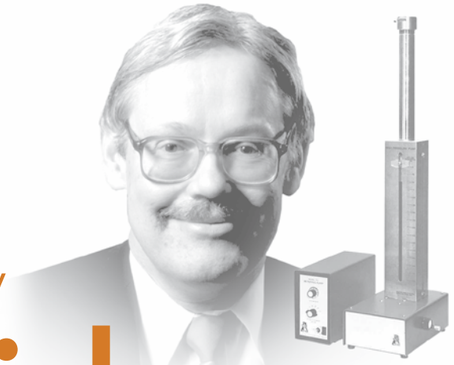
TELEDYNE ISCO
Everywhereyoulook™

PUMPS

HIGH PERFORMANCE
HIGH PRECISION

Pumps
for Practically
Any Fluid



Founder Dr. Robert Allington and one of his earliest syringe pumps.

Dr. Bob Allington built ISCO's first high performance liquid chromatography (HPLC) pump in 1970 to improve his separation and purification techniques. The DNA from that first Model 314 is still present in the pumps Teledyne ISCO builds today.

From chemicals, to oil/gas, pharmaceutical, and plastics, we continue our tradition of producing quality pumps for ever growing markets.

Dr. Allington required durability and precision in the pumps he built and used in his lab and we've never strayed from that directive.

Since then our D-Series pumps have become the industry standard for the research and development, chemical, and gas and oil industries. Our customers demand the same precision and dependability Dr. Allington required, and Teledyne ISCO delivers.

Our customer satisfaction is unmatched for highly specialized applications and the tradition of innovation allows us to meet any pumping challenge now and in the future.

PHARMACEUTICAL

Whether in the lab, through scale up, or in production where precision dosing is required, Teledyne ISCO pumps are the right choice for continuous flow pharmaceutical applications. In many chemical reactions that occur during research of new drugs, flow rate is key to the success of the experiment, the Teledyne ISCO line of pumps are an accurate and reliable option.

- Product Development—Precise fluid delivery (±0.5% or better) to produce high quality results
- Process Development/Pilot Scale/Production—High repeatability with pulseless flow for trouble-shooting and proof of concept

PLASTICS

Many Teledyne ISCO pumps can pump liquefied gases that are key in the research and development of foam structures. If you are dosing colors or materials into your extrusion process, we have a pump which can perform that. Additionally, the reciprocating line of Teledyne ISCO pumps can provide constant pressure to assist during rotational molding activities.

- Research or Industrial Environments—High Reliability in tough environments
- Ability to Handle Liquified Gases—CO^2, and other gasses can be pumped

PETROCHEMICAL

Teledyne ISCO pumps have a legacy of success throughout the years in the Petrochemical market with many types of applications including, but not limited to, core flooding and reaction feed. The precision flow capabilities coupled with the higher pressure abilities make Teledyne ISCO pumps the choice when designing your experiment or pilot process.

SyriXus
Syringe Pumps

When reliability & accuracy are critical

1000x Pump

Teledyne ISCO SyriXus precision syringe pumps give you flow and pressure control throughout a broad operating range. SyriXus syringe pumps can be metered with great accuracy and do not exhibit pulsation or flow anomalies typically associated with other pump types.

- **Zero Pulsation**—Control pressures and flow precisely through the full pressure ranges up to 20,000 psi
- **Continuous Constant Flow or Pressure**—Worry free operation for long periods. Change between constant flow and pressure modes at a click of the button
- **Computer Control or Standalone**—Varity of external interfaces for computer control or can operate with easy to use keypad input
- **Precision Dosing of Fluids**—Flow ranges from 0.00001 to 408 mL/min
- **Broad Operating Temperature Range**—Normal operation 5–40 °C ambient with an available option up to 200 °C

HANDLE A WIDE VARIETY OF FLUIDS INCLUDING:

- Aqueous and organic liquids
- Corrosive solutions
- Heated fluids
- Liquefied gases
- Viscous fluids
- Slurries and pastes

SYRIXUS 500XV FOR HIGH VISCOSITY MATERIALS

The 500xv is able to pump higher viscosity material by reducing the restriction within the pump, specially designed with 3/8" ports at a 45 degree angle. Ball valves are used for automating refill and continuous flow which clear easily.

