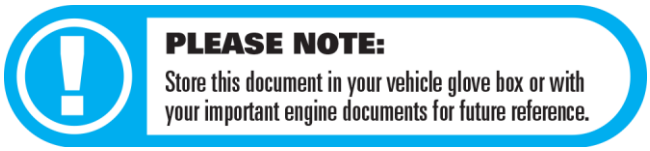
Installation Manual

PH+ POWERHALT
AIR INTAKE EMERGENCY SHUT-OFF VALVES by PACBRAKE

AFTERMARKET BY PACBRAKE

L6474 • ECN 1-2822

800.663.0096 www.powerhalt.com



ATTENTION

Prior to installation, read through all system requirements.

If you cannot meet certain 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

CAUTION

Failure to comply with these instructions may result in PRODUCT DAMAGE or SYSTEM FAILURE – FALSE TRIPS AND/OR IMPROPER FUNCTION:

- Maximum ambient air temperature at controller should not exceed 85°C.
- Do not mount controller directly on engine, vehicle frame, or other components exhibiting harsh vibration.
- Do NOT remove pins from harness connectors to pass wiring harness through small sized holes.
- Do NOT operate engine with any harness connections disconnected. Doing so could cause system components to fail under extreme operating conditions.
- Ensure power is drawn directly from battery.
- Only power, switch, and secondary trip speed input are permitted to be extended. If extending wiring harness lengths, individual runs must not extend beyond 6 meters [20 feet] from controller. Use sealed connections and specified wire type & size as indicated on wiring schematic.
- No extension of speed signal and valve control wires is permitted.
- As this is a safety device, activation testing must be employed at a minimum of once per month to ensure system remains functional and valve is free moving. Daily activations are recommended to ensure proper function of the system.

Thank you for your purchase of a PowerHalt PH+ electronic air shut-off system by Pacbrake. Please read the entire manual before you begin to ensure that you can complete the installation once started.

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

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REQUIRED TOOLS

- Drill with Drill Bits
- Rachet and socket
- Wrenches
- Side Cutters

1 Switch Installation

Read requirements below and find suitable location for toggle switch within vehicle cab and install.

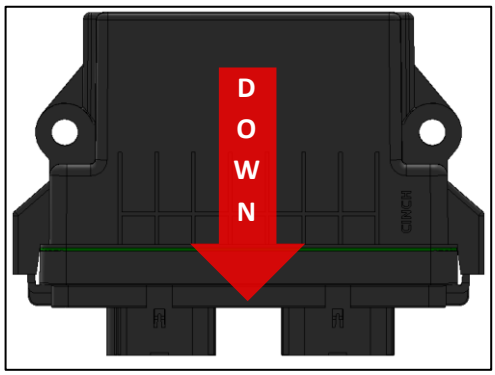
- Switch must be on dash and accessible from the ground outside of driver's door.
- Drill ½" hole and install switch assembly through panel with acrylic label and toggle cover. Do not over-tighten nut.
- Route wiring through vehicle firewall and connect the switch as per the schematic shown on page 5. Ensure wiring is connected correctly according to wiring schematics.

2 PowerHalt Controller

Read requirements below and find suitable location for PowerHalt Controller. Mount securely using self-tapping screws or provided tie straps.

- Ensure the controller is not mounted in a location which will be exposed to high pressure water or steam during engine cleaning.
- Ensure the controller is not mounted in a location where ambient temperatures can exceed 85°C.
- Mount the controller with the connectors exiting from the bottom to prevent the ingress of standing water.

⚠ Do NOT mount directly on engine, vehicle frame or other components exhibiting harsh vibration.



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3 Wiring Harness

Read requirements below and follow wiring schematic on following page to make all electrical connections. For locations of crankshaft speed sensor connector and valve control connector, refer to your engine application in Section 4 of this manual.

