



Masterflex® Peristaltic Pump Ecosystem in Bioprocessing

Flexible solutions that adapt to your process.



About Avantor®

Avantor is a leading life science tools company and global provider of mission-critical products and services to the life sciences and biopharmaceutical industries.



For almost 5 decades, the Masterflex® brand has been a global leader in the entire ecosystem of peristaltic instruments and aseptic single-use (SU) transfer technologies for bioprocessing applications, including:

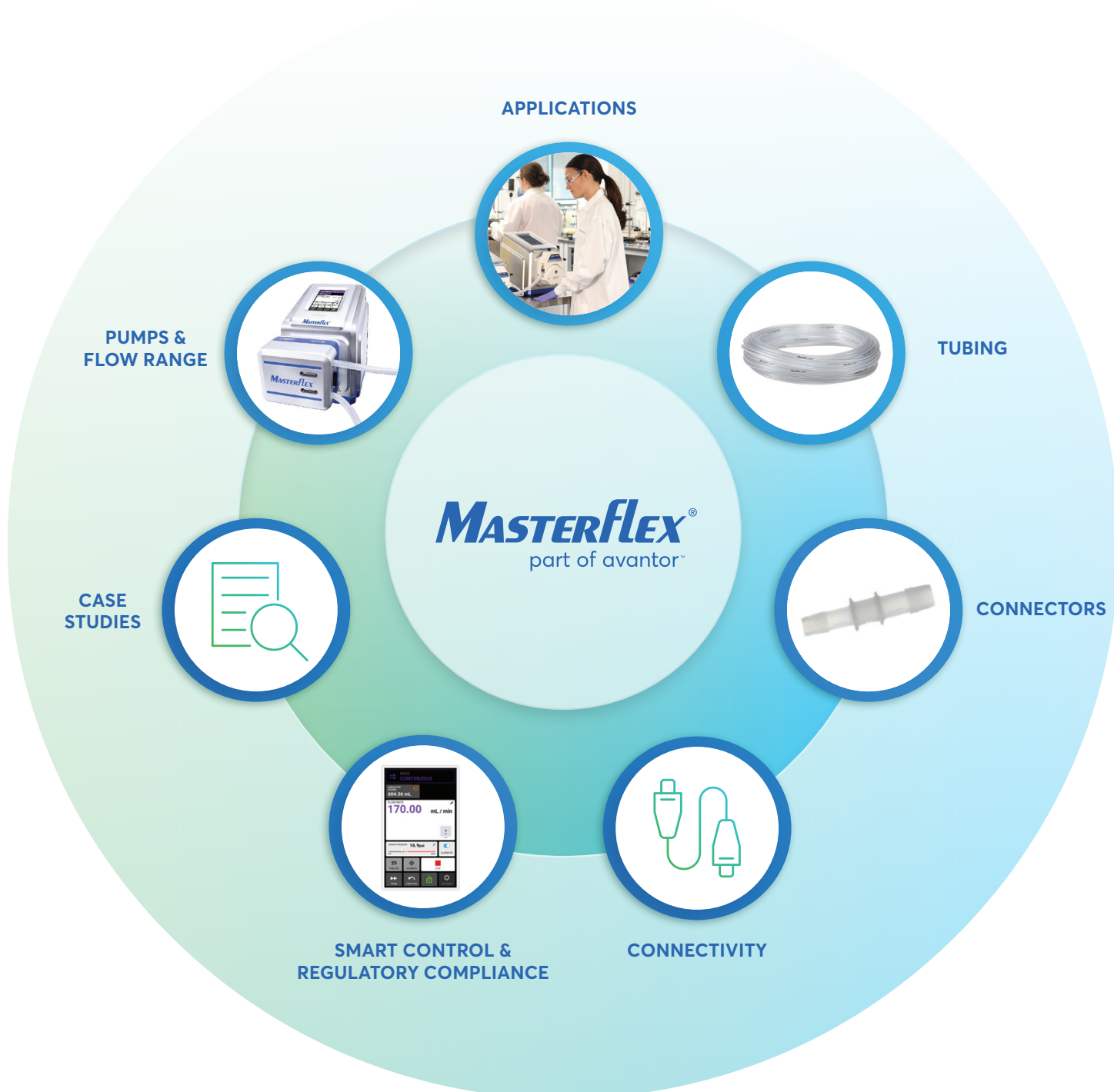
Peristaltic
pumps

Pump and
transfer tubing

Single-use
components

Digital
solutions

The Masterflex® ecosystem brings together the features and requirements that enable peristaltic fluid transfer in bioprocessing



Masterflex® pump solutions: Bridging early research to large-scale biomanufacturing

Masterflex brings together pumps, tubing, sensors and software in a seamless ecosystem designed to reduce risk, improve efficiency and scale with your needs.



