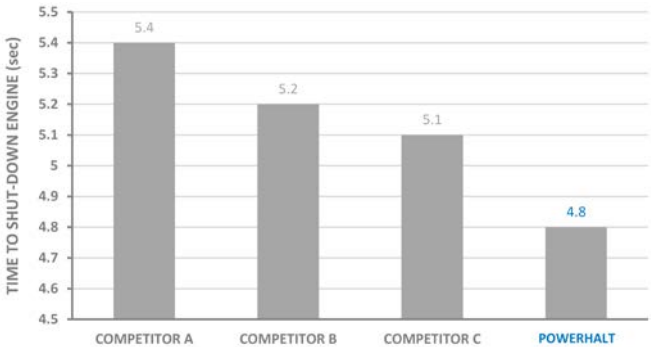
POWERHALT
AIR INTAKE EMERGENCY SHUT-OFF VALVES *by PACBRAKE*

# PH2 Product Data Sheet

- Reliable and safe emergency shut down for diesel engines
- Multiple activation methods with operator friendly manual reset
- Optional smart controller with IP67 protection and low power consumption
- Enclosed drive system is debris and corrosion resistant
- Highly durable O-ring material providing near zero leakage when shut
- Designed for a wide range of temperatures
- Robust design; Tested to MIL-STD-810G vibration and 10,000 activations
- Corrosion tested to ASTM B117, 96 hours salt fog
- Wide range of sizes available


## Product Description

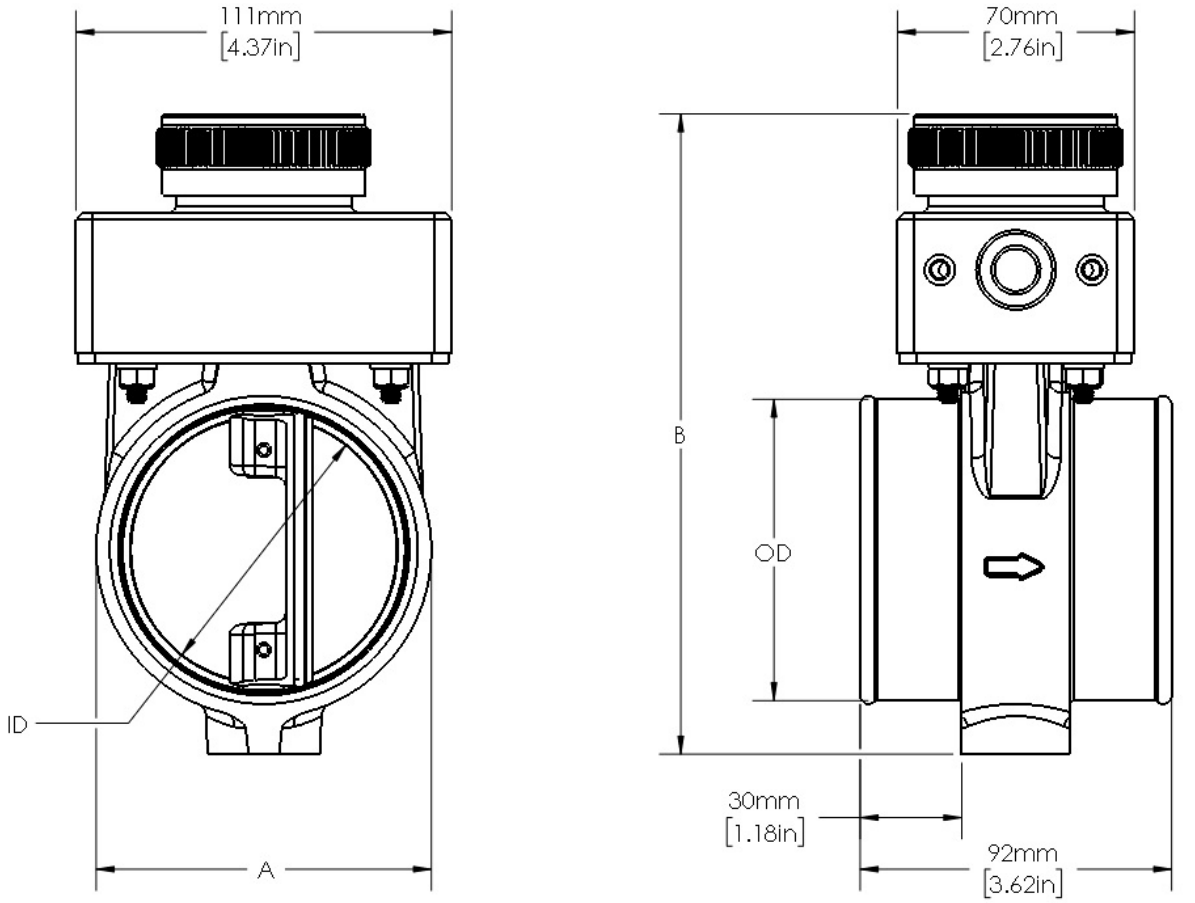
| | |
|---|---|
| **Maximum Intake Boost Air Pressure** | 2.76 bar(gauge) [40 psig] |
| **Continuous Intake Air Temperature** | -55°C to +200°C [-67°F to +392°F] *(depending on seal selection)* |
| **Ambient Temperature Range** | -40°C to +120°C [-40°F to +248°F] *(depending on actuator)* |
| **Valve Operation** | Energize to close |
| **Standard Mounting Options** | Hoses and clamps *(139.7 mm [5.5 in] nominal valve size comes with M6x1x8 mounting holes for optional additional support)* |
| **Pipe Sizes Supported** | Ø64 mm to Ø140 mm [Ø2.5 in to Ø5.5 in] |

**Seal Selections**

| Material | Continuous Intake Air Temperature |
|---|---|
| Buna-N | -50°C to +130°C [-58°F to +266°F] |
| Viton | -20°C to +200°C [-4°F to +392°F] |
| Fluorosilicone | -55°C to +200°C [-67°F to +392°F] |

