



Process
Automation

Our product brands:
IMI MAXSEAL®

ICO4-PST Solenoid Valve

Partial Stroke Testing System



Breakthrough
engineering for
a better world

ICO4-PST Solenoid Valve



Key Benefits

- High performance solenoid valve with integrated Partial Stroke Testing
- Hydraulic and pneumatic versions available
- Compatible with valve closure times from 1.5 to 120 seconds
- Compatible with QEVs and POVs for very fast closing valves
- SIL 3 capable, always tests all final elements for best possible PFD
- PST operates final elements in identical manner to a shutdown
- Both remote (from DCS) and local (handheld device or control panel) operation

Technical Features

Medium	Hydraulic and pneumatic – customer to specify and confirm compatibility
Operation	Direct solenoid operated poppet valves
Mounting Position	Solenoid vertical
Flow	0.28 Cv (Hydraulic) and 0.6 Cv ... 2.1 Cv (Pneumatic)
Port Size	1/4 NPT, 1/2 NPT, G1/4, G1/2 or manifold version
Operating Pressure	0 ... 20 bar (0 ... 290 psi)
	0 ... 50 bar (0 ... 725 psi)
	0 ... 207 bar (0 ... 3002 psi)
	0 ... 414 bar (0 ... 6004 psi)
Temperature	Media: -20 ... +90°C (-4 ... +194°F)
	Options to -60°C (-76°F) available on request.
	Ambient: See table on page 2
Materials	Air supply must be dry enough to avoid ice formation at temperatures below +2°C (+35°F)
	Valve body, trim, coil housing and top cover: stainless steel 1.4404 (316 L)
	O-rings seats & seals: high NBR
	Other seal materials available on request

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under »Technical features/data«. Before using these products with fluids other than those specified, for non-industrial applications, lifesupport systems or other applications not within published specifications, consult Thompson Valves Ltd.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure. System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided. System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products.

Technical Data - Standard

Configuration					
Parameter		Pneumatic	Pneumatic	Pneumatic	Hydraulic
Size		1/4"	1/4"	1/2"	1/4"
Configuration		3/2	5/2	3/2	3/2
Fluid Specification					
Maximum Operating Pressure	Cv	0.8	0.6	2.1	0.3
	bar	20	12	12	300
	PSI	290	174	174	4350
Fluid Temperature	°C	-40 ... +60	-40 ... +60	-40 ... +60	-20 ... +60
	°F	-40 ... 140	-40 ... 140	-40 ... 140	-4 ... 140
Electric Specification					
Power Consumption		6W	9W	9W	8W
Current Drain @ 24V		0.25A	0.38A	0.38A	0.35A
Available Voltages		24Vdc, 48Vdc, 110/115Vdc, 125Vdc, 120Vac			
Voltage Tolerance	%	±12.5%			
	@24Vdc	21 - 27V			
Trip Signal		De-energise to trip (DTT)			
Analogue Input		4-20mA pass-through with HART 7			
Physical Specification					
Weight	kg	6.5	7.0	6.5	6.5
	lb	14.3	15.4	14.3	14.3
Ambient Working Temperature Range	°C	-40 ... +60	-40 ... +60	-40 ... +60	-20 ... +60
	°F	-40 ... +140	-40 ... +140	-40 ... +140	-4 ... +140

Contact Maxseal engineering for details regarding valve manifolds and NAMUR interfaces

Solenoid Valve Specification



Type	Direct operated poppet
Operation	Auto, Local Manual Reset, Remote Manual Reset
Redundancy Architectures	SIL2: 1oo1 & 2oo2 SIL3: 1oo2 & 2oo3
Mounting Orientation	Vertical or horizontal
All Exposed Metalwork	Stainless steel 1.4404 (316L)
Conduit Connection	1/2" NPT or M20 x 1,5
Insulation Class	Class H
Ingress Protection EN 60529	IP66
Safety Function Trip Position	Normally Open (NO), Normally Closed (NC)
Safety Function Trip Signal	De-energise to trip (DTT)

Certifications

Model Certification Code	ICO4E
ATEX	Ex db IIC T4/T6
T6 Ambient Temperature Limit	+43°C, +109°F
Additional Approvals	InMetro, Class 1 Div 2 FM3600 / FM3615 / CSA 22.2
Functional Safety	
SIL Capability	SIL 2 with HFT=0, SIL 3 with HFT=1
Operational Mode	Low demand mode
Device Type	Type A
Hardware Analysis Method	Prior Use : Route 2H
Data Sample	> 50-years, 200,000 valves & 2 billion hours
Confidence Interval	90%
Trip Signal	De-energise to trip (DTT)

