

INSTALLATION AND OPERATION MANUAL

ZP6 Six Zone Forced Air Zoning System

READ THIS MANUAL THOROUGHLY BEFORE PROCEEDING WITH INSTALLATION

INTRODUCTION

The ZP6 is a residential and light commercial forced air zone control system that allows a single HVAC unit to have up to six separate zones. The system can be expanded to as many as 12 zones by adding 3-zone expansion modules. Intuitive firmware allows the panel to be used with single stage, multi-stage, heat pump and dual fuel equipment having up to 3 stages of heating and 2 stages of cooling. Standard heat / cool or heat pump thermostats can be used with the ZP6 along with a choice of two or three-wire zone dampers. Simple slide switch configuration allows for a wide range of system setup and control options best suited for each zoning application. Additional features include, fuse protected inputs and outputs, easy-to-read and access wiring terminals, LED status indication of all system functions, time delay override, adjustable on-board limits, balance point controls, and selectable ventilation and purge modes. An adjustable upstage timer allows single stage thermostats to be used with multi-stage equipment. Capacity Control can also stage equipment based on the number of zones calling. The ZP6 comes in an attractive and rugged 2-piece anodized aluminum enclosure that provides easy access for wiring, system setup and diagnostics.

WARNING

1. Turn power off to HVAC unit and control panel during installation to prevent serious injury from electrical shock and/or damage to system.
2. Use extreme care when making duct openings and handling sheet metal to avoid injury.
3. The ZP6 and all components must be installed in a conditioned space where the ambient temperature will not exceed 150°F.
4. Install all components in a manner that prevents access by children.

CAUTION

1. Installation of this system must be in compliance with all applicable codes.
2. HVAC system must be properly sized and balanced to assure optimum system performance.
3. A bypass damper must be installed to maintain proper system airflow and static pressure.
4. All low voltage wire must be 18 gauge or heavier.
5. All wiring should be color coded and tagged for proper identification.
6. When landing wires to the control panel make sure wires are snug but do not over-tighten screw terminals.

CONTROL PANEL MOUNTING

Mount the zone control panel on a flat, moisture-free surface in a conditioned space that will facilitate easy access for wiring and system setup.

CONTROL PANEL TRANSFORMER

1. Never use the 24 volt equipment transformer to power the control panel, regardless of it VA rating.
2. Wire a separate 24 VAC transformer of the proper VA to the designated terminals on the zone control panel marked 24 VAC.

INSTALLATION

ZONE DAMPERS

1. Zone dampers may be two-wire (powered closed, spring open) or three-wire (powered closed, powered open)
2. Two-wire dampers connect to the zone damper terminals marked 'D' and 'D'. Three-wire dampers connect to the terminals marked PC (Powered Closed), C (Common), and PO (Powered Open).
3. As many as three dampers may be wired in parallel for any single zone, providing the total VA of all dampers does not exceed the VA rating of the zone control panel transformer.
4. 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.
5. If the total VA of all dampers exceeds 75 VA, a relay and a separate 24 volt transformer will be required to power additional dampers.
6. Use only 18 gauge thermostat wire. Do not exceed 300 feet from zone damper to control panel.

ZONE THERMOSTATS

1. Zone thermostats must match equipment type. (Heat / Cool or Heat Pump) Power stealing thermostats are not recommended.
2. Use only 18 gauge thermostat wire. Do not exceed 300 feet from zone thermostat to control panel.

REMOTE SENSORS

ZPA-DTS

1. Mount the ZPA-DTS Discharge Temperature Sensor in the supply trunk. Mount the sensor out of the line of sight of the heat exchanger and cooling coils whenever possible and before any zone dampers. The ZPA-DTS sensor has a resistance value of 10,000 Ohms @ 77° F.
2. Use 18 gauge thermostat wire to connect the sensor to the DAS terminals on the zone control panel.

ZPA-OTS (For dual fuel applications)

1. Mount the ZPA-OTS Outdoor Temperature Sensor inside the outdoor unit where it will not be directly exposed to sunlight, water, snow or ice. The ZPA-OTS sensor has a resistance value of 10,000 Ohms @ 77° F.
2. Use 18 gauge thermostat wire to connect the sensor to the OTS terminals on the control panel.