- Route the power and ground wires to the battery and connect. Ensure that the connection surface is clean and securely tightened.
- Securely latch all connectors. Do NOT disconnect connectors once latched.
- If vehicle has been modified to function with Intake Air Valve disabled, leave factory harness disconnected.
- Allow adequate slack in wiring harness near connections to prevent vibrating components from straining wires.
- Harness arms with additional length can be looped and secured in a safe location with provided tie straps.
- Secure wiring harness away from moving parts or high heat sources with provided tie straps.

⚠ Do NOT remove pins from connectors to pass through small sized holes.

⚠ Ensure power is drawn directly from battery.

⚠ Only power, switch, and secondary trip speed input are permitted to be extended. If extending wiring harness lengths, individual runs must not extend beyond 6 meters [20 feet] from controller. Use sealed connections and specified wire type and size. See Wiring Schematic for details.

⚠ Extending speed signal and valve control cables is NOT permitted.

⚠ Do NOT mistake Camshaft Position Sensor for Crank Position Sensor

3.1 Secondary Trip Speed [Optional]

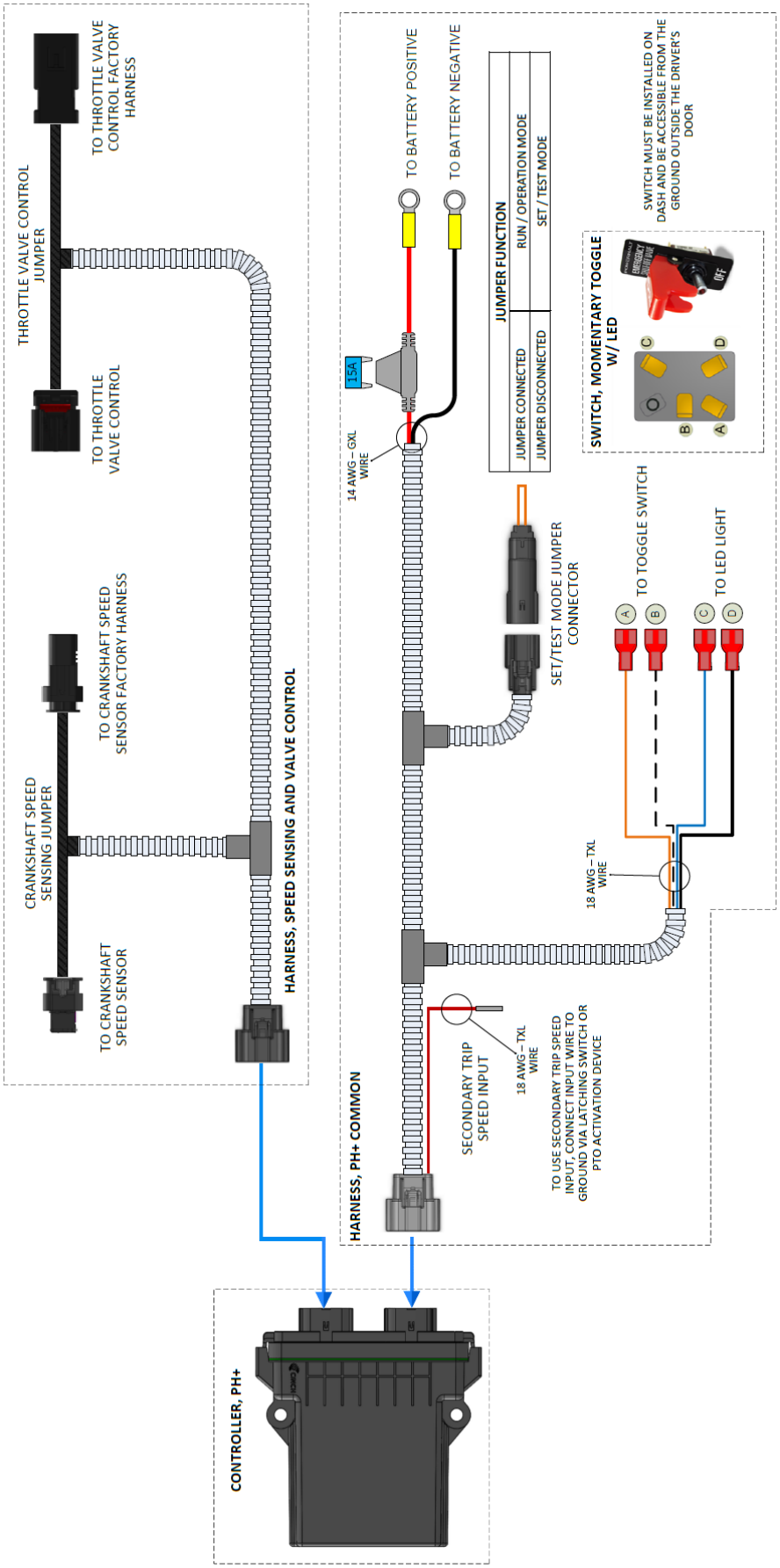
System can force engine shutdown at two different engine speeds. Secondary Trip Speed can be used for protection of auxiliary equipment powered by Power Take-Off (PTO) system or as anti-theft mechanism when set near idle speed.

