L8004 PH3 AIR INTAKE EMERGENCY SHUT-OFF VALVE DATASHEET

Pacbrake PowerHalt 3 Air Intake Emergency Shut-Off Valve is an electronically controlled emergency engine shut down system which forces engine shut down by blocking an engine's air intake path. It is available in an automatic engine speed sensing model where shutdown occurs if engine speed exceeds a trip speed (or by manual override). Alternatively, a manual activation only configuration is available where an operator or external input will activate emergency engine shut-down. The valves electronically return to open position after emergency engine shutdown, all while providing feedback to the operator that the valve is held closed via illuminated toggle switch or panel indicator light.

Product Highlights

- 12 and 24 VDC system compatible
- Reliable and safe emergency shut down for diesel engines
- Operator friendly fully automatic operation with manual override
- Enclosed drive system is debris and corrosion resistant
- Aluminum flap and housing for durable seal
- High temperature design for challenging thermal applications
- In compliance with CSA B621-14 & B622-14
- Corrosion tested to ASTM B117 – 96 hours Salt Fog
- Rated for 18.6G_{RMS} vibration (7.7G_{RMS} for 5" bore)
- Robust design – designed to pass 100k+ fatigue cycles
- IP 66 rated valve motor
- Low power consumption with smart control
- Supports multiple trip input sources
- Auxiliary trip inputs available (PowerGuard Automatic and Manual)
- Compatible with hall effect and VR sensors (PowerGuard Automatic)
- Secondary pre-set speed for Power Take Off (PTO) applications (PowerGuard Automatic)

Applications

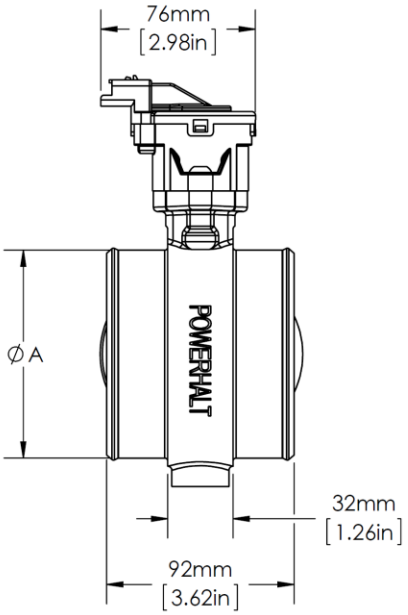
- Bulk Haulers
- Grain Processing Plants
- Refinery Processing
- Fueling Vehicles
- Pump Trucks
- Lighting Units
- Tankers
- Cranes
- Vehicles
- Tow Vehicles
- Fire Trucks
- Frac Trucks
- Power Generators
- Forklifts
- Underground Equipment
- Support Vehicles
- Vacuum Trucks
- Drilling Rigs
- Work Boats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

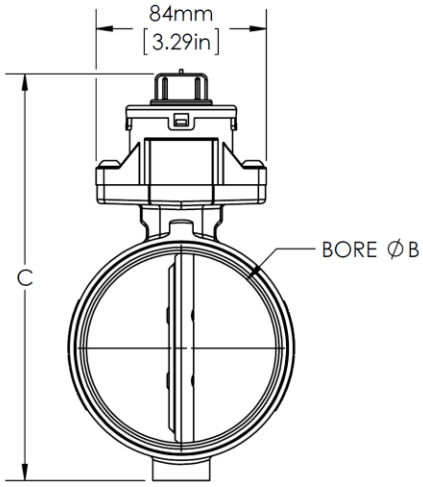
Valve

Maximum Intake Boost Air Pressure	3.45 bar (gauge) [50 psig]
Continuous Intake Air Temperature	-55°C to +175°C [-67°F to +347°F]
Ambient Temperature Range	-40°C to +120°C [-40°F to +248°F]

Resting Position	Valve open
Activated Position	Valve closed

Standard Mounting Flanges	Hose to Hose
Pipe Sizes Supported	Ø38 mm to Ø114 mm [Ø1.5 in to Ø4.5 in]

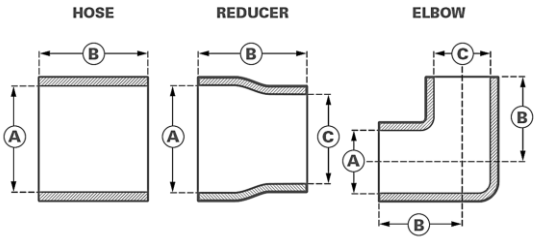




Part Number	Dimension			Weight
	'A' - Hose Bore Diameter	'B' - Valve Bore Diameter	'C' - Height	
C50087	44.5 mm [1.75 in]	35.5 mm [1.40 in]	149 mm [5.87 in]	0.75 kg [1.7 lbs]
C50088	51 mm [2.0 in]	42 mm [1.65 in]	149 mm [5.87 in]	0.73 kg [1.6 lbs]
C50089	57 mm [2.25 in]	48 mm [1.89 in]	149 mm [5.87 in]	0.71 kg [1.6 lbs]
C50097	64 mm [2.5 in]	55 mm [2.17 in]	170 mm [6.69 in]	0.90 kg [2.0 lbs]
C50096	70 mm [2.75 in]	61 mm [2.40 in]	170 mm [6.69 in]	0.87 kg [1.9 lbs]
C50090	76 mm [3.0 in]	67 mm [2.64 in]	170 mm [6.69 in]	0.84 kg [1.8 lbs]
C50098	89 mm [3.5 in]	80 mm [3.15 in]	200 mm [7.87 in]	1.1 kg [2.4 lbs]
C50086	102 mm [4.0 in]	93 mm [3.66 in]	200 mm [7.87 in]	1.0 kg [2.2 lbs]

