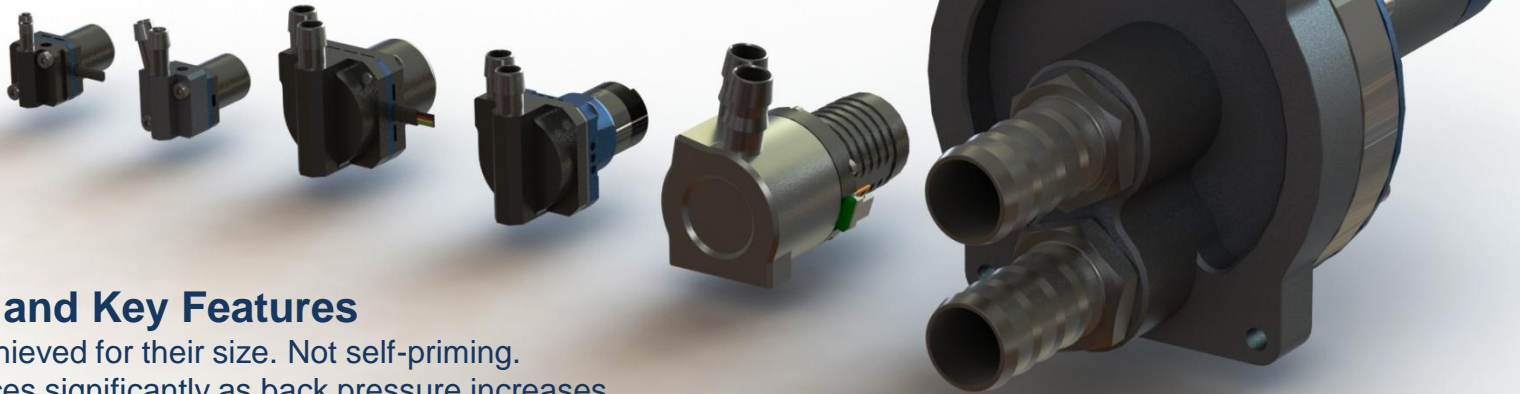


CENTRIFUGAL PUMP TECHNOLOGY



The 'M' range of centrifugal liquid pumps.

TCS Micropumps manufacture a range of miniature centrifugal pumps that will satisfy pumping requirements where, small size, high flow and low power are often key requirements.



Capabilities and Key Features

Very high flow achieved for their size. Not self-priming.

Output flow reduces significantly as back pressure increases.

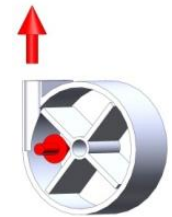
Output flow can be restricted or regulated without causing any damage to the pump

Flow direction cannot be reversed.

Working Principle

Centrifugal pumps use a roto-dynamic pumping principle. Liquid is introduced at the centre of a rotating impeller, which spins and accelerates the fluid towards the outer wall, where the flow is channelled into a tangential outlet port.

TCS centrifugal pumps are very durable with minimal wearing components. They are ideal when designing a high flow, long life, reliable pump. They are not positive displacement and do not self-prime. They have the potential to develop very high flow for their size, although flow reduces significantly as back pressure increases.



CENTRIFUGAL PUMPS – THE RANGE



M100 and M200

These are the smallest pumps in the TCS standard range and yet capable they are capable of up to 500ml/min. Available with various seal materials and configurations to suit a wide range of chemicals and applications.

Delivering smooth and consistent flow, these pumps are particularly suitable for portable systems where size, weight and low power consumption are often key requirements.

Flow is easily controlled via the supply voltage or by restricting/regulating the pump outlet side. They are capable of continuous operation.



M400 range

Powered by a long life, 'Brushless Motor' the M400 series are slightly larger than the M100/200 range but can achieve up to 2.5 LPM.

They are highly efficient long life pumps, powered by their own built in miniature motor controller with overload protection.

Like all M series pumps they come in a large range of Inlet/Outlet port configurations to suit all possible installation requirements. A range of seal options is available for maximum chemical compatibility.

Manifold mounting and custom configurations are also available, which broaden the potential application and use further.



CENTRIFUGAL PUMPS – THE RANGE

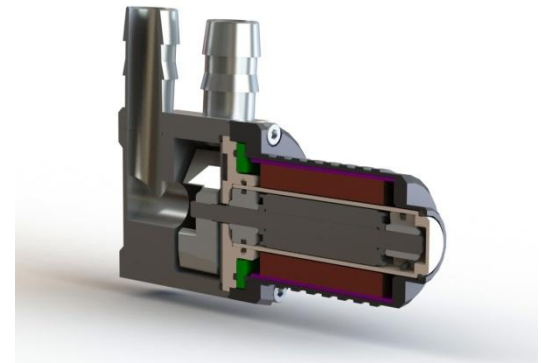
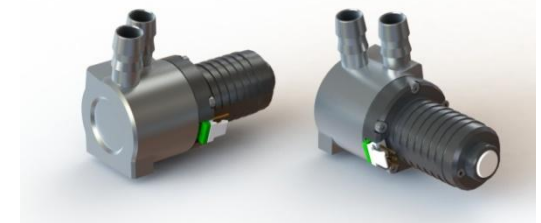


M500 - M510

TCS Innovative M500 range of pumps are driven by powerful and optimised brushless drive motors which enable them to deliver unparalleled levels of performance for their size.

The unique design cleverly eliminates the need for dynamic seals and motor brushes. A high level of performance is achieved with robust, long life reliability in a small and quiet package. The design uses ultra reliable TCS brushless motor technology and the M500 series pumps can be expected to outlast all other pumps in their class.