# PH2 PRODUCT DATA SHEET

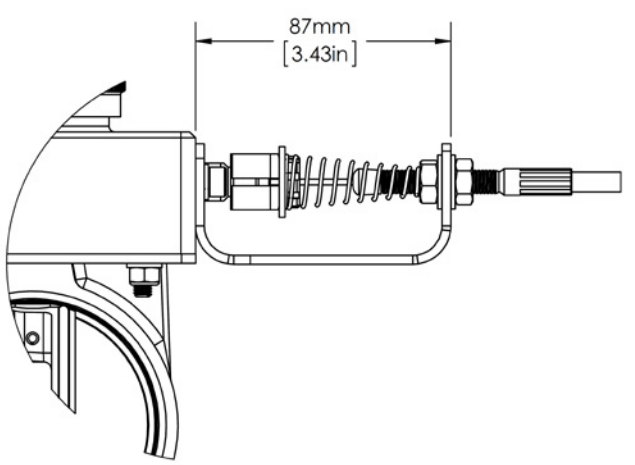
## Physical Characteristics

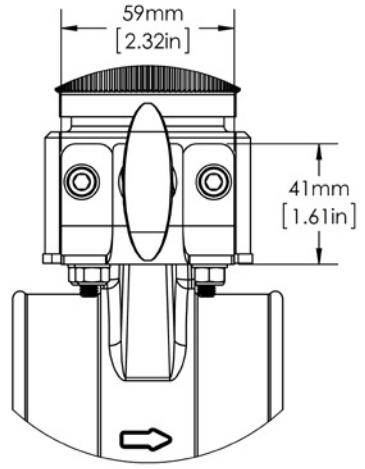



| Nominal Valve Size [OD] | Valve Core Dimensions | | | Weight |
|---|---|---|---|---|
| | Bore [ID] | Width [A] | Height [B] | |
| **71.0 mm [2.8 in]** | 58 mm [2.28 in] | 81 mm [3.19 in] | 176.3 mm [6.94 in] | 1.46 kg [3.25 lb] |
| **76.2 mm [3.0 in]** | 63 mm [2.48 in] | 81.5 mm [3.20 in] | 179.3 mm [7.05 in] | 1.48 kg [3.26 lb] |
| **89mm [3.5 in]** | 78.5 mm [3.09 in] | 99 mm [3.89 in] | 189.1 mm [7.44 in] | 1.55 kg [3.41 lb] |
| **102 mm [4.0 in]** | 91.5 mm [3.60 in] | 112 mm [4.41 in ] | 202.1 mm [7.95 in] | 1.64 kg [3.61 lb] |
| **127 mm [5.0 in]** | 116.5 mm [4.59 in] | 134 mm [5.27 in | 227 mm [8.94 in] | 1.75 kg [3.86 lb] |
| **139.7 mm [5.5 in]** | 126.5 mm [5.1 in] | 151 mm [5.9 in] | 238.1 mm [9.37 in] | 1.96 kg [4.32 lb] |

# PH2 PRODUCT DATA SHEET

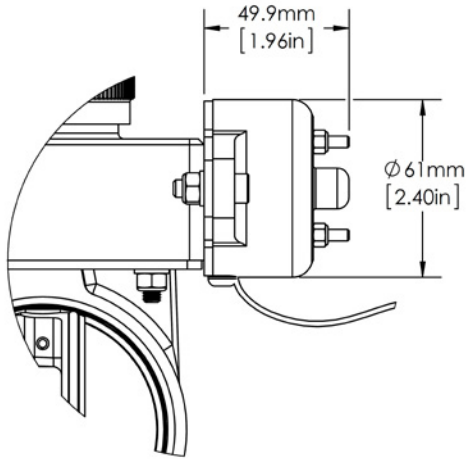
## Single Pull Cable Activation

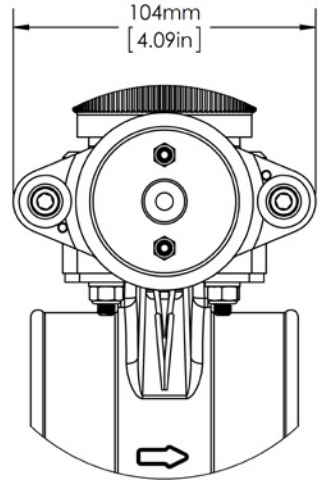



| | |
|---|---|
| **Cable Activation Pull Force** | 90 N [20.2 lbf] |
| **Minimum Stroke for Activation** | 12 mm [0.47 in] |
| **Activation** | Pull to close |
| **Actuator Weight (Cable Weighed Separately)** | 0.24 kg [0.53 lb] |

