PYROBAN®

SVH Air Shut-Off Valves

Pneumatically, Hydraulically & Electrically
Actuated Valves for Diesel Engines.

Selection - Installation - Maintenance

Document No. COM001 Issue 9

1.0 Contents

2.0 Introduction

The SVH range of butterfly Valves is designed for diesel engine shutdown preventing "over-speeding" should the engine ingests flammable gasses.

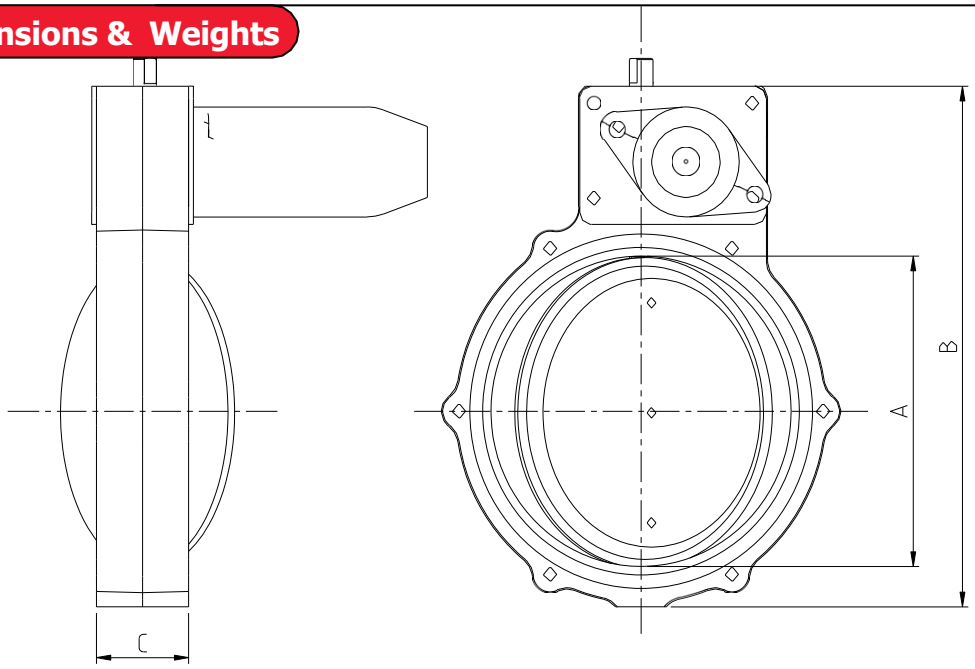
The design includes a metal to metal plate seal and high temperature bearings for turbo-charged or intercooled engines (max air temperature 150ºC). The slim butterfly design has a low pressure drop avoiding loss in engine power.

SVH Valve bodies are cast aluminium and are further protected from corrosion by anodising with PTFE impregnation. Other SVH Valve parts are made from corrosion resistant stainless steel.

There are numerous build configurations to suit a wide range of hazardous and non- hazardous applications including a choice of 3" or 5" SVH Valve sizes, and electric/pneumatic or hydraulic actuation.

SVH Valves can be supplied in basic form, with hose ends or with an integral flame trap for the 3" and 5" versions.

3.0 Dimensions & Weights



VALVE SIZE (INCHES)	A (mm)	B (mm)	C (mm)	Hole Pattern	Weight (kg)
3	76	162	39	4off dia6.5 on 98 PCD	1.4
5	127	213	39	6off dia6.5 on 154PCD	2.7

4.0 Marking & Specifications

Hazardous Area Electric Valve with Junction Box 12V/24V

Ex db eb IIC T4 Gb

Ex tb IIIC T135°C Db
BSEN 80079-36:2016 Non-Electrical Safety
BSEN 60079-0: 2018 General Requirements
BSEN 60079-1:2014 Flameproof Protection
BSEN 60079-7:2015 Increased Safety Protection
BSEN 60079-31:2014 Dust Protection
IECEx approvals to above equivalent standards
ATEX 2014/34/EU Approval
UK SI 2016 No.1107 Approval
May be used in a NORSOK Z-10 compliant system

The lid to the junction box includes the warning:
DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT
All flamepath dimensions comply with Standard EN 60079-1:2014 Table 2

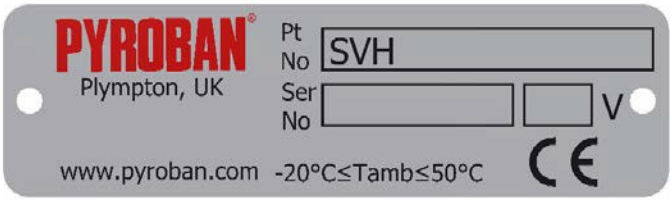
Hazardous Area Electric Valve with Flying Leads 12V/24V

Ex db IIC T4 Gb
Ex tb IIC T135°C Db
BSEN 80079-36:2016 Non-Electrical Safety
BSEN 60079-0: 2018 General Requirements
BSEN 60079-31:2014 Dust Protection
IECEx approvals to above equivalent standards
ATEX 2014/34/EU Approval
UK SI 2016 No. 1106 Approval