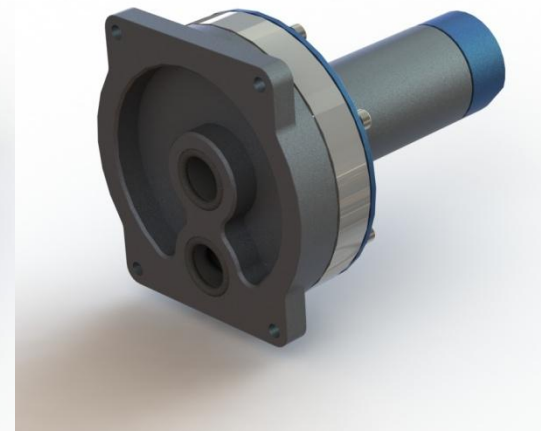
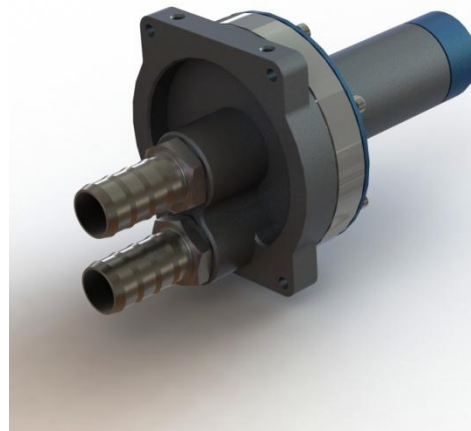
Constructed from precision CNC machined stainless steel, Peek and aluminum alloy components. Optionally wetted part coatings and material use, enable this pump range to suit most applications and resist most chemicals and solvents.



M3000 Range

With the M3000 TCS Micropumps have taken the proven, sealless, brushless motor technology that was developed for the M510 pump range and pushed it to the next level.

Constructed from precision CNC machined Aluminum, Stainless Steel and Polyacetal components they are capable of exceptional levels of flow and pressure.

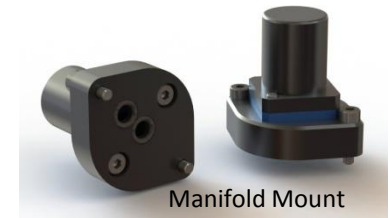


CENTRIFUGAL PUMPS – THE RANGE



Port Options

All M series pumps are available with different port options to satisfy most installation requirements. The most popular: -

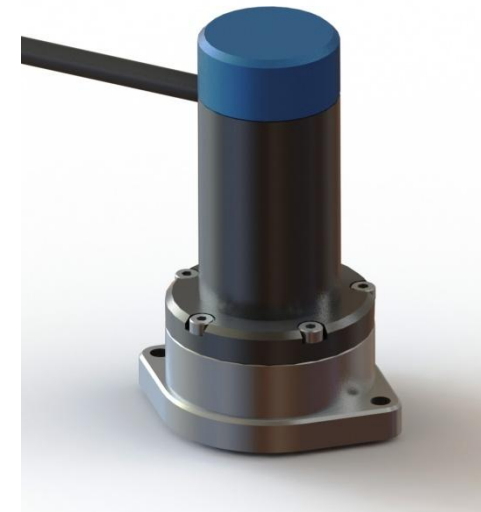
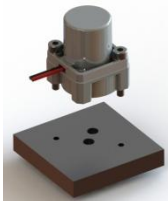
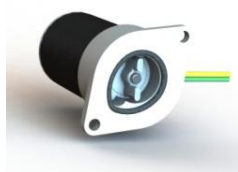


Special Variants

'M series' pumps can also be supplied with optional seal materials to cover a wide range of different chemical requirements.

Customers with unique requirements, that are not covered by the stock range, can engage with the in-house R&D team. TSO (TCS Special Operations) can develop bespoke OEM systems that are precisely tailored to the requirement. TSO examples

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CENTRIFUGAL PUMPS - PERFORMANCE



TCS Micropumps test the performance and life expectancy of all pumps in-house on dedicated test rigs.

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

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

TCS Centrifugal pump performance does not change with wear, age or use. They perform at a 100% of the original performance until failure is reached at the end of the pumps life. IE No performance deterioration takes place during the pumps working life.

Maximum Performance Characteristics

Model	Voltage Range	Max Flow	Max Pressure	Max Power	Weight
M100	1.5-3.0 V	430 mLpm	230 mbar	1.2 W	10 grms
M200	1.5-3.0 V	700 mLpm	230 mbar	1.3 W	13 grms
M400	6.0 -12 V	2685 mLpm	380 mbar	7.1 W	34 grms
M410	6.0 - 12 V	2685 mLpm	380 mbar	7.1 W	45 grms
M510	12 - 30 V	8700 mLpm	586 mbar	22.8W	86 grms
M3000	12-30 V	54 Lpm	1.3 bar	200W	770 grms

Life expectancy of Standard Product under typical operating conditions

Model	Voltage	Flow	Pressure	Power	Life	Failure Mode
M100	3 V	400 mLpm	25 mbar	0.9 W	500-1000 hrs	Full performance retained until DC Motor fails
M200	3 V	650 mLpm	30 mbar	0.9 W	500-1000 hrs	Full performance retained until DC Motor fails
M400	12 V	2500 mLpm	50 mbar	6.0 W	5000-8000 hrs	Full performance retained until Brushless drive fails
M410	10 V	1800 mLpm	30 mbar	0.6 W	20,000+ hrs	Full performance retained until Brushless drive fails
M510	12 V	5000 mLpm	29 mbar	15 W	40,000+ hrs	Full performance retained until Brushless drive fails
M3000	12V	30 Lpm	100 mbar	100 W	40,000+ hrs	Full performance retained until Brushless drive fails