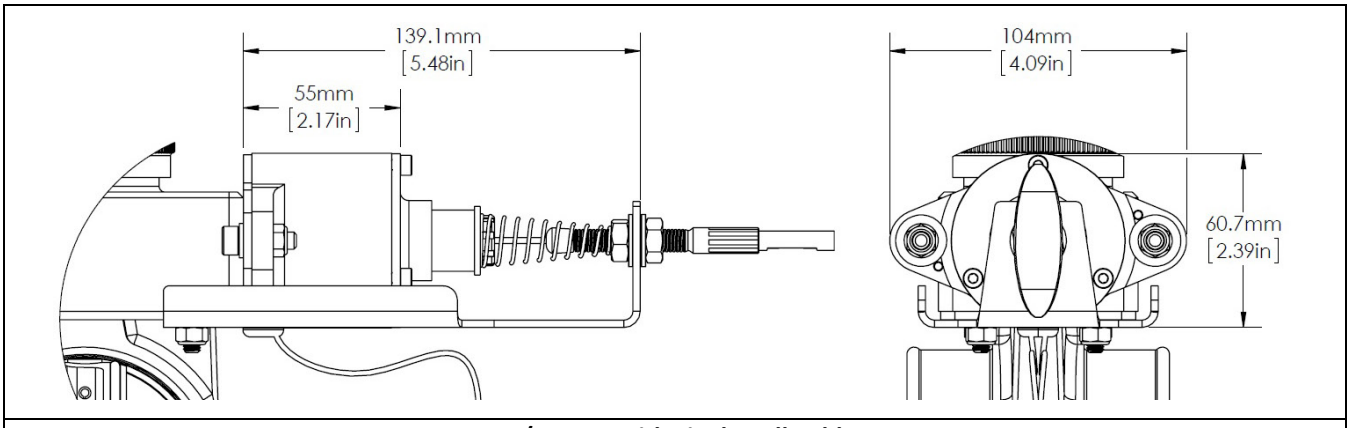
## 12/24 VDC Electric Activation



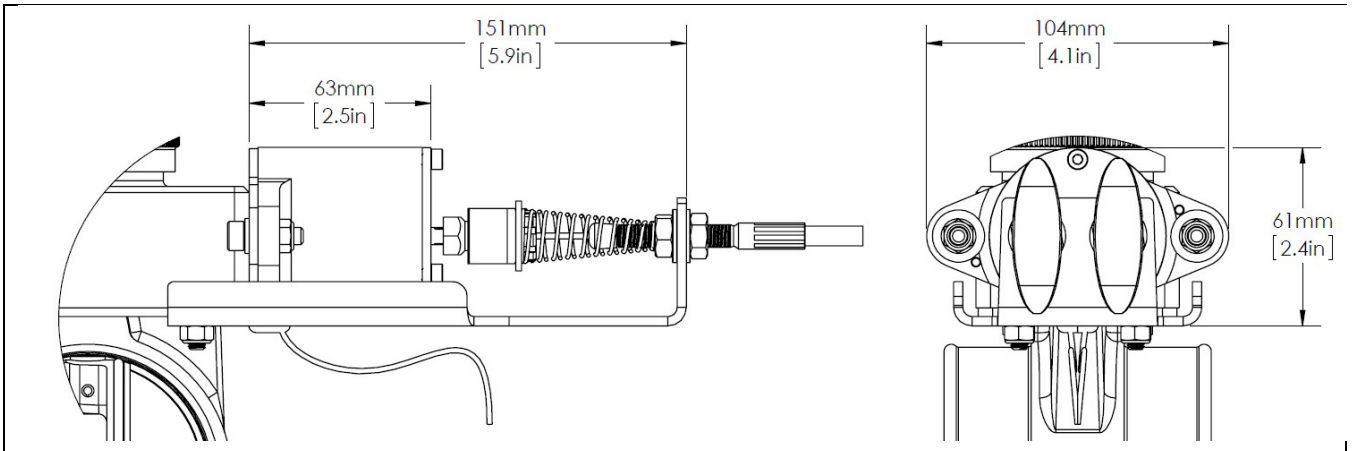




| **Voltages** | **12 VDC** | **24 VDC** |
|---|---|---|
| **Resistance** | 1.7 Ω +/- 10% | 3.9 Ω +/- 10% |
| **Duty cycle** | 10 sec ON / 90 sec OFF | 10 sec ON / 90 sec OFF |
| **Activation** | Power to close | Power to close |
| **Electrical Connector** | Metri-Pack, 280 Series<br>Female, 2 Pin (Delphi # 15300027) | Metri-Pack, 280 Series<br>Female, 2 Pin (Delphi # 15300027) |
| **Actuator Weight** | 0.84 kg [1.9 lb] | 0.84 kg [1.9 lb] |

## 12/24 VDC Electric Solenoid with Single/Dual Pull Cable Activation



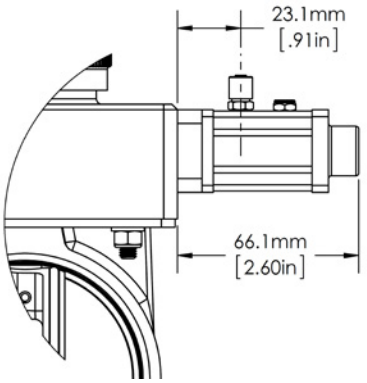

**12/24 VDC with Single Pull Cable**

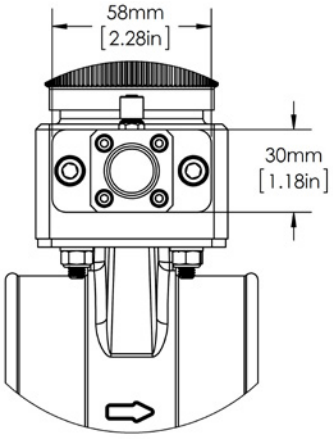



**12/24 VDC with Dual Pull Cable** *(available with solenoid option only)*

| Pull Cable Configuration | | |
|---|---|---|
| **No. of cables** | **Single** | **Dual** |
| **Cable Activation Pull Force** | 90 N [20.2 lbf] | 98 N [22 lbf] |
| **Minimum Stroke for Activation** | 12 mm [.47 in] | 12 mm [.47 in] |
| **Activation** | Pull to close | Pull to close |
| **Electrical configuration** | | |
| **Voltages** | **12 VDC** | **24 VDC** |
| **Resistance** | 1.7 Ω +/- 10% | 3.9 Ω +/- 10% |
| **Duty cycle** | 10 sec ON / 90 sec OFF | 10 sec ON / 90 sec OFF |
| **Activation** | Power to close | Power to close |
| **Electrical Connector** | Metri-Pack, 280 Series<br>Female, 2 Pin (Delphi #15300027) | Metri-Pack, 280 Series<br>Female, 2 Pin (Delphi #15300027) |
| **Actuator Weight**<br>*(Cable Weighed Separately)* | 0.96 kg [2.1 lb] | 1.08 kg [2.4 lb] |

