Zone Ctrl II and VAV Zone II Secondary Duct
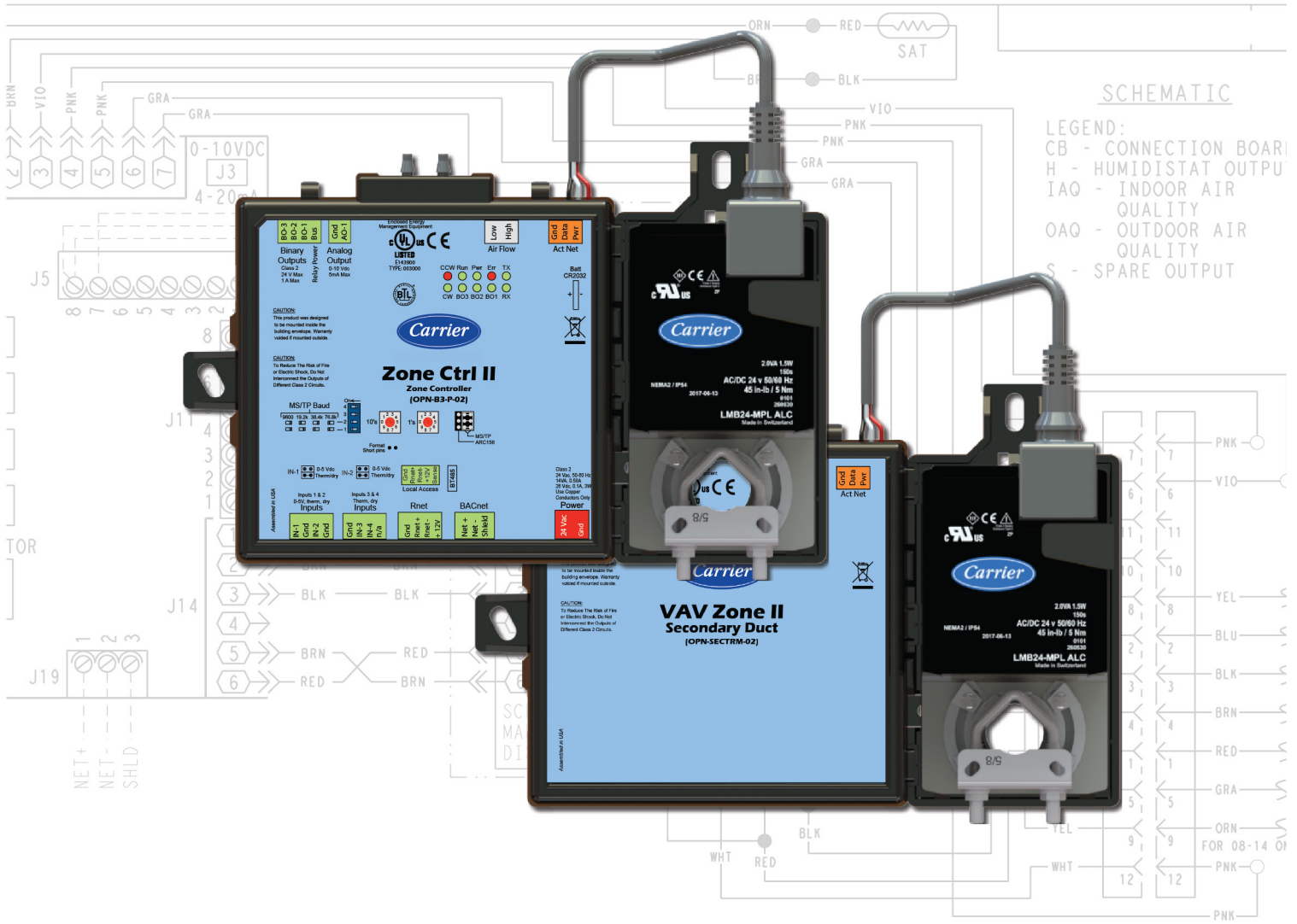## Installation and Start-up Guide

⚠ Verify that you have the most current version of this document from **www.hvacpartners.com**, the **Carrier Partner Community** website, or your local Carrier office.

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

Contents

Overview and specifications

What are the Zone Ctrl II and VAV Zone II Secondary Duct?

The Zone Ctrl II (OPN-B3-P-02) is for zone control, using custom control programs. It has a built-in flow sensor and a detachable actuator, uses a patented flow control algorithm, and mounts directly on the terminal unit damper shaft. Use EquipmentBuilder or Snap to create or modify your control program. There are many control programs for single and for dual duct terminals that are already prepared that you can access in EquipmentBuilder.See *Create or edit equipment control programs* (page 30).

You can disconnect the actuator from the controller and mount them separately, connecting them with just the actuator cable or using an additional extension cable, up to a maximum distance of 300 feet.
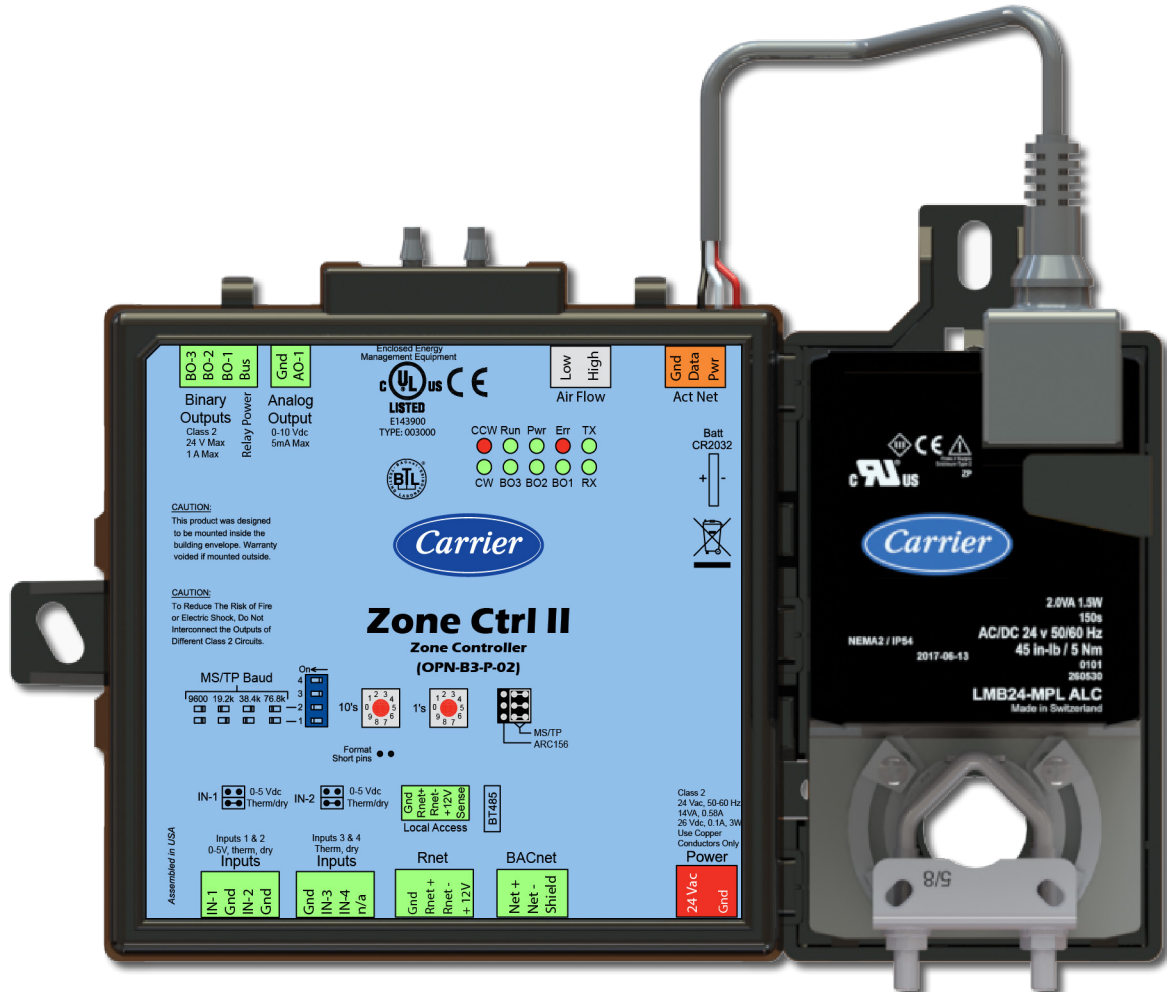
You can also use a VAV Zone II Secondary Duct (OPN-SECTRM-02) controller and actuator, which controls damper movement and has an integrated flow sensor to measure airflow on the secondary VAV box in a dual duct system. The VAV Zone II Secondary Duct works only with a Zone Ctrl II. For details, see *Using a VAV Zone II Secondary Duct* (page 25).

