

Maxseal ICO3S

Installation, Operation and Maintenance Instructions (MI0294 Rev.9)

The following instructions apply to equipment certificate numbers:
 Exd Certificate No. SIRA IECEX 05.0029
 Exd Certificate No. SIRA ATEX 1156
 Exd Certificate No CSA 1805901 (LR51486)
 Exmbe Certificate No. SIRA IECEX SIR05.0056
 Exmbe Certificate No. SIRA ATEX 5284
 FUNCTIONAL SAFETY Certificate SIRA FSP 04001/01

THE ICO3 SHALL ONLY BE USED IN ACCORDANCE WITH REQUIREMENTS OF THIS DOCUMENT. READ ALL THE INSTRUCTIONS CAREFULLY BEFORE USING THIS PRODUCT.

The ICO3S 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 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.

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 30K, USE SUITABLY RATED CABLE	THIS INDICATES THE MAX INTERNAL TEMPERATURE RISE, THIS CAN BE USED TO EVALUATE CABLE TEMPERATURE RATING.
Ex II 2 G D	ATEX MARKING EQUIPMENT SUITABLE FOR EXPLOSIVE GAS AND DUST ENVIRONMENTS. EQUIPMENT GROUP 2 EQUIPMENT CATEGORY 2.
Ex tD A21	IEC MARKING - DUST ENVIRONMENTS
IP66	INGRESS PROTECTION RATING FOR BOTH ATEX AND IEC 66 = STRONG WATER JETS
Exmbe IIC	EQUIPMENT RELIES ON Exmbe PROTECTION SUITABLE FOR USE IN Ex GAS GROUP IIC
Exd IIC	EQUIPMENT RELIES ON Exd PROTECTION SUITABLE FOR USE IN Ex GAS GROUP IIC
T4 Ta (-60 to 80°C)	T-CLASSIFIED EQUIPMENT SHOULD NOT BE EXPOSED TO TEMP OUTSIDE THE SPECIFIED TEMPERATURE RANGES (Ta). TYPICAL MARKING SHOWN.
Y013AA1H1BS	WORKING CONDITIONS SHOULD NOT EXCEED THE CAPABILITIES OF COMPONENTS/MATERIALS DETAILED IN THE CONSTRUCTION
WP 0-12BAR	THE RANGE AND MAXIMUM MEDIA WORKING PRESSURE RATING
INLET, OUTLET, VENT	PIPEWORK SHOULD BE CONNECTED SUCH THAT IT FUNCTIONS AS PORT MARKINGS
24V DC 3W (1/4") 8W (1/2")	THE ELECTRICAL SUPPLY LIMITS ARE NOMINAL VOLTAGE +/-10%
Serial No.	FOR YEAR OF MANUFACTURE REFER TO CERTIFICATE OF CONFORMITY

Expected duty

The ICO3 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 ICO3.

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 100,000 cycles. 12 month Max Proof Test Interval. For best practice exercise the valve once per month.
LIFE	20 years or 1 million 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)

