

# Installation Manual

**PH3** **POWERHALT**  
AIR INTAKE EMERGENCY SHUT-OFF VALVE



## C50230A AIR INTAKE SHUT-OFF VALVE

### APPLICATION

MERCEDES SPRINTER  
*3.0L V6 2011-15*

800.663.0096

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



Thank you for your purchase of a PowerHalt Air Intake Emergency Shut-Off Valve by Pacbrake. Please read the entire manual to ensure you can complete the installation once started.

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#### INSTALLATION REQUIREMENTS & RECOMMENDATIONS:

Prior to the installation, please read through the requirements and recommendations listed below so you have a clear understanding of your system and the location which you plan to install the shut-off valve.

If you cannot meet these requirements, or are unsure of your system, contact your dealer or PowerHalt representative and we can work with you to overcome your installation constraints and challenges.

**A PowerHalt Technical Representative can be reached Monday-Friday 6:00-4:30 (PST) at 800.663.0096**

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- A 1" clearance is required from the valve to any other components. The valve can be in any orientation.
- Maximum ambient air temperature at the valve should not exceed 120°C.
- All hoses, adapters, and fittings must be suitable for the vibration\* of the engine application.

***\*If unsure of your vibration requirement, contact Pacbrake.***

- Flexible hose gaps should be kept to a minimum and the overall pipe quality and integrity from the shut-off valve to the intake manifold should be confirmed.

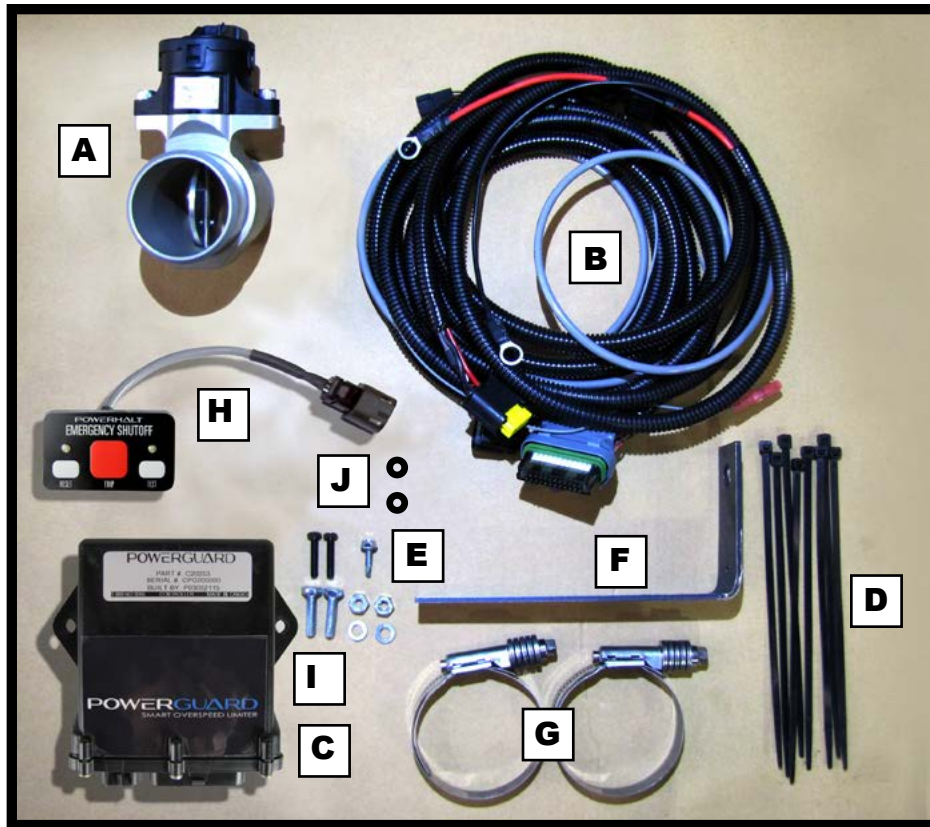
***NOTE: Failure to ensure this may result in hose collapse during valve activation and possible system leaks, preventing engine shutdown.***

***For excessive vibration applications, and installations with long pipe runs, additional support brackets may be required.***

- If an air intake flame trap is used, the valve must be installed upstream of the trap.
- Crankcase breather connections to the intake system must be sealed and replaced by an external breather.
- When cutting the existing intake piping to allow for the shut-off valve installation, remove the pipe off of the engine and thoroughly clean it to ensure no shavings are present prior to the installation.

