RVM System

Engineering GREAT Solutions

Setting the standard for reliability and safety
Redundant Valve Manifold
IMI Precision Engineering is a world-leader in fluid and motion control. Building close, collaborative relationships with our customers, we gain a deep understanding of their engineering needs and then mobilise our resources and expertise to deliver distinctive products and solutions. Wherever precision, speed and engineering reliability are essential, our global footprint, problem-solving capability and portfolio of high performance products enables us to deliver GREAT solutions which help customers tackle the world’s most demanding engineering challenges.

- **Reliability**
  We deliver and support our high quality products through our global service network.

- **High performance products**
  Calling on a world-class portfolio of fluid and motion control products including IMI Norgren, IMI FAS, IMI Buschjost, IMI Maxseal and IMI Herion. We can supply these singly, or combined in powerful customised solutions to improve performance and productivity.

- **Partnership & Problem Solving**
  We get closer to our customers to understand their exact challenges.

Innovation, products and service
Setting the standard for safety, reliability and performance

IMI Precision Engineering has over 80 years experience in providing oil, gas and chemical solutions that are proven in safety, reliability and durability, in the most extreme environmental and operating conditions around the globe.

With world-class product ranges including IMI Norgren, IMI Buschjost, IMI Herion and IMI Maxseal, our products are designed to work effectively in aggressive environments and extreme temperatures and meet international standards such as:

- ATEX
- TÜV
- TR-CU
- INMETRO
- CSA
- KOSHA
- DVGW
- FM AND UL
- NEMA

At the heart of our offering to the Energy sector are stainless-steel solenoid valves and air preparation equipment (filters, regulators and filter-regulators), pneumatic and hydraulic pressure switches, I/P and E/P converters, 2/2 way and 3/2 way process valves and Redundant Valve Manifold (RVM) systems.

Our work with leading national and international oil and gas companies and global suppliers means that we talk our customers’ language, and can bring specialised experience about legislation, standards and specifications.

Our Reach
Global manufacturing and support

➢ We have a global network of technical centres close to our key markets where skilled and experienced design and development engineers produce custom-built solutions to give our customers competitive advantage.

➢ With established manufacturing facilities globally we have the manufacturing and support capabilities to be able to cope with the most demanding international projects.

➢ With an established sales and service network in 75 countries, we have the reach and capability to ensure continuity of supply and local support where it is needed.

Sales & Service in 75 countries

➢ Sales, manufacturing and technical centres
➢ Sales locations
➢ Manufacturing locations
Expertise in the oil, gas & chemical sector

The IMI Precision Engineering Energy range covers a wide range of applications, in many of the processes all the way through onshore and offshore extraction to distribution. With references from some of the key major players in the industry, we have proven expertise and reliability.

Upstream solutions

IMI Maxseal is an extremely high quality range of stainless steel solenoid valves, designed and manufactured with reliability & integrity in mind. IMI Maxseal valves have performed exceptionally well in harsh environments all across the world for over 50 years.

These products are traditionally associated with offshore oil & gas applications and coastal environments where a fully stainless steel construction is advantageous.

IMI Maxseal valves are in operation at all the big international oil companies, and most of the significant nationals.

- Global certifications including SIL, ATEX, IECEx, TR-CU, CSA, CCOE, FM & Inmetro
- Suitable for SIL / Safety Instrumented Systems
- Reliable & resilient in hazardous environments
- Low power options
- Pneumatic & hydraulic options

Downstream solutions

Safe and reliable operation in chemical and petrochemical applications is increasingly vital to plant operations.

Our extensive range of high performance products includes the world-leading IMI Herion pilot and control valves, created specifically for the chemical and process industries.

- Global certifications including SIL, ATEX, IECEx, TR-CU, CSA, CCOE, FM & Inmetro
- High functionality
- Energy saving modular solenoid systems
- Compact design
- Resilient in hazardous environments

3 Watt power consumption

Integrated stainless steel

FFR = 10

Interchangeable coil

High efficiency

Upstream solutions

IMI Maxseal

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Downstream solutions

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Global certifications including SIL, ATEX, IECEx, TR-CU, CSA, CCOE, FM & Inmetro

High functionality

Energy saving modular solenoid systems

Compact design

Resilient in hazardous environments
Redundant valve manifold (RVM) systems

Redundant systems are required to increase uptime by ensuring the process continues to run in the event of a valve failure; or to increase safety by ensuring the process can be shut down in the event of a failure - or both.

The issues with existing solutions

- Current systems are hard piped systems, components bolted together on a back plate, or tie rodded together
- The complete systems are not SIL certified
- Difficult to service and maintain
- Incorrect configuration can be dangerous
- Number of potential leaks
- No failure indication for valves and outputs

The RVM system solves these problems. Combining safety and availability in a single convenient package. Our RVM system offers simpler installation, helps eliminate unplanned shutdowns and is available in either aluminium or stainless steel to suit both upstream and downstream applications.

