

# Troubleshooting Guide

**PH3 POWERHALT**  
AIR INTAKE EMERGENCY SHUT-OFF VALVES *by PACBRAKE*




L6455 • ECN 1-1872

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[www.powerhalt.com](http://www.powerhalt.com)



**IMPORTANT:** Prior to proceeding:

- Ensure all wiring harness connections are securely connected to their mates.
  - Inspect all wiring for signs of damage or wear that could cause electrical shorts or discontinuities.
  - Ensure valve is re-calibrated (See PowerGuard Programming Manual [L6452]) if individual system components are replaced.
-  Use your discretion to restart the engine after an engine shut-down. In most cases, it is recommended to wait until the cause is understood and shared with the necessary safety parties before restarting.

**AUTOMATIC CONTROL KITS ONLY:**

The PH3 is a smart system which monitors operating conditions. It ensures that potential issues are identified in a timely manner, preventing unwanted downtime and safety concerns.

If there is a system error detected during operation, the following will occur:

1. Rapid alternating flashing of red and green lights on membrane switch.
2. A one second pause followed by a number of simultaneous flashes corresponding to the error code.
3. Cycle repeats until error is resolved and system power is cycled.

**WARNING:**

- **Valve disabled when system displaying error code. Valve will not respond to any commands and will not actively hold its position.**
- **Cycling power clears error code but should only be done once issue is understood. Do NOT cycle power until underlying cause is resolved.**
- **Do NOT cycle power by removing connectors from PowerGuard Controller. Cycle power by disconnecting at battery or removing fuse.**
- **Do NOT operate engine with any harness connections disconnected. This is dangerous and could cause valve to trip.**
- **Unnecessary connection and disconnection of harness connections wears out plating on electrical contacts and will affect continuity.**

**Error Code 1-2**

Cause	Solution
The valve failed to close (1) or open (2) – the motor position is not reading.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated and cycle system power to clear the code.</li> <li>• Inspect the valve for any obstructions and remove if possible.</li> <li>• Perform <u>Calibration</u> to re-calibrate the valve. Refer to PowerGuard Programming Manual for more information</li> </ul>
Gear tooth sensor is damaged (RARE).	<ul style="list-style-type: none"> <li>• Cycle power. <u>If error re-occurs immediately</u>, disconnect gear tooth sensor from harness &amp; cycle power again. If error does not re-occur upon second cycling of power, contact Pacbrake support for replacement gear tooth sensor.</li> </ul>

**Error Code 3-4**

Cause	Solution
The valve opens (3) or closes (4) too slowly or not all the way.	<ul style="list-style-type: none"> <li>• Inspect the valve for any obstructions (4) and remove if possible.</li> <li>• Attempt to manually press the flap closed/open while feeling for any binding.</li> </ul>
Gear tooth sensor is damaged (RARE).	<ul style="list-style-type: none"> <li>• Cycle power. <u>If error re-occurs immediately</u>, disconnect gear tooth sensor from harness &amp; cycle power again. If error does not re-occur upon second cycling of power, contact Pacbrake support for replacement gear tooth sensor.</li> </ul>

## Error Code 5

Cause	Solution
The valve is drawing too much current.	<ul style="list-style-type: none"> <li>• Inspect all wiring for signs of damage. Contact Pacbrake support for replacement harness if necessary.</li> <li>• Identify valve serial number and contact Pacbrake support.</li> </ul>

## Error Code 6-9

Cause	Solution
Internal controller error.	<ul style="list-style-type: none"> <li>• Identify valve serial number and contact Pacbrake support for replacement controller.</li> </ul>

## Error Code 10

Cause	Solution
Motor position sensor reading is out of range, disconnected, or failed.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated and cycle system power to clear the code.</li> <li>• Identify valve serial number and contact Pacbrake support.</li> </ul>
Gear tooth sensor is damaged (RARE).	<ul style="list-style-type: none"> <li>• Cycle power. <u>If error re-occurs immediately</u>, disconnect gear tooth sensor from harness &amp; cycle power again. If error does not re-occur upon second cycling of power, contact Pacbrake support for replacement gear tooth sensor.</li> </ul>

