – In cooling mode, the cooling outputs are controlled so that the supply air temperature does not drop below this value.	D: 50°F (10°C) R: 38 to 60°F (3.3 to 15.5°C)
Maximum Heating SAT – In heating mode, the heating outputs are controlled so the supply air temperature does not rise above this value.	D: 90°F (32.2°C) R: 80 to 140°F (26.6 to 60°C)
Min DCV / Purge SAT – The minimum supply air temp during DCV or purge.	D: 67°F (19.4°C) R: 55 to 85°F (12.7 to 29.4°C)
Fan Off Value – Hydronic heating only - The supply air temperature, read from the SAT sensor, to be maintained when the fan is off.	D: 55°F (12.7°C) R: 40 to 120°F (4.4 to 48.9°C)
Vent Dmpr Pos / DCV Min Pos – The minimum outdoor air damper position maintained during occupied periods. (Not displayed if **Damper Type** equal to **None**.)	D: 20% R: 0 to 100%
Economizer Purge Min Pos – The minimum outdoor air damper position maintained during an unoccupied purge cycle when the Pre-Occ Purge mode is active.	D: 40% R: 0 to 100%
DCV Max Vent Damper Pos – The maximum outdoor air damper position allowed while DCV is active. (Displayed if a valid CO_2 sensor value is available – Local or Linkage.)	D: 60% R: 0 to 100%
Filter Service Alarm Timer – The amount of time the fan will run before generating a **Filter Alarm**. Set to 0 to disable the alarm and reset accumulated fan hours.	D: 600 hr R: 0 to 9999 hr
Pushbutton Override – Enables or disables the use of a pushbutton override from a local space temperature sensor.	D: Enable R: Disable/Enable
T55 Override Duration – The amount of time that the controller runs in the occupied mode when a user presses the T55 sensor's override button for 1 to 10 seconds. **Pushbutton Override** must be set to **Enable**.	D: 0 hr R: 0 to 4 hrs
Setpoint Adjustment – Enables or disables the setpoint adjustment mechanism on the local space sensor.	D: Enable R: Disable/Enable
Setpoint Adjustment Range - The maximum amount that a user can adjust the setpoint on the local SPT sensor.	D: 5Δ°F (2.7Δ°C) R: 0 to 5Δ°F (0 to 2.7Δ°C)
Damper Lockout Temp – The outdoor air temperature, if exceeded, inhibits economizer cooling. (Displayed if **Damper Type** equal to **Modulating**.)	D: 63°F (17.2°C) R: -65 to 80°F (-53.9 to 26.6°C)

Pre Occupancy Purge – Indicates if the pre-occupancy purge cycle is active.	D: Disable R: Disable/Enable
Purge Time – The maximum amount of time used for a pre-occupancy purge.	D: 20 minutes R: 0 to 9999 minutes
Cooling Lockout Temperature – Cooling is inhibited below this outdoor air temperature.	D: 45°F (7.2°C) R: -65 to 80°F (-53.9 to 26.6°C)
Heating Lockout Temperature – Heating is inhibited above this outdoor air temperature.	D: 65°F (18.3°C) R: 35 to 150°F (1.6 to 65.5°C)
Power Fail Restart Delay – How long the controller delays normal operation after the power is restored. Typically used to prevent excessive demand when recovering from a power failure.	D: 5 seconds R: 0 to 600 seconds
Occ Override Delay – The amount of time the controller remains occupied after the remote occupancy switch returns to the unoccupied position. (Displayed if **Input Ch#5 Function** equal to **Remote Occupancy**.)	D: 15 minutes R: 0 to 240 minutes
Occupancy Schedules – Enables or disables the occupancy schedule function.	D: Enable R: Disable/Enable
Sensor Calibration	
Bypass Sensor Test – Provides the capability to bypass the factory test used to verify proper sensor operation. Must be set to **Yes** for normal unit operation.	D: Yes R: No/Yes
Space Temperature – The current space temperature.	R: -56 to 245°F (-48.9 to 118.3°C)
Space Temp Calibration – A calibration offset value to allow the local space temperature sensor to be adjusted to match a calibrated standard measuring the temperature in the same location.	D: 0°F (0°C) R: -9.9 to 10Δ°F (-5.5 to 5.5Δ°C)
Supply Air Temperature – Displays the current supply air temperature.	R: -56 to 245°F (-48.9 to 118.3°C)
Supply Air Temp Calibration – A calibration offset value to allow the supply air temperature sensor to be adjusted to match a calibrated standard measuring the temperature in the same location.	D: 0°F (0°C) R: -9.9 to 10Δ°F (-5.5 to 5.5Δ°C)
Return Air Temperature – Displays the current return air temperature sensor exceeds the high or low alarm limit.	R: -56 to 245°F (-48.9 to 118.3°C)
Return Air Temp Calibration – A calibration offset value to allow the return air temperature sensor to be adjusted to match a calibrated standard measuring the temperature in the same location.	D: 0°F (0°C) R: -9.9 to 10Δ°F (-5.5 to 5.5Δ°C)
Outdoor Air Temperature – The current outdoor air temperature from a linked air source, if available, or from another network source.	R: -56 to 245°F (-48.9 to 118.3°C)
Outdoor Air Temp Calibration – A calibration offset value allows the outdoor air temperature sensor to be adjusted to match a calibrated standard measuring the temperature in the same location.	D: 0°F R: -9.9 to 10°F

Changeover Temperature – The current value of the system water temperature, if present. (Displayed on 2-pipe changeover units using a changeover sensor.)	R: -56 to 245°F (-48.9 to 118.3°C)
Changeover Temp Sensor Calibration – A calibration offset value allows the changeover water temperature sensor to be adjusted to match a calibrated standard measuring the temperature in the same location. (Displayed on 2-pipe changeover units using a changeover sensor.)	D: 0°F (0°C) R: -9.9 to 10Δ°F (-5.5 to 5.5Δ°C)

Alarm Configuration

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Configuration** > **Alarm Configuration**

Point Name/Description	Default/Range
Space Temperature Alarm	
Occupied Alarm Hysteresis – This value is added to the occupied high effective setpoint and subtracted from the occupied low effective setpoint to establish the occupied high and low limits that the space temperature must exceed before an occupied SPT alarm is generated. The alarm returns to normal when the space temperature drops below the high effective setpoint or rises above the low effective setpoint.	D: 5Δ°F (2.7Δ°C) R: 2 to 20Δ°F (1.1 to 11.1Δ°C)
Alarm Delay (min/deg) – Determines the amount of delay before an occupied space temperature alarm is generated when the controller transitions to the occupied mode. The delay time equals this value multiplied by the difference between the sensor temperature and occupied alarm setpoint plus 15 minutes.	D: 10 minutes R: 0 to 30 minutes
Unoccupied Low SPT Alarm Limit –The value that the space temperature must drop below to generate a **Space Temperature Alarm** in the unoccupied mode. There is a fixed hysteresis of 1Δ°F (.5Δ°C) for return to normal.	D: 45°F (7.2°C) R: 35 to 90°F (1.6 to 32.2°C)
Unoccupied High SPT Alarm Limit – The value that the space temperature must exceed to generate a **Space Temperature Alarm** in the unoccupied mode. There is a fixed hysteresis of 1Δ°F (.5Δ°C) for return to normal.	D: 95°F (35°C) R: 45 to 100°F (7.2 to 37.7°C)
Supply Air Temperature Alarm	
Low SAT Alarm Limit – The value that the supply air temperature must drop below to generate a **Supply Air Temp Alarm**. There is a fixed hysteresis of 3Δ°F (1.6Δ°C) for return to normal.	D: 45°F (7.2°C) R: 15 to 90°F (-9.4 to 32.2°C)
High SAT Alarm Limit – The value that the supply air temperature must exceed to generate a **Supply Air Temp Alarm**. There is a fixed hysteresis of 3Δ°F (1.6Δ°C) for return to normal.	D: 120°F (48.9°C) R: 90 to 175°F (32.2 to 79.4°C)
Return Air Temperature Alarm	

Point Name/Description	Default/Range
Low RAT Alarm Limit – The value that the return air temperature must drop below to generate a **Return Air Temp Alarm**. There is a fixed hysteresis of 1Δ°F (.6Δ°C) for return to normal.	D: 50°F (10°C) R: 35 to 90°F (1.6 to 32.2°C)
High RAT Alarm Limit – The value that the return air temperature must exceed to generate a **Return Air Temp Alarm**. There is a fixed hysteresis of 1Δ°F (.5Δ°C) for return to normal.	D: 120°F (48.9°C) R: 70 to 140°F (21.1 to 60°C)
Outdoor Air Temperature Alarm	
Low OAT Alarm Limit – The **Outdoor Air Temperature** must drop below this value to generate an **Outdoor Air Temp Alarm**. There is a fixed hysteresis of 1Δ°F (.5Δ°C) for return to normal.	D: -45°F (-42.7°C) R: -65°F to 70°F (-53.9 to 21.1°C)
High OAT Alarm Limit – The **Outdoor Air Temperature** must exceed this value to generate an **Outdoor Air Temp Alarm**. There is a fixed hysteresis of 1Δ°F (.5Δ°C) for return to normal.	D: 150°F (65.5°C) R: 70 to 175°F (21.1 to 79.4°C)
IAQ/Ventilation Alarm	
Occupied High CO2 Alarm Limit – The value that the CO_2 sensor must exceed to generate an **Indoor Air Quality Alarm** in the occupied mode.	D: 1100ppm R: 0 to 9999 ppm
Alarm Delay (min/ppm) – The fractional portion of a minute used to determine the amount of delay before an indoor air quality alarm is generated when the controller transitions to the occupied mode. The delay time equals this value multiplied by the difference between the sensor CO_2 value and the setpoint plus 15 minutes.	D: 0.25 minutes R: 0.10 to 1.00 minutes
Alarms Displayed on ZS or SPT Sensor (if optional sensor is connected)	
Space Temperature Alarm – If set to display, shows the alarm indicator on the SPT Pro and SPT Pro Plus sensors if the **Space Temperature** alarm is active.	D: Ignore R: Ignore/Display
Supply Air Temp Alarm – If set to display, shows the alarm indicator on the SPT Pro and SPT Pro Plus sensors if the **Supply Air Temp** alarm is active.	D: Ignore R: Ignore/Display
Fan Failure Alarm – If set to display, shows the alarm indicator on the communicating zone sensors with display, if the **Supply Fan Failure** alarm is active.	D: Ignore R: Ignore/Display
Return Air Temp Alarm – If set to display, shows the alarm indicator on the SPT Pro or SPT Pro Plus sensors if the **Return Air Temp** alarm is active.	D: Ignore R: Ignore/Display
Space High CO2 Alarm – If set to display, shows the alarm indicator on the SPT Pro and SPT Pro Plus' sensor if the **Indoor Air Quality** alarm is active.	D: Ignore R: Ignore/Display
Freezestat Alarm – If set to display, shows the alarm indicator on the SPT Pro or SPT Pro Plus sensors if the **Freezestat** alarm is active.	D: Ignore R: Ignore/Display
Fire/Smk Alarm – If set to display, shows the alarm indicator on the communicating zone sensors, if the **Fire/Smoke Alarm** is active.	D: Display R: Ignore/Display

Point Name/Description	Default/Range
Maintenance Displayed on ZS Sensor	
Thermostat Linkage Fault – If set to display, shows the maintenance indicator on the ZS Pro Sensor, if **Thermostat Linkage** is in a Fault condition.	D: Ignore R: Ignore/Display
Dirty Filter Alarm – If set to display, shows the alarm indicator on the communicating zone sensors, if a **Filter** alarm is active.	D: Display R: Ignore/Display
OAT Fault – If set to display, shows the maintenance indicator on a ZS Sensor, if the outside air reading is not valid.	D: Ignore R: Ignore/Display
SPT Sensor Fault – If set to display, shows the maintenance indicator on a ZS Sensor with display, if the zone temperature sensor reading is not valid.	D: Ignore R: Ignore/Display

Service Configuration

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Configuration** > **Service Configuration**

Point Name/Description	Default/Range
# of Fan Speeds – The number of fan motor speeds.	D: Three R: One Two Three
High Speed EH Only – Multi-speed fan applications. When enabled and electric heat is active, the fan runs at high speed. Viewable only when **Service Test** is enabled and **Heat Test** is active.	D: Enable R: Disable/Enable
Fan (G) Output Type – When set to **Fan On**, **G** output is energized when any fan speed is active (required for ECM and 33ZC fan control board). When set to **Fan Low**, the output is only energized for **Low Speed**.	D: Fan Low R: Fan On/Fan Low
Face & Bypass – Indicates whether the unit is equipped with a modulating F&B (Face & Bypass) damper to control the cooling and heating capacity of the unit.	D: No R: No/Yes
2-Pipe Changeover – Indicates that the water source connected to this equipment supplies both heating and cooling depending on the season. Set to **Yes** if water source is not a dedicated heating and cooling source.	D: Yes R: No/Yes
Changeover Config – Defines the type of sensor that determines the suitability of the water in a 2-pipe changeover system. Requires **Configuration** > **Service Configuration** > **2-Pipe Changeover** set to **Yes**.	D: Thermistor R: Switch/Thermistor
Changeover Cool Limit – Defines the lower limit of a changeover system and determines when the water is suitable for cooling. Temperatures below this value are suitable. **Configuration** > **Service Configuration** > **2-Pipe Changeover** must be set to **Yes**. Only valid if **Changeover Config** is set to **Thermistor**.	D: 60°F (15.5°C) R: 40 to 65°F (4.4 to 18.3°C)

Point Name/Description	Default/Range
Changeover Heat Limit – Defines the upper limit of a changeover system and determines when the water is suitable for heating. Temperature above this value is considered suitable. **Configuration** > **Service Configuration** > **2-Pipe Changeover** must be set to **Yes** Only valid if **Changeover Config** is set to **Thermistor**.	D: 80°F (26.6°C) R: 65 to 99°F (18.3 to 37.2°C)
Heat Type – The type of heating that the unit has. Selecting **2-Pipe Electric** automatically sets **2-Pipe Changeover** to **Yes**.	D: Modulating R: None Modulating Electric 2-Pipe/Electric
Heating Coil Position – When 2 or more coils are present, the position of the heating coil in the air stream, with respect to the cooling coil. **Preheat** indicates a heating coil is before the cooling coil. **Reheat** indicates the heating coil is after the cooling coil. **Configuration** > **Service Configuration** > **2-Pipe Changeover** must be set to **No**.	D: Preheat R: Preheat/Reheat
Valve Type – Indicates the position of the control valve with no power applied. Applicable to 2-position valves used with F&B control or modulating type water valves used in 4-pipe heating or 2-pipe applications.	D: NO R: NC (normally closed) NO (normally open)
# of Elect Heat Stages – Defines the number of electric heat stages controlled. The total combined number of heat stages plus fan speeds cannot exceed 4.	D: 1=One Stage R: 1= One Stage 2= Two Stage 3= Three Stage
Cool Type – The type of cooling that the unit has. Applicable to non-2-pipe changeover systems only and is visible when **Properties** > **Equipment** > **Configuration** > **Service Configuration** > **2-Pipe Changeover** is set to **No**.	D: Modulating R: None Modulating 1 Stage DX
Cooling Valve Type – Indicates the position of the cooling valve with no power applied. Applicable to 2-position cooling valves used with F&B control or modulating cooling valves used in cooling only or non-changeover applications.	D: NC R: NC (normally closed) NO (normally open)
Damper Type – The type of mixed air damper that the unit has.	D: Modulating R: None 2-Position Modulating
Damper Actuator Type – Used to determine damper output signal range (closed – open).	D: 0-10 V R: 0-10 V 2-10 V
Hardwired CO2 Sensor – Determines whether the optional CO_2 sensor is connected.	D: N/A R: N/A / Installed
DCV Control – Enables or disables zone demand controlled ventilation (DCV) if valid CO_2 sensor value is available.	D: Disable R: Disable/Enable
Min Setpoint Separation – Minimum separation that must be maintained between the heating and cooling setpoints.	D: 5Δ°F (2.7Δ°C) R: 2 to 10Δ°F (1.1 to 5.5Δ°C)

Point Name/Description	Default/Range
Input Ch #5 Function – Determines the function of the input connected to channel #5. **NOTE** When using Wireless Remote Occupancy contact for Carrier wireless sensors: D: None R: None / Fan Status	D: Remote Occupancy R: Fan Status Remote Occupancy
Ch #5 Normal Logic State – Specifies the state of the contact when the input #5 is in the normal state. (Either unoccupied or the fan is off.)	D: Open R: Open/Closed
Freezestat Switch Alarm State - Specifies the alarm state of the Freezestat switch input.(The unit shuts down if this point is in alarm.)	D: Closed R: Open/Closed
CO2 Sensor Min Input Volts – The lowest voltage that should be read from the hardwired CO_2 sensor. (Displayed if CO_2 sensor is Installed.)	D: 1.00 V R: 0 to 2 V
CO2 Sensor Max Input Volts – The highest voltage that should be read from the hardwired CO_2 sensor. (Displayed if CO_2 sensor is Installed.)	D: 5.00 V R: 2 to 5 V
CO2 Sensor Value @ Min Volts – The ppm value that correlates to the hardwired CO_2 sensor's low voltage reading. (Displayed if CO_2 sensor is Installed.)	D: 0 ppm R: 0 to 9999 ppm
CO2 Sensor Value @ Max Volts – The ppm value that correlates to the hardwired CO_2 sensor's high voltage reading. (Displayed if CO_2 sensor is Installed.)	D: 2000 ppm R: 0 to 9999 ppm

Sensor Binder / Zone Temp / ZS Zone CO2

Ctrl+click on the name of these properties to access the microblock popup **Properties** page > **Details** tab. See below for instructions on configuring your ZS or wireless sensors.

See the microblock Help for more detailed explanations.

