

# Maxseal SOV Exd range

## Installation, Operation and Maintenance Instructions (MI0238 Rev.2 - 12.02.09)

The following instructions apply to equipment certificate numbers:

Exd Certificate No. BASEEFA ATEX 2436X

Exd Certificate No. GOST-R 7998219

ALL SOV'S SHALL ONLY BE USED IN ACCORDANCE WITH REQUIREMENTS OF THIS DOCUMENT. READ ALL INSTRUCTIONS CAREFULLY BEFORE USING THESE PRODUCTS.

The SOV is designed and certified to meet the requirements of: IEC61508-1:1998 & IEC61508-2:2000 as being suitable for use in safety-related applications up to and including SIL3 & SIL4 where safety operation of the valve is by de-energisation of the solenoid. This manual covers all installation, maintenance and operation requirements for these applications.

Installation by a suitably-trained personnel in accordance with the applicable code of practice e.g. EN 60079-14:1997.

Inspection and maintenance of equipment by trained personnel in accordance with the applicable code of practice e.g. EN 60079-17.

Repair of this equipment by suitably trained personnel in accordance with the applicable code of practice e.g. EN 60079-19.

Components to be incorporated into or used as replacement parts for the equipment shall be fitted by suitably trained personnel in accordance with this documentation.

The certification of this equipment relies upon 316 stainless steel, magnetic steel, carbon steel and cast iron materials used in its construction.

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection provided by the equipment is not compromised.

Aggressive substances: e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

Suitable precautions: e.g. regular checks as part of routine inspections or establishing from the material's data sheets that it is resistant to specific chemicals.

DO NOT MODIFY, RECLAIM OR CHANGE ANY COMPONENTS.

### Maxseal sales

TEL.: +44(0) 1202 647331

FAX: +44(0) 1202 647302

E-MAIL: maxseal@thompson-valves.com

WEB: www.thompson-valves.com

Maxseal products are manufactured by:

### Thompson Valves

17 Balena Close, Creekmoor,  
Poole, Dorset, England. BH17 7EF

### Marking Indicator

MARKING (TYPICAL)	DESCRIPTION
WARNING: DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT	COVER FORMS PART OF FLAMEPROOF ENCLOSURE AND SHOULD NOT BE REMOVED WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT
WARNING: MAXIMUM INTERNAL RISE 35K, USE SUITABLY RATED CABLE	THIS INDICATES THE MAX INTERNAL TEMPERATURE RISE, THIS CAN BE USED TO EVALUATE CABLE TEMPERATURE RATING.
Ex II 2 G	ATEX MARKING EQUIPMENT SUITABLE FOR EXPLOSIVE GAS. EQUIPMENT GROUP 2 EQUIPMENT CATEGORY 2.
IP66-X8	INGRESS PROTECTION RATING FOR BOTH ATEX AND IEC 66 = STRONG WATER JETS / X8 = CONTINUOUS IMMERSION IN WATER
Exd IIC	EQUIPMENT RELIES ON Exd PROTECTION SUITABLE FOR USE IN Ex GAS GROUP IIC
T4 Ta (-40 to 90°C) T6 Ta (-40 to 40°C)	T-CLASSIFIED EQUIPMENT SHOULD NOT BE EXPOSED TO TEMP OUTSIDE THE SPECIFIED TEMPERATURE RANGES (Ta). TYPICAL MARKING SHOWN.
S123SAA3H1BD	WORKING CONDITIONS SHOULD NOT EXCEED THE CAPABILITIES OF COMPONENTS / MATERIALS DETAILED IN THE CONSTRUCTION
WP 20 BAR	THE RANGE AND MAXIMUM MEDIA WORKING PRESSURE RATING
INLET, OUTLET	PIPEWORK SHOULD BE CONNECTED SUCH THAT IT FUNCTIONS AS PORT MARKINGS
110V DC	THE ELECTRICAL SUPPLY LIMITS ARE NOMINAL VOLTAGE +/-10%
Serial No.	FOR YEAR OF MANUFACTURE REFER TO CERTIFICATE OF CONFORMITY

### Expected duty

The SOV should not be used in excess of the expected duty limits as shown below. In special applications that exceed these duty limits, contact Maxseal sales before installing / operating an SOV.