HVAC UNIT

1. Wire the HVAC unit to the HVAC System terminals on the zone control panel. For equipment having separate heating and cooling transformers, cut the jumper marked RH-RC on the control board and wire independently.
2. Use 18 gauge thermostat wire to connect the zone control panel HVAC System terminals to the HVAC unit terminals.
3. **The 24 VAC equipment common does not wire to the ZP6 panel.**

SYSTEM STATUS LED DEFINITIONS AND FUNCTIONS

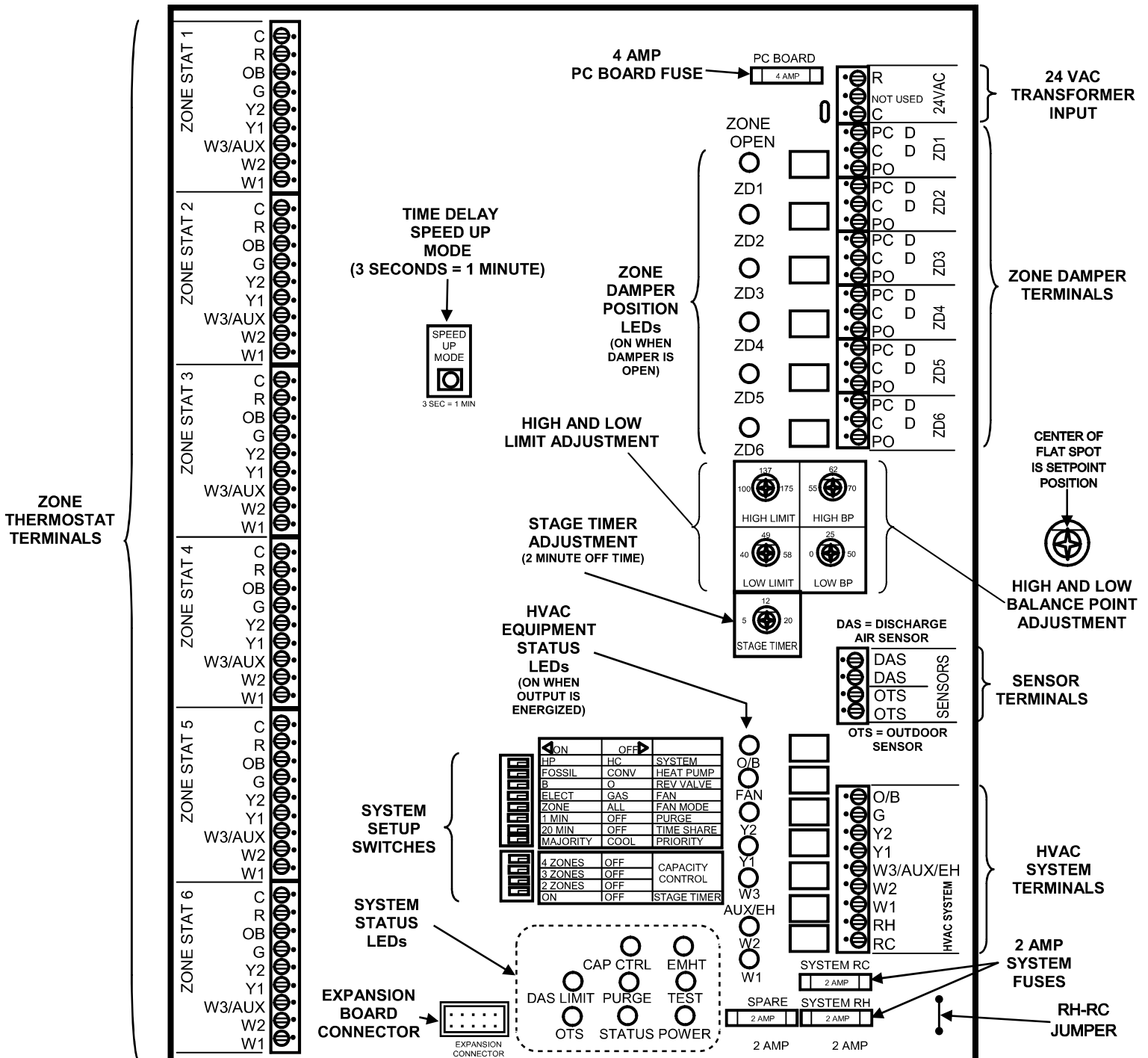
CAP CTRL	Capacity Control	BLINKS when below selected value. ON when equal to or greater than selected value. (See Capacity Control Settings on back page)
EMHT	Emergency Heat	BLINKS when heat pump system is in the emergency heat mode. ON to indicate that a zone thermostat is still in the emergency heat mode. (See Emergency Heat Reset instructions)
DAS LIMIT	Discharge Air Sensor	ON when DAS is connected. BLINKS when panel goes out on high or low limit.
PURGE	Purge Cycle	ON for 1 minute after heating or cooling call when Purge is selected.
TEST	Time Delay Speed Up	BLINKS when time delays are in speed up mode. Resets in 15 minutes.
OTS	Outdoor Temperature Sensor	BLINKS when outdoor temperature sensor is connected and when panel goes out on high or low balance point.
STATUS	Continuous System Check	BLINKS to confirm microprocessor is functioning properly.
POWER	System Power	ON when system is receiving 24 Volts.