Zone Ctrl II specifications

Driver	drv_b3popn02
Maximum number of control programs*	1
Maximum number of BACnet objects*	300
* Depends on available memory	
Power	24 Vac ±10%, 50–60 Hz 14 VA power consumption 26 Vdc (25 V min, 28.8 V max), 3W Single Class 2 source only, 100 VA or less
Actuator	Belimo brushless DC motor, torque 45 inch-pounds (5 Nm), runtime 154 seconds
Act Net port	To connect the actuator cable, the VAV Zone II Secondary Duct, and up to 2 i-Vu® Smart Valves
BACnet port	For communication with the controller network using ARC156 or MS/TP (9600 bps–76.8 kbps)
Rnet port	• Supports up to 5 wireless and/or ZS sensors, and one Equipment Touch or TruVu™ ET Display. • Supplies 12 Vdc/200 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
Inputs	4 inputs configurable for thermistor or dry contact. Inputs 1 and 2 are also configurable for 0–5 Vdc.
Input resolution	10 bit A/D
Input pulse frequency	10 pulses per second. Minimum pulse width (on or off time) required for each pulse is 50 msec.
Binary outputs	3 N.O. binary outputs, relay contact rated at 1 A max. @ 24 Vac/Vdc. Configured normally open.
Analog output	1 analog output, 0–10 Vdc (5 mA max)
Output resolution	8 bit D/A
Integral airflow sensor	Precision differential pressure sensor 0–2 in. H2O, sensitive down to ±0.001 in. H2O. Barbed tapered airflow connections accept 3/16 in. (4.75 mm) I.D. tubing. Allows for readings across the 0–2 in. H2O range, accurate to ±5% of full flow at 2 in. H2O.
Microprocessor	High speed 16-bit microprocessor with ARCNET communication co-processor

Memory	512 kB non-volatile battery-backed RAM, 1 MB Flash memory, 16-bit memory bus
Battery	10-year Lithium CR2032 battery retains the following data for a maximum of 10,000 hours during power outages: control programs, 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.
BT485 connector	You attach a BT485 (not included) to a controller at the beginning and end of a network segment to add bias and to terminate a network segment.
Status indicators	LEDs indicate status of communications, running, errors, power, and binary outputs
Environmental operating range	32 to 130°F (0 to 54.4°C), 10–90% relative humidity, non-condensing
Storage temperature range	-24 to 140°F (-30 to 60°C), 0 to 90% relative humidity, non-condensing
Physical	Fire-retardant plastic ABS, UL94-5VA
Controller and actuator overall dimensions	Width: 8.9 in. (22.7 cm) Height: 5.9 in. (15.0 cm)
Controller and actuator mounting dimensions	7.1 in. (18.0 cm) from left side controller mounting hole centerline to actuator mounting hole centerline
Controller overall dimensions	Width: 6.4 in. (16.3 cm) Height: 5.7 in. (14.5 cm) Depth: 2.1 in. (5.3 cm)
Controller mounting dimensions	5.3 in. (13.4 cm) from left side controller mounting hole centerline to right side controller mounting hole centerline
Actuator overall dimensions	Width: 3.0 in. (7.6 cm) Height: 5.9 in. (15.0 cm) Depth: 2.5 in. (6.4 cm)
Actuator mounting dimensions	4.4 in. (11.2 cm) from shaft centerline to actuator mounting hole centerline
Weight	1.8 lbs (0.82 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 B, 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

VAV Zone II Secondary Duct specifications

Power requirements	The VAV Zone II Secondary Duct receives power from the Zone Ctrl II. For AC, increase the controller's power supply by 3 VA when connecting a Zone Ctrl II. For DC, increase the controller's power supply by 2.5W when connecting a Zone Ctrl II.
Actuator	Belimo brushless DC motor, torque 45 inch-pounds (5 Nm), runtime 154 seconds
Act Net port	To connect the actuator to the VAV Zone II Secondary Duct controller and to the Zone Ctrl II
Protection	Built-in surge and transient protection for power and communications in compliance with EN61000-6-1.
Status indicators	LEDs indicate status of communications, running, power, and motor direction
Environmental operating range	32 to 130°F (0 to 54.4°C), 10–90% relative humidity, non-condensing
Integral airflow sensor	Precision differential pressure sensor 0–2 in. H2O, sensitive down to ±0.001 in. H2O. Barbed tapered airflow connections accept 3/16 in. (4.75 mm) I.D. tubing. Allows for readings across the 0–2 in. H2O range, accurate to ±5% of full flow at 2 in. H2O.
Controller and actuator overall dimensions	Width: 8.9 in. (22.7 cm) Height: 5.9 in. (15.0 cm)
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Controller mounting dimensions	5.3 in. (13.4 cm) from left side controller mounting hole centerline to right side controller mounting hole centerline

Actuator overall dimensions	Width:	3.0 in. (7.6 cm)
	Height:	5.9 in. (15.0 cm)
	Depth:	2.5 in. (6.4 cm)
Actuator mounting	4.4 in. (11.2 cm) from shaft centerline to mounting hole centerline	
Weight	1.8 lbs (0.82 kg)	
Listed by	UL-916 (PAZX), cUL-916 (PAZX7), FCC Part 15-Subpart B, Class B, 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 Zone Ctrl II before wiring it. Failure to follow this warning could cause electrical shock, personal injury, or damage to the controller.

Installing the Zone Ctrl II

1 *Mount the controller* (page 8).

2 *Wire the controller for power* (page 11).

3 *Set the controller's address* (page 12).

4 *Wire the controller to the BACnet MS/TP or BACnet ARC156 network* (page 14).

5 *Wire inputs and outputs.* (page 15)

6 *Wire devices to the controller's Rnet port* (page 18).

For details on installing a secondary terminal, see *Using a VAV Zone II Secondary Duct for a dual duct system* (page 25).

To mount the Zone Ctrl II

To disconnect and mount the controller and actuator separately
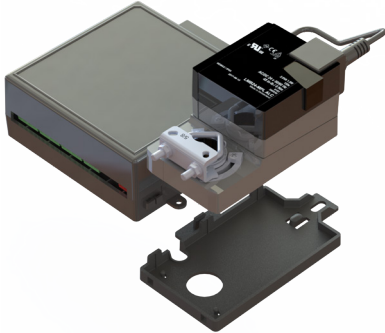
Disconnect the actuator from the controller by inserting a screw driver in the slot on the back of the Zone Ctrl II and pressing the tab. The actuator cable or an attached extension cable must connect to the controller's **Act Net** port.

Press tab in slot to disconnect actuator

To actuator

Act Net port

Mounting bracket

Mounting bracket when detached
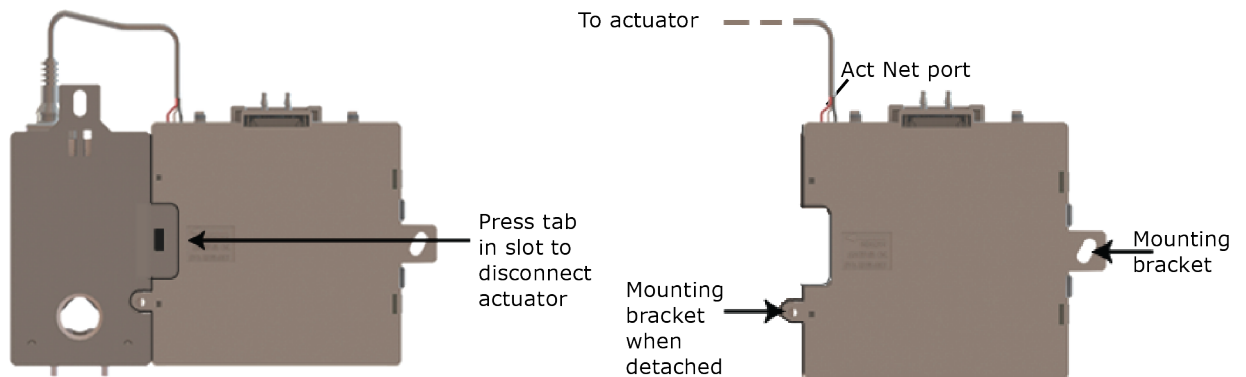
Adding an extension cable

If you need to mount the actuator more than 14 in. from the controller, you can use an 18 AWG wire for an extension cable. The maximum distance that the actuator and controller can be separated is 300 feet (91.4 m). Connect the extension cable to the end of the actuator cable. You can use connectors or splice the wires. Terminate the extension cable in the **Act Net** port on the controller.