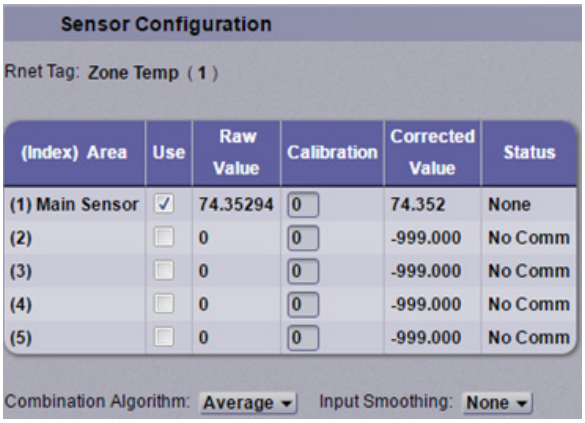
Sensor Binder - Use the **Associated Sensors** table to configure the Rnet to use additional ZS or wireless sensors.

D: **(Index)** - (1)
Network Type - Rnet
Address - 1

Index	Area	Network Type	Address	Lock Display	Version	Status	Error
1	Main Sensor	Rnet	1			Sensor Offline	No Comm
2	Sensor 2	Unused	2			Sensor Offline	None
3	Sensor 3	Unused	3			Sensor Offline	None
4	Sensor 4	Unused	4			Sensor Offline	None
5	Sensor 5	Unused	5			Sensor Offline	None

- **Network Type** - Set to **Rnet**
- **Address** - Enter the DIP switch settings that are on the additional ZS sensors (up to 5 total) or RnetID assigned to each wireless sensor in SensorBuilder
- **Lock Display** - Check to make the sensor display-only

Zone Temp - Configure additional ZS or wireless temperature sensors used on the controller.



- **Use** - Check to include ZS or wireless sensors' value in the **Combined Algorithm** (**Average** is the default).
- **Raw Value** - Displays sensed temperature for each ZS or wireless temperature sensor's address
- **Calibration** - If needed, enter value to adjust the **Corrected Value** from the **Raw Value**, in order to calibrate an individual ZS or wireless sensor's sensed value.
- **Combination Algorithm** - Use **Average**, **Maximum**, or **Minimum** zone temperature to calculate the **Corrected Value** for temperature control.

D: **(Index) Area** - (1) Main Sensor

Use - checked

Calibration - 0

Combination Algorithm - Average

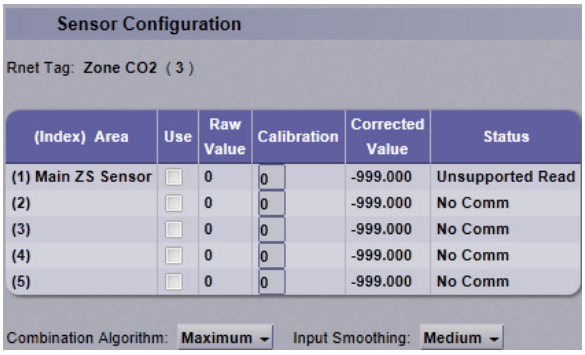
Input Smoothing - None

Show on Sensors - Calculated Value

Display Resolution - 1

COV Increment - .1

ZS Zone CO2 - Configure additional ZS CO_2 sensors used on the controller.



- **Use** - Check to include ZS sensors' value in the **Combined Algorithm** (**Maximum** is the default).
- **Raw Value** -Displays sensed CO_2 for each ZS CO_2 sensor's address
- **Calibration** - If needed, enter value to adjust the **Corrected Value** from the **Raw Value**, in order to calibrate an individual ZS sensor's sensed value.
- **Combination Algorithm** - Use **Average**, **Maximum**, or **Minimum** ZS CO^2 to calculate the **Corrected Value** for CO_2 control.

(Index) Area - (1) Main ZS Sensor

Use - unchecked

Calibration - 0

Combination Algorithm - Maximum

Input Smoothing - Medium

Show on Sensors - Calculated Value

Display Resolution - 1

COV Increment - 10

WS Signal Strength % — Displays radio signal strength of the wireless space temperature sensor. If there are multiple wireless sensors, it displays the lowest value.	R: %
WS Battery Strength % — Displays charge strength indicated on the wireless space temperature sensor. If there are multiple wireless sensors, it displays the lowest value.	R: %
Rnet Sensed Occupancy – Displays occupancy status detected by wireless infrared motion sensor.	R: Off/On
ZS model to show on graphic – Select the ZS model, from the drop-down list, that you want to display on the graphic.	D: ZS Pro-F model R: ZS Base model ZS Plus model ZS Pro model ZS Pro-F model
WS model to show on graphic – Select the wireless model, from the drop-down list, that you want to display on the graphic.	D: WS Plus model R: WS Base model WS Plus model WS Pro model
Net Space Temp to show on graphic — Select the type of sensor to display on graphic.	D: Equipment Touch R: Network Temp Equipment Touch
System Space Temperature – Allows this controller to use a space temperature value from another controller over the network. The remote controller must be equipped with a network-accessible space temperature sensor.	D: -999.0°F (-999.0°C) R: -50 to 150°F (-45.5 to 65.5°C)
System Setpoint Adjustment – The space temperature setpoint adjustment value received over the network.	D: -999.0°F (-999.0°C) R: -5 to 5Δ°F (-2.7 to 2.7Δ°C)
System Space AQ – Allows this controller to use a CO_2 value from another controller over the network. The remote controller must be equipped with a network-accessible CO_2/IAQ sensor value.	D: -999 R: 300 to 9999 ppm
System Cool Demand Level – The system cool demand level being received over the network.	D: 0.00 R: 0 to 3
System Heat Demand Level – The system heat demand level being received over the network.	D: 0.00 R: 0 to 3
System Outdoor Air Temperature – Allows the controller to use an outdoor air temperature value from the network. The remote controller must have a network-accessible outdoor air temperature sensor value.	D: -999.0°F (-999.0°C) R: -50 to 150°F (-45.5 to 65.5°C)
System Water Temperature – Allows a changeover temperature sensor value (system water temperature) from a central water plant to be read over the network and used by this controller. The remote controller must be equipped with a leaving water temperature sensor value that is network-accessible.	D: -999.0°F (-999.0°C) R: 0 to 250°F (0 to 121.1°C)
System Fire / Smoke – Allows a fire or smoke detector status value from another controller to be read over the network and used by this controller. The remote controller must be equipped with a network-accessible occupancy status point.	D: Off R: Off/On
System Occupancy – Allows reading and using another controller's occupancy status value over the network. The remote controller must have a network-accessible Occupancy Status point.	D: Unoccupied R: Unoccupied/Occupied

Service Test	
Point Name/Description	**Default/Range**
Service Test – Enable to stop automatic control so you can test the controller's outputs. Automatically resets to **Disable** after 1 hour.	D: Disable R: Disable/Enable
Sensor Status – Displays the status of the sensor test if the **Bypass Sensor Test** is set to **No** when service test mode is active. **Service Test** must be set to **Enable**.	R: TEST PASSED RAT bad OAT bad RAT/OAT bad? SAT bad SAT/RAT bad? SAT/OAT? Multiple bad
Fan Test – Enable to test the controller's fan operation. Sequences the fan from the low speed to the highest speed of the unit and operates at each speed for 60 seconds. **Service Test** must be set to **Enable**.	D: Disable R: Disable/Enable
Fan / Speed – The commanded state of the supply fan.	R: Off Low Med High On
Cooling Test – Enable to test the unit's cooling. During the test, the appropriate cooling device is activated. If DX cooling is configured, the supply fan output is activated and deactivated. For changeover units configured as 2-pipe/electric heat, the water valve output is tested. **Service Test** must be set to **Enable**.	D: Disable R: Disable/Enable
Heating Test – Enable to test the unit's heating. During the test, the appropriate heating device is activated. If electric heat is configured, the supply fan output is activated and deactivated. For changeover units configured as 2-pipe/electric heat, the electric heat output is tested. **Service Test** must be set to **Enable**.	D: Disable R: Disable/Enable
Preload OA Damper – Enable to drive the OA Damper 7.5% open. The installer should secure the damper shaft to the actuator with the damper in the fully closed position at this time. This assures a tight seal when the damper is in the closed position. **Service Test** must be set to **Enable**.	D: Disable R: Disable/Enable
Open Vent Damper 100% – Enable to test the OA Damper output. During the test, the damper is driven slowly to the 100%, or fully open, position. You must perform the **Preload OA Damper Position** test before this test and set **Service Test** to **Enable**.	D: Disable R: Disable/Enable

Maintenance

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Maintenance**

Point Name/Description	Default/Range
Unit	
Occupancy Status – The controller's occupancy status as determined by a network schedule, a local schedule, or a timed override.	R: Unoccupied/Occupied
Temp Compensated Start or **Learning Adaptive Start** – Indicates the type of optimal start (if any) that is configured and whether the algorithm is active or inactive.	R: Inactive/Active
Pre-Occ Purge – Indicates if the pre-occupancy purge cycle is active.	R: Inactive/Active
Space Temp Source – The source of the controlling space temperature value States: **Sensor Failure** – No valid space temperature or sensor status = failed **SPT Sensor** – An SPT sensor is connected to the controller's Rnet port **RAT/T55** – Using a RAT or T55 sensor wired to I/O terminal **Network** – A network temperature sensor is bound to the controller's space temperature AV **Airside Linkage** – The space temperature is from a linked terminal **Locked Value** –The controller's space temperature input has been manually locked at a value **T-Stat Linkage** – Space temperature shared via Thermostat Linkage **ZS Sensor** - A ZS sensor is connected to the controller's Rnet port **Wireless Sensor** - A Carrier wireless sensor is connected to the controller's Wireless Adapter, which is connected to the Rnet port	R: Sensor Failure SPT Sensor RAT/T55 Network Airside Linkage Locked Value T-Stat Linkage ZS Sensor Wireless Sensor
Setpoint Adjustment – The amount that a user has adjusted the setpoints at a zone sensor.	R: 0 to 5Δ°F (0 to 2.7Δ°C)
Effective Heat Setpoint – The current heating setpoint. May include offsets from the configured occupied/unoccupied setpoints resulting from **Optimal Start** or **Demand Limit**.	R: _°F/C
Effective Cool Setpoint – The current cooling setpoint. May include offsets from the configured occupied/unoccupied setpoints resulting from **Optimal Start** or **Demand Limit**.	R: _°F/C
IAQ Source – The source of the indoor air quality value. States: **N/A** – No sensor value associated with this device **Local** – A physical sensor is wired and connected to the appropriate input channel of this controller **Network** – A network sensor value provided to this controller **Linkage** – The sensor value from a linked device, obtained through **Airside Linkage**, **Thermostat Linkage**, or **Condenser Water Linkage**. **Locked Value** –The controller's sensor input is manually locked to a specific value **ZS Sensor** – A ZS wireless sensor is connected to the controller's Rnet port	R: N/A Local Network Linkage Locked Value ZS Sensor

Point Name/Description	Default/Range
Outdoor Air Temperature Source – The source of the OAT value. States: **N/A** – No sensor value associated with this device **Local** – A physical sensor is wired and connected to the appropriate input channel of this controller **Network** – A network sensor value provided to this controller **Linkage** – The sensor value from an active Linkage connection, such as Airside Linkage. **Locked Value** –The controller's sensor input is manually locked to a specific value	R: N/A Local Network Linkage Locked Value
Changeover Source – The source of the changeover input (contact or thermistor, as configured). States: **N/A** – No sensor value associated with this device **Local** – A physical sensor is wired and connected to the appropriate input channel of this controller **Network** – A network sensor value provided to this controller **Linkage** – The sensor value from a linked device, obtained through **Airside Linkage**, **Thermostat Linkage**, or **Condenser Water Linkage**. **Locked Value** –The controller's sensor input is manually locked to a specific valuet	R: N/A Local Network Linkage Locked Value
System Cooling Demand Level – The system cool demand level received over the network. (Not displayed if demand level is 0.)	R: 0 to 3
System Heating Demand Level – The system heat demand level received over the network. (Not displayed if demand level is 0.)	R: 0 to 3
Heating Control Setpoint – The calculated supply air temperature setpoint the heating device maintains when in the heating mode. The disabled value is 40°F. (Not displayed if **Heat Type** is equal to **None**.)	R: 40 to 140°F (4.4 to 60°C)
Cooling Control Setpoint – The calculated supply air temperature setpoint the cooling device maintains when in the cooling or dehumidification modes. The disabled value is 150°F. (Not displayed if **Cool Type** is equal to **None**.)	R: 38 to 150°F (3.3 to 65.5°C)
Damper Setpoint – The calculated supply air temperature setpoint that the mixed air damper maintains when cooling is required. The disabled value is 150°F. (Displayed if **Damper Type** is equal to **Modulating**.)	R: 38 to 150°F (3.3 to 65.5°C)
Damper Setpoint Override Value – A user-defined override for the calculated damper setpoint above. This value (if non-zero) is used by the mixed air damper control in place of the calculated value above, whenever cooling is required and the OA is suitable. This override function is disabled when set to 0°F. (Displayed if **Damper Type** is equal to **Modulating**.)	D: 0°F (0°C) R: 0 to 80°F (0 to 26.6°C)
Calculated DCV Damper Position – The calculated minimum damper position to maintain during an AQ override condition. (Displayed if **Damper Type** is equal to **Modulating**.)	R: 0 to 100%
# of Elect Heat Stages – The actual number of electric heat stages being controlled. This value always matches the configured value of **# of Elect Heat Stages** in Service Configuration, unless the total number of electric heat stages and fan speeds exceed 4. (Displayed if **Heat Type** is equal to **Electric** or **2-Pipe/Electric**.)	R: 1 to 3
# of Active Elec Heat Stages – The actual number of electric heat stages currently active or ON. (Displayed if **Heat Type** is equal to **Electric** or **2-Pipe/Electric.**)	R: 0 to 3

Point Name/Description	Default/Range
Reset Filter Alarm – Set this to **On** to reset an active **Filter Alarm** and restart the **Filter Service Alarm Timer**. After the alarm returns to normal, this automatically changes to **Off**.	D: Off R: Off/On
Input Channel #5 – The current state of the input (if present) connected to channel #5.	R: Open/Closed
Changeover Device – The current device being used to determine the suitability of the system water in a 2-pipe changeover system. (Displayed if **2-Pipe Changeover** equal to **Yes**.)	R: Switch/Sensor
Changeover Temperature – The current value of the system water temperature, if present. (Displayed if **Changeover Device** above equal to **Sensor**.)	R: -56 to 245°F (-48.9 to 118.3°C)
Changeover Switch – The current state of the changeover switch input, when present. (Displayed if **Changeover Device** above equal to **Switch**.)	R: Open/Heat Closed/Cool
Fire/Smk Shutdown – Displays the current state of the **System Fire/Smoke** network input.	R: Normal/Alarm
Occupancy	
BAS On/Off – Determines the occupancy state of the controller and can be set over the network by another device or third party BAS. Options: **Inactive** – Occupancy is determined by a configured schedule. **Occupied** – The controller is always in the occupied mode. **Unoccupied** – The controller is always in the unoccupied mode. **NOTE** If **BAS On/Off** is set to either **Unoccupied** or **Occupied**, the **Optimal Start** routine is automatically disabled.	D: Inactive R: Inactive Occupied Unoccupied
Schedules – The controller's occupancy status based on the local schedule.	R: Unoccupied/Occupied
Pushbutton Override – **Active** indicates if a user pushed the sensor's override button to override the occupancy state.	R: Off/Active
Override Time Remaining – The amount of time remaining in an override period.	R: 0 to 480 minutes
Occupancy Contact – The current status of **Input Channel #5** when configured as a **Remote Occupancy** contact input.	R: Inactive Active Occupied
System Occupancy – The status of the **System Occupancy** network point.	R: Inactive Unoccupied Occupied

Local BACnet Schedule	R: Off/On
Configure ZS Sensors by setting the following options in the **Local BACnet Schedule** microblock popup. Click **Local BACnet Schedule** to access the microblock popup **Properties** page > **Details** tab. See the microblock Help for more detailed explanations.	
Sensor Configuration	

	Allow Force Unoccupied: – Check to allow a user to save energy by forcing the zone into an unoccupied schedule on the ZS sensor. The user does this by holding the sensor's On/Off button for at least 3 seconds. This forced state remains in effect until the schedule transitions to unoccupied or until a user presses the sensor's On/Off button again.	D: Enabled R: Disabled/Enabled
	Force Unoccupied without Delay: – Check to allow a user to force a zone to unoccupied immediately instead of the normal 3-second delay. **NOTE** This option is not available if **Allow TLO Set During Occupied** is checked.	D: Enabled R: Disabled/Enabled
Timed Local Override		
	Increment: – Minutes that the microblock adds to the zone's occupied time for each click of the zone's local override button or switch.	D: 30:00 mm:ss
	Maximum Duration: – Maximum value (up to 960 minutes) the microblock outputs, regardless of additional pulses from the controller's input.	D: 60:00 mm:ss R: 0 to 960:00 mm:ss

Alarms

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Alarms**

Point Name/Description	Range
Fire / Smoke Shutdown – Indicates if the network **Fire / Smoke Shutdown** is in an alarm state.	R: Normal/Alarm
Space Temperature – Indicates if the space temperature sensor exceeds the high or low alarm limit.	R: Normal/Alarm
Alarming Temperature – The value of the alarming space temperature sensor. Visible only in an alarm condition.	R: The sensor's range
Alarm Limit Exceeded – The alarm limit that the alarming space temperature sensor exceeded. Visible only in an alarm condition.	R: -60 to 250°F (-51.1 to 121.1°C)
SPT Sensor – Indicates if the SPT space temperature sensor fails to communicate with this controller after having successfully communicated previously. (Only displayed if SPT sensor is connected and has communicated successfully.)	R: Normal/Alarm
ZS Temp Sensor – Indicates if the ZS communicating zone temperature sensor is no longer communicating.	R: Normal/Alarm
ZS/WS Sensor Configuration– Indicates a configured ZS or wireless sensor is no longer communicating.	R: Normal/Alarm
Space Temp Sensor – Indicates if the space temperature sensor fails.	R: Normal/Alarm
Wireless Battery Strength Alarm – Indicates one of the configured wireless space temperature sensors is displaying low charge strength.	R: Normal/Alarm
Wireless Signal Strength Alarm – Indicates one of the configured wireless space temperature sensors is displaying low radio signal strength.	R: Normal/Alarm

Point Name/Description	Range
Supply Fan Failure – Indicates an alarm condition if the supply fan's status fails to match the fan's commanded state when ON.(Only applicable if Input Ch#5 is set to **Fan Status**.)	R: Normal/Alarm
Indoor Air Quality – Indicates if the occupied CO_2 level exceeds the configured high alarm limit.	R: Normal/Alarm
Indoor Air Quality Sensor – Indicates that a valid indoor air quality sensor or sensor value is no longer available to the controller.	R: Normal/Alarm
Freezestat – Indicates a potential coil freeze condition exists because the input has been in an alarm state for more than 3 minutes. A delay of 3 minutes is provided between the input alarm detection and the alarm generation in order to correct the potential coil freeze condition and prevent nuisance alarms.	R: Normal/Alarm
Supply Air Temperature – Indicates if the supply air temperature exceeds the high temperature alarm limit or drops below the low temperature alarm limit.	R: Normal/Alarm
Return Air Temperature – Displays the current return air temperature sensor exceeds the high or low alarm limit.	R: Normal/Alarm
Filter – Indicates a dirty filter condition when the filter runtime exceeds the value of the **Filter Service Alarm Timer**.	R: Clean/Dirty
Outdoor Air Temperature – Indicates if the outdoor air temperature exceeds the high temperature alarm limit or drops below the low temperature alarm limit.	R: Normal/Alarm
Changeover Sensor – Indicates the controller is no longer receiving the system water temperature value.	R: Normal/Alarm
Thermostat Linkage – Indicates a failure exists between this unit and the other units in the group operating as a single zone using **Thermostat Linkage**.	R: Normal/Alarm

Linkage

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Linkage**

Point Name/Description	Range
Thermostat Linkage – Indicates whether this unit is a part of a group of units operating as a single zone using **Thermostat Linkage**.	R: Not Active/Active
Linkage Thermostat Appl (Provider) – For those slave units not sequentially addressed and polled by the master unit, set the **Network Number** and **Address** of the master unit in this slave unit.	
Network Number	R: 1 to 65534
Address	R: 1 to 99

Point Name/Description	Range
Linkage Thermostat Appl (Collector) – For a master unit with sequentially addressed slave units, set the **Number of Providers** to the total number of unit ventilators (including the master) that are sequentially addressed in this system. **Application Instance** **Number of Providers**	 D: 1 R: 1 to 8
Alarm if < # of Linked Units – Used to set the minimum number of communicating units that are connected with this master unit through **Thermostat Linkage**. The function is disabled if set to 0. Set this value in the master only to the system size to detect and alarm any slave zone failures. (Not displayed if controller is a slave unit.)	D: 1 R: 0 to 8

I/O Points

The values shown on the **I/O Points Properties** page are the raw values at the I/O objects and may not match values shown on status displays that are affected by control program logic.

i-Vu users logged in as **Power User** and above are able to edit various parameters associated with the input channels and the display names for all channels.

