By-Pass Eliminator™
Model BPE

For use with Plug-In Damper Motors and Control Panels Only



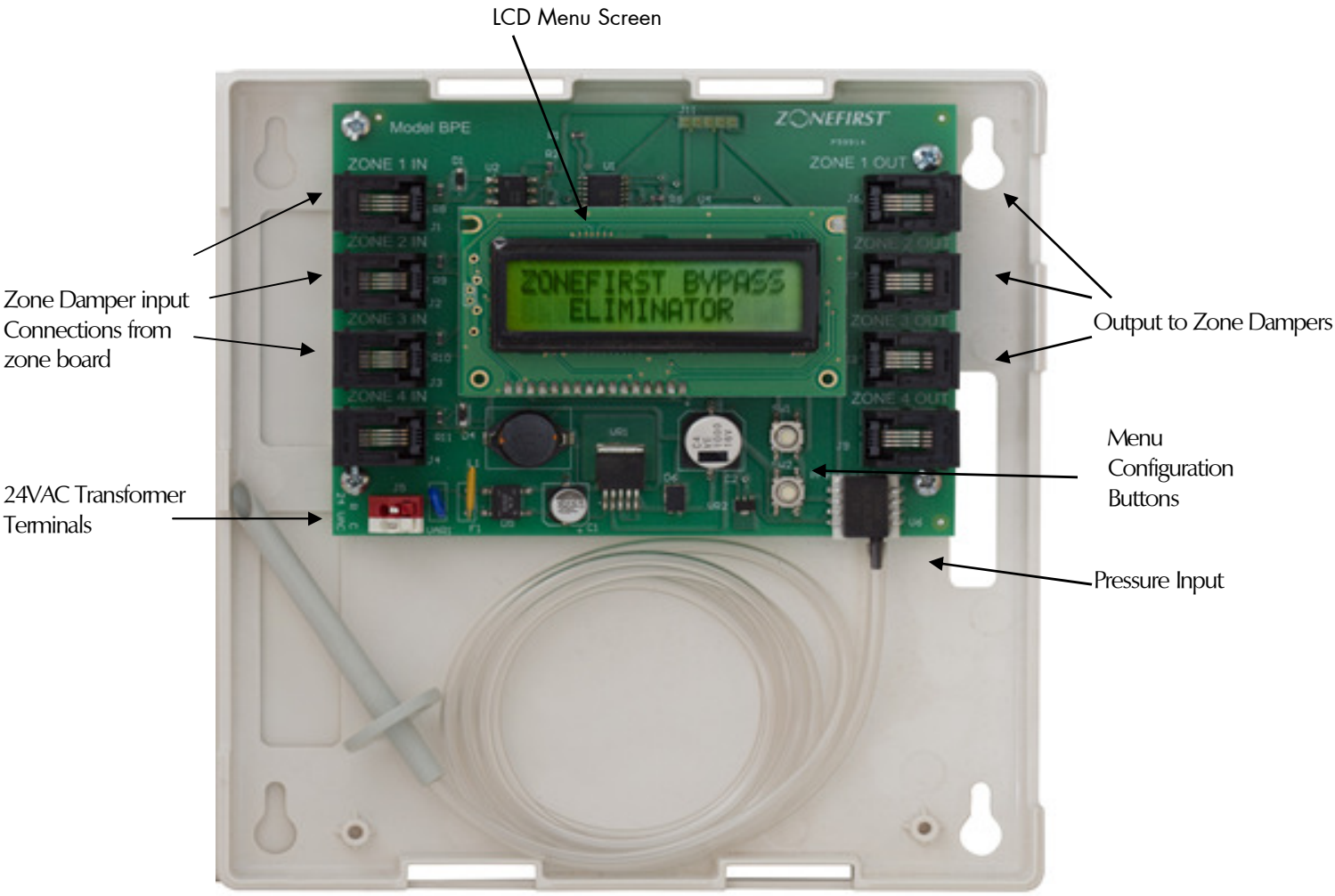
Installation and Operating Instructions

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Control Panel Features



The Bypass Eliminator™ (Model BPE) Control is an interface between a ZONEFIRST Zone Control Panel and its zone dampers. The BPE is used to eliminate the need for a traditional separate by-pass duct and damper directed back into the return duct. The BPE can **ONLY** be used with ZONEFIRST'S Plug-In Zone Dampers and control panels.

The BPE uses an air sensor in the duct system on the supply side and before all zone dampers so it can monitor the systems static pressure, whenever the blower is running. The zone dampers are now wired directly into the BPE and not the zone control panel. The BPE has 4 zone inputs where the damper outputs of the zone control panel will plug-in on the BPE. The zone control panel controls the zone dampers through the BPE.

The BPE will, on an increase in static pressure in the duct system, modulate the closed dampers to gradually open to relieve the air pressure back below the high set-point. When this occurs the zone dampers will stop.

INSTALLATION

The BPE can be mounted against flush surface and should be located within 10' of where the pressure sensor tube is placed in the duct. Ideally if mounted next to the zone control panel this will minimize the length of wires for the interconnection of the panels for the zone dampers.