SEQUENCE OF OPERATION

Each zone damper is controlled by its own space thermostat and motorized zone damper. If any of the zone thermostats call for heating or cooling, the zones not calling will have their dampers powered closed, and the zones calling will have their dampers open. The heating or cooling equipment will be brought on at the same time. When all zones are satisfied, the heating or cooling equipment turns off. Zone dampers then reposition based on ventilation mode selection. The system can be set up to operate in either Cooling Priority or Majority Wins mode.

COOLING PRIORITY MODE - If any zones are calling for heating and a zone calls for cooling, the cooling will receive priority and the system will operate in the cooling mode. When all cooling calls are satisfied, the system will automatically changeover and take care of the heating calls.

MAJORITY WINS MODE - If more zones call for heating than cooling, the system will be in the heating mode. If more zones call for cooling than heating, the system will be in the cooling mode. If the number of heating and cooling calls are equal, cooling wins.



SYSTEM SETUP

SYSTEM SWITCH SETTINGS

There are twelve, two-position slide switches located on the control panel. Set applicable switches in their proper position for HVAC equipment configuration and control options.

ON	OFF	
HP	HC	SYSTEM
FOSSIL	CONV	HEAT PUMP
B	O	REV VALVE
ELEC	GAS	FAN
ZONE	ALL	FAN MODE
1 MIN	OFF	PURGE
20 MIN	OFF	TIME SHARE
MAJORITY	COOL	PRIORITY

DEFINITIONS

HP	Heat pump equipment
HC	Conventional heating and cooling equipment
FOSSIL	Heat pump with fossil fuel furnace
CONV	Heat pump with or without electric auxiliary heat
B	Heat pump reversing valve energized in heating
O	Heat pump reversing valve energized in cooling
ELEC	Fan energized on call for heat
GAS	Fan controlled by furnace
ZONE	Ventilation controlled by individual zone thermostat
ALL	Ventilation for all zones when any zone thermostat is set on continuous fan
1 MIN	Fan purges to last zone calling for 1 minute (<u>Do not use with constant fan</u>)
20 MIN	20 minute Time Share used with Majority Wins or Cooling Priority mode
MAJORITY	Heating and cooling controlled by greatest demand
COOL	Cooling calls receive priority over heating calls

TIME SHARE

Time Share can be used with either the Cooling Priority Mode or Majority Wins Mode. If zones being served (heating or cooling) have not been satisfied within 20 minutes and an opposite call takes place, the system will changeover. When that mode is satisfied or 20 minutes has gone by, the system will again changeover if an opposite call exists.

FAN MODE

When the Fan Mode slide switch is set in the ALL position and at least one zone thermostat is set in the fan ON mode, all zone dampers will open for ventilation air between equipment calls. When the Fan Mode slide switch is set in the ZONE position, only those zone thermostats set in the fan ON mode will have their dampers open for ventilation air between equipment calls.

