Phoenix Controls Zone Presence Sensor® (ZPS®) detects the presence of personnel in front of a fume hood. When an operator is present, the ZPS signals the fume hood system into the standard, higher flow, mode. When operators are absent, the ZPS signals the fume hood system into the standby, lower flow, mode, thereby maximizing energy savings and system diversity.

**FEATURES**

- Used in variable air volume and two-position applications
- Interfaces to Phoenix Controls fume hood monitor to initiate standard and standby operation
- ZPS and Phoenix Controls airflow control valves provide less than one-second response time for full-range flow change
- System fail-safe configured for highest flow set point

**SPECIFICATIONS**

**General**
- Mounting height field adjustment from 6-12’ (1.8-3.7 m) above the floor surface [factory default mounting height setting of 7’ (2.1 m) for a six-foot wide hood]
- One ZPS for fume hoods up to 8’ or 2.4 m. Consult factory for larger fume hoods.
- Detection zone extends approximately 20” (50 cm) from front of fume hood (adjustable)

**Dimensions**
8.875” W x 2.75” H x 1.75” D (225 x 70 x 44 mm)

**Enclosure**
Dustproof (NEMA 1, IP21)
Color—White

**Operating Range**
32-122 °F (0-50 °C)
8202’ (2500 m) altitude

**Power Requirements**
24 Vac, ±15%, 50-60 Hz, 3 VA
+15 Vdc, ±15%, 50-60 Hz, 120 mA

**Light Requirements**
50-150 foot candles

**Detection Time**
<1 second

**Setback Time**
Adjustable

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If the Zone Presence Sensor (ZPS) is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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To detect the presence and motion of fume hood users, the redesigned ZPS uses Charge-Coupled Device (CCD) image sensing technology. CCD arrays are most commonly used in image processing devices. The ZPS does not store, transmit or otherwise make available any optical images.

To detect movement, the ZPS cycles through a three-step process, 10 times each second:
1. The ZPS converts the detection zone image into counts of black and white pixels.
2. The ZPS comparator circuit monitors for differences between the previous counts of pixels and the present counts of pixels.
3. If the pixel count differences are greater than an adjustable sensitivity threshold, the ZPS determines that movement has occurred and the fume hood is then commanded to a higher face velocity set point.

The use of a CCD array is strictly for achieving a high resolution pixel count of the detection area in front of the fume hood.
ORDERING GUIDE

ZPS  2  10

PRODUCT FAMILY
ZPS = Zone Presence Sensor

SERIES
2 = Second Generation

NUMBER OF MODULES
10 = Kit with one ZPS unit and mounting hardware
20 = Kit with two ZPS units and mounting hardware for each
30 = Kit with three ZPS units and mounting hardware for each
40 = Kit with four ZPS units and mounting hardware for each

Note: One ZPS for fume hoods up to 8', contact Phoenix Controls for larger fume hoods

APPLICATIONS

Fume Hood Containment

Face Velocity Control: The standard FV set point ranges from 60 fpm to 100 fpm (0.3-0.5 m/s). The most common set point is 100 fpm. Fumes can be contained at a reduced FV (e.g., 60 fpm) after an operator has vacated the hood area (please consult your environmental, health and safety specialist).

This graph shows the reduction in flow of a typical VAV fume hood using the ZPS. With no operator present, reductions in airflow are realized throughout the range of sash opening.

This graph shows the reduction in flow of a typical two-state fume hood using the ZPS. With no operator present, the airflow is reduced to a safe standby level—regardless of sash position. The fume hood would require a bypass.
INSTALLATION

Zone Presence Sensors are surface mounted on the hood by the hood manufacturer or the field controls electrician.

Physical Installation

Materials required:
- Two sheet metal screws per ZPS (provided)
- Level (not provided by Phoenix)

1. Mark a point from 6-12’ (1.8-3.7 m) above the finished floor centered laterally on the hood.
2. Remove the ZPS cover and hold the ZPS assembly centered, just above the mark, level to the floor.
3. Using the assembly as a template, mark the mounting holes at both ends and the cable hole onto the hood panel. Be certain the ZPS assembly is oriented as indicated in the ZPS mounting assembly figure on the following page. Set ZPS aside.
4. Drill pilot holes at the marked mounting holes (recommended sizes are from .128” to .148”, or 0.325 to 0.375 cm). Drill a 3/4” (2 cm) hole for the cable.
5. Install ZPS assembly using two sheet metal screws.

Retrofit Installation

Materials required:
- Two sheet metal screws per ZPS (provided)
- Level (not provided by Phoenix)

1. Remove the older model of the ZPS.
2. Remove the ZPS cover from the new unit and hold the ZPS assembly centered over the old mounting spot.
3. Follow steps 3-5 above.

NOTE: Because the ZPS110 had a larger footprint, previous holes may need to be filled for aesthetic purposes. Phoenix Controls offers a plastic barbed plug (white) to fill the holes.

