

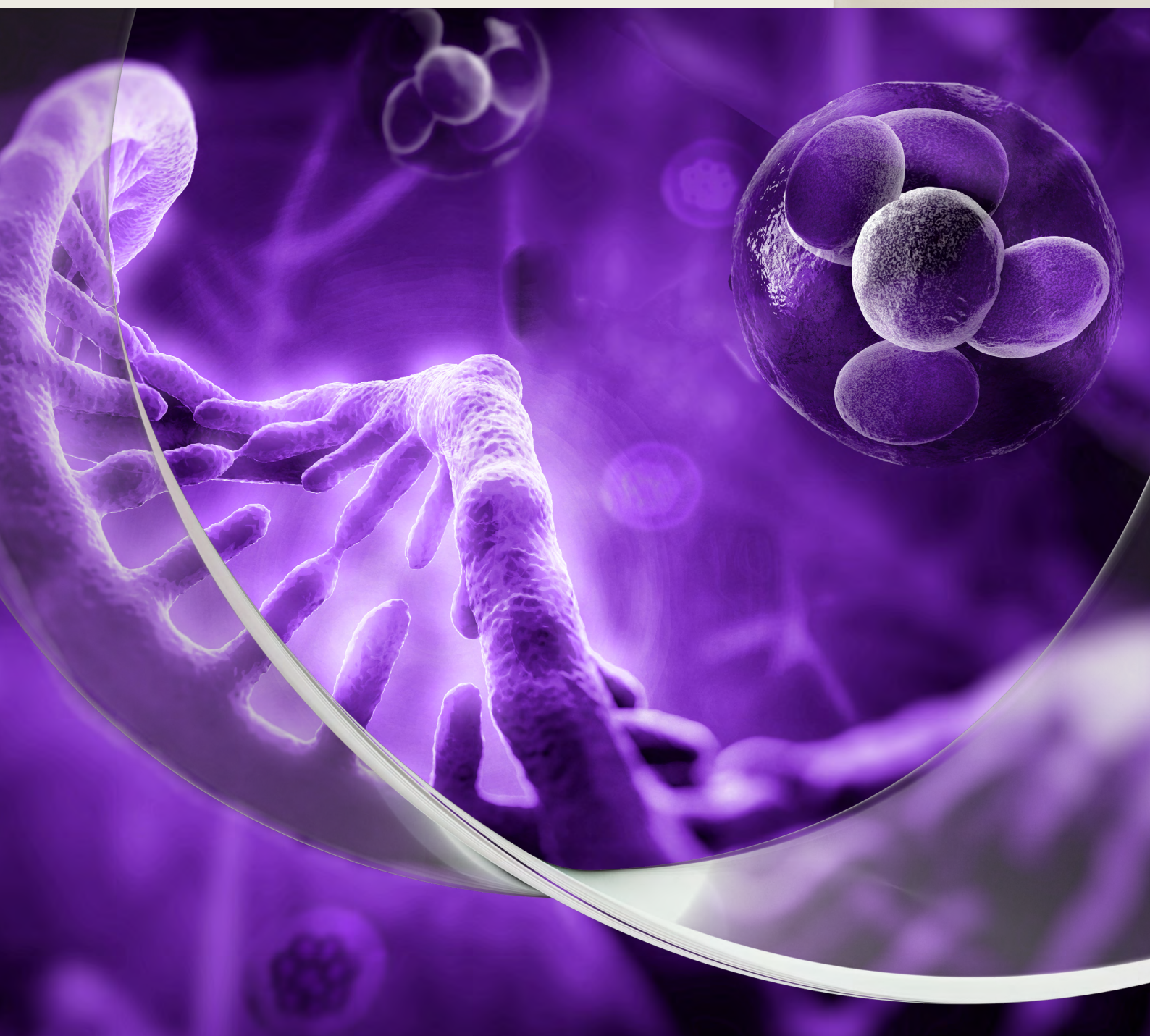


Life Science

Brochure

IMI Life Science
Fluid Control and Detection Solutions

Breakthrough
engineering for
a better world

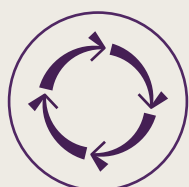


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Breakthrough engineering for a better world

We are at the forefront of life science technology, working in close partnership with our customers to create a better world. We develop cutting-edge fluid control and detection solutions that empower Life Science OEMs to accelerate drug discovery and therapeutic research, diagnose disease earlier, and provide patient-focused critical care.



Broad portfolio

Our portfolio provides sample-to-answer coverage, from sample preparation solutions, to fluid handling components, to detection technology.



Application expertise

Our product and application expertise is at your disposal from the start of your project. We work side by side with you to solve some of the most challenging problems in Life Science!



Customer experience

We embrace a mindset where the customer is at the heart of everything we do.

Life Science Expertise

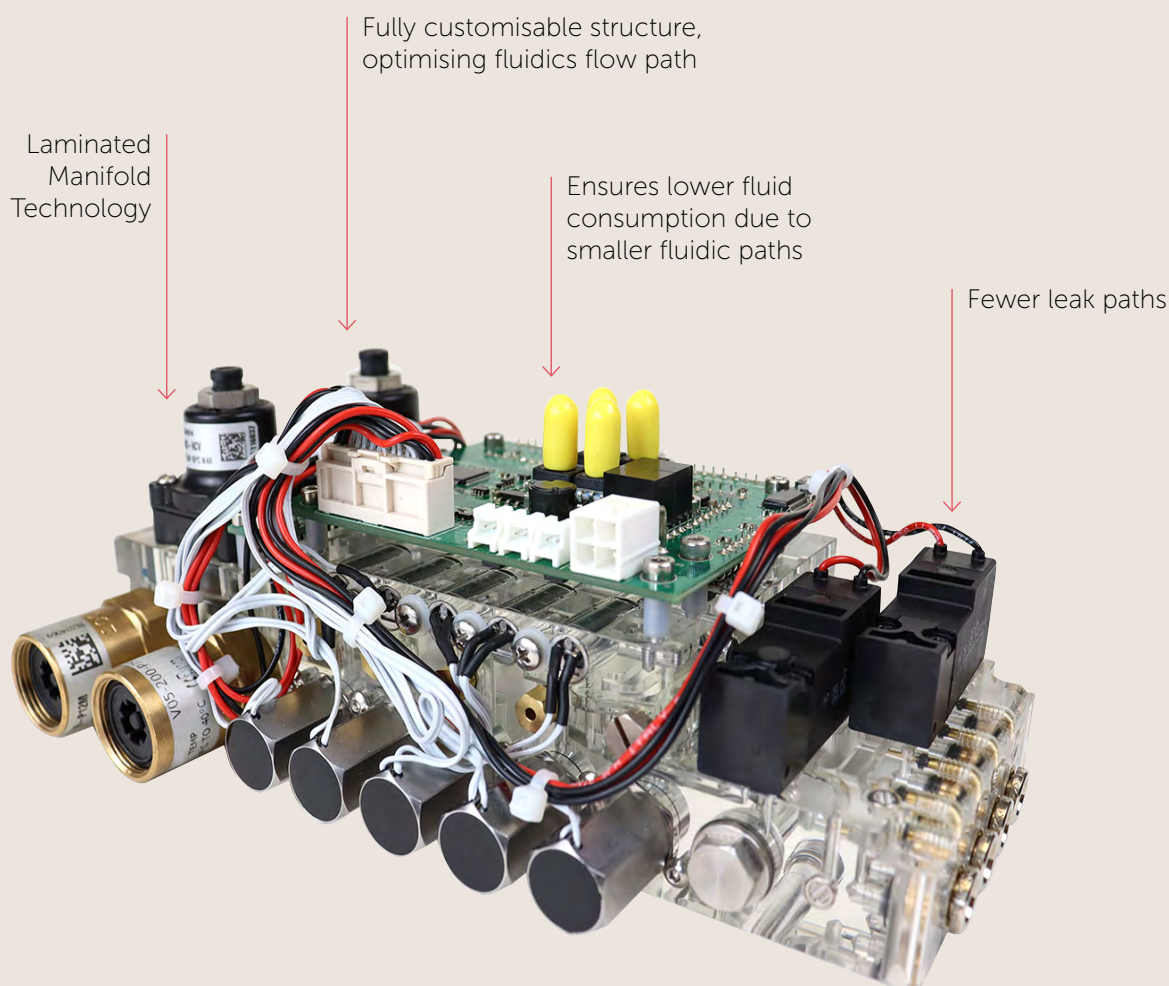
With our experience in the life science sector, IMI is one of the most recognised names in the custom design and manufacture of precision fluidic and motion control components and assemblies for the OEM instrument manufacturer. We are well used to designing for the precise control, repeatability and safety needs of the industry.

