

Installation Manual

PH2 **POWERHALT**
AIR INTAKE EMERGENCY SHUT-OFF VALVE



PH2 C50219A AIR INTAKE SHUT-OFF VALVE

WITH POWERGUARD SMART OVERSPEED LIMITER
T800 KENWORTH / ISX ENGINE

800.663.0096

www.powerhalt.com



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 you plan to install the shut-off valve.

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

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

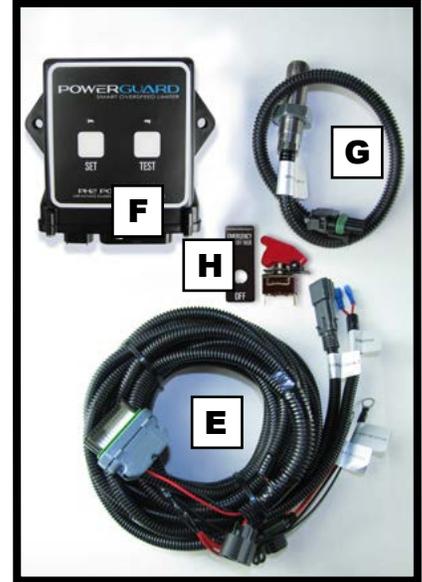
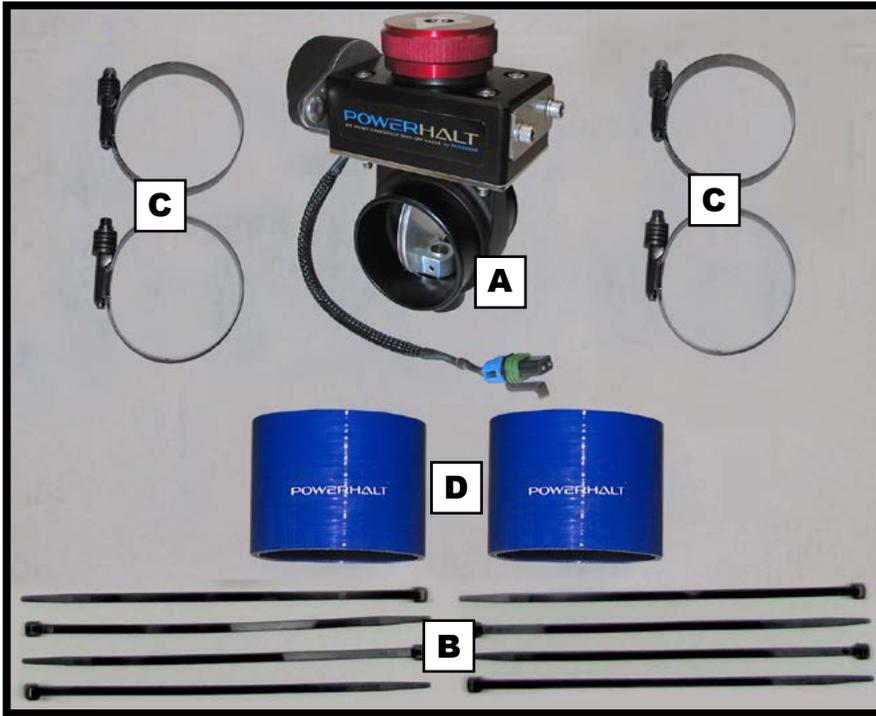
- A 1" clearance is required from the valve to any other components. The valve can be in any orientation.
- Maximum air temperature at the valve should not exceed 120°C.
- All hoses, adapters, and fittings must be suitable for the vibration of the engine application, and of reinforced type. *If unsure 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 in the intake system between the valve and engine (or in engine intake parts) must be sealed and replaced by an external breather.
- If you need to cut the existing intake piping to allow for the shut-off valve installation, please make sure to cut the pipe off of the engine and that it is cleaned thoroughly to ensure no shavings are present.
NOTE: Failure to do so may result in engine damage caused by foreign debris ingesting into the engine.
- It is highly recommended that the pipe is rolled with a bead to ensure hose fitting retention on both the inlet and outlet sides of the shut-off valve.
- If more than one shut-off valve is installed on one engine it is imperative that the control method is consistent with this requirement, ensuring valve activation is simultaneous for both valves.

KIT LAYOUT

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



KIT CONTENTS

- A** Air Intake Shut-Off Valve
- B** Tie Straps (8)
- C** Clamps (4)
- D** Silicone Hose (2)
- E** Wiring Harness
- F** PowerGuard Controller
- G** Magnetic Pick-Up
- H** Switch

REQUIRED TOOLS

- Drill
- 1/2" Unibit
- Ratchet with 7/16" & 1/2" Sockets
(a 14" extension is ideal)
- Hack Saw
- Utility Knife

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.