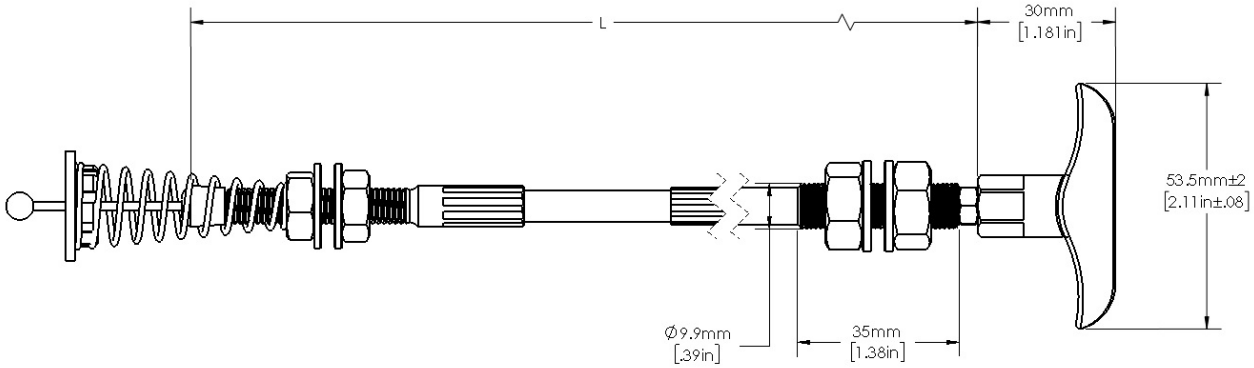
## Pneumatic Activation



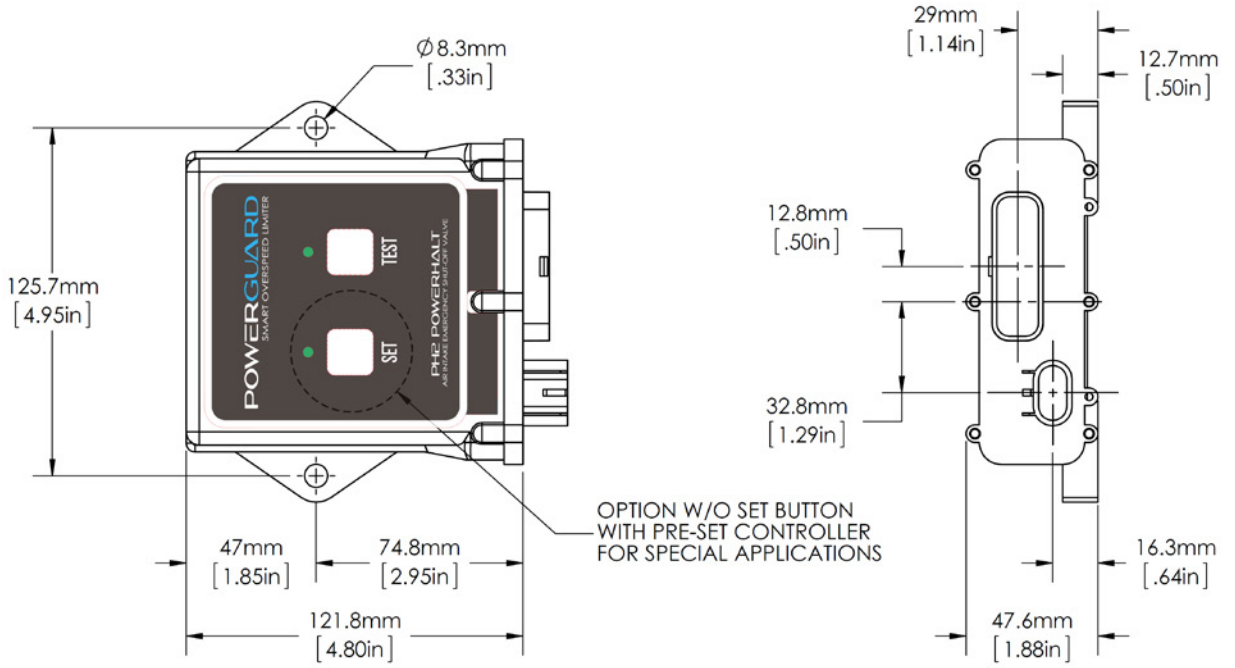

| | |
|---|---|
| **Minimum Air Supply Pressure for Activation** | 4.1 bar(gauge) [60 psig] |
| **Maximum Air Supply Pressure** | 10 bar(gauge) [145 psig] |
| **Pneumatic Cylinder Temperature Range** | -40°C to +70°C [-40°F to +158°F] |
| **Pneumatic Connection** | Tube: 6 mm OD, 4 mm ID, nylon, soft nylon, or polyurethane |
| **Air System Cleanliness** | Contaminant particle size < 40 µm [ .16 µin] |
| **Activation** | Provide pressure to close valve |
| **Actuator Weight** | 0.20 kg [0.44 lb] |

## Pull Cable




| | | | | | | |
|---|---|---|---|---|---|---|
| **Minimum Cable Bending Radius** | | 90 mm [3.54 in] | | | | |
| **Cable Lengths [L]** | **mm** | 610 | 1220 | 1830 | 2440 | 3050 |
| | **ft** | 2 | 4 | 6 | 8 | 10 |
| **Default Position** | | Handle retracted | | | | |
| **Cable Weight (Reference)** | | 0.29 kg [0.64 lb] for 1830 mm [6 ft] Length | | | | |
| **Total degrees of all bends** | | 360° maximum | | | | |
| **Through-hole size** | | 11 mm [7/16 in] | | | | |

## Digital Controller




| | |
|---|---|
| **Controller Housing Material Compliance** | J1455 (-40°C to +85°C) [-40 F to +185 F] |
| **Controller Voltage** | 12/24 VDC |
| **Maximum Relay Rating** | 20 A@28 VDC |
| **Power Consumption** | 30 mA max continuous |
| **Ingress Protection Rating** | IP67 |

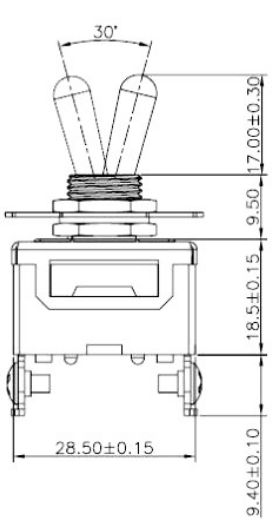
## Magnetic Pickup – Gear Tooth Sensor

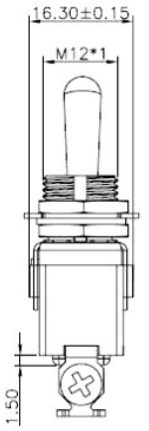
**Sizes Available**

| Thread Size | Length | Installation Torque |
|---|---|---|
| 3/8 - 24 UNF | 51 mm [2 in] | 5.1 ± 0.3 Nm [45 ± 3 in-lbf] |
| 3/8 - 24 UNF | 76 mm [3 in] | 5.1 ± 0.3 Nm [45 ± 3 in-lbf] |
| 5/8 - 18 UNF | 51 mm [2 in] | 25.8 ± 1.4 Nm [19 ± 1 ft-lbf] |
| 3/4 - 16 UNF | 64 mm [2.5 in] | 81.3 ± 2.7 Nm [60 ± 2 ft-lbf] |

| | |
|---|---|
| **Temperature Range** | -40°C to +105°C [-40°F to +221°F] |
| **Signal Output** | 0 VDC to 5 VDC TTL |
| **Connector** | Weather-Pack, Male, 3 Pin (Delphi # 12010717) |

