

# Troubleshooting Guide

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



 **PLEASE NOTE:**  
Store this document in your vehicle glove box or with your important engine documents for future reference.

L6455 • ECN 1-1941

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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 valve 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 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  |
|---|---|
| Valve 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   |
|---|--|
| Valve 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  |
|--|---|
| Valve 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 valve motor connector to Pin A on 2 pin connector at controller. Ensure red 14 AWG wire traces from Pin 2 on valve 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>   |
| Auxiliary Trip Input is activated.  | <ul style="list-style-type: none"> <li>• Confirm that an auxiliary trip input harness is being used and check for activation signal.</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> |