***NOTE: Failure to do so may result in engine damage caused by foreign debris ingesting into the engine.***

Please ensure that you have all the parts listed in this kit **before** you start the installation.



### KIT CONTENTS

- A** Shut-Off Valve (1)
- B** Wiring Harness (1)
- C** PowerGaurd Controller (1)
- D** Tie Straps (12)
- E** Self Tapping Screw (1)
- F** Bracket (1)
- G** Gear Clamp (2)
- H** Membrane Control Switch (1)
- I** Mounting Screws (2)
- J** Nyloc Nuts (2)

### REQUIRED TOOLS

- Drill
- ½" Unibit
- Ratchet with ⅝", ⅜", ⅞" and 10 mm DeepSockets
- Wire Strippers & Crimpers
- Electrical Tape
- Flat Blade Screwdriver
- Volt Meter
- Heat Gun
- E14 Female Torx Socket
- Large Pick Tool
- Side Cutters
- Sharp Utility Knife or Razor
- Paint Pen
- ⅞" Wrench

**1**

Mount the controller bracket on the driver's side of the engine bay.

Remove the nut on the ground stud and place the bracket over this stud. Re-install the nut and tighten until the bracket is horizontal. Install the provided self tapping screw in the other hole to secure the bracket (see picture 1A, 1B and 1C). You will need a drill motor to drill into the inner fenderwell with the drill screw for installation (picture 1F).



1A



1B



1C



1D



1E

**2**

Mount the PH-3 controller to this bracket. Using the 1/4 x 20 bolts, lock washers and nuts

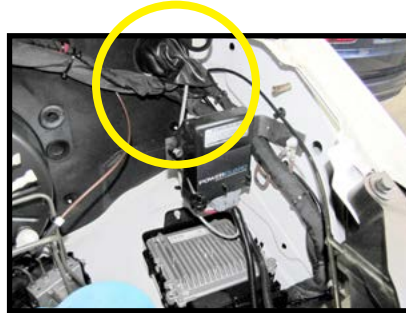


2

- 3** Layout the wiring harness starting at the control box. Plug the 2 main plugs into the control box (picture 3A). Route the PH-3 plug and wiring across the top of the rad support and down the passenger's side of the engine (picture 3D). Route the single crank sensor trigger wire, power and ground wires down the driver's side of the engine bay (see picture 3C). Route the switch plug thru the firewall and into the trucks cab. Also, There is a rubber boot on the firewall to pass wires through (see picture 3B).



3A



3B



3C



3D

- 4** Remove the driver's seat to gain access to the wiring. Remove the 4 torque bolts (see picture 4A) and unplug the seat belt plug under the seat. Place the seat off to the side.



4A



4B



- 5** From underneath of the driver's side of the vehicle, Cut the tie strap off the weatherproof boot on the floor of the vehicle. This is where the main wiring harness passes thru the floor. Route the power and ground wires along the frame of the truck and up thru the access boot in the floor of the truck.



5A



5B



5C



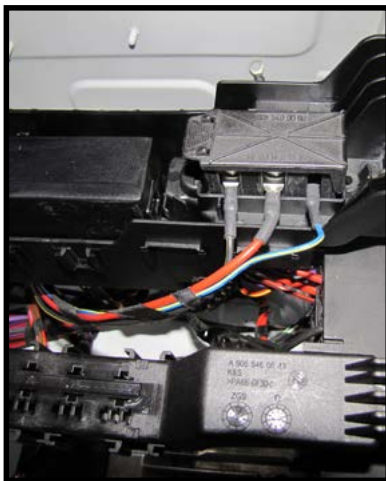
5D

- 6** Secure all wiring with the provided tie straps.