Fluid Requirements

Pneumatic	Instrument air supply must be dry enough to avoid ice formation below +2°C (+35°F)
Hydraulic	Suitable for media conforming to NAS 1638 Class 6/ ISO 4406 18/16/13 and Devlon compatible
Seats & Seals †	
Pneumatic	NBR/FMP/ FKM
Hydraulic	Seat - Devlon O-Rings - NBR/FMP/ FKM

† Others available on request



Option Selector

YV★★★★★★S★

Fluid Type	Max Pressure	Substitute
Pneumatic	10Bar *	1
Hydraulic	300bar	7

Port Config	Susbtitute
3/2	3
5/2 Pneu 1/4" †	5

Operation	Susbtitute
Auto Reset	A
Local manual reset	P
Remote manual reset	J

Port Thread Type	Susbtitute
G (BSPP)	E
NPT	A
RVM 1/4" †	KF

Port Size	Cv	Susbtitute
1/4" Hyd	0.28 Cv	1
1/4" Pneu	0.8 Cv	1
1/2" Pneu	2.1 Cv	3
RVM 1/4" †	0.8 Cv	

Additional Certification	Suffix
InMetro	-INM

Voltage	Susbtitute
24Vdc	B
48/50Vdc	C
125Vdc	E
110Vac	J
110/115Vdc	R
120Vac	T

Conduit	IS Barrier	Substitute
M20 x 1.5mm	No	1
1/2" NPT	No	2
M20 x 1.5mm	Yes	3
1/2" NPT	Yes	4

Seal Material	Substitute [§]	
	Pneumatic	Hydraulic ‡
Nitrile	H	N
Viton	V	W

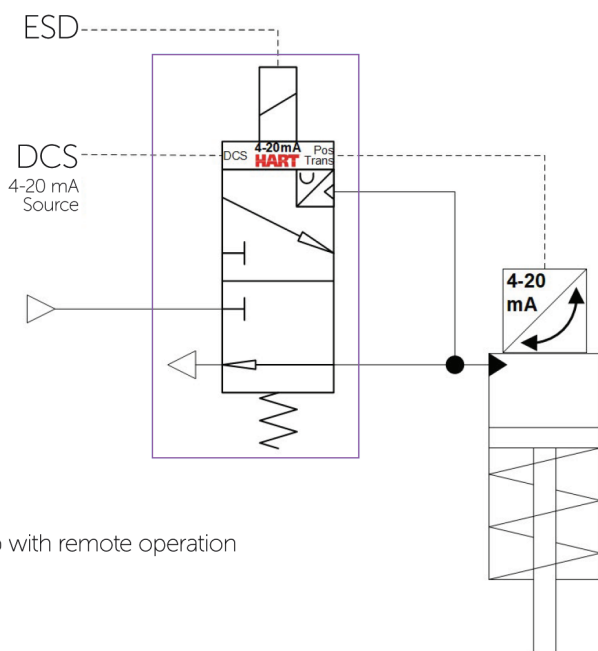
* For 1/4" at 20bar substitute "2"

