

# Quattroflow® Quaternary Diaphragm Pumps

for Biopharma Applications



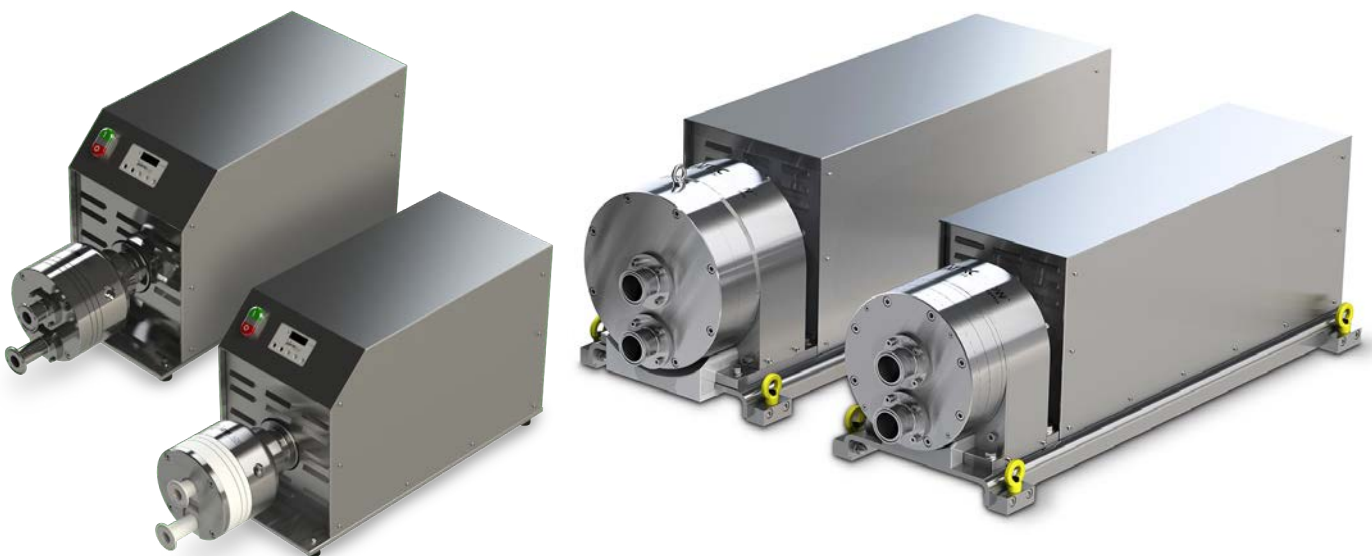


## Who We Are

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Based in Duisburg, Germany, Quattroflow<sup>®</sup> Fluid Systems develops and manufactures multiple- and single-use quaternary (four-piston) diaphragm pumps that have been designed for critical fluid-processing applications in biopharma production. A wide distributor network and the cooperation with OEM companies help Quattroflow satisfy customer needs all over the world.