We strongly recommend that you leave these parameters at their defaults. The controller is not a programmable controller. I/O can only be used for the purpose designed in the equipment control program. Modifying these parameters may result in unpredictable equipment control.

See *Wiring inputs and outputs* (page 8) for more information. This table lists each of the I/O Channels, their functions, associated hardware, and terminal numbers.

Navigation: i-Vu® / Field Assistant: **Properties** > **I/O Points**

WARNINGS

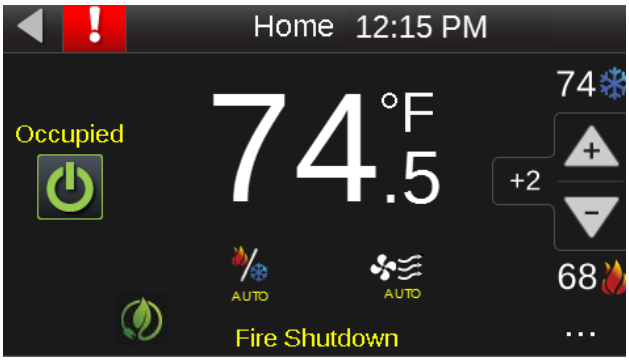
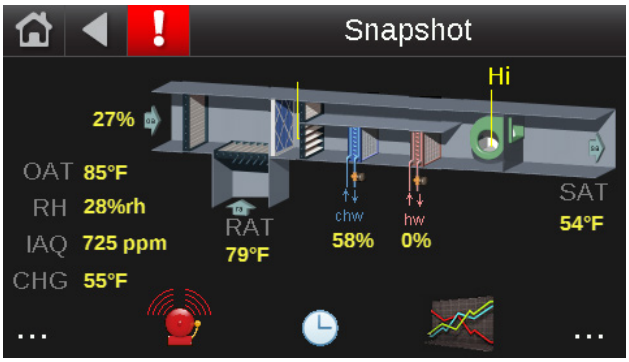
- Do not change the **Value**, **Offset/Polarity**, **Exp:Num**, **I/O Type**, **Sensor/Actuator Type**, **Min/Max**, or **Resolution** I/O configuration parameter for the points listed below. Changing these parameters could cause improper control and/or equipment damage.
- Use extreme caution if locking a point as this may also cause improper control and/or equipment damage.

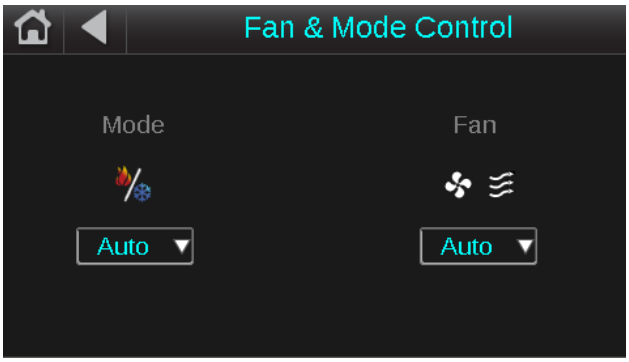
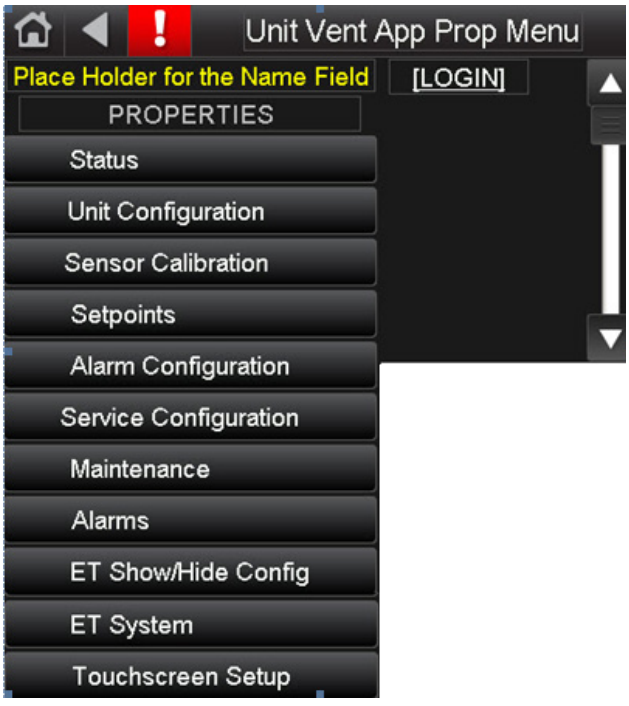
Point Name/Description	Default/Range
Zone Temp / Zone Temp (SPT Standard, SPT Plus, SPT Pro, and SPT Pro Plus sensors only). Sensor configurations on the microblock's **Properties** > **Details** tab are listed below. For more information, see the *Carrier Sensors Installation Guide*. **NOTE** Do not edit settings on the **Zone Temp** microblock on the right.	R: -56 to 245°F (-48.9 to 118.3°C)
Sensor Type: **Min Present Value** - Minimum present value the sensor transmits before indicating an alarm.	D: 45°F (7.2°C)

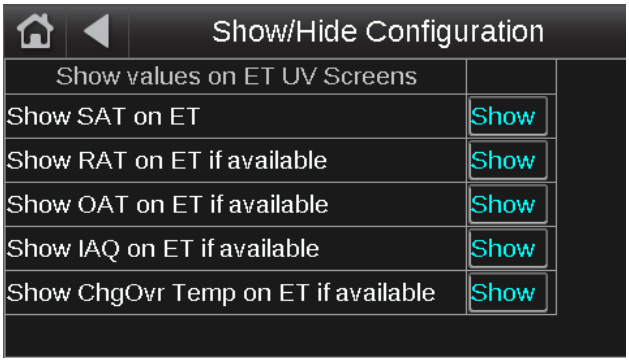
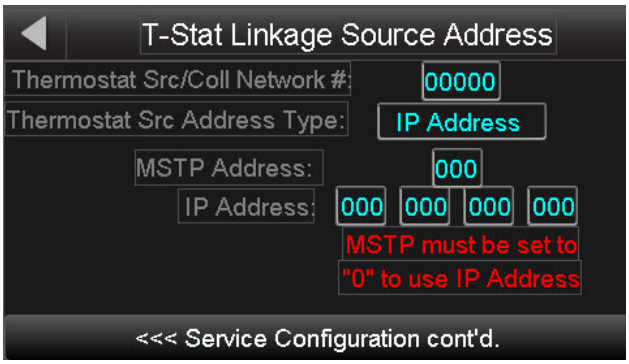
Max Present Value - Maximum present value the sensor transmits before indicating an alarm.	D: 96°F (35.5°C)
Setpoint Adjustment: **Max Adjust** – The amount that a user may adjust the setpoint at the sensors.	D: 5Δ°F (2.7Δ°C) R: 0 to 15Δ°F (0 to 8.3Δ°C)
Reset setpoint adjust to zero when unoccupied - Resets the setpoint bias to zero when the controller transitions to unoccupied.	D: Off
Timed Local Override: **Allow Continuous** (SPT Pro only) – If checked, a user can press the sensor's local override button until the **Max Accum** value is reached, then press one more time to have a continuous override until the next occupied period or until the user cancels the override. The display shows **On** during a continuous override.	D: Off R: Off/On
Each Pulse – The amount of time added to the total override time when a user pushes the sensor's override button.	D: 30:00 mm:ss R: 0:00 to 1440:00 mm:ss
Max Accum – The maximum amount of override time accumulated when a user pushes the sensor's override button.	D: 240:00 mm:ss R: 0:00 to 2000:00 mm:ss
Cancel override – How long a user must push the sensor's override button to cancel an override.	D: 3 seconds R: 0 to 60 seconds
Sensor Array: **Sensor calculation method -** When using multiple SPT sensors, select the process variable to be passed to the controller.	D: Avg R: Avg, Min, Max
BACnet configuration: **Network Visible -** Must be enabled for other BACnet objects to read or write to this point, and for this point to generate alarms.	D: Enabled
Object Name - Do <u>not</u> change.	D: zone_temp
CO2 Sensor – The current voltage of the controller's **CO2** input.	R: 0 to 5 Volt
RAT Sensor – The value of the controller's return air temperature sensor input, prior to any operator-configured **Calibration Offset**.	R: -56 to 245°F (-48.9 to 118.3°C)
SAT Sensor – The value of the controller's supply air temperature sensor input, prior to any operator-configured **Calibration Offset**.	R: -56 to 245°F (-48.9 to 118.3°C)
OAT Sensor – The value of the controller's outdoor air temperature sensor input, prior to any operator-configured **Calibration Offset**.	R: -56 to 245°F (-48.9 to 118.3°C)
Changeover Temp – The value of the controller's changeover water temperature sensor input, prior to any operator-configured **Calibration Offset**.	R: -56 to 245°F (-48.9 to 118.3°C)
WS Battery Strength % — Displays charge strength indicated on the wireless space temperature sensor. If there are multiple wireless sensors, it displays the lowest value.	R: _%

WS Signal Strength % — Displays radio signal strength of the wireless space temperature sensor. If there are multiple wireless sensors, it displays the lowest value.	R: _%
Zone Temp – The value provided by the controller's ZS or wireless sensor (if present).	R: _°F/C
ZS Zone CO2 - IAQ/CO2 signal received from CO2-enabled ZS Sensor(s).	R: _ppm
Changeover – The current state of the changeover contact input.	R: Open/Closed
Input Channel #5 – The current state of the input (if present) connected to channel #5.	R: Open/Closed
Freezestat – The current state of the freezestat contact input.	R: Open/Closed
Sensor Invalid – This internal input monitors the communication between the controller and the SPT sensor. **Off** indicates communication is normal.	R: Off/On
Rnet Sensed Occupancy – Displays occupancy status detected by wireless infrared motion sensor.	R: Off/On
OA Damper – The current, commanded output of the outdoor air damper that always represents the fixed hardware output of 0-10 Vdc. If the Damper Actuator type is configured for 2-10 Vdc, the Damper Output will display the adjusted damper position as the result of the rescaling the 2-10 Vdc range to 0 to 100%.	R: 0 to 100%
Valve / F&B – The current, commanded output of the connected device, if equipped. This device can be an F&B damper or a modulating water valve (2-pipe or heating).	R: 0 to 100%
Cooling Valve – The current, commanded output of the 4-pipe modulating cooling valve, if equipped.	R: 0 to 100%
Fan High Spd – The assigned output channels's current configuration-dependent, commanded output. If the **# of Fan Speeds** is set to **3**, then this is the High speed fan output. If the **# of Fan Speeds** is set to less than 3, then this output can be used for the 2nd electric heat stage.	R: Off/On
Fan Med Spd – The assigned output channel's current configuration-dependent, commanded output. If the **# of Fan Speeds** is set to **3**, then this is the Med speed fan output. If the **# of Fan Speeds** is set to **2**, then this is the High speed fan output. If the **# of Fan Speeds** is set to **1**, then this output can be used for the 3rd electric heat stage.	R: Off/On
Fan G / Low Spd – The assigned output channel's current configuration-dependant, commanded output. If the **# of Fan Speeds** is set to **1** or if **Fan (G) Output Type** is set to **Fan On**, then this output is on whenever the fan is commanded to run. Otherwise, the output is the Low speed fan output.	R: Off/On
BO-4 – The assigned output channel's current configuration-dependent, commanded output. If **Heat Type** is electric, then this is the 1st stage electric heat output. If **Face & Bypass** is **Yes**, then this is the 2-position water valve output (if **2-Pipe Changeover** is **Yes**) or the 2-position heating valve output (if **2-Pipe Changeover** is **No**).	R: Off/On
BO-5 – The assigned output channel's current configuration-dependent, commanded output. If **2-Pipe Changeover** is **No** and **Face & Bypass** is **Yes**, then this is the 2-position chilled water valve output. If **Heat Type** is **2-Pipe/Electric**, then this is the 1st stage electric heat output.	R: Off/On

Navigation screens

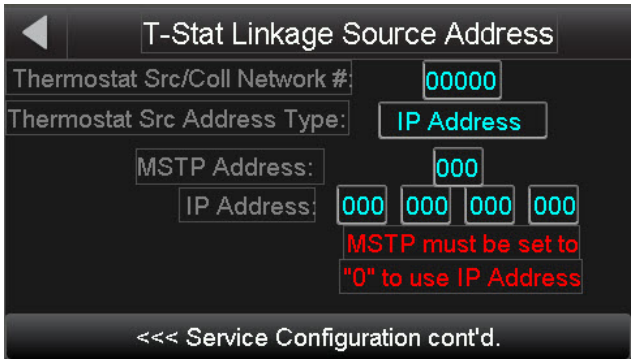
Screen Names	Display	Details
Standby	 Not an interactive screen. Touch anywhere to advance to **Home** screen.	Screen displays after the **Inactivity Timer** expires (default is 5 minutes). Displays: • Space temperature • Current setpoints • Mode - Cooling, Fan Speed, Economizer • Occupancy • OAT, if available
Home	 Click ... on the right to navigate to **Snapshot** screen.	Displays: • Space temperature • Current setpoints • Mode - Cooling, Fan Speed, Economizer • Occupancy • OAT, if available Allows: • Pushbutton Override • Space Setpoint Offset Adjustment
Snapshot	 Forward to **Unit Vent App Properties Menu** screen - click ... on the right	Navigates to: • Alarm status • Schedules • Trends • Back to the **Home** screen - click ... on the left

Screen Names	Display	Details
	Displays: • SAT, if allowed • RH, if available and allowed • IAQ, if available and allowed • OAT, if available and allowed • Coil & Dampers' positions and % open • Filter status 	Displays: • Unit Vent for AppController alarms, if present  • Fan speed 
Fan & Mode Control		Manually set Modes and Fan Speed. Displays: • Fan Mode • Fan Speed • Cool Mode • Heat Mode
Unit Vent App Properties Menu		Navigates to **Property** pages Login with one of the following passwords: ○ User level - type `user` ○ Admin level - type `admin` ○ Factory level - type `Touch` **NOTE** Only the buttons that are authorized for a specific password level are visible.

Screen Names	Display	Details
Show/Hide Configuration		Configure Show/Hide conditions for values on the following screens: • Standby • Home • Snapshot **NOTE** Only displayed for the Factory or Admin password. (See above.)
T-Stat Linkage Source Address	 Click on the bottom to navigate to **Service Configuration cont'd**.	Set up T-Stat Linkage using the following properties: • Thermostat Src/Coll Network# • Thermostat Src Address Type: (IP Address/MAC) • MSTP Address of Collector • IP Address of Collector (to set an IP address, the MSTP address must be set to "0")

Thermostat Linkage Source

Navigation: Equipment Touch: **Service Configuration** > **Service Configuration cont'd. > T-Stat Linkage Source Address**

T-Stat Linkage Source Address	**Range**
 Use this screen to set up T-Stat Linkage Source Address using the following properties (listed below). To navigate to **Service Configuration cont'd.**, click on the bottom.	
Thermostat Src/Coil Network# – Enter the thermostat's MSTP network number.	D: 0 R: 0 to 65,534
Thermostat Src Address Type – Select the type of BACnet network of the source water controller.	D: MSTP R: MSTP or IP Address
MSTP Address: – Set the MAC address of the source water controller. **NOTE** The MSTP address and IP address are mutually exclusive. To set an IP address, the MSTP address must be 0.	D: 0 R: 0 to 99
IP Address: – Set the MAC address of the source water controller. **NOTE** The MSTP address and IP address are mutually exclusive. To set an IP address, the MSTP address must be 0.	D: 0.0.0.0 R: 0.0.0.0 to 255.255.255.255

Thermostat Linkage

The controller uses one wall-mounted SPT-type sensor to control multiple units using **Thermostat Linkage**. A single unit is selected as a master and configured for the total number of linked units (including the master). The slave units must be sequentially addressed, below the master's address.