## Error Code 11

Cause	Solution
Electrical motor is receiving no power or a low voltage.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated. Pay particular attention to the 2 pin connector on the PowerGuard controller. Cycle system power to clear code.</li> <li>• Inspect wiring for signs of damage. Contact Pacbrake support for replacement harness if necessary.</li> <li>• Perform <u>Calibration</u> to re-calibrate the valve. Refer to PowerGuard Programming Manual for more information</li> <li>• Identify valve serial number and contact Pacbrake support.</li> </ul>

## Error Code 12

Cause	Solution
Electrical motor failed to rotate in the correct direction and may be miswired.	<ul style="list-style-type: none"> <li>• Ensure black 14 AWG wire traces from Pin 4 on motor connector to Pin A on 2 pin connector at controller. Ensure red 14 AWG wire traces from Pin 2 on motor connector to Pin B on 2 pin connector at controller.</li> <li>• Identify valve serial number and contact Pacbrake support.</li> </ul>

## Error Code 13

Cause	Solution
Valve position outside of calibrated range.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated and cycle system power to clear the code.</li> <li>• Identify valve serial number and contact Pacbrake support.</li> </ul>
Gear tooth sensor is damaged (RARE).	<ul style="list-style-type: none"> <li>• Cycle power. <b>If error re-occurs immediately</b>, disconnect gear tooth sensor from harness &amp; cycle power again. If error does not re-occur upon second cycling of power, contact Pacbrake support for replacement gear tooth sensor.</li> </ul>

## Error Code 14-18

Cause	Solution
Internal controller error.	<ul style="list-style-type: none"> <li>• Inspect all wiring for signs of damage. Contact Pacbrake support for replacement harness if necessary.</li> <li>• Ensure system voltage does not drop below 10V upon start-up/engine cranking and replace/charge battery if necessary. Cycle system power to clear code.</li> <li>• Identify valve serial number and contact Pacbrake support for replacement controller.</li> </ul>

## Error Code 19

Cause	Solution
Electronic interference.	<ul style="list-style-type: none"> <li>• Identify valve serial number and contact Pacbrake support.</li> </ul>
The valve is obstructed.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated and cycle system power to clear the code.</li> <li>• Inspect the valve for any obstructions and remove if possible.</li> <li>• Perform <a href="#">Calibration</a> to re-calibrate the valve. Refer to PowerGuard Programming Manual for more information</li> </ul>
Gear tooth sensor is damaged (RARE).	<ul style="list-style-type: none"> <li>• Cycle power. <b>If error re-occurs immediately</b>, disconnect gear tooth sensor from harness &amp; cycle power again. If error does not re-occur upon second cycling of power, contact Pacbrake support for replacement gear tooth sensor.</li> </ul>

## False Trip: System has automatically shut down the engine at the incorrect engine speed

Cause	Solution
PowerGuard Controller is not programmed for the correct trip speed.	<ul style="list-style-type: none"> <li>• Use <a href="#">TEST Mode</a> to ensure the controller was programmed correctly. Refer to PowerGuard Programming Manual for more information.</li> </ul>
Speed sensor is not correctly sensing the engine speed.	<ul style="list-style-type: none"> <li>• See Speed Sensor troubleshooting below.</li> </ul>
Secondary Set-Point is enabled/disabled and is causing the system to trip at the incorrect speed.	<ul style="list-style-type: none"> <li>• Depending on your application, ensure that the Secondary Set-Point is correctly enabled/disabled.</li> </ul>
Wiring harness is loose.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated.</li> </ul>
Wiring harness is damaged.	<ul style="list-style-type: none"> <li>• Inspect all wiring for signs of damage. Contact Pacbrake support for replacement harness if necessary.</li> </ul>

