

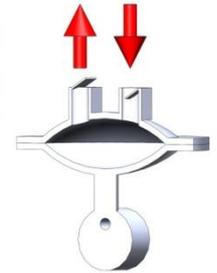


The 'D' range of diaphragm pumps.

TCS Micropumps manufacture a range of miniature diaphragm pumps that will satisfy pumping requirements, where small size, high pressure and the ability to self-prime are key requirements. Different models in the range have the ability to pump liquid, gasses or both.

Working Principle

The diaphragm pumps are positive displacement pump that use a reciprocating flexible diaphragm, in conjunction with one-way valves, to create a one-way flow.



Capabilities and Key Features

High pressure capability

Self-priming

The technology is suitable for both gases and liquids.

The pumps inbuilt valves act as a check valve, against backflow and can hold/maintain a pressure, even when the pump is off.

DIAPHRAGM PUMPS – THE RANGE



D200 RANGE

A versatile range of miniature diaphragm pumps for air/gasses and liquids.

The completely sealed, oil free pumping chamber make them particular suitable for applications where contaminants cannot be tolerated. They can run dry, are self priming and are suitable for a wide range of different chemicals by selecting from TCS range of material choices for the pump body and elastomers.

Available with a range of different drive motors.

D220 range

The moulded polymer construction enables this pump to be manufactured in large numbers. It is the lowest cost model and ideal for many high volume requirements.



Optimised for gases but capable of pumping liquids

D250 range

CNC machined stainless steel pump head for wider range of performance, precision and strength.



Optimised for gases but capable of pumping liquids

D250-L

A special variant of the D250 optimized for higher flows with liquids



Optimised for liquids but capable of pumping gases

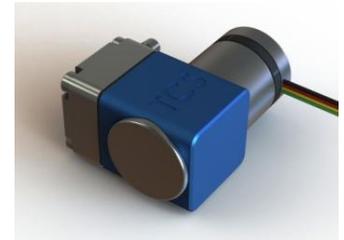
D250-LF

A special variant of the D250 optimized for Liquid Fuels with stainless steel valves. It uses a long-life TCS brushless drive motor for long life and has an integrated controller. Exceptional reliability.



D250-LF-ENS

A special D250 variant with all metal construction, utilising a CNC aluminium machined motor mount, with the proven all stainless steel pump head from the D250-LF.



Double Headed Diaphragm Pump Ranges

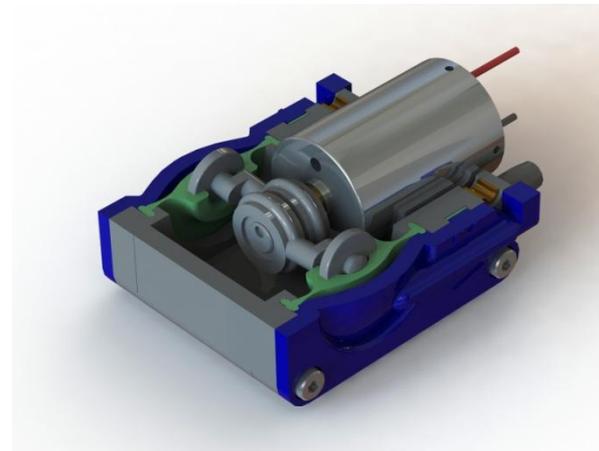
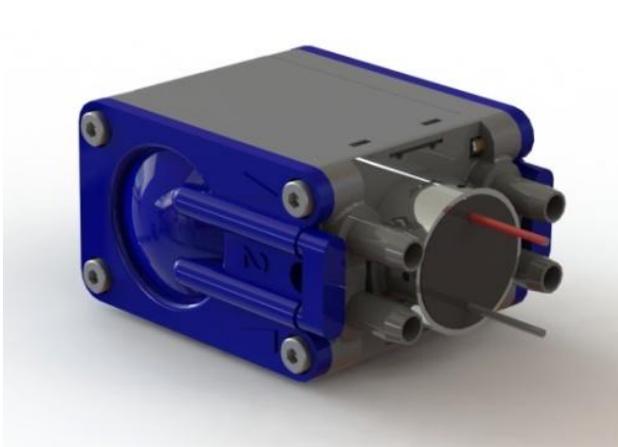
Diaphragm pumps are a well developed and proven pumping technology that offer exceptional pumping efficiency in a small form factor. Their strength is the ability to generate high pressures very efficiently from comparatively low power drive motors. However they suffer with low flow rates and a pulsatile flow delivery.

To help overcome these limitations TCS Micropumps have developed the double headed diaphragm pump, maintaining the benefits inherent in the basic diaphragm pump design, yet optimised around increased flow rates. The double-headed design and TCS configuration helps smooth out some of the pulsation that is inherent in the design of other diaphragm pumps.

D3K Range

A small light weight double-headed high-flow diaphragm pump for air and other gases.

The moulded polymer construction, enables this pump to be manufactured in large numbers and is the most economic pumping solution for high volume requirements.



Reversing Flow

All diaphragm pumps use valves to turn the movement of the fluid caused by the reciprocating motion of the diaphragm into a flow. These same valves then restrict the pump to only one flow direction.

If flow reversal is required however, TCS Micropumps have developed a range of flow reversing manifolds.

