

Installation Manual

PH2 POWERHALT
AIR INTAKE EMERGENCY SHUT-OFF VALVES by PACBRAKE



PH2 POWERHALT AIR INTAKE SHUT-OFF VALVE

WITH POWERGUARD SMART OVERSPEED LIMITER

C50200A – 1994-2002 Dodge Cummins
with PowerGuard

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.

INSTALLATION REQUIREMENTS & RECOMMENDATIONS:

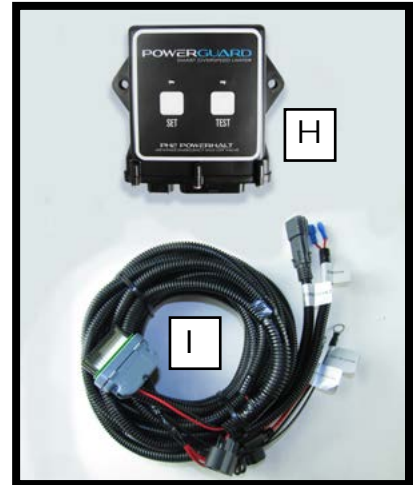
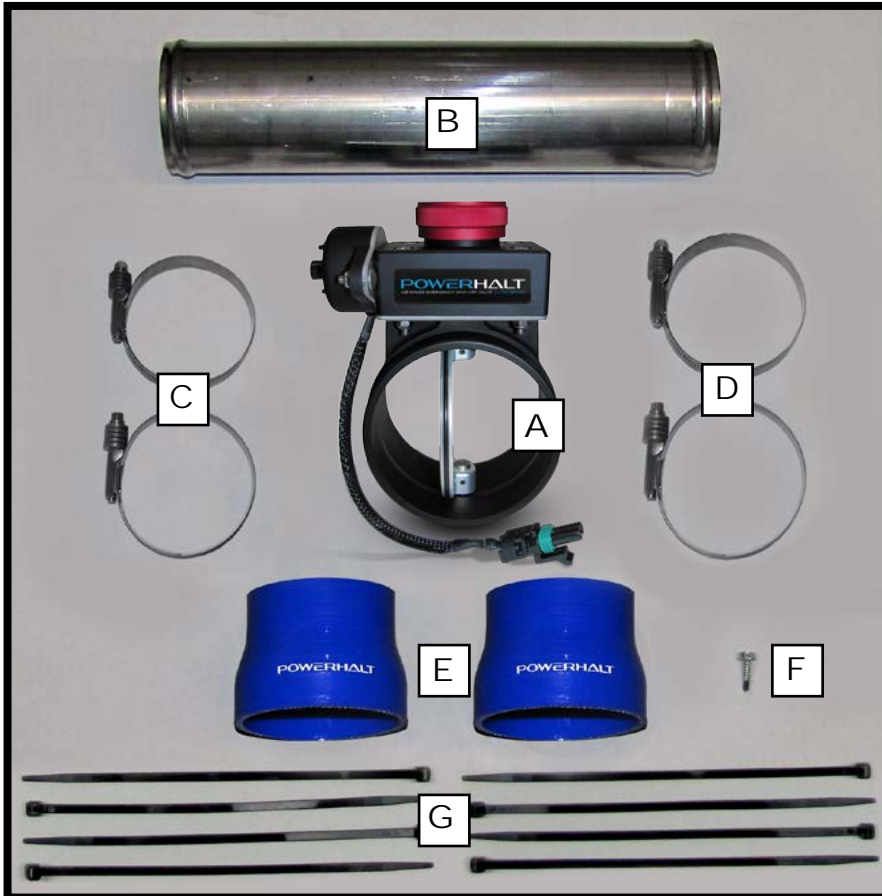
- A 1" clearance is required from the valve to any other components.
- Maximum air temperature at the valve should not exceed 120°C.
- All hoses, adapters, and fittings must be suitable for the vibration of the engine application, and of reinforced type. *If unsure of your vibration requirement, contact 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

- 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.