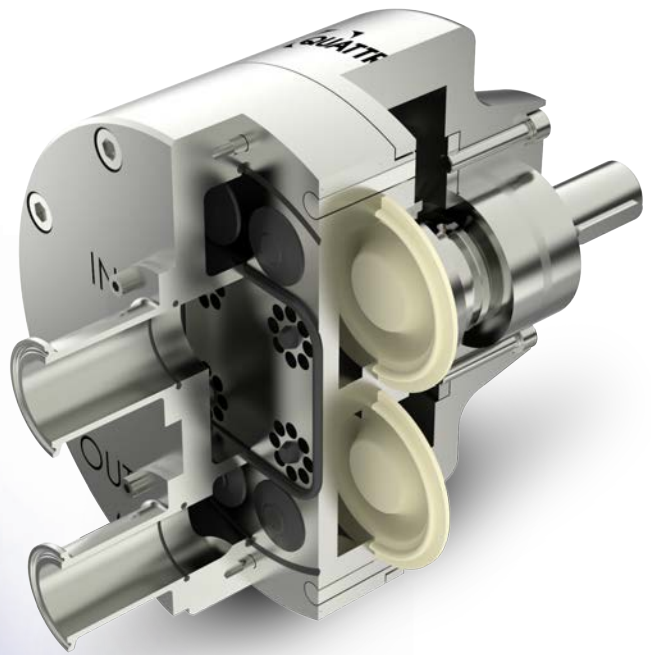
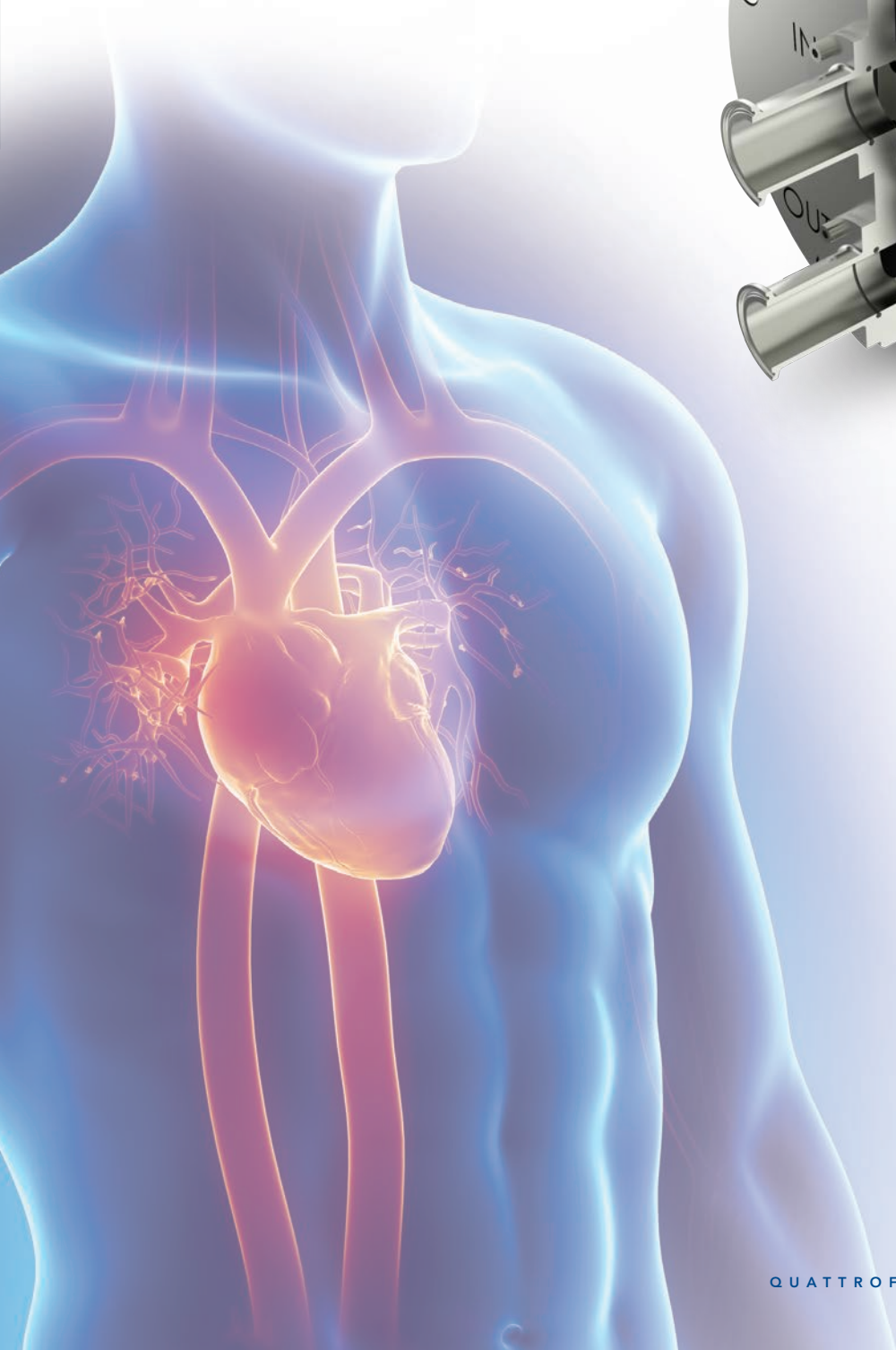
Quattroflow is a product brand of PSG<sup>®</sup>, a global pump-solution expert for key vertical markets, including hygienic, chemical and energy. PSG is part of the Pumps & Process Solutions segment within Dover Corporation, a diversified global manufacturer for more than 60 years.