Pneumatic & Hydraulic Valves

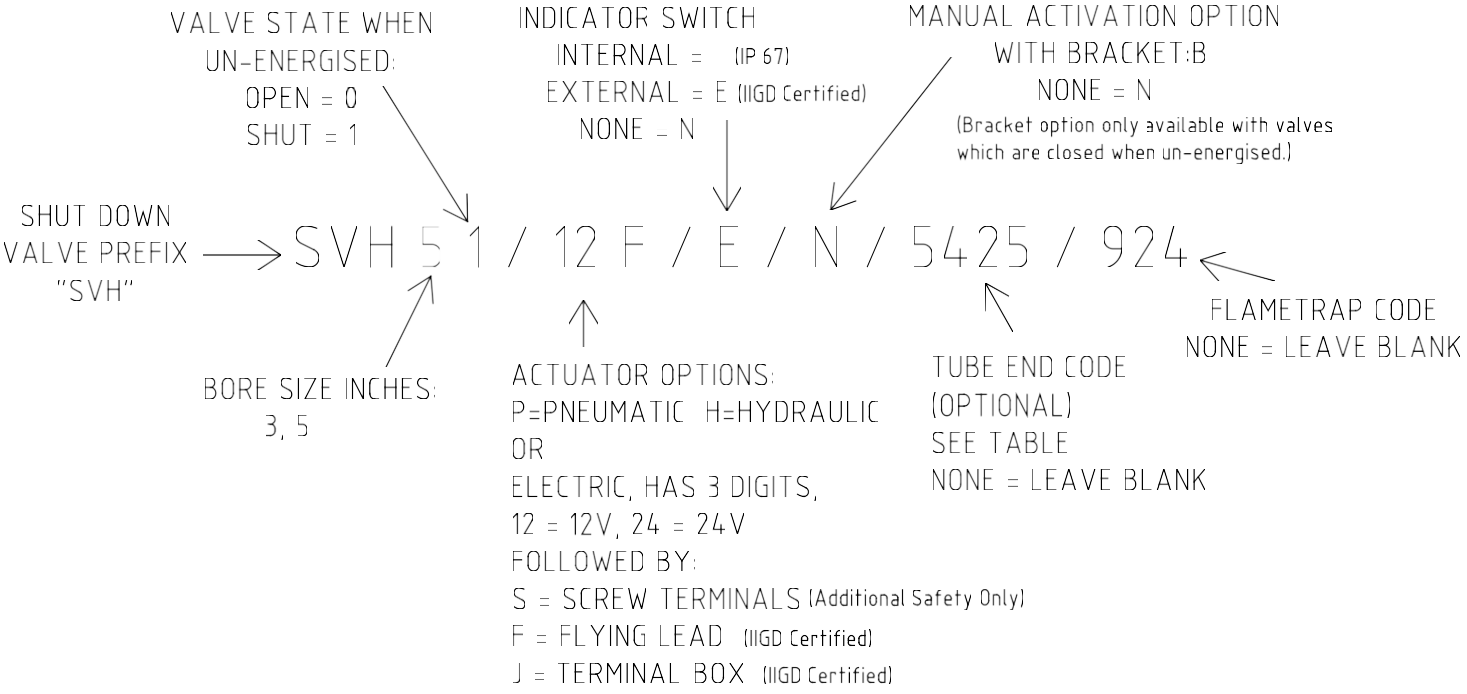
BSEN 80079-36:2016 Non-Electrical Safety
ATEX 2014/34/EU
UK SI 2016 No.1107

Additional Safety Electric Valves (Screw terminal) 12V/24V



All valves have an inlet air temperature limit of -20°C to +150°C
(Note this is reduced when choosing switch options – see section 5.4)

5.0 Selection - Code



5.1 Selection - Valve Size

3" Valve
SVH**3***/*/*/*/***

5" Valve
SVH**5***/*/*/*/***

5.2 Selection - State when De-energised

SVH*1/*/*/*/***	Closed when de-energised. Valve must be energised to open and fails safe (closes) if power or pressure is lost. Typical application hazardous area engine
SVH*0/*/*/*/***	Open when de-energised. Valve is energised to close. Typical application additional safety or emergency fire pump. Draws no current in normal operation.

5.3 Selection: Solenoid Valves

12V or 24V coils can be chosen using the following codes:

SVH**/**12**/*/*/*** 12V solenoid

SVH**/**24**/*/*/*** 24V solenoid

5.3.1 Solenoid Valve with Flying Leads

SVH**/***F**/*/*/***

This is a compact solenoid solution where space may be restricted and suitable for hazardous area applications. Both 12V and 24V versions are available and fitted with a 4m long 4mm^2 supply cable.

5.3.2 Solenoid Valve with Junction Box

SVH**/***J**/*/*/***

This option is suitable for hazardous area applications and enables the installer to define cables and cable glands. There are a choice of 3 entry directions to optimise wiring. The position switch may also be terminated in this box (subject to limitations in the installation section).

5.3.3 Solenoid Valve with Screw Terminals

SVH**/***S***/*/*/***

This option is to be used without a valve timer.

This design is suitable for additional safety applications only.

5.3.4 Selection - Pneumatic or Hydraulic Valves

SVH**/***P***/*/*/*** pneumatic piston
SVH**/***H***/*/*/*** hydraulic piston

Pneumatic valves are often chosen when mains air is available.

Hydraulically activated valves are usually selected in combination with a lever/bracket option.

Note: Pistons are Machinery's Directive compliant to EN983/EN984

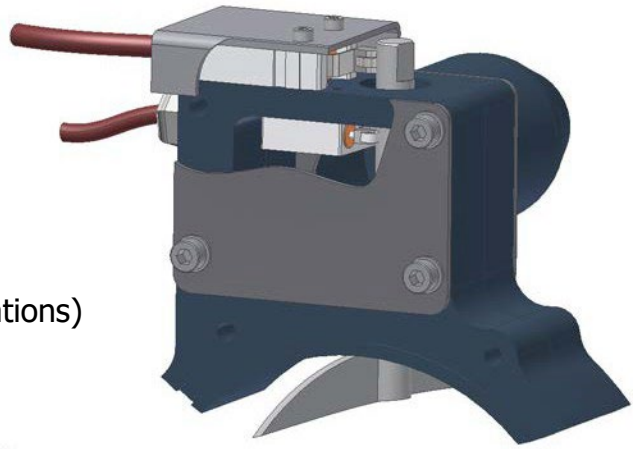
5.4 Selection - Position Switches

Selection codes:

SVH**/**/**I**/*/*** Internal switch (IP67)

SVH**/**/**E**/*/*** External switch (ATEX/IECEx/IP66)

SVH**/**/**N**/*/*** No switch



Position switches may be fitted to indicate when the SVH Valve is open or closed.
There are two choices

a) Internal IP67 Rated switch, non certified
Approved for -20ºC to +70ºC Application
(Feed via IS barrier for hazardous area applications)

b) ATEX IECEx approved external switch
Ex II 2 G D
Exd II C T6
IP66
Approved for -55ºC to +75ºC Application

Replacement ATEX switches are available but must always be fitted with a switch guard or protected from impact to conform to hazardous installation requirements.

ATEX Switch	3010007105
Switch guard	3000815801

Care must be taken to ensure the temperature limit of these switches should not be exceeded. This might be alleviated by fitting the valve upstream of the turbo-charger. If in any doubt, an installation survey should be run to determine the potential switch temperature allowing for high engine loads and ambient temperatures.