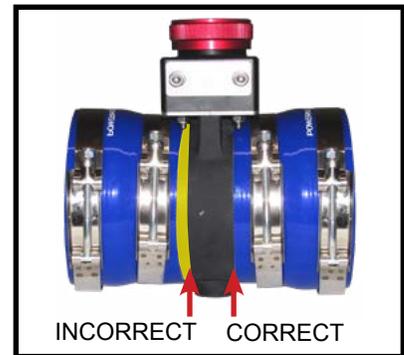
Should you have any issues during the installation, please call technical support at 800.663.0096.

- 1** | Open the hood of the vehicle.
Loosen the stock clamps on both sides of the hump hose attached post intercooler.
- 2** | Loosen the upper clamp on the first charge air cooler (CAC) pipe, then remove the CAC pipe and hump hose.
CAUTION: Ensure the intake system is covered and protected from any foreign debris ingress during the installation process.
- 3** | Install the provided silicone hose to the intercooler, along with 2 clamps (keeping the clamps loose so that the hose can be re-positioned if needed).
- 4** | Install the PowerHalt valve onto the silicone hose opening from the intercooler, ensuring the flow direction on the valve is pointing towards the intake manifold (as shown).



If the Pacbrake replacement CAC pipe is purchased, skip steps 5 & 6

- 5** | Take the removed factory CAC pipe and measure from the PH2 valve to the upper hump hose and mark the pipe.
- 6** | Have the factory pipe cut and beaded accordingly, to ensure a minimum of 1/2" clearance is provided from the valve to the pipe.
CAUTION: Ensure a bead (or bead kit) is utilized as high boost pressures may cause the hose to blow off if no bead is used.
- 7** | Install the provided silicone hose to the outlet side of the PH2 valve and then install the 2 provided clamps loosely to the silicone hose.
- 8** | Ensure that both the inlet and outlet hoses are fully seated on the PH2 valve as shown.
- 9** | Install the factory cut and beaded CAC pipe (or the custom pipe provided by Pacbrake) and clamps.
- 10** | Rotate the PH2 valve to obtain the required valve clearance, as shown, then torque all clamps to 70-80 in-lbs (7.9-9 N•m)



11 | PowerGuard Auto Controller Installation

On T800/ISX applications, the firewall space is limited so it is recommended that the controller be mounted to the air intake support bracket as shown.

NOTE: Please ensure the PowerGuard controller box is mounted in a location which is easily accessible, as access is required for set-up and programming.

CAUTION: Please ensure the PowerGuard controller box is mounted in a location where it is not exposed to high pressure water contact or where it can reach ambient temperatures that exceed 80°C.

Drill 2 holes on the air intake support bracket and install the appropriate bolt and nut (not provided) to secure the controller firmly to the bracket. The entry port on the controller should be facing the driver's side of the vehicle.

**12 |** Install the wiring harness to the PowerGuard controller and run as per the schematic provided on page 10 of this manual.

NOTE: Ensure the wiring harness is secured appropriately with the provided tie straps and is routed away from high heat sources or any moving parts which could damage the wiring. Also ensure adequate slack is provided when transitioning from fixed parts to engine mounted parts to allow for engine movement.

**13 | Switch Installation**

Locate the desired location for the activation switch in your cab.

NOTE:

- Activation switch should be as close to driver's side door as possible to allow for shutdown when standing outside of the vehicle
- Consider the dash construction, as the switch requires a single dash wall for install unless the double wall is modified

• **DO NOT ACTIVATE THE MANUAL SWITCH FOR MORE THAN 10 SECONDS.**

Damage to the solenoid may occur

**14 |** Drill a 1/2" hole in the desired location. Route the 2 wires from the switch location to the PowerGuard controller.**15 |** Install the toggle switch through the backside of the dash, then remove the nameplate protective film and install the nameplate, switch cover, washer, and nut - as shown. Tighten nut firmly.

NOTE: If the dash cannot accept the switch nameplate, use the toggle sticker and install onto the switch cover as shown.



16 | Battery Connection

Connect the RED positive wire and the BLACK ground wire of the PowerGuard controller to the vehicle battery post using the ring terminal. Ensure a good clean battery connection is provided.

NOTE: Secure the wiring harness with the provided tie straps away from any moving parts or high heat sources.