## Toggle Switch

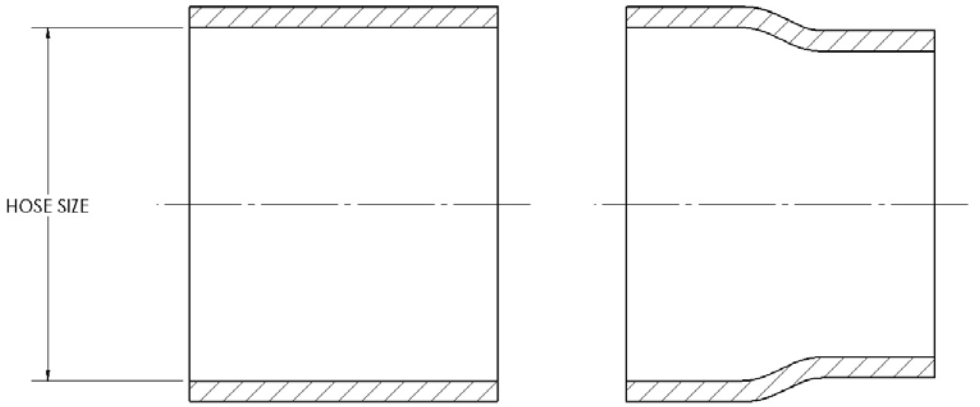




| | | |
|---|---|---|
| **Thru-Hole Drill Size** | | 12.7 mm [0.5 in] |
| **Temperature Rating** | | -25°C to +80°C [-13°F to +176°F] |
| **Current Rating** | **12 VDC** | 6.25 A |
| | **24 VDC** | 3.13 A |

## Hoses




| | |
|---|---|
| **Temperature Rating** | -55°C to +175°C [-67°F to +347°F ] |
| **Pressure Rating** | Conforms to SAE J20 (20R1 HD SW) |
| **Hose Sizes** | 63 mm to 140 mm [2.5 in to 5.5 in] |

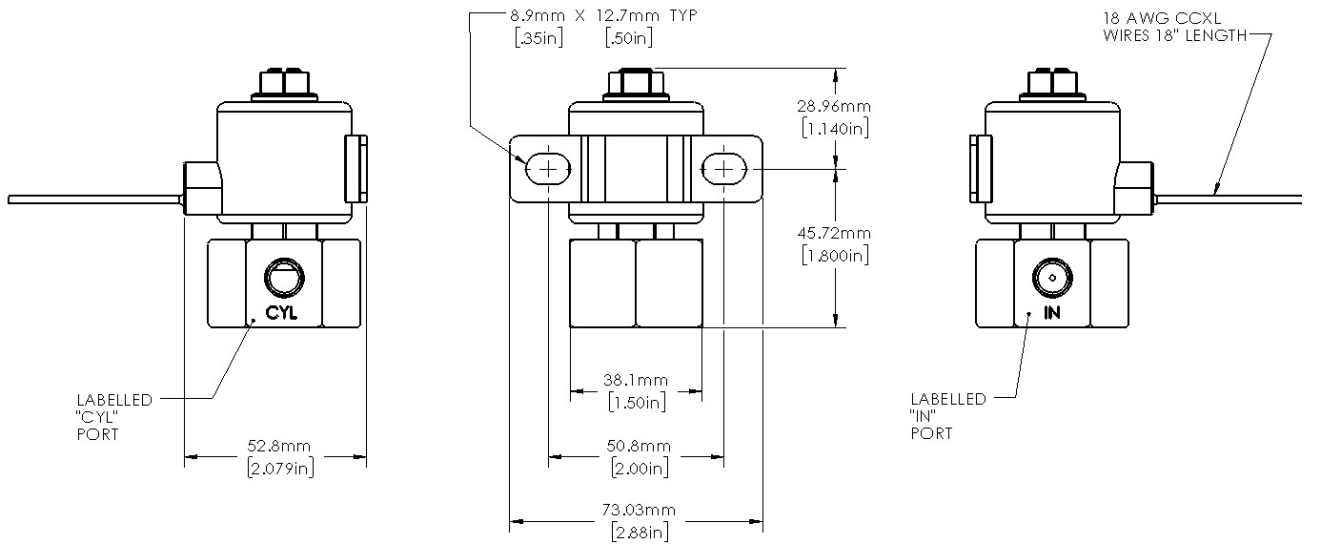
## Clamps

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Description** | Spring Loaded T-Bolt, Heavy Duty/ SAE J1508 Type SLTB | | | | | | | | | | | |
| | Clamp, spring loaded constant tension gear/SAE J1508 Type SLF | | | | | | | | | | | |
| **SAE Sizes** | 64 | 68 | 76 | 84 | 92 | 102 | 112 | 116 | 124 | 136 | 140 | 148 | 154 |
| **Size Range** | 73 mm to 152 mm [2.88 in to 6 in] | | | | | | | | | | | |
| **Installation Torque** | 7.9 Nm [70 in-lbf] | | | | | | | | | | | |