Our market-driven product portfolio, designed to meet the demanding performance requirements in medical devices, diagnostic and analytical instrumentation applications, features niche or platform products and technologies, supported by regular new product launches. Specialising in miniature solenoid valve technology, microfluidics, precision liquid handling solutions and analytical instrument solutions, our IMI Adaptas and IMI FAS products are renowned in the industry.

IMI delivers breakthrough engineering, by reducing the size of OEM devices while enhancing accuracy, throughput and fluid control performance. Our components are designed for optimal 'size to performance' ratio with smaller footprints, higher repeatability and lower operating power.

Our understanding of the market trends, engineering challenges and regulatory standards gives us the capability to provide a complete, OEM-specific, integrated platform that delivers value.

With an established sales and service network in 75 countries, our dedicated life science sector teams connect around the world to ensure continuity of support for leaders in the life science industry.



Analytical Instrumentation Applications

IMI specialises in engineering core components that empower the analytical instrumentation market, including applications such as Mass Spectrometry, Gas Chromatography, Liquid Chromatography, Elemental Analysis, and Sample Prep & Laboratory Automation.

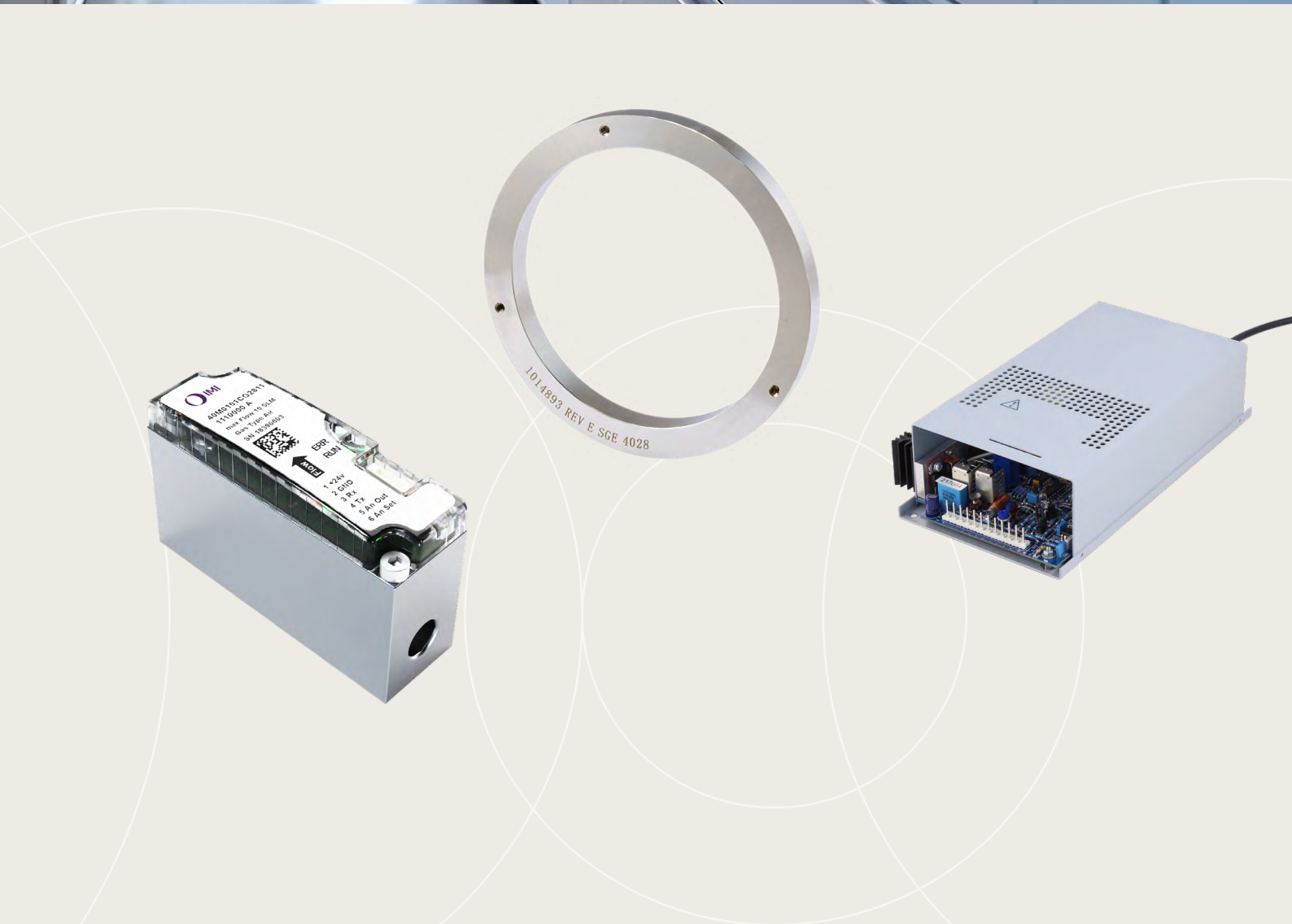
Find out more
lifescience.imiplc.com/applications/analytical-instrumentation