## Engine will not start

Cause	Solution
Valve does not remain open or is stuck in the closed position.	<ul style="list-style-type: none"> <li>• Confirm if red light is illuminated.</li> <li>• Attempt to actuate the valve with the manual override function. Listen for valve movement.</li> <li>• Inspect the valve for any obstructions and remove if possible.</li> <li>• Ensure all connectors are fully seated.</li> <li>• Inspect all wiring for signs of damage. Contact Pacbrake support for replacement harness if necessary.</li> </ul>
Stock vehicle gear tooth sensor (IF EQUIPPED) is being misread.	<ul style="list-style-type: none"> <li>• Ensure the supplied PowerHalt T-Jumper Harness is securely connected at all 3 of its connection points.</li> <li>• Inspect all wiring for signs of damage. Contact Pacbrake support for replacement harness if necessary.</li> <li>• Attempt to disconnect the supplied PowerHalt T-Jumper Harness and install the factory harness as originally connected. Contact Pacbrake support for replacement PowerHalt Harness if necessary.</li> <li>• Use a multi-meter to ensure the sensor is working correctly and replace if necessary.</li> </ul>

## Engine fails to shut down when valve actuates

Cause	Solution
There is a leak in the system allowing air to continue entering the engine.	<ul style="list-style-type: none"> <li>• Inspect all piping/hosing for leaks and repair/patch.</li> </ul>
Valve is installed backwards.	<ul style="list-style-type: none"> <li>• Ensure that electrical connector points in direction of air flow. Refer to Installation Manual for more information.</li> </ul>

## Manual Override Function fails to actuate valve

Cause	Solution
Wiring harness is loose.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated.</li> </ul>
Wiring harness is damaged.	<ul style="list-style-type: none"> <li>• Inspect all wiring for signs of damage. Contact Pacbrake support for replacement harness if necessary.</li> </ul>
Switch is damaged.	<ul style="list-style-type: none"> <li>• See Membrane Switch troubleshooting section.</li> </ul>
Actuator is damaged.	<ul style="list-style-type: none"> <li>• Remove wiring harness and ensure coil resistance is equal to <math>2 \pm 0.2 \Omega</math> across pins 2 and 4 and replace valve assembly if necessary.</li> <li>• Perform Manual Trip and listen for movement to determine if it is seized.</li> </ul>
System is not receiving adequate power.	<ul style="list-style-type: none"> <li>• Ensure system voltage is not less than 10V and replace/charge battery if necessary.</li> <li>• Check fuse and replace if necessary.</li> </ul>

## Automatic shutdown function fails to actuate valve at programmed Trip Speed

Cause	Solution
PowerGuard Controller is not programmed for the correct trip speed.	<ul style="list-style-type: none"> <li>• Use <u>TEST Mode</u> to ensure the controller was programmed correctly. Refer to the PowerGuard Programming Manual for more information.</li> </ul>
Speed sensor is not correctly sensing the engine speed.	<ul style="list-style-type: none"> <li>• See Speed Sensor troubleshooting below.</li> </ul>
Secondary Set-Point is enabled/disabled and is causing the system to trip at the incorrect speed.	<ul style="list-style-type: none"> <li>• Depending on your application, ensure that the Secondary Set-Point is correctly enabled/disabled.</li> </ul>
Actuator is damaged.	<ul style="list-style-type: none"> <li>• Remove wiring harness and ensure coil resistance is equal to <math>2 \pm 0.2 \Omega</math> across pins 2 and 4 and replace valve assembly if necessary.</li> <li>• Perform Manual Trip and listen for movement to determine if it is seized.</li> </ul>
System is not receiving adequate power.	<ul style="list-style-type: none"> <li>• Ensure system voltage is not less than 10V and replace/charge battery if necessary.</li> <li>• Check fuse and replace if necessary.</li> </ul>
Wiring harness is loose.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated.</li> </ul>
Wiring harness is damaged.	<ul style="list-style-type: none"> <li>• Inspect all wiring for signs of damage. Contact Pacbrake support for replacement harness if necessary.</li> </ul>