† Consult Maxseal engineering for configuration advice

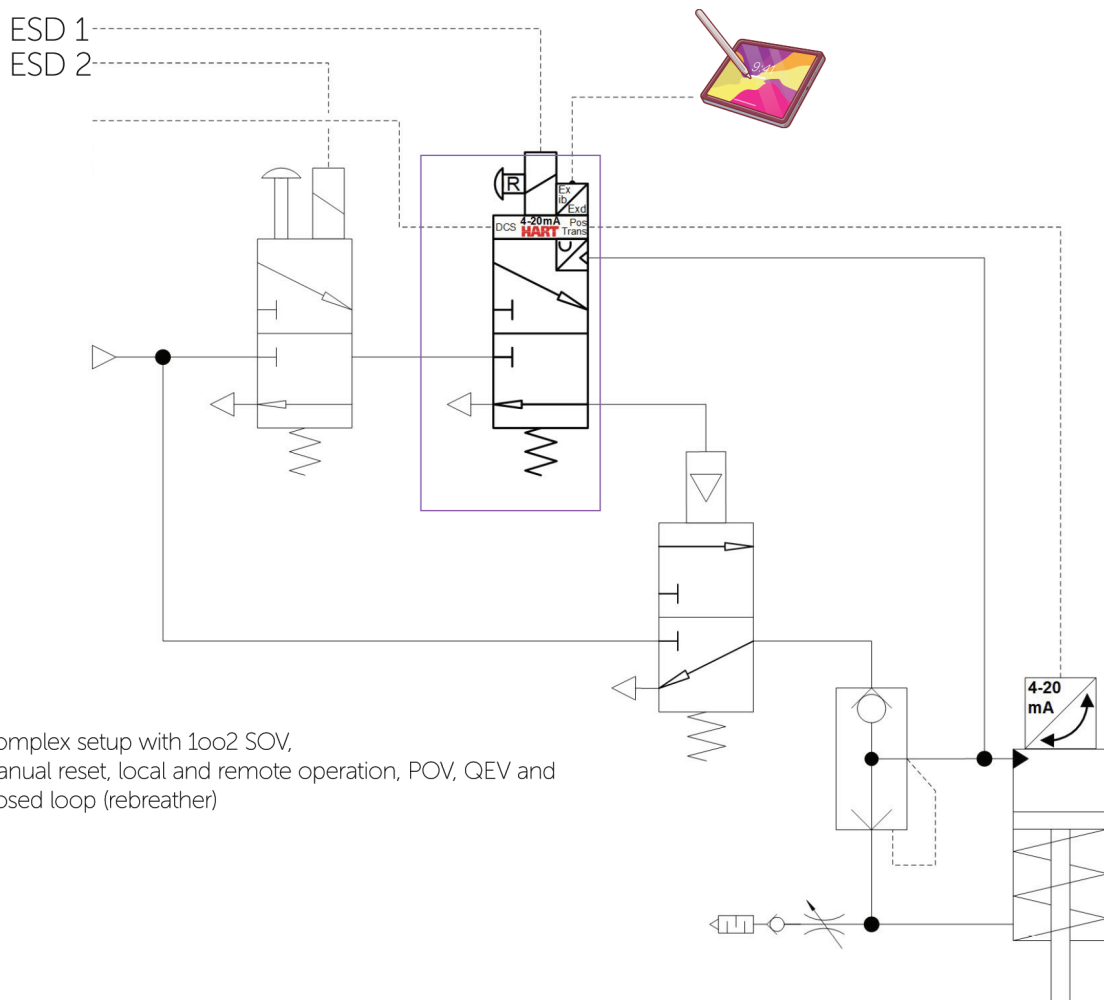
‡ Other seals available on request

§ Hydraulic fluid must be Devlon compatible

Typical Schematics



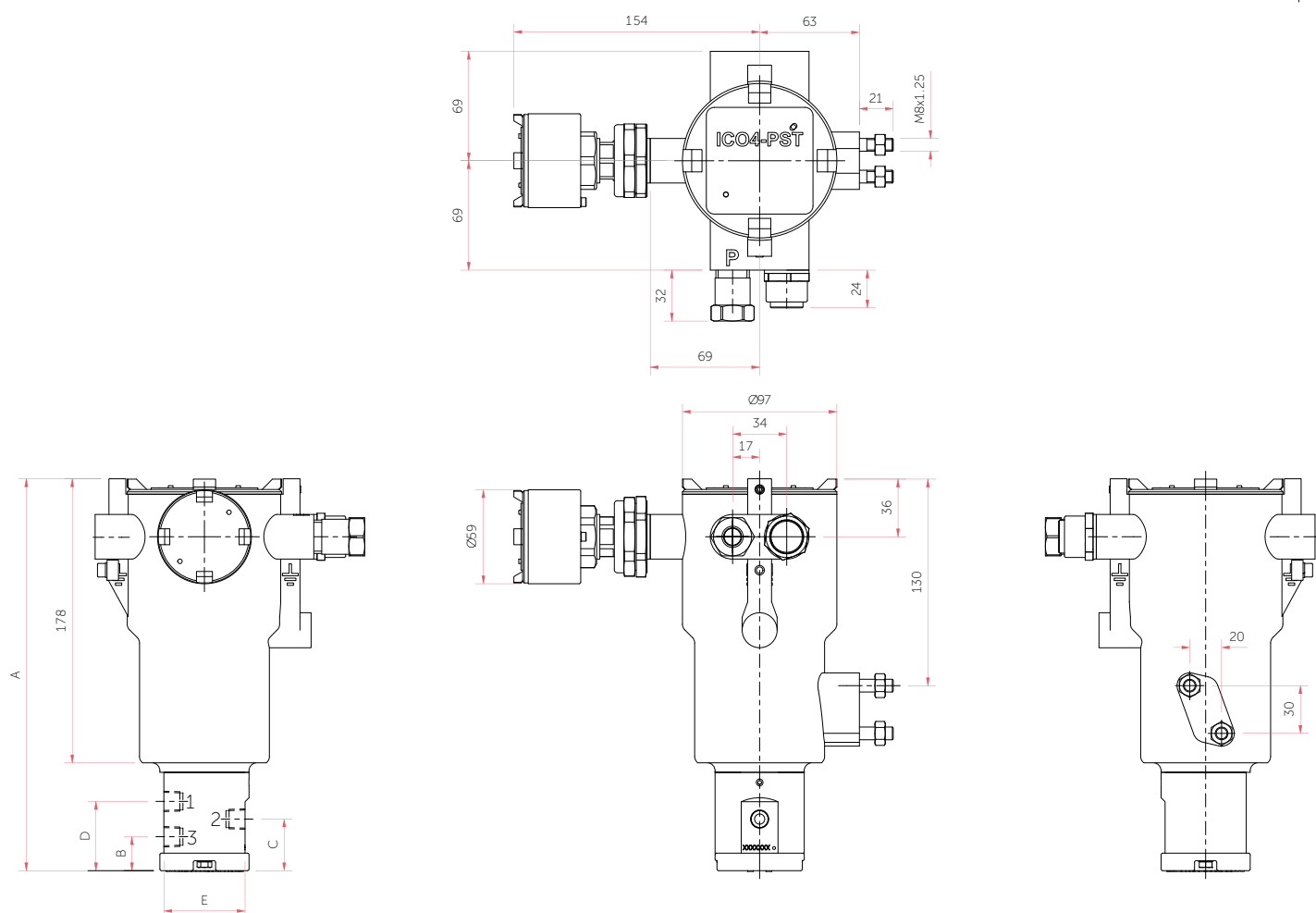
Basic setup with remote operation



Complex setup with 1oo2 SOV,
Manual reset, local and remote operation, POV, QEV and
closed loop (rebreather)

Dimensions

Dimensions in mm
Projection/First angle



		Dimensions (mm)					Port Function *			Weight (kg) †
Valve Type		A	B	C	D	E	1	2	3	
Pneumatic	1/4"	246	21	32	44	51	In	Out	Ex	7.3
	1/2"	273	18	42	64	64	Ex	Out	In	7.3
Hydraulic	1/4"	254	25	36	48	51	In	Out	Ex	7.3

* In = Inlet, Out = Outlet, Ex = Exhaust

† Include IS Barrier



ICO4-PST Solenoid Valve Options

IS Barrier

The ICO4-PST has an optional IS Barrier that provides an Exib connection for HART that can be opened for use without the need for a hot permit. This facilitates easy use of handheld devices such as the 457 communicator, Trex or suitable tablet computers.

Manual reset

A manual reset option provides a facility to manually reset the solenoid valve after an ESD event. After reenergising the ESD signal the operator must press the button to move the valve to the open position.

This button can be incorporated into the valve or used in a local junction box.

Local Control Panel