Part Number Details

SEAL MATERIAL	CODE
FLUOROSILICONE	L
VITON	V
NITRILE	H

VALVE OPERATION	CODE
AUTOMATIC	A
PUSH BUTTON OVERRIDE	C
PUSH BUTTON RESET	P
JACKSCREW OVERRIDE	S

VALVE PORTS	CODE
2/2 ENG-OPEN	1
2/2 ENG-CLOSE	2
3/2 UNIVERSAL	3

CODE	VOLTAGE
B	24 VDC
D	125 VDC
E	125 VDC
J	110 VAC
M	220/240 VAC
S	90/140 VDC

Y	0	1	3	A	A1	H	1	B	S
ICO3 Exd	0								
ICO3 Exmb	2								

PRESSURE	CODE
0-12 bar	1

THREAD	CODE
1/4" NPT	A1
1/4" BSPP	E1
1/2" NPT	A3
1/2" BSPP	E3

CODE	VALVE ASSEMBLY MATERIAL
S	ST. STEEL / ST. STEEL

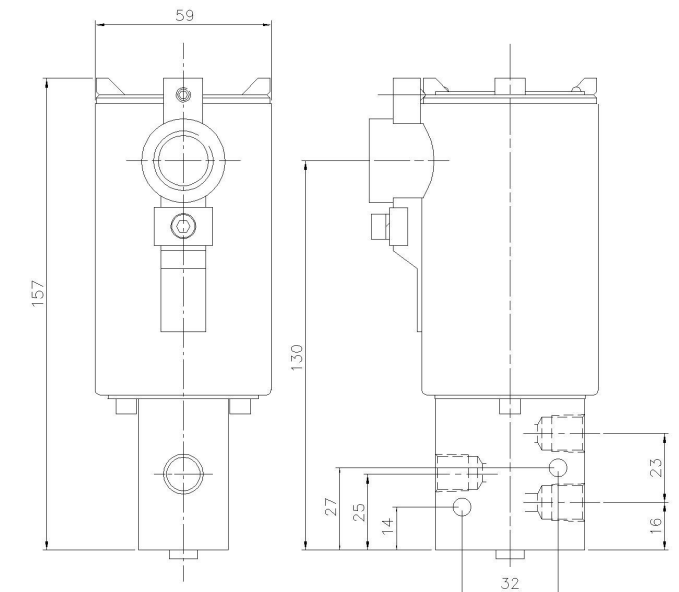
CODE	CONDUIT SIZE
1	20mm x 1.5mm
2	1/2" NPT

Description

The ICO3S is an Ex certified solenoid valve used to control a pressurised media (liquid or gas). The standard variant (3/2 0-12 bar automatic) has the following characteristics.

- Equipment weighs 2.0 kg (1/4") 2.5kg (1/2") Typical.
- Valve's typical speed <70ms pull in, <50ms drop out.

Standard ICO3 1/4" Construction and Installation Dimensions



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Storage and Handling

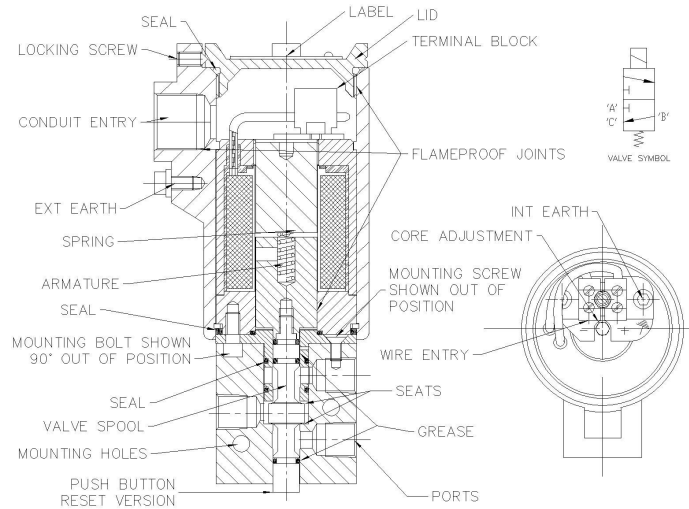
The ICO3 should not be stored in a corrosive environment. All ports should remain sealed and the valve markings made visible. Recommended storage temperature 5 to 25 °C, relative humidity <75%. Storage areas shall not contain ozone producing equipment (eg. welding equipment, mercury vapour lamps). Due attention should be paid to personal protection during handling.

Operation

All ICO3 solenoid valves consist of an Exd or Exmbe enclosure.

In order for the enclosure to provide flameproof protection:

- None of the flameproof joints shall be damaged.
- All flameproof joints with threads shall be fully engaged.



The pressurised media is retained within the valve assembly (pressure boundary) by the mechanical strength of all its metal parts, seats and seals. Degradation of any of these components will cause the valve to leak.

The flow path of the media is altered by moving the spool assembly and engaging / disengaging the seats. The spool assembly can be moved by either:

- Energising the coil to produce an electromotive force.
- Applying a pressure to a piston.
- Applying a mechanical force to a linkage.
- Compressing a mechanical spring.

Restricting the spool movement or allowing the seats to degrade, will not allow the flow to be re-directed.