## Our Technology

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The design of the Quattroflow quaternary diaphragm pumps has some similarities to the human heart, which is tasked with pumping one of the most critical fluids on Earth: human blood. While the human heart has two chambers, Quattroflow pumps feature four individual and integrated chambers to effectively minimize pulsation. This method of operation allows for the gentle, safe and secure transfer of aqueous solutions and biopharma products. In addition, Quattroflow pumps enable dry-run operation, self-priming startup and low-heat input while offering a broad flow range and a flow rate proportional to the motor speed.

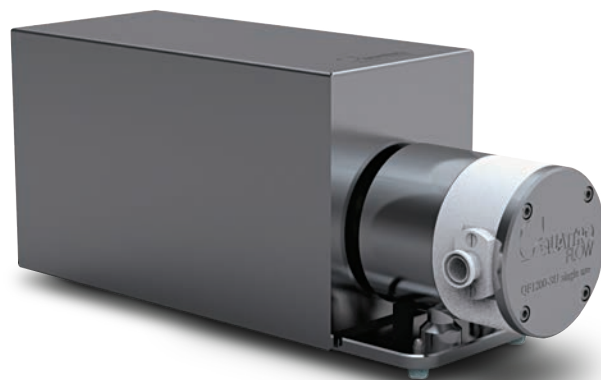


# Single-Use Pump Solutions

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Single-use technology offers many advantages and flexibility in bioprocessing. For this, Quattroflow single-use pumps have a disposable wetted pump chamber that can be replaced as a complete unit.

- Identical flow range as multiple-use versions
- Max. discharge pressure of 4 bar
- Solid polypropylene (PP) material of construction
- Eliminates costly and time-consuming cleaning and sterilization
- Ideal for use in multi-product facilities like:
  - Process development
  - Production of clinical-trial material
  - Contract manufacturing
- Assembled in an ISO Class 7 cleanroom
- Available in a pre-gamma irradiated version (dose >25kGy)
- Full single-use validation guide available, including extractables data and material certifications (FDA, USP Class VI, BSE/TSE)



## EZ-Set: Quick, Easy & Safe

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Quattroflow single-use pumps are available with the EZ-Set Chamber Replacing System that allows a faster replacement of single-use pump chambers.

- Quick replacement of the pump chambers
- Available for single-use pump sizes 150 and 1200
- Integrated force limitation for proper tightening, no torque wrenches needed
- Retrofittable on most existing standard Quattroflow single-use pumps by replacing the pump chamber, pressure plate and shaft bearing kit



# Multiple-Use Pump Solutions

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Quattroflow multiple-use pumps feature stainless-steel construction and offer clean-in-place (CIP) and steam-in-place (SIP) capabilities to satisfy the necessary cleaning requirements.

- Material of the pump chamber: 1.4435 (SS316L), electropolished, Ra <0.4µm product-wetted surface roughness
- Max. discharge pressure of 6 bar
- Suitable for CIP/SIP procedures
- Autoclave capability
- Elastomers FDA and USP Class VI compliant
- Optional certifications for wetted parts:  
Stainless steel: 3.1, Surface roughness, Ferrite (EN10204)