ISMATEC® SERIES

- Benchtop and portable
- Multi-channel pumphead: one pump for several fluid paths
- Optimal for sub-milliliter flow rates



I/P® SERIES

- Most suitable for process development and commercial manufacturing
- MasterSense sensor integration
- Widest flow range (sub-milliliter to liter)



L/S® SERIES

- Benchtop pumps suitable for R&D and process development
- Wide flow range sub-milliliter to liter
- MasterSense® sensor integration
- Compatible with the largest selection of tubing chemistries and sizes



B/T® SERIES

- Highest flow rate for Masterflex portfolio
- Can be paired with bioproduction cart for better mobility
- MasterSense sensor integration

ISMATEC SERIES

0.0001 ML/MIN 0.365 LPM

L/S SERIES

0.00005 ML/MIN 3.4 LPM

I/P SERIES

0.001 LPM 26 LPM

B/T SERIES

0.3 LPM 42 LPM

PRE-CLINICAL,
R&D SCALE

PROCESS DEVELOPMENT,
PILOT SCALE

COMMERCIAL,
PRODUCTION SCALE

Masterflex® pumps provide versatility, ensuring flowrates perform across all bioprocessing applications, from **upstream** to **downstream**



ISMATEC SERIES

0.1 µl/min ↔ 0.365 LPM



L/S SERIES

0.05 µl/min ↔ 3.4 LPM



I/P SERIES

0.001 LPM ↔ 26 LPM



B/T SERIES

0.3 LPM ↔ 42 LPM

Logistic

Buffer/Media prep

Bulk transfer

Upstream

Culture seed

Media feed

Perfusion

Harvest

Clarification

Downstream

UF/DF system

Chromatography

Bulk drug product filling

Sterile filtration

Bench-top scale

Bench-top scale

Bench-top scale

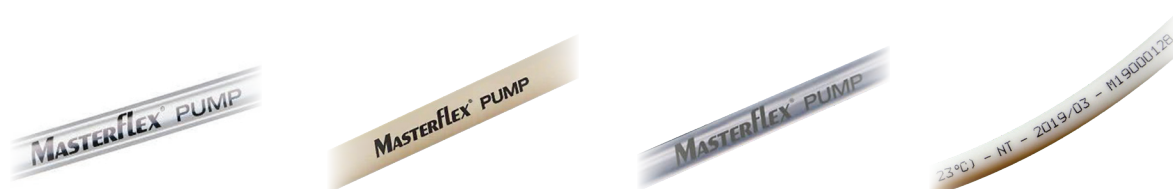
Bench-top scale

Bench-top scale

- Standalone for bench scale
- Panel-mount used in system

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- Panel-mount used in system

Wide selection of peristaltic and transfer tubing for diverse bioprocess fluid types and process conditions



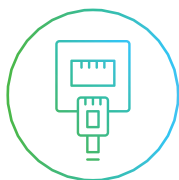
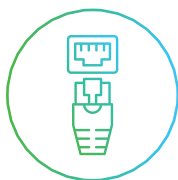
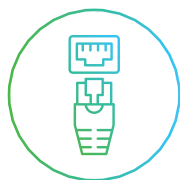
	SILICONES	THERMOPLASTIC ELASTOMERS (TPEs)	THERMOPLASTICS	CO-EXTRUSION AND SPECIALTY
Pump tubing examples	- Puri-Sil silicone—platinum cured - Silicone—platinum cured (96410) - BioPharm silicone—platinum cured	- PharMed BPT - C-Flex - Puri-Flex	- Tygon S3 E-LFL - Tygon E-Lab	- Chem-Durance - PharmaPure - GORE STA-PURE
Features	- Biocompatibility - Low extractables and leachables - Wide temperature range - Smooth inner bore - Translucence	- Heat sealable, weldable - Biocompatibility	- Clarity - Chemical compatibility - Low gas permeability	- Long tubing life - Biocompatibility - Low spallation - Chemical resistance
Recommended applications	- Critical unit operations - Commonly used in bioprocessing - Single-use assemblies	- Single-use assemblies - Aseptic sampling and transfer	- General transfer - Viscous fluids	- Critical unit operations - Fill-finish, accurate dispensing
Tubing sizes	- Nominal internal diameter (ID) from 0.13 to 19 mm - Available for all pump series - All examples meet USP Class VI			

Build reliable fluid paths that meet your needs with essential, industry-standard components



	SINGLE-USE SENSORS	SINGLE-USE FITTINGS	ASEPTIC FITTINGS	SANITARY FITTINGS & CLAMPS
Examples	- Pressure sensors - Flow sensors	Barbs in all flow path configurations, male and female luer locks, quick-disconnects, and various adapters	- CPC® Aseptiquik® - CPC MicroCNX® - CPC Steam-Thru®	- SterilEnz® Pre-Gasketed Sanitary to Hose Barb Adapter - Sanitary reducers, sanitary tees, sanitary gaskets, and sanitary tri-clamps
Feature	- Plug-and-play with pump interface - Gamma irradiation sterilization	- Material: polypropylene, PVDF - Size: 1/16" to 1" - Sterilization: gamma irradiation, autoclave, EtO	- Material: polycarbonate, polysulfone, polyphenylsulfone - Size: 1/16" to 1-1/2" - Sterilization: gamma irradiation, autoclave, EtO	- Fitting material: polypropylene, PVDF - Gasket material: Silicone - Clamp material: nylon - Size: 1/2" to 4" - Sterilization: gamma irradiation, autoclave, EtO
Flow rate range	Low, medium, high	Low, medium, high	Medium, high	Medium, high
Relevant bioprocessing applications	- Filtration processes (including depth and tangential flow filtration) - Buffer and media preparation - Filling and formulation operations	- Upstream and downstream manufacturing - Fluid transfer	- Cell therapy - Cell culture seed train - Sterile filtration - Fluid transfer	- Buffer preparation - Media feed - Bulk harvest - Fluid transfer
Use case	Ideal for pressure or when flow feedback is needed. Data is shown directly on pump interface or accessed via remote and real-time control software.	Designed for single-use connections with tubing Common in assemblies due to variety of configurations.	Suited for controlled connections and disconnections during sterile processes Preferred in aseptic operator environments.	Ensures secure transfer between unit operations. Common for large volume transfers.

