

WHITE PAPER

# Valve Islands

## Specifying Valve Islands in Automation Applications



# CONTENTS

<b>Introduction</b>	<b>03</b>
<b>Solving customer challenges</b>	<b>04</b>
<b>Norgren's Valve Island portfolio – the one-stop-shop</b>	<b>06</b>
<b>Selecting the right Valve Island</b>	<b>08</b>
<b>A connected future with IO-Link</b>	<b>10</b>
<b>Norgren's one-stop-shop for Valve Island solutions</b>	<b>11</b>

# Norgren – Breakthrough Engineering

The challenges and problems the world faces grow ever more complex. Businesses demand fresh thinking and new approaches to successfully tackle fundamental issues such as climate change, rapid population growth and using technology to improve the quality of lives.

Breakthrough Engineering is at the heart of Norgren's offering and is an integral element in driving the essential systems we all rely upon.

From improving speed, productivity, reliability, and efficiency of equipment, to generating significant energy and cost savings, or lowering total cost of ownership across many industries - Norgren's solutions are designed to help customers pursue progress, achieve new goals, and overcome problems.

Norgren offers insight, technical excellence, and a true collaborative approach to help organisations forge a brighter future by breakthrough engineering for a better world.

**Breakthrough  
Engineering  
for a Better World**





# Solving customer challenges

**Creating value for our customers by solving their key challenges and addressing their industrial needs is at the heart of Norgren's values.**

Today's industrial automation users are seeking flexible and innovative application solutions that optimise operational efficiencies, save time and expense, reduce complexity, and lessen the resource burden of carrying out maintenance responsibilities.

Versatility, reliability, and proven performance are the key characteristics they require from component solutions that support OEM machinery innovation, busy production lines, critical processes, and vital industrial systems.

The many options within the Norgren Valve Island portfolio are designed to help OEMs and end users address the day-to-day challenges they face. Below, we've considered the challenges our customers regularly face and how Valve Islands with the latest communications and connectivity options can help solve them.



## Minimise Process Downtime

Anytime a machine is down it costs a business money. Lost production is very expensive and cannot be recovered, meaning maintenance teams have limited time to identify the issue and get a machine back in service. Maintenance engineers would like to receive proactive alerts when a product is at increased risk of failure. Being able to predict errors and failures gives maintenance teams the opportunity to prevent the machine from going down in the first place. Additionally, end users are also seeing a shortage of skills and resources in critical maintenance and specialist roles.



### Solution

The connectivity options available across Norgren's Valve Island portfolio can provide engineers with data-driven performance insight to optimise operational efficiencies and enhance productivity ambitions.

IO-Link technology provides predictive maintenance messaging, that for example, a solenoid coil on a Valve Island should be changed before it could possibly fail, enabling maintenance teams to take action that will reduce unplanned downtime. Given the skills shortage in maintenance and specialist roles, smart Valve Islands which can simplify maintenance and installation, provide diagnostic information, and require less specialisation and knowledge is of value to both end users faced with production loss and OEM machine builders providing technical support to their installed equipment base.

## Complexity in Machine Build and Design

Machine Builders (OEMs) want to build machines quickly, simply and cost effectively. Build times are critical, assembly technician's time is expensive and hardware cost pressures are an important consideration.

Minimising space taken up on the machine and providing mounting flexibility so it's easy to add, remove and reposition hardware on the machine is also important, and can reduce installation and set-up time, especially where machines have multiple customisation options.



### Solution

Valve Islands offer the flexibility and modularity OEMs need to design customised machines tailored towards the needs of a specific customer. They are available in a wide range of configuration options, valve functions and are easily expandable and adaptable in the field.

Complex wiring and connections can mean more errors, extensive testing and fault finding. Valve Islands offer the inherent benefit of reduced number of connections, reduced pipework, simpler electrical and data connections, leading to minimal potential for errors and leakage.

## Industrial Automation System Integration

Distributors and Integrators specialising in system design and motion control, are challenged to integrate multiple products and sensing technologies into one solution and to do so within a tight timeframe.

This can require coordination across different technology platforms from multiple manufacturers which can be challenging and costly due to the lack of in-house knowledge, resource and highly skilled employees (particularly for software).



### Solution

IO-Link technology, which is available as standard on Norgren VR and VS Series' Valve Islands, helps distributors seamlessly integrate hardware and software into one system regardless of the technology or brand of each of the devices on-board the machine. IO-Link is a vendor agnostic system, which means any technology can be integrated together, from pneumatics to pumps, to sensors and vision systems.

Regardless of what PLC a customer is using (Siemens, Rockwell Allen-Bradley, Mitsubishi etc.), if they use IO-Link Valve Islands and other IO-Link products, a distributor can quickly and confidently integrate and add numerous devices into a system in a plug-and-play manner.

