AURORA

Aurora Universal Protocol Converter (UPC)

ZS Zone Sensors

Installation Guide

Aurora UPC ZS Zone Sensors Installation Guide

IG1582EW 06/18

Contents

What are ZS sensors?

The ZS line of thermistor-based temperature sensors consist of:

- Zone sensors that may optionally sense humidity, CO_2, VOC, or motion
- Duct sensors for sensing temperature, temperature/humidity, or averaging temperature
- A pipe temperature sensor
- An immersion sensor
- Outdoor air sensors for sensing temperature or temperature/humidity

ZS Sensors are wired to the Rnet of the following OEMCtrl® controllers:

- I/O Zone
- I/O Flex
- I/O Pro
- UPC
- XPC
- OEMPrtl Pro

The following table shows the ZS Sensor models, their features, and the available configurations.

Zone Sensors	Features	Available configurations	Part number
ZS Standard 	• Local access port • No user control	Temperature only Temp and humidity Temp and VOC Temp and CO2 Temp, humidity, and VOC Temp, humidity, and CO2	ZS2-WFI02 ZS2-H-WFI02 ZS2-V-WFI02 ZS2-C-WFI02 ZS2-HV-WFI02 ZS2-HC-WFI02
ZS Plus 	• Slider to make zone warmer or cooler • ⏻ button to override schedule and put zone in an occupied state, or force zone to an unoccupied state • Green LED to indicate occupied state • Local access port	Temperature only Temp and humidity Temp and VOC Temp and CO2 Temp, humidity, and VOC Temp, humidity, and CO2	ZS2PL-WFI02 ZS2PL-H-WFI02 ZS2PL-V-WFI02 ZS2PL-C-WFI02 ZS2PL-HV-WFI02 ZS2PL-HC-WFI02

What are ZS sensors?

Zone Sensors	Features	Available configurations	Part number
ZS Pro 	• LCD display • ⏻ button to override schedule and put zone in an occupied state, or force zone to an unoccupied state • ▲ and ▼ buttons to change any editable property, such as setpoint • *i* button to cycle through information defined in control program • Green LED to indicate occupied state • Local access port • Optional motion sensor (Future Use) 	Temperature only Temp and humidity Temp and CO2 Temp, humidity, and CO2 Temp and motion Temp, humidity, and motion Temp, CO2, and motion Temp, humidity, CO2, and motion	ZS2P-WFI02 ZS2P-H-WFI02 ZS2P-C-WFI02 ZS2P-HC-WFI02 ZS2P-M-WFI02 ZS2P-HM-WFI02 ZS2P-CM-WFI02 ZS2P-HCM-WFI02
ZS Pro-F 	All of the ZS Pro's features plus: • ❄/🔥 button to turn on heating, cooling, or fan only, or set to auto control. (Not Used) • button to adjust fan speed (Not Used) • **F/C** button to set temperatures to Fahrenheit or Celsius	Temperature only Temp and humidity Temp and CO2 Temp, humidity, and CO2	ZS2PF-WFI02 ZS2PF-H-WFI02 ZS2PF-C-WFI02 ZS2PF-HC-WFI02

What are ZS sensors?

Rnet configuration

You can use wireless sensors, ZS sensors, and an Equipment Touch on the same Rnet. The number of sensors you can use on a controller's Rnet depends on how many control programs it can have. If the controller supports:

- Only one control program, the Rnet can consist of:
  - Up to 5 ZS sensors
  - One Wireless Adapter supporting up to 5 wireless sensors
  - One Equipment Touch

  NOTE You can have any combination of ZS and wireless sensors, but no more than 5 sensors total.

- Multiple control programs, the Rnet can consist of:
  - Up to 15 ZS sensors
  - One Wireless Adapter supporting up to 15 wireless sensors
  - One Equipment Touch

  NOTES
  - You can have any combination of ZS and wireless sensors, but no more than 15 sensors total.
  - You can have no more than 5 sensors per control program.

CAUTIONS

- You cannot have ZS sensors on the same Rnet with any of the above devices.
- An Rnet can have more than one wireless Pro-F sensor, however, changing the setpoint on one Pro-F will not be reflected on the display of another Pro or Pro-F, possibly causing confusion for the user.

What are ZS sensors?