Product range

- High-quality electron multipliers
- Ion optic grids,
- Filaments
- High voltage power supplies
- World-class ion optic software for GC-MS, LC-MS, ICP-MS, TOF-MS, field portable miniaturized systems and magnetic sector applications

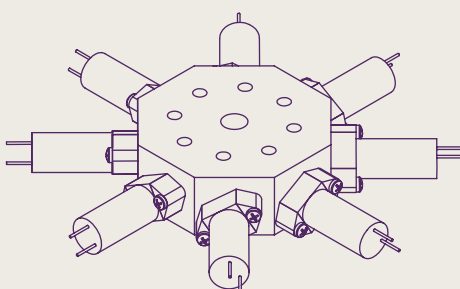




Analytical Chromatography

Media Separated Valves

High precision
gradient mixing
valves available



19µl internal
volume



More flow,
higher pressure

Low heat
generation

Low internal
volume, minimal
carryover

**Mobile
Phase**

**Mobile Phase Mixing /
Flow Control**

Sample Introduction

Proportional Valves

Low flow
proportional valve

Precision
control down
to ml/min range

Orifice
0.05 mm

High stability
in closed loop
control systems

Cleaned for
analytical
applications



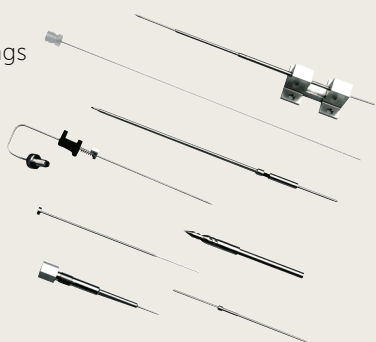
Pumps



- High precision and accuracy, optimised to reduce pulsation
- Zero dead volume syringe; no carryover, no bubbles
- Low coefficient of friction within syringes; increased accuracy and precision as well as increased lifetime

Needles and Probes

- Speciality coatings for inertness and carryover minimisation
- OEM specific



Column

Detection System

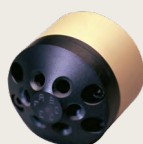


Waste



Sample Introduction Valves

- Allows simplification of fluidic circuit
- Real time monitoring of the health of the valve
- Eliminates cross port leak



Ceramic, PEEK, PTFE and plastic materials available

HPLC Case Study

It was due to the strong relationship over many years that our customer, a very successful company in the HPLC market, came to us with a project to develop a sample preparation and cleansing system for their new line of UPLC systems.

To fulfil their requirements, we designed a dual syringe pump solution into a single unit. The solution consisted of a smaller volume syringe for aspirating sample into the sample loop, and a higher pressure syringe system for applying cleansing fluid throughout sample preparation and introducing all fluids to the high pressure area of the instrument.

This solution has added to our world-class portfolio of high pressure syringes for this and other high pressure fluid handling technologies.

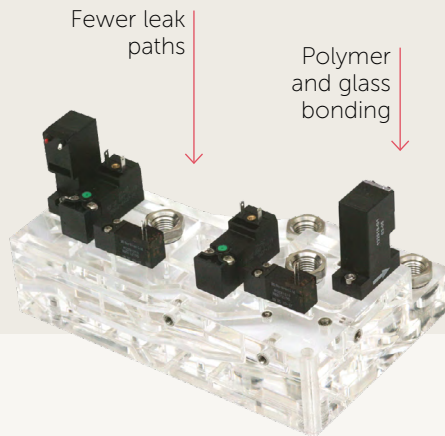
●● We work closely with customers to understand their engineering needs ●●



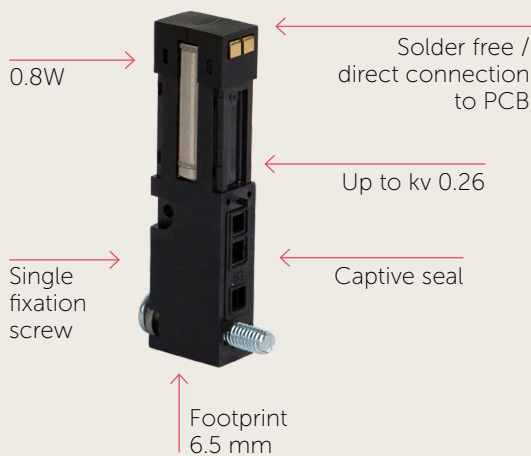
Diagnostic Flow Cytometry

Laminated Manifold Technology

- Fully customisable structure, optimising fluidics flow path
- Ensures lower fluid consumption due to smaller fluidic paths