## Green Light on membrane switch is not flashing while engine is running – indicating the system is not active and the RPM is not being monitored

Cause	Solution
Speed sensor is not correctly sensing the engine speed.	<ul style="list-style-type: none"> <li>• See Speed Sensor troubleshooting section.</li> </ul>
System is not receiving adequate power.	<ul style="list-style-type: none"> <li>• Ensure system voltage is not less than 10V and replace/charge battery if necessary.</li> <li>• Check fuse and replace if necessary.</li> </ul>
Wiring harness is loose.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated.</li> </ul>
Wiring harness is damaged.	<ul style="list-style-type: none"> <li>• Inspect all wiring for signs of damage. Contact Pacbrake support for replacement harness if necessary.</li> </ul>
Membrane Switch is damaged.	<ul style="list-style-type: none"> <li>• See Membrane Switch troubleshooting section.</li> </ul>

## Membrane switch is unresponsive and neither light flashes

Cause	Solution
Wiring harness is loose.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated.</li> </ul>
Wiring harness is damaged.	<ul style="list-style-type: none"> <li>• Inspect all wiring for signs of damage. Contact Pacbrake support for replacement harness if necessary.</li> </ul>
System is not receiving adequate power.	<ul style="list-style-type: none"> <li>• Ensure system voltage is not less than 10V and replace/charge battery if necessary.</li> <li>• Check fuse and replace if necessary.</li> </ul>
Membrane Switch is damaged.	<ul style="list-style-type: none"> <li>• Check to see if switch is responsive to button presses and Manual Trip.</li> <li>• Check that both lights flash when both buttons are held down for 5 seconds.</li> <li>• Contact Pacbrake support for replacement switch if necessary.</li> </ul>

## Speed sensor is not correctly sensing engine speed

Cause	Solution
Wiring harness is loose.	<ul style="list-style-type: none"> <li>• Ensure all connectors are fully seated.</li> </ul>
Sensor is damaged.	<ul style="list-style-type: none"> <li>• Inspect sensor and wiring leads for visible signs of damage. Contact Pacbrake support for replacement sensor if necessary.</li> </ul>
Gear tooth sensor is not installed to the correct depth.	<ul style="list-style-type: none"> <li>• Ensure push-in type sensor is fully inserted and correctly torqued.</li> <li>• Ensure thread-in type sensor was fully threaded into port so that it contacts flywheel teeth and then backed off ½ turn. Remove sensor and measure depth of port to confirm.</li> <li>• Use bottoming tap to clear impeding dirt and burrs from port threads.</li> <li>• Ensure sensor is centered over the flywheel teeth.</li> </ul>
Hall Effect (3 Wire) sensor is faulty.	<ul style="list-style-type: none"> <li>• Test by using a 12VDC power source to supply power to Pin A and ground to Pin B of sensor. Use multi-meter to ensure that 5VDC is being read at Pin C of the sensor when it is away from a steel plate. The reading should drop to 0VDC when the sensor is touching the plate.</li> <li>• NOTE: C50192 sensor will output 12VDC at Pin C instead of 5VDC.</li> <li>• Contact Pacbrake support for replacement sensor if necessary.</li> </ul>
Variable Reluctance (2 Wire) sensor or R-Terminal Harness is faulty.	<ul style="list-style-type: none"> <li>• With sensor/harness installed on engine, use multi-meter to ensure that frequency of VAC output at sensor/harness leads changes with changes in RPM.</li> <li>• Contact Pacbrake support for replacement sensor if necessary.</li> </ul>

## Unable to program trip speed; lights slowly flash alternatingly

Cause	Solution
Speed sensor is not correctly sensing the engine speed.	<ul style="list-style-type: none"> <li>• See Speed Sensor troubleshooting section.</li> </ul>
Membrane switch is unresponsive	<ul style="list-style-type: none"> <li>• See Membrane Switch troubleshooting section.</li> </ul>