A Local Control Panel (LCP) can be used to initiate a PST and report the result. This can be configured to match the customers requirements, to include:

Functions:

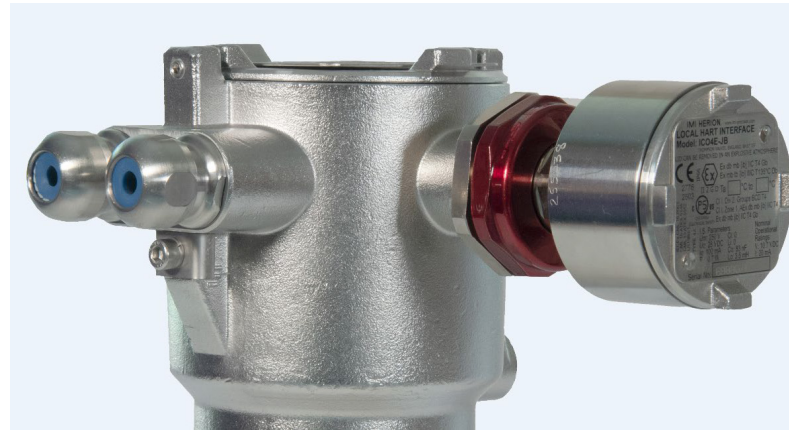
- Perform ESD
- Local ESD
- Manual reset
- Test lamps
- Perform solenoid valve test

Indication:

- Test pass/fail
- Process valve open/closed
- Ready to reset solenoid valve

Advanced Condition Monitoring

As the ICO4-PST captures data for pressure, position, and time, advanced valve condition monitoring can be performed by exporting this data in to custom designed tools. This permits the monitoring of valve torque parameters, such as Break To Close, over a period of time or against other identical valves. This can greatly help with planned and/or preventative maintenance thus reducing downtime caused by unexpected ESD valve failures.



Redundant Valve Manifolds

IMI manufacture Redundant Valve Manifolds that can incorporate the ICO4-PST. These can be configured for 1oo1, 1oo2, 2oo2 & 2oo3 solenoid valve redundant architectures. In addition, this can simplify the supply chain, warranty, and certification and greatly reduce the requirements for installation, commissioning, and servicing. The following components can be included in the manifolds:

- ICO4-PST
- Solenoid valves
- Filter regulator
- Flow control
- Check valves
- Pressure relief valve



Process Automation

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