To activate Secondary Trip Speed, provide ground to Brown Wire (Pin 3 on Connector B). This can be done via existing PTO activation device or via latching switch (not provided).

For use as an anti-theft device, install a latching switch within the vehicle in a concealed location. When the switch is engaged, ground will be provided to the Secondary Trip Speed Input. Set the Secondary Trip Speed to a low value such as 1000 or 1250 RPM. While the switch is activated, the vehicle will shut down if an attempt is made to drive away without deactivating the Secondary Trip Speed.

See Wiring Schematic for more detail.

Wiring Schematic



WIRE SPECIFICATIONS	
DESCRIPTION	WIRE SIZE/TYPE
12 VDC BATTERY POWER	RED 14 AWG - GXL
BATTERY GROUND	BLACK 14 AWG - GXL
SWITCH 12 VDC POWER SUPPLY	WHITE 18 AWG - TXL
SWITCHED SIGNAL WIRE	ORANGE 18 AWG - TXL
LED 12 VDC POWER	BLUE 18 AWG - TXL
LED GROUND	BLACK 18 AWG - TXL

4 Wiring Harness Connection Locations

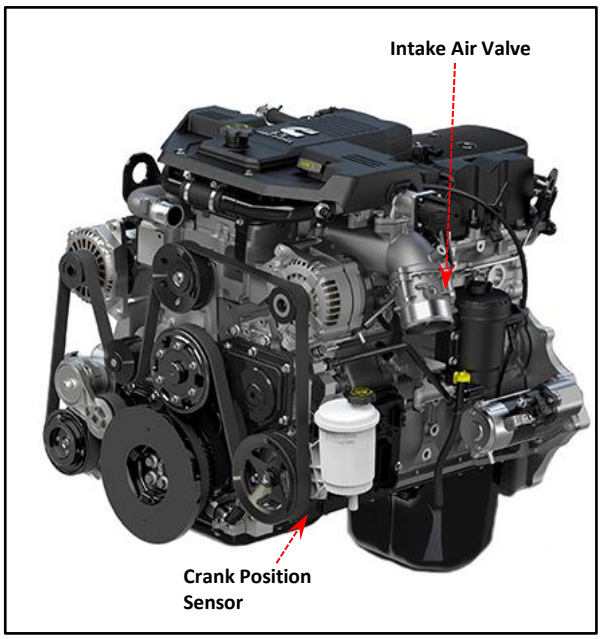
Follow the relevant step below depending on your engine model.

⚠ System functionality is dependent on ordering the correct harness for your specific vehicle. Contact PowerHalt Representative for more information.

