

Precision Piston Pumps

**MAINTENANCE-FREE
DISPENSING FOR
HIGH-THROUGHPUT
LIFE SCIENCE
APPLICATIONS**

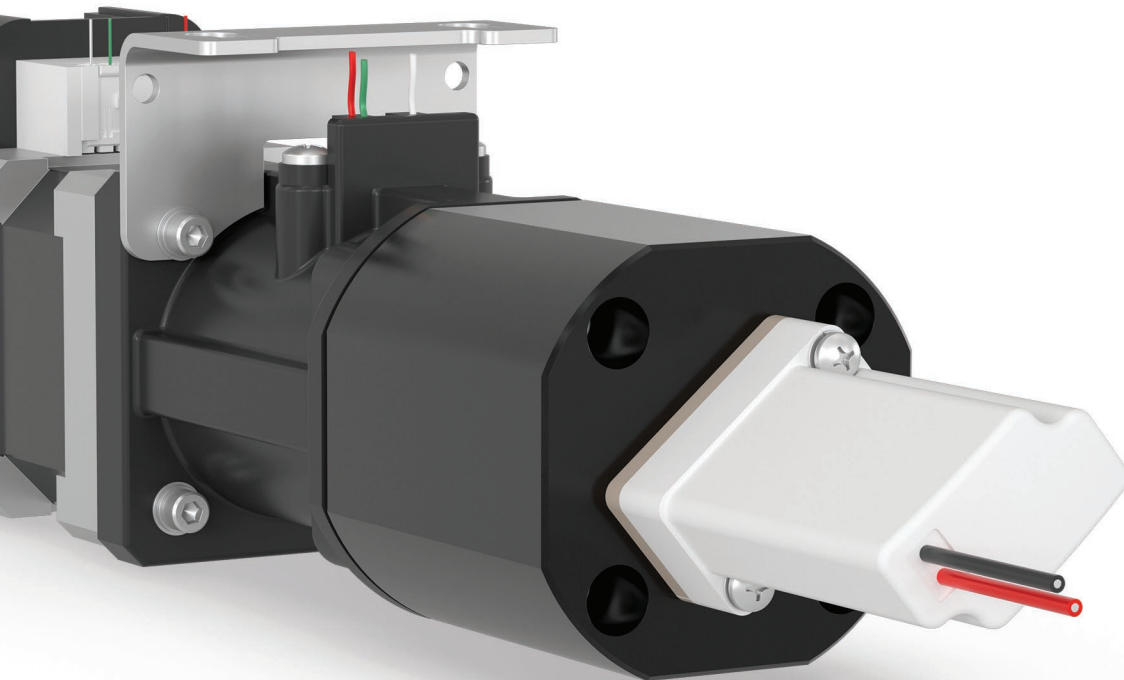


Your Partner in Fluidic Innovation

For over 50 years, IDEX Health & Science has been the silent engine behind the world's most advanced analytical and diagnostic instrumentation.

Life science instruments demand consistent, high-performance fluid handling, especially in workflows involving aggressive reagents, high-throughput protocols, and minimizing downtime. That is why we developed our Durable Seal Piston Pumps: engineered to deliver precision dispensing with a static seal that lasts the life of your instrument. Even in high-salt, detergent-rich, or otherwise challenging chemical environments, our pumps maintain accuracy and flow stability across millions of cycles, eliminating the need for maintenance, consumable replacements, or recalibration.

Our commitment to innovation ensures you receive top-tier technology and uncompromising quality. By streamlining our manufacturing processes and leveraging advanced materials, we deliver high-performance fluidic solutions that offer exceptional value. Every pump we ship is the result of precision manufacturing and 100% functional testing, ensuring your instrument performs exactly as intended, from the first cycle to the last.



Applications Where Performance Matters

Your workflows have no tolerance for variability. Reagent accuracy, seal integrity, and cycle-after-cycle consistency are the baseline, not the differentiator.



