

RVM System



Engineering GREAT Solutions



Setting the standard for reliability and safety
 Redundant Valve Manifold

Contents

- 03 Introduction
- 04 Setting the standard for safety, reliability and performance
- 05 Global Reach
- 06 Upstream Solutions
- 07 Downstream Solutions
- 08 Redundant valve manifold (RVM) systems
- 10 RVM system for Chemical and Petrochemical applications
- 12 RVM systems for Oil and Gas applications
- 14 Redundant valve manifold functionality options
- 15 Hydraulic RVM Systems

Innovation,
products
and service



Engineering GREAT solutions through people, products, innovation and service

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.





Production



Transportation



Refining



Petrochemical



Chemical



Power Generation

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 and manufacturing facilities in 75 countries give us the global reach, understanding and capabilities that customers look for



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

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-rodged 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.

> Compact design

Space saving with the smallest overall footprint

> Semi-modular design

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

Modular design with By-pass



Semi-modular



Diversity



Compact design

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.



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) (depending on sealing material)
Temp. range: 24010: -25 to +80°C (-13 to +176°F) | > Reliable direct acting poppet valve operating from 0 to 10 bar (0 to 145 PSI) |
| > Temp. range: 980xx: -40 to +60°C (-40 to +140°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

V81-Modular RVM with By-Pass



V82-Compact RVM



V87 - Semi modular RVM without By-pass



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 | > Coil thermally and magnetically engineered for performance |
| > Integrated outlet filter to protect against particle ingress | > Standard and high flow options |
| > Reduced potential leak paths | > Large reduction in installation time |
| > Modular construction enabling standard and customisable solutions | > Fast, simple removal of individual components |
| > Bypass function for online valve replacement | > Cable terminations inside coil housing negating the need for additional ex certified termination enclosures |
| > Integrated exhaust guards preventing moisture ingress | > Up to 10 years maintenance service intervals |

Specification

- | | |
|---|--|
| > All 316L stainless steel construction | > 1oo2, 2oo2 and 2oo3 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

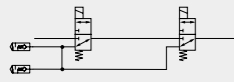
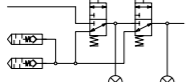
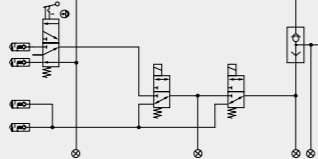
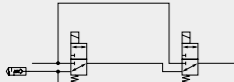
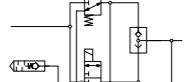
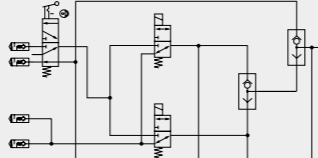
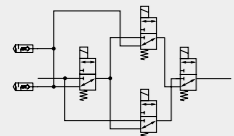
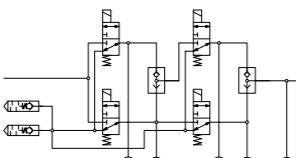
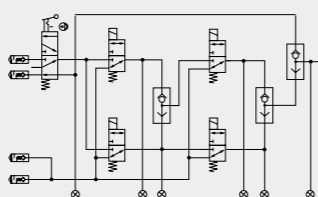
- > IECEx, INMETRO, FM, CSA, CRN, TR-CU, CCOE & SIL



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.

<p>> Compact 1oo2</p> 	<p>> Semi modular 1oo2</p> 	<p>> Modular 1oo2 (with bypass)</p> 	<p>> 1oo2 "Safety" Double channel redundant system</p> <p>Redundancy for the process valve closure.</p> <p>Any one out of two solenoid valves needs to de-energise to ensure safety.</p>
<p>> Compact 2oo2</p> 	<p>> Semi modular 2oo2</p> 	<p>> Modular 2oo2 (with Bypass)</p> 	<p>> 2oo2 "Availability" Double channel redundant system</p> <p>Redundancy for the process valve to remain open.</p> <p>Any one out of two solenoid valves needs to remain energised to ensure availability.</p>
<p>> Compact 2oo3</p> 	<p>> Semi modular 2oo3</p> 	<p>> Modular 2oo3 (with Bypass)</p> 	<p>> 2oo3 "Safety AND Availability" Triple channel redundant system</p> <p>Any two channels out of three need to operate to provide safety (process valve closure) and availability (process valve remain open).</p> <p>The RVM system combines the strength of "1oo2" and "2oo2" thus increasing both safety and availability functions.</p>

Hydraulic RVM Systems

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

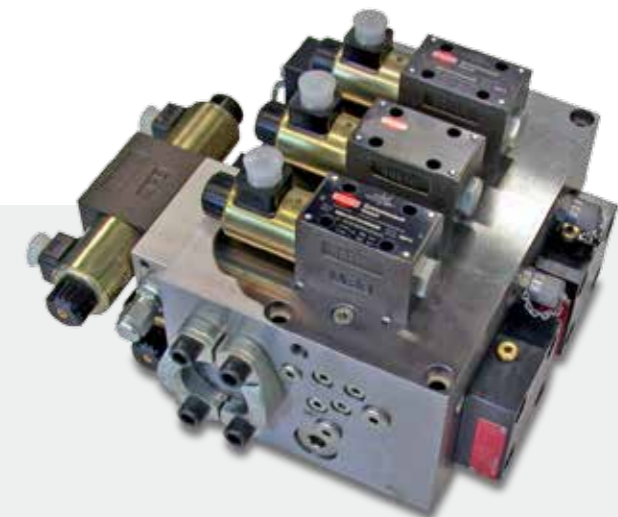
The IMI Herion Hydraulic 2oo3 system provides safety and availability for main shut off emergency process valves with hydraulic actuators.