The master sends the setpoints, occupancy status, space temperature, and optional sensor value from the master to the slave units. Each slave then sends its operating mode and supply air temperature. If a local sensor for either RH or CO_2 is provided, the value at the slave unit vent, rather than the value received through **Thermostat Linkage,** is used.

Each slave sends its operating mode and supply air temperature. When using **Thermostat Linkage**, the units do not need to be the same type or have the same coils. Each unit may be independently configured for coil types, fan operation, etc. **Thermostat Linkage** is designed to support a maximum of 8 units operating together, using a single SPT sensor.

Troubleshooting

If you have problems mounting, wiring, or addressing the controller, contact Carrier Control Systems Support.

NOTE To help you troubleshoot, obtain a Module Status (Modstat) from the controller and review the System Error and Warning details.

LED's

The LED's indicate if the controller is speaking to the devices on the network. The LED's should reflect communication traffic based on the baud rate set. The higher the baud rate the more solid the LED's become.

Verify the LED patterns by cycling power to the controller and noting the lights and flashes.

LEDs	Status
Power	Lights when power is being supplied to the controller. **NOTE** The controller is protected by internal solid state Polyswitches on the incoming power and network connections. These Polyswitches are not replaceable, but they will reset themselves if the condition that caused the fault returns to normal.
Rx	Lights when the controller receives data from the network segment; there is an Rx LED for Ports 1 and 2.
Tx	Lights when the controller transmits data from the network segment; there is an Rx LED for Ports 1 and 2.
Run	Lights based on controller health.
Error	Lights based on controller health.

The **Run** and **Error** LED's indicate controller and network status.

If Run LED shows...	And Error LED shows...	Status is...
1 flash per second	1 flash per second, alternating with the **Run** LED	The controller files are archiving. Archive is complete when **Error** LED stops flashing.
2 flashes per second	Off	Normal
2 flashes per second	2 flashes, alternating with **Run** LED	Five minute auto-restart delay after system error
2 flashes per second	3 flashes, then off	The controller has just been formatted
2 flashes per second	4 flashes, then pause	Two or more devices on this network have the same network address
2 flashes per second	1 flash per second	The controller is alone on the network

If Run LED shows...	And Error LED shows...	Status is...
2 flashes per second	On	Exec halted after frequent system errors, due to: • Controller halted • Program memory corrupted • One or more programs stopped
5 flashes per second	On	Exec start-up aborted, Boot is running
5 flashes per second	Off	Firmware transfer in progress, Boot is running
7 flashes per second	7 flashes per second, alternating with **Run** LED	Ten second recovery period after brownout
14 flashes per second	14 flashes per second, alternating with **Run** LED	Brownout
On	On	Failure. Try the following solutions: • Turn the controller off, then on. • Download memory to the controller. • Replace the controller.

NOTE If you resolve the issue but the **Error** LED does not turn off, cycle power to the controller.

Serial number

If you need the controller's serial number when troubleshooting, the number is on a sticker on the back of the main controller board.

To restore defaults

WARNING This erases all archived information and user-configuration settings. You will have to reconfigure all custom settings. It is recommended to restore the factory defaults only under the guidance of Carrier Control Systems Support.

To erase volatile memory data and restore factory default configuration settings:

1. Turn off the controller's power switch.
2. Put the **Factory Defaults** jumper on.
3. Turn on the controller's power switch.
4. Remove the **Factory Defaults** jumper.

To replace the controller's battery

To determine when to replace the battery, remove power and measure the voltage. If the voltage is below 2.9 volts, you need to replace the battery.

CAUTION Power must be **ON** to the controller when replacing the battery, or your date, time, and trend data will be lost.

1. Remove the battery from the controller, making note of the battery's polarity.
2. Insert the new battery, matching the battery's polarity with the polarity indicated on the controller.

Compliance

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

CE and UKCA Compliance

WARNING This is a Class B product. In a light industrial environment, this product may cause radio interference in which case the user may be required to take adequate measures.

BACnet Compliance

Compliance of listed products to requirements of ASHRAE Standard 135 is the responsibility of BACnet International. BTL® is a registered trademark of BACnet International.

Appendix A: Unit Vent for AppController wire list

Open System Network - Unit Vent for AppController	
Project Name: Location:	Controller: Network Number: MAC Address:

 Thermistor/dry contact  0-5Vdc

Point/ Cable#	Inputs (+)	(G)	Input Type	Jumper Position of Pins	I/O	Sensor code	Equipment Name	Point Name
	IN-1	Gnd	Therm/Dry Contact	Upper	IN-1			
	IN-1	Gnd	0-5Vdc	Lower				
	IN-2	Gnd	Therm/Dry Contact	Upper	IN-2			
	IN-2	Gnd	0-5Vdc	Lower				
	IN-3	Gnd	Therm/Dry Contact	N/A	IN-3			
	IN-4	Gnd	Therm/Dry Contact	N/A	IN-4			
	IN-5	Gnd	Therm/Dry Contact	N/A	IN-5			
	IN-6	Gnd	Therm/Dry Contact	N/A	IN-6			
	IN-7		Unused					
	IN-8		Unused					

Point/ Cable#	Outputs (+)	COM	B-Output Type	Jumper Position of Pins	I/O	Sensor code	Equipment Name	Point Name
	AO-1	Gnd	N/A	N/A	AO-1			
	AO-2	Gnd	N/A	N/A	AO-2			
	AO-3	Gnd	N/A	N/A	AO-3			
	BO-1	Pwr	N.O.	N/A	BO-1			
	BO-2	Pwr	N.O.	N/A	BO-2			
	BO-3	Pwr	N.O.	N/A	BO-3			
	BO-4	Pwr	N.O.	N/A	BO-4			
	BO-5	Pwr	N.O.	N/A	BO-5			

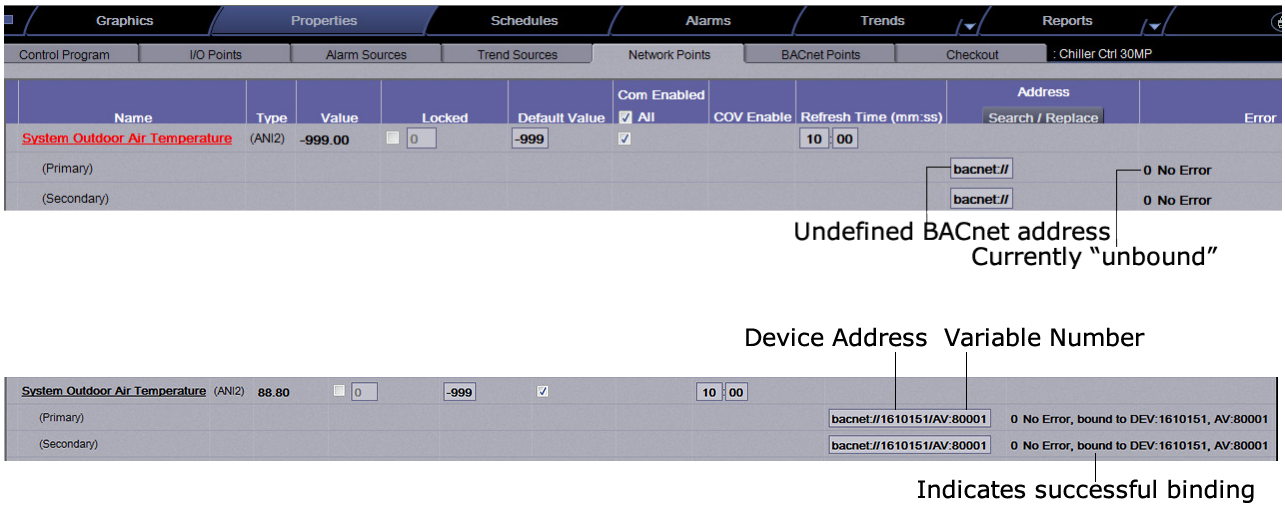
Appendix B: Device Address Binding

Device Address Binding (DAB) allows the controller to receive data from other Open controllers when they are connected by a network. The controller receives data from other Open or BACnet controllers when they are installed as part of an i-Vu® Control System. The data transfer takes the form of DAB, which you must configure.

Currently, the controller implements DAB for the following variables:

- **System Outdoor Air Temperature**
- **System Occupancy**
- **System Fire / Smoke**
- **System Space Temperature**
- **System Water Temperature**
- **System Occupancy**
- **System Cool Demand Level**
- **System Heat Demand Level**

You can implement DAB on network points with an undefined BACnet address, displayed in Field Assistant and the i-Vu® interface on the **Properties** page > **Network Points** tab. See example below.



Appendix C: Unit Vent for AppController Points/Properties

The following tables describe all of the possible settings for your controller on the i-Vu® or Field Assistant **Properties** tab.

NOTE Some of the properties are available only when other settings have been enabled. For example, **Status** > **Supply Fan Status** is visible only when **Configuration** > **Service Configuration** > **Input CH #5 Function** is set to **Fan Status**.

See *Appendix D* (page 105) for the points and properties available on the Equipment Touch interface.

NOTE Engineering units shown in this document in the defaults and ranges are strictly for reference. You must enter an integer only.

Status

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Status**

Point Name/Description	Range
System Mode – The controller's current operating mode.	R: Off Fan Only Economize Cooling Heating Cont Fan Test Start Delay Temper SAT Fire Shutdown Shutdown IAQ Override Pre-occ Purge
Space Temperature - Prime Variable – The space temperature value currently used for control.	R: -56 to 245°F (-48.9 to 118.3°C)
Supply Air Temperature – Displays the current supply air temperature.	R: -56 to 245°F (-48.9 to 118.3°C)
Return Air Temperature – Displays the current return air temperature.	R: -56 to 245°F (-48.9 to 118.3°C)
Outdoor Air Temperature – The outdoor air temperature used for control.	R: -56 to 245°F (-48.9 to 118.3°C)
Fan / Speed – The commanded state of the supply fan.	R: Off Low Med High On

Point Name/Description	Range
Supply Fan Status – Displays the current operating status of the fan. (Displayed if the **Input Ch #5 Function** is set to **Fan Status**.)	R: Off/On
Heating Output – Displays the current active heating capacity as a percentage of the total available capacity. (Not displayed if **Heat Type** is equal to **None**.)	R: 0 to 100%
Cooling Output – Displays the current active cooling capacity as a percentage of the total available capacity. (Not displayed if **Cool Type** is equal to **None**.)	R: 0 to 100%
Damper Output – Displays the current position of the damper as a function of the amount of outdoor air. (Not displayed if **Damper Type** is equal to **None**.)	R: 0 to 100%
Changeover Mode – 2-pipe changeover systems only. Displays the available operating mode based on the current water temperature being supplied to the unit. (Displayed for 2-pipe changeover systems.)	R: Cool/Heat
Indoor Air Quality CO2 (ppm) – Displays the current CO_2 sensor value. (Displayed if **CO2 Sensor** is installed.)	R: 0 to 9999 ppm
Shutdown – When **Active**, provides a means to stop heating and cooling in an orderly manner. All alarms are reset and current active alarms are displayed.	R: Inactive/Active

Unit Configuration

4Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Configuration** > **Unit Configuration**

Point Name/Description	Default/Range
Heat Enable – Enables or disables heating operation.	D: Enable R: Disable/Enable
Cool Enable – Enables or disables cooling operation.	D: Enable R: Disable/Enable
Fan Mode – The supply fan's operating mode. Options: **Auto** - The fan cycles on/off in conjunction with heating or cooling. **Continuous** - The fan runs continuously during occupancy and intermittently during unoccupied periods with heating or cooling. **Always On** - The fan runs continuously regardless of occupancy or calls for heating and cooling.	D: Continuous R: Auto Continuous Always On
Fan On Delay – How long the fan should delay starting after heating or cooling starts. Automatically overridden to **0** if configured for DX cooling or electric heat is active.	D: 10 seconds R: 0 to 60 seconds
Fan Off Delay – The number of seconds that the fan continues to run after heating or cooling has ended.	D: 90 seconds R: 0 to 180 seconds

Unoccupied Fan Cycling – When set to **Enable**, the controller cycles the indoor fan on for 1 minute each hour during the unoccupied time period.	D: Enable R: Disable/Enable
Minimum Cooling SAT – In cooling mode, the cooling outputs are controlled so that the supply air temperature does not drop below this value.	D: 50°F (10°C) R: 38 to 60°F (3.3 to 15.5°C)
Maximum Heating SAT – In heating mode, the heating outputs are controlled so the supply air temperature does not rise above this value.	D: 90°F (32.2°C) R: 80 to 140°F (26.6 to 60°C)
Min DCV / Purge SAT – The minimum supply air temp during DCV or purge.	D: 67°F (19.4°C) R: 55 to 85°F (12.7 to 29.4°C)
Fan Off Value – Hydronic heating only - The supply air temperature, read from the SAT sensor, to be maintained when the fan is off.	D: 55°F (12.7°C) R: 40 to 120°F (4.4 to 48.9°C)
Vent Dmpr Pos / DCV Min Pos – The minimum outdoor air damper position maintained during occupied periods. (Not displayed if **Damper Type** equal to **None**.)	D: 20% R: 0 to 100%
Economizer Purge Min Pos – The minimum outdoor air damper position maintained during an unoccupied purge cycle when the Pre-Occ Purge mode is active.	D: 40% R: 0 to 100%
DCV Max Vent Damper Pos – The maximum outdoor air damper position allowed while DCV is active. (Displayed if a valid CO_2 sensor value is available – Local or Linkage.)	D: 60% R: 0 to 100%
Filter Service Alarm Timer – The amount of time the fan will run before generating a **Filter Alarm**. Set to 0 to disable the alarm and reset accumulated fan hours.	D: 600 hr R: 0 to 9999 hr
Pushbutton Override – Enables or disables the use of a pushbutton override from a local space temperature sensor.	D: Enable R: Disable/Enable
T55 Override Duration – The amount of time that the controller runs in the occupied mode when a user presses the T55 sensor's override button for 1 to 10 seconds. **Pushbutton Override** must be set to **Enable**.	D: 0 hr R: 0 to 4 hrs
Setpoint Adjustment – Enables or disables the setpoint adjustment mechanism on the local space sensor.	D: Enable R: Disable/Enable
Setpoint Adjustment Range - The maximum amount that a user can adjust the setpoint on the local SPT sensor.	D: 5Δ°F (2.7Δ°C) R: 0 to 5Δ°F (0 to 2.7Δ°C)
Damper Lockout Temp – The outdoor air temperature, if exceeded, inhibits economizer cooling. (Displayed if **Damper Type** equal to **Modulating**.)	D: 63°F (17.2°C) R: -65 to 80°F (-53.9 to 26.6°C)
Pre Occupancy Purge – Indicates if the pre-occupancy purge cycle is active.	D: Disable R: Disable/Enable

Purge Time – The maximum amount of time used for a pre-occupancy purge.	D: 20 minutes R: 0 to 9999 minutes
Cooling Lockout Temperature – Cooling is inhibited below this outdoor air temperature.	D: 45°F (7.2°C) R: -65 to 80°F (-53.9 to 26.6°C)
Heating Lockout Temperature – Heating is inhibited above this outdoor air temperature.	D: 65°F (18.3°C) R: 35 to 150°F (1.6 to 65.5°C)
Power Fail Restart Delay – How long the controller delays normal operation after the power is restored. Typically used to prevent excessive demand when recovering from a power failure.	D: 5 seconds R: 0 to 600 seconds
Occ Override Delay – The amount of time the controller remains occupied after the remote occupancy switch returns to the unoccupied position. (Displayed if **Input Ch#5 Function** equal to **Remote Occupancy**.)	D: 15 minutes R: 0 to 240 minutes
Occupancy Schedules – Enables or disables the occupancy schedule function.	D: Enable R: Disable/Enable
Sensor Calibration	
Bypass Sensor Test – Provides the capability to bypass the factory test used to verify proper sensor operation. Must be set to **Yes** for normal unit operation.	D: Yes R: No/Yes
Space Temperature – The current space temperature.	R: -56 to 245°F (-48.9 to 118.3°C)
Space Temp Calibration – A calibration offset value to allow the local space temperature sensor to be adjusted to match a calibrated standard measuring the temperature in the same location.	D: 0°F (0°C) R: -9.9 to 10Δ°F (-5.5 to 5.5Δ°C)
Supply Air Temperature – Displays the current supply air temperature.	R: -56 to 245°F (-48.9 to 118.3°C)
Supply Air Temp Calibration – A calibration offset value to allow the supply air temperature sensor to be adjusted to match a calibrated standard measuring the temperature in the same location.	D: 0°F (0°C) R: -9.9 to 10Δ°F (-5.5 to 5.5Δ°C)
Return Air Temperature – Displays the current return air temperature sensor exceeds the high or low alarm limit.	R: -56 to 245°F (-48.9 to 118.3°C)
Return Air Temp Calibration – A calibration offset value to allow the return air temperature sensor to be adjusted to match a calibrated standard measuring the temperature in the same location.	D: 0°F (0°C) R: -9.9 to 10Δ°F (-5.5 to 5.5Δ°C)
Outdoor Air Temperature – The current outdoor air temperature from a linked air source, if available, or from another network source.	R: -56 to 245°F (-48.9 to 118.3°C)
Outdoor Air Temp Calibration – A calibration offset value allows the outdoor air temperature sensor to be adjusted to match a calibrated standard measuring the temperature in the same location.	D: 0°F R: -9.9 to 10°F

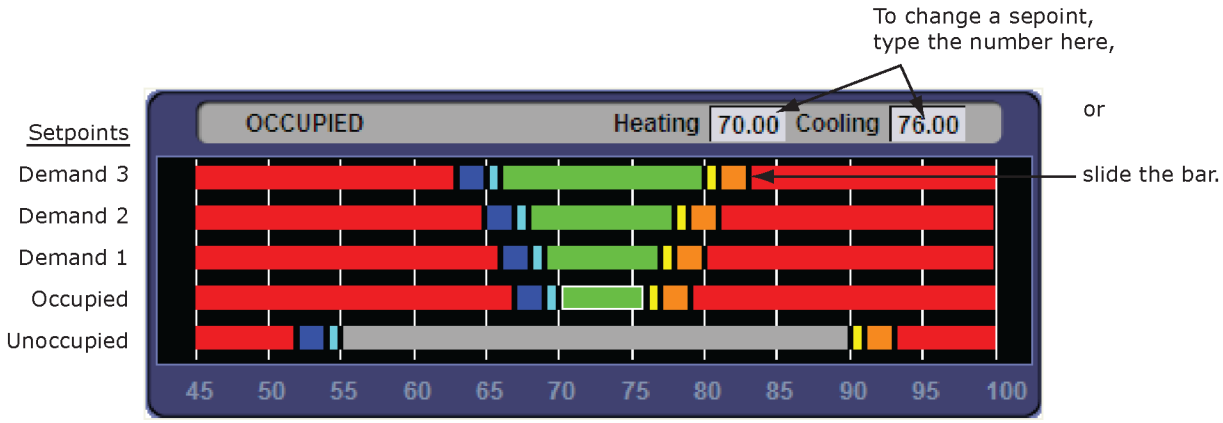
Changeover Temperature – The current value of the system water temperature, if present. (Displayed on 2-pipe changeover units using a changeover sensor.)	R: -56 to 245°F (-48.9 to 118.3°C)
Changeover Temp Sensor Calibration – A calibration offset value allows the changeover water temperature sensor to be adjusted to match a calibrated standard measuring the temperature in the same location. (Displayed on 2-pipe changeover units using a changeover sensor.)	D: 0°F (0°C) R: -9.9 to 10Δ°F (-5.5 to 5.5Δ°C)

Setpoints

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Configuration** > **Setpoints**

Select a color band on the setpoint graph to see the current setpoints in the **Heating** and **Cooling** fields. The values in this graphic are Fahrenheit. See setpoint descriptions below.