MOLECULAR ASSAY PLATFORMS

Next-generation sequencing (NGS), PCR, qPCR



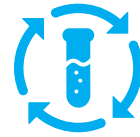
MULTI-OMICS

Integrated workflows requiring ultra-precise fluid handling



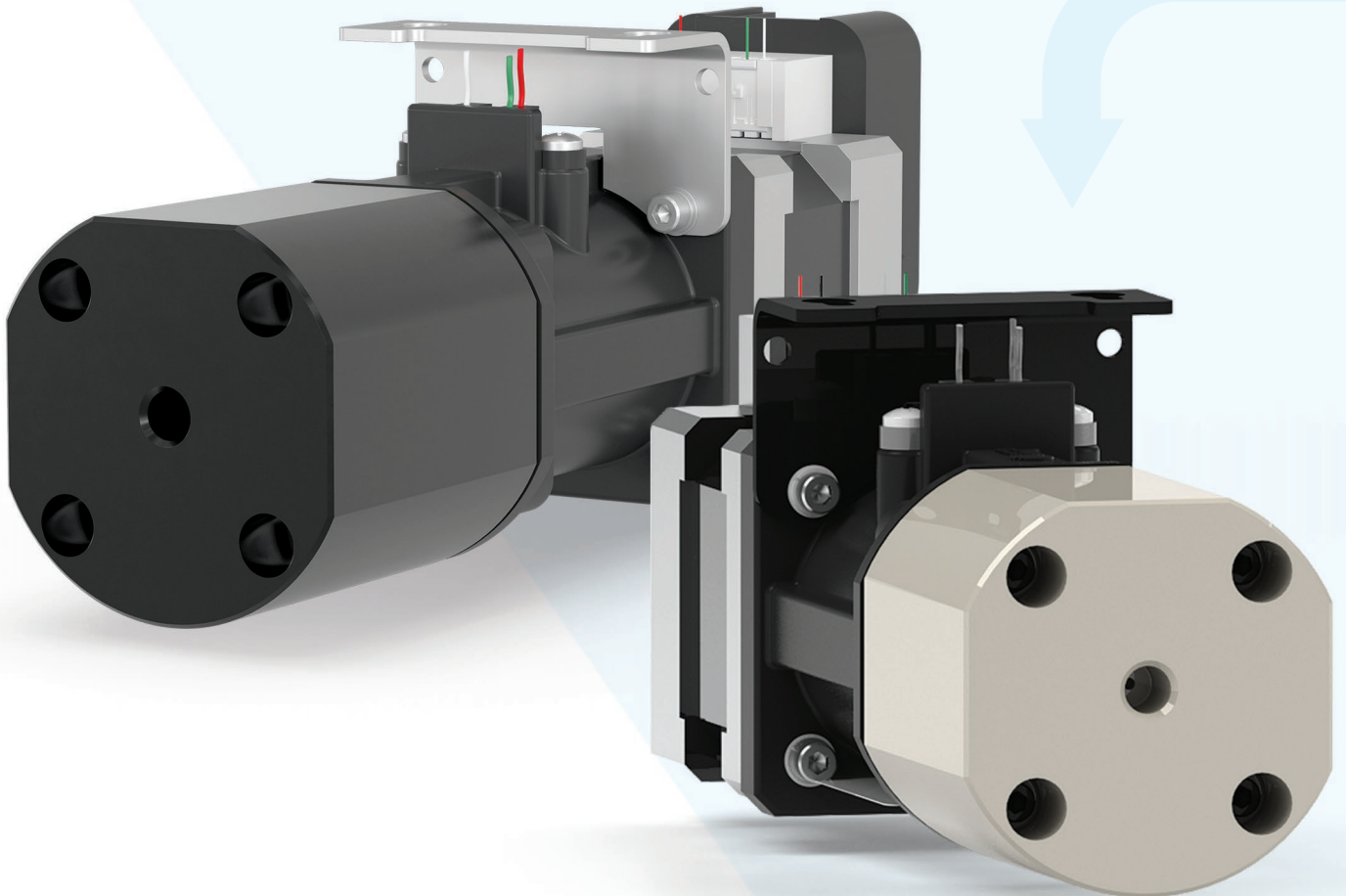
CLINICAL DIAGNOSTICS

Immunoassay analyzers and bio-chemistry analyzers



AUTOMATED SAMPLE PREPARATION

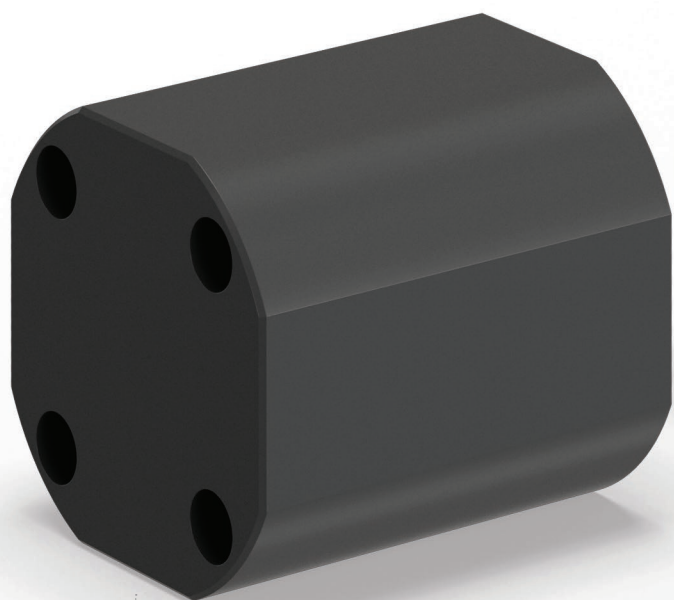
Reliable, repeatable dispensing



New to Piston Pumps?

