

# ZP3-HPS Installation and Operation Instructions

## 3 Heat / 2 Cool Heat Pump with Fossil Fuel option

### Auto Changeover - First Call Priority - Time Share



#### Sequence of Operation:

The ZP3-HPS is a residential / light commercial zone control system that allows a single HVAC unit to have up to three separate zones. Each zone is controlled by its own space thermostat and motorized zone damper. If a zone thermostat calls for heating or cooling, the zones not calling will have their dampers powered closed, and the zone calling will have its damper opened. The heating or cooling equipment will also be brought on at the same time. When the zone calling is satisfied, the heating or cooling equipment turns off. If one zone calls for heating and another zone calls for cooling, the first zone to call receives priority. When the first call is satisfied, the system will changeover and take care of the opposite call. If a one being served (heating or cooling) has not been satisfied within 20 minutes while an opposite call is taking place, the system will changeover. When the zone is satisfied or 20 minutes has elapsed, the system will again changeover if an opposite call exists. This is referred to as Auto Changeover - First Call Priority - Time Share. In the event of a tie, cooling will receive priority. The changeover valve only changes position when the mode of operation changes.

#### High and Low Limit Protection:

The ZPA-DTS Discharge Temperature Sensor should be mounted on the discharge air plenum of the HVAC unit and wired to the DA terminals on the panel. The sensor is used for both high and low limit protection. The high limit setting can be adjusted using the two slide switches located on the panel. (See switch location and settings on page 2) The low limit is fixed at 45° F. When the discharge air temperature rises above the high limit setting or falls below the low limit setting, the panel will cycle the equipment off while the fan continues to run. The LIMIT LED blinks when high or low limit is reached.

#### Ventilation Mode:

Zone ventilation is established by the individual zone thermostat fan setting. Any thermostat set in the fan AUTO mode will not receive ventilation air when there are no heating or cooling calls. Any thermostat set in the fan ON mode will receive ventilation air whenever there are no heating or cooling calls taking place.

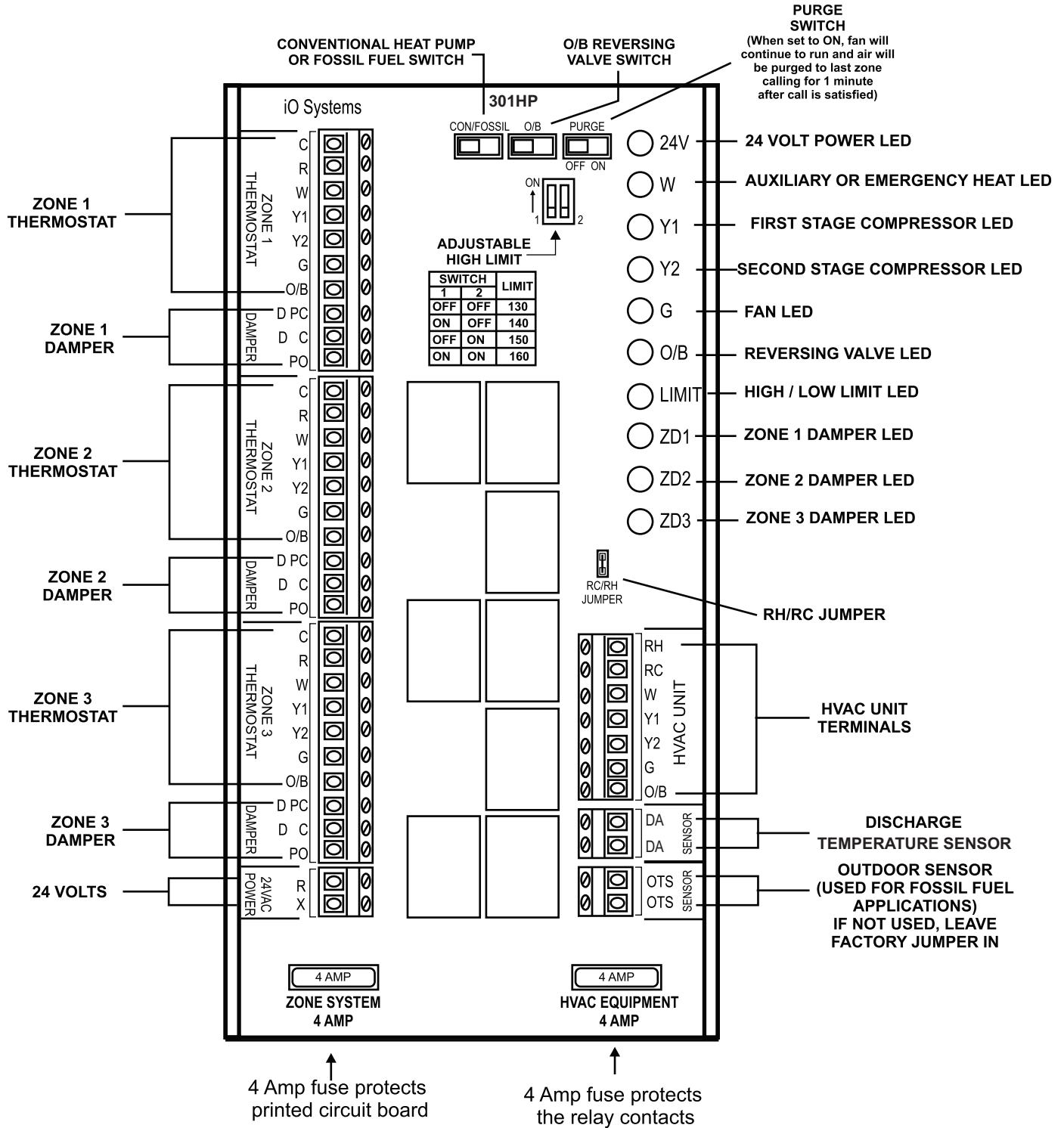
#### Power Requirements:

The ZP3-HPS requires a separate 24 Vac transformer. A 40 VA transformer will power the panel and up to four (4) dampers. A 75 VA transformer will power the panel and up to seven (7) dampers. If more than three (3) dampers for an individual zone are required, a RY-1-HB relay should be used with an additional properly sized transformer. iO HVAC Controls HD-XXXX rectangular and D-XX round dampers are powered close / spring return open. Damper actuators are rated at 10 VA. If 3-wire dampers (power open / power closed) are installed, VA ratings will vary depending on the damper actuator used.

#### Wiring:

All wiring should be conventional 18 gauge thermostat wire. Thermostats and zone dampers may be located up to 300 feet from the ZP3-HPS panel.

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### Installation

#### Mounting the Panel:

Carefully remove the ZP3-HPS panel and cover from the shipping carton. Slide the PC board out of the snap track base and mount the base to a flat surface either on or near the HVAC indoor unit in an area that will facilitate easy access for wiring. Reinstall the PC board by carefully centering it over the base and snapping it back into the track grooves.

#### Wiring the Zone Thermostats and Dampers:

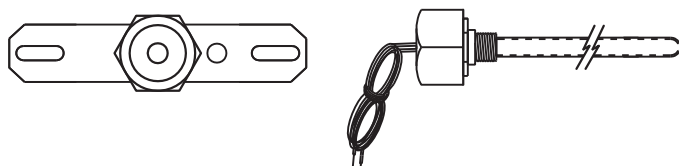
Refer to the logic panel wiring diagram. Wire zone 1 thermostat and its associated damper to the ZONE 1 terminals on the logic panel. Wire zone 2 and 3 thermostats and dampers in the same manner.

#### Wiring the HVAC Equipment:

Wire the HVAC unit to the ZP3-HPS HVAC UNIT terminals. Note: Do not wire the equipment common to the ZP3-HPS panel.