- 7** Under the driver's seat, connect the red lead to the batt+ (see pic 7A-7C).

• Batt+ is the middle terminal red/grey wire.

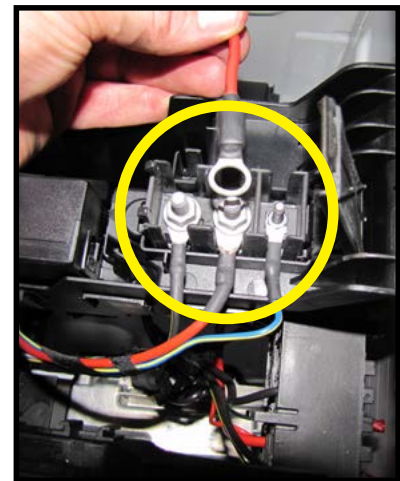
**\* DOUBLE CHECK WITH A DIGITAL VOLT METER \***



7A



7B



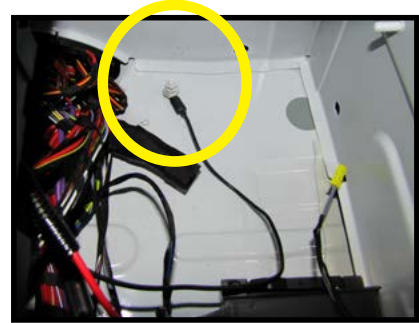
7C

8

Under the drivers seat connect the ground wire to the grounding stud (pictures 8A and 8B).



8A



8B

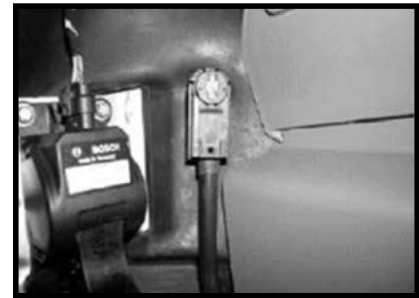
9

## DISCONNECT BOTH BATTERIES:

### Disconnect Main Battery:

Main Battery Connector (next to accelerator pedal)

**WARNING:** Before working on the electrical system, disconnect the main battery using the quick connect located right of the accelerator pedal in the driver's foot well. Failure to disconnect the battery may cause serious damage to the electrical system and its components. Do not disconnect the battery before ensuring that the vehicle ignition key is in position 0 (off) or the key is removed, otherwise serious damage to the electrical system and its components may occur.



9

10

Secure all wiring and place a zip tie around the rubber boot in the floor



10

11

Locate the crank position sensor on the driver's side transmission bellhousing, underneath the truck. Cut the middle wire (grey with black trace), strip it and connect it to the trigger wire with a butt connector and seal it with heat shrink tubing (picture 11).

**NOTE:** If the wire color in the connector does not appear to be correct ensure that the pin location is correct. It is not uncommon for the OEM to change wire colors in mid-production.



11

- 12** Inside the cab of the truck mount the control switch on the left side of the dash as shown in picture 12 or a preferred location that is easily accessible to shut down the engine in the event of an emergency.



12

## 13 SWITCH INSTALLATION

Locate the desired location for the PH3 switch taking into consideration the below points.

**NOTE:**

- The switch must be accessible from the ground outside of the driver's door. Ideally the switch should be to the left of the steering column.
- A flat 2" x 4" location that is accessible from the backside of the panel is required
- Dash thickness and construction needs to be understood, ensuring the bolts can extend through the dash.