KIT LAYOUT

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** Charge Air Cooler (CAC) Pipe (1)
- C** 3" Clamps (2)
- D** 3½" Clamps (2)
- E** 3½" - 3" Silicone Hose (2)
- F** Self Tapping Screw (1)
- G** Tie Straps (8)
- H** PowerGuard Controller
- I** Wiring Harness
- J** Washer
- K** Nut
- L** Switch
- M** Switch Identification Plate
- N** Switch Cover
- O** Butt Connector

REQUIRED TOOLS

- Drill
- 1/2" Unibit
- Ratchet with 7/16", 1/2" and 10mm Deep Sockets
(a 14" extension is ideal)
- Torque wrench capable of 0-80 in-lbs
- Soldering Iron
- Wire Strippers & Crimpers
- Electrical Tape

1 | Open the hood. Disconnect the batteries.

2 | **CONTROLLER, SWITCH & WIRING HARNESS INSTALLATION:**
Use self tapping screws or tie straps to secure the PowerGuard controller to the desired location. Ensure the box is accessible (as shown in Photo A), as it will need to be used for the set-up procedure.

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.

3 | Connect the harness connector to the PowerGuard.

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

4 | **1994-1998 VEHICLES ONLY**

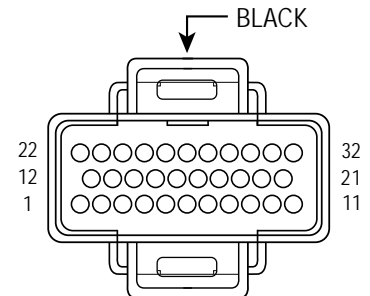
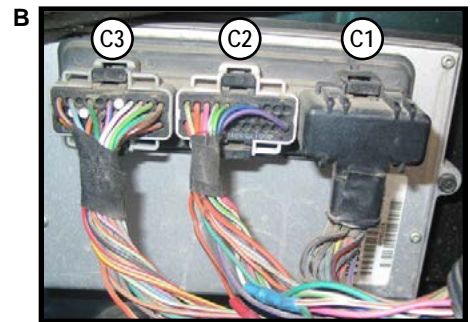
Route the white wire of the Pacbrake harness to the C1 connector of the Powertrain Control Module (PCM) (Photo B). At this connector locate the wire in Pin location 8, it should be an 18awg Grey with black stripe. Splice the white wire into Pin 8 of C1, using the heat shrinkable butt connector provided.

6	T41 18BK/WT	PARK/NEUTRAL POSITION SENSOR SIGNAL
7	S21 18YL/BK	AIR INTAKE HEATER RELAY NO.1 CONTROL
8	K24 18GY/BK	ENGINE SPEED SENSOR SIGNAL
9	S22 18OR/BK	AIR INTAKE HEATER RELAY NO.1 CONTROL
10	-	-

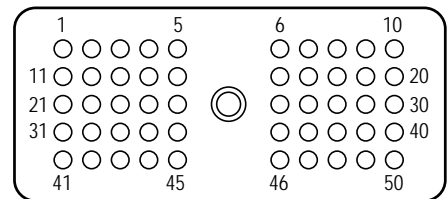
1998.5-2002 VEHICLES ONLY

Route the white wire of the Pacbrake harness to the 50 pin connector of the Engine Control Module (ECM). At this connector locate the wire in pin location 45, it should be an 18awg Grey with black stripe. Splice the white wire into pin 45 wire, using the heat shrinkable butt connector provided. Once crimped, heat the connector to provide a water tight seal.

43	G7 18WT/OR	VEHICLE SPEED SENSOR SIGNAL
44	K243 200R/BR	DATA LINK SHIELD FUEL INJECTOR PUMP
45	K24 18GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL
46	-	-
47	S22 18OR/BK	AIR INTAKE HEATER RELAY COMNTROL NO.2



POWERTRAIN CONTROL MODULE - C1 (DIESEL)



ENGINE CONTROL MODULE (DIESEL)

5 | SWITCH LOCATION:

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

6 | SWITCH INSTALLATION:

Drill a ½" hole in the desired location. Then, install the PowerHalt switch, switch plate, and red switch guard as shown (6).

Tighten the nut to secure the switch in place.

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



- ## 7 |
- Route the red and red/white stripe wires of the harness to the switch location. Cut to length and crimp on the spade terminals then connect it to the switch.

NOTE: Ensure the wiring harness routing is secured with provided tie straps and away from any moving parts or high heat sources.



8 | 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: Ensure the wiring harness routing is secured with provided tie straps and away from any moving parts or high heat sources.

9 VALVE INSTALLATION PREPARATION:

Remove the driver's side charge air cooler (CAC) pipe and upper silicone hose using a 7/16" deep well socket with ratchet.