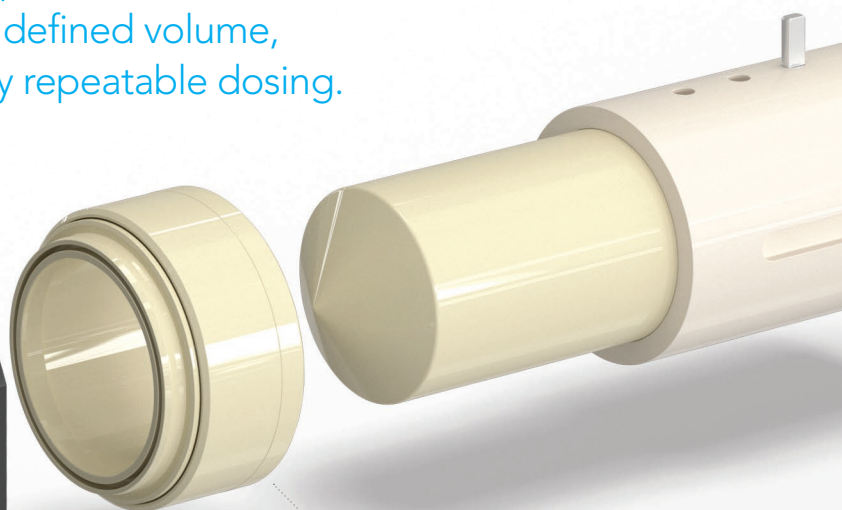
Here's How a Piston Pump Works:

A high-precision ceramic piston moves within a tightly controlled bore, creating a positive displacement of fluid. Because each stroke corresponds to a defined volume, the system delivers accurate and highly repeatable dosing.



PUMP HEAD

We offer a range of polymer materials and can customize port configurations to match your instrument's orientation.



SEAL ASSEMBLY

Our proprietary seal design delivers reliable sealing across millions of pump cycles.

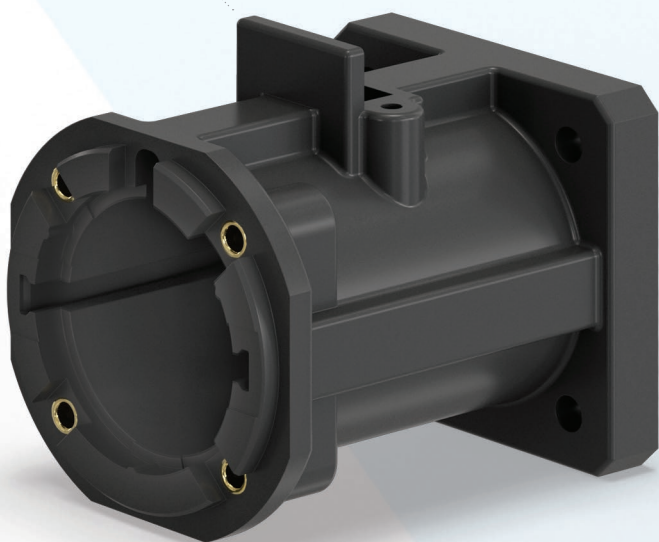


Isolated Wetted Path

The seal interface isolates the wetted path from the mechanical drive, helping prevent leaks and protecting internal components across a wide range of reagents.

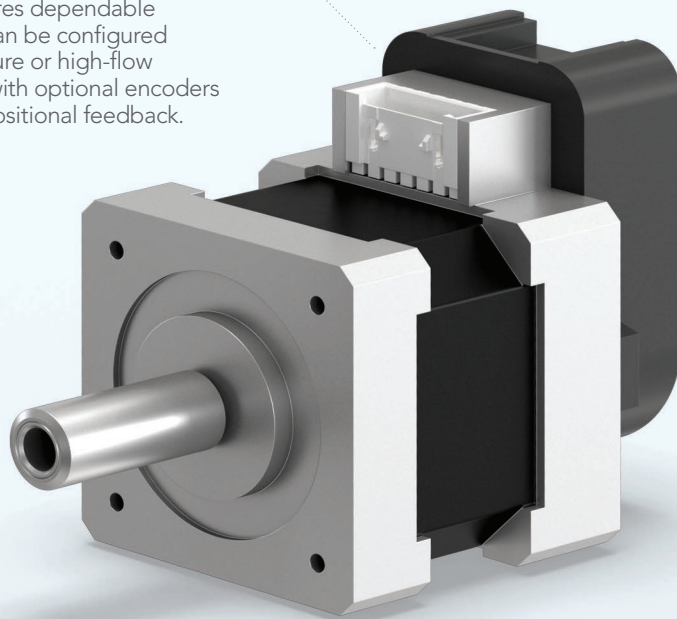
PUMP BODY

The pump body houses the home sensor, maintains critical alignment of internal components, and protects the pump mechanism.



MOTOR WITH ENCODER

A motor with high-performance bearings ensures dependable operation. It can be configured for high-pressure or high-flow applications, with optional encoders for accurate positional feedback.



PISTON FERRULE ASSEMBLY

Ceramic piston assemblies provide precise aspirate and dispense performance, featuring superior surface finish and industry-leading piston OD and ferrule ID tolerances.