**CAUTION:** Ensure control wiring is moved prior to drilling.

### INSTALLATION STEPS

- Take out Layout Template provided (see picture 13A on page 8). Cut out and mark drill locations.
- Remove dash panels accordingly in order to access the backside of the dash switch location.
- Drill 1 1/8" hole using uni-bit and 2 - 1/4" holes for fasteners (as per drill template).
- De-burr holes.
- Install the switch with the supplied hardware.
- Torque the nuts on both bolts to 15-25 in-lbf (1.7-2.8) N•m.

**CAUTION:** Do not over-torque nuts.



14A

- 14** Feed the cable through the rubber access boot in the firewall. The tie strap, securing the rubber boot will need to be cut to gain access (picture 14A).

Connect the plug to the mating plug on the harness (picture 14B).



14B

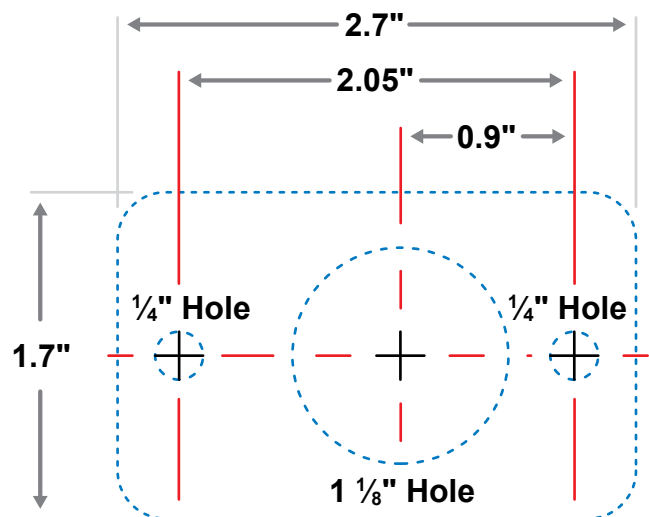




## SWITCH FEATURES

- RESET** Used during the setup procedure. (Has a red LED indicator above the button)
- TRIP** Used for a manual activation (override).
- TEST** Used to test the automatic function and during the setup procedures. (Has a green LED indicator above the button)

## PH3 DRILL TEMPLATE



**NOTE:** When printing out the drill template for use make sure your printer is not scaling the image or stretching it. Open your print dialogue box and select print at 100% scale.

13A

## 15 VALVE INSTALLATION:

Remove the cold side intercooler pipe located on the passenger side of the engine. Use a flat blade screwdriver or a pick tool to release the locking clips on each coupler and firmly pull each connection apart to remove the hose.



15A



15B

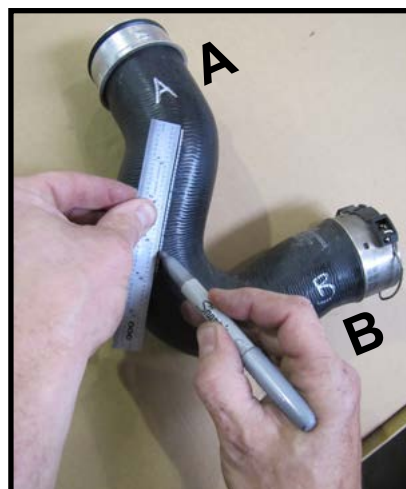
- 16** Place intercooler hose on a bench and prepare for cutting. Clean off any dirt or oil on the hose first.

- 17** Mark the hose as shown with a paint pen. Mark the hose A and B. A being the engine intake side and B being the intercooler side.