The ICO3 has an IP66 rating. Degradation of the IP66 seals / gaskets / sealing faces or failure to tighten all sealing joints, will allow water to leak inside the enclosure.

For best practice, the valve should ideally be exercised at least once a month.

Removing an existing valve

Tools

3mm Electrical Screw Driver
Allen Keys: 2.5mm, 3mm, 4mm and 5mm.
5mm A/F spanner. 5mm Tommy Bar.

1. Obtain work permit and check area for hazards.
2. Isolate valve from all pipeline and electrical supplies.
3. Loosen M5 locking screw and unscrew cover.
4. Disconnect supply cable and remove.
5. Remove pipe connections from valve assembly.
6. Unscrew mounting bolts and remove the valve.

Installing a valve

General requirements

- Pipe work and media must be clean.
- Suitable Inlet filters are recommended (e.g. <20 microns).
- Prevent pipe sealant from entering the system.
- Use only correct tools (i.e. as listed above).
- Do not use valve as a lever.
- Earth equipment to prevent the build up of electrostatic charge.
- Ensure all interfacing equipment is rated to the expected duty conditions and will not degrade the integrity of the ICO3.

Mounting

An ICO3 will function satisfactorily when mounted inclined from the vertical. However for maximum life and efficiency mount vertically - Do not invert. The ICO3 is not designed for use in vibration applications. Do not mechanically stress the equipment.

High temperature applications

In applications where the media is > 80 °C, an ICO3 with a high temperature spacer shall be used. The high temperature spacer provides a thermal barrier between the media and the enclosure. To ensure that the spacer performs its intended function:

- The user shall provide ventilation around the valve assembly, enclosure and spacer.
- The valve assembly and Exd enclosure shall not be lagged.

Additionally, ensure all associated parts, including cable glands and cabling are fit for rated duty.

Low temperature applications

Contact Maxseal Sales for special operating conditions.

Procedure

1. Make connections to the valve ports as required. DO NOT OVERTIGHTEN.
2. Loosen M5 locking screw and remove solenoid cover.
3. Install cable using an appropriate certified gland fit for duty.
4. Make terminal connections as labelled. All terminals must be tightened before commissioning.
5. Replace solenoid cover and lock M5 locking screw.

Maintenance

It is recommended that all products be returned to Thompson Valves for refurbishment.

Spares

Only Maxseal spares kits should be used. Maxseal supply seals specially designed for the duty. Incorrect seals will affect valve performance.

Main valve kit includes: seals and operating spring.

Lubrication

-60 °C to 90 °C: Molycote 55 medium grease

Part A. Disassembling a standard valve

1. Remove the Cap Head Bolts at the base of the valve body and remove valve body and armature assembly.
2. Remove C/Sunk screws holding valve to flange and remove valve body.
3. Secure armature with a *Tommy bar* and using a spanner remove the spool assembly.
4. Separate all valve assembly components, noting orientation, sequence and position of parts.

Part B. Examining a valve's components

Examine and replace all worn or damaged parts.

The flameproof joints will retain their original certified clearances provided they are not damaged. Replace all seals, seats and operating spring with Maxseal spare parts kit. All seals should be lubricated and have no deformation. All seating and sealing faces should be free from contamination, marks, scratches, etc.

DO NOT MODIFY OR RECLAIM FLAMEPROOF JOINTS.

Part C. Assembling a standard valve

Smear all seals with recommended grease. Build assemblies in reverse order shown in part A.

Torque: Valve M5 bolts to 5Nm. Valve spool to 4Nm.

Part D. Adjusting & testing a standard valve

1. Loosen M5 locking screw and remove solenoid cover.
2. Make connections to valve ports as per markings.
3. Apply air to valve body and energise coil.
4. Using 5mm AF Allen Key screw down core to the point *just before* ports leak.
5. Screw core back a further 1/10 of a turn.
6. Ensure valve operates correctly at Nom Voltage \pm 12%

Part E. Problems

If the ICO3 does not function as intended, do not install valve. Repeat the maintenance procedures Parts A to D. If the problem persists contact Maxseal Sales.

If you are not sure about any application, maintenance or technical issue, contact Maxseal Sales for advice.