Rnet wiring specifications

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

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

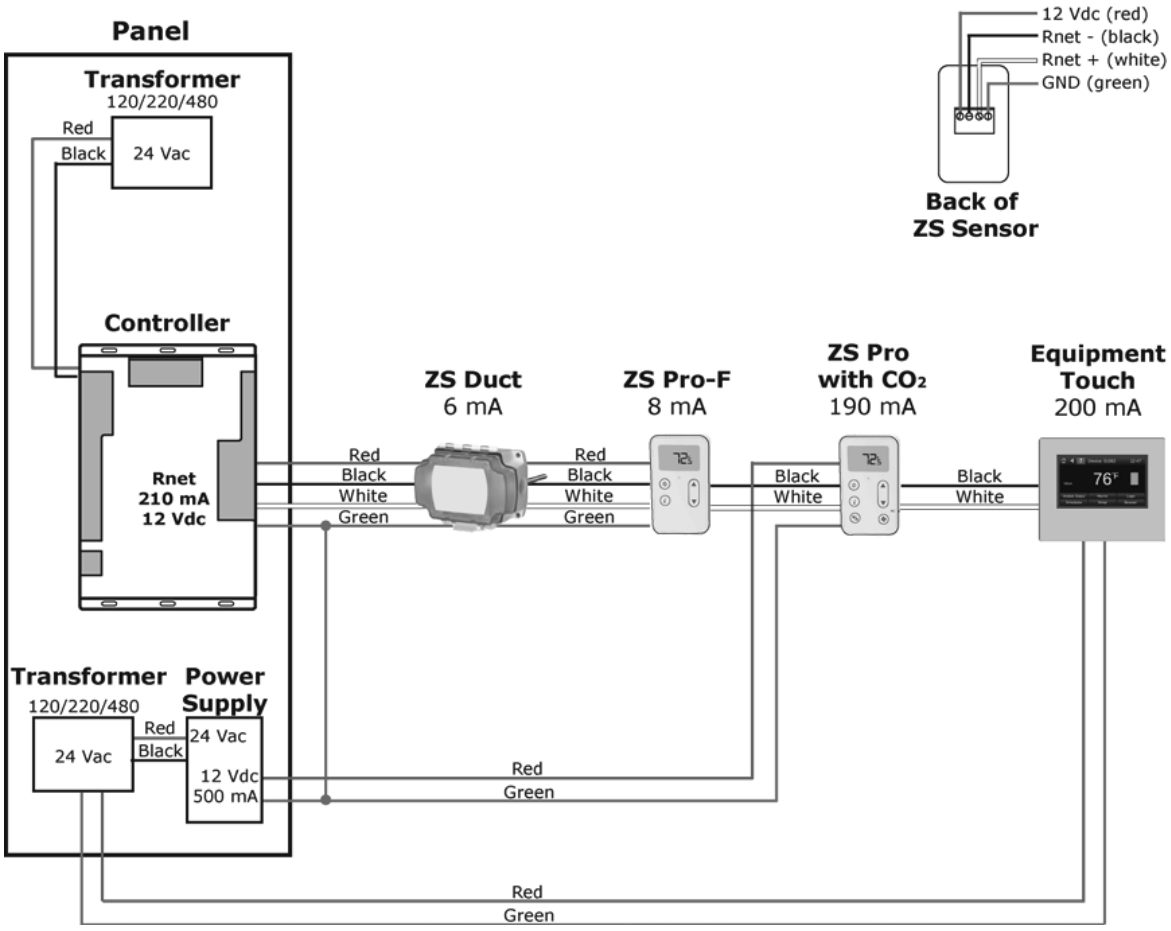
Description	4 conductor, shielded or unshielded, CMP, plenum rated cable
Conductor	22 AWG (7x0096) bare copper
Maximum length	500 feet (152 meters)
Insulation	Low-smoke PVC (or equivalent)
Color Code	Black, white, green, red
Shielding	If shielded, Aluminum/Mylar shield (100% coverage) with TC drain wire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

What are ZS sensors?

Power requirements

See the sensor specifications for power requirements and power supply information.

Sample wiring diagram with external power supply:



CAUTION Do not share power between controller's power and external 12 Vdc unless both devices are half wave.

ZS zone sensors

ZS Standard

ZS Plus

ZS Pro

ZS Pro with motion sensor **(Future Use)**

ZS Pro-F

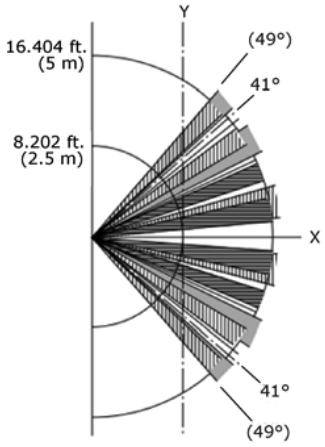
Specifications for ZS zone sensors

Sensing element accuracy		
Temperature	Temperature only: 32° to 122°F (0° to 50°C): ±0.36°F (0.2°C)	Temperature if humidity is included: 50° to 104°F (10° to 40°C): ±0.54°F (0.3°C)
Humidity	10% to 90%: ±1.8% typical. Less than 0.5% drift per year.	
CO_2	400 to 1250 PPM: ±30 PPM or 3% of reading, whichever is greater 1250 to 2000 PPM: ±5% of reading plus 30 PPM See *CO_2 sensor installation* (page 10).	
VOC	0 to 2,000 CO2 PPM Equivalent: ±100PPM	
CO_2 sensor type	Non-Dispersive Infrared (NDIR)	