Mark a straight line on the hose with a paint pen (picture 17A-B)



16

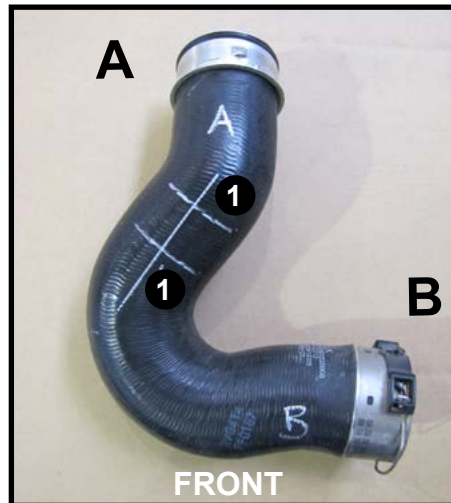


17A

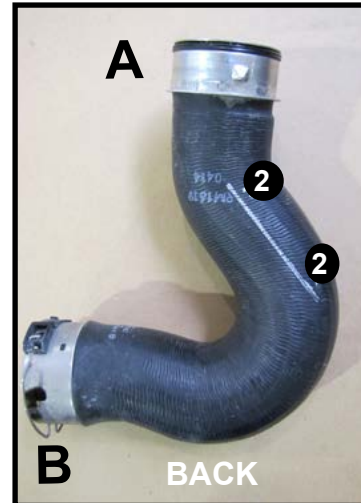


17B

- 18** Mark 2 lines about 4" long (one on each side of the hose), in line with the hose, as shown. This is to orient the hoses after they are cut so that they can be realigned before reinstallation. Label them 1-1 and 2-2.



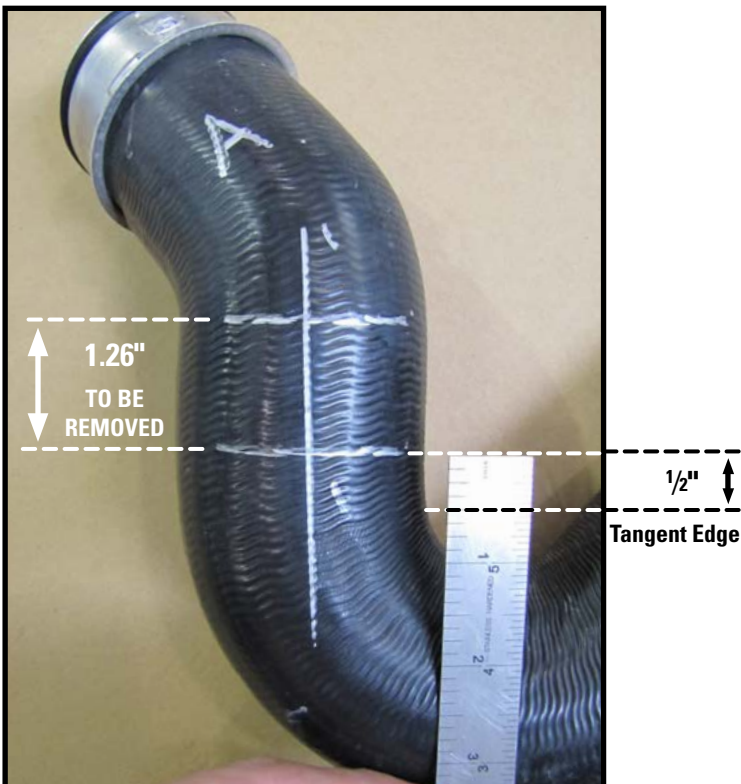
18A



18B

- 19** Cut a 1.26" section out of the hose at approximately  $\frac{1}{2}$ " up the hose from the tangent end of the curve (picture 19A).

**TIP:** Place hose clamps around the hose to use as a cutting guide (see picture 19B and 19C).



19A



19B



19C

- 20** Install the PH3 between the 2 cut hoses and orient as shown in image 20A and 20B. The electrical plug faces towards hose end A.

**ELECTRICAL PLUG** →



20A

- 21** Install the 2 constant torque gear clamps as shown. They need to be placed in these orientations that provide clearance for the assembly once it is reinstalled on the engine.

- 22** Tighten the clamps up a bit but still allow the valve to rotate. Align the 2 marks previously made, 1-1 and 2-2.

- 23** Install the intercooler hose assembly back onto the engine and ensure both locking clips on the hose couplers are properly engaged.