PowerHalt Accessories

Hoses



Description Silicone Class “A”, 4 Ply Polyester Reinforced

Temperature Rating -55°C to +175°C [-67°F to +347°F]

Pressure Rating Conforms to SAE J20 (20R1 HD SW)

Part Number	Hose Type	Dimensions		
		‘A’ – Diameter	‘B’ – Hose Length	‘C’ – Diameter
C3912	Straight	44.5mm [1.75 in]	76.2 mm [3.0 in]	N/A
C3913	Straight	50.8 mm [2.0 in]	76.2 mm [3.0 in]	N/A
C3914	Straight	57.2 mm [2.25 in]	76.2 mm [3.0 in]	N/A
C3997	Straight	63.5 mm [2.5 in]	76.2 mm [3.0 in]	N/A
C3784	Straight	69.9 mm [2.75 in]	76.2 mm [3.0 in]	N/A
C3828	Straight	76.2 mm [3.0 in]	76.2 mm [3.0 in]	N/A
C3789	Straight	88.9 mm [3.0 in]	76.2 mm [3.0 in]	N/A
C3859	Straight	88.9 mm [3.5 in]	101.6 mm [4.0 in]	N/A
C3792	Straight	101.6 mm [4.0 in]	76.2 mm [3.0 in]	N/A
C3797	Straight	127 mm [5.0 in]	76.2 mm [3.0 in]	N/A
C5009	Straight	139.7 mm [5.5 in]	76.2 mm [3.0 in]	N/A
C4070	Reducer	44.5 mm [1.75 in]	76.2 mm [3.0 in]	38.1 mm [1.5 in]
C3835	Reducer	69.9 mm [2.75 in]	76.2 mm [3.0 in]	44.5 mm [1.75 in]
C3783	Reducer	69.9 mm [2.75 in]	76.2 mm [3.0 in]	63.5 mm [2.5 in]
C3786	Reducer	76.2 mm [3.0 in]	76.2 mm [3.0 in]	69.9 mm [2.75 in]
C3866	Reducer	88.9 mm [3.5 in]	76.2 mm [3.0 in]	63.5 mm [2.5 in]
C3831	Reducer	88.9 mm [3.5 in]	76.2 mm [3.0 in]	69.9 mm [2.75 in]
C3788	Reducer	88.9 mm [3.5 in]	76.2 mm [3.0 in]	76.2 mm [3.0 in]
C3860	Reducer	88.9 mm [3.5 in]	76.2 mm [3.0 in]	82.6 mm [3.25 in]
C3861	Reducer	95.3 mm [3.75 in]	76.2 mm [3.0 in]	88.9 mm [3.5 in]
C3791	Reducer	101.6 mm [4.0 in]	76.2 mm [3.0 in]	88.9 mm [3.5 in]
C3862	Reducer	101.6 mm [4.0 in]	76.2 mm [3.0 in]	95.3 mm [3.75 in]
C3863	Reducer	108 mm [4.25 in]	76.2 mm [3.0 in]	101.6 mm [4.0 in]
C3794	Reducer	114.3 mm [4.5 in]	76.2 mm [3.0 in]	101.6 mm [4.0 in]
C3796	Reducer	127 mm [5.0 in]	76.2 mm [3.0 in]	114.3 mm [4.5 in]
C3864	Reducer	127 mm [5.0 in]	76.2 mm [3.0 in]	120.7 mm [4.75 in]
C3865	Reducer	133.4 mm [5.25 in]	76.2 mm [3.0 in]	127 mm [5.0 in]
C3799	Reducer	139.7 mm [5.5 in]	76.2 mm [3.0 in]	127 mm [5.0 in]
C3832	120° Elbow	69.9 mm [2.75 in]	127 mm [5.0 in]	69.9 mm [2.75 in]
C3857	90° Elbow	76.2 mm [3.0 in]	127 mm [5.0 in]	69.9 mm [2.75 in]
C3834	90° Elbow	88.9 mm [3.5 in]	127 mm [5.0 in]	69.9 mm [2.75 in]
C3829	90° Elbow	88.9 mm [3.5 in]	127 mm [5.0 in]	76.2 mm [3.0 in]

Clamps

Description Stainless Steel, Constant Tension Gear Clamp, Heavy Duty
Standard SAE J1508 Type SLHD
Size Range 45 mm to 80 mm [1.75 in to 3.13 in]
Installation Torque 8.5± 0.6 Nm [75 ± 5 in-lbf]

Part Number	SAE Size	Minimum Diameter	Maximum Diameter	Band Width
C3975	262	44.5 mm [1.75 in]	66.7 mm [2.625 in]	15.9 mm [0.625 in]
C3976	312	57.2 mm [2.25 in]	79.4 mm [3.125 in]	15.9 mm [0.625 in]

Description Stainless Steel, Spring Loaded T-Bolt Clamp, Heavy Duty
Standard SAE J1508 Type SLTB
Size Range 70 mm to 152 mm [2.75 in to 6 in]
Installation Torque 8.5± 0.6 Nm [75 ± 5 in-lbf]