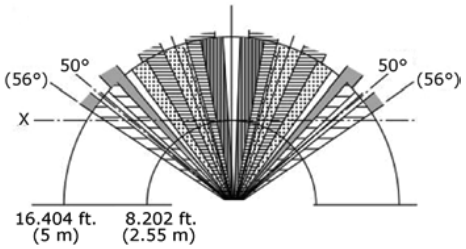
ZS zone sensors

Motion sensor specifications	Detector distance:	16.4 in. (5 m)
	Detection range (HxV):	100° x 82°
	Movement speed:	2.62 to 3.94 ft/s (0.8 to 1.2 m/s)
	Detection object:	27.56 x 9.84 in. (700 x 250 mm)

Side View



Top View



Power requirements *	Temperature only	
	ZS Standard or ZS Plus:	12 Vdc @ 6 mA
	ZS Pro or Pro-F:	12 Vdc @ 7 mA
	Temperature with humidity	
	ZS Standard or ZS Plus:	12 Vdc @ 7 mA
	ZS Pro or Pro-F:	12 Vdc @ 8 mA
	Temperature and VOC	
	ZS Standard or ZS Plus	12 Vdc @ 60 mA
	Temperature, humidity, and VOC	
	ZS Standard or ZS Plus	12 Vdc @ 60 mA
	Temperature, humidity, and CO_2	12 Vdc @ 15 mA (idle) to
	All models	190 mA (CO_2 measurement cycle)
	Temperature and CO_2	12 Vdc @ 15 mA (idle) to
	All models	190 mA (CO_2 measurement cycle)
	* A ZS Pro with motion sensor has the same power requirements as a ZS Pro without a motion sensor.	
Power supply	The 4-conductor Rnet cable from a controller supplies +12 Vdc @ 210 mA. For additional power, use an external power supply. Use the above power requirements to calculate the size of the external power supply. The controller and the external power supply must share a common ground.	
Communication	115 kbps	
Local access port	For local access to start up and troubleshoot the system	
Environmental operating range	32 to 122°F (0 to 50°C), 10 to 90% relative humidity, non-condensing	
Mounting	Standard 4x2-in. electrical box using the 6-32 x 1/2" mounting screws provided	
Overall dimensions	Width:	2.75 in. (6.98 cm)
	Height:	4.75 in. (12.06 cm)
	Depth:	.86 in. (2.18 cm)
Listed by	FCC Part 15-Subpart B-Class B, CE	

ZS zone sensors

CO2 sensor installation

IMPORTANT Do not install ZS CO_2 sensors in continuous occupancy applications. For a ZS CO_2 sensor to maintain accuracy, it must be installed only in a zone that is unoccupied for at least 4 hours a day with enough air movement during the unoccupied period to return CO_2 to background levels.

A ZS sensor with CO_2 uses Automatic Background Calibration which waits for the lowest value in a 24-hour period that deviates no more than 40PPM for at least 15 minutes, and assigns that value to the 400PPM baseline. This daily Automatic Background Calibration may take up to 21 days to fully calibrate the sensor.

NOTE Dropping a sensor can upset the calibration, and it may require 21 days to return to our stated accuracy.

Motion sensor installation

The motion sensor on a ZS Pro needs to have a direct line of sight to the occupants in the room.

If the size of the room exceeds the maximum detector range, use multiple sensors to adequately monitor the area.

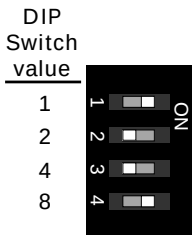
Avoid placing the sensor:

- In a location that has a direct line of sight through an open door to a hallway where the sensor could detect movement of people in the hallway.
- Near air ducts. Rapidly changing air currents from the air ducts could lead to false sensor readings.

To address a ZS zone sensor

Each ZS Sensor on an Rnet must have a unique address, but addresses do not have to be sequential.

Use the DIP switches on the back of the ZS zone sensor to set an address from 0 to 14. (0 is factory default.) Each DIP switch has the value shown in the figure below. Turn on as many DIP switches as you need so that their total value equals the address.



EXAMPLE DIP switches 1 and 4 above are on. Their values (1 + 8) total 9, so the sensor's address is 9.