NOTE This graphic is an example only. Your setpoints may differ.



Occupied Setpoints

The occupied setpoints described below are the setpoints under normal operating conditions. The Demand Level 1–3 setpoints apply if demand limiting is used.

Demand limiting is a cost-saving strategy to reduce energy consumption. The strategy expands the occupied heating and cooling setpoints when the system reaches one of 3 levels of consumption. With the expanded setpoints, the equipment works less, thereby saving energy. By default, Demand Level 1 expands the occupied heating and cooling setpoints by 1Δ°F (Δ.5°C), Demand Level 2 by 2Δ°F (1.1Δ°C), and Demand Level 3 by 4Δ°F (2.2Δ°C). If the occupied heating or cooling setpoints change, the (effective) demand level setpoints automatically change by the same amount. See *Sequence of Operation* (page 38) for more information.

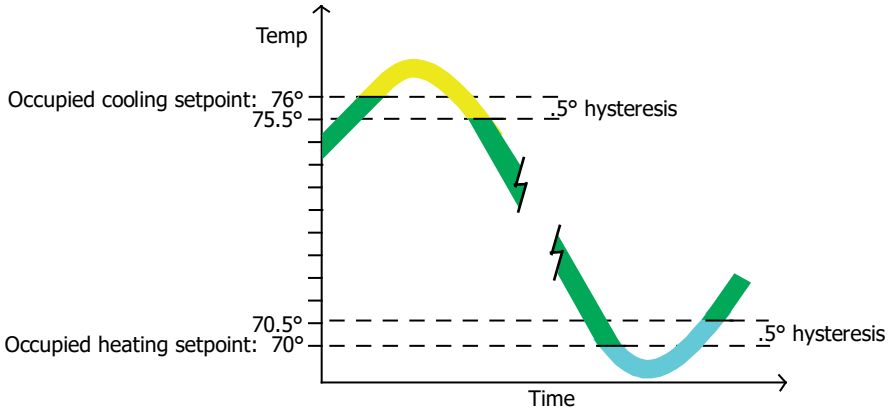
Point Name/Description	Default **Range:** -40 to 245°F (-40 to 118.3°C)				
	Occupied		Demand Level		
			1	2	3
Occupied Heating – Green The heating setpoint the controller maintains while in occupied mode.	D: R:	70°F (21.1°C) 40 to 90°F (4.4 to 32.2°C)	69°F (20.5°C)	68°F (20°C)	66°F (18.9°C)
Occupied Cooling – Green The cooling setpoint the controller maintains while in occupied mode.	D: R:	76°F (24.4°C) 55 to 99°F (12.7 to 37.2°C)	77°F (25°C)	78°F (25.5°C)	80°F (26.6°C)
Occupied Heating 1 – Light Blue The space temperature must be less than the **Occupied Heating 1** setpoint for the VVT Master to consider the zone a heating caller in a linked system. In a single-zone application, the heating requirement begins as soon as the space temperature falls below the **Occupied Heating** setpoint. We recommend that the **Occupied Heating 1** value be set no less than 0.5Δ°F (.27Δ°C) below the **Occupied Heating** setpoint.	69°F (20.5°C)		68°F (20°C)	67°F (19.4°C)	65°F (18.3°C)
Occupied Heating 2 – Dark Blue The space temperature must be less than the **Occupied Heating 2** setpoint to generate a low space temperature alarm. We recommend that this value be set no less than 0.5Δ°F (.27Δ°C) below the **Occupied Heating 1** setpoint.	67°F (19.4°C)		66°F (18.9°C)	65°F (18.3°C)	63°F (17.2°C)
Occupied Cooling 1 – Yellow The space temperature must be greater than the **Occupied Cooling 1** setpoint for the VVT Master to consider the zone a cooling caller in a linked system. In a single-zone application, the cooling requirement begins as soon as the space temperature exceeds the **Occupied Cooling** setpoint. We recommend that the **Occupied Cooling 1** value be set no less than 0.5Δ°F (.27Δ°C) above the **Occupied Cooling** setpoint.	77°F (25°C)		78°F (25.5°C)	79°F (26.1°C)	81°F (27.2°C)
Occupied Cooling 2 – Orange The space temperature must be greater than the **Occupied Cooling 2** setpoint to generate a high space temperature alarm. We recommend that this value be set no less than 0.5Δ°F (.27Δ°C) above the **Occupied Cooling 1** setpoint.	79°F (26.1°C)		80°F (26.6°C)	81°F (27.2°C)	83°F (28.3°C)

Unoccupied Setpoints

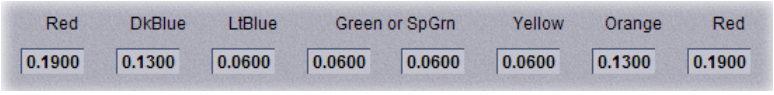
Point Name/Description	Default/Range
Unoccupied Heating – Gray The heating setpoint the controller maintains while in unoccupied mode.	D: 60°F (15.5°C) R: 40 to 90°F (4.4 to 32.2°C)
Unoccupied Cooling – Gray The cooling setpoint the controller maintains while in unoccupied mode.	D: 90°F (32.2°C) R: 45 to 99°F (7.2 to 37.2°C)

Unoccupied Heating 1 – Light Blue The space temperature must be less than the **Unoccupied Heating 1** setpoint for the VVT Master to consider the zone an unoccupied heating caller in a linked system. In a single-zone application, the unoccupied heating requirement begins as soon as the space temperature falls below the **Unoccupied Heating** setpoint. We recommend that the **Unoccupied Heating 1** value be set no less than 0.5Δ°F (.27Δ°C) below the **Unoccupied Heating** setpoint.	D: 59°F (15°C) R: 40 to 90°F (4.4 to 32.2°C)
Unoccupied Heating 2 – Dark Blue The space temperature must be less than the **Unoccupied Heating 2** setpoint to generate an unoccupied low space temperature alarm. We recommend that this value be set no less than 0.5Δ°F (.27Δ°C) below the **Unoccupied Heating 1** setpoint.	D: 57°F (13.9°C) R: 40 to 90°F (4.4 to 32.2°C)
Unoccupied Cooling 1 – Yellow The space temperature must be greater than the **Unoccupied Cooling 1** setpoint for the VVT Master to consider the zone an unoccupied cooling caller in a linked system. In a single-zone application, the unoccupied cooling requirement begins as soon as the space temperature exceeds the **Unoccupied Cooling** setpoint. We recommend that the **Unoccupied Cooling 1** value be set no less than 0.5Δ°F (.27Δ°C) above the **Unoccupied Cooling** setpoint.	D: 91°F (32.7°C) R: 45 to 99°F (7.2 to 37.2°C)
Unoccupied Cooling 2 – Orange The space temperature must be greater than the **Unoccupied Cooling 2** setpoint to generate an unoccupied high space temperature alarm. We recommend that this value be set no less than 0.5Δ°F (.27Δ°C) above the **Unoccupied Cooling 1** setpoint.	D: 93°F (33.9°C) R: 45 to 99°F (7.2 to 37.2°C)

Point Name/Description	Default/Range
Heating Capacity – Used for Optimal Start, this is the rate at which the space temperature changes when the heating system runs at full capacity to maintain designed occupied heating setpoint.	D: 3Δ°F (1.6Δ°C)/hr R: 0 to 120Δ°F (0 to 66.6Δ°C)/hr
Heating Design Temp – The geographically-based outdoor air temperature at which the heating system must run constantly to maintain comfort. This information is available in ASHRAE publications and most design references.	D: 0°F/C0°F (0°C) R: -100 to 150°F (-73.3 to 65.5°C)
Cooling Capacity – Used for Optimal Start, this is the rate at which the space temperature changes when cooling system runs at full capacity to maintain designed occupied cooling setpoint.	D: 3Δ°F (1.6Δ°C)/hr R: 0 to 140Δ°F (0 to 77.7Δ°C)/hr
Cooling Design Temp – The geographically-based outdoor air temperature at which the cooling system must run constantly to maintain comfort. This information is available in ASHRAE publications and most design references.	D: 100°F (37.7°C) R: -100 to 150°F (-73.3 to 65.5°C)

Point Name/Description	Default/Range
Hysteresis – The desired difference between the temperature at which the zone color changes as the space temperature departs from the acceptable range between the heating and cooling setpoints (green) into the Cooling 1 (yellow) or Heating 1 (light blue) and the temperature at which the zone color changes back to the acceptable range between the heating and cooling setpoints. For example, the following graph shows the zone color that results as the space temperature departs from and returns to the acceptable range in a zone with the following settings: • Color Change Hysteresis = .5Δ°F (.27Δ°C) (applies as the temperature returns to the acceptable range) • Occupied cooling setpoint = 76°F (24.4°C) • Occupied heating setpoint = 70°F (21.1°C) **NOTE** The values in the graph below are Fahrenheit.  	D: 0.5Δ°F (.27Δ°C) R: 0 to 120Δ°F (0 to 66.6Δ°C)

Learning Adaptive Optimal Start

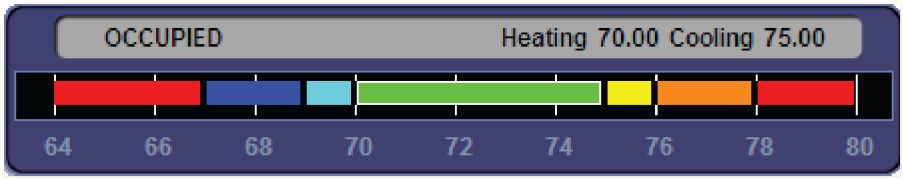


When the Learning Adaptive Optimal Start algorithm runs, the learned heating capacity or learned cooling capacity values are adjusted based on the color that is achieved when occupancy begins. The adjustment amounts for each color are displayed in the thermographic color fields (shown above with English default values).

Point Name/Description	Range English	Metric
Red – The amount the zone's learned heating capacity is adjusted when the Learning Adaptive Optimal Start algorithm runs, when the zone's thermographic color at occupancy is red.	D: 0.1900 R: 0 to 1	.1055 0 to 0.5555
DkBlue – The amount the zone's learned heating capacity is adjusted when the Learning Adaptive Optimal Start algorithm runs, when the zone's thermographic color at occupancy is dark blue.	D: 0.1300 R: 0 to 1	.0722 0 to 0.5555

Point Name/Description	Range English	Metric
LtBlue – The amount the zone's learned heating capacity is adjusted when the Learning Adaptive Optimal Start algorithm runs, when the zone's thermographic color at occupancy is light blue.	D: 0.0600 R: 0 to 1	.0333 0 to 0.5555
Green – The amount the zone's learned heating capacity is adjusted when the Learning Adaptive Optimal Start algorithm runs, when the zone's thermographic color at occupancy is green.	D: 0.0600 R: 0 to 1	.0333 0 to 0.5555
SpGrn – The amount the zone's learned cooling capacity is adjusted when the Learning Adaptive Optimal Start algorithm runs, when the zone's thermographic color at occupancy is green.	D: 0.0600 R: 0 to 1	.0333 0 to 0.5555
Yellow – The amount the zone's learned cooling capacity is adjusted when the Learning Adaptive Optimal Start algorithm runs, when the zone's thermographic color at occupancy is yellow.	D: 0.0600 R: 0 to 1	.0333 0 to 0.5555
Orange – The amount the zone's learned cooling capacity is adjusted when the Learning Adaptive Optimal Start algorithm runs, when the zone's thermographic color at occupancy is orange.	D: 0.1300 R: 0 to 1	.0722 0 to 0.5555
Red – The amount the zone's learned cooling capacity is adjusted when the Learning Adaptive Optimal Start algorithm runs, when the zone's thermographic color at occupancy is red.	D: 0.1900 R: 0 to 1	.1055 0 to 0.5555

Effective Setpoints

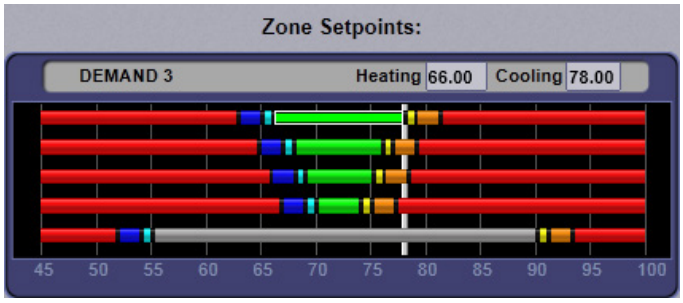
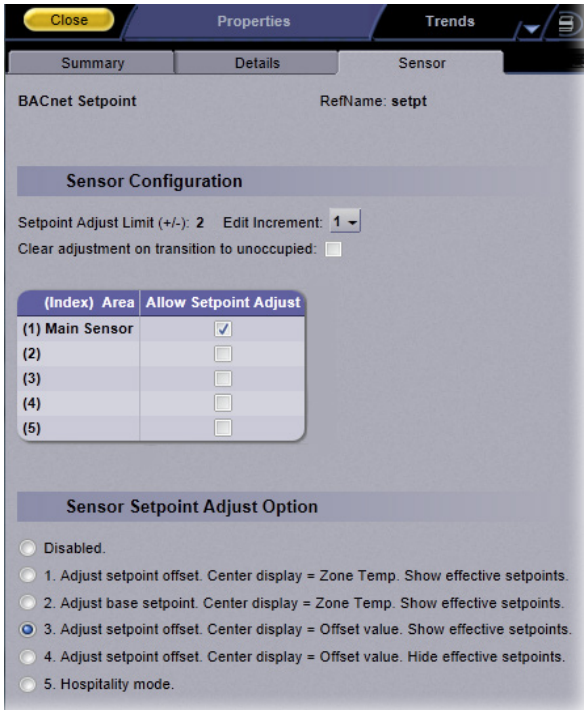


The **Effective Setpoints** graph shows the current occupied or unoccupied setpoints. If occupied, these values are the current programmed setpoints plus the offset of any setpoint adjustment that may be in effect. If unoccupied, the values are the programmed unoccupied setpoints. The values in the above graphic are Fahrenheit.