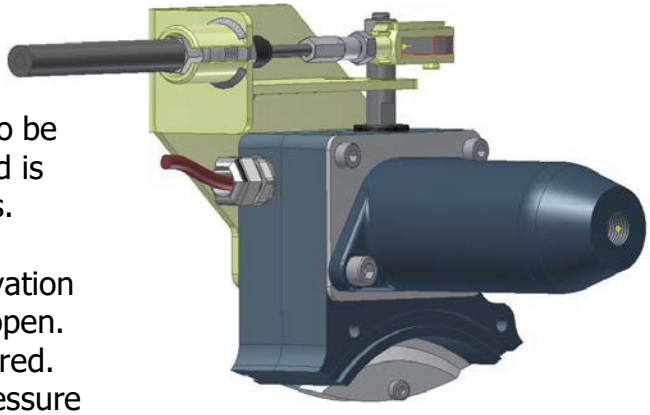
Switch lead identification

Function	External Switch	Internal Switch
NO (Normally open)	Grey	1 (black)
NC (Normally closed)	Brown	2 (black)
Common	Black	3 (green/yellow)

With the valve plate closed, the NO switch is open.

5.5 Selection – Bracket/ Lever Variants

SVH**/**/*/**B** /*** Bracket required
SVH**/**/*/**N** /*** No bracket required



Bracket variants are chosen when the valve is to be manually primed via a lever/cable assembly and is only available for hydraulic or pneumatic valves.

This variant is often chosen with hydraulic activation where the engine oil pressure holds the valve open. In this configuration, a hydraulic circuit is required. The valve shuts (latching) when the system pressure drops below 2.1 to 1.6bar. This latching shut pressure depends on the cable friction that connects the valve from the lever (longer cable with tight bends leads to a lower shut off actuation pressure).

Lever variants are only available with "energise-to-open" builds – ie SVH***1**/*/*/*/***
Levers and cables are available in section 7.3.

5.6 Selection - Hose Ends Adaptors

SVH**/**/*/* /**3250** for a hose end adaptor to connect a 3" SVH Valve to a 2.5" hose.

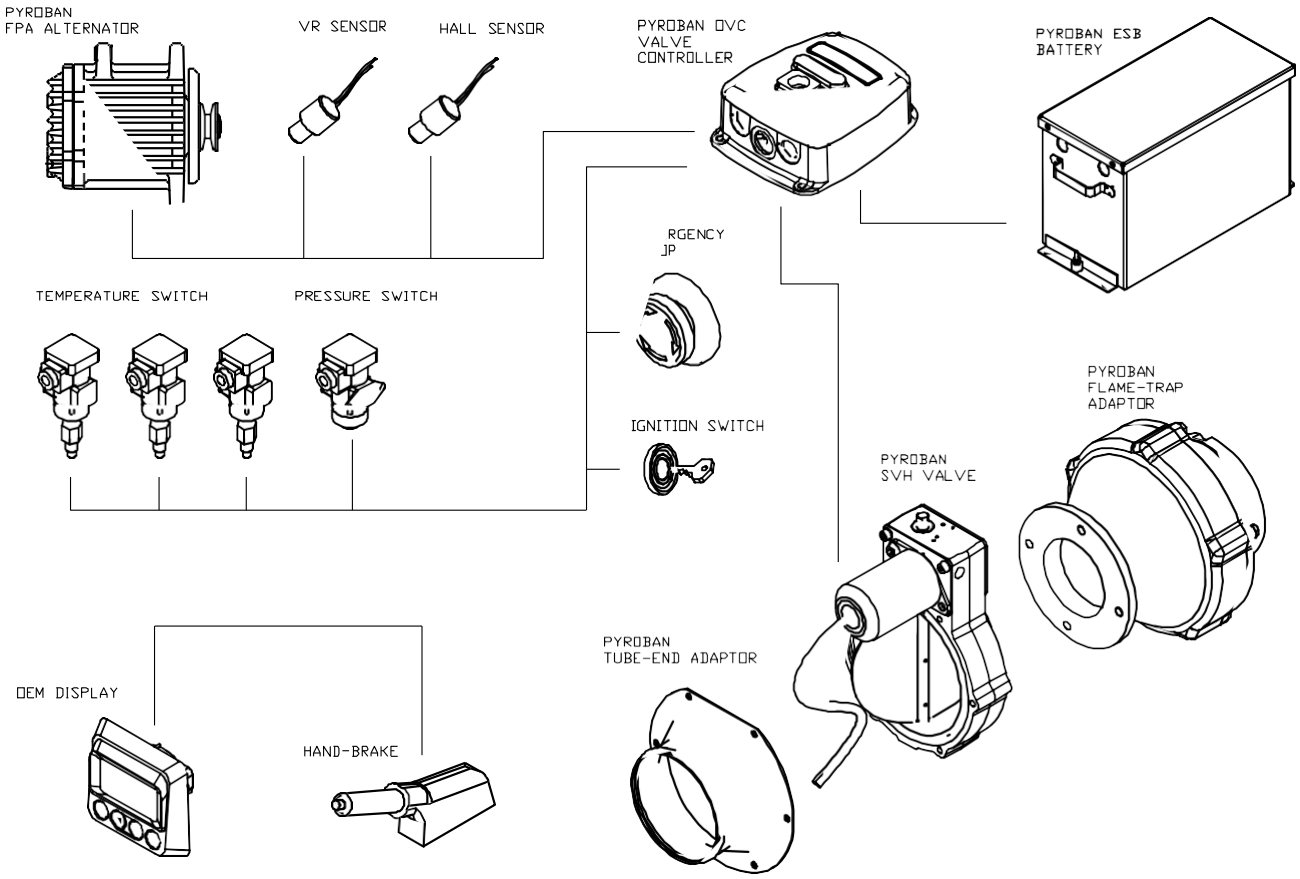
Spun hose end adaptors are available to connect SVH valves to hoses from the following table:

TUBE CODE	VALVE SIZE	TUBE OUTER DIA	WIDTH OF HOSE END (MM)
3200	SVH 3	2" (51mm)	46.5
3225	SVH 3	2.25" (51mm)	41.5
3250	SVH 3	2.5" (64mm)	39.5
3275	SVH 3	2.75" (70mm)	34.5
3300	SVH 3	3" (76mm)	34.5
3350	SVH 3	3.5" (89mm)	43.5
5400	SVH 5	4" (102mm)	57.0
5425	SVH 5	4.25" (108mm)	54.0
5450	SVH 5	4.5" (114mm)	50.0
5475	SVH 5	4.75" (121mm)	44.0
5500	SVH 5	5" (127mm)	38.0
5550*	SVH 5	5.5" (140mm)	51.5

* The 5550 hose adaptor has a limited clearance to the actuator such that a maximum hose thickness of 5mm can be used for solenoid operated valves or 9mm for piston operated valves.