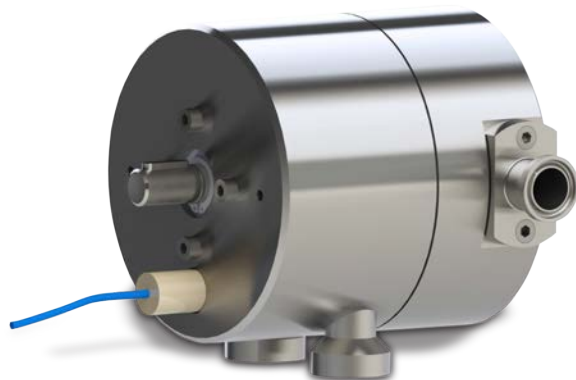


## Accessories for Single- & Multiple-Use Pumps

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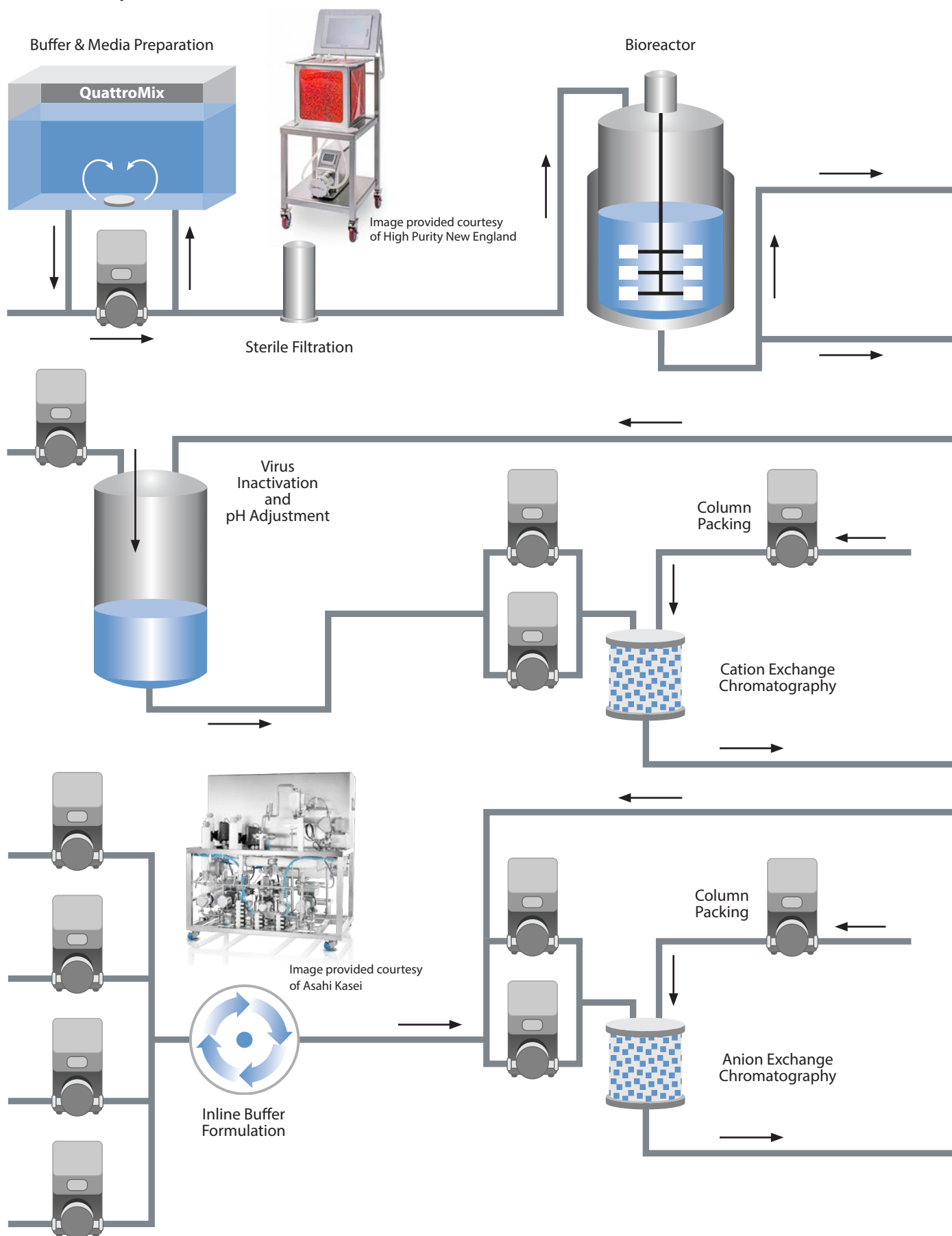
### Diaphragm Sensor