## Wiring Harness

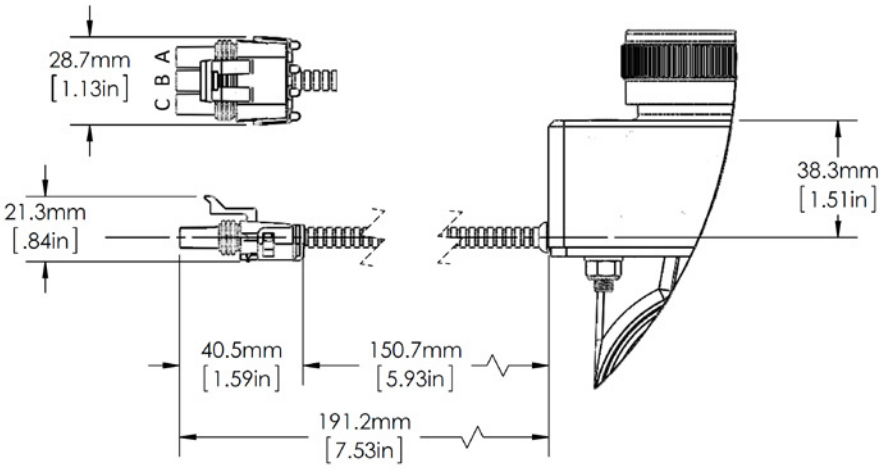
| | |
|---|---|
| **Temperature Rating** | -40°C to +85°C [-40°F to +185°F] |
| **Sealed Connectors** | Yes |

## Pneumatic Solenoid for Pneumatic Activation




| | | | |
|---|---|---|---|
| **Temperature Rating** | | -40°C to +85°C [-40°F to +185°F] | |
| **Air Pressure** | | 10.34 bar (gauge) [150 psig] max operating pressure | |
| **Nominal Voltage** | | 12 VDC | 24 VDC |
| **Current Rating** | | 1.5 A max | 0.8 A max |
| **Connector** | | Metri-Pack 280 (Delphi # 15300027) | |
| **Port thread** | **IN** | 1/8 NPT | |
| | **CYL** | 1/8 NPT | |

## Position Feedback Option




| **Pinout** | **A** = NC | **B** = COM | **C** = NO |
|---|---|---|---|
| **Current Rating** | 3.0 A @ 30 VDC | 3.0 A @ 125 VAC | |
| **Connector** | Weather-Pack, Female, 3 Pin (Delphi #12015793) | | |

## Applications

- Lighting Units
- Bulk Haulers
- Grain Processing Plants
- Refinery Processing
- Fueling Vehicles
- Pump Trucks
- Ambulances
- Tankers
- Cranes
- Vehicles
- Tow Vehicles
- Fire Trucks
- Lighting Trucks
- Power Generators
- Forklifts
- Underground Equipment
- Support Vehicles
- Vacuum Trucks
- Frack Trucks
- Drilling Rigs
- Work Boats
- Barges
- Welders

# PRODUCT LINE OPTIONS

## PH1

- 1.75" to 2.5" sizes available
- Compact and lightweight
- Low maintenance, pull cable valve

PowerHalt's PH1 is a cost-effective solution for your safety needs. This option is recommended when the operator works in close proximity to the equipment.


## PH2

- 2.8" to 5.5" sizes available
- Designed for extreme environments
- Rigorously tested, zero leakage

PowerHalt's PH2 comes with various control and actuation options that cover a broad range of industry applications and requirements. Custom kits are available for most pick-up truck applications.

## PH3

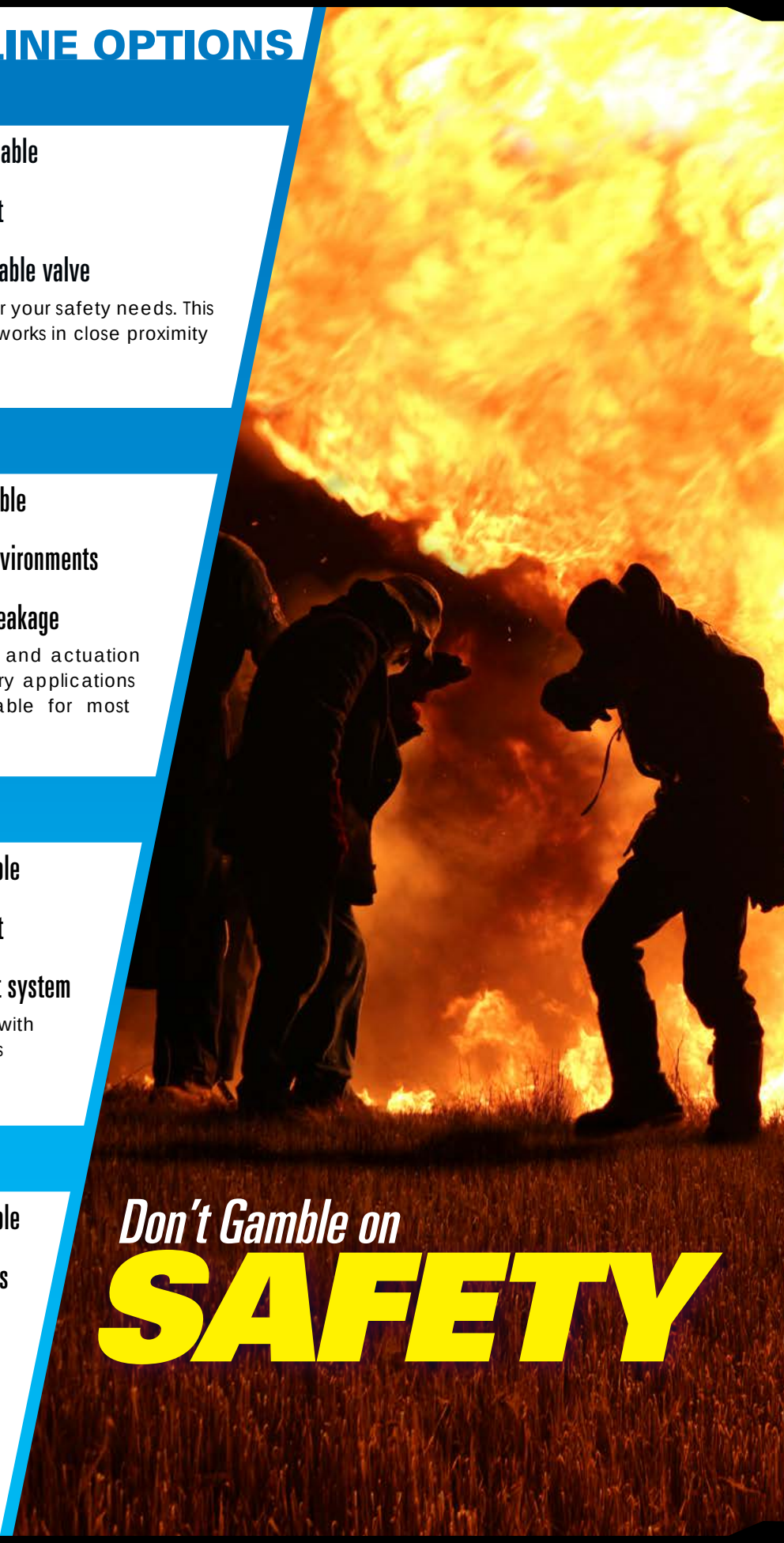
- 1.75" to 4" sizes available
- Compact and lightweight
- Maintenance free, Smart system