- 24** Rotate the PH3 and gear clamps if needed so that they are not contacting any engine parts and there is ample clearance all around the valve.

- 25** Torque the 2 clamps to 75 in-lbs (8.5 N•m).

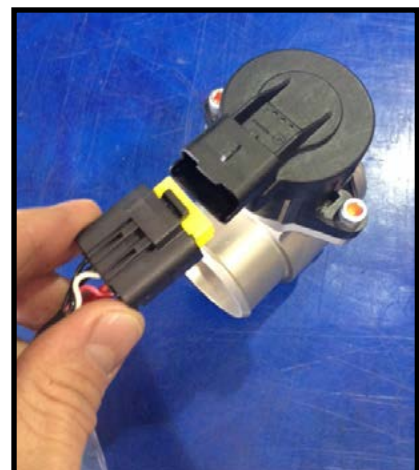


20B

- 26** Plug the harness connector into the actuator on the top of the PH3 valve. Make sure the plug connector is pushed in firmly and locks into place.

- 27** Secure all wiring with tie straps to make sure it does not contact any hot or moving components on the engine.

- 28** Reconnect batteries.



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## 29 VALVE OPERATION

### POWERGUARD CONTROLLER FUNCTIONAL STATES

The PowerGuard is a smart controller and has the following three states:

**STATE 1 – Pre Set-Up:** When you first purchase your kit the controller does not have an RPM threshold set within its memory.

- The red and green LEDs alternately flash

**STATE 2 – Normal Operation:** When the controller has a stored RPM threshold, it will behave in the following way:

- When the engine is running: the green LED will flash every 5 seconds indicating the system is active and RPM is being monitored
- When the engine is not running: no LED lights will flash
- When RPM drops to zero (during normal key-off engine shutdown), the valve will perform an anti-foul cycle (closing 0.25 sec then opening) which keeps the valve free of debris and corrosion. This results in an extended valve life.
- If the valve is tripped manually or automatically, the valve will close and the red LED will illuminate. When 0 RPM is detected and 30 seconds has elapsed, the valve will automatically re-open and the red LED light will go out.

**STATE 3 – System Error:** If there is a system error detected during the initial power-up of the PowerGuard controller, the LEDs will flash an error code as per the below sequence;

1. Rapid alternating illumination of the red and green LED lights indicates a system error
2. A one second pause is followed by a flash code where the number of flashes is the error code as per Flash Error Codes, see below
3. This cycle repeats until the error is fixed and the power to the controller is cycled.

### FLASH ERROR CODES:

#### 1. Valve failed to close or motor position is not read

- Ensure all connectors are fully installed and latched, then cycle power
- If this fails, ensure continuity from the five pin connector at the shut-off valve to the controller, then cycle power

#### 2. Valve failed to open or motor position is not read

- Ensure the shut-off valve connector is fully installed and latched, then cycle power

#### 3. Valve closes too slowly or not all the way

- Inspect the shut-off valve for obstructions, and attempt to manually press the flap closed and open (feeling for any binding). If the valve does not operate smoothly, contact Pacbrake support at 800.663.0096.

#### 4. Valve opens too slowly or not all the way

- Inspect the shut-off valve for obstructions, and attempt to manually press the flap closed and open (feeling for any binding). If the valve does not operate smoothly, contact Pacbrake support at 800.663.0096.

**5. Shut-off valve pulls too much current**

- Ensure continuity from the five-pin connector at the shut-off valve to the controller on the two large power wires (red and black). Check for damage to the wires causing shorts, then cycle power.