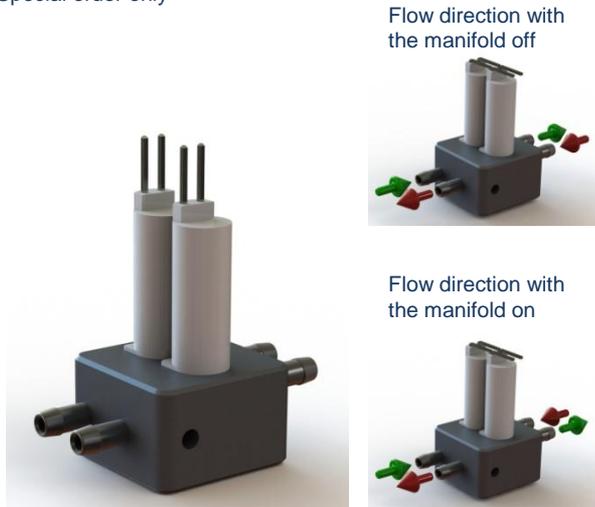
Placed inline with the pumps inlet and outlet ports the manifold allows flow to pass straight through it when not energised, just like a standard pump. But when powered the manifold switches the pumps inlet and outlet ports and reverses the flow direction.

For example a single pump and manifold combination can be used to fill a vessel, pause, and then by energising the manifold use the same pump to empty the vessel.

TCS-303

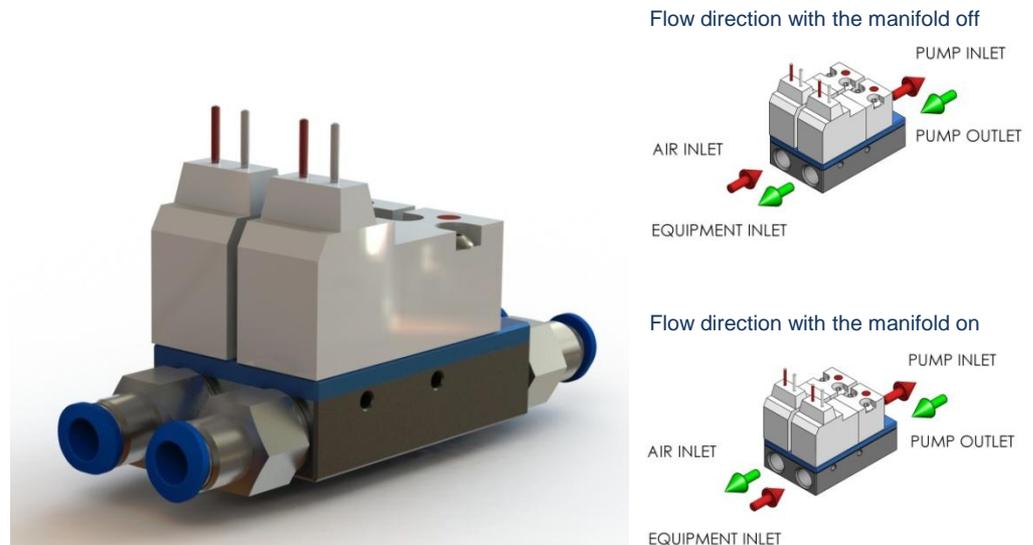
Miniature Reversing Manifold suited to the smallest pumps/ lower gas flow.

Special order only



TCS-304

Larger Reversing Manifold, capable of handling flows up to 10Lpm



Special Variants

The standard 'D200 and D250 series' pumps not only come in a range of different material and port configurations but can be supplied with various drive motors. These Range from small, highly efficient brushed DC motors utilizing a coreless construction, to brushless motors with built in pump controller or separate EQi controller.

All "D" series pumps can be supplied in a wide range of seal material options to deliver a wide range of chemical compatibility.

Requirements that cannot be satisfied by a TCS stock pump or variant, can utilise TSO. This is where the in-house R&D team can develop a bespoke OEM system that can be specifically tailored to match the requirement.

TCS have specialised D series pumps all over the world in a wide range of different hand held, laboratory and monitoring equipment but also "Off-World", circulating the earth in the international space station.



DIAPHRAGM PUMPS - PERFORMANCE



TCS Micropumps test the performance and life expectancy of all pumps in house.

Unless otherwise specified all tests are run on air or on TCS Coolant (90% water + biocide + detergent), with the pump subjected to standard atmospheric pressure at 20-24 deg C.

Note the life of all pumps can be increased by running at a reduced performance / power point.

As performance is not affected by age the failure mode is defined as the point at which the pump stops

Maximum Performance Characteristics

Model	Voltage Range	Max Flow	Max Pressure	Max Power	Weight	
D220S	3.0-4.5 V	425 mLpm	650 mbar	0.1 - 0.6 W	31 grms	Air
D220BLZ	3.0-6.0 V	450 mLpm	700 mbar	0.1 - 0.6 W	32 grms	Air
D250S	3.0-4.5 V	580 mLpm	750 mbar	0.1 - 0.6 W	33 grms	Air
D250BLZ	3.0-6.0 V	620 mLpm	800 mbar	0.1 - 0.6 W	34 grms	Air
D250S-L	4.5 V	180 mLpm	350 mbar	1.4 W	26 grms	Liquid
D250BLZ-L	4.5 V	160 mLpm	200 mbar	2.4 W	26 grms	Liquid
D3k	3.0-6.0 V	3600 mLpm	700 mbar	2.1 W	45 grms	Air

Life expectancy under typical operating conditions for standard versions.

Model	Voltage	Flow	Pressure	Power	Life	Failure Mode
D220S	3 V	250 mLpm	10 mbar	0.2 W	1500-5000 hrs	Full performance retained until Coreless Motor fails
D250BLZ	6 V	600 mLpm	10 mbar	0.2W	5000+ hrs	Full performance retained until crank bearing fails
D3K	5.6 V	3000 mLpm	30 mbar	1.8 W	3,000+ hrs	Full performance retained until motor fails