**17 | Air Intake Valve Wiring**

Connect the metri-pack connector of the harness to the mating connector on the PowerHalt valve.

NOTE: Secure the wiring harness with the provided tie straps away from any moving parts or high heat sources.

**18 | Mag Installation**

Install the provided magnetic pick-up sensor into the sensor port of the bellhousing. Thread in all the way until the mag connects with the ring gear. Once this happens back off a ½ turn. Use hand tap to clean port threads if necessary. Tighten jam nut securely as per suggested torque.

Suggested Torque:

⅜ -24 is 44 in-lbs +/- 4 in-lbs

⅝ -18 is 18 ft-lbs +/- 2 ft-lbs

¾ -16 is 60 ft-lbs +/- 2 ft-lbs

Run the mag sensor wiring to the mag location on your engine and connect the weather-pack connector.

Note: Secure the wiring harness with the provided tie straps away from any moving parts or high heat sources.





POWERGUARD LEGACY CONTROLLER

NOTE: The PowerGuard controller For PH2 kits has been updated with new technology. If you have a kit with our Legacy Controller (Serial # CPG100339 & before) see the addendum for the proper set-up procedure.

Pacbrake.com/Legacy

CURRENT CONTROLLER
(AFTER SERIAL # CPG100339)

LEGACY CONTROLLER
(SERIAL # CPG100339 & BEFORE)

SETUP PROCEDURE

The PowerHalt is a smart controller that detects diesel engine runaway and immediately stops the engine by triggering the emergency air shut-off valve. The unit has the following states:

UNPROGRAMMED STATE: When you first purchase your kit, the controller's red and green lights will flash in an alternating order to indicate there is no emergency engine shut-off speed programmed.

PROGRAMMED STATE: If an emergency engine shutdown speed has been programmed to the controller's memory, the controller unit will act in the following way:

- **Engine off:** no lights flashing.
- **Engine running:** green light flashes every 5 seconds indicating the system is working as intended.
- **Valve actuated (manually or automatically):** the emergency shut-off has occurred and the red light on the controller turns on for 5 seconds.

SETTING THE EMERGENCY ENGINE SHUT-OFF SPEED

If the controller has no emergency engine shutoff speed programmed, setup is required for the emergency shut-off system to function. The controller uses a setup engine speed and adds a user defined overspeed margin to program the emergency engine shut-off speed.

IMPORTANT: Please consult your engine manufacturer and the relevant safety operating procedures to determine the emergency engine shut-off speed prior to proceeding.

1. With the engine idling, hold down the SET and TEST buttons simultaneously until both lights begin to flash (approximately 5 seconds), then release the buttons.
2. Press and release the SET button on the controller to begin monitoring engine speed – the red light will flash rapidly to confirm the engine speed is being monitored.
3. Bring the engine to your desired setup engine speed **GRADUALLY**, then return engine to idle.
WARNING: The controller is monitoring for the peak RPM while the engine is brought up to speed – do not exceed your target RPM or you will need to restart this procedure.
4. Press the SET button: 1 time to add 10% to the setup engine speed for the emergency engine shut-off speed, 2 times for 20%, 3 times for 30% or 4 times for 100%.
5. When the data is saved successfully, the red light will confirm your input by blinking the same number of times the SET button was pressed. If no engine speed is detected, the controller will exit the setup and erase any saved engine speed from the memory.
6. Check the controller to verify that programming was successful by confirming that the green light blinks every 5 seconds while the engine is running .
7. Document your emergency shut-off speed for future reference.

EXAMPLE:

SETUP RPM	PRESS "SET" BUTTON	OVERSPEED MARGIN		EMERGENCY ENGINE SHUTOFF SPEED (SETUP RPM) + (OVERSPEED MARGIN)
		%	RPM	
1800	1 time	10	$1800 \times 0.10 = 180$	$1800 + 180 = 1980$
1800	2 times	20	$1800 \times 0.20 = 360$	$1800 + 360 = 2160$
1800	3 times	30	$1800 \times 0.30 = 540$	$1800 + 540 = 2340$
1800	4 times	100	$1800 \times 1.00 = 1800$	$1800 + 1800 = 3600$

TEST MODE

The test mode ensures that the system's automatic function is working as intended.