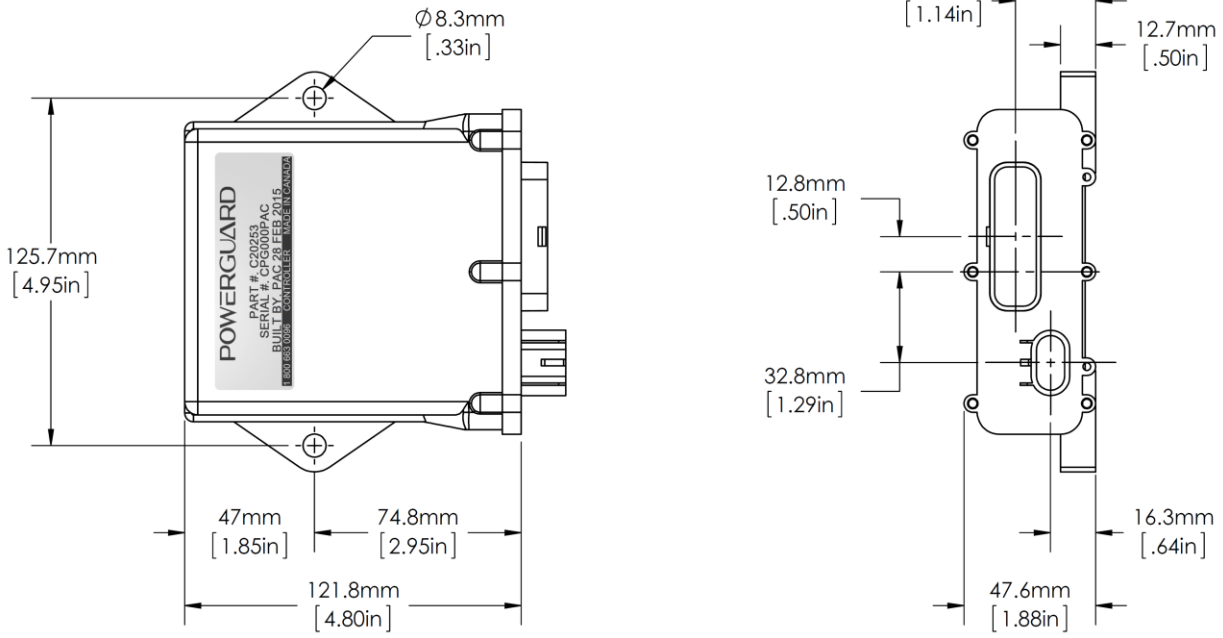
Part Number	SAE Size	Minimum Diameter	Maximum Diameter	Band Width
C3871	60	69.9 mm [2.75 in]	77.8 mm [3.063 in]	19.1 mm [0.75 in]
C3872	68	76.2 mm [3.0 in]	84.1 mm [3.313 in]	19.1 mm [0.75 in]
C3873	76	82.6 mm [3.25 in]	90.5 mm [3.563 in]	19.1 mm [0.75 in]
C3874	84	88.9 mm [3.5 in]	96.8 mm [3.813 in]	19.1 mm [0.75 in]
C3875	92	95.3 mm [3.75 in]	103.2 mm [4.063 in]	19.1 mm [0.75 in]
C3977	96	98.4 mm [3.875 in]	106.4 mm [4.188 in]	19.1 mm [0.75 in]
C3876	102	103.2 mm [4.063 in]	111.1 mm [4.375 in]	19.1 mm [0.75 in]
C3877	104	104.8 mm [4.125 in]	112.7 mm [4.438 in]	19.1 mm [0.75 in]
C3878	116	114.3 mm [4.5 in]	122.2 mm [4.813 in]	19.1 mm [0.75 in]
C3879	124	120.7 mm [4.75 in]	128.6 mm [5.063 in]	19.1 mm [0.75 in]
C3880	136	130.2 mm [5.125 in]	138.1 mm [5.438 in]	19.1 mm [0.75 in]
C3881	140	133.4 mm [5.25 in]	141.3 mm [5.563 in]	19.1 mm [0.75 in]
C3882	148	139.7 mm [5.5 in]	147.6 mm [5.813 in]	19.1 mm [0.75 in]
C3883	154	144.5 mm [5.688 in]	152.4 mm [6.0 in]	19.1 mm [0.75 in]

PowerGuard Automatic Control

PowerGuard Automatic Control monitors engine speed through a gear tooth sensor mounted to the transmission bell housing using an existing auxiliary port or by drilling and tapping a new port. The controller has a programmable trip speed – when the programmed trip speed is exceeded, emergency engine shutdown will occur automatically. Emergency shutdown can be activated at any time through a manual override button. All control and programming is completed using a membrane switch mounted in a vehicle's cab or on a control panel. An auxiliary input harness is available to expand systems to utilize external trip input signals or switches.

- Automatically activates after programmable engine trip speed is exceeded
- Manual override, programming, and valve position feedback from cab/panel mounted membrane switch
- Valve automatically resets 30 seconds after close by default. Behaviour can be altered to remain closed until manually reset by operator and achieve compliance with CSA B621-14 & B622-14.
- Secondary trip speed for PTO applications. Providing ground to the PTO input allows users to engage a second emergency shut-down speed for use while powering auxiliary equipment. To prevent accidental shut down while enabling and disabling PTO, a 5 second grace period is applied when switching to a lower trip speed, to allow for engine speed to reduce. When switching to a higher trip speed, the change is applied immediately.

