

MEDICAL EQUIPMENT PUMP



MEDICAL

Industry Overview

IVD, which stands for In Vitro Diagnostics, refers to products that conduct testing on samples taken from the human body (such as blood, body fluids, and tissues) outside of the body in order to obtain clinical diagnostic information. The IVD industry is subdivided into various sectors including immunodiagnostics, clinical chemistry, molecular diagnostics, microbiology diagnostics, blood diagnostics, and point-of-care testing (POCT).

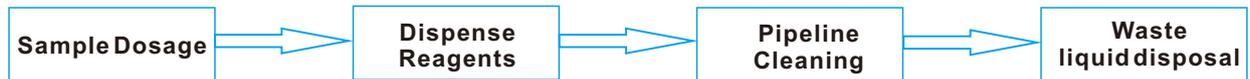


High Precise Micro DC Pump

EQUIPMENT OVERVIEW

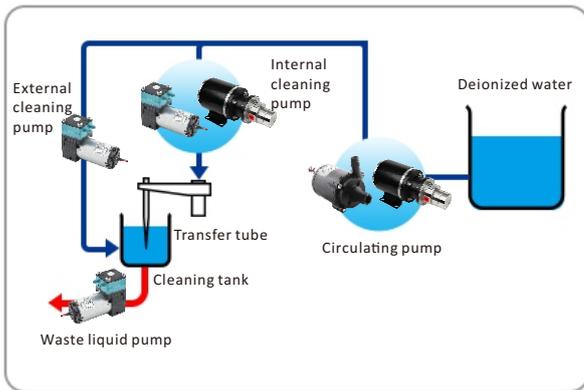
TOPSFLO PUMP SOLUTION

Micro pumps are a crucial driving component for in vitro diagnostic analysis. They serve as the power elements of fluidic systems and are extensively used in various fields such as clinical chemistry, blood analysis, immunology, microbiology, etc. Micro pumps perform essential functions including sample delivery, waste removal, pipeline and component cleaning.

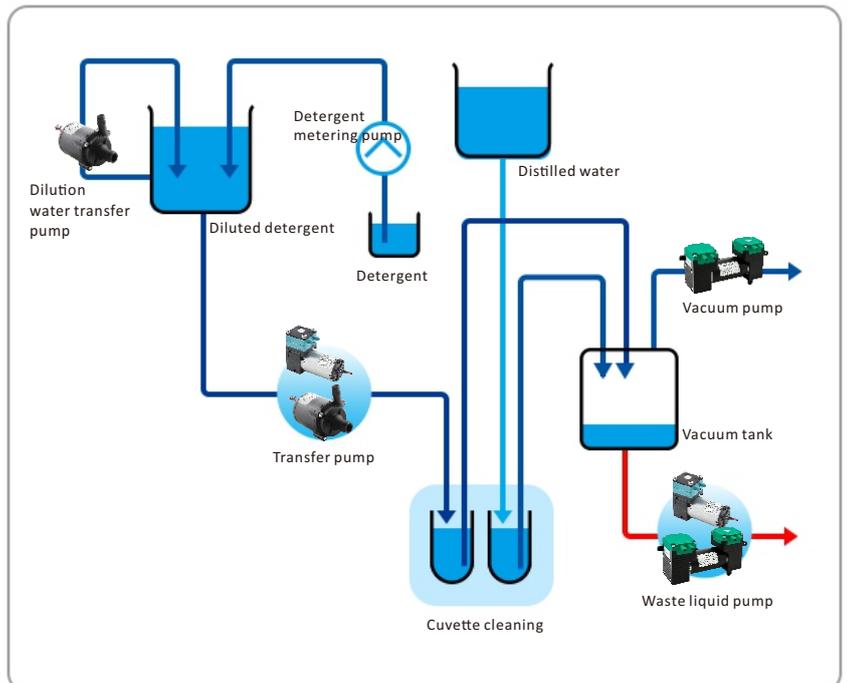


Taking the Fully automated biochemistry analyzer as an example, TOPSFLO micro pump can be used in systems such as needle cleaning, cuvette washing, and constant temperature circulation:

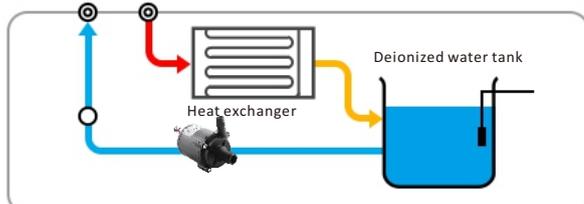
Needle Cleaning



Cuvette Cleaning / Waste Liquid Extraction



Constant Temperature Circulation



Diaphragm Liquid Pump

Diaphragm pumps are the most widely used pumps in IVD instruments, especially in **waste systems**, where they clean and eliminate waste from reaction cups and pipelines. In this process, **diaphragm liquid pumps** can directly pump out waste liquids. Alternatively, **miniature vacuum pumps** can be used to create a vacuum in sealed containers, indirectly drawing out waste from the instrument. This method is efficient and the waste doesn't pass through the pump chamber, thus extending the pump's lifespan.

Depending on the specific application, there are larger double-headed and single-headed vacuum pumps used to create a vacuum in containers, as well as smaller diaphragm pumps with lower flow rates and pressures. Small diaphragm pumps are often employed to directly extract waste from individual needles. Miniature pumps need to operate under various working pressures, meeting the demands of different pressure and flow scenarios.