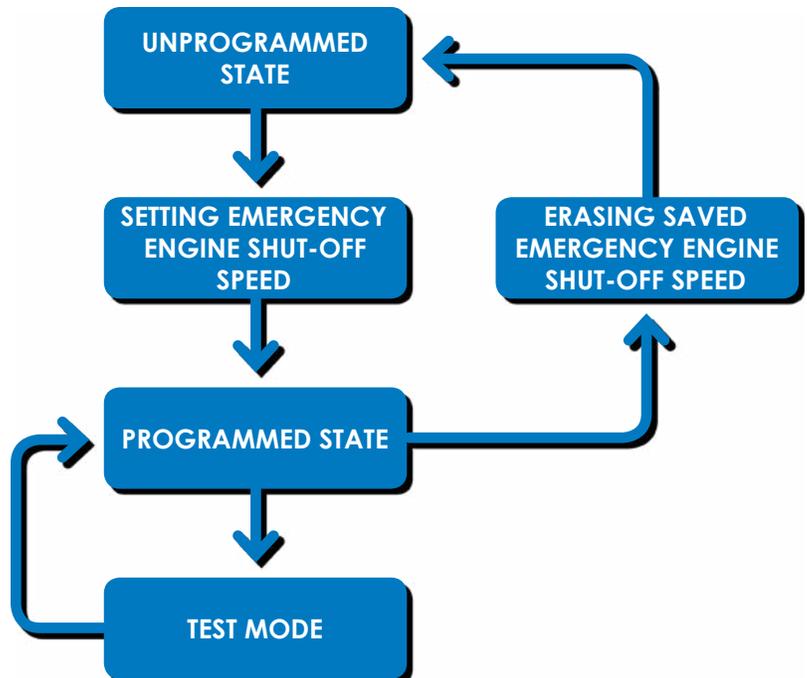
1. Hold the SET and TEST buttons simultaneously until both lights begin to flash (approximately 5 seconds), then release both buttons.
2. Press then release the TEST button on the controller, the green light will start flashing rapidly and the red light will turn off.
3. Raise the engine speed to HALF of the emergency engine shut-off speed.
4. The emergency shut-off valve will actuate to shut down the engine.
5. The green light will continue flashing and the red light will illuminate for 5 seconds before returning to Programmed State.

NOTE: If the valve activated but the engine failed to shut down, check for leaks in the piping and consult a PowerHalt representative.

ERASING THE EXISTING EMERGENCY ENGINE SHUTOFF SPEED

1. Hold both SET and TEST buttons simultaneously until both lights begin to flash (approximately 5 seconds) before releasing.
2. Press and hold the SET button until the red and green lights begin flashing in an alternating order, indicating that memory has been cleared.
3. Repeat SETUP PROCEDURES to program a new emergency engine shut-off speed.

SYSTEM FUNCTION FLOW CHART



WINDOW DECAL

Install the window decal included in your kit to the lower corner of the inside of your windshield so that it is legible to those on the outside.

POST INSTALLATION TESTING OF YOUR POWERHALT SHUT-OFF VALVE

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

1. Activate the manual switch (no engine running).
NOTE: DO NOT ACTIVATE THE MANUAL SWITCH FOR MORE THAN 10 SECONDS. Damage to the solenoid may occur
2. View valve and confirm valve has tripped. The reset knob should be in the tripped position. This will have the line direction on the reset knob facing 90° from air flow direction.



VALVE CLOSED (TRIPPED)



VALVE OPEN (RUN POSITION)

3. Reset the valve.
4. Start the engine and run at low RPM (preferably at idle).
5. Activate the PowerHalt shut-off valve by pushing the manual switch in an upward direction. The engine should stop within a few seconds.
 - If the engine does not shutdown in the specified time please check all intake piping and hoses for leaks between the valve and intake system.
 - If the system is leak-free and your valve still does not shut down the engine, please consult a PowerHalt Service Representative for support.
6. Once the engine stops, wait 30 seconds, then reset the valve by turning the red reset knob clockwise to the open "Run" position with knob arrow in line with air flow direction.

VALVE OPERATION

Prior to running your system you must ensure that the valve is latched (clockwise) into its open position and that the above installation procedure was completed as described. It is recommended that the engine be shipped with the shut-off valve system in its active/open and ready-to-use state.

To carry out the emergency shutdown procedure, the pull cable handle must be pulled as this will shut the valve and stop the engine.

CAUTION: No attempt to restart the engine should happen until the activation information/details are understood and the valve is confirmed to be returned back to the open "Run" position.

NOTE: Please reference your specific operation procedures defined by your organization for additional operation specifics/details. If you require additional recommendations on the steps to operate your shut-off valve, please reference PowerHalt's operation manual based on your application.