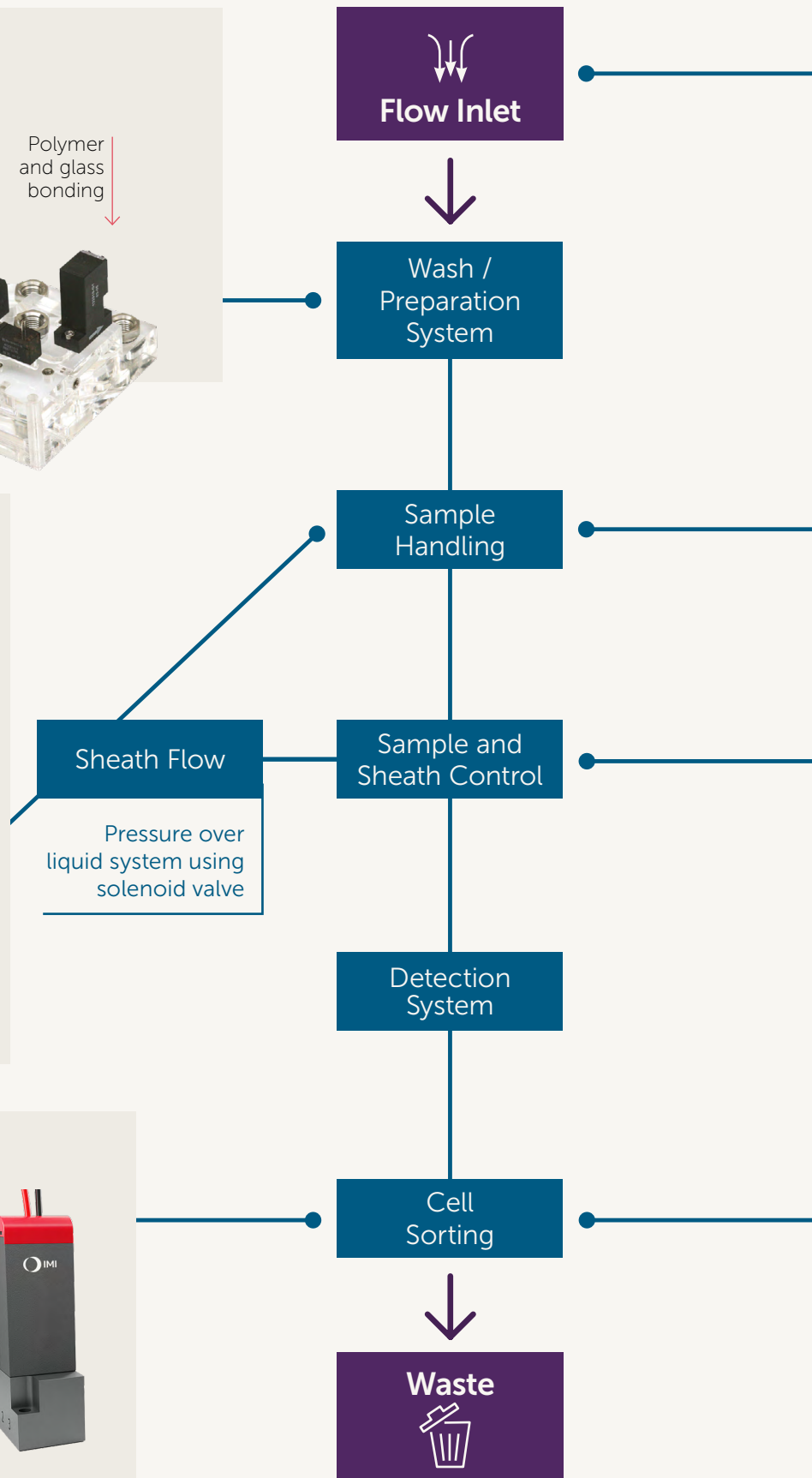


Solenoid Valves for Air Over Liquid Dispense



Media Separated / Isolation Valves

- Low internal volume
- More flow, higher pressure
- Low energy consumption (0.4W); less energy and less heat



Custom Liquid Level Switches

- Single and multiple point switches available

Ultra low level switch available



Syringe Pumps

- High precision and accuracy, optimised to reduce pulsation

Media separated valves also available for sample handling

Multichannel options available, dispense up to 8 samples at once!



Inline pump available with easy to replace syringe

Tool free maintenance

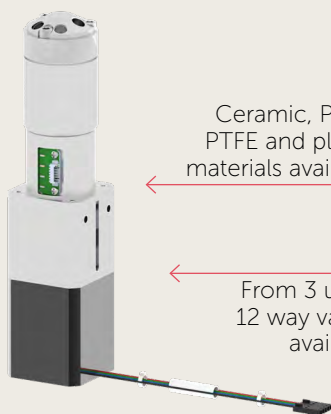
Rotary Valve

Allows simplification of fluidic circuit

Ceramic, PEEK, PTFE and plastic materials available

Handles up to 7 Bar fluid pressure

From 3 up to 12 way valves available



High Flow Media Separated Valves

- Chemical inertness; handles bleach, wash fluids etc.

High flow rate

Large orifice for bulk fluidics handling

PTFE seals



Flow Cytometry Case Study

A customer of ours decided to develop an area of instrumentation that they had not worked on previously – a Flow Cytometer for food analysis.

IMI was involved from the very beginning to help them design their fluidic circuit; the key requirement being the subtle introduction of sample into a continuously flowing sheath fluid. After working closely with the customer to gain a deeper understanding of their application needs, we were able to design a solution based on a modification of our current syringe pump range.

By introducing a new electronic control system for the V6 syringe pump, we were able to account for the large range of flow rates required by the instrument. The pump was reconfigured to quickly alter between fast flows to slow dispense at speeds less than $1\mu\text{l/s}$, with a lifetime of millions of cycles.

●● We specialise in designing customised solutions ●●



Diagnostic Immunology / Clinical Chemistry / Liquid Handling Robotics

Syringe Pumps

Multichannel options available, dispense up to 8 samples at once!



Zero dead volume syringe; no carryover, no bubbles

Minimised heat transfer to fluids



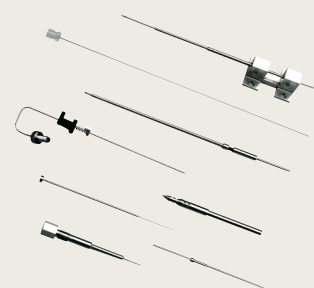
The Cadent™ 3 Syringe Pump with premier flow stability, smart diagnostics, and customizability

Ceramic rotary valve; long lifetime and chemically inert



Needles and Probes

- Speciality coatings for inertness and carryover minimisation
- OEM specific



Flow Inlet



Sample / Reagent Handling

Mixing Station

Needle Wash Station

Manifold or Cartridge Mounting



Integration in to portable devices

Less than 0.1W holding power

2 Way Media Separated Valves

- Low internal volume
- Optimised energy consumption



High cycle lifetime

Reliability

Manifold Technology

- Fully customisable structure, optimising fluidics flow path

Reduces reagent usage



Laminated acrylic structures available allowing for optical analysis

PEEK, metallic and other materials also available

Liquid Handling Case Study

3 Way Isolation Valves

- Low internal volume
- More flow, higher pressure
- Low energy consumption (0.4W); less energy and less heat



Compact design

Detection Instrument

Waste



Custom Level Switch Solutions

- Custom Level Switches or Bottle Assemblies



Stop overflow!

Our customer designed a DNA sample handling and preparation system to generate small droplets of PCR oil-based reagent that has been loaded with DNA content. The bubbles are dispensed into a well plate and sent to a digital PCR system for replication.

The solution is a unique design that incorporates 11-Chipsol valves, 2-MS valves, a FLATPROP and an array of sensors, fittings and PCBs. All of these components are mounted onto a 5-layer acrylic manifold with two discrete integrated pressure chambers. The unit allows the direct interface of the customer's disposable – the bottle with PCR reagent – into the manifold.

This unit uses an air-over-liquid system, supplying the necessary means to pull the PCR reagent out of the bottle and redirect to a separate dispense head. The dispense head then auto-fills the small well plates that are loaded into the PCR system.

This assembly creates advantage by reducing instrument production time and inventory management, reducing field service warranty claims and improving operational efficiencies.

●● We improve operational efficiency ●●

Medical Device

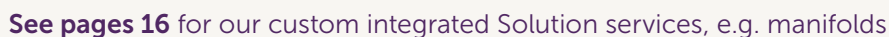
Delivering proven quality and tailored solutions for your complex fluidic systems in medical device applications

IMI understands the challenges of the medical device market, including the need for precision, high quality, and regulatory compliance. We specialise in engineering advanced fluid control solutions for applications such as Ventilation, Anaesthesia, Dialysis, and Surgery.

Find out more
lifescience.imiplc.com/applications/medical-devices







Anaesthesia Case Study

A customer of ours wanted to look at anaesthesia machine design from the point of view of the anaesthesiologist. They wanted to build expertise into a machine that had maximum functionality, comfort and control.

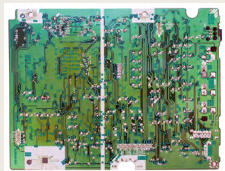
Our expertise in VRA allowed us to rapidly supply 20 unique components from our facilities around the globe and then work in partnership with our customer to create the final design in Europe.