**6-9. Internal controller error**

- Contact Pacbrake support at 800.663.0096

## 30 POWERGUARD SET-UP & TEST PROCEDURE

### TO SETUP RPM:

With the engine running, hold the reset and test buttons together for 5 seconds until both LED lights start flashing, and then release both buttons

The controller is now in the set/test mode with 2 options (see below)

**FIRST:** If your controller is already set for a specific RPM, and you want to change the RPM trip point, press and hold reset for 5 seconds to remove the RPM limit, then the controller will revert to Functional State 1 (from step 29)

**SECOND:** if your controller has not been set up you will need to do the following steps;

1. Determine your desired RPM over speed shutdown RPM value.

**NOTE:** Pacbrake manufacturing recommends a 20% (min) and 30% (max) over rated Engine RPM setting for shutdown.

**EXAMPLE:** Rated engine RPM = 2150 + 20% over speed value = 430

(2150 + 430 = 2570 then divide this value by 50% = 1375 RPM is the setting RPM to hold when pressing the reset buttons 4 times).

2. Increase the truck RPM to 50% of your over speed shutdown value determined
3. While at this RPM press the reset button on your Powerhalt switch located in the vehicle cab 4 times.

**NOTE:**

- There must be less than 2 seconds between presses for the controller to read inputs.
- After presses are complete, the red LED will flash 4 times to confirm programming has been accepted.
- If there was no RPM detected when pressing the reset button, the controller will remove the existing RPM threshold and change to functional state 1 (from step 29)
- If no action is taken while in the set/test mode, after 60 seconds the controller will timeout and return to normal function and its most recent RPM threshold.

## 31 POWERGUARD TEST PROCEDURE

### TO ENTER TEST MODE:

With the engine running, hold the reset and test buttons together for 5 seconds until both LED lights start flashing, and then release both buttons

Press and release the TEST button to enter into test mode, where the threshold will be reduced to 100% of original RPM, or 50% of threshold

The controller will wait for 60 seconds before reverting back if threshold is not reached.

If the RPM threshold is reached, the valve will close and the red LED will illuminate until 0 RPM is detected and either 30 seconds elapses or the TEST button is pressed

Next, the valve will automatically re-open and the red LED will extinguish

## 32 POST INSTALLATION TESTING

Once the installation is complete, ensuring all steps, schematics and recommendations have been followed, it is now time to test your system

1. Press the red TRIP button and confirm the red LED is illuminated. Wait 30 seconds for the valve to auto reset
2. Start the engine
3. Press the red TRIP button and ensure:
  - The engine stops within a few seconds
  - Hose collapse is not severe
  - No excessive leaks are present in the system

**NOTE:** if the engine does not fully shut down check all intake piping and hoses for leaks between the valve and intake system. If the system is sealed and the valve still fails to shut down the engine consult your Pacbrake service representative for support

4. Once the engine stops wait 30 seconds until the valve automatically re-opens and the red LED turns off
5. Utilize the test mode (in step 31) as per PowerGuard Test Procedure to ensure that the automatic overspeed is functioning properly

## 33 NORMAL VALVE OPERATION

Automatic function or manual override can be used to shut down the engine during an over speed event

**CAUTION:** Do not attempt to start the engine after an over speed condition occurs until the cause is understood and shared with the necessary safety parties.

**NOTE:** Please reference your organizations specific operation procedures and ensure they are in line with the PowerHalt operating instructions and requirements. If there is a discrepancy always follow your site requirements first.