CAPACITY CONTROL SETTINGS

The three Capacity Control slide switches have a numerical value of 2, 3 and 4. Any switch or combination of switches set in the ON position establishes the Capacity Control value. This value equals the minimum number of zones that must be calling in the same mode before a second stage **can be** energized. Capacity Control only allows for the upstaging to occur; it still requires a second stage call from the thermostat or Stage Timer to actually initiate the second stage of the equipment. It is recommended that the Capacity Control value equal no more than 50% of the total number of zones. This feature works with multi-stage and single-stage thermostats. The Stage Timer must be ON when single-stage thermostats are used with multi-stage equipment.

4 ZONES	OFF	CAPACITY CONTROL
3 ZONES	OFF	
2 ZONES	OFF	

CAPACITY CONTROL VALUES

2 ON	= 2 Zones	2 & 4 ON	= 6 Zones
3 ON	= 3 Zones	3 & 4 ON	= 7 Zones
4 ON	= 4 Zones	2, 3 & 4 ON	= 9 Zones
2 & 3 ON	= 5 Zones		

STAGE TIMER

The Stage Timer switch is located below the Capacity Control switches. When the switch is set in the ON position, the adjustable Stage Timer is activated. This feature allows for the use of single-stage zone thermostats with multi-stage and heat pump equipment. The Stage Timer can be set from 5 to 20 minute upstaging. (Typically set at 10 minutes)

ADJUSTABLE LIMITS

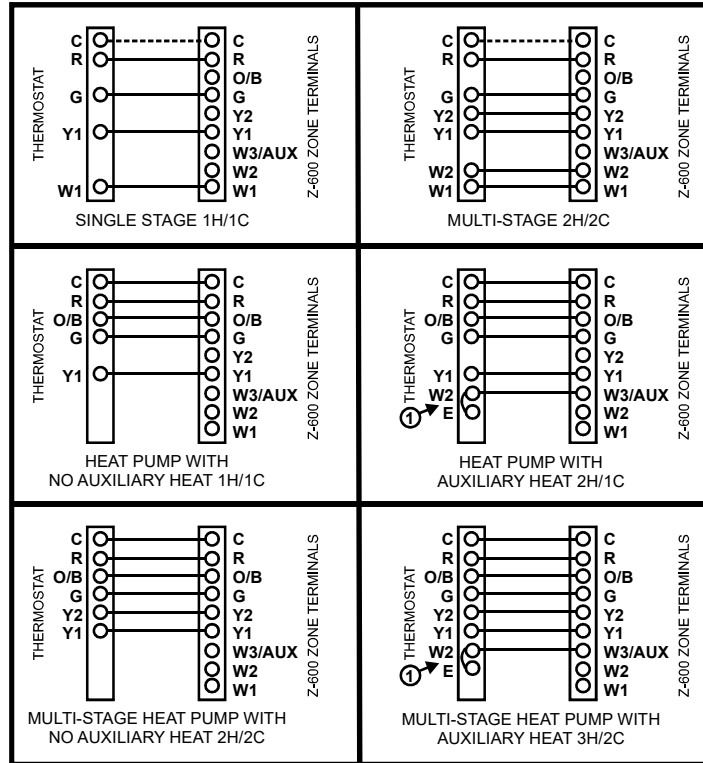
High Limit (ZPA-DTS Sensor) - Adjustable from 100° to 175° F. High limit setpoint should be below safety limit setpoint of heating system. When limit is reached, fan continues to run but equipment is shut off or down-staged to prevent overheating.

Low Limit (ZPA-DTS) - Adjustable from 40° to 58° F. Used to prevent coil from freezing. Allows fan to run but shuts off or down-stages equipment while activating a time delay to prevent short cycling.

Low BP (ZPA-OTS) - Used to set the low balance point to prevent heat pump operation when outdoor temperature falls below setpoint. Adjustable from 0° to 50° F.

High BP (ZPA-OTS) - Used to set the high balance point to prevent fossil fuel heat operation when outdoor temperature rises above setpoint. Adjustable from 55° - 70° F.