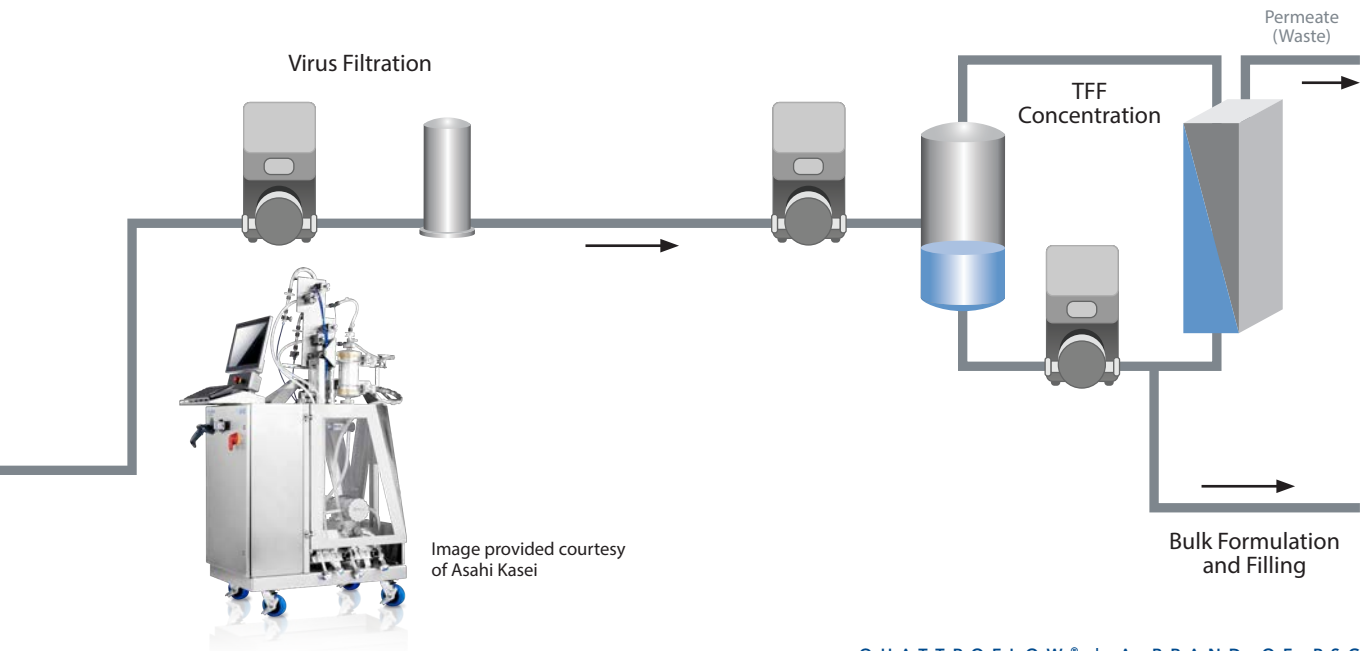
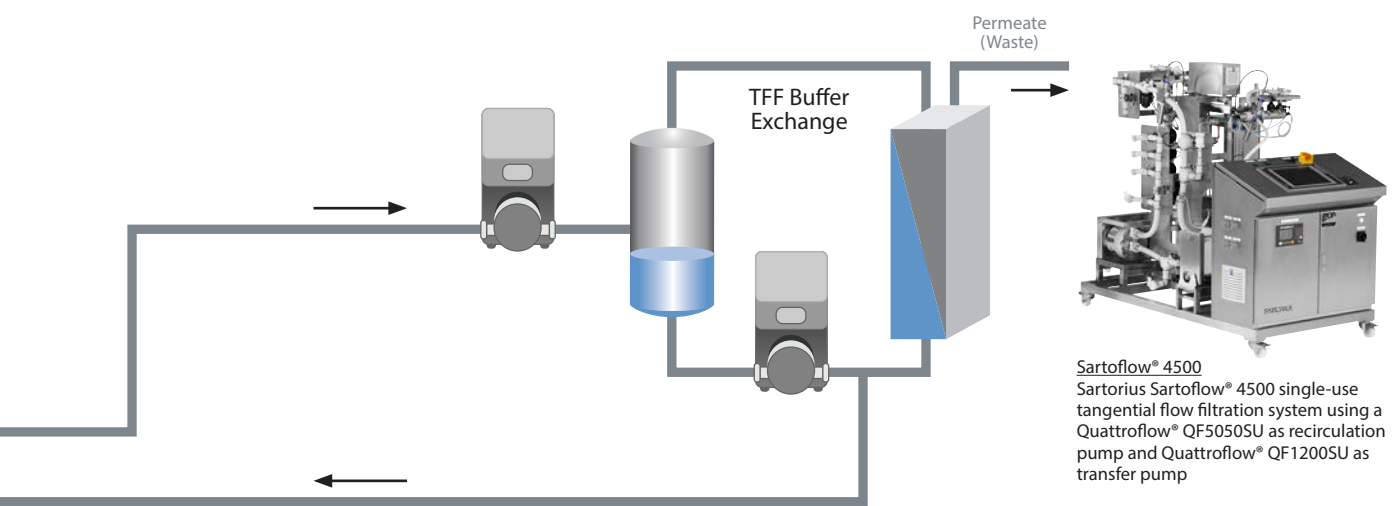
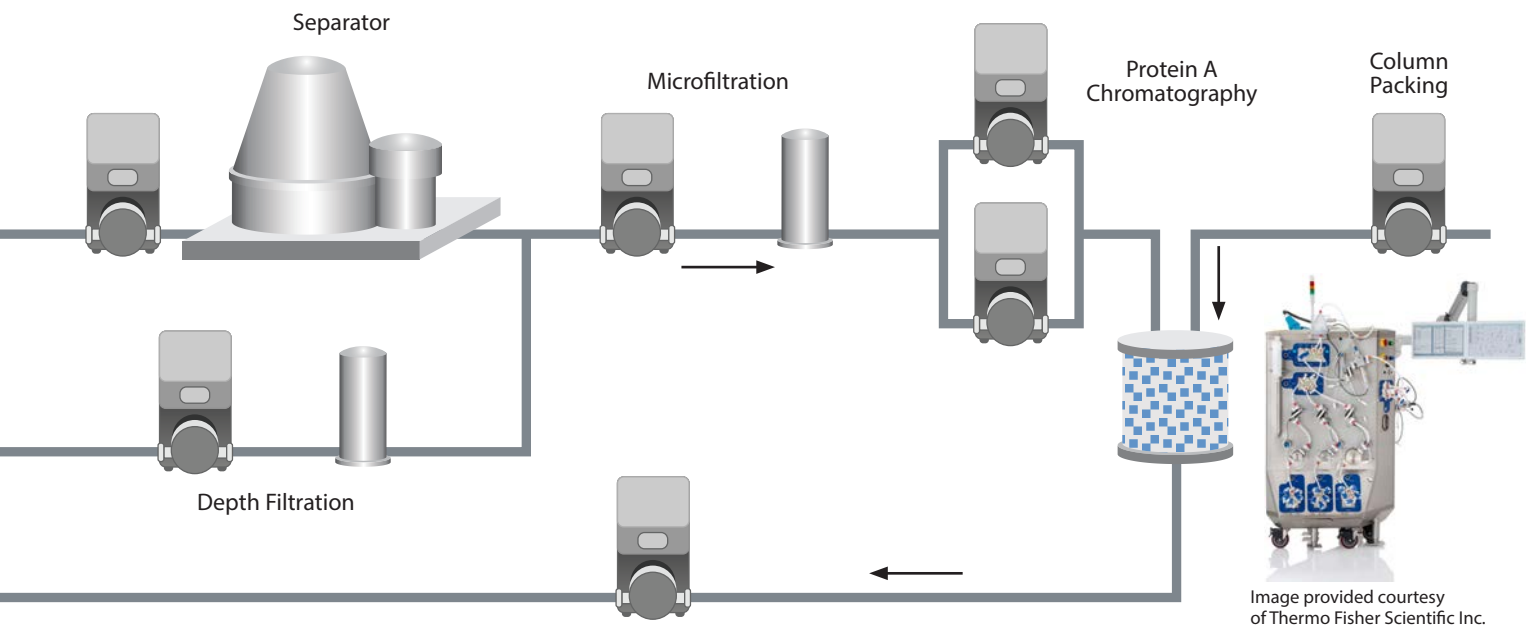
- Sensor installed in ring drive unit
- Detection of all liquids
- Signal output to a controller, if diaphragm is ruptured