CONDITIONS	LIMITS
FUNCTION	The working temperature and pressure shall not exceed the marked label rating. The valve should not be operated at a speed >6 cycles/min.
ENVIRONMENT	All external conditions shall not exceed IP66. External conditions shall not degrade the Exd enclosure or pressure boundary.
MAINTENANCE PERIOD	10 years or 10,000 cycles. 12 month Max Proof Test Interval. For best practice exercise the valve once per month.
LIFE	20 years or 100,000 cycles.
MEDIA	Media: Instrument air or non-corrosive hydraulic fluids - clean and free from particulate pollution. A suitable inlet filter should be fitted (eg. 20µm)

### Description

To obtain flow through a valve, it is necessary to ensure all relevant process and electrical connections have been made. The electrical supply will energise the solenoid coil, thus opening, closing or changing over the valve. The solenoid varies in power depending on the size of the solenoid, refer to Table 1.

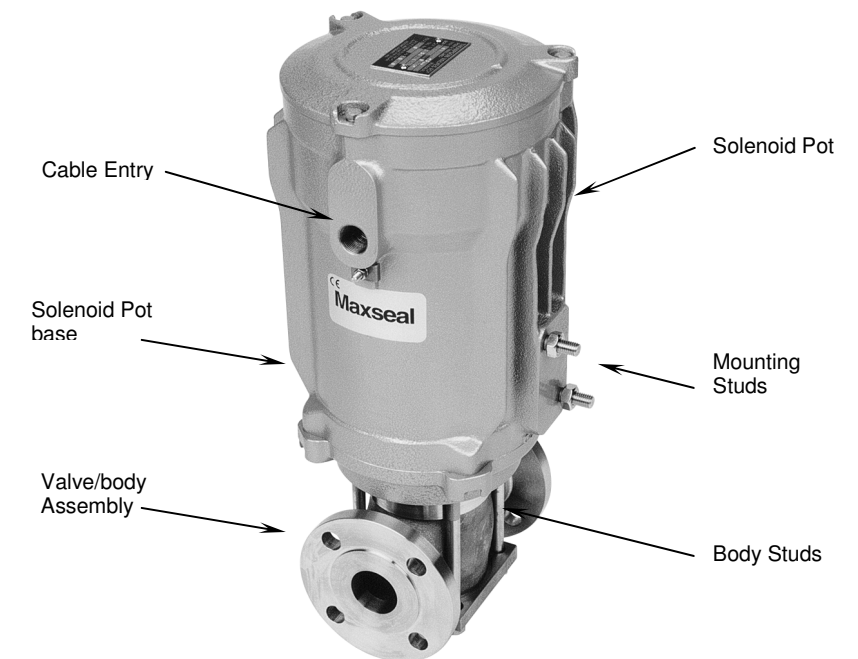
Solenoid Size	1	2	3	4	5	6
Watts	18	25	40	75	100	150
VA	25	35	56	105	140	210

Table 1

The solenoid assembly consists of a metal casing or housing which contains a coil; this is located and protected by potting with epoxy resin compound. The electrical connections to the coil are made in an integral cavity in the housing.

- The solenoid assembly is CE marked and ATEX certified.
- Solenoid assemblies are attached to a variety of valve assemblies, which have a nominal bore ranging from 1/4" (6.35 mm) to 4" (101.6 mm).
- Exd temperature range: -40°C to 90°C. The maximum surface temperature of the housing will not exceed 85°C (T6) or 135°C (T4).
- Due to a maximum allowable internal temperature rise of 60K appropriate electrical cables must be used.
- The cable entry is in the form of a tapped hole to accommodate conduit with an appropriate approved flameproof gland.
- Internal sealing is achieved with "O" rings.
- Although the solenoid body has mounting connections, it is recommended that connecting pipe-work be suitably supported close to the valve connections.

- A maximum of four line switches can be fitted internally on the size 3 to 6 coil housings.



Typical SOV with Flanges

### Storage and Handling

The SOV should not be stored in a corrosive environment. All ports should remain sealed and the valve markings made visible. Recommended storage temperature 5 to 25 °C, relative humidity <75%. Storage areas shall not contain ozone producing equipment (eg. welding equipment, mercury vapour lamps).

Damage may occur to the valve if subjected to any impact, this risk increases at lower temperatures. If the valve is dropped or subject to any impact it should be returned to the manufacturer for inspection.

### Installation

BEFORE COMMENCEMENT OF ANY INSTALLATION WORK, IT IS IMPORTANT THAT ANY SOURCE OF PRESSURISED MEDIA BE TURNED OFF OR ISOLATED FROM THE POINT AT WHICH THE SOV WILL BE INSTALLED.