## 34 VALVE MAINTENANCE REQUIREMENTS

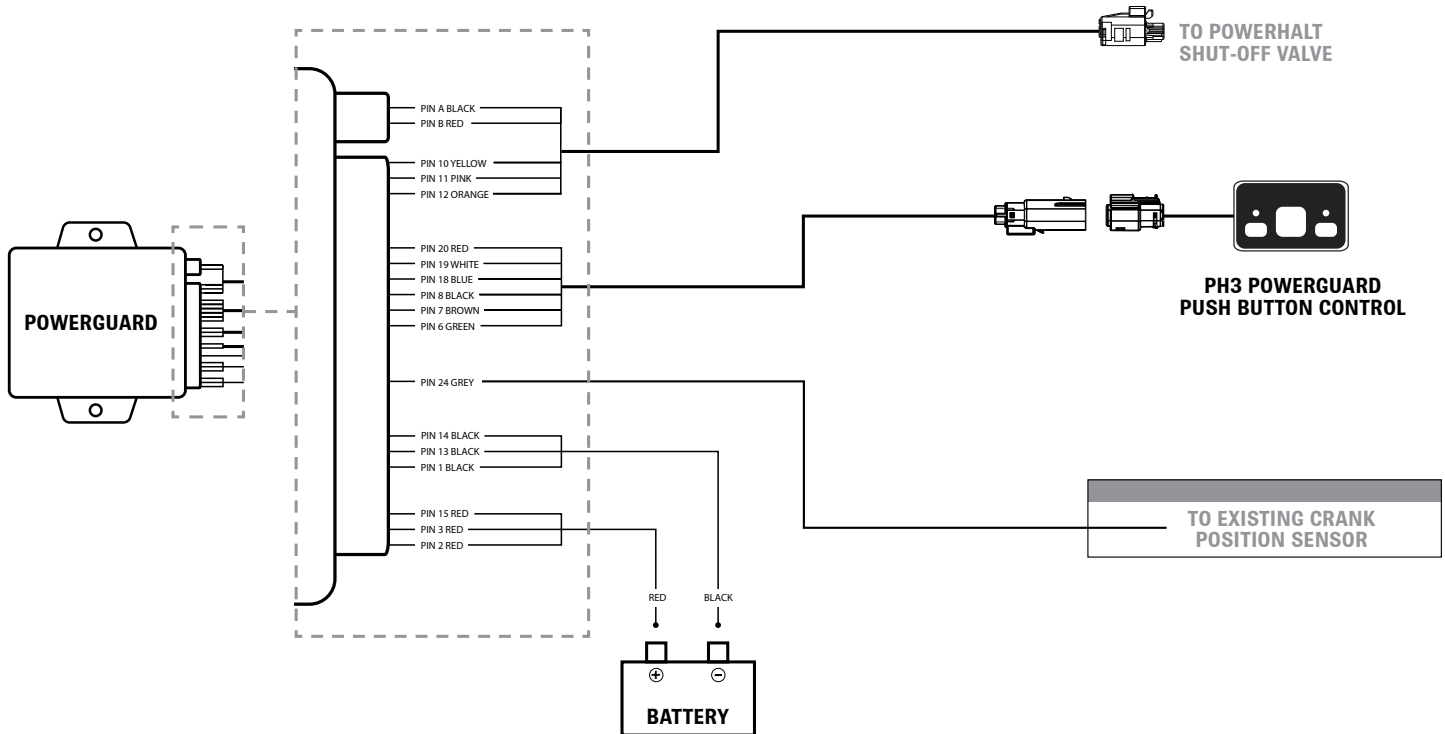
As the PH3 is a maintenance free and self-checking valve, it does not require any specific operator involvement. The PH3 performs an anti-foul cycle every time the engine comes to a stop after a period of running. However if the unit is stored for extended periods, or run for extended periods without pause, it is imperative that the engine run and shut down monthly so that the PH3 valve can perform its anti-foul cycle.

## 35 MONTHLY INSPECTION REQUIREMENTS

- Inspect all fasteners and clamps to ensure proper torque.
- Inspect all hoses and pipes for signs of wear or vibration related issues.
- Inspect all wiring connections and routing to ensure correct strapping.
- Inspect the membrane switch while the unit is running to ensure the green LED light is flashing every 5 seconds.



## WIRING DIAGRAM

**CUSTOMER SERVICE HOURS**

MONDAY TO FRIDAY FROM 6:00 AM TO 4:30 PM PST

**BUSINESS HOURS OF OPERATION**

MONDAY TO FRIDAY FROM 7:30 AM TO 4:00 PM PST

**CORPORATE HEADQUARTERS / R&D CENTER**19594 96TH AVENUE  
SURREY, BRITISH COLUMBIAISO 9001  
QMI-SAI Global**POWERHALT**

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