4.1 Dodge RAM Engines

4.1.1 6.7L Cummins [2007 – 2024]

- Intake Throttle Valve connector is located on the driver side of the engine on the underside of the air intake valve. The connector may have a secondary locking cover that will need to be removed to unlatch the connector.
  - 2007 – 2009 models use a 4-pin grey connector
  - 2010 – 2024 models use a 5-pin black connector
- Crankshaft Position Sensor is located at the bottom of the engine on the driver side behind the crankshaft pulley. The connector may have a secondary locking cover that will need to be removed to unlatch the connector.
  - 2007 – 2018 models use a 3-pin white connector
  - 2019 – 2024 models use a 3-pin black connector



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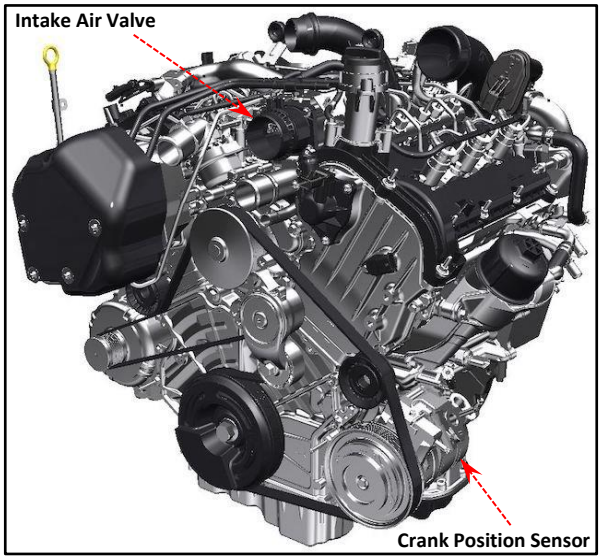
4.1.2 3.0L EcoDiesel [2014 – 2023]

- Intake Throttle Valve connector is located on top of the engine on the lower left side of the throttle valve. The plastic engine cover and charge air hose must first be removed. Next remove the four bolts securing the intake hose adapter to the intake valve. Move the adapter to access the connector.
  - All model years use a 6-pin orange connector
- Crank Position Sensor connector is on the bottom of the engine towards the rear. It is near the driver side of the oil pan, close to the crankshaft.
  - All model years use a 3-pin black connector



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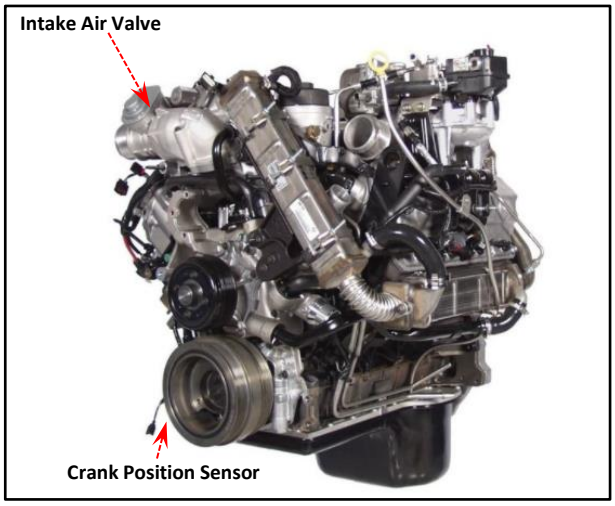
4.2 Ford Engines

4.2.1 6.4L Power Stroke [2008 – 2010]

- Intake Throttle Valve connector is located on the backside of the intake valve at the top of the engine, behind the radiator fan shroud.
  - All model years use a 4-pin black connector

- Crank Position Sensor is on the passenger side of the engine near the lower front. Removing the upper bolt securing the steering stabilizing shock and moving the shock will allow easier access to the connector.
  - All model years use a 2-pin black connector