Draws In, Pushes Out

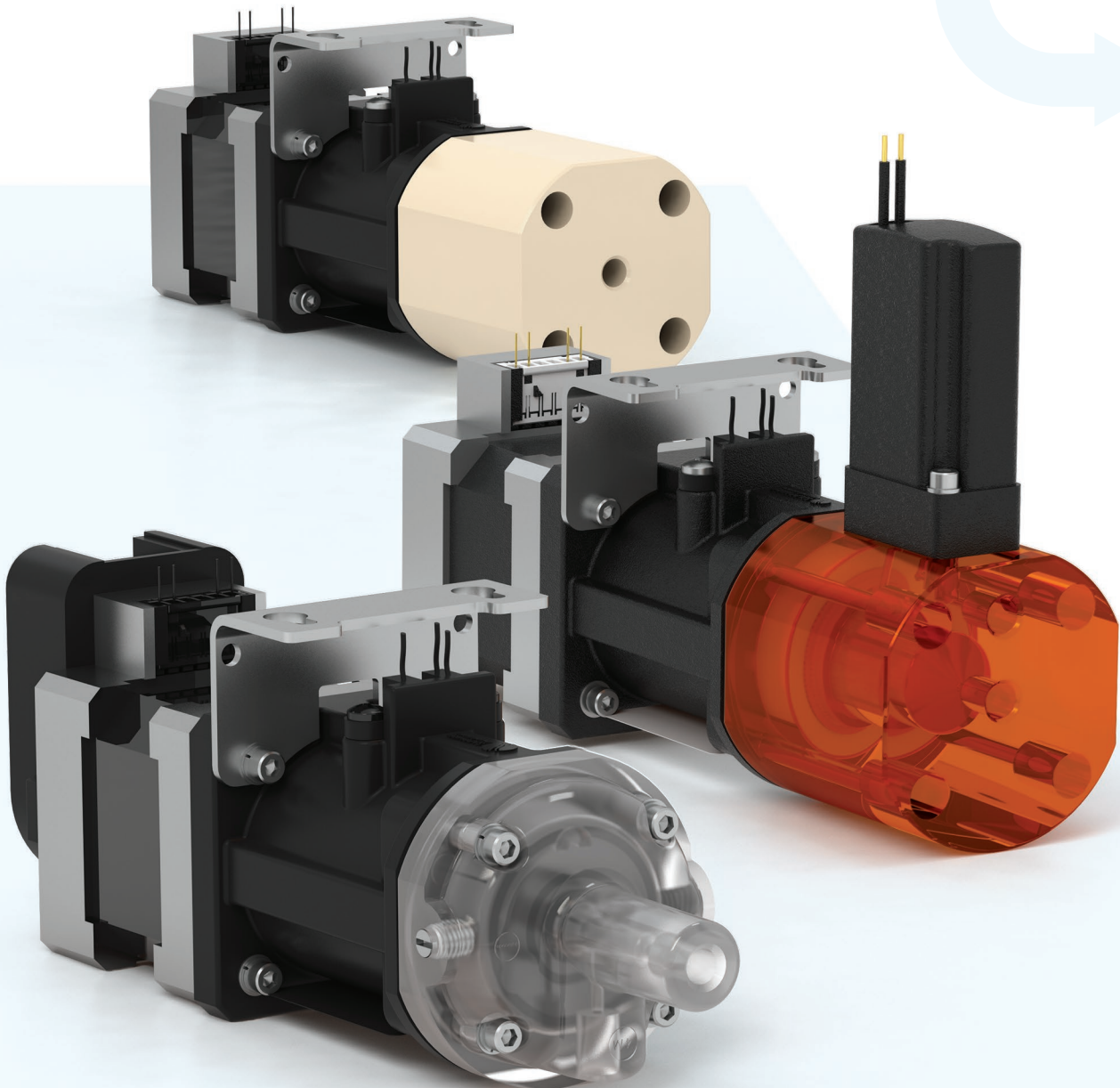
As the piston retracts, the change in volume draws fluid into the pump chamber; as it advances, fluid is pushed out. A controlled stepper motor coordinates this motion to deliver repeatable volume accuracy and stable flow.



Matched to Your Chemistry

Application-specific head and seal options allow you to match materials to your required volume range and chemistry, supporting high performance and long lifetime over millions of cycles.

Why Choose Piston Pumps for Life Science Instruments



Optimized for NGS, Omics, and IVD Workflows

Your instrument's performance depends on reliable fluid delivery. With IDEX Health & Science precision pumps, experience worry-free operation for the life of your instrument.



High Precision without High Maintenance

- › Pumps deliver tightly controlled volumes from microliters to milliliters for high precision delivery of reagents and gradient formation.
- › The static seal design and robust materials are engineered for millions of cycles, reducing downtime from seal wear and barrel contamination that is typical of syringe-based systems.
- › Ideal for systems that cannot afford maintenance calls and recalibration.