Most parts were derived from standard products but configured, tuned or applied to our customer's highly specific functional requirements. For simpler installation and a smaller footprint, many products were designed for integration into sub-assembly manifolds. Additionally, to reduce waste from discarded anesthesia gas bottles that were not completely exhausted, We suggested a modified pressure regulator that allowed the gases to continue to flow at a lower pressure, maximising gas used.

With the best size to performance ratio for proportional valve technology on the market and capabilities to provide a complete integrated platform. Our experience providing market leading fluidic control technology for the VRA market gives our customers competitive advantage.

Electronics

- Custom Electronics Design



Closed loop flow and pressure control

FLATPROP EQP

- Frictionless design enables high resolution
- Up to 186 L/min. at 2 Bar
- Validated to 100 million cycles



Quick response time for immediate changes to pressure system

Low hysteresis

High flow proportional valve

FLATPROP EQP

- Compact footprint



Customisable cracking pressure and flows

RV

O₂ Sensor

PS

NPRV

Free Breathing Valve

Patient

Peep*

Flow Sensor

CHIPPROP

- Custom designed for respiratory applications



2/2 or 3/2 way 8 mm proportional valve

Very compact design

Cartridge valve

*Other PEEP valves and voice coil technology available

●● Market leading technology for VRA ●●



Medical Device Ventilator

Check Valves



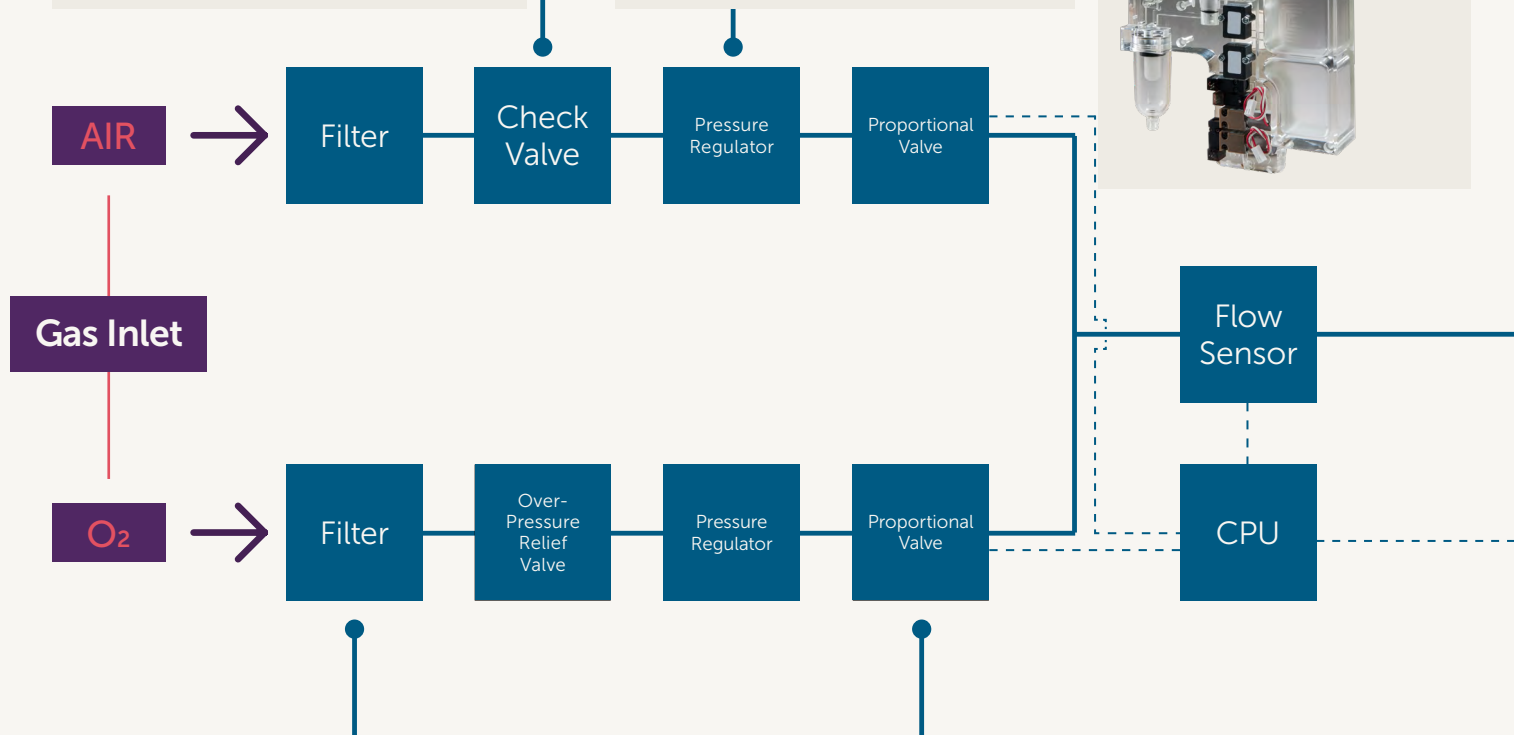
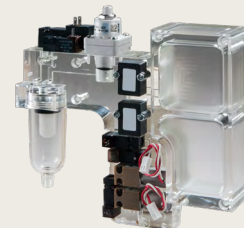
RM1

- High precision regulator
- Excellent flow, pressure and hysteresis characteristics
- Non bleed and compact design



Manifolds

- Customised component integration to exact specification
- Suitable for all respiratory applications
- Reduces fluid path complexity



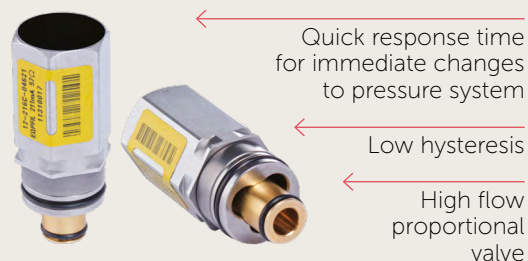
Filters

- In-line or modular installation



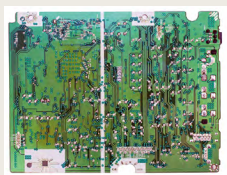
FLATPROP EQP

- Frictionless design enables high resolution
- Up to 186 L/min. at 2 Bar
- Validated to 100 million cycles



Electronics

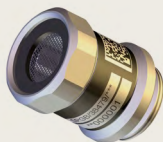
- Bespoke electronics for components available