Zero Cross-Contamination

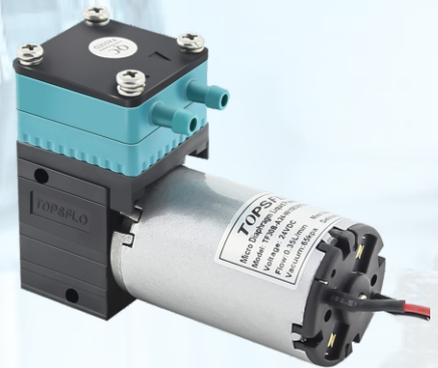
- Providing a clean environment for the transfer, extraction, and compression of gases; oil-free and maintenance-free

High Air-tightness

- Highly airtight diaphragm pumps are crucial for IVD equipment because they ensure the precision, reliability, and repeatability of tests, thus supporting accurate diagnostics and analysis.

Precise Flow Rate

- IVD systems rely on highly reliable sample introduction systems to complete processes such as sample pretreatment, sample/reagent addition, and more. It's crucial to ensure the high-precision and high-repeatability conveyance of samples and reagents, along with maintaining smooth flow and minimal pulsation in the process.



TF Series Specifications

- Flow Max: 3L/min (0.8 GPM)
- Water Head: $\geq 10\text{m}$ (1Bar)
- Ambient Temperature: $-20\sim 60^{\circ}\text{C}$
- Media temperature: $-5\sim 60^{\circ}\text{C}$
- Life Time: 15000 Hours

Diaphragm Gas Pump

Corrosion Resistance

- When flushing pipelines and needles, corrosive solvents are often used, and it's necessary to promptly remove waste containing crystals or blood clots from the system. Therefore, miniature pumps need to possess a certain level of **corrosion resistance**. The pump head, diaphragm, and valve components of TOPSFLO diaphragm pumps can all be customized with a variety of materials to accommodate different solvents.



Extremely Long Product Lifespan

- Within the lifecycle of IVD instruments, there is a requirement for miniature pumps to not require replacement, to have a long operational lifespan, and to maintain stability and reliability.

Compact Structure, Flexible Installation

- IVD systems typically need to accommodate other critical components such as sensors, valves, and reservoirs. With limited space for equipment and components, there is a requirement for miniature pumps to have a compact structure and flexible installation capabilities.

TM Series Specifications

- Flow Max: 17L/min (4.50 US GPM)
- Max pressure: 220Kpa
- Max vacuum: 95Kpa
- Ambient Temperature: -20~60°C
- Media temperature: -5~60°C
- Life Time: 15000 Hours

Centrifugal Pump

TOPSFLO centrifugal pumps are commonly used in IVD to regulate the temperature of in vitro diagnostic reagent kits, enzyme-linked immunosorbent assay (ELISA) instruments, fluorescence analyzers, and more. This ensures the accuracy and reproducibility of experiments.

The following are the requirements for pumps in the IVD circulation constant temperature system:

Reliability and Stability

- **The IVD equipment demands highly reliable results**, requiring centrifugal pumps to exhibit high stability to ensure continuous operation without any failures. Furthermore, within the IVD instrument's lifespan of **10 to 15 years**, it is expected that the micro pumps do not require replacement.
- TOPSFLO pumps have successfully passed reliability validation from major IVD manufacturers, demonstrating a long lifespan and stable reliability.

Zero Cross-Contamination

- In the IVD system, cross-contamination can lead to errors and inaccurate results. For instance, deionized water within the system needs to possess high purity to ensure that the flowing water does not contaminate samples or reagents. Additionally, the pump itself must avoid releasing even trace amounts of pollutants.
- TOPSFLO pumps utilize **food-grade materials**, achieving genuine **zero impurities and zero cross-contamination**. This approach contributes to medical equipment providing the most authentic and reliable test data.



Corrosion Resistance

- Alkaline cleaning solutions possess a certain level of corrosiveness, requiring pumps to be corrosion-resistant to prevent damage during the handling process.
- TOPSFLO adopts corrosion-resistant materials and has successfully passed alkaline cleaning solution immersion tests conducted by various major IVD manufacturers.

TL Series Specifications

- Flow Max: 24L/min (6.34 US GPM)
- Water Head: 35M
- Ambient Temperature: -40~40°C
- Media temperature: -40~105°C
- IP Rate: IP68

Gear Pump

Gear pumps are commonly used for cleaning the inner walls of needles with high pipe resistance. The cleaning effectiveness of the needle is closely related to the internal roughness and design of the inner needle wall, but more importantly, it's correlated with the high pressure provided by the gear pump. High-pressure flushing of the inner walls ensures an adequate cleaning flow even under high resistance conditions.

Stable pressure output

- Gear pumps should be capable of providing a stable pressure output to ensure the flushing force of liquids within the system.

Reliability and Stability

- IVD equipment typically requires precise flow control to ensure accurate dosing, mixing, and transfer of reagents, samples, or other liquids. TOPSFLO gear pumps possess stable flow control capabilities to meet experimental requirements.

Corrosion resistance

- IVD equipment may use various types of reagents and samples, some of which might be corrosive. The materials of TOPSFLO gear pumps are designed to withstand the characteristics of the liquids used to prevent pump damage during operation.

Reliability and Durability

- Gear pumps need to have high reliability, capable of continuous operation over extended periods, and maintaining performance stability throughout the equipment's entire lifespan.



MG Series Specifications

- Flow Max: 6.5L/min (1.72 US GPM)
- Max Output Pressure: 10bar (145.04 psi)
- Max System Pressure: 20 Bar (290.08 psi)
- Ambient Temperature: -30~50°C
- Media temperature: -10~100°C

TOPSFLO
Excellence in Micro Pump,DC Pump

THE LEADER OF HIGH-END MICRO DC PUMP