Built for Aggressive Chemistries

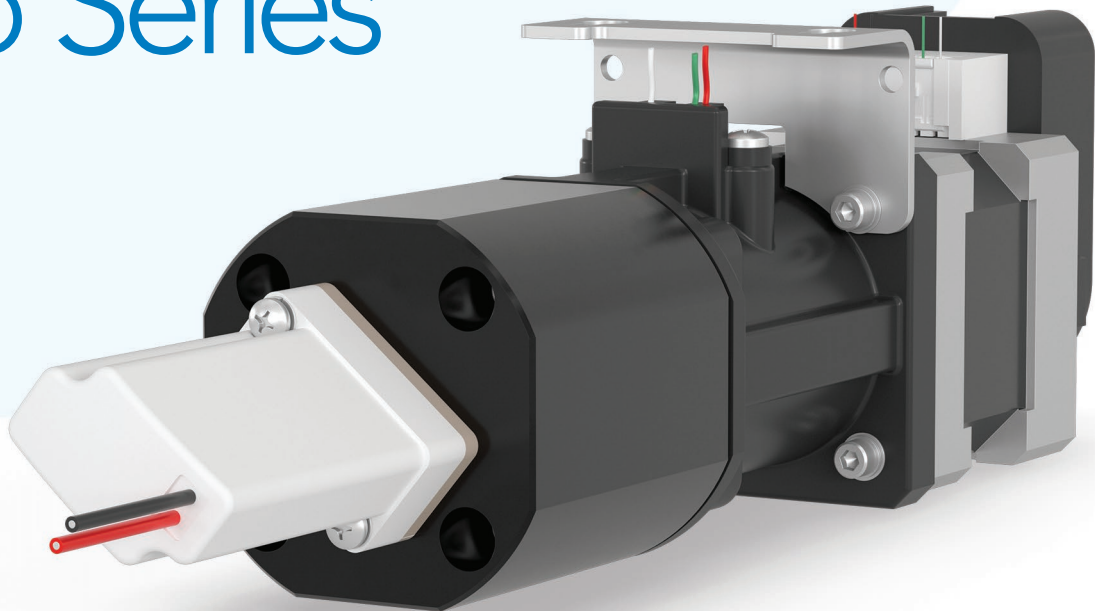
- › Available with specialized head and seal materials to handle high-salt, surfactant-rich, and other challenging buffers common in omics workflows
- › Extended system life even under demanding cleaning and decontamination protocols
- › Comprehensive lifetime and reagent testing to meet your needs



Compact, Integrated Fluidic Modules

- › Small footprint and flexible mounting make the pump easy to integrate
- › Pairs seamlessly with rotary valves, manifolds, sensors, and low-dead-volume fittings to create fluidic modules
- › Reduce plumbing complexity and leak paths through our application-specific design

Durable Seal Pump Series



Robust Performance

High concentrations of detergents, salts, and aggressive buffers can quickly degrade conventional pump seals, leading to costly downtime and compromised instrument performance. The IDEX Health & Science Durable Seal Series represents a breakthrough in precision pump technology, specifically engineered to withstand challenging reagents while delivering exceptional lifetime performance.

Superior Seal Technology

The Durable Seal pump series augments the VFP17 platform with a strong seal design that solves critical challenges in fluidic applications by handling harsher reagents without any required maintenance.

Performance that Redefines Industry Standards



MAINTENANCE-FREE OPERATION:

Piston pumps with static durable seals require no routine maintenance or consumables over the instrument's lifetime, minimizing service calls and downtime.



EXTREME DURABILITY

The pump is designed for the life of instrument and built to withstand high-salt and high-detergent reagents.



PRECISION & PERFORMANCE

Delivers high precision ($\leq 1\%$ variation) at typical dispense volumes. Select models support pressures up to 1500 psi.



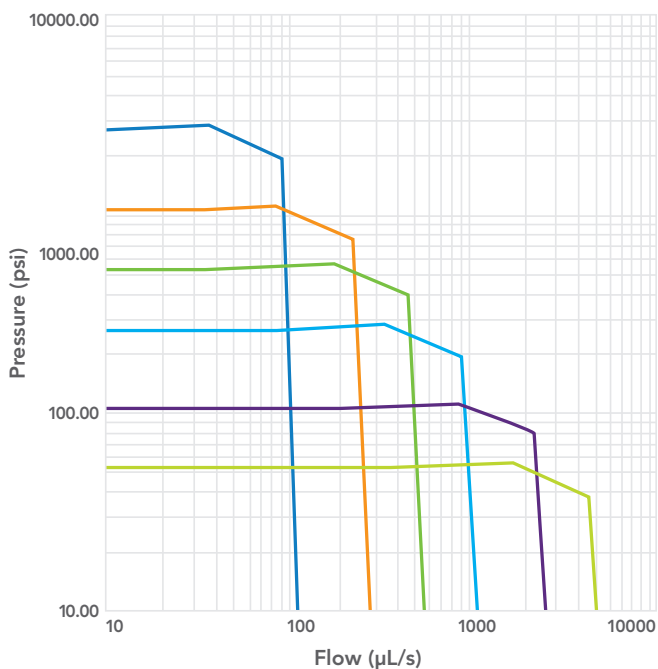
IDEX HEALTH & SCIENCE TRUSTED QUALITY

100% of pumps are functionally tested before shipping, and our expertise in fluidic systems guarantees consistent quality and support.