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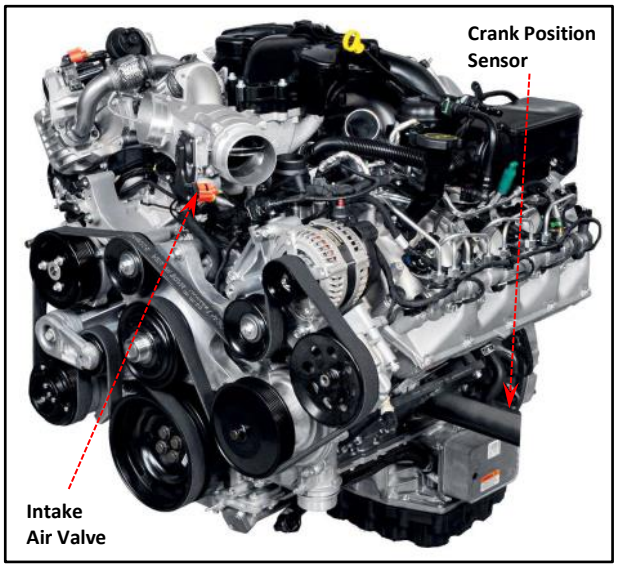
4.2.2 6.7L Power Stroke [2011 – 2023]

- Intake Throttle Valve connector is located on the bottom side of the intake valve at the front of the engine, behind the radiator fan shroud. Removing the charge air tube will allow for better access to the connector
  - All model years use a 6-pin orange connector

- Crank Position Sensor is on the driver side of the engine, in the engine-transmission adapter flange. The rubber plug must be removed to gain access to the connector.
  - All model years use a 3-pin black connector



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IMPORTANT:

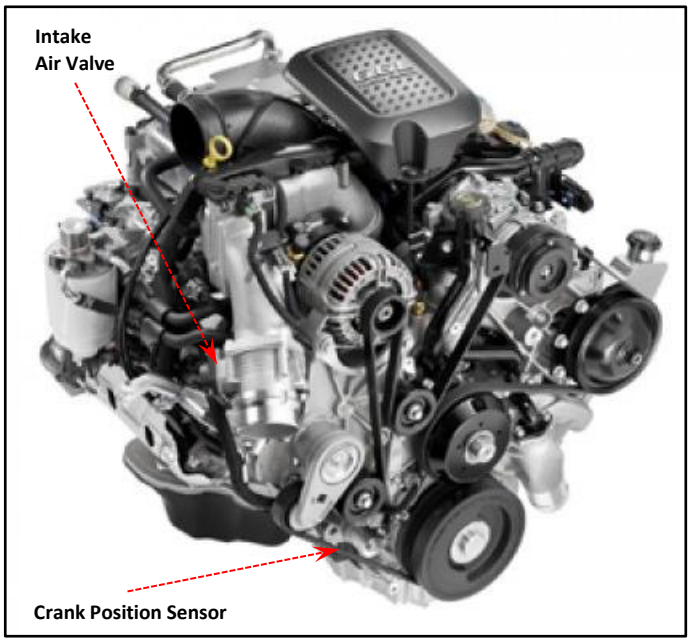
On 2020+ Ford Superduty Trucks with the 6.7L Power Stroke, a residual voltage on the speed sensor line may cause the PowerHalt controller to fail to detect engine speed in the next step. A long shut-down will allow this voltage to drop and for the PowerHalt to function correctly. After all harness connections are made, the truck must be turned off, locked, and left for 10 minutes. This step is important to complete prior to programming and testing in the next section.

4.3 GM Engines

4.3.1 6.6L Duramax [2008 – 2010]

- Intake Throttle Valve is located on the passenger side of the engine between air intake box and alternator. Removing the air intake tube will allow better access to the connector.
  - All model years use a 6-pin black connector

- Crank Position Sensor is at the bottom of the engine on the passenger side (beside crankshaft pulley)
  - All model years use a 3-pin black connector