PowerHalt's PH3 offers hands-free operation with an electronic reset function as well as various control options.

## PH5

- 1.75" to 5" sizes available
- Operator friendly controls
- Rigorously tested

PowerHalt's PH5 is the newest member of the PowerHalt family. It is electrically activated and available in an automatic engine speed sensing mode or a manual control configuration.



# Diesel Engine Safety Overview

## IS YOUR SITE AT RISK?

*IT'S YOUR OBLIGATION TO PROVIDE A SAFE WORK SITE*

Oil and gas production, refining, petrochemical processing, and mining are all industries where flammable hydrocarbon emissions or leaks may occur in a diesel engine's operating environment.

If you work in or provide services to these industries and you are around a diesel engine, you need to be aware of the risk to your crew and equipment.

Diesel engines do not usually incorporate a throttle valve to limit air into the engine, as their speed is primarily driven by the rate of fuel flow. The risk occurs when the diesel engine is operating in an environment that contains airborne hydrocarbons or other combustibles. This can occur from any number of sources, such as gas pocket vents, fuel leaks, atomized oil spray, or even grain dust. In this state, the engine experiences uncontrolled combustion, which may lead to an overspeed condition and catastrophic engine failure or backfire. The risk continues to rise from there, as the engine's behavior can then translate to ignition of the local atmosphere, which has been shown to cause explosions. In addition to the potential for explosion, the equipment driven by the engine may also experience unpredictable behavior and become a risk to personnel in the vicinity.

Since the early 2000's, the North American oil and gas industry has seen dozens of deaths and hundreds of injuries related to diesel engine overspeed events. In that time period, the same industries have also lost hundreds of millions in equipment damage and financial losses. This is entirely preventable.

PowerHalt – Air Intake Emergency Shut off valve by Pacbrake will starve the engine of air: safely and effectively shutting it down, protecting your crew and equipment.

*If you run a diesel engine it has the potential to ingest combustible vapors.* ***Emergency air intake shut-off valves (also known as positive air shut-off valves) are the only safe way to shut down your engine during runaway conditions.***

*Your biggest challenge is to know your industry, application and risks...*

*The information below will help you define the industries and applications that can expose your diesel engines to these dangerous conditions:*

## INDUSTRY

- Oil & Gas
- Power Generation
- Transportation
- Petrochemical Processing
- Mining
- Fire Suppression
- Agriculture
- Marine
- Airport - Refueling
- Construction

## APPLICATIONS

- Lighting Units
- Ambulances
- Lighting Trucks
- Underground Equipment
- Bulk Haulers
- Tankers
- Power Generators
- Grain Processing Plants
- Drilling Rigs
- Cranes
- Forklifts
- Work Boats
- Refinery Processing
- Vehicles
- Frac Trucks
- Barges
- Fueling Vehicles
- Tow Vehicles
- Support Vehicles
- Welders
- Pump Trucks
- Fire Trucks
- Vacuum Trucks

# Understanding Your Application

## QUESTIONS AND CONSIDERATIONS

**Is this application operated offshore or on ground?**

- Offshore applications may have specific regulations for your equipment
- Corrosion is a concern for offshore applications so PowerHalt valves are all corrosion tested to ASTM B117 96Hrs Salt-Fog to ensure product longevity

**Can manual reset be achieved easily and without placing workers at risk?**

- Frequent safety checks may prove cumbersome when manually resetting the valve if it is difficult to access. Our electronic reset option is best suited to these applications
- Routing of the switch or pull cable is an important consideration to make. Pull cables are a great low cost option if your application and regulations allow

**Does your system have a compressed air source?**

- Pneumatically actuated valves require an air source of 60 psig (minimum) to 145 psig (maximum)

**Does your engine require dual shut-off valves? (This changes the specification for control)**

- Large V-engines may require two or more shut-off valves
- The automatic reset option is recommended to prevent incidents where only one valve is re-opened after a shutdown, preventing engine damage

**Does your application require auxiliary/multiple sources for activation in case of emergency?**

- The PowerHalt PH3 series can incorporate multiple auxiliary inputs from external sources for activation of the shut off valve in the event of an emergency
- Ideal for secondary emergency monitoring systems as well as multiple locations for manual override input