Point Name/Description	Default/Range
Heating – (Occupied or Unoccupied, depending on mode) The current programmed **Heating** setpoint adjusted by any offset that may be in effect.	R: 0 to 120°F (-17.7 to 48.9°C)
Cooling – (Occupied or Unoccupied, depending on mode) The current programmed **Cooling** setpoint adjusted by any offset that may be in effect.	R: 0 to 120°F (-17.7 to 48.9°C)
Learned cooling capacity – The cooling capacity learned by Learning Adaptive Optimal Start that is required to bring the space temperature down to the occupied cooling setpoint prior to the occupied time.	R: _°F/C
Learned heating capacity – The heating capacity learned by Learning Adaptive Optimal Start that is required to bring the space temperature up to the occupied heating setpoint prior to the occupied time.	R: _°F/C

Point Name/Description	Default/Range
Min Setpoint Separation – Minimum separation that must be maintained between the heating and cooling setpoints. May be adjusted at **Configuration** > **Service Configuration** > **Min Setpoint Separation**. See the *Service Configuration* (page 53) for additional detail.	R: _°F/C
Optimal Start – The number of hours prior to occupancy, at which the Optimal Start function may begin to adjust the effective setpoints to achieve the occupied setpoints by the time scheduled occupancy begins. Enter 0 to disable Optimal Start. **NOTE** Optimal Start is automatically disabled when occupancy is controlled by a network write to the controller's keypad_ovrde variable. (Display name: **BAS On/Off**, in **Properties** > **Control Program** > **Maintenance** > **Occupancy** > **BAS On/Off**. or when utilizing **Airside Linkage** or the **System Occupancy Network Variable**.	D: 1 hr R: 0 to 4 hrs
Optimal Start Type – The method used to change from unoccupied to occupied setpoint. Options: **None*** – Unit will not change to occupied setpoint until the scheduled time or the unit goes into an occupied mode. Setpoints do not ramp, but change immediately from unoccupied to occupied values. **Temp Compensated*** – Unit changes to occupied setpoints at a variable time prior to the occupied time, which is calculated by the current difference between space temperature and the appropriate heating or cooling setpoint. At that time, the setpoints do not ramp, but change immediately from unoccupied to occupied values. **Learning Adaptive Start** – Unit gradually changes to occupied setpoints by adjusting the unoccupied setpoints over a specified period of time to achieve the occupied setpoint by the time scheduled occupancy begins. ***When selecting **None** or **Temp Compensated**, you should set all **Learning Adaptive Optimal Start** transition factors to **0**, as shown below. Red 0.0000 DkBlue 0.0000 LtBlue 0.0000 Green or SpGrn 0.0000 0.0000 Yellow 0.0000 Orange 0.0000 Red 0.0000	D: Temperature Compensated None R: Temperature Compensated Learning Adaptive
Heat Start K factor (min/deg) – If **Optimal Start Type** is **Temp Compensated**, this is the time in minutes per degree that the equipment starts before the occupied period when the space temperature is below the occupied heating setpoint (including any setpoint offset).	D: 15.00 (27.00) R: 0 to 99 (0 to 177)
Cool Start K factor (min/deg) – If **Optimal Start Type** is **Temp Compensated**, this is the time in minutes per degree that the equipment starts before the occupied period when the space temperature is above the occupied cooling setpoint (including any setpoint offset).	D: 15.00 (27.00) R: 0 to 99 (0 to 177)
DCV Start Ctrl Setpoint – The value that the CO_2 level must exceed to begin the IAQ control function. **Configuration** > **Service Configuration** > **Ventilation Damper Type** must be set to **DCV**.	D: 500ppm R: 0 to 9999 ppm
DCV Max Ctrl Setpoint – The value that the CO_2 level must exceed for the IAQ function to control the damper to its **DCV Max Vent Damper Pos**. **Configuration** > **Service Configuration** > **Ventilation Damper Type** must be set to **DCV**.	D: 1000ppm R: 0 to 9999 ppm

Setpoints for ZS and wireless sensors

Setpoints for ZS and wireless sensors	
To configure setpoint properties for ZS or wireless sensors, **Ctrl+click** anywhere on the **Zone Setpoints:** graph at the top of the **Setpoints** section in order to access the **Properties** microblock popup. 	
In the popup, on the **Properties** > **Sensor** tab, configure ZS or wireless sensors for **Setpoint Adjust**. 	
Edit Increment – Amount of offset in degrees for each press of the up or down arrows on the ZS or wireless sensor for setpoint adjustment.	D: 1 R: 0.1 0.5 1

Allow Setpoint Adjust – Check to allow setpoint adjustments on the specified ZS or Carrier wireless sensor.	D: (1) enabled R: disabled/enabled
Sensor Setpoint Adjust Option – Check to select the ZS or wireless setpoint adjustment display.	D: 3

Alarm Configuration

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Configuration** > **Alarm Configuration**

Point Name/Description	Default/Range
Space Temperature Alarm	
Occupied Alarm Hysteresis – This value is added to the occupied high effective setpoint and subtracted from the occupied low effective setpoint to establish the occupied high and low limits that the space temperature must exceed before an occupied SPT alarm is generated. The alarm returns to normal when the space temperature drops below the high effective setpoint or rises above the low effective setpoint.	D: 5Δ°F (2.7Δ°C) R: 2 to 20Δ°F (1.1 to 11.1Δ°C)
Alarm Delay (min/deg) – Determines the amount of delay before an occupied space temperature alarm is generated when the controller transitions to the occupied mode. The delay time equals this value multiplied by the difference between the sensor temperature and occupied alarm setpoint plus 15 minutes.	D: 10 minutes R: 0 to 30 minutes
Unoccupied Low SPT Alarm Limit –The value that the space temperature must drop below to generate a **Space Temperature Alarm** in the unoccupied mode. There is a fixed hysteresis of 1Δ°F (.5Δ°C) for return to normal.	D: 45°F (7.2°C) R: 35 to 90°F (1.6 to 32.2°C)
Unoccupied High SPT Alarm Limit – The value that the space temperature must exceed to generate a **Space Temperature Alarm** in the unoccupied mode. There is a fixed hysteresis of 1Δ°F (.5Δ°C) for return to normal.	D: 95°F (35°C) R: 45 to 100°F (7.2 to 37.7°C)
Supply Air Temperature Alarm	
Low SAT Alarm Limit – The value that the supply air temperature must drop below to generate a **Supply Air Temp Alarm**. There is a fixed hysteresis of 3Δ°F (1.6Δ°C) for return to normal.	D: 45°F (7.2°C) R: 15 to 90°F (-9.4 to 32.2°C)
High SAT Alarm Limit – The value that the supply air temperature must exceed to generate a **Supply Air Temp Alarm**. There is a fixed hysteresis of 3Δ°F (1.6Δ°C) for return to normal.	D: 120°F (48.9°C) R: 90 to 175°F (32.2 to 79.4°C)

Point Name/Description	Default/Range
Return Air Temperature Alarm	
Low RAT Alarm Limit – The value that the return air temperature must drop below to generate a **Return Air Temp Alarm**. There is a fixed hysteresis of 1Δ°F (.6Δ°C) for return to normal.	D: 50°F (10°C) R: 35 to 90°F (1.6 to 32.2°C)
High RAT Alarm Limit – The value that the return air temperature must exceed to generate a **Return Air Temp Alarm**. There is a fixed hysteresis of 1Δ°F (.5Δ°C) for return to normal.	D: 120°F (48.9°C) R: 70 to 140°F (21.1 to 60°C)
Outdoor Air Temperature Alarm	
Low OAT Alarm Limit – The **Outdoor Air Temperature** must drop below this value to generate an **Outdoor Air Temp Alarm**. There is a fixed hysteresis of 1Δ°F (.5Δ°C) for return to normal.	D: -45°F (-42.7°C) R: -65°F to 70°F (-53.9 to 21.1°C)
High OAT Alarm Limit – The **Outdoor Air Temperature** must exceed this value to generate an **Outdoor Air Temp Alarm**. There is a fixed hysteresis of 1Δ°F (.5Δ°C) for return to normal.	D: 150°F (65.5°C) R: 70 to 175°F (21.1 to 79.4°C)
IAQ/Ventilation Alarm	
Occupied High CO2 Alarm Limit – The value that the CO_2 sensor must exceed to generate an **Indoor Air Quality Alarm** in the occupied mode.	D: 1100ppm R: 0 to 9999 ppm
Alarm Delay (min/ppm) – The fractional portion of a minute used to determine the amount of delay before an indoor air quality alarm is generated when the controller transitions to the occupied mode. The delay time equals this value multiplied by the difference between the sensor CO_2 value and the setpoint plus 15 minutes.	D: 0.25 minutes R: 0.10 to 1.00 minutes
Alarms Displayed on ZS or SPT Sensor (if optional sensor is connected)	
Space Temperature Alarm – If set to display, shows the alarm indicator on the SPT Pro and SPT Pro Plus sensors if the **Space Temperature** alarm is active.	D: Ignore R: Ignore/Display
Supply Air Temp Alarm – If set to display, shows the alarm indicator on the SPT Pro and SPT Pro Plus sensors if the **Supply Air Temp** alarm is active.	D: Ignore R: Ignore/Display
Fan Failure Alarm – If set to display, shows the alarm indicator on the communicating zone sensors with display, if the **Supply Fan Failure** alarm is active.	D: Ignore R: Ignore/Display
Return Air Temp Alarm – If set to display, shows the alarm indicator on the SPT Pro or SPT Pro Plus sensors if the **Return Air Temp** alarm is active.	D: Ignore R: Ignore/Display
Space High CO2 Alarm – If set to display, shows the alarm indicator on the SPT Pro and SPT Pro Plus' sensor if the **Indoor Air Quality** alarm is active.	D: Ignore R: Ignore/Display

Point Name/Description	Default/Range
Freezestat Alarm – If set to display, shows the alarm indicator on the SPT Pro or SPT Pro Plus sensors if the **Freezestat** alarm is active.	D: Ignore R: Ignore/Display
Fire/Smk Alarm – If set to display, shows the alarm indicator on the communicating zone sensors, if the **Fire/Smoke Alarm** is active.	D: Display R: Ignore/Display
Maintenance Displayed on ZS Sensor	
Thermostat Linkage Fault – If set to display, shows the maintenance indicator on the ZS Pro Sensor, if **Thermostat Linkage** is in a Fault condition.	D: Ignore R: Ignore/Display
Dirty Filter Alarm – If set to display, shows the alarm indicator on the communicating zone sensors, if a **Filter** alarm is active.	D: Display R: Ignore/Display
OAT Fault – If set to display, shows the maintenance indicator on a ZS Sensor, if the outside air reading is not valid.	D: Ignore R: Ignore/Display
SPT Sensor Fault – If set to display, shows the maintenance indicator on a ZS Sensor with display, if the zone temperature sensor reading is not valid.	D: Ignore R: Ignore/Display

Service Configuration

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Configuration** > **Service Configuration**

Point Name/Description	Default/Range
# of Fan Speeds – The number of fan motor speeds.	D: Three R: One Two Three
High Speed EH Only – Multi-speed fan applications. When enabled and electric heat is active, the fan runs at high speed. Viewable only when **Service Test** is enabled and **Heat Test** is active.	D: Enable R: Disable/Enable
Fan (G) Output Type – When set to **Fan On**, **G** output is energized when any fan speed is active (required for ECM and 33ZC fan control board). When set to **Fan Low**, the output is only energized for **Low Speed**.	D: Fan Low R: Fan On/Fan Low
Face & Bypass – Indicates whether the unit is equipped with a modulating F&B (Face & Bypass) damper to control the cooling and heating capacity of the unit.	D: No R: No/Yes
2-Pipe Changeover – Indicates that the water source connected to this equipment supplies both heating and cooling depending on the season. Set to **Yes** if water source is not a dedicated heating and cooling source.	D: Yes R: No/Yes

Point Name/Description	Default/Range
Changeover Config – Defines the type of sensor that determines the suitability of the water in a 2-pipe changeover system. Requires **Configuration** > **Service Configuration** > **2-Pipe Changeover** set to **Yes**.	D: Thermistor R: Switch/Thermistor
Changeover Cool Limit – Defines the lower limit of a changeover system and determines when the water is suitable for cooling. Temperatures below this value are suitable. **Configuration** > **Service Configuration** > **2-Pipe Changeover** must be set to **Yes**. Only valid if **Changeover Config** is set to **Thermistor**.	D: 60°F (15.5°C) R: 40 to 65°F (4.4 to 18.3°C)
Changeover Heat Limit – Defines the upper limit of a changeover system and determines when the water is suitable for heating. Temperature above this value is considered suitable. **Configuration** > **Service Configuration** > **2-Pipe Changeover** must be set to **Yes** Only valid if **Changeover Config** is set to **Thermistor**.	D: 80°F (26.6°C) R: 65 to 99°F (18.3 to 37.2°C)
Heat Type – The type of heating that the unit has. Selecting **2-Pipe Electric** automatically sets **2-Pipe Changeover** to **Yes**.	D: Modulating R: None Modulating Electric 2-Pipe/Electric
Heating Coil Position – When 2 or more coils are present, the position of the heating coil in the air stream, with respect to the cooling coil. **Preheat** indicates a heating coil is before the cooling coil. **Reheat** indicates the heating coil is after the cooling coil. **Configuration** > **Service Configuration** > **2-Pipe Changeover** must be set to **No**.	D: Preheat R: Preheat/Reheat
Valve Type – Indicates the position of the control valve with no power applied. Applicable to 2-position valves used with F&B control or modulating type water valves used in 4-pipe heating or 2-pipe applications.	D: NO R: NC (normally closed) NO (normally open)
# of Elect Heat Stages – Defines the number of electric heat stages controlled. The total combined number of heat stages plus fan speeds cannot exceed 4.	D: 1=One Stage R: 1= One Stage 2= Two Stage 3= Three Stage
Cool Type – The type of cooling that the unit has. Applicable to non-2-pipe changeover systems only and is visible when **Properties** > **Equipment** > **Configuration** > **Service Configuration** > **2-Pipe Changeover** is set to **No**.	D: Modulating R: None Modulating 1 Stage DX
Cooling Valve Type – Indicates the position of the cooling valve with no power applied. Applicable to 2-position cooling valves used with F&B control or modulating cooling valves used in cooling only or non-changeover applications.	D: NC R: NC (normally closed) NO (normally open)
Damper Type – The type of mixed air damper that the unit has.	D: Modulating R: None 2-Position Modulating
Damper Actuator Type – Used to determine damper output signal range (closed – open).	D: 0-10 V R: 0-10 V 2-10 V
Hardwired CO2 Sensor – Determines whether the optional CO_2 sensor is connected.	D: N/A R: N/A / Installed

Point Name/Description	Default/Range
DCV Control – Enables or disables zone demand controlled ventilation (DCV) if valid CO_2 sensor value is available.	D: Disable R: Disable/Enable
Min Setpoint Separation – Minimum separation that must be maintained between the heating and cooling setpoints.	D: 5Δ°F (2.7Δ°C) R: 2 to 10Δ°F (1.1 to 5.5Δ°C)
Input Ch #5 Function – Determines the function of the input connected to channel #5. **NOTE** When using Wireless Remote Occupancy contact for Carrier wireless sensors: D: None R: None / Fan Status	D: Remote Occupancy R: Fan Status Remote Occupancy
Ch #5 Normal Logic State – Specifies the state of the contact when the input #5 is in the normal state. (Either unoccupied or the fan is off.)	D: Open R: Open/Closed
Freezestat Switch Alarm State - Specifies the alarm state of the Freezestat switch input.(The unit shuts down if this point is in alarm.)	D: Closed R: Open/Closed
CO2 Sensor Min Input Volts – The lowest voltage that should be read from the hardwired CO_2 sensor. (Displayed if CO_2 sensor is Installed.)	D: 1.00 V R: 0 to 2 V
CO2 Sensor Max Input Volts – The highest voltage that should be read from the hardwired CO_2 sensor. (Displayed if CO_2 sensor is Installed.)	D: 5.00 V R: 2 to 5 V
CO2 Sensor Value @ Min Volts – The ppm value that correlates to the hardwired CO_2 sensor's low voltage reading. (Displayed if CO_2 sensor is Installed.)	D: 0 ppm R: 0 to 9999 ppm
CO2 Sensor Value @ Max Volts – The ppm value that correlates to the hardwired CO_2 sensor's high voltage reading. (Displayed if CO_2 sensor is Installed.)	D: 2000 ppm R: 0 to 9999 ppm

Sensor Binder / Zone Temp / ZS Zone CO2 **Ctrl+click** on the name of these properties to access the microblock popup **Properties** page > **Details** tab. See below for instructions on configuring your ZS or wireless sensors. See the microblock Help for more detailed explanations.	

Sensor Binder - Use the **Associated Sensors** table to configure the Rnet to use additional ZS or wireless sensors.

Index	Area	Network Type	Address	Lock Display	Version	Status	Error
1	Main Sensor	Rnet	1			Sensor Offline	No Comm
2	Sensor 2	Unused	2			Sensor Offline	None
3	Sensor 3	Unused	3			Sensor Offline	None
4	Sensor 4	Unused	4			Sensor Offline	None
5	Sensor 5	Unused	5			Sensor Offline	None

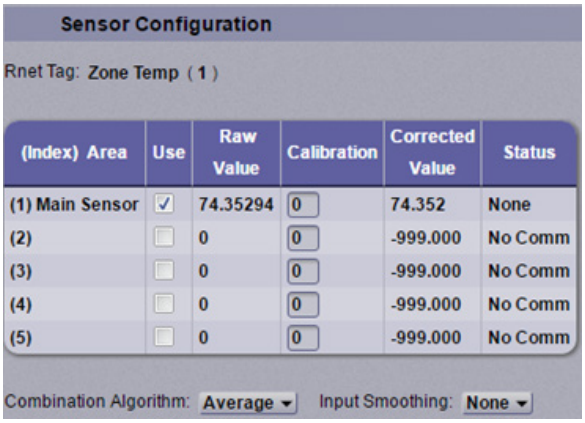
- **Network Type** - Set to **Rnet**
- **Address** - Enter the DIP switch settings that are on the additional ZS sensors (up to 5 total) or RnetID assigned to each wireless sensor in SensorBuilder
- **Lock Display** - Check to make the sensor display-only

D: **(Index)** - (1)

Network Type - Rnet

Address - 1

Zone Temp - Configure additional ZS or wireless temperature sensors used on the controller.



- **Use** - Check to include ZS or wireless sensors' value in the **Combined Algorithm** (**Average** is the default).
- **Raw Value** - Displays sensed temperature for each ZS or wireless temperature sensor's address
- **Calibration** - If needed, enter value to adjust the **Corrected Value** from the **Raw Value**, in order to calibrate an individual ZS or wireless sensor's sensed value.
- **Combination Algorithm** - Use **Average**, **Maximum**, or **Minimum** zone temperature to calculate the **Corrected Value** for temperature control.

D: **(Index) Area** - (1) Main Sensor

Use - checked

Calibration - 0

Combination Algorithm - Average

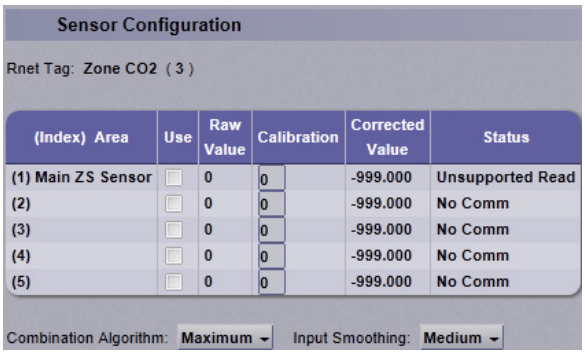
Input Smoothing - None

Show on Sensors - Calculated Value

Display Resolution - 1

COV Increment - .1

ZS Zone CO2 - Configure additional ZS CO_2 sensors used on the controller.



- **Use** - Check to include ZS sensors' value in the **Combined Algorithm** (**Maximum** is the default).
- **Raw Value** -Displays sensed CO_2 for each ZS CO_2 sensor's address
- **Calibration** - If needed, enter value to adjust the **Corrected Value** from the **Raw Value**, in order to calibrate an individual ZS sensor's sensed value.
- **Combination Algorithm** - Use **Average**, **Maximum**, or **Minimum** ZS CO^2 to calculate the **Corrected Value** for CO_2 control.