ZP6 TYPICAL THERMOSTAT WIRING DIAGRAMS



① IF HEAT PUMP THERMOSTAT HAS AN 'E' EMERGENCY HEAT TERMINAL, FIELD JUMPER THE 'E' TERMINAL TO THE AUXILIARY HEAT TERMINAL ON THE THERMOSTAT.

ZP6 TIME DELAYS

DELAY	NORMAL MODE	SPEED UP MODE
MINIMUM OFF TIME	2 MINUTES	5 SECONDS
CHANGEOVER	5 MINUTES	12 SECONDS
TIME SHARE	20 MINUTES	50 SECONDS
PURGE	1 MINUTE	2.5 SECONDS

High and Low Limits -

Whenever the system down stages the HVAC equipment or shuts off first stage due to high or low limit control, 2 minutes must pass before first stage or upstaging can be initiated providing the discharge air temperature has dropped below the heating limit setpoint or risen above the cooling limit setpoint.

Dual Fuel Low Balance Point -

Whenever the outdoor temperature drops below the low balance point setting and the system changes over from heat pump to the auxiliary heat source (gas or oil), auxiliary heat will remain on until the call is satisfied regardless if the outdoor temperature rises above the low balance point during the heating call.

USING THE ZP6 WITH HEAT PUMPS AND DUAL FUEL EQUIPMENT

REVERSING VALVE:

Make sure that the heat pump thermostats and ZP6 reversing valve system switch are configured in the same mode.

- O = Reversing valve energized on a call for cooling**
- B = Reversing valve energized on a call for heating**

When the reversing valve is energized on a call for heating (B) or cooling (O), the O/B LED will be ON, The reversing valve will remain energized until an opposite call takes place.

HEAT PUMP AUXILIARY HEAT WIRING:

The zone thermostat auxiliary heat terminals are marked **W3/AUX**. The HVAC System auxiliary heat terminal is marked **W3/AUX/EH**. (See Typical Thermostat Wiring Diagrams)

THERMOSTAT CONTROL OF AUXILIARY HEAT:

When a zone thermostat calls for auxiliary heat in standard heat pump mode, the auxiliary heat cycles and the heat pump compressor will be on at the same time.

When a zone thermostat calls for auxiliary heat in dual fuel (fossil fuel) mode, the heat pump compressor is locked out and auxiliary heat (fossil fuel) becomes first stage until the heating call is satisfied.

Heat pump thermostats should always be configured for electric backup regardless of what type of backup heat is present.

BALANCE POINT CONTROL:

Low Balance Point

When a zone thermostat calls for first stage heat in dual fuel (fossil fuel) mode and the outdoor temperature is below the selected low balance point setting, the heat pump compressor is locked out and auxiliary heat (fossil fuel) replaces heat pump operation. This feature does not apply for standard heat pump operation.

High Balance Point

When a zone thermostat calls for auxiliary heat in standard heat pump mode and the outdoor temperature is above the selected high balance point setting, the auxiliary heat will be locked out. This feature does not apply for dual fuel (fossil fuel) operation.

EMERGENCY HEAT:

In the event of a heat pump failure, only one zone thermostat needs to be placed in the Emergency Heat mode. The ZP6 panel remembers the zone thermostat set in the Emergency Heat mode and treats all calls for heating from any zone as an emergency heat call. The **EMHT** LED will be ON to signify that an emergency heat call has taken place. To reset the system back to standard heat pump operation, take the zone thermostat out of the Emergency Heat mode. On the next call for heating the **EMHT** LED will be OFF and the panel will resume normal heat pump operation.

PANEL FUSES:

4 AMP PC Board Fuse

The 4 AMP PC board fuse is designed to protect the ZP6 panel, zone thermostats and zone dampers from a 24 Volt short. Replacement fuse should not exceed 4 AMPS.

2 AMP System Fuses

The two, RC and RH 2 AMP system fuses are designed to protect the ZP6 panel from a 24 Volt HVAC equipment short. A 2 AMP spare fuse is located on the panel. However, replacement fuses should not exceed 3 AMPS.