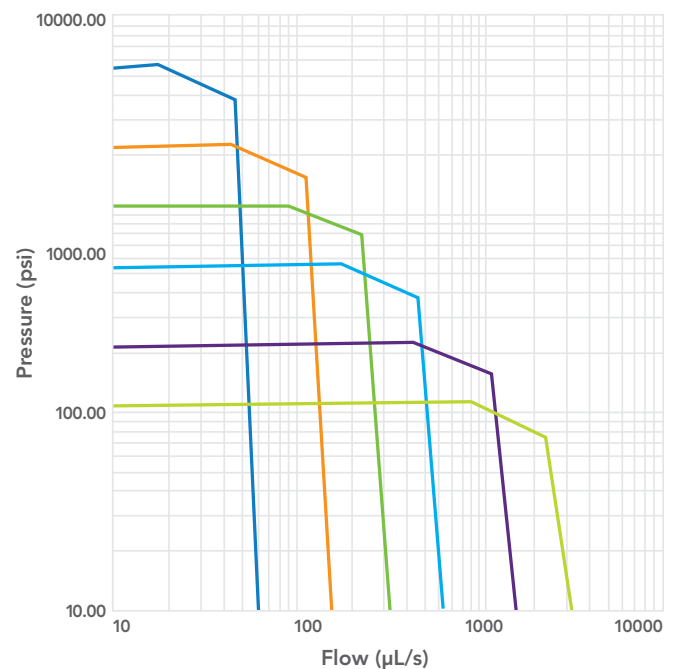
Engineered for Reliability in the Most Critical Applications

We understand that pumps are integral to advanced fluid-handling solutions across a wide range of life science instrumentations. To ensure all your application needs are covered, we offer two different drive train configurations. This allows you to configure the pump for your specific pressure and flow rate needs.

PUMP SERIES PRESSURE/FLOW CURVES (20TPI)



PUMP SERIES PRESSURE/FLOW CURVES (40TPI)



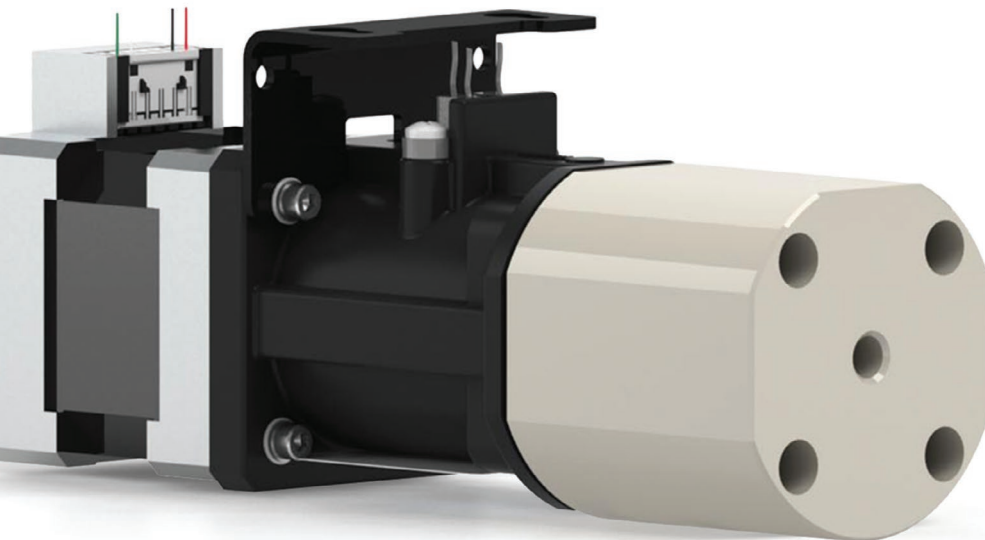
— 100 µL Pump — 250 µL Pump — 500 µL Pump — 1000 µL Pump — 2500 µL Pump — 5000 µL Pump

Precision Dispensing Solutions

VFP17 Series

Performance & Flexibility

Precision-machined performance for demanding applications and reagents.



Key Features

- › Anticipated Life: 5 million cycles
- › Durable Seal option available to handle aggressive reagents with high saline and/or detergents
- › Piston Displacement
Precision: 0.75% CV for 2% Full Stroke Dispense
- › Max Operating Pressure: Up to 500 psi (30 bar)
- › Pump Head: Acrylic (PMMA), Ultem, PEEK
- › Available Sizes: 250*, 500, 1000, 2500*, and 5000* μ l
**Available with Durable Seal*

Ideal Use

- › Applications requiring custom-mounted solenoid valving
- › Integrated with onto a manifold to simplify complex flow paths
- › Instruments requiring demanding chemical compatibility