(Index) Area - (1) Main ZS Sensor

Use - unchecked

Calibration - 0

Combination Algorithm - Maximum

Input Smoothing - Medium

Show on Sensors - Calculated Value

Display Resolution - 1

COV Increment - 10

WS Signal Strength % — Displays radio signal strength of the wireless space temperature sensor. If there are multiple wireless sensors, it displays the lowest value.	R: %
WS Battery Strength % — Displays charge strength indicated on the wireless space temperature sensor. If there are multiple wireless sensors, it displays the lowest value.	R: %
Rnet Sensed Occupancy – Displays occupancy status detected by wireless infrared motion sensor.	R: Off/On
ZS model to show on graphic – Select the ZS model, from the drop-down list, that you want to display on the graphic.	D: ZS Pro-F model R: ZS Base model ZS Plus model ZS Pro model ZS Pro-F model
WS model to show on graphic – Select the wireless model, from the drop-down list, that you want to display on the graphic.	D: WS Plus model R: WS Base model WS Plus model WS Pro model
Net Space Temp to show on graphic — Select the type of sensor to display on graphic.	D: Equipment Touch R: Network Temp Equipment Touch
System Space Temperature – Allows this controller to use a space temperature value from another controller over the network. The remote controller must be equipped with a network-accessible space temperature sensor.	D: -999.0°F (-999.0°C) R: -50 to 150°F (-45.5 to 65.5°C)
System Setpoint Adjustment – The space temperature setpoint adjustment value received over the network.	D: -999.0°F (-999.0°C) R: -5 to 5Δ°F (-2.7 to 2.7Δ°C)

System Space AQ – Allows this controller to use a CO_2 value from another controller over the network. The remote controller must be equipped with a network-accessible CO_2/IAQ sensor value.	D: -999 R: 300 to 9999 ppm
System Cool Demand Level – The system cool demand level being received over the network.	D: 0.00 R: 0 to 3
System Heat Demand Level – The system heat demand level being received over the network.	D: 0.00 R: 0 to 3
System Outdoor Air Temperature – Allows the controller to use an outdoor air temperature value from the network. The remote controller must have a network-accessible outdoor air temperature sensor value.	D: -999.0°F (-999.0°C) R: -50 to 150°F (-45.5 to 65.5°C)
System Water Temperature – Allows a changeover temperature sensor value (system water temperature) from a central water plant to be read over the network and used by this controller. The remote controller must be equipped with a leaving water temperature sensor value that is network-accessible.	D: -999.0°F (-999.0°C) R: 0 to 250°F (0 to 121.1°C)
System Fire / Smoke – Allows a fire or smoke detector status value from another controller to be read over the network and used by this controller. The remote controller must be equipped with a network-accessible occupancy status point.	D: Off R: Off/On
System Occupancy – Allows reading and using another controller's occupancy status value over the network. The remote controller must have a network-accessible Occupancy Status point.	D: Unoccupied R: Unoccupied/Occupied

Service Test	
Point Name/Description	**Default/Range**
Service Test – Enable to stop automatic control so you can test the controller's outputs. Automatically resets to **Disable** after 1 hour.	D: Disable R: Disable/Enable
Sensor Status – Displays the status of the sensor test if the **Bypass Sensor Test** is set to **No** when service test mode is active. **Service Test** must be set to **Enable**.	R: TEST PASSED RAT bad OAT bad RAT/OAT bad? SAT bad SAT/RAT bad? SAT/OAT? Multiple bad
Fan Test – Enable to test the controller's fan operation. Sequences the fan from the low speed to the highest speed of the unit and operates at each speed for 60 seconds. **Service Test** must be set to **Enable**.	D: Disable R: Disable/Enable
Fan / Speed – The commanded state of the supply fan.	R: Off Low Med High On
Cooling Test – Enable to test the unit's cooling. During the test, the appropriate cooling device is activated. If DX cooling is configured, the supply fan output is activated and deactivated. For changeover units configured as 2-pipe/electric heat, the water valve output is tested. **Service Test** must be set to **Enable**.	D: Disable R: Disable/Enable

Heating Test – Enable to test the unit's heating. During the test, the appropriate heating device is activated. If electric heat is configured, the supply fan output is activated and deactivated. For changeover units configured as 2-pipe/electric heat, the electric heat output is tested. **Service Test** must be set to **Enable**.	D: Disable R: Disable/Enable
Preload OA Damper – Enable to drive the OA Damper 7.5% open. The installer should secure the damper shaft to the actuator with the damper in the fully closed position at this time. This assures a tight seal when the damper is in the closed position. **Service Test** must be set to **Enable**.	D: Disable R: Disable/Enable
Open Vent Damper 100% – Enable to test the OA Damper output. During the test, the damper is driven slowly to the 100%, or fully open, position. You must perform the **Preload OA Damper Position** test before this test and set **Service Test** to **Enable**.	D: Disable R: Disable/Enable

Maintenance

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Maintenance**

Point Name/Description	Default/Range
Unit	
Occupancy Status – The controller's occupancy status as determined by a network schedule, a local schedule, or a timed override.	R: Unoccupied/Occupied
Temp Compensated Start or **Learning Adaptive Start** – Indicates the type of optimal start (if any) that is configured and whether the algorithm is active or inactive.	R: Inactive/Active
Pre-Occ Purge – Indicates if the pre-occupancy purge cycle is active.	R: Inactive/Active
Space Temp Source – The source of the controlling space temperature value States: **Sensor Failure** – No valid space temperature or sensor status = failed **SPT Sensor** – An SPT sensor is connected to the controller's Rnet port **RAT/T55** – Using a RAT or T55 sensor wired to I/O terminal **Network** – A network temperature sensor is bound to the controller's space temperature AV **Airside Linkage** – The space temperature is from a linked terminal **Locked Value** –The controller's space temperature input has been manually locked at a value **T-Stat Linkage** – Space temperature shared via Thermostat Linkage **ZS Sensor** - A ZS sensor is connected to the controller's Rnet port **Wireless Sensor** - A Carrier wireless sensor is connected to the controller's Wireless Adapter, which is connected to the Rnet port	R: Sensor Failure SPT Sensor RAT/T55 Network Airside Linkage Locked Value T-Stat Linkage ZS Sensor Wireless Sensor
Setpoint Adjustment – The amount that a user has adjusted the setpoints at a zone sensor.	R: 0 to 5Δ°F (0 to 2.7Δ°C)
Effective Heat Setpoint – The current heating setpoint. May include offsets from the configured occupied/unoccupied setpoints resulting from **Optimal Start** or **Demand Limit**.	R: _°F/C

Point Name/Description	Default/Range
Effective Cool Setpoint – The current cooling setpoint. May include offsets from the configured occupied/unoccupied setpoints resulting from **Optimal Start** or **Demand Limit**.	R: _°F/C
IAQ Source – The source of the indoor air quality value. States: **N/A** – No sensor value associated with this device **Local** – A physical sensor is wired and connected to the appropriate input channel of this controller **Network** – A network sensor value provided to this controller **Linkage** – The sensor value from a linked device, obtained through **Airside Linkage**, **Thermostat Linkage**, or **Condenser Water Linkage**. **Locked Value** –The controller's sensor input is manually locked to a specific value **ZS Sensor** – A ZS wireless sensor is connected to the controller's Rnet port	R: N/A Local Network Linkage Locked Value ZS Sensor
Outdoor Air Temperature Source – The source of the OAT value. States: **N/A** – No sensor value associated with this device **Local** – A physical sensor is wired and connected to the appropriate input channel of this controller **Network** – A network sensor value provided to this controller **Linkage** – The sensor value from an active Linkage connection, such as Airside Linkage. **Locked Value** –The controller's sensor input is manually locked to a specific value	R: N/A Local Network Linkage Locked Value
Changeover Source – The source of the changeover input (contact or thermistor, as configured). States: **N/A** – No sensor value associated with this device **Local** – A physical sensor is wired and connected to the appropriate input channel of this controller **Network** – A network sensor value provided to this controller **Linkage** – The sensor value from a linked device, obtained through **Airside Linkage**, **Thermostat Linkage**, or **Condenser Water Linkage**. **Locked Value** –The controller's sensor input is manually locked to a specific valuet	R: N/A Local Network Linkage Locked Value
System Cooling Demand Level – The system cool demand level received over the network. (Not displayed if demand level is 0.)	R: 0 to 3
System Heating Demand Level – The system heat demand level received over the network. (Not displayed if demand level is 0.)	R: 0 to 3
Heating Control Setpoint – The calculated supply air temperature setpoint the heating device maintains when in the heating mode. The disabled value is 40°F. (Not displayed if **Heat Type** is equal to **None**.)	R: 40 to 140°F (4.4 to 60°C)
Cooling Control Setpoint – The calculated supply air temperature setpoint the cooling device maintains when in the cooling or dehumidification modes. The disabled value is 150°F. (Not displayed if **Cool Type** is equal to **None**.)	R: 38 to 150°F (3.3 to 65.5°C)
Damper Setpoint – The calculated supply air temperature setpoint that the mixed air damper maintains when cooling is required. The disabled value is 150°F. (Displayed if **Damper Type** is equal to **Modulating**.)	R: 38 to 150°F (3.3 to 65.5°C)

Point Name/Description	Default/Range
Damper Setpoint Override Value – A user-defined override for the calculated damper setpoint above. This value (if non-zero) is used by the mixed air damper control in place of the calculated value above, whenever cooling is required and the OA is suitable. This override function is disabled when set to 0°F. (Displayed if **Damper Type** is equal to **Modulating**.)	D: 0°F (0°C) R: 0 to 80°F (0 to 26.6°C)
Calculated DCV Damper Position – The calculated minimum damper position to maintain during an AQ override condition. (Displayed if **Damper Type** is equal to **Modulating**.)	R: 0 to 100%
# of Elect Heat Stages – The actual number of electric heat stages being controlled. This value always matches the configured value of **# of Elect Heat Stages** in Service Configuration, unless the total number of electric heat stages and fan speeds exceed 4. (Displayed if **Heat Type** is equal to **Electric** or **2-Pipe/Electric**.)	R: 1 to 3
# of Active Elec Heat Stages – The actual number of electric heat stages currently active or ON. (Displayed if **Heat Type** is equal to **Electric** or **2-Pipe/Electric.**)	R: 0 to 3
Reset Filter Alarm – Set this to **On** to reset an active **Filter Alarm** and restart the **Filter Service Alarm Timer**. After the alarm returns to normal, this automatically changes to **Off**.	D: Off R: Off/On
Input Channel #5 – The current state of the input (if present) connected to channel #5.	R: Open/Closed
Changeover Device – The current device being used to determine the suitability of the system water in a 2-pipe changeover system. (Displayed if **2-Pipe Changeover** equal to **Yes**.)	R: Switch/Sensor
Changeover Temperature – The current value of the system water temperature, if present. (Displayed if **Changeover Device** above equal to **Sensor**.)	R: -56 to 245°F (-48.9 to 118.3°C)
Changeover Switch – The current state of the changeover switch input, when present. (Displayed if **Changeover Device** above equal to **Switch**.)	R: Open/Heat Closed/Cool
Fire/Smk Shutdown – Displays the current state of the **System Fire/Smoke** network input.	R: Normal/Alarm
Occupancy	
BAS On/Off – Determines the occupancy state of the controller and can be set over the network by another device or third party BAS. Options: **Inactive** – Occupancy is determined by a configured schedule. **Occupied** – The controller is always in the occupied mode. **Unoccupied** – The controller is always in the unoccupied mode. **NOTE** If **BAS On/Off** is set to either **Unoccupied** or **Occupied**, the **Optimal Start** routine is automatically disabled.	D: Inactive R: Inactive Occupied Unoccupied
Schedules – The controller's occupancy status based on the local schedule.	R: Unoccupied/Occupied
Pushbutton Override – **Active** indicates if a user pushed the sensor's override button to override the occupancy state.	R: Off/Active
Override Time Remaining – The amount of time remaining in an override period.	R: 0 to 480 minutes
Occupancy Contact – The current status of **Input Channel #5** when configured as a **Remote Occupancy** contact input.	R: Inactive Active Occupied

Point Name/Description	Default/Range
System Occupancy – The status of the **System Occupancy** network point.	R: Inactive Unoccupied Occupied

Local BACnet Schedule	R: Off/On
Configure ZS Sensors by setting the following options in the **Local BACnet Schedule** microblock popup. Click **Local BACnet Schedule** to access the microblock popup **Properties** page > **Details** tab. See the microblock Help for more detailed explanations.	
Sensor Configuration	
Allow Force Unoccupied: – Check to allow a user to save energy by forcing the zone into an unoccupied schedule on the ZS sensor. The user does this by holding the sensor's On/Off button for at least 3 seconds. This forced state remains in effect until the schedule transitions to unoccupied or until a user presses the sensor's On/Off button again.	D: Enabled R: Disabled/Enabled
Force Unoccupied without Delay: – Check to allow a user to force a zone to unoccupied immediately instead of the normal 3-second delay. **NOTE** This option is not available if **Allow TLO Set During Occupied** is checked.	D: Enabled R: Disabled/Enabled
Timed Local Override	
Increment: – Minutes that the microblock adds to the zone's occupied time for each click of the zone's local override button or switch.	D: 30:00 mm:ss
Maximum Duration: – Maximum value (up to 960 minutes) the microblock outputs, regardless of additional pulses from the controller's input.	D: 60:00 mm:ss R: 0 to 960:00 mm:ss

Alarms

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Alarms**

Point Name/Description	Range
Fire / Smoke Shutdown – Indicates if the network **Fire / Smoke Shutdown** is in an alarm state.	R: Normal/Alarm
Space Temperature – Indicates if the space temperature sensor exceeds the high or low alarm limit.	R: Normal/Alarm
Alarming Temperature – The value of the alarming space temperature sensor. Visible only in an alarm condition.	R: The sensor's range

Point Name/Description	Range
Alarm Limit Exceeded – The alarm limit that the alarming space temperature sensor exceeded. Visible only in an alarm condition.	R: -60 to 250°F (-51.1 to 121.1°C)
SPT Sensor – Indicates if the SPT space temperature sensor fails to communicate with this controller after having successfully communicated previously. (Only displayed if SPT sensor is connected and has communicated successfully.)	R: Normal/Alarm
ZS Temp Sensor – Indicates if the ZS communicating zone temperature sensor is no longer communicating.	R: Normal/Alarm
ZS/WS Sensor Configuration– Indicates a configured ZS or wireless sensor is no longer communicating.	R: Normal/Alarm
Space Temp Sensor – Indicates if the space temperature sensor fails.	R: Normal/Alarm
Wireless Battery Strength Alarm – Indicates one of the configured wireless space temperature sensors is displaying low charge strength.	R: Normal/Alarm
Wireless Signal Strength Alarm – Indicates one of the configured wireless space temperature sensors is displaying low radio signal strength.	R: Normal/Alarm
Supply Fan Failure – Indicates an alarm condition if the supply fan's status fails to match the fan's commanded state when ON.(Only applicable if Input Ch#5 is set to **Fan Status**.)	R: Normal/Alarm
Indoor Air Quality – Indicates if the occupied CO_2 level exceeds the configured high alarm limit.	R: Normal/Alarm
Indoor Air Quality Sensor – Indicates that a valid indoor air quality sensor or sensor value is no longer available to the controller.	R: Normal/Alarm
Freezestat – Indicates a potential coil freeze condition exists because the input has been in an alarm state for more than 3 minutes. A delay of 3 minutes is provided between the input alarm detection and the alarm generation in order to correct the potential coil freeze condition and prevent nuisance alarms.	R: Normal/Alarm
Supply Air Temperature – Indicates if the supply air temperature exceeds the high temperature alarm limit or drops below the low temperature alarm limit.	R: Normal/Alarm
Return Air Temperature – Displays the current return air temperature sensor exceeds the high or low alarm limit.	R: Normal/Alarm
Filter – Indicates a dirty filter condition when the filter runtime exceeds the value of the **Filter Service Alarm Timer**.	R: Clean/Dirty
Outdoor Air Temperature – Indicates if the outdoor air temperature exceeds the high temperature alarm limit or drops below the low temperature alarm limit.	R: Normal/Alarm
Changeover Sensor – Indicates the controller is no longer receiving the system water temperature value.	R: Normal/Alarm
Thermostat Linkage – Indicates a failure exists between this unit and the other units in the group operating as a single zone using **Thermostat Linkage**.	R: Normal/Alarm

Linkage

Navigation: i-Vu® / Field Assistant: **Properties** > **Control Program** > **Linkage**

Point Name/Description	Range
Thermostat Linkage – Indicates whether this unit is a part of a group of units operating as a single zone using **Thermostat Linkage**.	R: Not Active/Active
Linkage Thermostat Appl (Provider) – For those slave units not sequentially addressed and polled by the master unit, set the **Network Number** and **Address** of the master unit in this slave unit.	
Network Number	R: 1 to 65534
Address	R: 1 to 99
Linkage Thermostat Appl (Collector) – For a master unit with sequentially addressed slave units, set the **Number of Providers** to the total number of unit ventilators (including the master) that are sequentially addressed in this system.	
Application Instance	D: 1
Number of Providers	R: 1 to 8
Alarm if < # of Linked Units – Used to set the minimum number of communicating units that are connected with this master unit through **Thermostat Linkage**. The function is disabled if set to 0. Set this value in the master only to the system size to detect and alarm any slave zone failures. (Not displayed if controller is a slave unit.)	D: 1 R: 0 to 8

I/O Points

The values shown on the **I/O Points Properties** page are the raw values at the I/O objects and may not match values shown on status displays that are affected by control program logic.

i-Vu users logged in as **Power User** and above are able to edit various parameters associated with the input channels and the display names for all channels.

We strongly recommend that you leave these parameters at their defaults. The controller is not a programmable controller. I/O can only be used for the purpose designed in the equipment control program. Modifying these parameters may result in unpredictable equipment control.

See *Wiring inputs and outputs* (page 8) for more information. This table lists each of the I/O Channels, their functions, associated hardware, and terminal numbers.

Navigation: i-Vu® / Field Assistant: **Properties** > **I/O Points**

WARNINGS

- Do not change the **Value**, **Offset/Polarity**, **Exp:Num**, **I/O Type**, **Sensor/Actuator Type**, **Min/Max**, or **Resolution** I/O configuration parameter for the points listed below. Changing these parameters could cause improper control and/or equipment damage.
- Use extreme caution if locking a point as this may also cause improper control and/or equipment damage.