To mount the Zone Ctrl II

1   Turn the damper shaft to fully close the damper position. Ensure the damper is closed.

Mount the controller to the VAV terminal by sliding the clamp assembly onto the damper shaft.
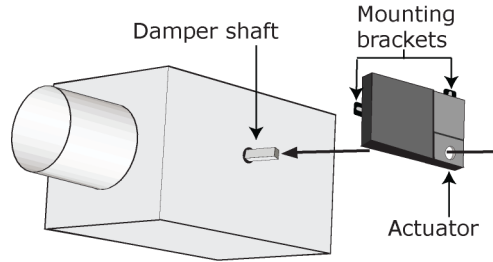
NOTE For service access, allow at least 1 foot (.3 m) of clearance between the front of the controller and adjacent surfaces.
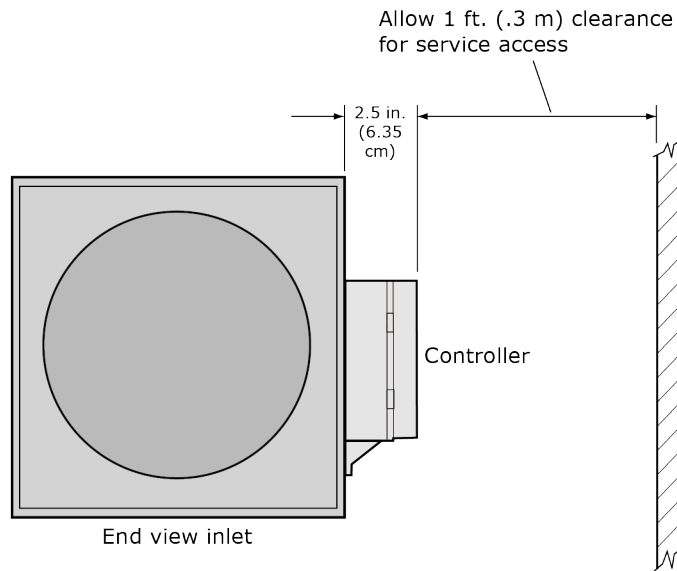
2   Secure the controller and the actuator by installing the screws, anti-rotation slot's bushings, and o-rings that are supplied with the Zone Ctrl II.
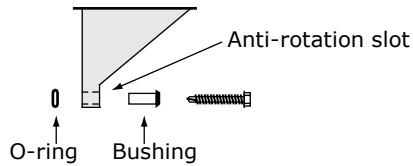
NOTES

○   Center the bushing in the slot. Failure to do so may cause the actuator to stick or bind.

○   The Zone Ctrl II must be secured, but loose enough to allow movement. of the damper shaft.

⚠ **CAUTIONS**

- You **must** use the screws, anti-rotation slot's bushings, and o-rings that are shipped with the Zone Ctrl II.
- Overtightening the screws so that the controller and actuator cannot move may damage the unit.
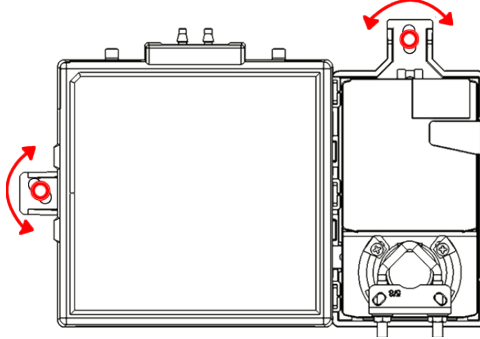
3 Hold down the Zone Ctrl II's actuator release button and rotate the actuator clamp in the same direction that closed the damper. Rotate the clamp until it stops, then rotate it back one notch.
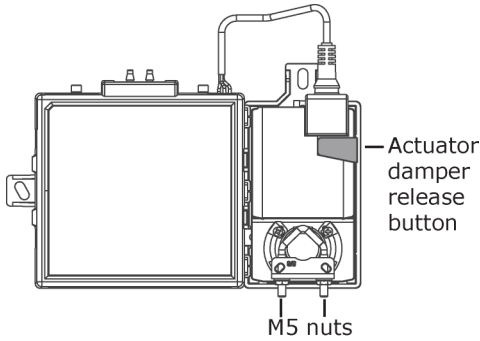
4 Release the button.

5 Tighten the actuator clamp to the damper shaft by tightening the two M5 nuts.

6 Hold down the actuator release button and rotate the damper from fully closed to fully open. If the damper traveled less than 90 degrees, do the following to prevent the damper traveling past fully open:

a) Loosen the appropriate stop clamp screw.

b) Move the stop clamp until it contacts the edge of the actuator cam.

c) Tighten the screw.

Move stop clamp if necessary
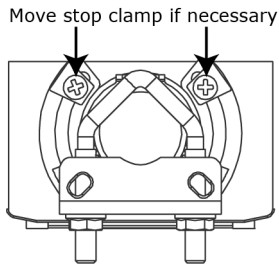
7 Hold down the actuator release button, rotate the damper to verify that it opens and closes, then release the button.

Wiring the Zone Ctrl II for power

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

⚠️ **CAUTIONS**

- The Zone Ctrl II 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 the controller for power

1 To access the screw terminal connectors, lift up the controller's cover by pulling the tabs located on both sides of the controller's left mounting bracket.
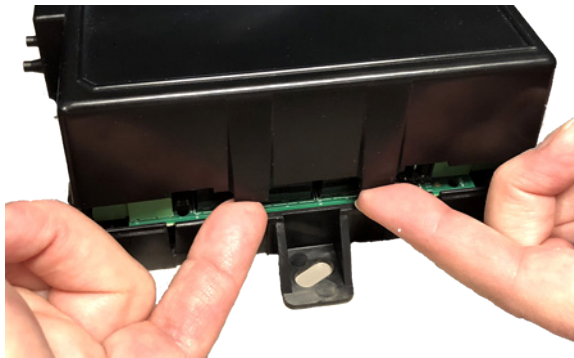
2 Remove power from the power supply.

3 Pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **24 Vac**.
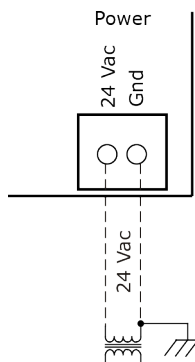
4 Connect the transformer wires to the screw terminal connector.

5   Apply power to the power supply.

6   Measure the voltage at the Zone Ctrl II's power input terminals to verify that the voltage is within the operating range of 21.6–26.4 Vac.

7   Connect a 4-inch (10.2 cm) wire from **Gnd** to the control panel.

8   Insert the screw terminal connector into the Zone Ctrl II's power terminals.

9   Verify that the **Power** LED is on and the **Run** LED is blinking.

Addressing the Zone Ctrl II

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

1   If the Zone Ctrl II has been wired for power, pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **24 Vac**. The controller reads the address each time you apply power to it.

2   Using the rotary switches, set the controller's 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.
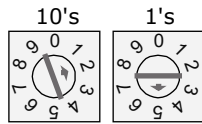
⚠️ **CAUTION**   The factory default setting is **00** and must be changed to successfully install your Zone Ctrl II.

Using flow sensors

In a single duct system, the Zone Ctrl II controls airflow using the built-in flow sensor and separate actuator.

In a dual duct system, the Zone Ctrl II controls airflow for one duct using the built-in flow sensor and separate actuator. For the other duct, the Zone Ctrl II uses a VAV Zone II Secondary Duct, which has its own flow sensors and actuator. Connect both the Zone Ctrl II actuator and the VAV Zone II Secondary Duct actuator to the Zone Ctrl II **Act Net** port.

To connect duct tubes to the flow sensors

NOTE   Tubing should be at least 2 ft. (.61 meters) long for stable airflow measurement. The combined high and low tubing length should not exceed 16.4 ft. (5 meters) in order to ensure accurate measurements.

For a single duct system

1   Turn off the Zone Ctrl II's power.

2   Connect the tube to the Zone Ctrl II's **High** connector and the **Low** connector. Then connect those tubes to the duct's high and low pressure tubes. Avoid sharp bends in the tubing.

For a dual duct system

1   Follow the single duct procedure above to connect the Zone Ctrl II to the cold duct's tubes.

2   To connect the VAV Zone II Secondary Duct to the second duct's tubes, turn off the VAV Zone II Secondary Duct's power.

3   Connect the secondary tubes to the duct's high and low pressure tubes. Avoid sharp bends in the tubing.

To set up the Airflow Control microblock

The Zone Ctrl II's control program must include one Airflow Control microblock for a single duct system or two of the microblocks for a dual duct system. You must set up the Airflow Control microblock for each flow sensor when creating a program in Snap.