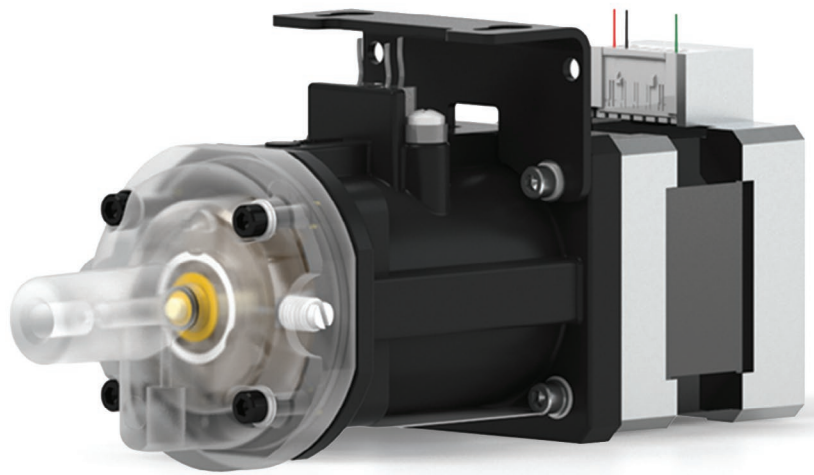
Benefits

- › Machined fluidic path minimizes unswept volume
- › Flexible design allows customization
- › Proven maintenance-free solution for OEMs

VP17 Series

High-Reliability Workhorse

Delivering value and performance.



Key Features

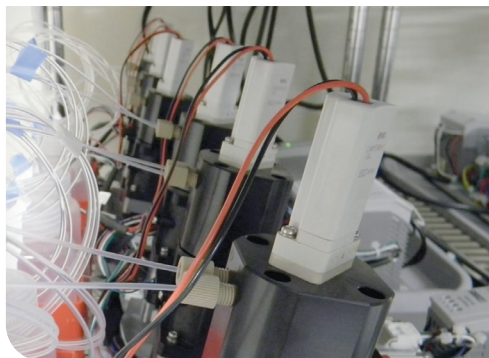
- › Anticipated Life: 5 million cycles
- › Piston Displacement Precision: < 1.0%
- › Max Operating Pressure: 500 psi (30 bar)
- › Pump Head: Molded acrylic (PMMA)
- › Available Sizes: 100, 500, and 1000 μ l

Benefits

- › Precision and performance for applications with moderate throughput
- › Proven reliability
- › Maintenance-free operation for life of instrument

A Design You Can Trust

Our applications lab has a rigorous validation process to ensure the piston pump will perform reliably in your instrument throughout its intended service life. Every pump



we design can be life-tested against your exact application requirements, including buffers, flow rate, dispense volume cycles, and operating conditions. Partnering with you to define a test plan that meets your real-world conditions, we validate the pumps to ensure precision and accuracy in your workflow.

Customization and Integration

Every application is unique. Our design team works with you to develop an optimized pump for your system.

Using state-of-the-art modeling systems, we design for minimum reagent loss and maximum lifetime. IDEX Health & Science offers comprehensive customization options:



CUSTOM-MOUNTED VALVING CONFIGURATIONS

Each pump can be configured with custom-mounted valving to direct fluid across fill, dispense, and waste paths, giving you precise control over your instrument's fluid actuation sequence.



MULTIPLE HEAD AND SEAL OPTIONS

Options like PEEK/Ultem heads, UHMWPE-based or FFKM seals allow you to match detergents, salts, and aggressive buffers, to support a durable-seal story versus syringe-style dynamic seals.



FLUIDIC INTERFACE DESIGN

Pump head defines the wetted flow path, housing the piston bore and attached valve assemblies.



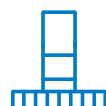
MULTIPLE MATERIAL AND PORT CONFIGURATIONS

Port geometry, thread patterns, and head materials can be specified to match your plumbing requirements and chemical compatibility needs.



ELECTRICAL CONNECTION OPTIONS

Encoder feedback provides position monitoring, allowing you to track piston location and achieve a higher level of fluid actuation control across each dispense cycle.



MANIFOLD INTEGRATION

Pumps integrate directly into multi-layer manifold assemblies alongside valves, pressure sensors, and other components, reducing plumbing complexity and reagent carryover in your instrument design.

TESTING & QUALITY

Our highly skilled production team, led by knowledgeable, experienced manufacturing and quality engineers, assembles and tests pumps in our Class 1000 (ISO Class 6) environments. Our focus is ensuring that you get a high-quality product, manufactured to the highest workmanship standards.



Questions to Consider when Selecting a Piston Pump

The right pump for your instrument depends on your reagents, your flow path, and your integration requirements. These questions cover the decisions that matter most in early-stage design:

I'm running a 1M NaCl solution. Which pump would you recommend?

A For high salt buffers, our Durable Seal pump is recommended, as it is designed to handle saline and detergent-containing fluids reliably while maintaining precision.

How do I know your pump will work with my reagents?

A We can perform accelerated testing with your specific reagents to ensure performance over the expected life of your instrument. We tailor our testing method to the needs of your application to ensure success.

How do IDEX Health & Science pumps compensate for backlash?

A Backlash is a mechanical clearance that provides ease of movement in pump components. This freedom reduces friction, minimizing wear and extending pump lifetime. It is important to compensate for backlash in high precision applications to ensure repeatability and accuracy.