Controller



Part Number	C20253
Controller Housing Material Compliance	SAE J1455 (-40°C to 85°C [-40°F to +185°F])
Controller Voltage	12/24 VDC (9 to 30 VDC)
Control Method	PID, PWM, H-Bridge
Power Consumption (Idle)	35 mA max continuous, nominal
Power Consumption (Valve Actuated)	6.5 A continuous, nominal

Gear Tooth Sensor (Magnetic Pickup)

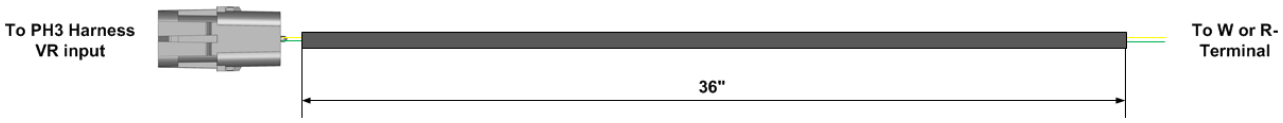
Temperature Range	-40°C to +105°C [-40°F to +221°F]
Signal Output	0 to 5 VDC TTL
Connector	Weather-Pack, Male, 3 Pin

Sizes Available:

Part Number	Thread Size	Available Sensor Lengths	Installation Torque
C50032, C50095	3/8 - 24 UNF	51 mm, 76 mm [2 in, 3 in]	5.1 ± 0.3 Nm [45 ± 3 in-lbf]
C50033, C50279	5/8 - 18 UNF	51 mm, 64 mm [2 in, 2.5 in]	25.8 ± 1.4 Nm [19 ± 1 ft-lbf]
C50034	3/4 - 16 UNF	64 mm [2.5 in]	81.3 ± 2.7 Nm [60 ± 2 ft-lbf]

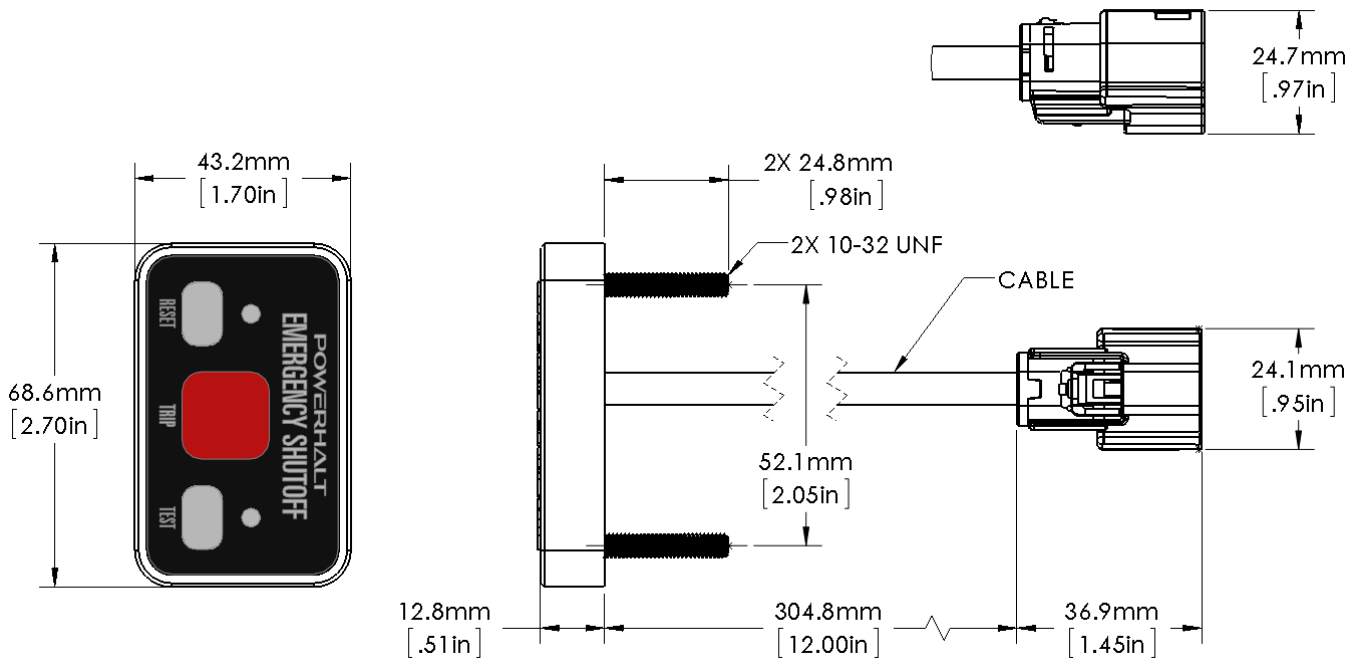
W or R-Terminal

The PowerHalt PH3 R or W-Terminal kit is an addition to the PH3 system that utilizes a Variable Reluctance (VR) sensor to read engine speed to determine proper and safe shut down event. Alternative to a VR sensor is to measure on the R or W-Terminal on an automotive engine's alternator stator tap. The output is used as a tachometer signal with AC voltage waveform similar to that of a VR sensor. The benefit of using the alternator output reduces the need for an external sensor, as the installation process is greatly simplified.



Part Number	C20592
Temperature Range	-40°C to +105°C [-40°F to +221°F]
Environmental Resistance	Fuel, oil, and solvent compatible
Voltage Rating	60V