Norgren offers a complete IO-Link system solution, including a wide range of IO-Link enabled devices such as IO-Link masters, I/O modules, switches and sensors, in addition to Valve Islands for a decentralised solution with ultimate flexibility.



# Norgren's Valve Island portfolio – the one-stop-shop

Norgren has been creating Valve Island solutions for over 20 years. With long standing expertise and heritage, the company has established a strong reputation for the delivery of flexible, high performing and connected products for industrial automation and motion control requirements. Modular Valve Islands are specified for use in automation applications across many industrial sectors including food & beverage, machine tools, mechanical, packaging, material handling, and paper industries.

## Key benefits

Users selecting a Valve Island solution will see a reduction in the number of pneumatic components and connections which together with simple online configuration and ordering via a single part number, can ensure the selection and installation process can be completed with greater efficiency.

## Connectivity to drive efficiencies

Norgren offers an extensive portfolio of Valve Island solutions through its well-established VR, VS and VM series. Each series provides a wide range of connectivity choices to meet growing customer demands, including Multipole, Ethernet/IP, PROFINET, EtherCAT and IO-Link.

Providing ultimate flexibility in machine design, Industrial Ethernet connectivity offers a standardised platform for networking of devices. This offers real-time data transmission together with large network coverage, making it ideal for applications where motion control is critical to production cycles. Meanwhile, Norgren Valve Islands with IO-Link offer a standard serial communication protocol, which can connect to intelligent sensors, field devices and actuators. Furthermore, IO-Link does not require any complicated wiring for ease of installation.

Valve islands, also known as valve manifolds, system valves or plug in type manifolds, are commonly used on machine installations to reduce assembly and downtime, optimise system design and adopt modern control protocols. Mounted together with a single air supply and common exhaust, Valve Islands help to reduce pipework, electrical connections and overall system complexity. They offer key operational, space saving and flexibility benefits for users when compared to standalone valve specification.

The group mounted islands, which are fully pressure tested, also help to save space on machine applications where mounting flexibility is a key consideration, whilst varied electrical connections are available to suit individual needs.

Delivering increased data availability at sensor level also ensures operational efficiencies of system components is maintained, while also providing end users with visibility into errors and health status from each device.

Based upon a highly configurable modular system, each series offers an innovative approach that provides versatility, reliability and straightforward maintenance and diagnostic support through its plug-in subbase. While also allowing for easy interruption-free replacement of system components.

Finally, the Norgren Valve Island portfolio delivers energy saving capability through the use of low power solenoids.



## VR Series

Flexibility and modularity are the key characteristics of the Norgren VR Valve Island range. A simple plug-in, sub-base style design allows for valves to be easily exchanged for straightforward installation and maintenance. Expanding the size and functionality of the Valve Island to match changing application demands is a simple "plug-and-play" experience.

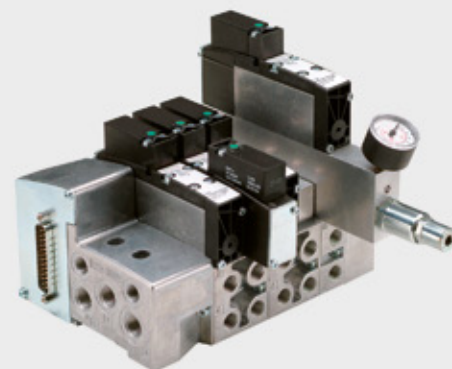
- » Two sizes – 10mm and 15mm
- » Maximum operating pressure 7 bar (101psi)
- » Up to 24 solenoids
- » Flow rates up to 590 l/min (VR15)
- » Wide operating temperature
- » 24 DC & 12V DC Multipole, Ethernet/IP, PROFINET, EtherCAT and IO-Link.
- » LED indicators
- » Horizontal and vertical installation options
- » Easy to replace valves, fittings, and silencers
- » Robust and lightweight construction



## VS Series

The VS Series provides the versatility to choose the features needed with the modularity to easily expand and add accessories. Whether using a simple Multipole, complex Fieldbus, PROFINET, EtherNet/IP, or IO-Link system, expanding the size of a Valve Island to match the changing demands of equipment is a simple exercise. The plug-in Printed Circuit Board (PCB) technology takes only seconds to install, and additional sub-bases can be attached with only two screws.

- » Universal PNP/NPN 24V DC Multipole connection
- » Extensive multi-pressure options
- » Up to 40 solenoids
- » Two sizes of plug-in subbase valves
- » Flow rates from 550 to 1350 l/min
- » Two spool technologies
- » Eleven valve configurations
- » Multiple Multipole, Fieldbus, industrial Ethernet, and IO-LINK protocols available
- » 200 million life cycle valve life
- » Robust construction
- » ATEX approved
- » Easy exchange of system components



## VM Series

The VM Series Valve Islands are available in both 10 mm and 15 mm valve body widths offering one of the best 'footprint to flow' ratios in the market. The VM Series also provides fast and easy connectivity via individually wired, Multipole, Fieldbus\*, PROFINET\* or EtherNet/IP\*.