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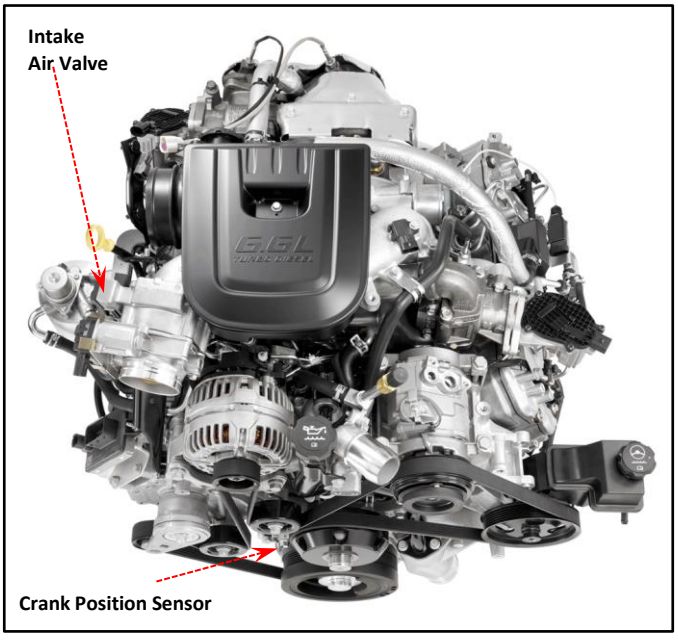
4.3.2 6.6L Duramax [2011 – 2016]

- Intake Throttle Valve connector is located at the top of the engine on the passenger side.
  - All model years use a 6-pin black connector

- Crank Position Sensor is at the bottom of the engine on the passenger side (beside crankshaft pulley)
  - All model years use a 3-pin black connector



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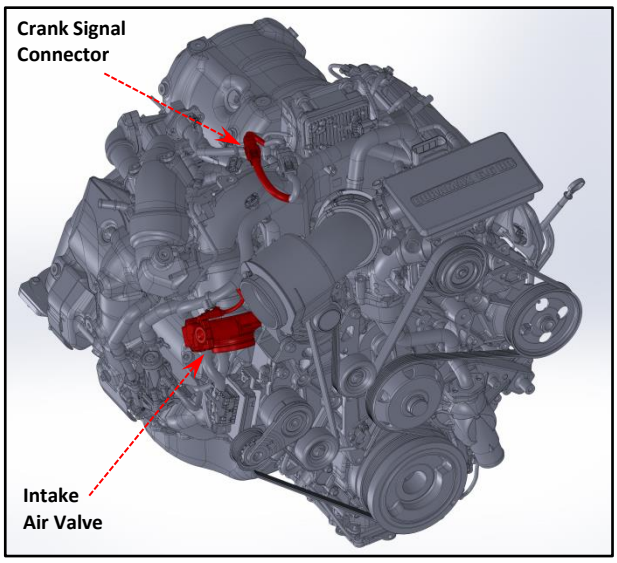
4.3.3 6.6L Duramax [2017 – 2024]

- Intake Throttle Valve connector is located below the air intake tube at the front of the engine on the passenger side. The air intake tube must be removed to access the electrical connector.
  - All model years use a 6-pin black connector

- Crank Position Sensor is inaccessible for this engine. PowerHalt harness will instead connect in-line with the combined factory connection for crankshaft position and fuel rail pressure located on top of the engine.
  - All model years use an 8-pin black connector



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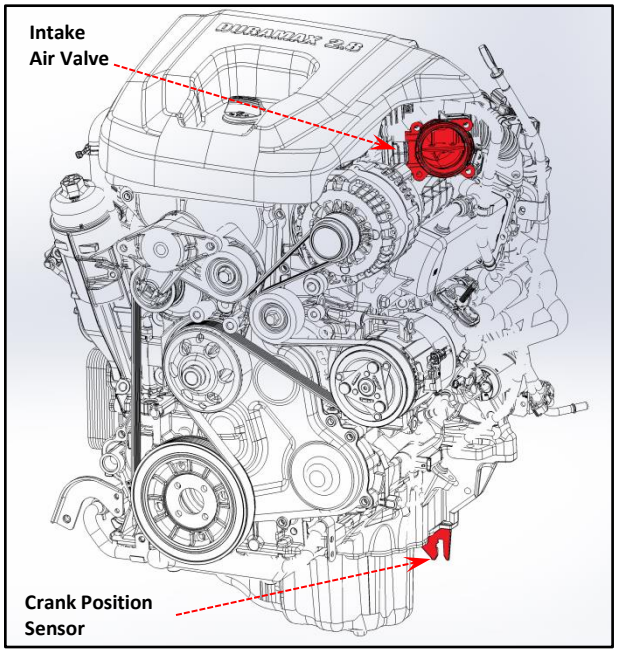
4.3.4 2.8L Duramax [2016 – 2023]