It is recommended that the panel be mounted to a wall or return plenum and NOT on the furnace or plenum where it will be in contact with the high heating temperatures. The panel can be located in an attic space or in an enclosed cabinet of a rooftop unit, provided the panel is enclosed and not in direct exposure to the elements.

The cover easily removes from the case by pulling firmly and separating the cover from the case exposing the circuit board. There are 4 key-hole mounting points in each corner of the case. The case has openings in the rear of the case as well as the side for all wiring. Wiring can come from the back as well as the side in order to make a neat installation.

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The BPE includes 10 feet of pressure tubing (which can be cut down to size), as well as a duct probe, and four 7 foot telephone cables to interface the BPE with the zone controller.

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OPERATION

The BPE controls up to 4 zones on a single HVAC unit and up to 10 dampers per zone on the output terminals. When the BPE gets a signal from the Zone Controller that a zone damper is to be powered open it immediately opens the corresponding zone damper(s) on the output terminals. Anytime the BPE's pressure sensor detects the pressure in the supply plenum is higher than the Upper Limit Set Point it will modulate the closed zone dampers open to relieve the excess pressure into those zones. As these dampers modulate open the air pressure should drop below the high set-point and the zone dampers stop. When the BPE's pressure sensor is below than the Lower Limit Set Point it will close the zone dampers. Once the pressure has equalized to higher than the Lower Limit set point and lower than the Upper Limit set point the BPE will signal the dampers to stay in their current position.

IMPORTANT: When the dampers are being modulated or signaled to stop the LEDs on the zone dampers may not be illuminated. This is completely normal and the LEDs will only illuminate when the damper is fully open (green) or fully closed (red).

Upper Limit

The Upper Limit is adjustable from 0.25"WC to 2"WC. This is the limit that once exceeded all dampers in the closed zones will begin to modulate open. To enter the Upper Limit menu from the main status display press SW1 and using SW1 and SW2 you can raise or lower the Upper Limit. Once you have finished setting the upper limit the menu will automatically exit after 5 seconds back to the main screen.

Lower Limit

The Lower Limit is adjustable from 0.15"WC to 1.90"WC. This is the limit that once the pressure drops below it all dampers in the closed off zones will begin to modulate closed. To enter the Lower Limit menu from the main status display press SW2 and using SW1 and SW2 you can raise or lower the Lower Limit. Once you have finished setting the lower limit the menu will automatically exit after 5 seconds back to the main screen.

Dead Band

There is a minimum 0.10"WC dead band between the upper and lower limits that insures there is a sufficient pressure range that can be maintained for the dampers to modulate properly without constantly opening and closing to maintain pressure.

Sensor Calibration

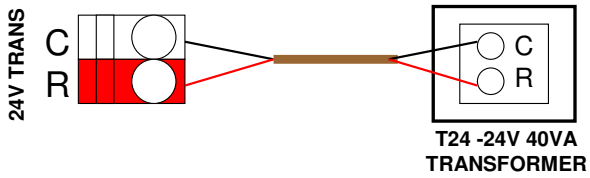
The pressure sensor is factory calibrated but due to the differences in elevation it may be a good idea to calibrate the pressure sensor in the location it is installed. The important thing to note is that if the sensor is calibrated with the HVAC unit running or in a windy environment it can lead to a bad calibration measurement.

To calibrate the pressure sensor press and hold both SW1 and SW2 if the unit does not immediately show the "Calibrating Please Wait" try pressing the upper button first then the lower button while still holding the top button. As soon as the calibration message appears release the buttons and calibration only takes approximately 6 seconds from there.

Display

The LCD Display will display the status of the zones OP (open), CL (closed), or a number from 01 to 99 to indicate what percent the zones that were in the closed position were modulated open in order to relieve the excess air from the ductwork. If a zone is available for modulation that means that the Zone control board is sending a close signal to the BPE. In the upper right hand corner the display will read P in with the pressure reading being displayed just below it.

Transformer – A 24 Volt AC, 40VA Transformer is recommended to power the BPE and can be the same transformer powering the zone control panel.



PRESSURE SENSOR

The BPE pressure sensor is a very sensitive device, never blow into the sensor with your mouth as the amount of pressure that the human body can produce far exceeds the limitations of the sensor and it can be damaged that way. If there is a need to test the sensor simply fold the pressure tube on itself and squeeze as this will create a gentler pressure increase on the sensor

TROUBLESHOOTING

The BPE is a very simple control to troubleshoot, especially with the LCD Display. The only other device needed is a simple Volt/Ohm meter.

Almost all problems can be traced to an external component or wiring to the BPE. While the BPE has been designed to operate under extreme voltage conditions and is fuse protected, like any computer the micro-processor can hang up and not operate properly.

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Turn off the power to the panel for several seconds until the LCD goes out, and then turn the power back on to see if the panel resets. In many instances this resolves the problem.

The first check is for 24VAC Power to the panel. When there is power the LCD will be lit. If not check the transformer and the power supply to it.