- System replaces components, panels and pipe work
- Available in aluminium or stainless steel construction
- Utilising industry proven products and technology

Three design options -

- Compact, semi-modular and modular
  - Reduces potential leak paths and installation time. Mounted at the point of use next to the process valve.
  - Space saving with the smallest overall footprint
  - Visual pressure indicators showing valve position status

- Modular design
  - Added benefit of a By-pass function enabling valve removal online, plus visual pressure indicators showing valve position status

- Valve position sensors
  - Provide electrical feedback on the valve position status

- Exhaust guards
  - Prevent moisture and particle ingress from the environment

- Cable terminations inside coil
  - No additional Ex terminations required

SIL certified components enable complete SIL certified RVM systems

- Ensures safe operation

- International approvals

- Diversity option
  - Unique combination of valve technology from IMI Herion and IMI Maxseal on the same manifold
RVM system for Chemical and Petrochemical applications

The natural choice for Safety Instrumented Systems in downstream applications, the IMI Herion 2401x or 980xx series solenoid valves have been successfully used in the Chemical and Petrochemical industries for over 40 years, gaining a reputation for reliability and safety. Available in aluminium or stainless steel, key features include an interchangeable coil system and optional valve position feedback sensors.

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Benefits

- Compact or modular manifold designs
- Interchangeable solenoid coils
- Reduced potential leak paths
- Integrated outlet filter to protect against particle ingress
- Modular construction enabling standard and customised solutions
- Fast, simple removal of individual components
- Bypass function for online valve replacement
- Up to 12 year maintenance service intervals
- 12 year 24011 series, 8 year 24010 series, 8 year 980xx series
- Large reduction in installation time
- Cable terminations inside coil housing negating the need for additional ex certified termination enclosures
- Standard and high flow options
- Integrated exhaust guards preventing moisture ingress

Specification

- Aluminium, or stainless steel construction
- IEC 61508 SIL based on field reliability data
- DIN EN 161/3394 DVGW type examination; Automatic shut off / control valves
- 1oo2, 2oo2 and 2oo3 options providing “safety”, “availability” or “safety & availability” functionality
- Inductive proximity sensing of valve poppet position
- 1/4 and 1/2 porting options
- Temp. range: 24011: -40 to +120°C (-40 to +248°F)
- Reliably direct acting poppet valve operating from 0 to 10 bar (0 to 145 PSI)
- Temp. range: 980xx: -40 to +80°C (-40 to +176°F)
- SIL Version: -25 to +60°C (-13 to 140°F)
- 10 times factor of safety, on solenoid de-energising return force

Approvals

- IECEx, INMETRO, FM, CSA, NEPSI, TR-CU, CCOE & SIL
RVM systems for Oil and Gas applications

With no reported ‘coil burn outs’ in over 20 year’s service, the IMI Maxseal ICO3 series valves have proved their reliability and value in upstream applications. Featuring a very high 5kg valve return spring and a unique, thermally efficient coil manufactured in stainless steel.

Benefits

- Compact or modular manifold designs
- Integrated outlet filter to protect against particle ingress
- Reduced potential leak paths
- Modular construction enabling standard and customisable solutions
- Bypass function for online valve replacement
- Integrated exhaust guards preventing moisture ingress

Specification

- All 316L stainless steel construction
- 1002, 2002 and 2003 options providing “safety”, “availability” or “safety & availability” functionality
- 5kg (10 times factor of safety) return spring (4kg Exia solenoid)
- Temp. Range: -55 to +90°C (-67 to 194°F), By-pass valve -40 to +80°C (-40 to +176°F)
- 1/4 and 1/2 porting options
- Reliable direct acting valve operating from 0 to 12 bar (0 to 174 PSI), By-pass valve 0 to 10 bar (0 to 145 PSI)

Approvals

- IECEx, INMETRO, FM, CSA, CRN, TR-CU, CCOE & SIL
Redundant valve manifold functionality options

The RVM System is available in three functionality options, the selection of which will be dependent on the Safety Instrumented Function (SIF) that it is to be used within. 1oo2, 2oo2 double channel and uniquely 2oo3 triple channel systems are available.

> Compact 1oo2  > Modular 1oo2 (with bypass)  > 1oo2 “Safety” Double channel redundant system

Redundancy for the process valve closure. Any one out of two solenoid valves needs to de-energise to ensure safety.

> Compact 2oo2  > Modular 2oo2 (with Bypass)  > 2oo2 “Availability” Double channel redundant system

Redundancy for the process valve to remain open. Any one out of two solenoid valves needs to remain energised to ensure availability.

> Compact 2oo3  > Modular 2oo3 (with Bypass)  > 2oo3 “Safety AND Availability” Triple channel redundant system

Any two channels out of three need to operate to provide safety (process valve closure) and availability (process valve remain open). The RVM system combines the strength of “1oo2” and “2oo2” thus increasing both safety and availability functions.

Hydraulic RVM Systems

Hydraulic 2oo3 Fail Safe Trip System for Gas and Steam Turbines

The IMI Herion Hydraulic 2oo3 system provides safety and availability for main shut off emergency process valves with hydraulic actuators.

Using three identical solenoid valves to create a flexible 2oo3 voting logic for unequalled failure tolerance, the system uses redundant cartridges which allow high flow rate and a quick response time.

- Available for low and high operational pressure 5 – 320 bar
- Different sizes provide high flow availability 200 – 4000 l/min
- Cartridges sizes DN 16; 25; 32; 40; 50 AND 63
- Fast reaction time
- Safety Control – direct monitoring of solenoid valves position closed open (proximity switches)

> SIL 3 approval
> IP 65
> Certification to ATEX, GOST
> Redundant cartridges
> Partial Stroke Testing Option
> Maintaining Safety 2oo3 during operation (redundant 2oo3 system)
> Prepared outlets for pressure transducers