We recommend a 1% move in the opposite direction before executing critical Aspirate or Dispense functions. For example, if a Dispense step is a critical move:

1. Aspirate the full pump volume
2. Dispense 1% of the pump volume (reverse-direction compensation step)
3. Execute the full Dispense of the pump

This method is preferred to mechanical compensation methods, which can add drag, accelerate wear, decrease pressure/flow capability, and introduce noise (as squeaking).

What consumables are required to run piston pumps?

A Our pumps are designed for life-of-instrument performance, so there are no routine consumables required for normal operation.

What do I need to integrate your pumps into my design?

A Each pump comes with wire cables so you can plug it directly into your electronics control. Standard port geometries make it straightforward to connect to tubing, manifolds, and valves.

What type of tubing should I use with the pump?

A Rigid-walled tubing (e.g., FEP, ETFE, PEEK) with super flangeless fittings is highly recommended for connections to and from the pump. This ensures the interior of the tubing will not deform, and precision is maintained.



Partner with the Leader in Precision Fluidics

IDEX Health & Science offers complete fluidic solutions and system integration options, giving you the flexibility to customize your pump solution with modular, adaptable configurations.

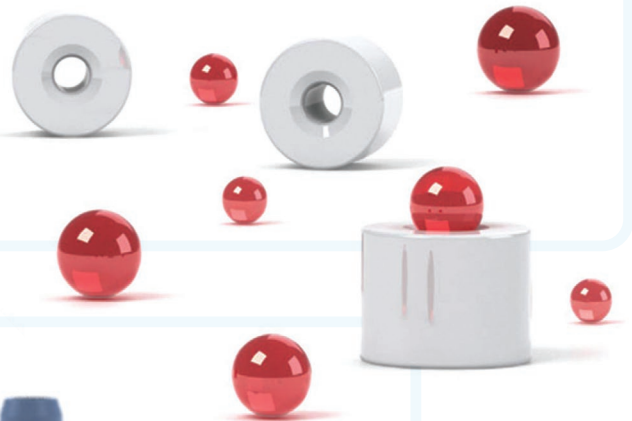
Ceramic or Sapphire Pistons

Ultra-hard, chemically inert pistons with a superior surface finish for long service life. Ideal for high-precision applications such as HPLC, medical devices, and industrial pumps.



Check Valves & Components

Ultra-precise one-way valves with sapphire or ruby ball-and-seat designs for reliable, chemically inert fluid control. Commonly used in HPLC and precision dispensing.



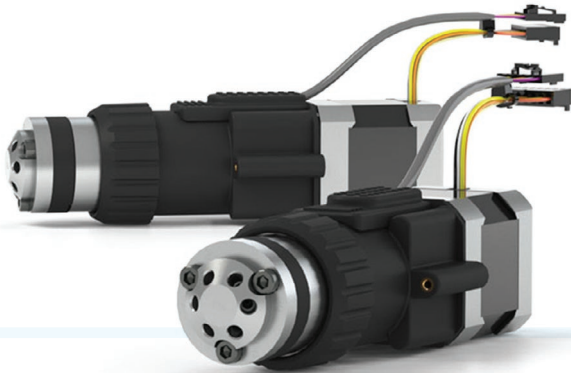
Connections & Tubing

We offer tight tolerances on polymer tubing in various materials and styles for consistent fluid delivery. Our kitting and custom labeling options simplify installation.



Injection & Selection Valves

Rotary valves provide accurate sample introduction and fluid routing with low dispersion and fast actuation. Available in a variety of inert material options.



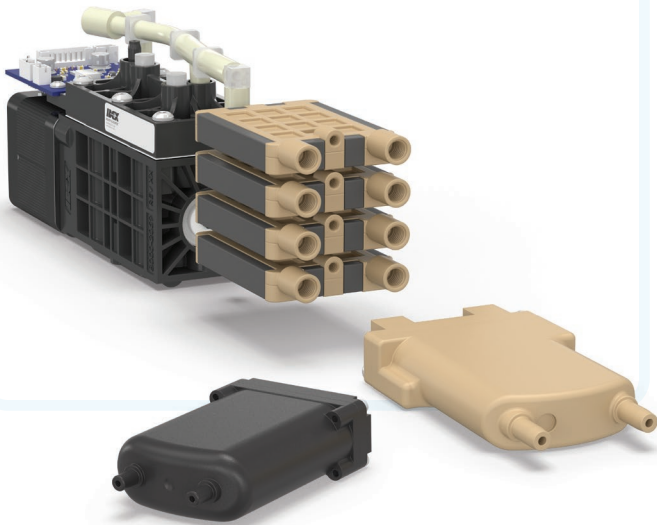
Subassemblies

We integrate pumps and components into compact subassemblies to streamline instrument design and simplify manufacturing integration.



Degasser Assemblies

Inline degassers reduce dissolved gases to prevent bubble formation, improving accuracy and minimizing disruptions in fluidic systems.



Pressure Sensors

Inline, low-volume sensors detect blockages quickly to protect samples. Designed for fast response and continuous monitoring of the fluidic path.





For ordering, technical support, and contact information
please visit www.idex-hs.com/pumps