6.0 Typical System Diagram

The SVH Valve actuator must be connected to a control system detecting engine over-speed to be effective.



To integrate to Pyroban offshore systems, a PCS2, 3GP or Ex-SCS controller may be used. For these systems request and follow the manuals below:

For PCS2
PCS2 MAN-GPD0009-01_V11

For 3GP
3GP Manual OG004 Issue 8

7.0 Installation - General

a) The valve is not designed for open-deck mounting or pressure washing and should be protected from the weather by enclosure or guarding.

b) Turbo-charged boost pressures in excess of 2.2 bar may damage the valve and remove engine protection. Consult Pyroban if excess pressures are anticipated.

c) For normally aspirated engines, fit the SVH Valve between the air filter and the engine.

d) The SVH Valve may be fitted either horizontally or vertically.

e) The valve is uni-directional i.e. it will stop the engine if mounted in either orientation relative to air flow.

f) If hose adaptors are used, the mating hose should be reinforced to support the valves' weight. Extra supporting brackets should be considered.

g) For turbo-charged applications, the SVH Valve may be installed either between the air filter and the turbo charger. Otherwise the SVH Valve can be mounted between the turbo-charger and the engine if maximum air temperatures are low enough. The maximum air temperature is limited at 150°C. After this temperature, both the solenoid and the shut off mechanism system significantly deteriorate in performance.

h) When fitting the valves or hose ends, the M6 screws should be tightened to 6Nm±1Nm

i) If mounted in the charge-air on a turbo-charged application, the SVH Valve may get hot and pose a hand-burning risk. If this is the case, add a guard or add a warning label near SVH Valve body.

j) All pipe-work downstream of the SVH Valve must be rugged and airtight as the SVH Valve creates a vacuum when it shuts the engine down; any leak may cause the engine to run on. A 10 bar pressure test is recommended on the inlet assembly to prove its suitability.

k) If a flame arrestor is fitted, it should always be downstream (engine side) of the SVH Valve (see also section on Flame-Arrestors).

l) If more than one SVH valve is used, the pneumatic, hydraulic or electric supply should come from the same source to enable the valves to close simultaneously. Furthermore the intake pipe-work should have a balance pipe connected across the intakes downstream (engine side) of the valves before the turbo. Catastrophic turbo damage may otherwise be caused by a single valve shut down.

m) Test the shut-off valve for over-speed protection to the following procedure:

- First work out a method of shutting the valve off without shutting off fuel. This process will depend on the valve selected and how the control system is designed. Decide whether the valve installed is an energise-to-run or energise-to-close version. Typically an electric relay or valve controller will activate the valve and will need to be activated/disconnected to operate the valve. Note that incorrectly powering the electric valves may destroy the solenoid. If in doubt, contact Pyroban for detailed advice.
- Run engine at 75% rated speed.
- Activate air shut-off ensuring that the fuel supply has not been cut.
- Check engine comes to a complete stop. Ensure air shut-off was actuated (look at spindle indicator flats at top of valve – section 8.0) Note: As every application has different parasitic loads and inertia, a duration for this to occur can not be specified.
- If the engine "stumbles" or attempts to continue running, this may be an indication of worn components or a leaking intake which may need replacement/repair.

Warning
For engines fitted with a turbocharger, operating the air shut-off may result in oil leakage past the shaft seal in some cases. These leaks are not an indication of the turbocharger failure. Repeated operation of the air shut off during loaded operation of the engine can result in mechanical damage reducing the life of the turbocharger.

7.1 Installation - Solenoid Operated Valves

Note instructions from 7.0 also apply.

All solenoids used with SVH Valves are dual-coil with separate pull and hold coils. The hold coil takes low current and can be powered indefinitely, but the pull coil takes high current. On Hazardous Area valves (/*J/ & /*F/), this coil must be controlled as described in the following sections to ensure excessive temperature rise is not caused.

Fitting of a fuse is mandatory for all solenoids and will protect the coils and supply lines from severe over heating.

For all solenoid operated valves, to prevent the solenoid over heating, or nuisance fuse blowing, the solenoid duty should be limited.
This has most potential to be a problem with energise-to-open valves combined with a difficult to start engine scenario. Overheating should be prevented by wiring the key switch for the engine such that it is not necessary to de-energise the solenoid between starting attempts. Instructions to the operator should advise not to return the key to the solenoid de-energise position between start attempts. If this is not possible, a warning label limiting the number of start attempts to six attempts per 30 minutes should be fitted near the ignition switch.

Fail-Safe Operation
Note, when considering fail safe operation, valves will revert to the default state in the event of power failure (open for SVH*0 & closed for SVH*1).

Coil Timer:
For the /*J/ and /*F/ solenoids, a coil timer is required to control the pull coil. The on-time for the pull coil should be limited to 1 second. For enhanced safety in zone 1 hazardous areas, it is also mandatory to include an extra circuit to switch the pull current off within 1.5 seconds in the event of the timer failing. Although the timer and checking circuits must be independent with independent isolator relays, the two circuits may co-exist on the same control product such as with the Pyroban Valve Controller (PCS2) which is suitable for Hazardous areas.

Example simple timers without hazardous area certification:

12V – 300993442 24V – 300993402
These are wired to the connections below:

Input			**Output**	
+ Signal	White		Pull	Yellow or green
- Battery	Black		Hold	Red
			Common	Black

Additional Safety Installation:

The additional safety SVH**/***S***/*/*/*** version has only two terminals and includes an internal switch which switches off the pull coil. Aside from the fitting of the fuse, no further protection is required. Cable lengths and sections must be chosen from the following table to minimise voltage drop and solenoid power loss.

All Valves:

Maximum Cable Lengths:

	Solenoid Voltage	
	12V	24V
2.5mm^2	2.7m	10.4m
4.0mm^2	4.3m	16.5m
6.0mm^2	7m	26.2m

Note the flying lead solenoid option is fitted with 4.0m of 4mm^2 cable for both the 12V and 24V versions.

