



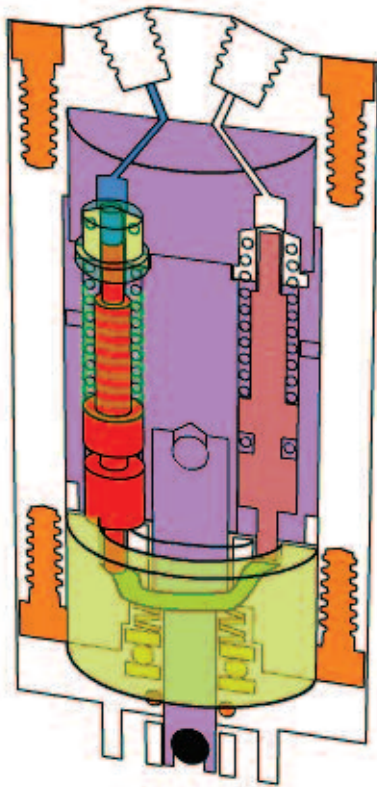
SmoothFlow™
MICROFLUIDIC PUMP

ABOUT SmoothFlow™ MICROFLUIDIC PUMP



- Positive displacement
- Bi-directional
- Pulseless flow
- Self-priming
- Continuous flow or metering modes
- Flow rates from μL to mL
- Pumps liquids and gases
- Fully automated with USB or RS-232 interface and control software
- End-user and OEM configurations available

TECHNOLOGY



The central component in the pump is a cylindrical rotor that is fitted with four equally spaced pistons (two are shown in figure to the left). This rotor seals against the stator end cap. The stator end cap has an inlet and outlet port. These ports are coupled to an inlet channel in the shape of an arc and a similar outlet channel in the stator cap. As the rotor turns, a cam governs the back and forth displacement of the spring-loaded pistons with a piston stroke of $1/8''$ (3mm). The diameter of the pistons of the Model 630 pump is larger than the pistons of the Model 100 pump. As the motor turns the rotor, one piston is dispensing into the outlet channel, one piston is filling from the inlet channel and the other two are moving between the inlet and outlet channels. The cam has been engineered to ensure a smooth transition when one piston hands off to the next.

A stepper motor governs rotation rate and direction. Flow direction is determined by the direction of rotation. Flow rate is determined by the rate of rotation. The metering capability of the pump is determined by the accuracy of the stepper motor working in micro-step mode. In addition to various levels of gearing, the stepper motor is operated in a mode where every stepper motor step is divided into 256 micro-steps. For the Model 100 pump, one revolution of the pump displaces 100 μL and for the Model 630 pump, one revolution displaces 630 μL . The volume per

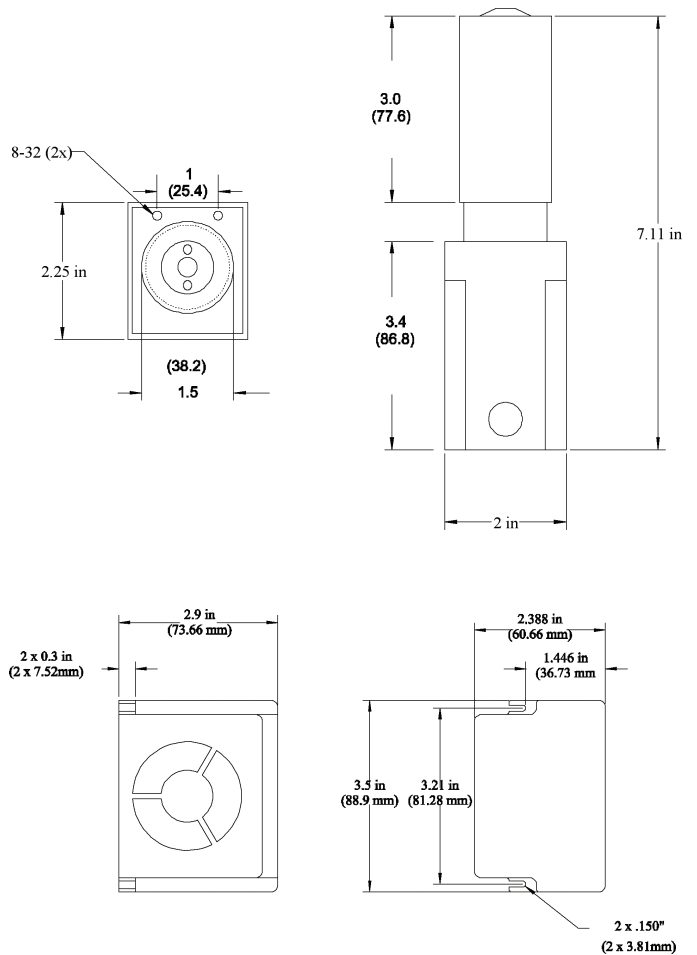
micro-step is dependent on motor, gearing, and pump used and can be calculated using a formula provided in the Operating Manual. In the event of a deadhead blockage, the backpressure overcomes the spring that holds the rotor against the stator. The rotor of the pump moves away from the stator and fluidleaks into the pump internals and eventually from one of the pump's leak ports. If this occurs, the leakage must be well flushed from the pump using distilled water and isopropyl alcohol to prevent permanent damage.