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

Hydraulic 2oo3 system



AUSTRALIA

Tel: +61 3 9213 0800
Fax: +61 3 9213 0890
enquiry@norgren.com.au

AUSTRIA

Tel: +43 22 36 63 520
Fax: +43 22 36 63 520 20
enquiry@at.norgren.com

BELGIUM & LUXEMBURG

Tel: +32 2 333 44 11
Fax: +32 2 333 44 88
enquiry@be.norgren.com

BRAZIL

Tel: +55 11 5698 4000
Fax: +55 11 5698 4001
vendas@norgren.com

CANADA

Tel: +1 303 794 2611
Fax: +1 303 795 9487
enquiry@usa.norgren.com

CHINA

Tel: +86 21 2416 1800
Fax: +86 21 2416 1900
info@norgren.com.cn

CROATIA

Tel: +386 4 5317550
Fax: +386 (64) 7000949
info@si.norgren.com

**CZECH REPUBLIC
& SLOVAKIA**

Tel: +420 465 612 879
Fax: +420 465 612 908
info@cz.norgren.com

DENMARK

Tel: +45 44500800
norgren@norgren.dk

FINLAND

Tel: +358 9 5712 140
Fax: +358 9 5712 1440
info@norgren.fi

FRANCE

Tel: +33 1 60 04 95 95
Fax: +33 1 60 43 18 86
norgren@norgren.fr

GERMANY

Tel: +49 2802 49-0
Fax: +49 2802 49356
info@norgren.com

HONG KONG

Tel: +852 2492 7608
Fax: +852 2498 5878
enquiry@norgren.com.hk

HUNGARY

Tel: +36 1 284 9000
Fax: +36 1 284 8980
info@norgren.hu

INDIA

Tel: +91-120-4089500
Fax: +91-120-4089599
enquiry@norgren.co.in

IRELAND

Tel: +353 1 8300 288
Fax: +353 1 8300 082
dublin@norgren.com

ITALY

Tel: +39 039 60 631
Fax: +39 039 60 63 301
info@norgrenitalia.it

JAPAN

Tel: +81 6 6876 8913
Fax: +81 6 6876 8929
toiawase@norgren.com

MALAYSIA

Tel: +60 3 5614 2888
Fax: +60 3 5614 2889
mysales@norgren.com

MEXICO

Tel: +52 55 1500 64 00
Fax: +52 55 1500 64 30
neumatica@norgren.com.mx

NETHERLANDS

Tel: +31 (0)36 548 6828
Fax: +31 (0)36 548 6838
enquiry@nl.norgren.com

NEW ZEALAND

Tel: +64 9 579 0189
Fax: +64 9 526 3398
enquiry@norgren.co.nz

NORWAY

Tel: +47 22 90 80 80
Fax: +47 22 90 80 81
norgren@norgren.no

POLAND

Tel: +48 22 518 9530
Fax: +48 22 518 9531
biuro@norgren.pl

ROMANIA

Tel: +40 31 425 17 06
Fax: +40 31 425 17 08
office@norgren.ro

RUSSIA

Tel: +7 495 640 59 63
Fax: +7 495 640 59 61
norgren@imi-international.ru

SINGAPORE

Tel: +65 6862 1811
Fax: +65 6862 1917
sgpsales@norgren.com

SLOVENIA

Tel: +386 4 531 7550
Fax: +386 4 531 7555
info@si.norgren.com

SPAIN

Tel: +34 93 748 9800
Fax: +34 93 783 0838
norgren@norgren.es

SWEDEN

Tel: +46 40 59 51 00
Fax: +46 40 49 50 90
info@norgren.se

SWITZERLAND

Tel: +41 71 973 82 00
Fax: +41 71 973 82 01
norgren@norgren.ch

TAIWAN

Tel: +886 33162673
Fax: +886 33162910
enquiry@norgren.com.tw

THAILAND

Tel: +66 2750 3598/99
Fax: +66 2750 3855
thsales@norgren.com

UK

Tel: +44 1543 265 000
Fax: +44 1543 265 827
advantage@norgren.com

USA

Tel: +1 303 794 2611
Fax: +1 303 798 4856
enquiry@usa.norgren.com

**Supported by
distributors worldwide**

For information on all
Norgren companies visit
www.norgren.com

Norgren, Buschjost, FAS,
Herion and Maxseal are
registered trademarks
©Norgren Limited 2014.
Due to our policy of continuous
development, Norgren reserve
the right to change specifications
without prior notice.

z7846BR en/11/14

Selected Images used under
license from Shutterstock.com

www.norgren.com
www.imi-precision.com