ZS zone sensors

To wire and mount a ZS zone sensor

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

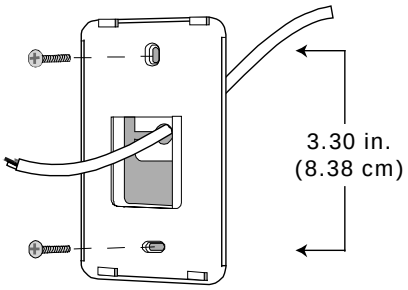
PREREQUISITE The Rnet cable is wired to the controller. The shield wire and the ground wire should be inserted into the controller's GND terminal.

1 Turn off the controller's power.

2 Using a hex screwdriver, turn the setscrew clockwise until it stops turning.

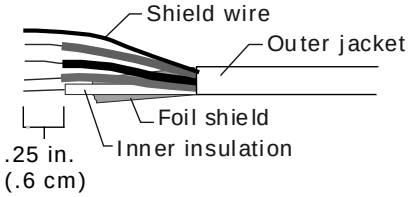
3 Pull out the bottom of the backplate, and then pull off the backplate.

4 Pull the Rnet communication cable through the wire guide in the backplate.



5 Use 2 screws to mount the backplate to the wall or outlet box.

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



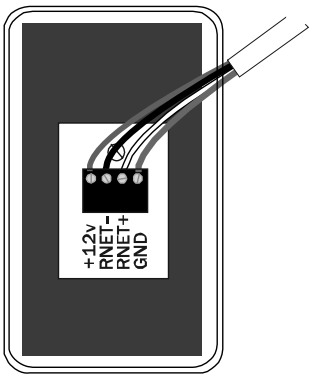
6 Strip about .25 inch (.6 cm) of the inner insulation from each wire.

7 If wiring 1 cable to the ZS Sensor, cut the shield wire off at the outer jacket, then wrap the cable with tape at the outer jacket to cover the end of the shield wire.

If wiring 2 cables in a daisy-chain configuration, twist together the shield wires, then wrap the shield wires with tape.

ZS zone sensors

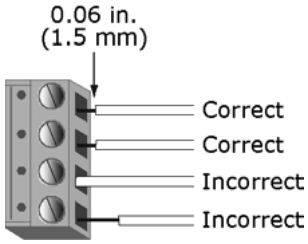
8 Insert the other 4 wires into the ZS Sensor's screw terminal connector. If wiring 2 cables, insert like-colored wires into each terminal.



OEMCtrl® recommends that you use the following Rnet wiring scheme:

Connect this wire...	**To this terminal...**
Red	+12V
Black	RNET-
White	RNET+
Green	GND

CAUTION Allow no more than 0.06 inch (1.5 mm) bare communication wire to protrude. If bare communication wire contacts the cable's foil shield, shield wire, or a metal surface other than the terminal block, the device may not communicate correctly.



9 Attach the sensor's cover and circuit board to the mounted backplate, inserting the top first.

10 Turn the setscrew counterclockwise until the cover cannot be removed.

11 Turn on the controller's power.

NOTE Use the same polarity throughout the Rnet.

To communicate through a ZS zone sensor's local access port

You can connect to the Local Access port of a ZS zone sensor to perform test and balance or to make changes to any device on the network.

PREREQUISITES

- A computer with a USB port
- A USB Link Kit

ZS zone sensors

If display shows...	Then...
	The sensor is not communicating with the network. Check: • Software/addressing setup • Wiring connections • Controller operating status
Characters that seem out of place	The sensor may have a memory problem. Try formatting the sensor.
Effective setpoints fields	These fields display the effective setpoint values. They can display a maximum value of 99 or 99.5 if the **Edit Increment** is set to 0.5. If the effective setpoint exceeds this maximum value or if the **Edit Increment** is set to 0.1, the value will flash. **TIP** If you need an Edit Increment of 0.1, put the effective setpoints on the Information screen in the Primary Value field. Hide the effective setpoints on the Home screen by selecting **Sensor Setpoint Adjust Option 4** on the **BACnet Setpoint** microblock's **Rnet** tab.

To format a ZS Sensor

Formatting a sensor clears its flash memory. Do either of the following to format a sensor:

- Download the controller that the sensor is connected to.
- Do the following:
  a) Remove the wiring connector from the sensor.
  b) Note the current position of the DIP switches.
  c) Set all DIP switches to the ON position.
  d) Reattach the wiring connector to format.
  e) After approximately 3 seconds, remove the wiring connector.
  f) Set the DIP switches back to their original position.
  g) Reattach the wiring connector.

NOTE If you move a sensor from one controller to another controller that has a different control program, format the sensor.

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