NOTE The Airflow Control microblock is already set up and adjusted in all of the EquipmentBuilder programs for this controller. You do not need to adjust the Airflow settings at all when using one of them. For a list of EquipmentBuilder control programs, see *To use an EquipmentBuilder control program* (page 30).

In a single duct system

1   In the i-Vu® interface, select **Properties** > **Service Configuration** > **Flow Control**.

     NOTE You can also access the control program's Airflow Control microblock on the **Logic** page.

2   On the **Details** tab in the **Flow Sensor** field under **Hardware Configuration**, select **Integral - onboard**.

3   In the **Damper Actuator** field, select **Integral - onboard**.

In a dual duct system

1 In the i-Vu® interface, select **Properties** > **Service Configuration** > **Cold Deck Flow Control**.

NOTE You can also access the control program's Cold Deck Airflow Control microblock on the **Logic** page.

2 On the **Details** tab under **Hardware Configuration**, in the **Flow Sensor** field, select **Integral - onboard**.

3 In the **Damper Actuator** field, select **Integral - onboard**.

4 On the **Logic** page, select the Airflow Control microblock for Flow #2.

NOTE The secondary Airflow microblock is not listed on the Properties page in the i-Vu® interface.

5 On the **Details** tab under **Hardware Configuration** in the **Flow Sensor** field, select **Integral - remote**.

6 In the **Damper Actuator** field, select **Integral - remote**.

NOTES

- When performing test and balance, follow the steps under **Test and Balance** on the Airflow Control microblock's **Properties** page **Details** tab.

- If you are using a version of the Snap application that is prior to v7.0, you must change the **Damper Motor Travel Time** to 154 seconds.

Wiring for communications

The Zone Ctrl II 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

⚠️ **WARNING** Attaching any ARCNET or MS/TP network to the **Act Net** port damages BT485s, DIAG485s, or terminating resistors on that network.

1 Pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **24 Vac**.

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

   NOTE Use the same baud rate for all controllers on the network segment.

5 If the Zone Ctrl II is at either end of a network segment, connect a BT485 to the Zone Ctrl II.

6 Insert the power screw terminal connector into the Zone Ctrl II's power terminals.

7 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 45) to print a blank wire list.

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	500 feet (152 meters)	22 AWG	100 feet (30.4 meters) unshielded
Pulse counter TL0			100 - 500 feet shielded
ZS sensors	See Wiring devices to the Zone Ctrl II's Rnet port.		
Wireless Adapter for wireless sensors			
Equipment Touch			
TruVu™ ET Display			

Inputs

The Zone Ctrl II has 4 inputs that accept the following signal types.

These inputs...	Support this signal type...	Description
All	Thermistor	Precon type 2 (10 kOhm at 77°F) Input voltage: 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 output impedance of a 0–5 Vdc source must not exceed 100 Ohms. The input impedance of the Zone Ctrl II is approximately 30 kOhm.
IN-3, IN-4	Thermistor Dry contact	

Analog outputs

The Zone Ctrl II has one analog output that supports 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

Binary outputs

The Zone Ctrl II has three normally open binary outputs rated at 1A, 24 Vac/Vdc.

See *To wire inputs and outputs for more information* (page 17).

To wire inputs and outputs

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

1 Verify that the Zone Ctrl II's power and communications connections work properly.

2 Pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **24 Vac**.

3 Connect the input wiring to the screw terminals on the Zone Ctrl II.

   NOTES

   ○ Connect the shield wire to the **Gnd** terminal with the ground wire.

   ○ **IN-3** and **IN-4** share the **Gnd** terminal beside **IN-3**.
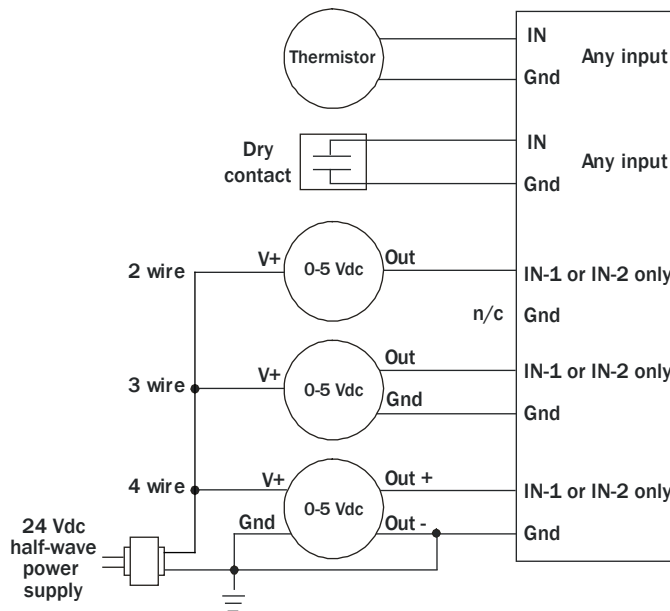
4 To use **IN-1** or **IN-2**, set jumpers **IN-1** or **IN-2** to the type of signal the input will receive (thermistor/dry contact, or 0–5 Vdc).

5 Connect the binary output wiring to the screw terminals on the Zone Ctrl II and to the controlled device.
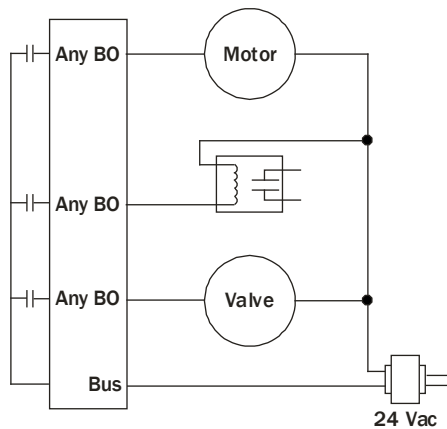
6 Connect the analog output wiring to the screw terminals on the Zone Ctrl II and to the controlled device.
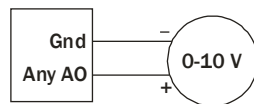
7 Insert the power screw terminal connector into the Zone Ctrl II's power terminals.

Wiring devices to the Zone Ctrl II's Rnet port

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

Supports up to

- 5 wireless and/or ZS sensors
- One Equipment Touch
- One TruVu™ ET Display

For more detailed instructions, see the device's *Installation Guide.*

⚠ **CAUTION Rnet power**

The Rnet port provides 12 Vdc/200 mA* maximum at 32°F (25°C). that can be used to power zone sensors. If the total power required by the sensors on the Rnet exceeds the power supplied by the port, use an external power supply. See the sensor's Installation and Start-up Guide to determine the power required.

* These numbers will be reduced at higher temperatures.

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 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

NOTE The ZS CO2 model uses 190 mA during sample period. Use auxiliary 12 Vdc, unless it is the only device on the Rnet port.

1 Remove power from the Zone Ctrl II.

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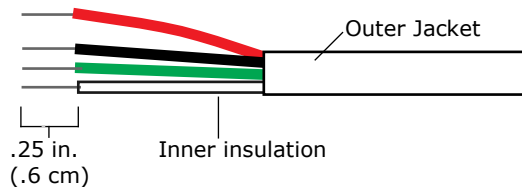
3 Wire each terminal on the sensor to the same terminal on the controller. See diagram below.

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 Zone Ctrl II.

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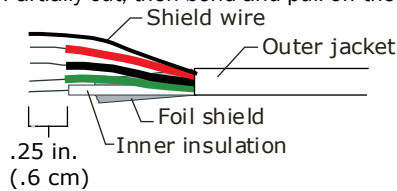
3   Strip about 0.25 inch (0.6 cm) of the inner insulation from each wire.

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.

Rnet connector
Gnd
Rnet +
Rnet -

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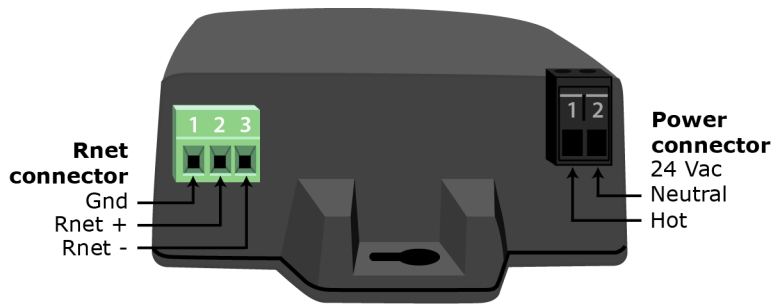
5   Wire the 24 Vac external power supply to the Wireless Adapter's power connector.

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 Zone Ctrl II

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 Zone Ctrl II* (page 19).

    ○ 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 Zone Ctrl II 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 Zone Ctrl II's power.