#### Installing and Wiring the ZPA-DTS Discharge Temperature Sensor:

Drill a 15/32" hole in the middle of the main discharge air plenum approximately 18" to 30" from the heat pump electric strip heater or the furnace heat exchanger in a fossil fuel application. Slide the discharge air probe into the hole and use two self-tapping sheet metal screws to secure the base to the plenum. Use conventional 18-2 thermostat wire and wire nuts to attach the sensor leads. Replace the cover with the wire nut connections inside. Strip 1/8" insulation off of each wire at the other end and connect the wires to the screw terminals marked DA on the panel.



#### Wiring the Transformer:

Wire a separate 24 Volt transformer of the proper VA to the logic panel terminals marked (R) and (X). Do not power the panel up until wiring is completed.

#### Test, Check and Startup:

1. Verify that all component wires have been connected to the proper terminals and are secure.
2. Disconnect the HVAC equipment (R) terminal wire at the panel and apply 24 Volts to panel.
3. Take a jumper wire and momentarily short the DA terminals. This will put the panel's time delays in "speed up" mode.
4. Place the zone thermostats in the OFF position.
5. The panel accepts 2-wire (power close / spring open) or 3-wire (power open / power close) zone dampers. 2-wire dampers should be wired to the (C) and (PC) terminals.
6. Place zone one thermostat in the fan ON mode. ZD1 LED will remain on and ZD2 and ZD3 LED will go out. The (G) FAN LED will come on.
7. Confirm that zone one damper is in the open position and zone two and three dampers are closed.
8. Leave zone one thermostat in fan ON and place zone two thermostat in the fan ON mode. ZD2 LED will come on.
9. Confirm that both zone one and zone two dampers are in the open position and zone three damper is closed.
10. Leave zone one and zone two thermostats in Fan ON and place zone three thermostat in the fan ON mode. ZD3 LED will come on. Confirm that all zone dampers are in the open position.
11. Place all zone thermostats in the Auto fan mode.
12. Remove 24 Volts to the panel and reconnect the HVAC® wire.
10. When 24 Volts is applied again to the panel, the internal time delays will be activated.
11. Place zone thermostats in proper mode of operation.
12. Confirm that the LIMIT LED is ON. If not, check LIMIT wiring. If the system goes out on high or low limit, the LIMIT LED will blink.

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### Fossil Fuel Applications:

Fossil fuel may be used as the auxiliary heat source with the ZP3-HPS allowing for up to 2 stages of cooling and 3 stages of heating. For systems having a 2 stage furnace, W1 and W2 are jumpered at the furnace. This method utilizes the internal furnace upstage timer to bring on second stage fossil fuel.

### Sequence of Operation:

#### 2 Heat / 1 Cool

When a zone thermostat calls for heating and the outdoor temperature is above the balance point as established by the ZP3-OTS, the heat pump operates as first stage heat. If there is a call for second stage heat (auxiliary), or if any thermostat is placed in the emergency heat mode, the panel will automatically de-energize the heat pump and bring on the furnace. When the outdoor temperature falls below the balance point, the heat pump will be locked out and the furnace will become first stage.

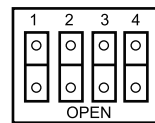
#### 3 Heat / 2 Cool

When a zone thermostat calls for heating and the outdoor temperature is above the balance point as established by the ZP3-OTS, both compressor stages of the heat pump will operate as normal. If there is a call for third stage heat (auxiliary), or if any thermostat is placed in the emergency heat mode, the panel will automatically de-energize all heat pump stages and bring on the furnace. When the outdoor temperature falls below the balance point, the heat pump will be locked out and the furnace will become first stage.

### Installing and wiring the ZP3-OTS

The ZP3-OTS is an adjustable electronic sensor used for both selecting the outdoor balance point and measuring the outdoor temperature. This information determines when the heat pump will be locked out and only the furnace will be used for heating.