Membrane Switch

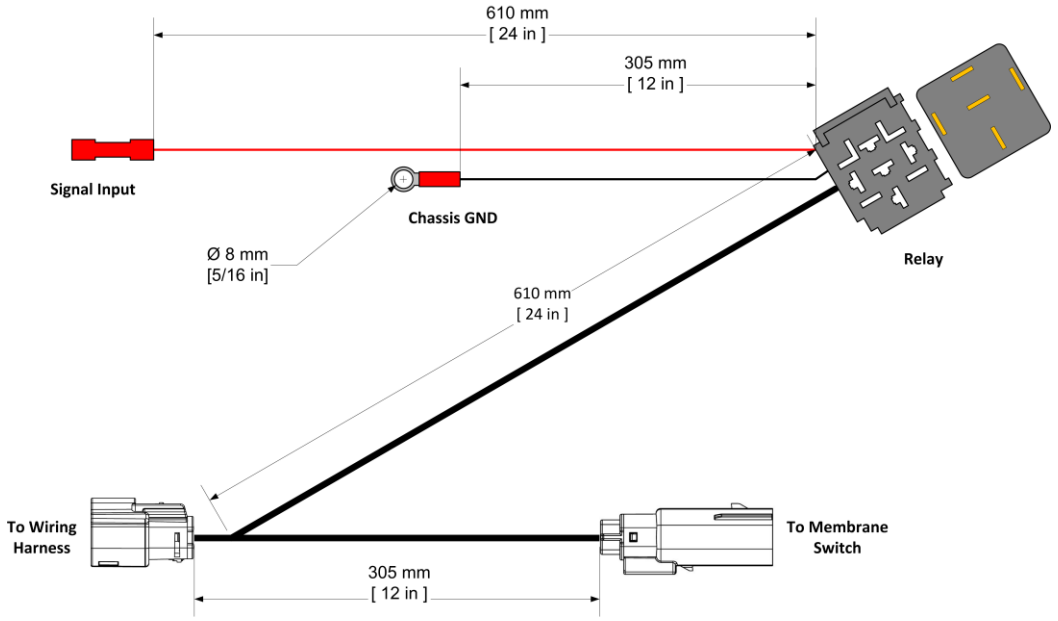


Part Number	C20541
Electrical Connector Hole Drill Size	28.5 mm [1.125 in]
Mounting Hole Drill Size	6.4 mm [.25 in]
Temperature Rating	-25°C to +80°C [-13°F to +176°F]
Installation Torque	2.25 ± 0.5 Nm [20 ± 5 in-lbf]

Auxiliary Trip Input Harness

- Expands the standard PowerGuard Automatic wiring harness to allow for an external trip signal (emergency shut down will be activated when 12 VDC or 24 VDC voltage is supplied)
- Integrates in-line with membrane switch and wiring harness connection

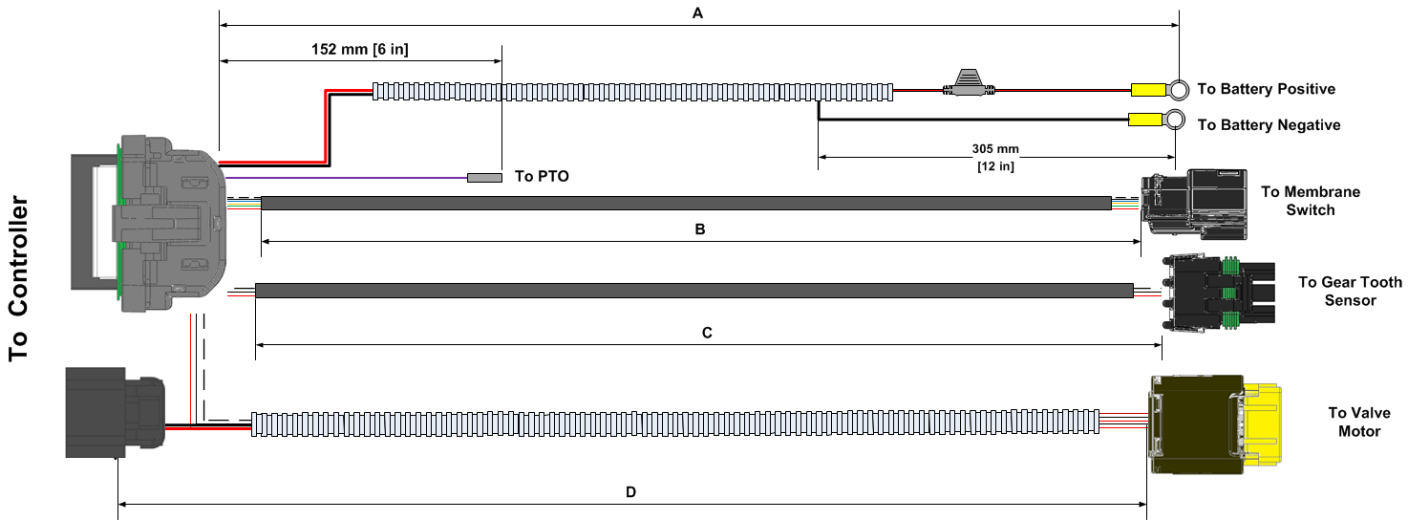
Temperature Rating (Continuous)	-40°C to +105°C [-40°F to +221°F]
Switching Response Time	50 ms
Environmental Resistance	Fuel, oil, and solvent compatible
Wiring	SAE J1128, Tinned Copper Conductor



Part Number	C50159 (12V)	C50159-24 (24V)
Signal Voltage, Nominal	12 VDC	24 VDC
Current Source/Sink Requirement	300 mA	480 mA

Wiring Harness

Temperature Rating (Continuous)	-40°C to +105°C [-40°F to +221°F]
Sealed Connectors	Yes
Flammability Rating	FT2
RoHS Compliant	Yes
Environmental Resistance	Fuel, oil, and solvent compatible
Wiring	SAE J1128, Tinned Copper Conductor