2 Partially cut, then bend and pull off the outer jacket of the cable. Do not nick the inner insulation.
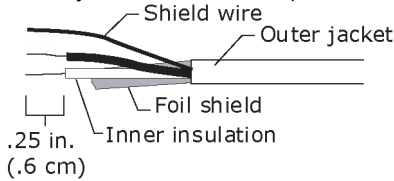
3 Strip about 0.25 inch (0.6 cm) of the inner insulation from each wire.

4 Wire the Zone Ctrl II'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 Zone Ctrl II'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.
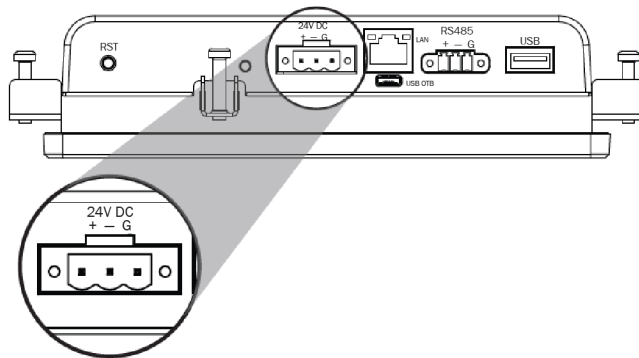
Wiring communication

1 Turn off the Zone Ctrl II'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).
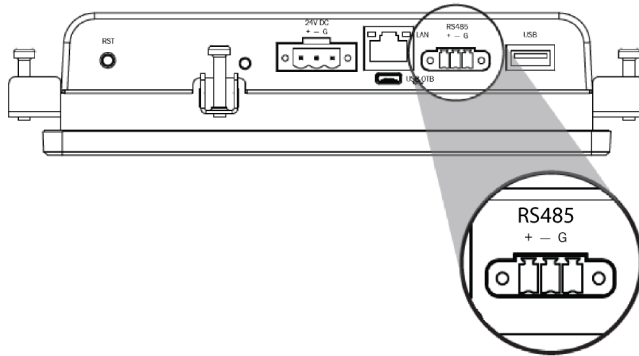
3 Turn on the Zone Ctrl II's power.

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

Wiring devices to the Zone Ctrl II's Act Net port

The Zone Ctrl II supports Act Net communication to the Act Net devices on a bus with a maximum length of 300 feet (91.44 meters). The bus should be wired with copper conductors of an appropriate size (18 AWG or larger) to compensate for voltage drop and ensure that bus voltage does not drop below 19.2 Vac or 21.6 Vdc.

Wire the Act Net terminals on the controller with the following color wires from the controller's actuator.

1 - Pwr - Red
2 - Data - White
3 – Gnd - Black

NOTE The controller's actuator **Data** wire is white and the i-Vu® Smart Valve's **Data** wire is orange.

i-Vu® Smart Valves

You can connect two i-Vu® Smart Valves to a Zone Ctrl II's Act Net port. See the *i-Vu® Smart Valve Installation Guide* for more details.

Wire the Act Net terminals on the controller with the following color wires from the valve's actuator.

1 - Pwr - Red
2 - Data - Orange
3 – Gnd - Black

Controller mounted upright
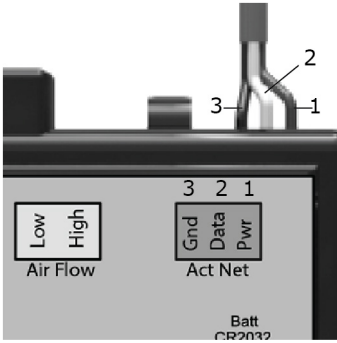
Controller mounted upside down
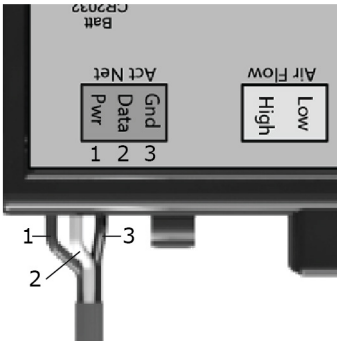
Using a VAV Zone II Secondary Duct for a dual duct system

See *To set up the Airflow Control microblock* (page 13), if applicable.

To wire the VAV Zone II Secondary Duct to the Zone Ctrl II

⚠️ **WARNING** Do not apply line voltage (mains voltage) to this device's ports or terminals.

1 Wire the VAV Zone II Secondary Duct actuator cable to the VAV Zone II Secondary Duct **Act Net** port.

2 Wire the VAV Zone II Secondary Duct **Act Net** port to the Zone Ctrl II **Act Net** port.

NOTE Use an 18 AWG wire, maximum length 300 feet (91.4 meters).

Terminal number	Wire this terminal on the controller...	Terminal number	To this terminal on the Zone Ctrl II
1	Pwr	1	Pwr
2	Data	2	Data
3	Gnd	3	Gnd

⚠️ **WARNING** Attaching any ARCNET or MS/TP network to the **Act Net** port damages BT485s, DIAG485s, or terminating resistors on that network.

To connect duct tubes to the flow sensors

NOTE Tubing should be at least 2 ft. (.61 meters) long for stable airflow measurement. The combined high and low tubing length should not exceed 16.4 ft. (5 meters) in order to ensure accurate measurements.

For a single duct system

1 Turn off the Zone Ctrl II's power.

2 Connect the tube to the Zone Ctrl II's **High** connector and the **Low** connector. Then connect those tubes to the duct's high and low pressure tubes. Avoid sharp bends in the tubing.

For a dual duct system

1 Follow the single duct procedure above to connect the Zone Ctrl II to the cold duct's tubes.

2 To connect the VAV Zone II Secondary Duct to the second duct's tubes, turn off the VAV Zone II Secondary Duct's power.

3 Connect the secondary tubes to the duct's high and low pressure tubes. Avoid sharp bends in the tubing.

VAV Zone II Secondary Duct

The LED's on the VAV Zone II Secondary Duct show the status of certain functions.

If this LED...	Is...	Status is...
Pwr	On	The VAV Zone II Secondary Duct has power
RX	On	The VAV Zone II Secondary Duct is receiving data from the network segment
TX	On	The VAV Zone II Secondary Duct is transmitting data over the network segment
CW	On	The actuator motor is turning clockwise
CCW	On	The actuator motor is turning counterclockwise
Run	Flashing	VAV Zone II Secondary Duct is operating

LED's

The LED's on the Zone Ctrl II show the status of certain functions.

If this LED is on...	Status is...
Pwr	The Zone Ctrl II has power.
RX	The Zone Ctrl II is receiving data from the network segment
TX	The Zone Ctrl II is transmitting data over the network segment
Run	See table below.
Err	See table below.
BO1	The binary output is active
BO2	The binary output is active
BO3	The binary output is active
CW	The actuator motor is turning clockwise
CCW	The actuator motor is turning counterclockwise

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

If Run LED shows...	And Error LED shows...	Status is...
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 ARC156 network address
2 flashes per second	1 flash per second	The controller is alone on the network
2 flashes per second	On	Obtain a Module Status Report (Modstat) to determine which of the following occurred: • Exec halted after frequent system errors • Control programs halted • Zone Ctrl II stopped communicating with the VAV Zone II Secondary Duct
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

If Run LED shows...	And Error LED shows...	Status is...
14 flashes per second	14 flashes per second, alternating with **Run** LED	Brownout
On	On	Failure. Try the following solutions: • Turn the Zone Ctrl II off, then on. • Format the Zone Ctrl II. • Download the Zone Ctrl II. • Replace the Zone Ctrl II.

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

Installing the Zone Ctrl II and VAV Zone II Secondary Duct into the i-Vu® application

You must complete the following procedures to successfully install your Zone Ctrl II and VAV Zone II Secondary Duct into the i-Vu® application. Use the Help in the referenced software for detailed descriptions of these procedures.

EquipmentBuilder or Snap

1 Use EquipmentBuilder or Snap to create control program(s).

2 If applicable, print the Sequence of Operation, which includes the points list.

NOTE You can create a points list under **Reports** in the i-Vu® application or Field Assistant after installing your control program.

This Installation Guide

1 Prepare a wire list using the points list. Refer to *Appendix A* (page 45).

2 Use the wire list and the following installation procedures to install and wire I/O points to your Zone Ctrl II

The i-Vu® or Field Assistant application

1 Upload the controller to the database by selecting the router in the navigation tree.

2 Select **Devices** > **Manage** tab.

3 Select the controller in the list on the page and click **Upload**.

4 If you are adding a new control program, click Add Control Program . A dialog window appears.

5 Enter a name for your control program in **Display Name** and select your controller in the **Controller** drop-down list.

NOTES

○ If you already have the maximum number of control programs for a controller, it will not appear in the list.

○ Optional: You can change the control program's **Reference Name** if needed.