While care has been taken to ensure a smooth transition from one piston to the next, some users with sensors that are extremely sensitive to flow may notice a small perturbation as one piston hands off to the next.

The pistons are Teflon™ tipped and the Teflon tip is longer than the piston stroke thereby ensuring that the wetted surface of the piston chamber is not exposed to air. This has a positive implication for wear life of the pistons as crystals of dried dissolved solids cannot form and scratch the seal surface.

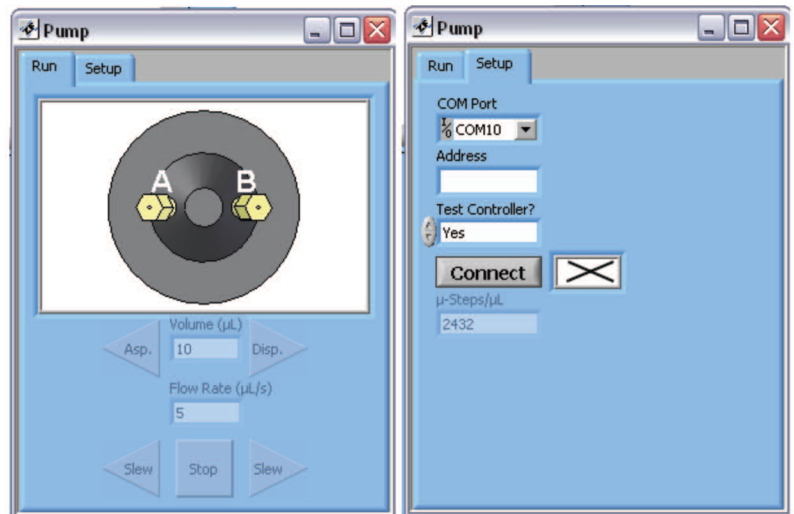
The SmoothFlow pump is a self-priming positive displacement pump and can tolerate gas in the fluid lines.

PUMP & MOTOR ASSEMBLY



SmoothFlow Controller Software

The SmoothFlow Pumps are delivered with a dedicated software control package to enable easy operation.



PHYSICAL DATA

	SmoothFlow 100	SmoothFlow 630
HEIGHT	7.1" (18cm)	8" (20.6cm)
WIDTH	2" (5cm)	2" (5cm)
DEPTH	2.25" (5.7cm)	2.25" (5.7cm)
WEIGHT, PUMP	520g	520g
WEIGHT, MOTOR & GEAR	530g	645g
POWER	24 VDC	24 VDC

ORDERING INFORMATION

Part No. 10130

Model 100 SmoothFlow microfluidic bi-directional liquid/gas pump, uL range, to include pump, controller, stepper motor, 24 VDC power supply, power cable and interface cable

Part No. 10130-005

Model 100 SmoothFlow Microfluidic Pump and stepper motor

Part No. 10130-010

Model 100 SmoothFlow Microfluidic Pump only

Part No. 10130-015

Controller only

Part No. 10130-020

Replacement pump motor

Part No. 10140

Model 630 SmoothFlow microfluidic bi-directional liquid/gas pump, mL range, to include pump, controller, stepper motor, 24 VDC power supply, power cable and interface cable

Part No. 10140-005

Model 630 SmoothFlow Microfluidic Pump and stepper motor

Part No. 10140-010

Model 630 SmoothFlow Microfluidic Pump only

Part No. 10140-015

Controller only

Part No. 10140-020

Replacement pump motor



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