Loosen the clamps as follows:

- intake plenum to silicone hose
- lower CAC pipe clamp

NOTE: Leave the silicone hose attached to the intercooler.

Using a non-oily cleaner (such as iso-propyl alcohol) and a lint-free cloth, clean the inside surface of the silicone hose that is still attached to the intercooler, as well as the outside of the intake plenum.

VALVE INSTALLATION:

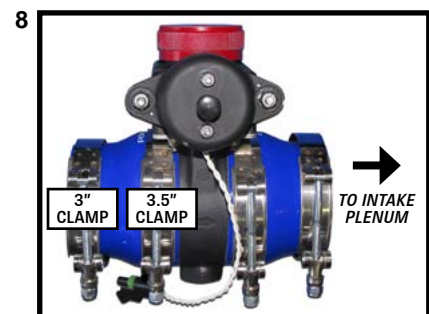
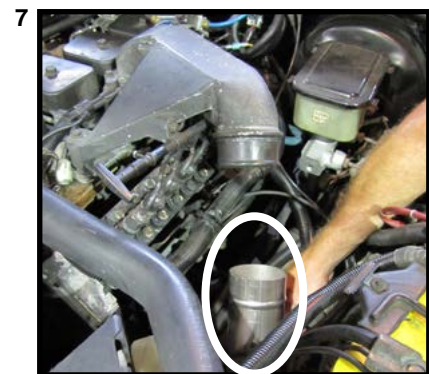
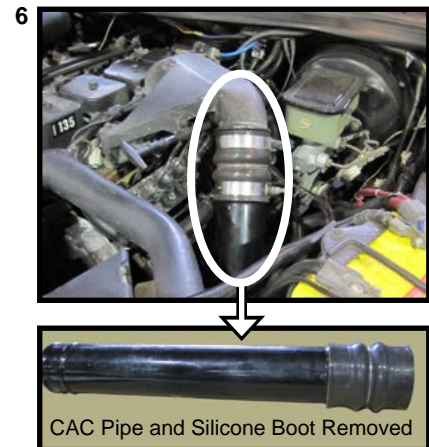
- 10 Install the new CAC pipe (that is provided in the kit) into the factory silicone hose and loosely attach the factory clamp.
The clamp will be torqued in step 9.

- 11 Attach the two silicone reducer hoses provided in the kit onto the PowerHalt valve. Loosely install the clamps as shown (image 8).
NOTE: The clamps provided in the kit require a 10mm deep well socket. The factory clamps require a 7/16" deep well socket.

- 12 Install the PowerHalt Valve assembly between the CAC pipe and the intake horn. Note the flow direction arrow on the valve body and the reset knob. It must point in the direction of flow to the intake plenum.

Position the valve so the reset knob is easily accessible to vehicle operator for valve reset operation.

Torque the factory clamp to 72 in-lbs (8 N•m)
Torque the supplied clamps to 75 in-lbs (8.5 N•m)



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

NOTE: Ensure the wiring harness routing is secured with provided tie straps and away from any moving parts or high heat sources.

- 14 | Reconnect the batteries.





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.

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

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

TEST MODE

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

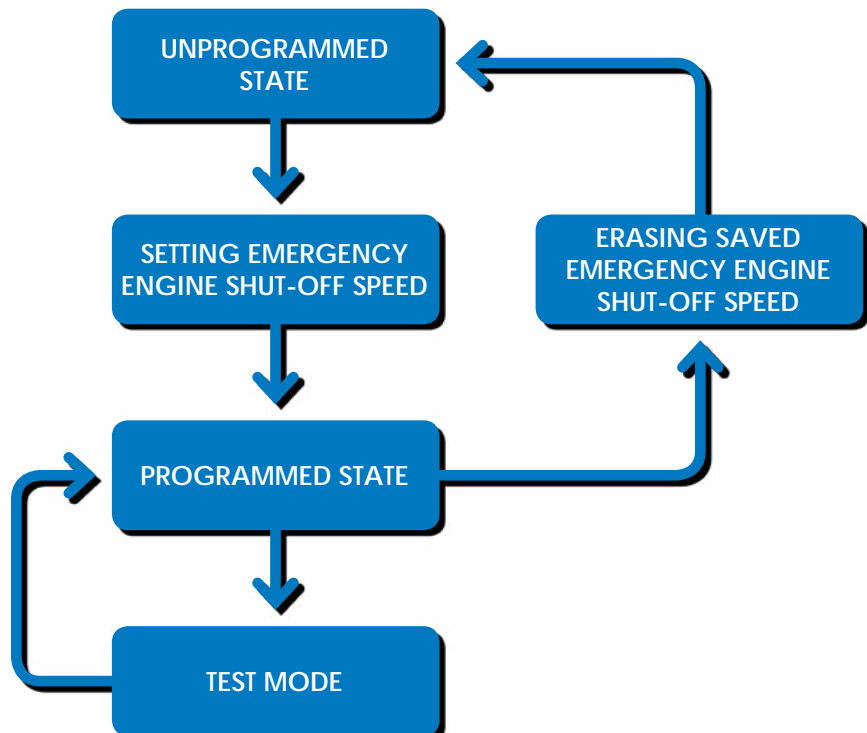
1. Hold the SET and TEST buttons simultaneously until both lights begin to flash (approximately 5 seconds), then release both buttons
2. Press then release the TEST button on the controller, the green light will start flashing rapidly and the red light will turn off
3. Raise the engine speed to HALF 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