6 Do one of the following:

If the control program is...	
In the **Control Program** drop-down list	Select the control program.
Not in the **Control Program** drop-down list	a. Click **Add New**. b. Browse to select the control program. c. Click **Open**. d. Click **Continue**. e. Click Close.

7   To upload a graphic, click **Add New** under **Views** and browse to your .view file.

8   Click **Continue**. When message appears **File added successfully**, click **Close**.

9   Click **Close** again.

10   Right-click on the programmable controller in the controller list and select **Check Status** from the list. The status of the controller should say **File Mismatch**.

11   Click the **Download All Content** button.

12   Assign channel numbers to the physical points by selecting the controller in the navigation tree and going to **Properties** page > **I/O Points** tab.

13   Configure the controller on the **Properties** page > **Control Program** tab.

14   Check out and commission the equipment.

To use an EquipmentBuilder control program

EquipmentBuilder allows you to choose your equipment file from a list of currently available equipment products from the factory. If the factory equipment is not available in EquipmentBuilder, you must build a control program in Snap. See Snap Help for detailed information on using Snap.

After creating a control program in EquipmentBuilder, download it to the Zone Ctrl II using the i-Vu® or Field Assistant application.

NOTE The Airflow Control microblock is already set up and adjusted in all of the EquipmentBuilder programs for this controller. You do not need to adjust the Airflow settings at all when using one of them.

Single duct control programs using the Zone Ctrl II

- VAV Single Duct No Heat

- VAV Single Duct Elec Heat

- VAV Single Duct Mod Heat

- VAV Parallel Fan No Heat

- VAV Parallel Fan Elec Heat

- VAV Parallel Fan Mod Heat

- VAV Series Fan No Heat

- VAV Series Fan Elec Heat

- VAV Series Fan Mod Heat

- VVT Single Duct No Heat

- VVT Single Duct Elec Heat

- VVT Single Duct Mod Heat

- VVT Parallel Fan No Heat

- VVT Parallel Fan Elec Heat

- VVT Parallel Fan Mod Heat

Dual duct control programs using the Zone Ctrl II and a VAV Zone II Secondary Duct

- Constant Volume Dual Duct (Cold Deck and Hot Deck Airflow Sensing)

- Constant Volume Dual Duct (Cold Deck and Total Airflow Sensing)

To create your control program in EquipmentBuilder

1   Start EquipmentBuilder. (Windows **Start** > **All Programs** > **i-Vu Tools x.x**)

2   Click **Create Equipment** and then click **Next**.

3   Select the ivu-x.x-universal-controller.sal library from the **Library:** drop-down list.

4   Select the equipment type from the list and click **Next**.

5   In the **Equipment Name** field, edit the name, if desired.

   NOTE Your name must not exceed 21 characters.

6   Select options on the **Summary** tab and, if applicable, edit setpoints on the **Sequence** tab.

   NOTE The **Points** and **Sequence** tabs change based on your choices on the **Summary** tab.

7   Click **Next**.

8   Check the files you wish to generate from the list.

9   Check to select saving your control program files to a folder of your choice or a folder linked to a system.

10 Click **Next**.

To edit an existing control program in EquipmentBuilder

1   Start **EquipmentBuilder**. (Windows **Start** > **All Programs** > **i-Vu Tools x.x**)

2   Click **Open Equipment** and browse to the .equipment file that you want to edit. and click **Open**.

   NOTE

   ○   If using i-Vu® Standard or Plus, you must first save your control program to your computer from the i-Vu® interface, using the right-click **Configure** window.

   ○   If using i-Vu® Pro, navigate to the webroot/<system>/programs folder.

3   In the **Equipment Name** field, edit the name, if desired.

   NOTE Your name must not exceed 21 characters.

4   Select options on the **Summary** tab and ,if applicable, edit setpoints on the **Sequence** tab.

   NOTE The **Points** and **Sequence** tabs change based on your choices on the **Summary** tab.

5   Click **Next**.

6   Check the files you wish to generate from the list.

7   Check to select saving your control program files to a folder of your choice or a folder linked to a system.

8   Click **Next**.

See i-Vu® Help for instructions on how to apply your new or edited control programs to controllers in your system.

To assign inputs or outputs to points

An input or output must be assigned to its corresponding point in the control program. This is typically done when the control program is created, but you can adjust the settings at the time of installation in the i-Vu® interface.

1 In the i-Vu® navigation tree, select the equipment controlled by the Zone Ctrl II.

2 On the **Properties** page, select the **I/O Points** tab.

3 In each point's **Num** field, type the number of the controller's corresponding input or output. For example, if you use BO1 on the Zone Ctrl II for the point **Fan S/S**, type 1 in the **Num** field for **Fan S/S**.

> **NOTES** Do not assign the same output number to more than one point.

4 Enter the appropriate values for each input and output in the remaining columns. See *Input values*, *Output values*, *Resolution values* and *Offset/Polarity values* below.

> **NOTE** You can also enter these values in the Snap application.

5 If you have not performed the initial download to the Zone Ctrl II, you must download now so you can verify inputs and outputs.

6 To verify each input's operation, force each sensor to a known value, then compare it to the **Value** shown on the **Properties** page on the **I/O Points** tab.

7 To verify each output's operation, lock each output to a known condition on the **I/O Points** tab, then verify that the equipment operates correctly.

Input values

Input	I/O Type	Sensor/Actuator Type	Min/Max
Analog (BAI)			
0-5 Vdc	**0–5 Volt**	**Linear Full Range**	Engineering values associated with 0 Vdc (Min) and 5 Vdc (Max) [1]
Thermistor	**Thermistor**	Select your Thermistor type or set up and select a **Non-Linear, Custom Table** [2]	N/A
Pulse to Analog (BPTA) [3]			
Pulse Counter	**Counter Input**	N/A	N/A
Digital (Binary) (BBI)			
Dry Contact	**Dry Contact**	N/A	N/A
Special (BI)[4]			
Binary	Special	Online flow sensor status	N/A

[1] The sensor reads a value and sends a corresponding signal (Volt, mA, or psi) to the Zone Ctrl II's physical input. The Analog Input microblock uses the Min and Max values to linearly translate the signal into the engineering value used in subsequent control logic. For example, set Min to 0 and Max to 10 for a 4–20 mA sensor that measures velocity from 0.0 to 10.0 inches/second so that when the input reads 4 mA, the microblock outputs a value of 0. Similarly, when the input reads 8 mA, the microblock outputs a value of 2.5.

[2] You can set up a custom translation table on the driver's Custom Translation Tables pages in the i-Vu® interface.

[3] The control program must have one Pulse to Analog Input microblock for each pulse counting input.

[4] The special binary input indicates a communication loss to the airflow sensor. You can use this in your control program to select the actuator movement in the case of flow sensor fault. Sensor reconnection is detected automatically and a power cycle is not required. In the microblock popup, under **Hardware Configuration**, set **Expander** to **0**, **Input Number** to **110**, and **I/O Type** to **Special**. To detect a flow sensor fault on the VAV Zone II Secondary Duct, use **Input Number 111**.

Output values

Output	I/O Type	Sensor/Actuator Type	Min/Max
Analog (BAO)			
0-10 Vdc	**Electrical 0–10 Volt**	**Linear Full Range**	Engineering values associated with 0 Vdc (Min) and 10 Vdc (Max) [1]
2-10 Vdc	**Electrical 0–10 Volt**	**Linear w/Offset, 2–10 Volts**	Engineering values associated with 2 Vdc (Min) and 10 Vdc (Max) [1]
Binary (BBO)			
Relay	**Relay/Triac Output**	N/A	N/A

[1] The Analog Output microblock uses the Min and Max values to linearly translate its Snap wire value into a physical output signal (Volt, mA, or psi) sent from the Zone Ctrl II to an actuator. For example, set Min to 0 and Max to 100 for an Analog Output microblock that receives a 0 to 100% open signal from a PID microblock and that controls a 0–10 Vdc actuator so that when the PID signal is 100%, the Zone Ctrl II output is 10 Vdc. Similarly, when the PID signal is 50%, the Zone Ctrl II output is 5 Vdc.

Resolution values

Resolution is not particular to a type of input or output, but the driver handles analog and digital (binary) inputs and outputs differently. To set these values appropriately, you should understand how the driver uses them.

Resolution	Notes
Analog Input (BAI)	The driver truncates the microblock's present value according to the resolution. **EXAMPLE** If the calculated present value is 13.789 and you set the **Resolution** to 0.1, the control program uses 13.7 for any calculations downstream from the microblock.
Analog Output (BAO)	The driver truncates the wire input value to the microblock before performing any scaling calculations. **EXAMPLE** If the wire input value is 13.789 and you set the **Resolution** to 0.1, the microblock uses 13.7 for any scaling calculations.
Digital (Binary) Inputs and Outputs	N/A

Offset/Polarity values

Offset/Polarity is not particular to a type of input or output, but the driver handles analog and digital (binary) inputs and outputs differently. To set these values appropriately, you should understand how the driver uses them.