Electrical Installation

Materials required:
- Phoenix Controls submittal wiring diagrams
- Three cable mounts (provided)
- Cable (not provided by Phoenix)

1. Wire ZPS unit(s) as indicated on wiring diagram (see the following page).
2. Attach one cable mount behind the ZPS assembly’s mounting surface near the cable hole to secure cable and act as a strain relief.
3. Use the other cable mounts to secure the cable so that the sash will not hit the cable when raised.
4. Reinstall the cover.
ZPS210 board.

**COMPONENTS**

<table>
<thead>
<tr>
<th>Device</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>JP1</td>
<td>Flash programming port</td>
</tr>
</tbody>
</table>
| JP3    | Jumper:  
|        | • IN for last ZPS in chain  
|        | • OUT for all others |
| CN1    | USB port |
| TB1    | 7-pin terminal block |

**TERMINAL BLOCK POINTS**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB1</td>
<td>Volts</td>
<td>DC/AC</td>
<td>Ground</td>
<td>Secondary In</td>
<td>User Status</td>
<td>Isolated (ISO)</td>
<td>Ground</td>
</tr>
</tbody>
</table>

**Wiring Detail for ZPS210**

Powered by DC Voltage

- ISO Ground to TB1 Pin 1
- Not Used to TB1 Pin 2
- User Status to TB1 Pin 5
- Secondary in to TB1 Pin 7
- Ground to TB1 Pin 8

ZPS210

To fume hood monitor

24 Vac power connection

**Wiring Detail for ZPS220**

Powered by AC Voltage

- ISO Ground to TB1 Pin 1
- Not Used to TB1 Pin 2
- User Status to TB1 Pin 5
- Secondary in to TB1 Pin 7
- Ground to TB1 Pin 8

ZPS220

To fume hood monitor

24 Vac power connection

**Wiring Detail for ZPS220**

Powered by DC Voltage

- ISO Ground to TB1 Pin 1
- Not Used to TB1 Pin 2
- User Status to TB1 Pin 5
- Secondary in to TB1 Pin 7
- Ground to TB1 Pin 8