Masterflex® pumps support many connectivity options for seamless bioprocessing automation



PROTOCOL TYPE	ETHERNET/IP	PROFINET	PROFIBUS	SERIAL	ANALOG
How it connects	Enables real-time data exchange and pump control through PLC or computer via ethernet	Enables real-time data exchange and pump control through PLC or computer via ethernet	Enables real-time data exchange and pump control through PLC or computer via RS-485	Sends ASCII-based string commands like "start," "stop" or "set speed"	Uses a continuous 4–20 mA or 0–10 V analog signal for basic flow or speed modulation
Connection port	RJ45	RJ45	DB9	USB	DB25 / 31-pin
Advantage	• High-speed data exchange • Real-time automation	• Seamless integration into Siemens TIA Portal • Real-time automation	• Multi-device control • Well-established in legacy systems	• Low infrastructure cost • Simple to program	• Lowest complexity • Universally compatible with basic control systems
Ideal for	North American facilities using Rockwell/ Allen-Bradley PLC architectures	Production lines with Siemens architecture or PROFINET based PLCs	Facilities with installed Profibus networks, especially in regulated GMP environment with Siemens controllers	Research labs, pilot plants, or small-scale setups with minimal automation infrastructure	Basic control applications or cost-sensitive processes needing proportional pump modulation.
Available pump family	Ismatec, L/S, I/P, B/T	Ismatec, L/S, I/P, B/T	L/S, I/P, B/T	Ismatec, L/S, I/P, B/T	Ismatec, L/S, I/P, B/T

MasterSense®: Intuitive software designed for regulatory compliance

MASTERSENSE DRIVE



MP1 ADAPTER

PRESSURE SENSOR

Easy-to-use software interface

- Unified interface across all pump families for easy training and operation
- Intuitive touchscreen control for setup, monitoring and adjustments
- Secure, PIN-protected function lock to prevent unintended changes
- Customizable recipes for repeatable and validated workflows
- Integrated pressure feedback directly on the touchscreen from the MasterSense MP1 adapter and single-use sensor

Continuous mode



Time mode



Volume mode



Remote mode



Tube calibration



Automation and regulatory compliance

- Integration-ready for 21 CFR Part 11 and GMP compliances
- Connectivity to PLC or automation software for data traceability
- Tamper-proof locked-out pump screen when connected

Masterflex[®] in action

Innovative Masterflex solutions from Avantor help biopharmaceutical manufacturers reduce risk, improve efficiency and safeguard every batch.

MasterSense pressure-sensor capability mitigates risk of tube rupture

01

CUSTOMER PROBLEM

A biopharma CDMO customer faced a significant challenge during the filtration and clarification steps in their viral vector manufacturing process. Occasional back pressure buildup caused fluid loss and potential contamination, highlighting the need for a more reliable solution.

02

HOW AVANTOR HELPED

The Avantor team implemented Masterflex MasterSense pumps, using pressure sensors and the pump interface to directly monitor inline pressure. Pressure thresholds were set to trigger an audible alarm or shut-off during the pumps' operation, avoiding overpressure buildup.

03

THE OUTCOME

With this upgrade, the CDMO successfully mitigated future risks and enhanced its process controls. The Masterflex solution ensured a safer and more efficient viral vector manufacturing process, safeguarding against potential losses and contamination.

Connecting pumps via a distributed control system (DCS) while maintaining risk control

01

CUSTOMER PROBLEM

A multinational biopharmaceutical manufacturer expanded its monoclonal antibody production with eight 2,000L single-use bioreactors. However, they were concerned about losing control over the pumps in the event these were disconnected from a DCS-controlled pump solution.

02

HOW AVANTOR HELPED

The Avantor team successfully connected 54 Masterflex pumps to DeltaV™ via EtherNet/IP and enhanced the pump software and hardware with a stop-upon-disconnect feature.

03

THE OUTCOME

The customer successfully implemented the software update, meeting all safety requirements. As a result, Masterflex solutions are now utilized in upstream production across media/buffer preparation, culture seed and perfusion feed.

DeltaV™ or equivalent automation and data management platform

DeltaV™

EtherNet/IP Network

Local
HostRemote
Host

For more information, visit
avantorsciences.com

or contact an
[Avantor](#) expert.