Offset/Polarity	Notes
Analog Input (BAI)	**Offset** value (positive or negative) adds a fine adjustment to a sensor reading after all scaling for calibration. **EXAMPLE** If a sensor reads 74.9°F when the actual measured value is 73.6°F, enter an **Offset** of −1.3 to calibrate the sensor to the measured value.
Analog Output (BAO)	You can use the **Offset** value (positive or negative) to calibrate an output, but you generally do not need to. If used, the driver adds the offset value to the wire input value before performing any scaling calculations to determine the Zone Ctrl II's output.
Digital (Binary) Input (BBI)	**Polarity** determines the microblock's present value when no signal is received from the equipment. When no signal is received from the equipment, if **Polarity** is set to: **normal**—present value is **off** **reversed**—present value is **on**
Digital (Binary) Output (BBO)	**Polarity** determines the Zone Ctrl II's output based on the control program's signal to the microblock. When the control program's signal to the microblock is **on**, if **Polarity** is set to: **normal**—output is **on** **reversed**—output is **off** **NOTE** Regardless of **Polarity**, the output will be off if the Zone Ctrl II loses power.

Local access to the Zone Ctrl II

You can use the following items as a local user interface to an Open controller. These items let you access the controller information, read sensor values, and test the controller.

Connect...	To the controller's...	For...
Field Assistant[1] application	Local Access port	Temporary user interface for start-up
Equipment Touch[2] touchscreen device	Rnet port	Temporary or permanent user interface for start-up

[1] Requires a USB Link (Part #USB-L)
[2] See the *Equipment 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.

These are accessory items that do not come with the controller.

To set up the driver

After discovering your Zone Ctrl II, you may want to change the driver's properties in the i-Vu® interface to suit your application.

1 On the i-Vu® navigation tree, right-click the Zone Ctrl II.

2 Select **Driver Properties** and make changes if needed.

Driver

On the **Driver** > **Update** tab, you can get a Module Status and add, update, or delete the driver and the touchscreen file.

1 To update the driver, do one of the following:

If the driver is...	
In the **Driver Version** drop-down list	Select the driver and click **Apply** or **Accept**..
Not in the **Control Program** drop-down list	a. Click **Add**. b. Browse to select the driver. c. Click **Open**. d. Click **Continue**. e. Click **Apply** or **Accept**.

2 To change, delete, or upload a screen file, click **Add** under **Screen File** and browse to your touchscreen file or select from the drop-down list..

3 Click **Continue**. When message appears **File added successfully**, click **Close**.

4 Click **Close** again.

5 Click the **Download** button.

On the **Driver** > **Settings** tab, you can change the following properties:
- Module clock synchronization and failure. See table below.
- Network Input microblock communication properties.

Click <u>Device</u> at the top of the page to advance to the next **Driver Property** > **Device** page.

BACview Control	
Keypad inactivity timeout (minutes)	Log out the user (if a user-level password is required), turn off the backlight, and display the standby screen after this period of inactivity.
Keypad user-level password	Numeric password user must enter to access system through a BAC*view*® device.

TouchScreen Control	
TouchScreen Schedule Edit Enable	Check this field to allow a user to edit this controller's schedules from an Equipment Touch or System Touch Schedules screen. **NOTE** Schedules edited on an Equipment Touch or System Touch are not uploaded to the i-Vu® application. This could result in the controller operating on a schedule that differs from the one you see in the i-Vu® interface.
Module Clock	
Clock Fail Date and Time	Date and time the control program uses when controller's real-time clock is invalid. **TIP** Use an occupied date and time (such as a Tuesday at 10 a.m.) so the equipment does not operate in unoccupied mode if the controller loses power during occupancy.
Time Synch Sensitivity (seconds)	When the controller receives a time sync request, if the difference between the controller's time and the time sync's time is greater than this field's value, the controller's time is immediately changed. If the difference is less than this field's value, the controller's time is slowly adjusted until the time is correct.
Network Microblocks	
Number of poll retries before Network Input Microblocks indicate failure	The maximum number of retries after the initial attempt that a Network microblock will attempt to communicate with its target device. If unsuccessful, the point will transition to an idle state for 30 seconds before attempting to communicate again. Change this field only if directed by Technical Support.
Periodic rebinding interval	If a microblock uses a wildcard in its address, this timer determines how often the microblock will attempt to find the nearest instance of its target. For example, if an outside air temperature address uses a wildcard, a VAV application will look for the outside air temperature on the same network segment or on the nearest device containing that object.
BACnet COV Throttling	
Enable COV Throttling	Under normal circumstances, COV Throttling should be enabled to prevent excessive network traffic if an object's COV Increment is set too low. See EXCEPTION below. When enabled, if an object generates excessive COV broadcasts (5 updates in 3 seconds), the driver automatically throttles the broadcasts to 1 per second. Also, if the object's value updates excessively for 30 seconds, an alarm is sent to the i-Vu® application listing all objects that are updating excessively. A Return-to-normal alarm is sent only after all objects have stopped updating excessively. EXCEPTION: In rare circumstances, such as process control, a subscribing object may require COV updates more frequently than once per second. For these situations, clear this checkbox, but make sure that your network can support the increased traffic. You will also need to disable the **Excessive COV** alarms under the driver's **Common Alarms**.
Trend Sampling	
Collect a daily midnight sample for all points in this controller that are sampling on COV	For values that change infrequently, select to verify at midnight daily that the point is still able to communicate trend values.

Device

On the **Device** page, you can view the following properties:

- BACnet device object properties for the Zone Ctrl II
- Zone Ctrl II network communication

Configuration	**NOTE** The three APDU fields refer to all networks over which the Zone Ctrl II communicates.
Max Masters and Max Info Frames	Apply only if the Zone Ctrl II is on an MS/TP network.

Notification Classes

Alarms in the i-Vu® application use Notification Class #1. A BACnet alarm's Notification Class defines:

- Alarm priority for Alarm, Fault, and Return to Normal states
- Options for BACnet alarm acknowledgment
- Where alarms should be sent (recipients)

Priorities	**NOTE** BACnet defines the following Network message priorities for Alarms and Events.	
	Priority range	**Network message priority**
	00–63	Life Safety
	64–127	Critical Equipment
	128–191	Urgent
	192–255	Normal
Priority of Off-Normal	BACnet priority for Alarms.	
Priority of Fault	BACnet priority for Fault messages.	
Priority of Normal	BACnet priority for Return-to-normal messages.	
Ack Required for Off-Normal, Fault, and Normal	Specifies whether alarms associated with this Notification Class require a BACnet Acknowledgment for Off-Normal, Fault, or Normal alarms. **TIP** You can require operator acknowledgment for an Alarm or Return-to-normal message (stored in the i-Vu® database). In the i-Vu® interface on the **Alarm** > **Enable/Disable** tab, change the acknowledgment settings for an alarm source or an alarm category.	
Recipient List		
Recipients	The first row in this list is from the i-Vu® application. Do not delete this row. Click **Add** if you want other BACnet devices to receive alarms associated with this Notification Class.	
Recipient Description	Name that appears in the **Recipients** table.	

Recipient Type	Use **Address** (static binding) for either of the following:
	• Third-party BACnet device recipients that do not support dynamic binding
	• When you want alarms to be broadcast (you must uncheck **Issue Confirmed Notifications**). This use is rare.
Days and times	The days and times during which the recipient will receive alarms.
Recipient Device Object Identifier	Type the **Device Instance** from the network administrator for third-party devices in the **#** field.
Process Identifier	Change for third-party devices that use a BACnet Process Identifier other than 1. The i-Vu® application processes alarms for any 32-bit Process Identifier.
Issue Confirmed Notifications	Select to have a device continue sending an alarm message until it receives delivery confirmation from the recipient.
Transitions to Send	Uncheck the types of alarms you do not want the recipient to get.

Calendars

Calendars are provided in the driver for BACnet compatibility only. Instead, use the **Schedules** feature in the i-Vu® interface.

Common Alarms

On these pages, you can enable/disable, change BACnet alarm properties, or set delays for the following BACnet alarms:

Common alarms:

- Module Halted
- All Programs Stopped
- Duplicate Address
- Locked I/O

- Control Program
- Program Stopped
- Excessive COV

Module Generated Alarm	
Description	Short message shown on the i-Vu® **Alarms** page or in an alarm action when this type of alarm is generated.
Events	
Alarm Category and Alarm Template	See *Alarms* in i-Vu® Help.
Enable	Clear these checkboxes to disable Alarm or Return to normal messages of this type from this controller.
Notification Class	Do not change this field.