Point Name/Description	Default/Range
Zone Temp / Zone Temp (SPT Standard, SPT Plus, SPT Pro, and SPT Pro Plus sensors only). Sensor configurations on the microblock's **Properties** > **Details** tab are listed below. For more information, see the *Carrier Sensors Installation Guide*. **NOTE** Do not edit settings on the **Zone Temp** microblock on the right.	R: -56 to 245°F (-48.9 to 118.3°C)
Sensor Type: **Min Present Value** - Minimum present value the sensor transmits before indicating an alarm.	D: 45°F (7.2°C)
Max Present Value - Maximum present value the sensor transmits before indicating an alarm.	D: 96°F (35.5°C)
Setpoint Adjustment: **Max Adjust** – The amount that a user may adjust the setpoint at the sensors.	D: 5Δ°F (2.7Δ°C) R: 0 to 15Δ°F (0 to 8.3Δ°C)
Reset setpoint adjust to zero when unoccupied - Resets the setpoint bias to zero when the controller transitions to unoccupied.	D: Off
Timed Local Override: **Allow Continuous** (SPT Pro only) – If checked, a user can press the sensor's local override button until the **Max Accum** value is reached, then press one more time to have a continuous override until the next occupied period or until the user cancels the override. The display shows **On** during a continuous override.	D: Off R: Off/On
Each Pulse – The amount of time added to the total override time when a user pushes the sensor's override button.	D: 30:00 mm:ss R: 0:00 to 1440:00 mm:ss
Max Accum – The maximum amount of override time accumulated when a user pushes the sensor's override button.	D: 240:00 mm:ss R: 0:00 to 2000:00 mm:ss
Cancel override – How long a user must push the sensor's override button to cancel an override.	D: 3 seconds R: 0 to 60 seconds
Sensor Array: **Sensor calculation method -** When using multiple SPT sensors, select the process variable to be passed to the controller.	D: Avg R: Avg, Min, Max

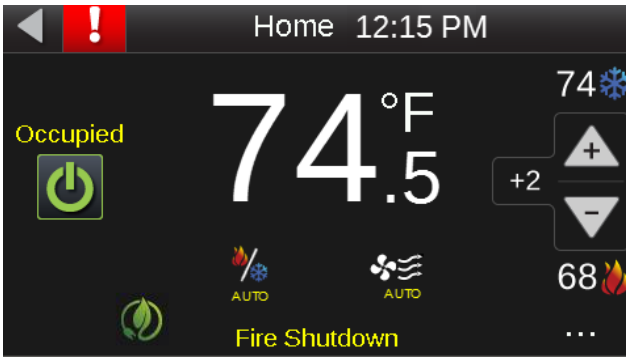
BACnet configuration: **Network Visible -** Must be enabled for other BACnet objects to read or write to this point, and for this point to generate alarms.	D: Enabled
Object Name - Do not change.	D: zone_temp
CO2 Sensor – The current voltage of the controller's **CO2** input.	R: 0 to 5 Volt
RAT Sensor – The value of the controller's return air temperature sensor input, prior to any operator-configured **Calibration Offset**.	R: -56 to 245°F (-48.9 to 118.3°C)
SAT Sensor – The value of the controller's supply air temperature sensor input, prior to any operator-configured **Calibration Offset**.	R: -56 to 245°F (-48.9 to 118.3°C)
OAT Sensor – The value of the controller's outdoor air temperature sensor input, prior to any operator-configured **Calibration Offset**.	R: -56 to 245°F (-48.9 to 118.3°C)
Changeover Temp – The value of the controller's changeover water temperature sensor input, prior to any operator-configured **Calibration Offset**.	R: -56 to 245°F (-48.9 to 118.3°C)
WS Battery Strength % — Displays charge strength indicated on the wireless space temperature sensor. If there are multiple wireless sensors, it displays the lowest value.	R: _%
WS Signal Strength % — Displays radio signal strength of the wireless space temperature sensor. If there are multiple wireless sensors, it displays the lowest value.	R: _%
Zone Temp – The value provided by the controller's ZS or wireless sensor (if present).	R: _°F/C
ZS Zone CO2 - IAQ/CO2 signal received from CO2-enabled ZS Sensor(s).	R: _ppm
Changeover – The current state of the changeover contact input.	R: Open/Closed
Input Channel #5 – The current state of the input (if present) connected to channel #5.	R: Open/Closed
Freezestat – The current state of the freezestat contact input.	R: Open/Closed
Sensor Invalid – This internal input monitors the communication between the controller and the SPT sensor. **Off** indicates communication is normal.	R: Off/On
Rnet Sensed Occupancy – Displays occupancy status detected by wireless infrared motion sensor.	R: Off/On
OA Damper – The current, commanded output of the outdoor air damper that always represents the fixed hardware output of 0-10 Vdc. If the Damper Actuator type is configured for 2-10 Vdc, the Damper Output will display the adjusted damper position as the result of the rescaling the 2-10 Vdc range to 0 to 100%.	R: 0 to 100%
Valve / F&B – The current, commanded output of the connected device, if equipped. This device can be an F&B damper or a modulating water valve (2-pipe or heating).	R: 0 to 100%
Cooling Valve – The current, commanded output of the 4-pipe modulating cooling valve, if equipped.	R: 0 to 100%
Fan High Spd – The assigned output channels's current configuration-dependent, commanded output. If the **# of Fan Speeds** is set to **3**, then this is the High speed fan output. If the **# of Fan Speeds** is set to less than 3, then this output can be used for the 2nd electric heat stage.	R: Off/On
Fan Med Spd – The assigned output channel's current configuration-dependent, commanded output. If the **# of Fan Speeds** is set to **3**, then this is the Med speed fan output. If the **# of Fan Speeds** is set to **2**, then this is the High speed fan output. If the **# of Fan Speeds** is set to **1**, then this output can be used for the 3rd electric heat stage.	R: Off/On

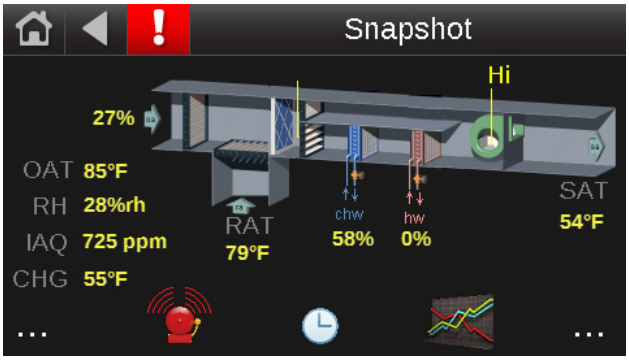
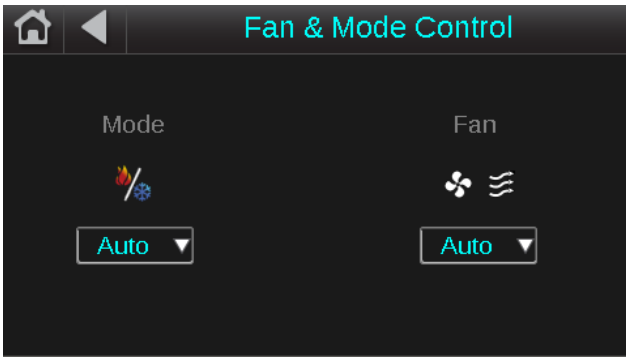
Fan G / Low Spd – The assigned output channel's current configuration-dependant, commanded output. If the **# of Fan Speeds** is set to **1** or if **Fan (G) Output Type** is set to **Fan On**, then this output is on whenever the fan is commanded to run. Otherwise, the output is the Low speed fan output.	R: Off/On
BO-4 – The assigned output channel's current configuration-dependent, commanded output. If **Heat Type** is electric, then this is the 1st stage electric heat output. If **Face & Bypass** is **Yes**, then this is the 2-position water valve output (if **2-Pipe Changeover** is **Yes**) or the 2-position heating valve output (if **2-Pipe Changeover** is **No**).	R: Off/On
BO-5 – The assigned output channel's current configuration-dependent, commanded output. If **2-Pipe Changeover** is **No** and **Face & Bypass** is **Yes**, then this is the 2-position chilled water valve output. If **Heat Type** is **2-Pipe/Electric**, then this is the 1st stage electric heat output.	R: Off/On

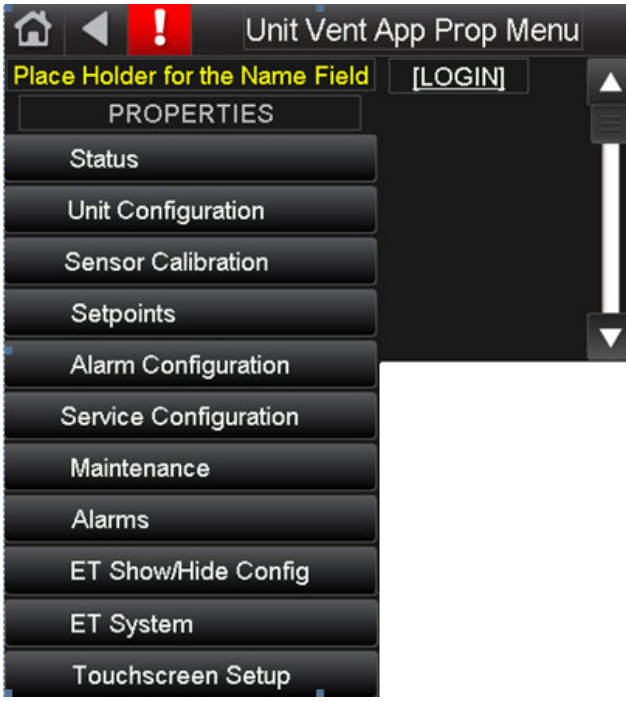
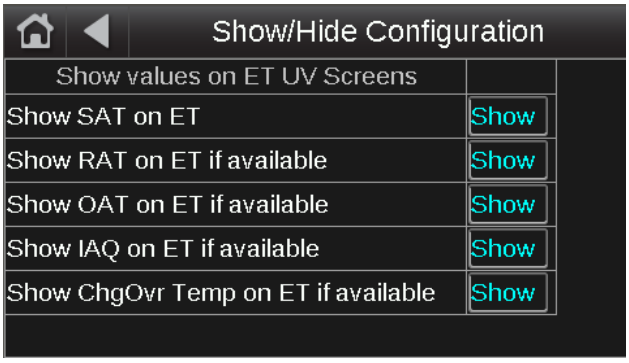
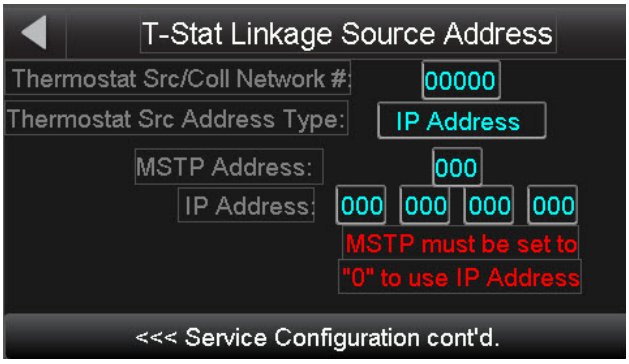
Appendix D: Unit Vent for AppController Points/Properties on the Equipment Touch

NOTE Engineering units shown in this document in the defaults and ranges are strictly for reference. You must enter an integer only.

Navigation screens

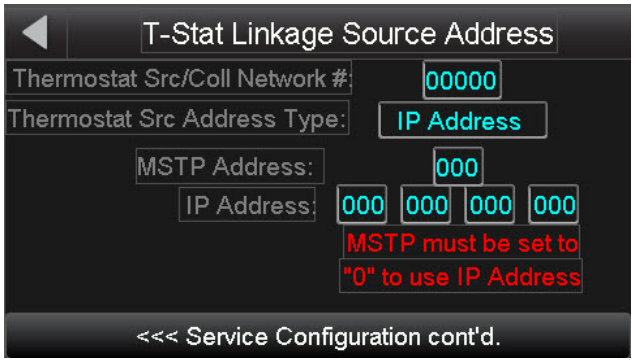
Screen Names	Display	Details
Standby	 Not an interactive screen. Touch anywhere to advance to **Home** screen.	Screen displays after the **Inactivity Timer** expires (default is 5 minutes). Displays: • Space temperature • Current setpoints • Mode - Cooling, Fan Speed, Economizer • Occupancy • OAT, if available
Home	 Click ... on the right to navigate to **Snapshot** screen.	Displays: • Space temperature • Current setpoints • Mode - Cooling, Fan Speed, Economizer • Occupancy • OAT, if available Allows: • Pushbutton Override • Space Setpoint Offset Adjustment

Screen Names	Display	Details
Snapshot	 Forward to **Unit Vent App Properties Menu** screen - click ... on the right Displays: • SAT, if allowed • RH, if available and allowed • IAQ, if available and allowed • OAT, if available and allowed • Coil & Dampers' positions and % open • Filter status	Navigates to: • Alarm status • Schedules • Trends • Back to the **Home** screen - click ... on the left Displays: • Unit Vent for AppController alarms, if present • Fan speed Hi
Fan & Mode Control		Manually set Modes and Fan Speed. Displays: • Fan Mode • Fan Speed • Cool Mode • Heat Mode

Screen Names	Display	Details
Unit Vent App Properties Menu		Navigates to **Property** pages Login with one of the following passwords: ○ User level - type `user` ○ Admin level - type `admin` ○ Factory level - type `Touch` **NOTE** Only the buttons that are authorized for a specific password level are visible.
Show/Hide Configuration		Configure Show/Hide conditions for values on the following screens: • Standby • Home • Snapshot **NOTE** Only displayed for the Factory or Admin password. (See above.)
T-Stat Linkage Source Address	 Click on the bottom to navigate to **Service Configuration cont'd**.	Set up T-Stat Linkage using the following properties: • Thermostat Src/Coll Network# • Thermostat Src Address Type: (IP Address/MAC) • MSTP Address of Collector • IP Address of Collector (to set an IP address, the MSTP address must be set to "0")

Thermostat Linkage Source

Navigation: Equipment Touch: **Service Configuration** > **Service Configuration cont'd. > T-Stat Linkage Source Address**

T-Stat Linkage Source Address	**Range**
 Use this screen to set up T-Stat Linkage Source Address using the following properties (listed below). To navigate to **Service Configuration cont'd.**, click on the bottom.	
Thermostat Src/Coll Network# – Enter the thermostat's MSTP network number.	D: 0 R: 0 to 65,534
Thermostat Src Address Type – Select the type of BACnet network of the source water controller.	D: MSTP R: MSTP or IP Address
MSTP Address: – Set the MAC address of the source water controller. **NOTE** The MSTP address and IP address are mutually exclusive. To set an IP address, the MSTP address must be 0.	D: 0 R: 0 to 99
IP Address: – Set the MAC address of the source water controller. **NOTE** The MSTP address and IP address are mutually exclusive. To set an IP address, the MSTP address must be 0.	D: 0.0.0.0 R: 0.0.0.0 to 255.255.255.255

Document revision history

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

Date	Topic	Change description	Code*
9/20/22	CE and UKCA Compliance	Updated for next gen	X-O-BH-E
	FCC Compliance		
9/21/21	Wiring devices to the controller's Rnet port	Removed hybrid wiring configuration for Rnet port	X-TS-AK-E
1/25/19	Wiring devices to the controller's Rnet port	Removed star configuration from the first paragraph.	X-TS-TS-O
	Specifications	Added surge CAUTION to Protection specification.	X-TS-AK-E-CC
10/29/18	Wiring devices to the controller's Rnet port	Combined overview and wiring on the zone sensors and touchscreen devices. Added TruVu™ ET Display.	C-D
	Field-supplied hardware	Removed SPT sensors.	C-D
	Wiring inputs and outputs > Input wiring specifications	Combined overview and wiring on the zone sensors and touchscreen devices. Added TruVu™ ET Display.	C-D
	Specifications	Reworded Rnet port specification and added power supplied by Rnet port. Reworded Protection specification and added first paragraph.	X-H-JS-O
3/13/18	Points and Properties > Alarm Configuration	Hysteresis corrected	C-AE-WB-O
1/11/18	Sequence of Operation > Supply Fan	Section added on Configuring Automatic Fan Speed setpoints	C-AE-AP-E-WB
	Appendix C: Unit Vent for AppController Points/Properties	Updated to support motion detectors	C-AE-MM-E
12/11/17	Service Configuration I/O Pts	WS Sensed Occupancy changed to Rnet Sensed Occupancy	C-AE-MM-E
9/26/17	Field-supplied sensor hardware	New topic	C-TS-AP-F-WB
9/7/17	Analog outputs	Corrected impedance from 500 Ohms to 2000 Ohms	C-AE-ZL-E-WB
4/17/17	Sequence of Operation Appendix C: Unit Vent for AppController Points/Properties	Updated to include metric values and wireless sensor support	C-AE-CP-E
	ZS sensor overview SPT sensor overview	Number of total ZS sensors corrected.	C-D
	Carrier wireless sensor overview To install the Wireless Adapter for wireless sensors	New Topics	C-D
	Wiring devices to the controller's Rnet port	Added Wireless Adapter for wireless sensors. Added overview of all sensors.	C-D
	Input wiring specifications	Added Wireless Adapter for wireless sensors	C-D
	To wire the controller to the network	Added BACnet ARC156 connection information	C-D
	Wiring for communications	Changed from Wiring the controller to the MS/TP network	C-D
	Controller specifications	Added BACnet ARC156 connection and Wireless Adapter for Carrier wireless sensors. Corrected SPT information.. Corrected SPT information.	C-D
	Cover What is the controller?	Changed to latest controller image	C-D
2/22/16	Start-up	Added USB Link wiring caution.	C-TS-RD-E-JH
1/13/16	Unit Vent for AppController Points and Properties on the Equipment Touch	Equipment Touch navigation updated.	C-AE-CP_E

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

Date	Topic	Change description	Code*
	Unit Vent for AppController Points/Properties	Updated to remove all BACview reference Added ZS sensor and Equipment Touch support Condenser Water is now referred to as Source Water	C-AE-MM-O
6/19/14	Restore factory defaults	Added information on using the Factory Defaults jumper	C-D-LJ-E-RD

* For internal use only