# Quattroflow Applications

Quattroflow pumps are used in various critical biopharma applications. The following overview shows a part of the application diversity.





## HT Drives

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Quattroflow HT pumps incorporate the same innovative features and benefits of standard pumps with one significant space-saving design element: The pump drive, motor and control box are all integrated into one unit.

- Powerful and precise servo motor provides extended turndown ratio and a wider range of flow rates than standard versions
- High accuracy in controlling flow rates
- Compact design with integrated motor controller
- Keypad for manual control and display of motor speed
- Available with multiple-use and single-use pump chambers
- Remote pump operation over analog input (4-20mA)



QF1200HT  
Multiple-Use  
& Single-Use  
Quaternary  
Diaphragm  
Pump



QF4400HT  
Multiple-Use  
& Single-Use  
Quaternary  
Diaphragm  
Pump

## Special Pumps for OEM Customers

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Quattroflow drives are available as OEM versions for integrating into panels.

- Available for sizes QF30 to QF4400
- Powerful servo motor with separate controller
- Different communication protocols available (analog, Ethernet IP, Profibus, etc.)

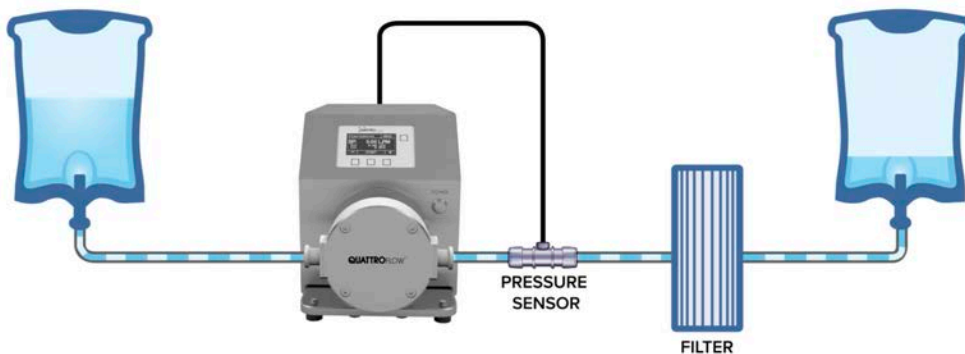




# Q-Control - Smart Control of Your Pump Operations

Q-Control is an integrated pump controller for Quattroflow pumps. It interfaces with a variety of flow and pressure sensors to provide users with automated control over their pump operations.

- Integrated pump controller that interfaces with different flow and pressure sensors
- Smart control functions that usually require an external PLC
- PID control mode for pressure- or flow-controlled pump operations
- Autotune function to automatically find optimal PID parameters
- Configurable alarms to stop the pump
- Dispensing feature to automatically fill defined volumes of liquid
- Direct connection of PendoTech pressure sensors or em-tec clamp on flow sensors as option
- Trend data and alarm logging
- Available for Quattroflow quaternary diaphragm pump models QF30, QF150, QF1200, QF2500, QF4400 and QF5k