DO NOT EXPOSE PRODUCT TO EXCESSIVE SHOCK LOADING AND VIBRATION. IF NOT SURE PLEASE CONTACT MAXSEAL SALES FOR FURTHER INSTRUCTIONS.

- The solenoid assembly is supplied with its relevant valve/body assembly.
- Check that the information listed on the nameplate confirms that the SOV supplied is suitable for the intended service.
- Mount the SOV with the coil housing in a vertical position.
- Make connections to the valve ports as required. DO NOT OVERTIGHTEN.
- Remove solenoid cover.
- Install cable using an appropriate certified gland.
- Make terminal connections as labelled. All terminals must be tightened before commissioning.
- Replace solenoid cover
- Energise coil and test operation.

## Maintenance

- Having few moving parts, the Solenoid assembly will require only periodic inspection of those items subject to wear, or deterioration, to ensure long service and reliability.
- It is recommended that all products be returned to Thompson Valves for refurbishment. However, the design of the Solenoid assembly does enable some servicing in the field, with minimal inconvenience, to satisfy plant operations and minimise down times.
- It is recommended that all repairs and servicing be carried out using only quality assured spares supplied by the manufacturer.

## Preventative Maintenance

When used in the environment it was designed for, the solenoid assembly will continue to deliver trouble free service over long periods of time. Check that the supply voltage corresponds to the operating voltage on the nameplate before using the SOV.

- Inspect all "O" seals and the spring for wear, brittleness or other signs of damage.
- All those displaying any indication of damage or deterioration should be replaced. However, it is recommended that all seals and the spring regardless of any damages should be routinely replaced.

## Remedial Maintenance

WHEN UNDERTAKING ANY REPAIR OR SERVICING IN WHICH THE SOV REMAINS IN THE LINE, IT IS ESSENTIAL THAT THE EQUIPMENT IS ISOLATED FROM THE PRESSURISED MEDIA AND ELECTRICAL SUPPLY.

If the SOV is maintained to a planned programme, it is unlikely that the need for remedial service will arise. However, if the system becomes contaminated or an operating system problem causes damage to one of the control elements, the SOV may malfunction. In general it is recommended that damaged SOV's be returned to the factory for repair. To facilitate field repair, and minimise plant downtime, Table 2 lists some possible faults and probable causes/solutions.

### NOTE:

We also make the following recommendation that the SOV be repaired or serviced under workshop conditions, as the opened equipment must be protected from ingress of dirt and other foreign material. Should operational requirements make it necessary to service the SOV in the pipeline, then precautions should be taken to avoid contamination of the unit or parts.

SYMPTOM	CAUSE	SOLUTION
VALVE WILL NOT OPEN -Energised to open	Armature/core gap too large	Refer to Table 3 for correct gap length and adjust accordingly
-Energised to close	Broken armature spring	Replace part
VALVE WILL NOT OPEN -Energised to open	Broken armature spring	Replace part
-Energised to close	Armature/core gap too small	Refer to Table 3 for correct gap length and adjust accordingly

Table 2

## Stripping and Re-assembly

Solenoid pot assemblies can be supplied separately from the valve assembly if required. To replace the solenoid pot assembly proceed as follows:

- Remove top cover bolts and remove top cover.
- Disconnect supply cable.
- Remove bolts from solenoid pot base.
- Lift off solenoid pot assembly from the valve assembly.
- Order new solenoid pot assembly.
- Re-assemble in reverse order of above.

### Tool List:

Torque wrench  
A/F Hexagon Sockets.

## Adjustment of Valve

NOTE THIS PROCEDURE IS ONLY VALID FOR THE 2/2 SOV ONLY AND IS ONLY A NECESSARY STEP THROUGH MALFUNCTION.

Should it become necessary proceed as follows:

- Remove M6 core set screw (see Figure 3).
- Screw in core with two pin spanner until it touches the armature.
- Unscrew core until the following air gaps are obtained (see Table 3) between the core and the armature.
- Lock M6 core setscrew and test.

