



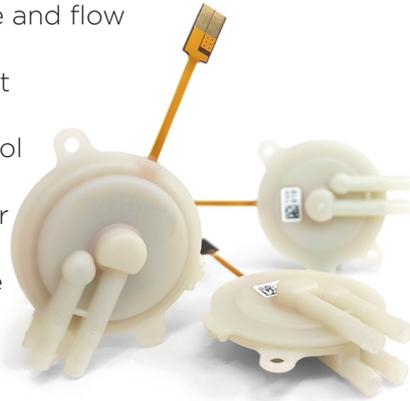
DISC PUMP

High performance micropump for Gas Sampling, Detection, Monitoring and Analysis.

Introduction

Tightening legislation and the growing global focus on air quality, worker safety and environmental emissions are driving the requirements for a new generation of measurement and monitoring systems. With its combination of high performance, pulsation-free flow, controllability and size, the multi award-winning Disc Pump distributed from ION Science is well placed to enable the development of these systems, from gas samplers and detectors, to laboratory analysers and particle counters.

- Exceptional pressure and flow
- Pulsation-free output
- High-precision control
- Compact form factor
- Millisecond response
- Silent operation



Sensitivity

Airflow pulsation is a challenge faced by many system designers, often limiting the signal-to-noise ratio (SNR) and the resulting sensitivity. Instruments often include baffles, accumulators and other damping hardware to reduce pulsation. Disc Pump moves a tiny quantity of air per cycle, typically in the range of 10s to 100s of nanolitres, resulting in negligible pulsation in pressure and flow. The resulting ultra-smooth output means that Disc Pump can deliver flow directly to the sensor, eliminating the need for damping hardware altogether.

Accuracy

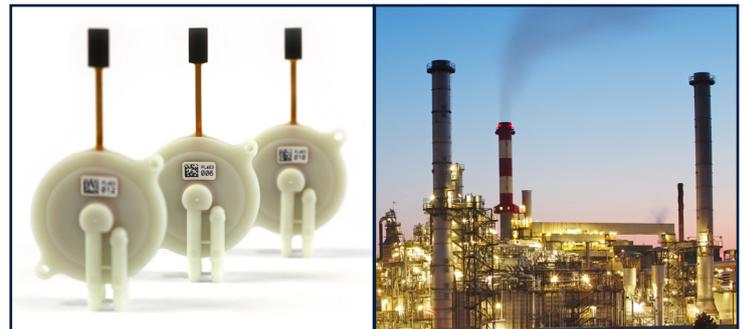
Accuracy also benefits from pulsation-free flow. When paired with an appropriate pressure or flow sensor, set points can be held within a fraction of a percent, with less than 0.1% often achievable. The stable, flat output helps to minimise integration error when calculating the pumped volume, which in turn supports accurate concentration measurements well into the ppb range. The ultra-smooth flow also helps to prevent double-counting in particle counting applications.

Portability and Wearability

The growing trend for portable and personal, wearable systems requires smaller and lighter components. Disc Pump weighs just 5g (1/5 oz) and occupies a volume of 7cm³. By eliminating the need for damping hardware, Disc Pump enables further reductions in size and complexity. The silent, vibration-free nature of the pump that follows from its ultrasonic operation helps to improve user experience, particularly in continuous monitoring and wearable applications.

Sampling Response

Unlike conventional motor-driven pumps, Disc Pump's piezoelectric actuator has relatively little inertia. This means that the pump can respond to full-scale set point changes and transition from 'off' to maximum output in a matter of milliseconds. For intermittent gas sampling applications, this provides true real-time capability to respond to trigger conditions.



Dynamic Range

Another feature of the technology is the near-infinite turn-down ratio on the pump speed. Unlike a motor, Disc Pump has no minimum or 'stall' speed. As a result, the pressure and flow that Disc Pump generates can be controlled from the maximum capacity of the pump linearly down to zero. This also enables the pump to start against pressurised lines - whether positive pressure or vacuum.

"Disc Pump's smooth flow is important to prevent noise on our sensors - the lower the noise, the greater sensitivity we can achieve. It will also help us to easily maintain constant flow via a feedback loop - as our system will change over time this is an important benefit."

Peter Morris, Business Unit Manager - Sensors, ION Science LTD



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Products

Product Line	Summary	Peak Pressure	Peak Flow	Peak Vacuum
BL Series	Entry-level pumps striking a balance between performance and cost.	> 300 mbar	> 0.95 L/min	> 200 mbar
XP Series	Highest performance and widest temperature range of -25 to +55 °C.	> 410 mbar	> 1.35 L/min	> 270 mbar

Typical Applications

With its unique set of features Disc Pump enables advances across a broad spectrum of Gas Sampling, Detection, Monitoring and Analysis applications, including but not limited to:

- VOC detection
- Air quality monitoring
- Portable & wearable monitors
- Docking & calibration stations
- Calibration gas generators
- Leak detection
- Particle counting
- Workplace monitoring
- Fence-line monitoring
- MRI-compatible measurements
- Ion Mobility Spectroscopy
- Chromatography

Evaluation Kit

The evaluation kit comes with everything necessary to start testing, including two pumps, electronics and PC application for configuration, control and data logging. Evaluation kits are suitable for laboratory testing, proof of concept and product prototyping.

Operational

- Kit contains
- 2 Disc Pumps.
 - Driver Board.
 - Mains PSU.
 - Accessories Kit.
 - USB drive with PC app for control, configuration, and documentation.

- Control Interfaces
- PC Application.
 - USB-Serial interface.
 - * Rotary dial.
 - * 0-2.5 V analog in.
 - ***can be configured to control pressure or power.**

- Control Modes
- Power control.
 - Closed-loop pressure control. (positive and negative pressure)
 - Bang-bang pressure control.



Request a Quotation

For more information or to request a quotation, please contact: sensors@ionscience.com.