- Intake Air Valve is located at the top of the engine on the driver side
  - Removing the plastic engine cover allows for easier access to the electrical connector
  - All model years use a 6-pin black connector

- Crank Position Sensor is at the bottom of the engine on the driver side. Removing the connector from its retaining clip will allow for easier disconnection.
  - All model years use a 3-pin black connector



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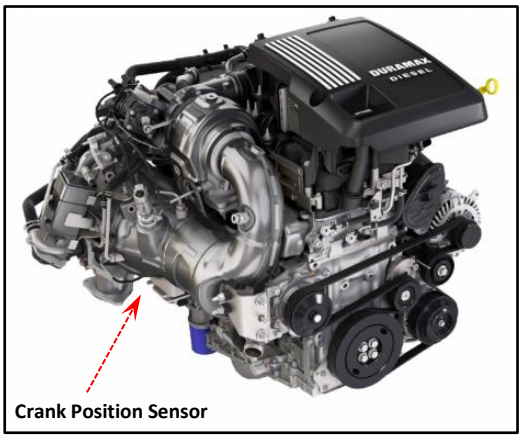
4.3.5 3.0L Duramax [2019 – 2024]

- Intake Air Valve is located at the top of the engine on the driver side
  - Removing the plastic engine cover allows for easier access to the electrical connector
  - All model years use a 6-pin black connector

- Crank Position Sensor is at the bottom of the engine on the passenger side. Removing the connector from its retaining clip will allow for easier disconnection.
  - All model years use a 3-pin black connector



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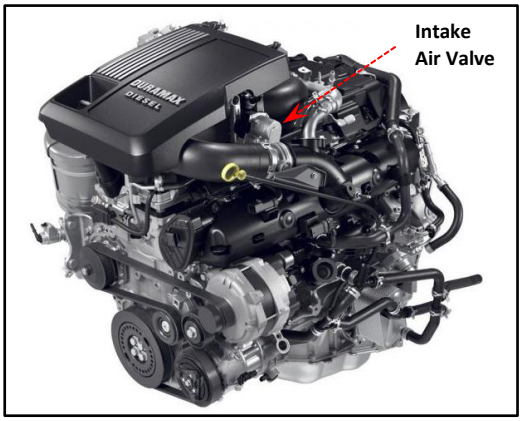

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5 Programming

PH+ System has 2 different modes of operation accessed by connecting or disconnecting the 2-pin SET/TEST mode jumper connector:

Run Mode (SET & TEST Jumper Connected)

- Normal Operating Mode. System will shut-down engine at set shut-off speed or when switch activated.

Set & Test Mode (SET & TEST Jumper Disconnected)

- Used to set the shut-off speed and test the automatic shutdown function.

5.1 Set Procedure

Review the Shut-Off Speed tables below to select your desired trip speed(s) and note the number of required toggle presses before beginning procedure. If the PTO wire was connected during installation, ensure no power is present at PTO input before beginning set procedure.

1. With engine off or running at idle, enter **SET & TEST Mode** by disconnecting the 2-pin black jumper connector with orange wire loop. Be sure to retain the jumper.
2. Press toggle switch the corresponding number of times to achieve desired trip speed selected from Shut-Off Speed tables below.
3. Confirm speed selection by counting the number of light flashes displayed on toggle switch after input is complete.
4. Reconnect 2-pin SET & TEST jumper connector removed in step 1 to save the trip speed and exit Set & Test mode.

Note: To set a secondary shut-off speed for PTO applications, connect PTO wire to ground to enable PTO mode and repeat the Set procedure. If programming both trip speeds ensure to complete step 4 of the procedure for the first trip speed before proceeding with the second trip speed.