A fuse must be fitted on all solenoid operated SVH valves in line with the common lead to prevent over-heating (Use slow blow Type 3AG).

Fuse Ratings:

Solenoid Voltage	
12V	24V
12A	7A

Current Draw:

	Solenoid Voltage	
	12V	24V
Pull	46A	25A
Hold	1.1A	0.5A

It is not necessary to fit additional fusing when the valve is driven from a Pyroban PCS2 system which provides protection against erroneous powering of the solenoid

Electrical equipment must be installed and maintained in accordance with BS EN 60079-14 and 17.

Cables should be clamped near the cable entry or gland to prevent twisting/pulling. The cable should be routed to minimise the risk of damage.

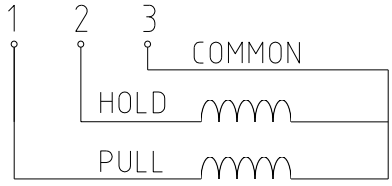
7.1.1 Installation - Solenoid Valves with Flying Leads

Note instructions from 7.0 and 7.1 also apply.

The PVC multicore cable may be cut to length.

Protect the common line with a fuse according to section 7.1

Core Idents:



7.1.2 Installation - Solenoid Valves with Junction Box

Note instructions from 7.0 and 7.1 also apply.

a) Three M20x1.5 gland entry holes exist for connection to the solenoid, plus connect to the indicator switches if required.

b) If a position switch is fitted, the supply cable is routed by the installer either into the valve junction box or to another local junction box (See section 5.4 for switch wiring idents). To wire to the valve junction box, an optional cable gland is shipped with the valve. An example of how to wire the switch is shown in the photo.

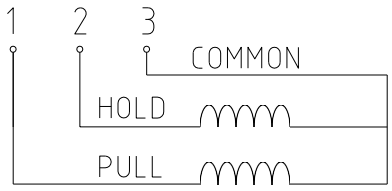
c) If the internal switch is fitted and an IS supply used, the junction box will not give adequate separation and the switch should not be wired through the junction box.

d) For hazardous area installations, cable glands must be ATEX/IECEx Zone 1 certified depending on the area of use.

Note: One line bush core is not used and is capped at both ends.

Protect the common line with a fuse according to section 7.1.

Cable/Terminal idents



7.1.3 Installation - Solenoid Valves with Screw Terminals

Note instructions from 7.0 and 7.1 also apply.

a) Screw terminals use 8-32 screws. The terminals are not polarity sensitive ie can be wired either way round.

b) Clamp and support cable as near to the terminals as practical to prevent pulling and twisting.

7.2 Installation - Hydraulic/Pneumatic Operated Valves

Note instructions from 7.0 and 7.1 also apply.

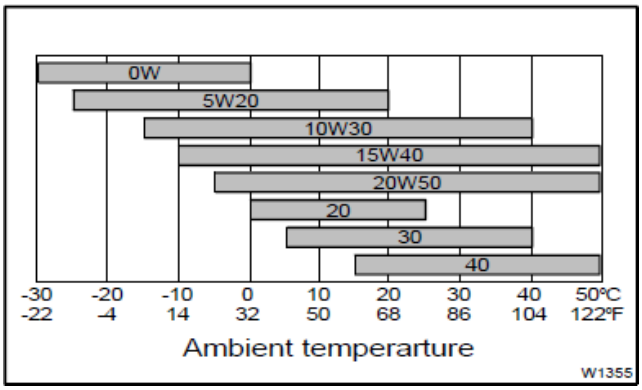
a) Working with high pressure air and hydraulic systems can lead to accidents involving eye injury or air or hydraulic injuries to skin and flesh tissue. Wear eye protection and appropriate P.P.E.

b) Connection to either pneumatic or hydraulic SVH Valves may be made via the ¼"NPT port.

c) The piston operates at 3 bar with a maximum pressure of 10bar. The system pneumatic feed line should be protected from over-pressure ideally by a pressure relief valve.

d) SVH Valves which are energised-to-close will not work if the system pressure fails. As the operator may not be aware, precautions such as alarms should be considered to avoid this.

e) The hydraulic piston is designed for use with synthetic or mineral engine oil (see recommended oil grades in table). Contact Pyroban for use with any other media as material compatibility may impair SVH Valve performance.



f) Hydraulic SVH Valves should have filtered supplies to prevent contamination of the seals and avoid corrosion.

g) Pneumatic SVH Valves must have a clean, dry air supply to prevent contamination of the seals and avoid corrosion.

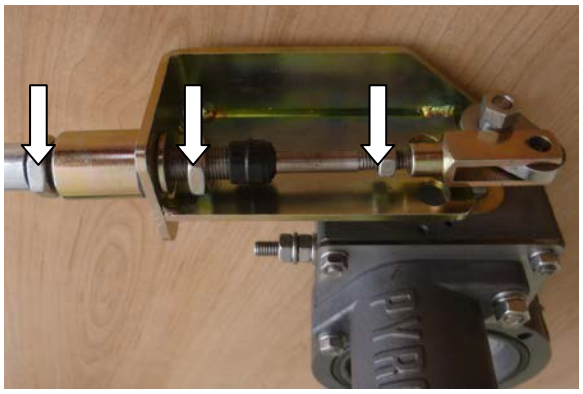
h) Support any pipe-work near the pipe to piston connection to avoid stress concentration on the piston fitting.

It is not intended for the piston to be user serviceable. Should a piston be faulty, the SVH Valve may be returned to Pyroban for servicing or replacement

7.3 Installation – Valves with Lever Control

Remote lever operation is only available with energise-to-open hydraulic or pneumatic valves.

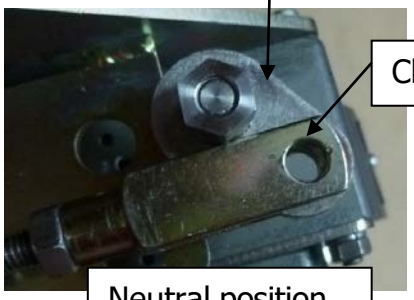
Note general installation instructions also apply.