SIZE	NORMAL	HAND RESET
6mm (0.250")	0.762mm (0.030")	2.5mm (0.100")
10mm (0.375")	1.0mm (0.040")	3.2mm (0.125")
15mm (0.500")	1.5mm (0.060")	4.0mm (0.156")
20mm (0.750")	2.3mm (0.090")	4.0mm (0.156")
25mm (1.000")	3.8mm (0.150")	4.8mm (0.187")
32mm (1.250")	5.5mm (0.218")	6.5mm (0.250")
40mm (1.500")	7.1mm (0.281")	7.1mm (0.281")
50mm (2.000")	9.5mm (0.375")	10.3mm (0.406")
65mm (2.500")	10.3mm (0.406")	11.9mm (0.468")
80mm (3.000")	12.7mm (0.500")	12.7mm (0.500")
100mm (4.00")	16.6mm (0.656")	16.6mm (0.656")

Table 3

## Special Conditions for Safe Use

- If the solenoid is used in an ambient exceeding 40 °C the temperature at the cable entry point may exceed 70 °C. The supply cable must therefore be selected accordingly.
- When the fluid temperature exceeds the maximum permitted ambient temperature an insulated spacer must be inserted between the solenoid adjacent to the spacer must be measured and must not exceed the maximum permitted ambient temperature.
- For replacement purposes, the cover fixing screws shall be of grade A4-80 stainless steel or stronger.
- The maximum flame-path gaps shall not exceed 0.1mm.

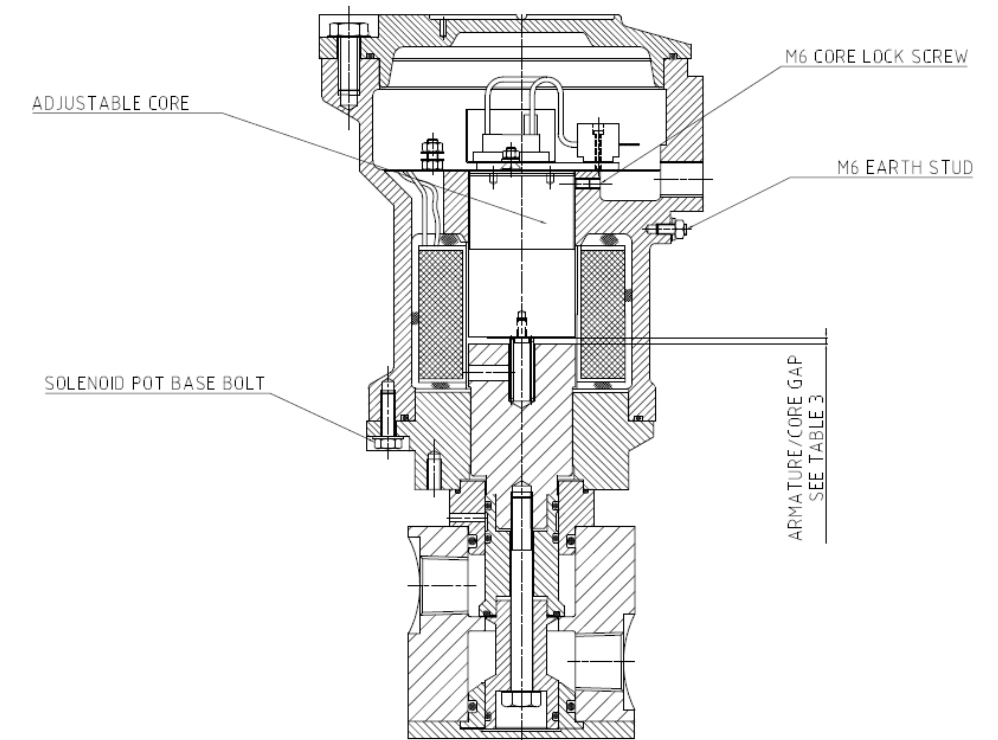


Figure 3 – Typical SOV Showing Solenoid Assembly

## Certification Notes

The SOV may be used with flammable gases and vapours with temperature classes T1, T2, T3, T4, T5 & T6 when used within the ambient temperature range -40 °C to +40 °C. The SOV may be used with flammable gases and vapours with temperature classes T1, T2, T3 & T4 when used within the ambient temperature range -40 °C to +90 °C.

The certification of this equipment relies upon the following materials used in its construction.

## Additional Notes

IF YOU ARE NOT SURE ABOUT ANY APPLICATION, MAINTENANCE OR TECHNICAL ISSUE, CONTACT MAXSEAL SALES FOR ADVICE.

WHEN REQUESTING SPARES KITS, PLEASE SUPPLY THE VALVE MODEL NUMBER AND/OR THE SERIAL NUMBER.