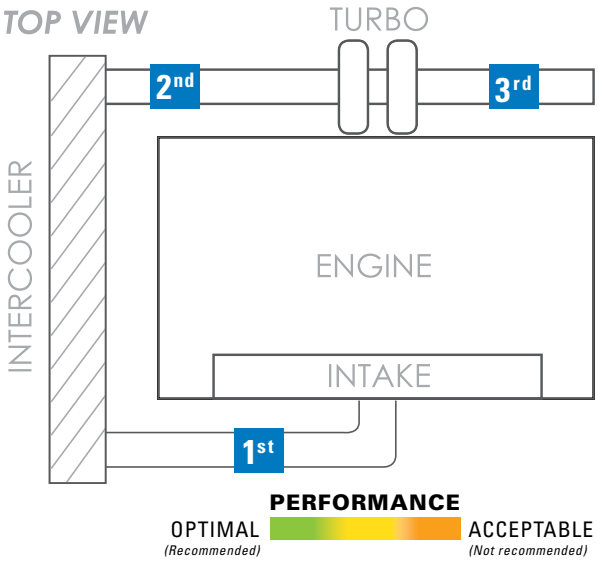
## VALVE INSTALLATION LOCATION

*In order of preferred location to least preferred*

### 1st POST INTERCOOLER
- Low Plumbing Leakage Risk
- Moderate Charge Air Temperature
- Fast Shutdown Response Time

### 2nd POST TURBO
- Moderate Plumbing Leakage Risk
- High Charge Air Temperature
- Moderate Shutdown Response Time

### 3rd PRE TURBO
- High Plumbing Leakage Risk
- Low Charge Air Temperature
- Slow Shutdown Response Time




## KIT CONTENTS

| | ACTUATION | RESET | Controller | Harness | Membrane Switch | Toggle Switch | Magnetic Pick-Up | Pneumatic Solenoid | Pull-Cable |
|---|---|---|---|---|---|---|---|---|---|
| PH1 | Pull-Cable | Manual | | | | | | | ✓ |
| PH2 | Automatic Electric | Manual | ✓ | ✓ | | ✓ | ✓ | | |
| | Automatic Pneumatic | Manual | ✓ | ✓ | | ✓ | ✓ | ✓ | |
| | Automatic Electric with Pull-Cable | Manual | ✓ | ✓ | | ✓ | ✓ | | ✓ |
| | Manual Electric | Manual | | ✓ | | ✓ | | | |
| | Manual Pneumatic | Manual | | ✓ | | ✓ | | ✓ | |
| | Manual Electric with Pull-Cable | Manual | ✓ | ✓ | | ✓ | ✓ | | ✓ |
| | Pull-Cable | Manual | | | | | | | ✓ |
| PH3 | Automatic Electric | Automatic/Manual | ✓ | ✓ | ✓ | | ✓ | | |
| | Manual Electric | Automatic | ✓ | ✓ | | ✓ | | | |
| PH5 | Automatic Electric | Manual | ✓ | ✓ | | ✓ | ✓ | | |
| | Manual Electric | Manual | | ✓ | | ✓ | | | |

# System Selection Guide

## CONTROL OPTIONS

### OPERATOR CONTROL
(MANUAL — PH3)

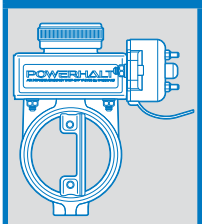
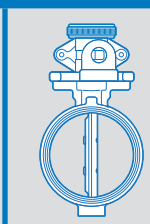
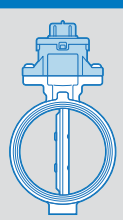
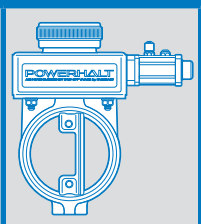
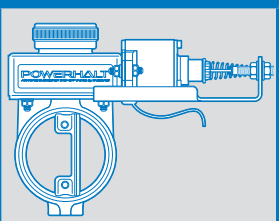
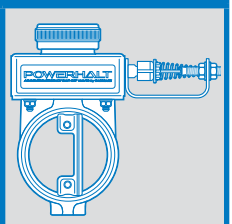
Manually controlled shut-off valves are more cost effective than automatic systems. However, they should only be used when the operator works in close proximity to the engine and has a clear, safe, and accessible location for shutdown activation during an emergency.


### POWERGUARD CONTROLLER
(AUTOMATIC— PH2/PH3/PH5)

This system provides hands-free activation of the shut-off valve. It has additional safety benefits by utilizing our PowerGuard controller and magnetic pick-up. This system includes a manual override for direct operation of the shut-off valve, which allows the operator to perform routine safety checks and tests.



## ACTUATION OPTIONS

| | ACTUATION OPTIONS | | | | | |
|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| **CONTROL OPTIONS AVAILABLE** | **Electric** (Pull Solenoid) | **Electric** (Pull Solenoid) | **Electric** (Actuator) | **Pneumatic** | **Electric** (Pull Solenoid) **+ Pull-Cable** | **Pull-Cable** |
| **Operator Control** *(Manual)* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **PowerGuard** *(Automatic)* | ✓ | ✓ | ✓ | ✓ | ✓ | |
| **AVAILABLE WITH** | PH2 | PH5 | PH3 | PH2 | PH2 | PH1, PH2 |

## RESET OPTIONS

### MANUAL RESET (PH1, PH2 & PH5)

- The knob must be manually turned to reset the valve
- Some safety procedures require this option

### ELECTRONIC RESET (PH3)

- The PowerHalt controller will electronically reset the shut-off valve, the operator will not have to turn a knob
- PH3 is available to be configured in manual reset mode, to be in compliance with CSA B621-14 and B622-14

# COMPONENT OVERVIEW

## POWERGUARD CONTROLLER


- Monitors engine speed and activates the shut-off valve, shutting down the engine, when the user-set trip speed is reached (automatic applications only)
- Digital micro processor

## PULL CABLE WITH FACEPLATE


- Stainless steel high quality pull cables are pre-assembled for easy installation and safety
- Braided lines capable of a tight radius
- Red T-handle with large nameplate for easy location

## MEMBRANE SWITCH


- Low profile membrane switch with trip, test and reset functions and LED lights

## HARNESS

- Custom plug and play wiring harness with weather tight connectors

## TOGGLE SWITCH


- Military style toggle switch with safety cover plate to prevent false trip hazards
- Provides a means to shut down the engine or to test the valve

## MOUNTING KITS

- The mounting kit comes with the appropriate mounting group to include 2 hoses and 4 clamps, ensuring a successful installation into your system
- Adapters and piping are also available as separate options

## MAGNETIC PICK UP

- Measures flywheel RPM and sends a signal to the PowerGuard controller to shut down the engine when engine runaway occurs
- Various thread sizes available
- Robust designs for extreme working environments

## PNEUMATIC SOLENOID

- Auto vent to allow for quick release of air pressure
- Available in 12VDC and 24VDC
- OEM grade solenoid with millions in service to-date