Pushes/Flashes	NORMAL Shut-Off Speed	PTO ON Shut-Off Speed
1	3250	1000
2	3500	1250
3	3750	1500
4	4000	1750
5	4200	2000
6	4600	2250
7	4750	2500
8	5000	2750
9	-	3000
10	-	3250

Table 1: Shut-Off Speeds and Number of Toggle Actuations

Engine	Speed	Toggles
RAM Cummins 6.7L	4200 RPM	5
GM Duramax 6.6L Ford Power Stroke 6.7L	4600 RPM	6
Ford Power Stroke 3.0L, 6.4L RAM EcoDiesel 3.0L GMC Duramax 2.8L, 3.0L	5000 RPM	8

Table 2: Recommended Shut-off Speeds

IMPORTANT:
By default, each controller is factory set with a shut-off speed of **5000 RPM** for **PTO OFF** and **3250 RPM** for PTO ON. Proper shutoff speed **must** be programmed for your engine in order to conduct safe automatic shutdown. Manual emergency shutdown by the toggle switch can still be performed as required in the unprogrammed state.

In rare circumstances due to wear or debris build-up, some intake lines and throttle bodies may not seal completely when valve is fully closed. This may allow enough air into the engine to prevent complete shutdown. If this occurs during testing, remove the vehicle key to stop fuel flow and shut down the engine. Inspect the factory throttle body and intake plumbing to identify any leaks and replace any components as necessary.

5.2 Test Procedure

1. With engine off or running at idle, enter **SET & TEST Mode** by disconnecting the 2-pin black jumper connector with orange wire loop. Be sure to retain the jumper.
2. Slowly raise engine speed to slightly above 1500 RPM – system will activate and force engine to shut down.
3. Toggle switch light will illuminate to indicate valve is closed. Light will extinguish 15 seconds after the engine has shut down to show valve has re-opened and engine is safe to re-start.

6 Post Installation

Once installation is complete, ensure all steps, schematics and requirements have been followed before following final testing procedure:

1. Activate and release toggle switch while engine is running.
2. Confirm engine shuts down and the valve is closed.
    - Check all connectors are securely latched if engine does not shut down.
3. Confirm valve resets itself 15 seconds after closing.

7 Maintenance

To ensure a trouble-free long life of your PowerHalt PH+ system, a scheduled monthly maintenance procedure is mandatory:

⚠ As this is a safety device, activation testing must be employed at a minimum of once per month to ensure system remains functional and intake valve is free moving. Daily activations are recommended to ensure proper function of the system.

- Inspect controller fasteners for tightness and required torque
- Inspect all wiring / cable runs for corrosion, vibration wear, and loose connections
- Inspect controller for damage, dirt, and poor connections

8 Check Engine Light/Trouble Codes

PH+ features technology to circumvent trouble codes being issued during an engine shutdown. However, there are some vehicles which will still issue a check engine light upon system activation. The diagnostic trouble code is typically P0069 pertaining to the manifold absolute pressure (MAP) sensor or a mismatch between the MAP sensor and barometric pressure sensor. No damage occurs and no service is required should this code be presented.

8.1 Duramax 6.6L

2017-2024 GM 6.6L Duramax applications will trigger a check engine light and P0106 fault code on every PH+ shutdown. This is normal and may put the truck in a reduced power state. The code can be cleared with a code reading device or will extinguish on its own after several normal start-up and shutdown cycles. This is inherent for dedicated shut-off valves as well, not just the PH+ product. The 2.8L Duramax, 3.0L Duramax, and other years of the 6.6L Duramax are not affected.

8.2 PowerStroke 6.7L

2011-2019 Ford Power Stroke 6.7L applications will display a check engine light and P0069 fault code after two consecutive forced shutdowns with PH+. Two consecutive normal start-up and shutdown cycles should clear the check engine light. Alternatively, a code reading device can be used to clear the code.

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

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