Valve bracket: keep nuts loose while finding the neutral position.

a) Mount the lever and cable ensuring that the cable run has no tight radius bends (over 0.25m radius). Check the lever can return to the centre position freely before attaching it to the valve.

b) Feed the threaded cable end through the dia 10 clearance hole in the valve bracket with the clamp nuts loose and positioned as shown in the photograph. Remove the clevis from the valve and loosely attach to the cable end.



c) Before fixing the clevis nut and locking nuts, position the cable in the neutral position. This position can be found when the hole for the clevis lines up with the hole on the valve lever. The valve must be closed and the lever at rest to achieve this. **If the valve is not set up with reference to this position, it will not fully close when activated and over-speed may not be protected.**

d) Tighten all adjuster nuts (1x M6 & 2x M10) without moving the clevis from the neutral position and **check the cable is not twisted as this increases friction**. Finally fit the clevis pin.

e) Pull the cable to check the opening/closing action and check the valve fully closes when released.

Cable & Lever Part numbers:

Description	Part Number
Cable 1.0m	3010007179
Cable 2.0m	3010007180
Cable 3.0m	3010007181
Lever	300480424

8.0 Operation

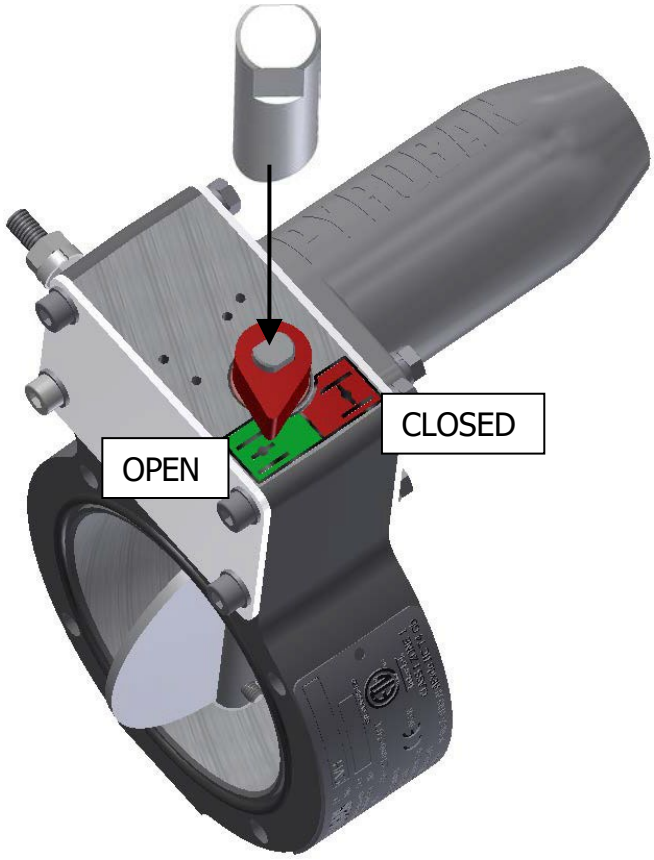
All SVH Valves

a) If the safety system trips whilst the engine is being used in a hazardous area, DO NOT ATTEMPT TO RE-START until the reason for the shutdown has been determined

b) Residual inlet vacuum after shutdown. Do not attempt to reset the SVH Valve against this vacuum as use of excessive force may damage the SVH Valve mechanism.

c) Many SVH valves are fitted with a plate open/closed indicator at the top of the valve.

Valves not fitted with indicators are valves with external electrical switches and lever operated valves. For these valves, it is not practical to fit an indicator, but the machined flats on the plate spindle can be used instead to ascertain the plate position.



Electric Valves

- To prevent over-heating, the solenoid should not be de-energised between starting attempts.
- SVH Valves which are closed when de-energised SVH*__1__/*/*/*/*** require the solenoid to be energised to open prior to starting the engine e.g. by turning the start key.

Hydraulic and Pneumatic Valves:

a) Normally closed valves (SVH***1**/*/*/*/***) need to be opened prior to starting the engine either by pressurising or by manual opening for those fitted with a lever.
b) Valves are designed to be energised at 4 to 8 bar.
c) Pressurising the piston above 5.5bar activates the valve, to de-activate the valve, vent hydraulic fluid to tank or pneumatic system to atmosphere (pistons begin to drop out at 2bar).

Lever Operated SVH Valves

To start the engine:

Latch the SVH Valve open using the control lever prior to cranking the engine. After the engine starts, wait a few seconds for pressure to build up prior to releasing the lever.

Never force the lever, particularly if re-starting the engine as a partial vacuum on the inlet may hold the valve closed. To re-start in these circumstances, allow the vacuum to clear (say 10s to 20s) before re-attempting. Forcing the lever may damage the valve.

The valve shuts off when the supply pressure from the control circuit drops below 1.6bar.

The lever is not intended to shut the engine down and shutting down the engine in this manner may damage the turbo and invalidate the warranty.

9.0 Flame Arrestors

a) If fitting a flame arrestor to the 3" or 5" versions, a close-coupled flame arrestor is available. Alternatively a stand alone flame arrestor may be used.

b) All other air inlets between the SVH Valve and the engine must be closed or rerouted to prevent ingress of air or gases after shutdown.

c) Fit the flame arrestor between the SVH Valve and the engine inlet as close as possible to the engine to maximise its effectiveness.

d) The selection of a correct flame arrestor can only be determined by means of a flame transmission test in an arrangement representing the final installation (for example testing a system to BS EN1834-1 will satisfy ATEX or UKEX).

e) If an explosion occurs in service, the flame trap SVH Valve must be exchanged for a new component or re-tested.

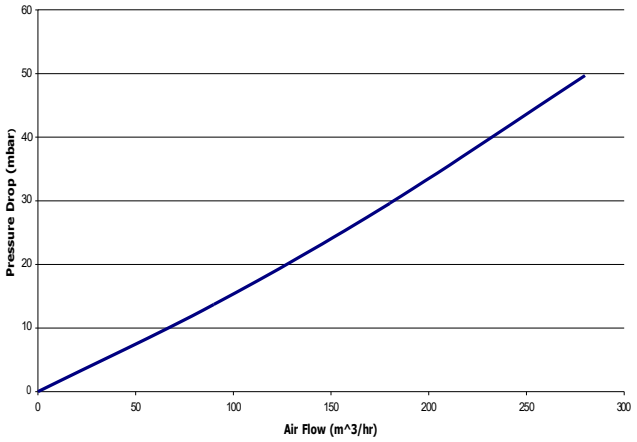
f) An efficient dry type air filter must be fitted upstream of the flame arrestor to prevent fouling.