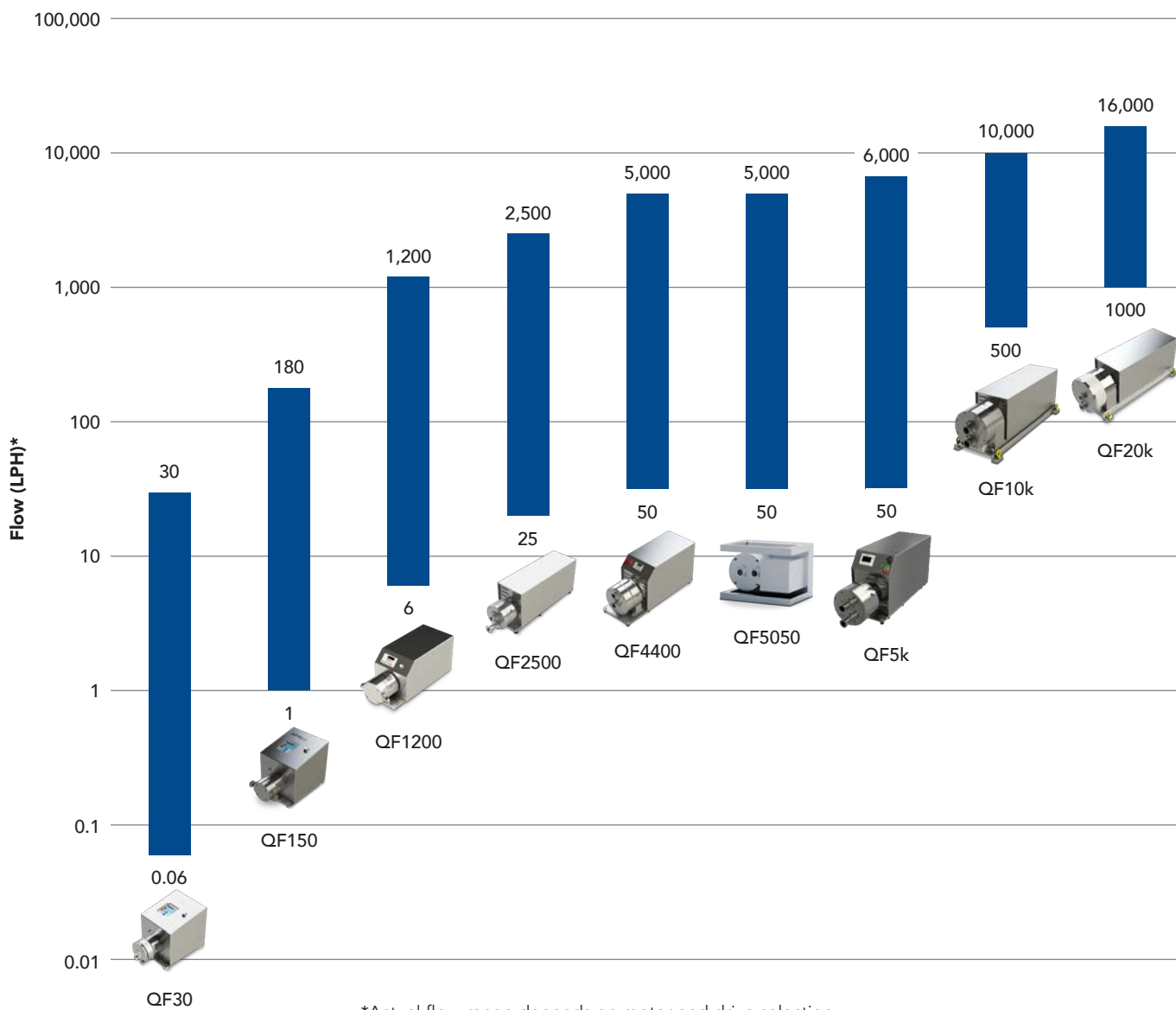
## em-tec Flow Sensor



Acquired by PSG, product brand em-tec GmbH, Finning, Germany, offers flow-measurement systems that can be used in conjunction with Quattroflow pumps in lab-scale biopharma applications. These systems accurately monitor flow rates with no media contact, contributing to a completely hygienic production process. For more information please go to [em-tec.com](http://em-tec.com).

# Quattroflow Pump Range

The Quattroflow pump range consists of nine sizes, with most of them available as single- and multiple-use versions. The complete pump scope covers a flow range between 0.06 and 16,000 lph. In addition to the flow range, you can find information about maximum pressures and the availability of HT and/or Q-Control models as well as the availability of the diaphragm monitoring sensor and the em-tec flow sensor.



| Models                     | QF30            | QF150     | QF1200    | QF2500     | QF4400     | QF5050     | QF5k                 | QF10k        | QF20k          |
|----------------------------|-----------------|-----------|-----------|------------|------------|------------|----------------------|--------------|----------------|
| Flow - LPH*                | 0.06 - 30       | 1 - 180   | 6 - 1,200 | 25 - 2,500 | 50 - 5,000 | 50 - 5,000 | 50 - 6,000           | 500 - 10,000 | 1,000 - 16,000 |
| Flow - LPM*                | 1 - 500<br>mlpm | 0.017 - 3 | 0.1 - 20  | 0.41 - 41  | 2.5 - 83   | 0.8 - 83   | 0.8 - 100            | 8.3 - 167    | 16.7 - 267     |
| Pressure - Bar:<br>MU (SU) | 6 (4)           | 6 (4)     | 6 (4)     | 6 (4)      | 6 (4)      | 6 (4)      | 6                    | 6            | 6 (4)          |
| MU                         | -               | ✓         | ✓         | ✓          | ✓          | ✓          | ✓                    | ✓            | ✓              |
| SU                         | ✓               | ✓         | ✓         | ✓          | ✓          | ✓          | Available<br>in 2022 | -            | ✓              |
| HT                         | ✓               | ✓         | ✓         | ✓          | ✓          | -          | ✓                    | -            | -              |
| Q-Control                  | ✓               | ✓         | ✓         | ✓          | ✓          | -          | ✓                    | -            | -              |
| Diaphragm<br>Monitoring    | ✓               | ✓         | ✓         | ✓          | ✓          | ✓          | ✓                    | ✓            | ✓              |
| em-tec<br>Flow Sensors     | ✓               | ✓         | ✓         | ✓          | ✓          | ✓          | ✓                    | -            | -              |

\*Actual flow-range depends on motor and drive selection



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Where Innovation Flows

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