Part Number	Dimension				Engine RPM Speed Sensor	Speed Sensor Connector
	A	B	C	D		
C20544	1245 mm [49 in]	1220 mm [48 in]	1370 mm [57 in]	1550 mm [61 in]	Hall Effect	Delphi (3 Pins)
C20535	3251 mm [128 in]	2745 mm [108 in]	3353 mm [132 in]	3175 mm [125 in]		
C20594	1245 mm [49 in]	1220 mm [48 in]	1370 mm [57 in]	1550 mm [61 in]	VR	Delphi (2 Pins)
C20534	3251 mm [128 in]	2745 mm [108 in]	3353 mm [132 in]	3175 mm [125 in]		
C20543	1245 mm [49 in]	1220 mm [48 in]	1370 mm [57 in]	1550 mm [61 in]	VR, T-Connection	
C20567	3251 mm [128 in]	2745 mm [108 in]	3353 mm [132 in]	3175 mm [125 in]	VR	Deutsch (2 Pins)
C20538	3050 mm[120 in]	1780 mm[70 in]	1270 mm [50 in]	2415 mm [95 in]	OEM Signal Input	Wire Only
C20551	1245 mm [49 in]	1220 mm [48 in]	N/A	2160 mm [85 in]	None	N/A

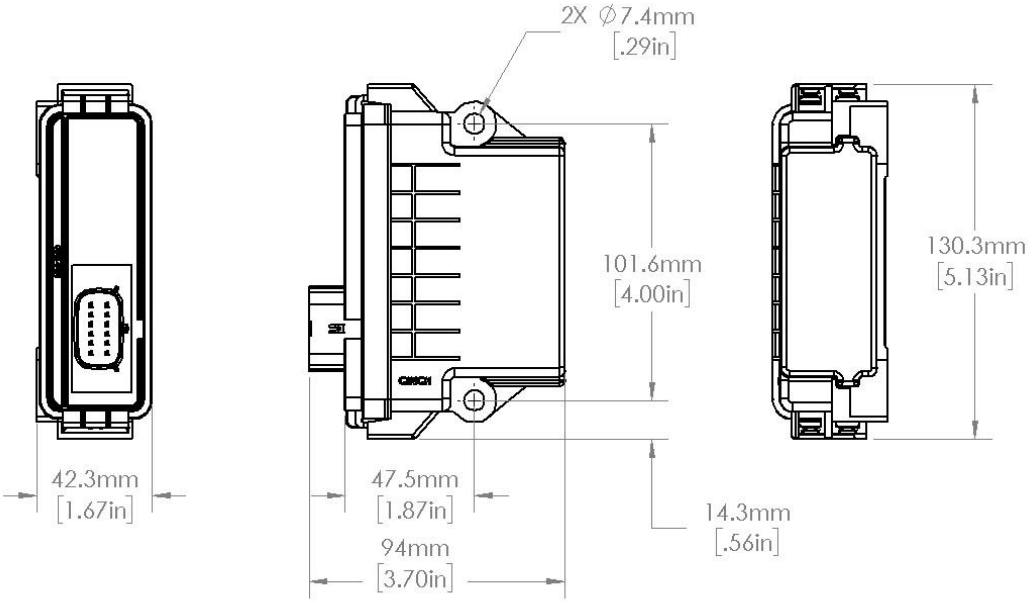
PowerGuard Manual Control

The PH3 PowerGuard Manual Control system is designed to activate a PH3 Air Intake Shut-Off Valve when an operator manually activates the emergency trip switch. The valve will remain closed for minimum 15 seconds after the trip switch is released; then the valve automatically resets itself. A supplied indicator light will illuminate when the valve is held closed to indicate that the engine cannot yet be started.

Controller (Second Generation)

Feature Overview

- Plug-n-Play wiring harnesses for easy install
- Compatible with both 12 VDC and 24 VDC systems
- Manual Trip Input accepts input range from 8 VDC to 32 VDC
- Fused switch power line to protect against faults
- Auxiliary output to connect external indicator light (included in kit)
- Valve remains closed for as long as switch held, up to a maximum 60 seconds

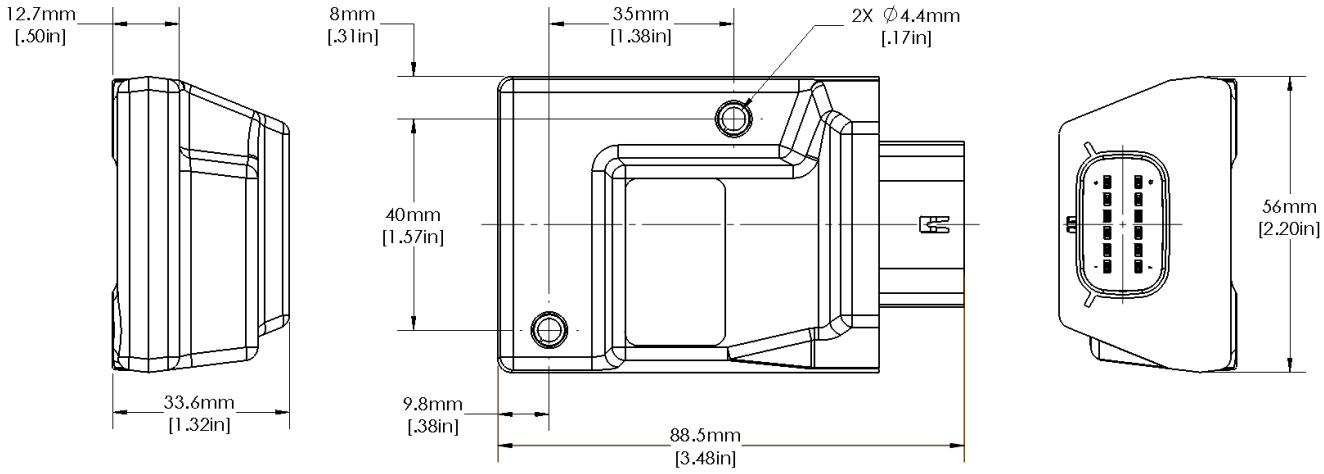


Part Number	C20644
Controller Voltage	12/24 VDC nominal (9 to 32VDC)
Seal Rating	IP67 / IP69K
Valve Actuation Duration	15 seconds min, 60 seconds max
Current Consumption (Idle/Active)	11 mA / 6.5A Nominal
Lamp output (AUX)	V-batt (12V / 24V) 130mA
Control Method	PWM, Open Loop
Installation Torque	3.39 ± 0.56 Nm [30 ± 5 in-lb]
Rated Service Temperature	-40°C to +85°C [-40°F to +185°F]