g) Flame arrestors may be specified as part of the valve assembly eg SVH**/**/*/*/****/**9.524** for a 9.5" diameter flametrap with 24th" crimp cell height. Otherwise, they may be specified separately from the table below:

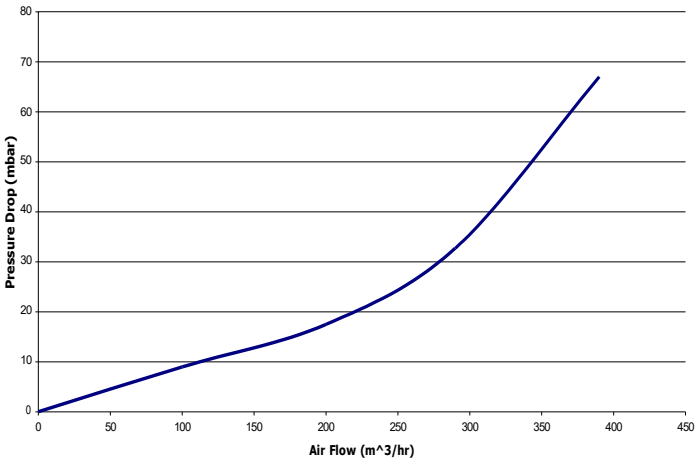
Valve Size	Flametrap element Diameter	Part No	Crimp Size	Gasket Pt No	Flametrap Code	Weight (Kg)	Axial Length (mm)
3"	4.6"	300816925/15	0.015"	300302440	415	1.6	86
3"	4.6"	300816925/18	0.018"	300302440	418	1.6	86
3"	4.6"	300816925/24	0.024"	300302440	424	1.6	86
5"	9.5"	300816919/24	0.024"	300200724	9.524	6.8	239
5"	12"	300816916/24	0.024"	300201254	1224	16.5	293

h) Flow/Pressure drop information for arrestor selection.

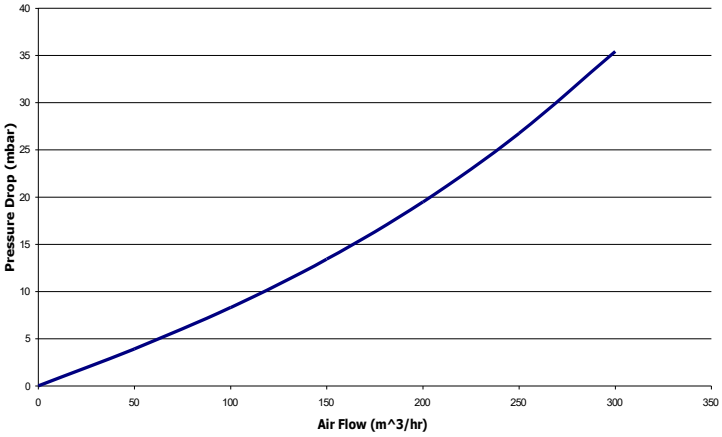
300816925/15 - 3" Valve, 4" Trap, 15th Crimp



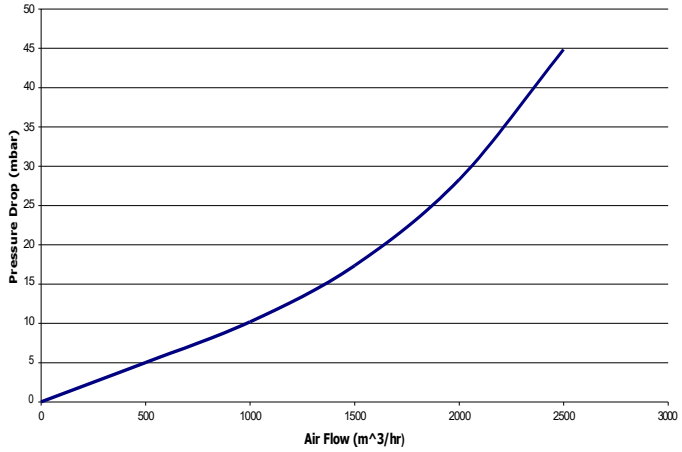
300816925/18 - 3" Valve, 4" Trap, 18th Crimp



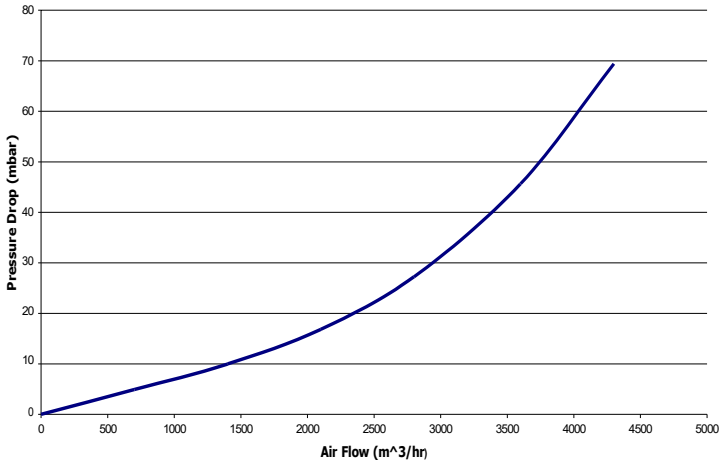
300816925/24 - 3" Valve, 4" Trap, 24th Crimp