Zone(s) Not Closing

If a zone is not closing and there is an active HVAC call it may be that there is an excessive amount of air being bypassed into the zone. End all HVAC calls and using the damper test button on the Main Controller you can check to see if the dampers are properly cycling.

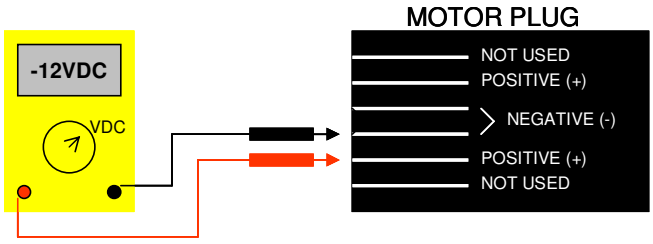
Damper Motor Checkout Procedure

Satisfy all zone thermostats HVAC calls and check that the main controller is no longer in purge. Each zone has a damper test button on the main controller. When the zone damper(s) are in the Open position and the damper's green LED is illuminated, press the damper test button and hold it down, the dampers on this zone will cycle closed in a few seconds and their damper LEDs will go out for a few seconds and then turn Red when the dampers close. Release the button and the dampers will cycle back open.

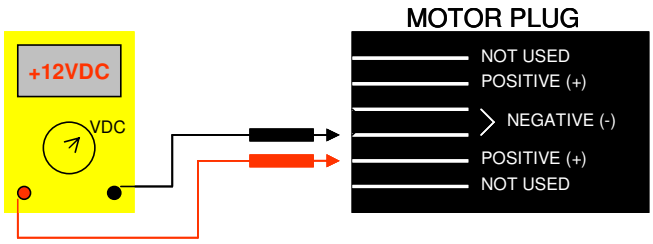
If the motor(s) fail to operate from the test button, the panel RJ11 connections can be tested to determine if the problem is from the panel. If there is power at the motor plug, the problem may be a broken wire or poor connection in the cord or the motor itself.

To check the power to the motor from the damper plug on the panel, switch your meter to DC Volts. Note the wires on the plug and check across either Positive and Negative wires. Note that each plug has two positive leads and two negative leads. Both positive and both negative leads are wired together. The meter will read either Plus (+) or Minus (-) 12VDC depending if the damper is to be Open or Closed respectively.

DAMPER CLOSED



DAMPER OPEN



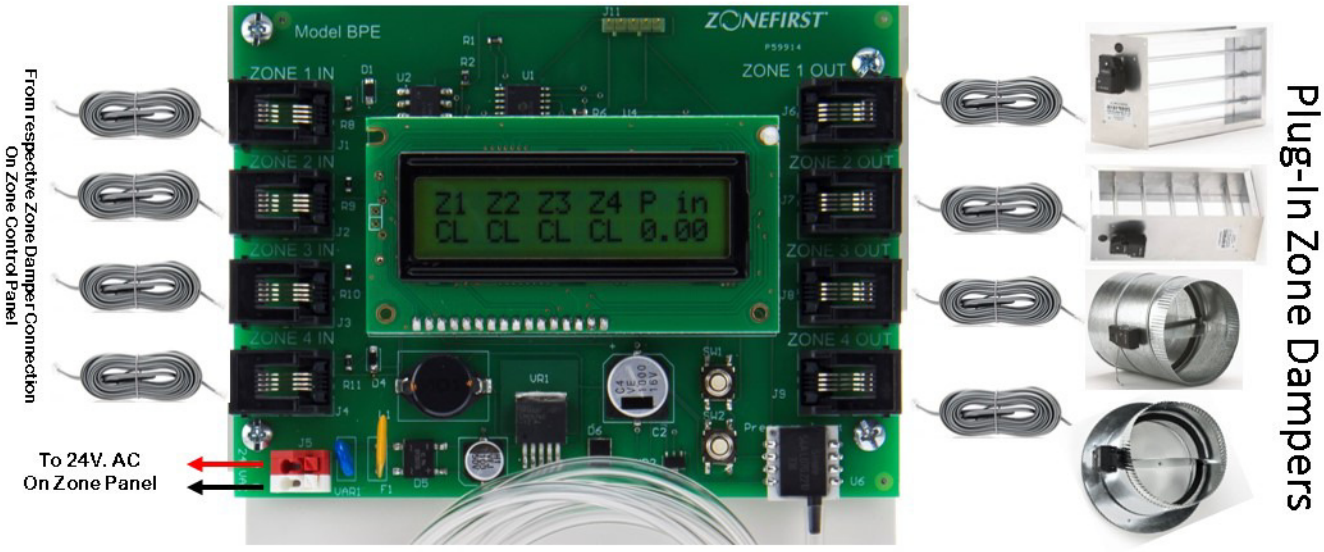
When using multiple dampers on a single zone, please note that up to 10 dampers may be used on a single zone. Adding dampers beyond the recommended number may cause all dampers to be slow to operate and may not fully cycle between open and closed as well as possible failure can occur.

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By-Pass Eliminator™ Wiring Diagram



NOTE: If there is a specific zone that should not be used to relieve air, wire zone damper directly to zone panel.

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