Closed loop flow and pressure control

Overpressure Relief Valve

- Customisable cracking pressure and flows
- Compact footprint



Sensors
e.g. 02

Safety
Valves



PICOSOL

Sensor
Calibration



10 mm digital valve

Low power consumption

Compact design

2/2 or 3/2 way

Excellent flow
to size ratio
Validated to 100
million cycles

Expiratory
Valve Pilot

Expiratory
Valve

CHIPPROP

- Custom designed for respiratory applications

Cartridge
valve



2/2 or 3/2 way 8 mm
proportional valve

Very compact design

Pilot for
exhalation valve

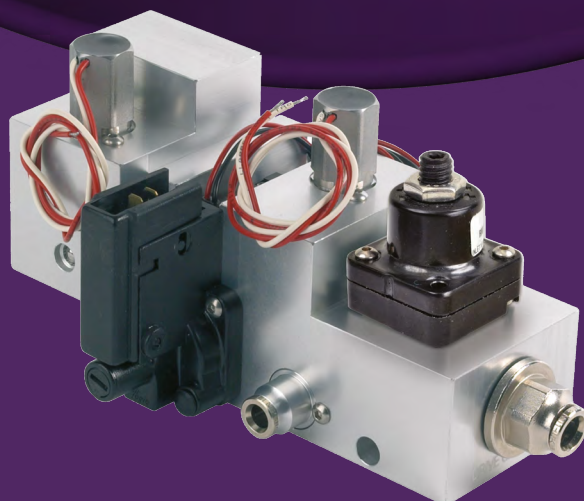
Atmosphere

Integrated Solutions

Our highly experienced engineering and production teams design and manufacture custom manifolds from Aluminum, Brass, Stainless Steel and a wide range of plastics, from Teflon to Acrylics. Our engineers incorporate the latest techniques and technologies to ensure the best design for your application - whether your unique application requires a simple machined manifold or full integration of a complex fluidic circuit in a multi-layered, multi-channel manifold..

Typical manifold or integrated solution benefits include:

- Reduce overall solution footprint and weight
- Eliminate potential leak paths
- Integrate multiple discrete components such as fittings, valves, pressure regulators, check valves, restrictors, filters, pressure and flow sensors
- Incorporate complex pneumatic and/or fluidic circuits directly into the manifold
- Allow for the maximum number of components on a given manifold face (high density of fluid circuits)
- Consistently maintain the exact fluidic volume between discrete components
- Eliminate potential dead spaces within the fluidic pathway (elimination of dead/static volumes)
- Improve reliability, reduce overall costs, and improve operational efficiency



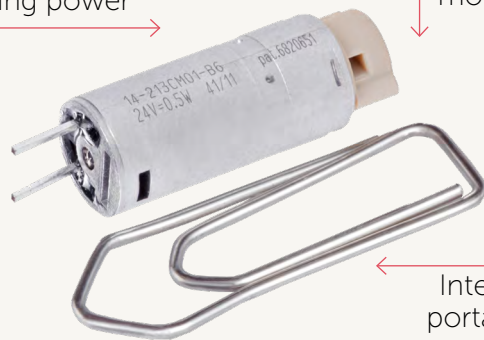
Media Separated Valves and Manifold Solutions

FAS 8 mm CHIPSOL MS

- 2/2 NC media separated solenoid valve
- Manifold or cartridge mount available
- Orifice size: 0.8 mm
- Pressure rating: 0 to 2 Bar (Vacuum version available)
- Materials: PEEK body, FFPM or EPDM seals
- Power consumption: 0.5W
- Virtually no unswept volume

Less than 0.1W
holding power

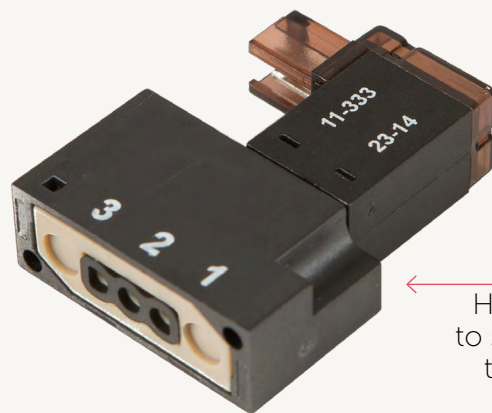
Manifold or
cartridge
mounting



Integration into
portable devices

FAS 10 mm PICOSOL MS

- 3/2 media separated solenoid valve
- Manifold mount
- Orifice size: 1.2 mm
- kv: 0.65
- Pressure rating: -0.95 to 2.2 Bar
- Materials: PEEK body, FFPM, FPM or EPDM seals
- Low internal volume
- Low power consumption
- Low internal / unswept volume



Highest flow
to size ratio in
the industry

FAS 15 mm MICROSOL MS-E

- 2/2, 3/2 media separated solenoid valve
- Manifold mount
- Orifice size: 1.6 mm
- kv: 0.6
- Pressure rating: -0.95 to 2.2 Bar
- Materials: PEEK body, FFPM, FPM or EPDM seals
- Low internal volume
- Low power consumption
- Low internal / unswept volume

Less heat transfer 0.4W
power consumption

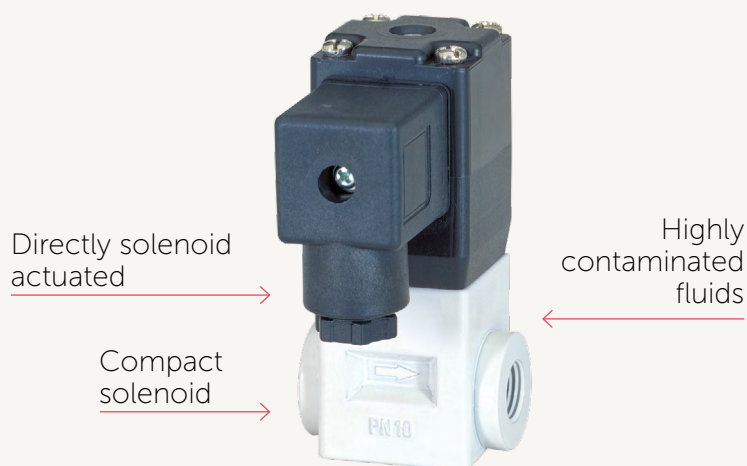
- 50% less internal volume
- Reduced contact with the valve

- Fast flushing
- Almost no carry over



Buschjost 82080

- 2/2 media separated solenoid valve
- Orifice size: 3 mm to 8 mm
- Pressure rating: 0 to 7 Bar
- Materials: PVDF body, EPDM seal, PTFE bellows
- Various mounting options available



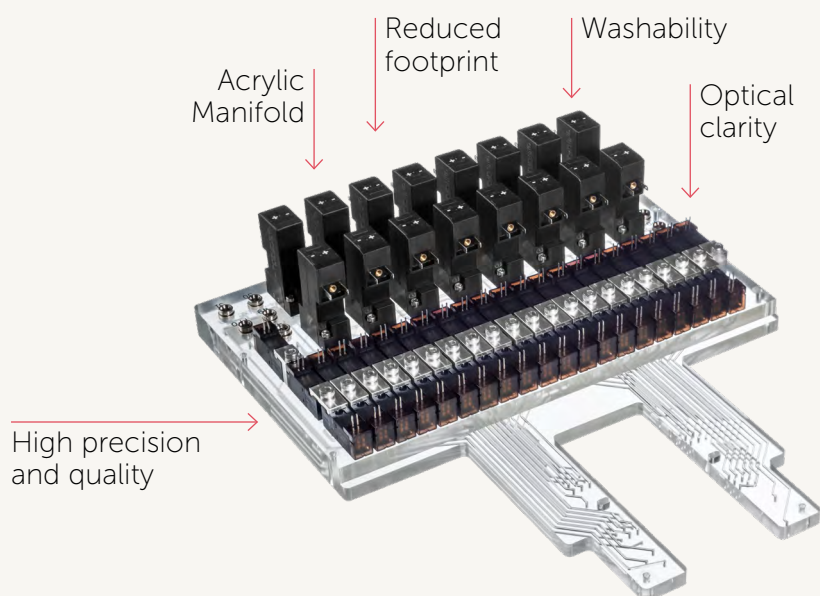
Custom Level Switches

- Various float options include: Pressure, Temperature, Compatibility, Actuation Points, Mounting, etc.
- Proven Reed Switch Technology
- Custom and simple to implement complete bottle & switch solutions