ZPS220

To fume hood monitor

24 Vac power connection
## Phoenix Recommended Cabling

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Plenum Rated</th>
<th>Function</th>
<th>Wire Gauge</th>
<th>Primary Vendor/Part #</th>
<th>Alternate Vendor/Part #</th>
<th>Color Code</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2C Round</td>
<td>No</td>
<td>24 Vac power to LOSEA or Pneumatic (110' max at load 1, 2)</td>
<td>18</td>
<td>Belden 9409</td>
<td>Windy City NP002360</td>
<td>1: Red  2: Black</td>
<td>Must be stranded</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>24 Vac power to HiSea (288' max at load 1, 2)</td>
<td>14</td>
<td>Belden 9411</td>
<td>Windy City NP007960</td>
<td>1: Red  2: Black</td>
<td>Must be stranded</td>
</tr>
<tr>
<td>TP</td>
<td>No</td>
<td>FTT-10 (4500')</td>
<td>22</td>
<td>Windy City 107500</td>
<td>Connect Air W221P-1002</td>
<td>1: White/Blue stripe  2: Blue/White stripe</td>
<td>For more alternatives visit: eche-lon.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TP1250 (425')</td>
<td></td>
<td>Windy City 109500</td>
<td>Connect Air W221P-2001</td>
<td>1: White/Blue stripe  2: Blue/White stripe</td>
<td>For more alternatives visit: eche-lon.com</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FTT-10 (8800')</td>
<td>16</td>
<td>Windy City 109600</td>
<td>Connect Air W221P-1002</td>
<td>1: White/Blue stripe  2: Blue/White stripe</td>
<td>For more alternatives visit: eche-lon.com</td>
</tr>
<tr>
<td>TP</td>
<td>Yes</td>
<td>FTT-10 (4500')</td>
<td>22</td>
<td>Windy City 105500</td>
<td>Connect Air W221P-2001</td>
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<td></td>
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<td>TP1250 (425')</td>
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<td>Windy City 109500</td>
<td>Connect Air W221P-2001</td>
<td>1: White/Blue stripe  2: Blue/White stripe</td>
<td>For more alternatives visit: eche-lon.com</td>
</tr>
<tr>
<td>3C Round</td>
<td>No</td>
<td>Signal</td>
<td>22</td>
<td>Belden 8443</td>
<td>Windy City 004380</td>
<td>1: Red  2: Black  3: Green</td>
<td>Must be stranded</td>
</tr>
<tr>
<td>3C or 4C Round</td>
<td>Yes</td>
<td>Signal</td>
<td>22</td>
<td>Belden 88444</td>
<td>Manhattan M13304</td>
<td>1: White  2: Green  3: Black  4: Red</td>
<td>Must be stranded</td>
</tr>
<tr>
<td>4C Round</td>
<td>No</td>
<td>Signal</td>
<td>22</td>
<td>Belden 8444</td>
<td>Manhattan M13305</td>
<td>1: White  2: Brown  3: Black  4: Red  5: Green</td>
<td>Must be stranded</td>
</tr>
<tr>
<td>5C Round</td>
<td>No</td>
<td>Signal</td>
<td>22</td>
<td>Belden 8445</td>
<td>Manhattan M13305</td>
<td>1: White  2: Brown  3: Black  4: Red  5: Green</td>
<td>Must be stranded</td>
</tr>
<tr>
<td>Cable Type</td>
<td>Plenum Rated</td>
<td>Function</td>
<td>Wire Gauge</td>
<td>Primary Vendor/Part #</td>
<td>Alternate Vendor/Part #</td>
<td>Color Code</td>
<td>Notes</td>
</tr>
<tr>
<td>------------</td>
<td>--------------</td>
<td>----------------</td>
<td>------------</td>
<td>-----------------------------</td>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>3C MS/TP</td>
<td>No</td>
<td>Shielded</td>
<td>22</td>
<td>Belden 3106A (120 ohm)</td>
<td></td>
<td>1: White with Orange stripe 2: Orange with White stripe 3: Blue with White stripe</td>
<td>Shielded with drain</td>
</tr>
<tr>
<td>4C MS/TP</td>
<td>Yes</td>
<td>Armored Shielded</td>
<td>22</td>
<td>Belden 1269A (100 ohm)</td>
<td></td>
<td>1: Red 2: Blue 3: Black 4: Yellow</td>
<td>Foil and braided shield with drain</td>
</tr>
<tr>
<td>4C MS/TP</td>
<td>Yes</td>
<td>Armored Shielded</td>
<td>22</td>
<td>Belden 123107A (100 ohm)</td>
<td></td>
<td>1: White with Blue stripe 2: Blue with White stripe 3: White with Orange stripe 4: Orange with White stripe</td>
<td>Foil and braided shield with drain</td>
</tr>
<tr>
<td>4C MS/TP</td>
<td>Yes</td>
<td>Armored Shielded</td>
<td>24</td>
<td>Belden 82842 (100 ohm)</td>
<td></td>
<td>1: White with Blue stripe 2: Blue with White stripe 3: White with Orange stripe 4: Orange with White stripe</td>
<td>Foil and braided shield with drain Low smoke</td>
</tr>
<tr>
<td>4C MS/TP</td>
<td>Yes</td>
<td>Shielded</td>
<td>24</td>
<td>Belden 82729 (100 ohm)</td>
<td></td>
<td>1: White with Blue stripe 2: Blue with White stripe 3: White with Orange stripe 4: Orange with White stripe</td>
<td>Shield with drain</td>
</tr>
<tr>
<td>4C MS/TP</td>
<td>Yes</td>
<td>Shielded</td>
<td>24</td>
<td>Belden 88102 (100 ohm)</td>
<td></td>
<td>1: White with Blue stripe 2: Blue with White stripe 3: White with Orange stripe 4: Orange with White stripe</td>
<td>Shield with drain</td>
</tr>
</tbody>
</table>
MAINTENANCE

Phoenix Controls Zone Presence Sensors require no ongoing preventive maintenance. Once the field engineer has completed the field setup, the monitors will provide years of continuous operation. Replacement parts are available.

<table>
<thead>
<tr>
<th>Item</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZPS assembly (includes entire assembly and optical device)</td>
<td>889-270-001</td>
</tr>
<tr>
<td>Enclosure cover</td>
<td>250-270-013</td>
</tr>
<tr>
<td>Plastic barbed plug to fill hole from ZPS110 footprint (white only)</td>
<td>049-500-004</td>
</tr>
</tbody>
</table>

If you use the ZPS Commissioning Software to adjust settings on the ZPS, you will also need to purchase a USB cable to connect your laptop computer to the ZPS. The type of cable you will need is an A-to-B, Male-to-Male Cable Assembly. These cables are available from any store that carries electronic accessories.

The recommended cable length is 10 feet or less. If cables are too long, signal degradation and communication loss can occur.

Detailed instructions for using the ZPS Commissioning Software are available in the Zone Presence Sensor (ZPS) User’s Manual.

TROUBLESHOOTING

In the event of a circuit failure within the ZPS, indication of user status will be at the fume hood monitor. A trained facilities person may troubleshoot the system using the guide below.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause/Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hood does not go into standby operation after operator leaves zone.</td>
<td>A. ZPS cable break or wires have been disconnected. Check cable and termination.</td>
</tr>
<tr>
<td></td>
<td>B. ZPS has been miscalibrated. Check the calibration settings.</td>
</tr>
</tbody>
</table>