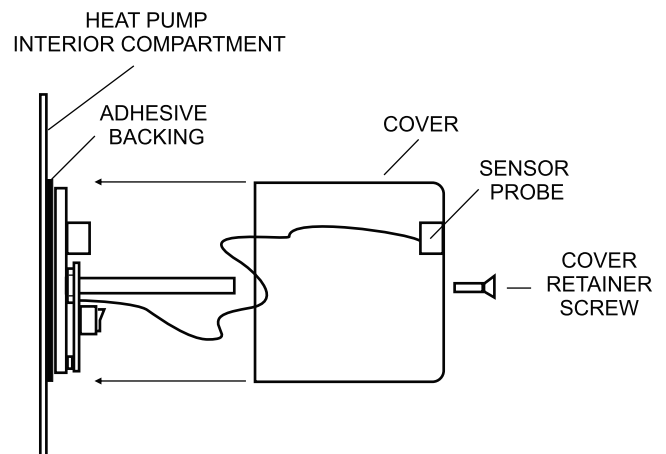
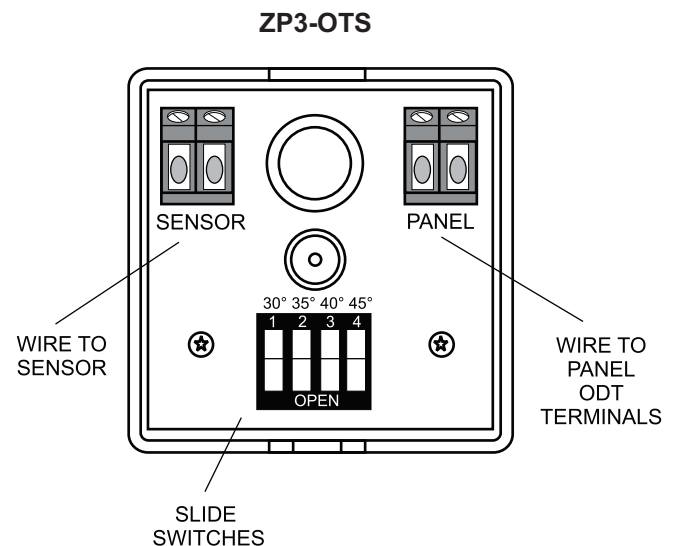
Before installing the ZP3-OTS, remove the retaining cover and select the outdoor balance point temperature using the slide switches.



SETPOINT  
30° F  
35° F (Default)  
40° F  
45° F

SWITCH SETTING  
1 Closed - 2,3,4 Open  
2 Closed - 1,3,4 Open  
3 Closed - 1,2,4 Open  
4 Closed - 1,2,3 Open

Mount the ZP3-OTS on a vertical surface inside the heat pump cabinet to avoid direct sunlight, freezing rain or snow.



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#### Specifications

##### Panel Dimensions:

Height: 8.0 Inches  
Width: 6.0 Inches  
Depth: 1.375 Inches

##### Mounting:

Snap Track with 2 back plate screws

##### Operating Temperature Rating:

-40° F to 150° F

##### Operating Humidity:

5% to 90% RH non-condensing

##### Wiring:

18-gauge wire for all equipment  
and system connections

##### Time Delays:

3 minutes minimum off between  
heating and cooling calls  
3 minutes minimum off on high and low  
limit  
20 minute time share  
Purge ON = 1 minute

##### Thermostats:

Single or multi-stage heat pump  
Programmable or non-programmable  
Auto or manual changeover

#### Terminal Designations

##### Thermostats:

C	24Vac (Common)
R	24Vac (Hot)
W	Auxiliary or Emergency Heat
Y1	First Stage Compressor
Y2	Second Stage Compressor
G	Fan

##### Dampers:

PC	Powered Closed
C	Common
PO	Powered Open

##### High / Low Limit

DA	Land to ZPA-DTS
DA	Land to ZPA-DTS

##### Outdoor Thermostat

OTS	Land to ZP3-OTS
OTS	Land to ZP3-OTS

##### HVAC Equipment:

RH	24Vac Heating Transformer
RC	24Vac Cooling Transformer
W	Auxiliary or Emergency Heat
Y1	First Stage Compressor
Y2	Second Stage Compressor
G	Fan
O/B	Reversing Valve

##### Panel Power:

R	24Vac (Hot)
X	24Vac (Common)

#### Typical System Layout