Controller (First Generation)

Feature Overview

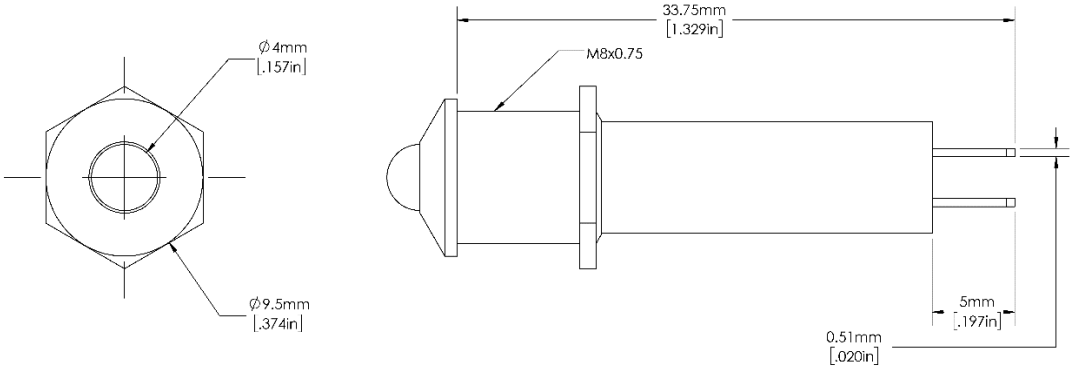
- Designed specifically for 12V Systems
- Compact IP67 rated controller design (potted)
- Lamp output to connect external Indicator Light (included in kit)
- Selectable 15 seconds or 30 seconds (default) valve activation duration



Part Number	C20576
Controller Voltage	12VDC, nominal (10.8VDC to 14VDC)
Seal Rating	IP67
Valve Actuation Duration	15 seconds or 30 seconds (default)
Current Consumption (Idle/Active)	10 mA/4.9 A, nominal
Installation Torque	3.39 ± 0.56 Nm [30 ± 5 in-lb]
Rated Service Temperature	-40°C to +85°C [-40°F to +185°F]

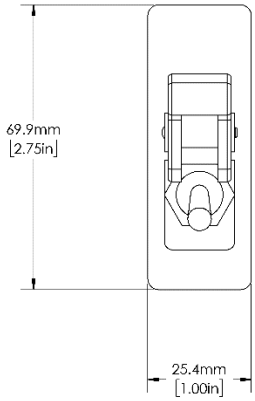
Panel Indicator Light

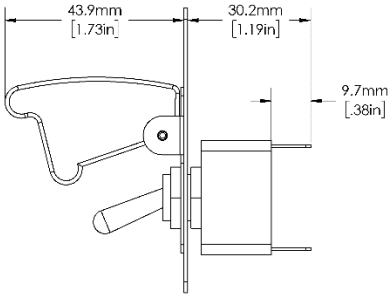
Temperature Rating	-40°C to +85°C [-40°F to +185°F]
Supply Voltage	12VDC, nominal
Connection	Quick Connect Terminals



Part Number	Voltage	Thru-Hole Drill Size	Connection	Max Mounting Panel Thickness
C11313	12V	8 mm [0.315 in]	2.79 mm x 0.5 mm [0.11 in x 0.02 in] quick connect terminals	6.75 mm [0.266 in]
C11313-24	24V			

Toggle Switch, Toggle Guard, Label





C50274

Temperature Range	-25°C to +80°C [-13°F to +176°F]
Signal Voltage	12/24 VDC, nominal

Illuminated Toggle Switch (Optional)