VALVE MAINTENANCE

To ensure a trouble-free long life of your PowerHalt shut-off valve a scheduled maintenance procedure is mandatory. It is recommended that you follow the requirements & procedures stated below:

MONTHLY REQUIREMENTS

- Inspect all clamps, pull cables and support brackets to ensure they are in good condition and to the required torque.
- Inspect all wiring & cable runs to ensure there is no corrosion or wear.
- Inspect all hoses to ensure there are no cracks or damage.
- Activate the valve to ensure it is exercised.
See procedure below.

3 MONTH REQUIREMENT (or at oil change interval's whichever comes first)

- Lubricate the PH2, flap O-ring, with Parker® Super O-Lube, Part # SLUBE 884-2, or equivalent.

VALVE ACTIVATION PROCEDURE:

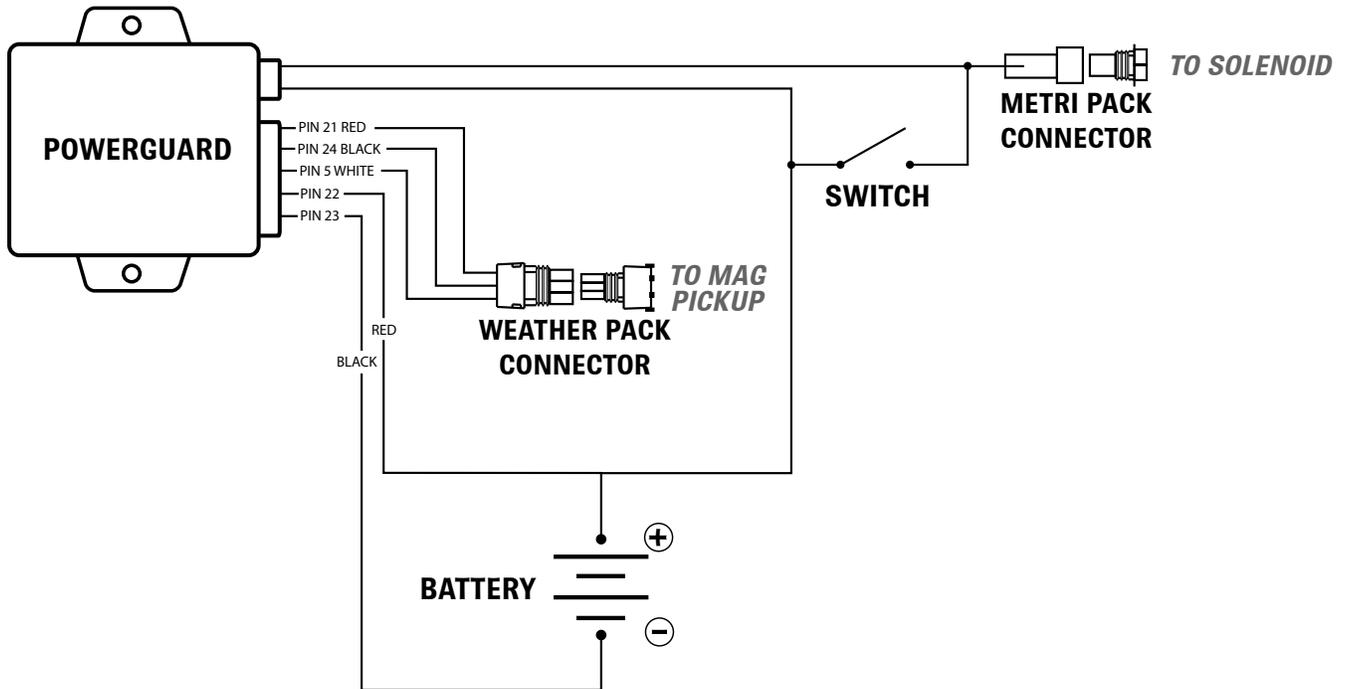
- 1 Run engine at low RPM (preferably at idle).
- 2 Activate the PowerHalt shut-off valve by pulling the cable handle.
The engine should stop within a few seconds.

NOTE:

- If the engine does not shutdown in the specified time, please check all intake piping and hoses for leaks between the valve and the intake system.
 - If the system is leak free and your valve still does not shut down the engine, please consult PowerHalt's service representative for support.
- 3 Once the engine stops, wait 30 seconds, then reset the valve by turning the red reset knob clockwise to the open "Run" position with knob arrow in line with air flow direction.

CAUTION: The #1 failure mode of any valve in the market is seizing due to lack of use. As this is a safety device, it is imperative that you employ safety activation testing at a minimum of once per month.

WIRING SCHEMATIC



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 COLUMBIA



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 QMI-SAI Global