Specific Events

On these pages, you can enable/disable, change BACnet alarm properties, or set delays for the following BACnet alarms:

Specific alarms:

- Flow Control Alarm

- Reheat Valve Alarm

NOTE To set up alarm actions for controller generated alarms, see *Alarms* in i-Vu® Help.

Controller Generated Alarm	
Description	Short message shown on the i-Vu® **Alarms** page or in an alarm action when this type of alarm is generated.
Events	
Alarm Category and Alarm Template	See *Alarms* in i-Vu® Help.
Enable	Clear these checkboxes to disable Alarm or Return to normal messages of this type from this controller.
Notification Class	Do not change this field.

Switches, Jumpers, Options

The **Switches, Jumpers, Options** page shows the current physical settings on the Zone Ctrl II.

Flow Calibration Archive

The **Flow Calibration Archive** page shows measured flow and sensor readings that were entered in the i-Vu® interface Test and Balance or through the stand-alone Airflow Test and Balance Utility. Editing Airflow microblock properties outside of Test and Balance will not change the values on this page.

Act Net Network Details

Act Net Statistics

The actuator serial numbers are automatically read and filled in by the i-Vu® application. Only those devices that are physically connected or in the control program will show in the table.

NOTE See *To get the Carrier Zone Ctrl II serial number* (page 42) for the controller serial number.

The **Act Net** network can have the following devices listed below with the following addresses:

- Address **1**: The Zone Ctrl II's actuator

- Address **2**: A VAV Zone II Secondary Duct's actuator

- Address **3**: A VAV Zone II Secondary Duct's sensor

- Address **4**: An i-Vu® Smart Valve

- Address **5**: An i-Vu® Smart Valve

Verify communication with your actuator and valves in **Device Status** on the **Act Net Statistics** table.

▽ Act Net Statistics			
Device Description	**Device Address**	**Device Status**	**Serial Number**
On-board Actuator	1	Normal operation	01724-20262-250-130
Reheat Valve- 1	4	Normal operation	01841-10400-250-200
Reheat Valve- 2	5	Normal operation	01841-10398-250-200

To add an i-Vu® Smart Valve

1 Go to **Driver** > **Act Net Network Details** > **Properties** tab > **Act Net Address Setting** section.

2 If the serial number is not displayed, locate it on the actuator and then enter it in the **Serial Number** fields.

▽ Act Net Address Setting		
Serial Number	**Device**	**Operation Status**
01841 - 10400 - 250 - 200	Reheat Valve-1 ▾	
☐ - ☐ - ☐ - ☐	No Change ▾	
☐ - ☐ - ☐ - ☐	No Change ▾	
☐ - ☐ - ☐ - ☐	No Change ▾	

3 Select **Reheat Valve-1** or **Reheat Valve-2** from the **Device** drop-down list.
   NOTE **Reheat Valve-1** sets to address **4** and **Reheat Valve-2** sets to address **5**.

4 Click **Accept**. When the changes are applied, the **Operation Status** of the **Act Net Address Setting** table displays **Success**.

Troubleshooting

Possible delay before control program starts

- When you first apply power to the Zone Ctrl II, it waits for up to 3 minutes to receive a time/date broadcast from its BACnet router. The Zone Ctrl II begins to run the control program only after it receives the time/date or when the 3 minute waiting period expires. If the Zone Ctrl II does not receive a time/date broadcast, it keeps the default setting of 6/12/2002 10:00:00 (am).

- The damper actuators' automatic full-range calibration on startup is staggered to prevent system high pressure. This calibration delay is based on rotary switch addresses.

  Delay = 20 x (rotary address mod 16) seconds. The minimum delay is 0 and the maximum is 300 seconds.

To get the serial number

If you need the Zone Ctrl II's serial number when troubleshooting, the number is on a Module Status report (Modstat) under **Core** (or **Main**) **board hardware**


```
Core board hardware:
   Type=170, board=1, manufactured on 06/27/2013   S/N 021362247P
   RAM: 512 kBytes;      FLASH: 1024 kBytes, type = 3
```

To obtain a modstat in the i-Vu® interface:

1   Select the Zone Ctrl II in the navigation tree.

2   Right-click and select **Module Status**.

To restore factory 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 Pull the screw terminal connector from the controller's power terminals labeled **Gnd** and **24 Vac**. Make sure the address switches are not set to 0, 0.

2 Short the **Format Short pins** jumper's pins and maintain the short for steps 3 and 4.

3 Insert the power screw terminal connector into the Zone Ctrl II's power terminals.

4 Continue to short the jumper until the **Error** LED flashes three times in sync with the **Run** LED.

5 Remove the short.

To replace the battery

If the Zone Ctrl II experiences a power outage and the control program stops functioning, replace the battery.

You need to replace the battery if the voltage measures below 2.9 volts when the controller is not powered.

1 Verify that the Zone Ctrl II's power is on.

⚠️ **CAUTION** If the controller's power is not **on** when replacing the battery, your date, time, and trend data will be lost.

2 Remove the Zone Ctrl II's cover.

3 Remove the battery from the controller, making note of the battery's polarity.

4 Insert the new battery, matching the battery's polarity with the polarity indicated on the controller's cover.

5 Replace the Zone Ctrl II's cover.

6 Download the Zone Ctrl II.

Compliance

FCC Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1 This device may not cause harmful interference.

2 This device must accept any interference received, including interference that may cause undesired operation.

⚠ **IMPORTANT** Any changes or modifications not expressly approved by manufacturer could void the user's authority to operate the equipment.

NOTE This equipment has been tested and found to comply with the limits for a Class B 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 residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with this document, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

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.

Zone Ctrl II BACnet Compliance

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

Appendix A: Zone Ctrl II wire lists

Zone Ctrl II wire list

Zone Ctrl II								
Project Name: **Location:**					**Controller:** **Network Number:** **MAC Address:**			

IN-1   IN-2

0-5Vdc
Thermistor/dry contact

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

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			
	BO-1	Bus	N.O.	N/A	BO-1			
	BO-2	Bus	N.O.	N/A	BO-2			
	BO-3	Bus	N.O.	N/A	BO-3			

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	Specifications	Added Compliance row	X-PM-AB-R-BH
	CE and UKCA Compliance	Added UKCA compliance	
1/6/22	Specifications	"Physical" row changed to "Fire-retardant plastic ABS, UL94-5VA"	X-PM-BM-E
		Specified "N.O." binary outputs	X-TS-BB-O
9/24/21	Wiring devices to the Zone Ctrl II's Rnet port	Removed hybrid wiring configuration for Rnet port	X-TS-AK-E
4/6/20	Wiring devices to the Zone Ctrl II's Act Net port	Clarified wiring guidelines.	X-TS-CP-E-EE
	To clean the airflow sensor orifice	Removed. This sensor does not require cleaning.	X-O-EH-E-RE
12/20/19	Zone Ctrl II specifications VAV Zone II Secondary Duct specifications	Power specs expanded to include watts for DC.	X-TS-TS-E-JHi
	Wiring devices to the Zone Ctrl II's Act Net port	New topic	C-D
	To set up driver properties > Act Net Network Details	Added information about i-Vu® Smart Valves.	C-D
	VAV Zone II Secondary Duct specifications	Added DC requirements.	X-TS-TS-E-KC
	Zone Ctrl II specifications	Power specs expanded to include watts.	X-TS-TS-E-KC
1/25/19	Wiring devices to the Zone Ctrl II's Rnet port	Removed star configuration from the first paragraph.	X-TS-TS-O
	Zone Ctrl II specifications	Added surge CAUTION to Protection specification.	X-TS-AK-E-CC
12/17/18	Wiring the Zone Ctrl II for power > To wire the controller for power. Mounting the Zone Ctrl II > To mount the controller and actuator	Added photograph of lifting up the cover	CA-H-RE-E-CC-JS
10/30/18	Wiring inputs and outputs > Input wiring specification	Removed SPT sensors.	C-D
8/28/18	Wiring devices to the Zone Ctrl II's Rnet port	Added TruVu™ ET Display. Made one topic for overview and wiring for each device. Removed SPT sensor detail.	C-D
	Zone Ctrl II specifications	Reworded Rnet port specification and added power supplied by Rnet port. Added first paragraph to Protection specification.	X-H-JS-O
8/16/18	To set up the Airflow Control microblock To use an EquipmentBuilder control program	Note added that adjusting the Airflow Control microblock is not necessary when using EquipmentBuilder control programs.	C-CP-AE-E-WB

* For internal use only