The 10mm valve body width system valve offers an unsurpassed flow rate of 430 l/min. Its design ensures it is highly suitable for many applications across a wide range of industrial sectors.

- » Fast and easy connectivity via Individually wired, Multipole, Fieldbus, PROFINET or EtherNet/IP
- » Modular system offering a wide range of valve options
- » Available in 8, 10, 12 and 16 stations with up to 32 solenoids
- » Reliable using proven technology for over 100 million life cycle valve life
- » Integrated push in fittings and bottom ported
- » Compact design
- » Maintenance friendly
- » Balanced spool for vacuum applications



# Selecting the right Valve Island



When looking to select the most appropriate Valve Island solution, some key considerations can help guide the final choice. By asking fundamental questions, users can be assured that they will specify the correct Valve Island for their application.

These questions should include:

- » How many components need to be controlled?
- » Will there be a need to add further components in the future?
- » What are the operating conditions for the Valve Island, will it have to deal with a harsh or challenging environment?
- » What flow rate is required?
- » What control options are required – Multipole, Fieldbus, PROFINET, Ethernet/IP, IO-LINK?
- » What size and type of outlet ports?
- » Do I need multiple pressure zones?

A quick example of the features of Norgren's Valve Islands range is shown below

Description		VR10	VR15	VM10	VM15	VS18	VS26
Control Option	Multipole	●	●	●	●	●	●
	Industrial Ethernet	●	●	●		●	●
	IO-Link	●	●			●	●
	Fieldbus			●		●	●
	Individually Wired			●	●		
	Single Station					●	●
Maximum Flow Rate	0-500	●		●			
	500-1000		●		●	●	
	1000-1500						●
Outlet Ports	G Threaded Ports					●	●
	Push In Fitting (PIF) Metric	●	●	●	●	●	●
	NPTF Threaded Ports					●	●
	Push In Fitting (PIF) Inch	●	●	●	●	●	●
Standards Approval	ATEX			●	●	●	●
	ISO15407-2					●	●
	UL			●	●		
Ingress Protection	IP65	●	●	●	●	●	●
Pressure Zoning		●	●	●	●	●	●



## Configure the best solution

To help customers, Norgren offers an online Valve Island product configurator that supports the selection of the correct Valve Island range to meet specific requirements. Through a step-by-step process, customers can use a simple drop-down menu to cover control options, required flow rates and outlet ports to build the most appropriate Valve Island product solution.

Price and availability information is also provided, as well as the ability to see a visualisation of the configuration and access downloadable 2D and 3D CAD files.

The Norgren Valve Island configurator can be found at: [www.norgren.com](http://www.norgren.com)



# A connected future with IO-Link

**The influence of digitalisation and the move towards Industry 4.0 is driving demand for intelligent solutions across industrial automation and motion control applications. The ability to access data-driven and real-time insight on the performance and condition of critical components and systems is creating powerful infrastructures that are enabling industrial users to better understand, manage and utilise their manufacturing processes.**

IO-Link is the ideal solution to deliver such insight. It is a standardised communication system and is easy to install. It enables continuous diagnostics as well as remote and automated configuration of all IO-Link devices in the system, providing an instant and intelligence-led view on important aspects of component and system health and performance.

IO-Link capability is available within the Norgren Valve Island portfolio offering a range of features and benefits.

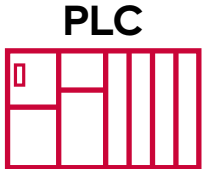
- » An open and standardised communication protocol
- » Installation ease
- » Reduced wiring
- » Remote configuration and monitoring capability
- » Simple device replacement
- » Intelligent sensing
- » Extended diagnostics



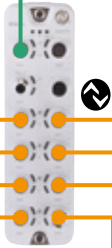


EtherNet/IP EtherCAT

Industrial Ethernet



IO-Link Master



IO-Link Device I/O Module



IO-Link Devices

Simple Input / Output products

# Norgren's one-stop-shop for Valve Island solutions

For more information about Norgren's portfolio of Valve Island options, as well as supporting accessories, technical help, and product guides, please visit [www.norgren.com](http://www.norgren.com)



Norgren operates four global centres of technical excellence and a sales and service network in 50 countries, as well as manufacturing capability in Brazil, China, Czech Republic, Germany, India, Mexico, UK and the USA.

For information on all Norgren companies visit

[www.norgren.com](http://www.norgren.com)

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