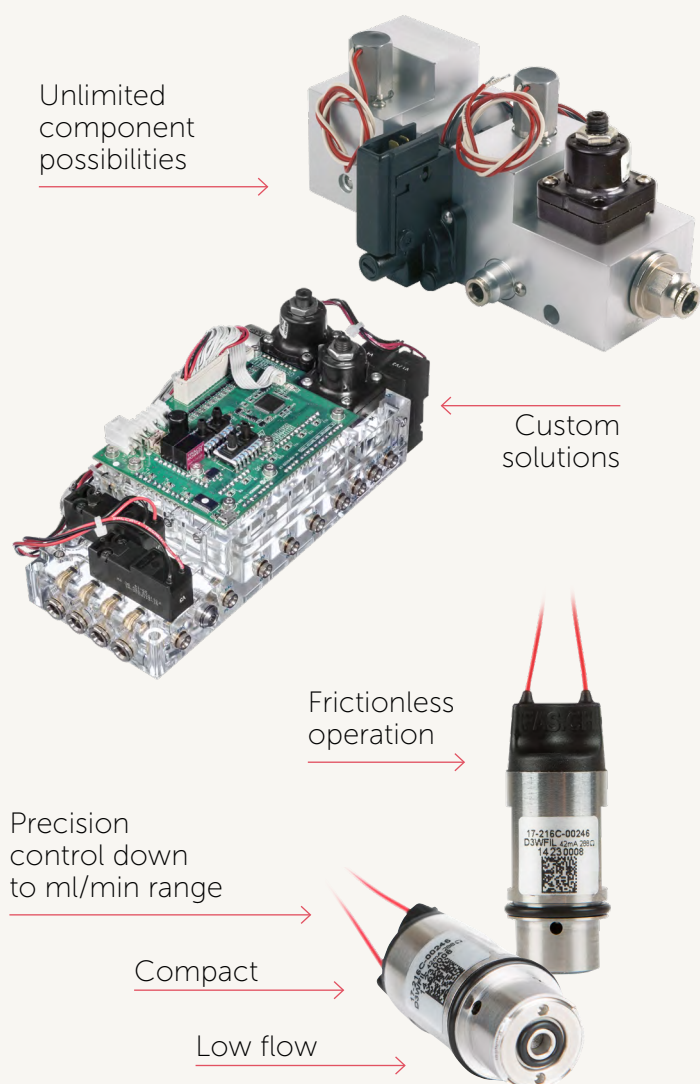


Laminated Manifold Technology

- Multi-layered designs
- Custom geometries and volumes
- Complex three dimensional flow paths
- Thermal, diffusion and solvent bonded
- Flame and vapour polishing



Non-Media Separated Valves and other Manifold Technologies



Manifold Technologies

- Robust, compact designs
- Aluminium, stainless steel, brass, engineered plastics
- Burr-free intersections
- NPT straight thread and flat bottom ports
- Uniform channels

FAS Low Flow Proportional Valves

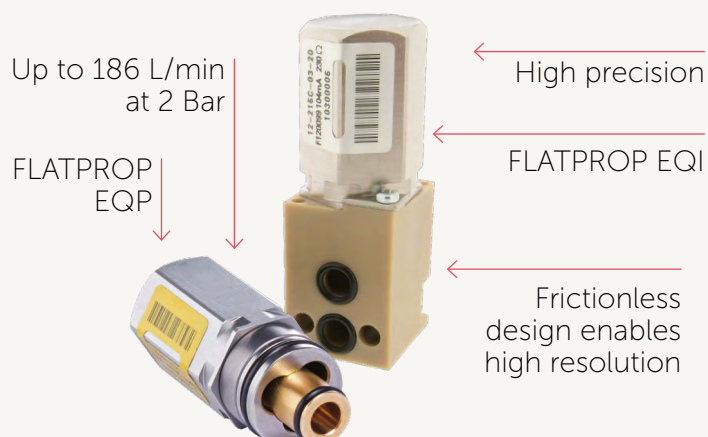
FAS 16 mm FLATPROP DA

- 2/2 NC proportional valve
- Suitable for medical applications
- Up to 40l/min Air at 2 Bar
- Design for use up to 12 Bar (varies with orifice)

FAS 16 mm FASPROP

Low flow proportional valve

- 2/2 NC proportional valve
- Suitable for analytical clean applications
- Materials: body - stainless steel, seal - FPM, FFPM
- High precision proportional control down to ml/min range
- Design for use up to 12 Bar (varies with orifice). Orifice sizes down to 0.05 mm
- Built-in filter



FAS High Flow Proportional Valves

FAS 16 mm FLATPROP EQI / EQP

- 2/2 NC proportional valve pressure compensated
- From 120 to 186 l/min Oxygen at 2 Bar
- Pressure rating: 0 to 7 Bar
- Materials: stainless steel body, FPM or NBR seals
- Power consumption: 2.5W at 20°C
- Validated to 100 million cycles
- Suitable for medical applications

FAS On/Off Cartridge Valves

FAS 8 mm CHIPSOL

- 2/2 or 3/2, NC or NO direct acting valve
- Orifice size: 0.5 mm to 1 mm
- Pressure rating: 0 to 8 Bar
- Materials: PPS and stainless steel body, HNBR Seal
- Power consumption: 0.5W



Low power consumption

Cartridge mount for optimal integration

FAS On/Off Valves

- Excellent flow to size ratio
- Low power consumption
- Validated to 100 million cycles
- Manifold mount

FAS 6.5 mm FLEXISOL

- 2/2 or 3/2, NC or NO valve
- Orifice size: 0.8 and 0.9 mm
- Flow: up to 3.5 l/min at 1.5 Bar
- Pressure range: 0 to 2.5 Bar
- One single screw, direct connection without soldering

FAS 10 mm PICOSOL

- 2/2 or 3/2, NC or NO valve
- Orifice size: 0.6 to 2 mm
- Flow: 5 to 32 l/min at 2 Bar
- Pressure rating: 0 to 10 Bar

FAS 15 mm MICROSOL MS-E

- 2/2 or 3/2, NC or NO valve
- Orifice size: up to 3.6 mm
- Flow: 6 to 120 l/min at 2 Bar
- Pressure rating: up to 16 Bar

Wide range of optional features



Electrical pad connection

No soldering

Electrical pad connection

Highly customisable



One single fixation screw

Mounting in 4s.