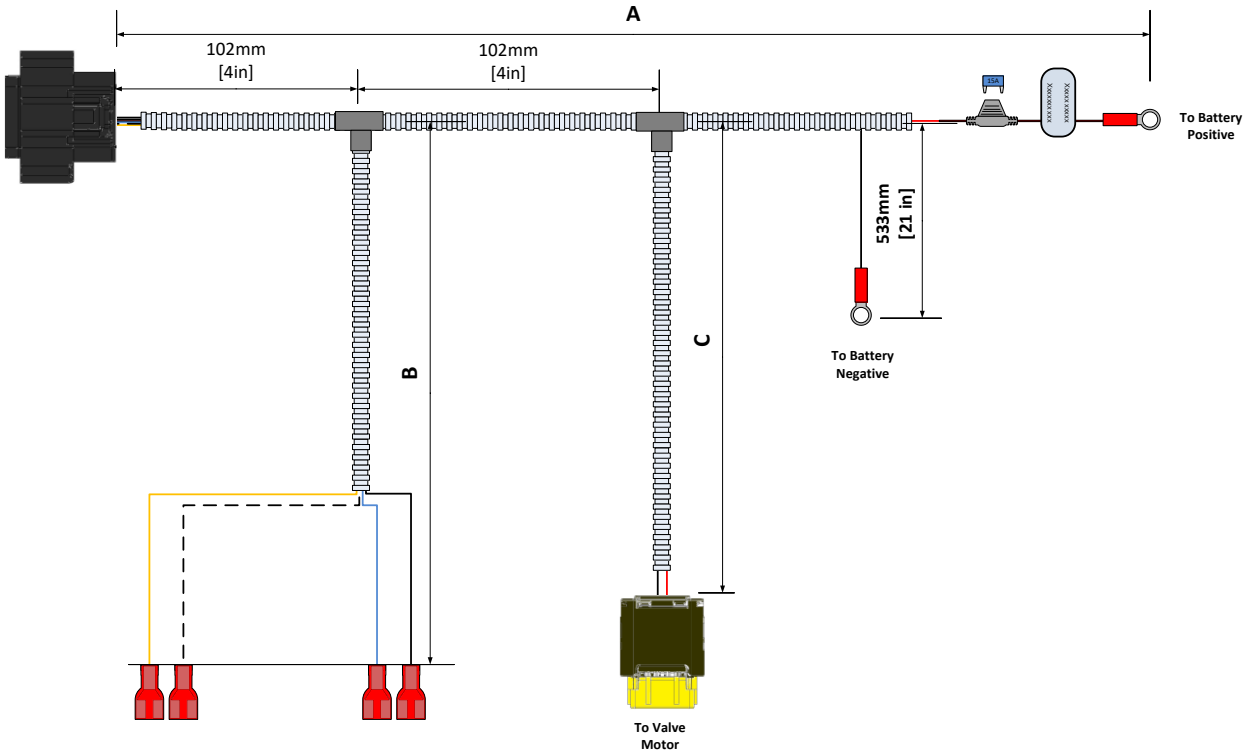
C50276

Temperature Range	-40°C to +85°C [-40°F to +185°F]
Signal Voltage	12/24 VDC, nominal
Illuminated Switch Lamp Voltage	12 VDC

Part Number	Thru-Hole Drill Size	Max Mounting Panel Thickness	Current Rating		Note
C50274	12.7 mm [0.5 in]	6.75 mm [0.266 in]	6.25 A @ 12 VDC	3.13 A @ 24 VDC	Regular Switch Hardware Subgroup
C50276	12.7 mm [0.5 in]	4.16 mm [0.164 in]	10 A @ max. 30VDC		Illuminated Switch Hardware Subgroup

Wiring Harness (Second Generation)

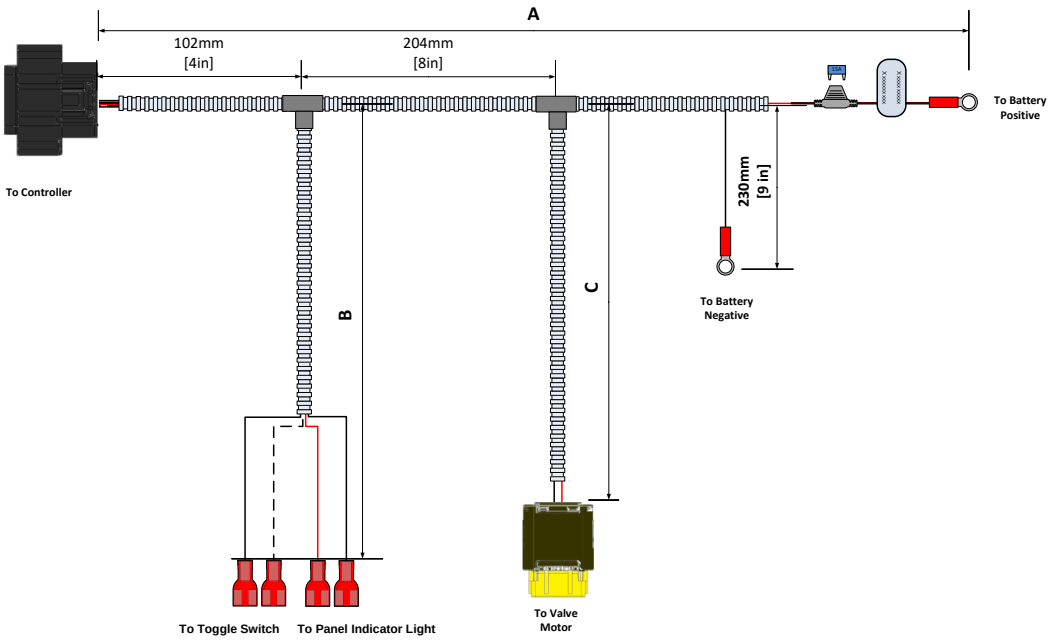
Temperature Rating (Continuous)	-40°C to +105°C [-40°F to +221°F]
Sealed Connectors	Yes
Flammability Rating	FT2
RoHS Compliant	Yes
Environmental Resistance	Fuel, oil, and solvent compatible
Wiring	SAE J1128, Tinned Copper Conductor



Part Number	Dimension		
	A	B	C
C20674	1525 mm [60 in]	1422 mm [56 in]	1475 mm [52 in]
C20675	3050 mm [120 in]	2946 mm [116 in]	2845 mm [112 in]
C20676	4572 mm [180 in]	4470mm [176 in]	4369mm [172 in]

Wiring Harness (First Generation)

Temperature Rating (Continuous)	-40°C to +105°C [-40°F to +221°F]
Sealed Connectors	Yes
Flammability Rating	FT2
RoHS Compliant	Yes
Environmental Resistance	Fuel, oil, and solvent compatible
Wiring	SAE J1128, Tinned Copper Conductor



Part Number	Dimension		
	A	B	C
C20674	3050 mm [120 in]	2920 mm [115 in]	2720 mm [107 in]
C20675	1525 mm [60 in]	1475 mm [58 in]	1475 mm [58 in]

Wiring Diagram (Typical Setup)