300816919/24 - 5" Valve, 9.5" Trap, 24th Crimp



300816916/24 - 5" Valve, 12" Trap, 24th Crimp

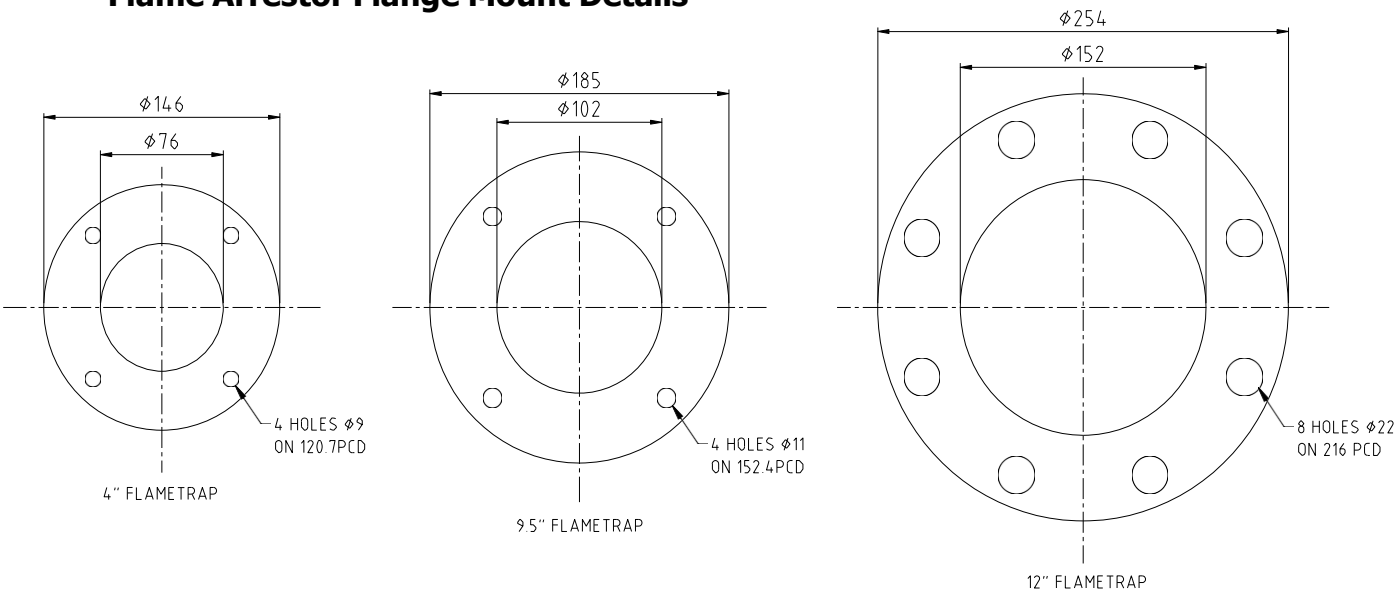


i) **Flame-trap assembly label**

Crimp size choice is dependent on gas group and application, other crimp sizes may be available on request.

If specifying a new system, flame transmission testing must be carried out. Consult customer services for further information should you require this service.

Flame Arrestor Flange Mount Details



10.0 Method of Disposal

Drain any oil from hydraulic variants. Most of the SVH Valve parts are metallic and can be recycled with metal scrap.

11.0 Maintenance

200 hours (or monthly)

1. Carry out an emergency shut-off test (see section 7.0)
2. If operation of the SVH Valve appears to be satisfactory but the engine does not stop within a few seconds then the inlet system including the inlet manifold should be checked for leaks.
3. For lever variants, check the lever and control cable move freely.

1000 hours (or six monthly)

1. Check that the mounting fixings are tight.
2. Clean the outside of the SVH Valve. Check for corrosion. Check all hoses and connections. On lever variants, lubricate the ball joint connection with LM grease.
3. Check that the supply cables are in good condition and fixed in their original position.
4. Check that the cable glands are tight.
5. Inspect the unit for mechanical damage, contact Pyroban Customer services for advice on repair or replacement.
6. To ensure the air shut-off valve is always prepared to shut-down the engine should it ingest gaseous fumes, test the shut-off valve with the following procedure:

- First work out a method of shutting the valve off without shutting off fuel. This process will depend on the valve selected and how the control system is designed. Decide whether the valve installed is an energise-to-run or energise-to-close version. Typically an electric relay or valve controller will activate the valve and will need to be activated/disconnected to operate the valve. Note that incorrectly powering the electric valves may destroy the solenoid. If in doubt, contact Pyroban for further advice.
- Run engine at tick-over ensuring all accessories that are normally used for the application are in use (i.e. fan, power take-offs, etc.).
- Activate air shut-off ensuring that the fuel supply has not been cut.

- Check engine comes to a complete stop. Ensure air shut-off was actuated (look at spindle indicator flats at top of valve – section 8.0) Note: As every application has different parasitic loads and inertia, a duration for this to occur can not be specified.
- If the engine "stumbles" or attempts to continue running, this may be an indication of worn components or a leaking intake which may need replacement/repair.

Warning
For engines fitted with a turbo charger, operating the air shut-off may result in oil leakage past the shaft seal in some cases. These leaks are not an indication of the turbo charger failure. Repeated operation of the air shut off during loaded operation of the engine can result in mechanical damage reducing the life of the turbo charger.

10,000 cycles (5 to 20 years)

For IIC applications with electric solenoid valves only:

The solenoid plunger may wear a brass bush (flamepath) which will impair the flameproof protection and the solenoid coil assembly should be replaced as a precaution.

Sticking Valve Plates

The free action and sealing of the valve plates in the valve bores relies on the mating parts being kept clean and dry. At the first sign of any contamination, the valve bores and plate tips should be cleaned with warm soapy water. After drying, a light coat of Molycote 33 medium Grease (or Vaseline Petroleum Jelly) should be applied and wiped clean with a dry rag.

Cleaning the inlet Flame-Arrestor Element

1. If the inlet air filter is changed regularly, the flame-trap may not need cleaning. If the engine performance is affected due to a partially blocked inlet flame-trap, the inlet flame-trap can be washed in petrol or other suitable solvent, then blown through with compressed air.
2. Do not attempt to remove the flame-trap element from the housing. Do not clean the inlet flame-trap by inserting probes as the fine passages could be enlarged and impair the flame-trap performance.

Replacement Valve Face O-Rings

Valve Size	O-ring part number
3″	3010007890
5″	3010007156

12.0 Declaration of Conformity

We, Pyroban Limited, 23 Dolphin Road, Shoreham-by Sea, Sussex, BN43 6PB, UK, declare that the component mentioned in this data sheet has been designed and manufactured in accordance with the essential heath and safety requirements of both the EU Directive 2014/34/EU (ATEX) and UK Regulation UK SI 2016 No. 1107 inclusive of subsequent amendments. Compliance with these is established by meeting the technical requirements of the relevant CEN, CENELEC and designated standards.

Dave Waring

QHSE & Engineering Manager

13.0 Other Information

Nothing contained in this brochure is intended to extend any warranty or representation, expressed or implied, regarding the products described herein. Any such warranties or other terms and conditions of sale of products shall be in accordance with Pyroban's standard terms and conditions of sale for such products, which are available upon request. Specifications and machinery may be altered without notice at any time.

14.0 Contacts

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