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:

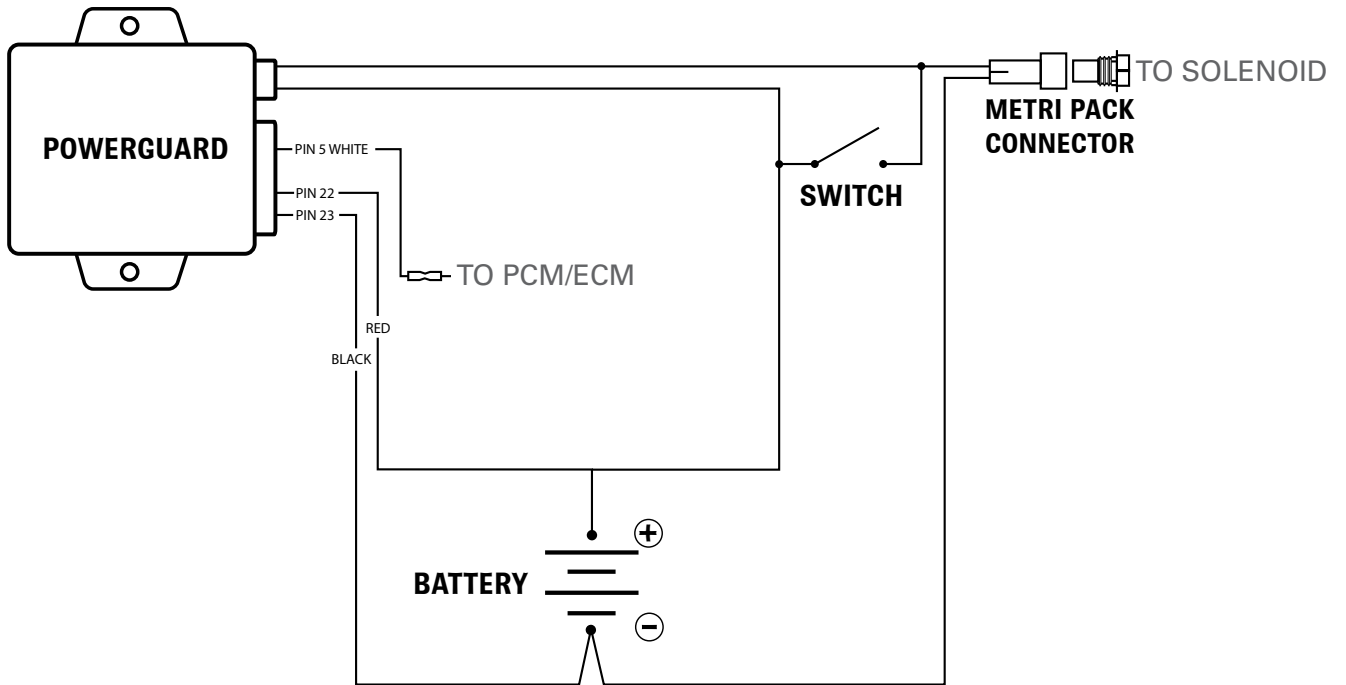
- 1 Run engine at low RPM (preferably at idle).
- 2 Activate the PowerHalt shut-off valve by pulling the cable handle.
The engine should stop within a few seconds.

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



ISO 9001
QMI-SAI Global