2/2 or 3/2 way



Buschjost Angle Seat Valves

- 84500 and 84520 series
- Pressure actuated valves featuring high flow rate and flexibility
- Suitable for neutral or aggressive gases and liquids



Maximum pressure 16 Bar

Compact design

RM1 Pressure Regulator

- Cleaned for Oxygen use
- Maximum inlet pressure: 10 Bar
- Maximum outlet pressure: 4 Bar
- Maximum flow: 400 l/min
- Base mounting
- Excellent hysteresis characteristics

Excellent regulation

Excellent hysteresis



Pumps and Accessories

Syringes

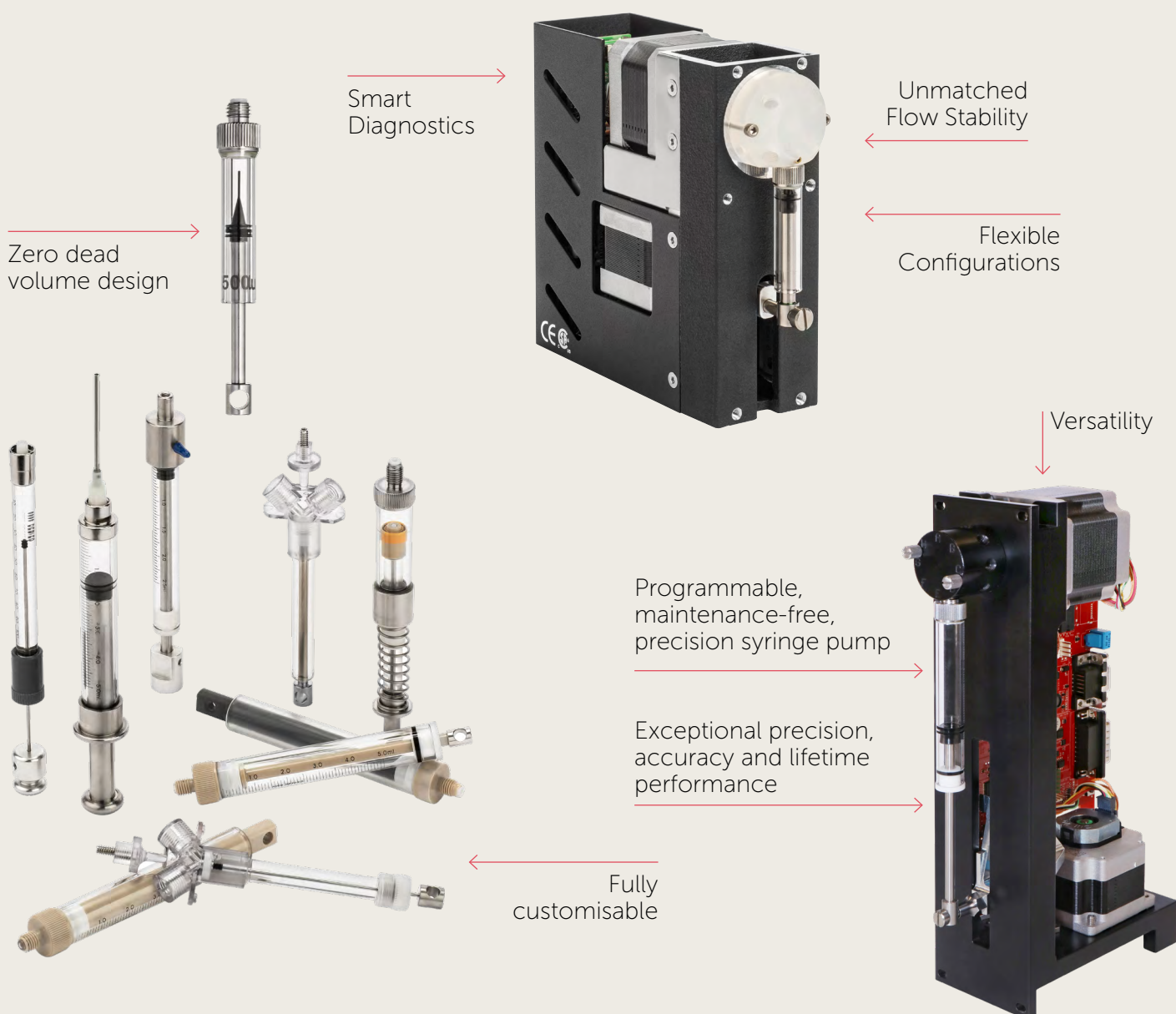
- 30 mm and 60 mm stroke lengths
- 10µl up to 50 ml internal volume
- Zero dead volume design available
- Wetted materials: Borosilicate Glass, PTFE and PCTFE (UHMW optional)
- Fully customisable for various shapes and sizes
- High pressure syringes available

Cadent™ 3

- 30 mm stroke pump
- 6k, 12k, or 24k resolutions available
- 50µl to 5 ml syringe volumes
- Rotary valves up to 12 way in PTFE and PEEK
- 3/2 solenoid valve option available
- Flow rate 0.008µL/min up to 500 ml/min
- Up to 267N pump force

Cadent™ 6

- 60 mm stroke pump
- 12k, 24k or 48k resolutions available
- 10µl to 50 ml syringe volumes
- Ceramic, PEEK and PTFE rotary valves up to 12 way
- Flow rate 2.8µl/min up to 2.5 ml/min
- Up to 308N pump force



Multichannel

- 60 mm stroke pump
- Up to 8 syringes on a single pump
- 24k or 48k resolutions available
- 2.5µl to 5 ml syringe volumes
- 3/2 solenoid valve options available
- Flow rate 1.25µl/min up to 125 ml/min
- Up to 667N pump force spread across all channels

Inline Pump IP 4000

- Dispense volume: 100 µl, 500 µl, 1ml
- Accuracy: $\pm 0.5\%$ at full dispense
- Precision: 1% CV @ 2% dispense
- Compact design
- High Reliability (2 million life cycle)
- Operating pressure: 100 psig
- Seal Wash Option
- RoHS certified

Rotary Valves

- 2 way up to 12 way
- Distribution, non-distribution and loop valve configurations
- PTFE, plastic or ceramic material valves
- Standalone rotary valve driver available



Dispenses up to 8 samples simultaneously

Customisable solenoid manifold for intelligent fluid pathway

High chemical compatibility



Compact size and optimum weight

Ceramic, PEEK, PTFE and plastic materials available



Simplifies fluidic circuits



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

Supported by distributors worldwide.

For further information, scan this QR code or visit

www.imiplc.com



Life Science

Our product brands:

IMI Adaptas

IMI FAS

Due to our policy of continuous development, IMI reserves the right to change specifications without prior notice.

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