The 500xv syringe pump provides precise delivery of high viscosity material up to 204 mL/min. Pulse-less flow is delivered up to 5,000 psi (345 bar) for pumping thick materials.

Reduce material viscosity by heating the pump chamber. A Temperature Control Jacket can be used to raise the temperature above ambient up to 150 °C. The High Temperature package allows the ability to heat up to 200 °C.

The 500xv pump module has a single-ratio drive train with auto-lubricating gears for long life and low maintenance. Special fittings are used to prevent leaks and ensure safety at maximum pressure.

	Capacity	Flow* Range (mL/min)	Flow** Accuracy	Pressure Range (psi, bar)	Standard Pressure Accuracy	Standard Plumbing Ports	Dimensions	Continuous Flow Range (mL/min)	Higher Viscosity Materials
1000x	1015 mL	0.01–408	0.5% of Setpoint	10–2,000 0.7–137.9	0.5% FS	1/4" NPT	40.3x10.7x18.4 in 102x27x47 cm	0.01–265	
500x	507 mL	0.001–204	0.5% of Setpoint	10–5000 0.7–345	0.5% FS	1/8" NPT	40.3x10.7x18.4 in 102x27x47 cm	0.001–132	
500xv	507 mL	0.001–204	0.5% of Setpoint	10–5000 0.7–345	0.5% FS	3/8" NPT	40.3x10.7x18.4 in 102x27x47 cm	0.001–132	X
260x	266 mL	0.001–107	0.5% of Setpoint	10–9,500 0.7–655	0.5% FS	1/8" Valco	39.8x10.7x18.4 in 101x27x47 cm	0.001–70	
65x	68 mL	0.00001–25	0.3% of Setpoint	10–24,000 0.7–1,655	0.5% FS	1/4" F250C	39.8x10.7x18.4 in 101x27x47 cm	0.00001–16	

See page 6 for more information

HLf-Series
Hazardous Locations

UL approved for Class I, Div 2 environments

100HLf Hazardous Location Syringe Pump

Teledyne ISCO HLf-Series pumps give you the same accurate, predictable flow and pressure control as our standard D-Series, while conforming to safety standards for use in UL Class I, Division 2, Groups A B C & D, T4 environments. The hazardous location rating is achieved through internal design modifications including the use of brushless DC motors. This approach eliminates the need for purge boxes or other additional safety devices.

Wetted materials are compatible with most aqueous and organic liquids, corrosive solutions, heated fluids, liquefied gases, viscous fluids, or slurries and pastes.

The HLf controller has a keypad and LCD, as well as built-in and optional interfaces for computer control and other devices. Programming is easy and flexible, with instant access to menu screens even when the pump is running. This allows you to change operating parameters on the fly.

APPLICATIONS

- Metering and dispensing in experiments and pilot plants where explosive conditions may occur
- Precision fluid addition in research and manufacturing processes
- Chemical/reactant feed in chemical process development, catalyst evaluation, plastic formulation
- Accurate metering of liquefied gases

STANDARD FEATURES

Operating Modes

- Constant flow or pressure with up to four pumps
- Continuous flow or pressure with dual pump
- Flow or pressure programming with single pump
- Dispense mode

External Interface

- RS232 serial interface
- Analog voltage inputs
- Digital inputs and outputs
- Ethernet/USB

HLf pumps are not available in Europe

	Capacity	Flow* Range (mL/min)	Flow** Accuracy	Pressure Range (psi, bar)	Standard Pressure Accuracy	Standard Plumbing Ports	Dimensions	Continuous Flow Range (mL/min)
1000HLf	1015 mL	1.0 µL–408	0.5% of Setpoint	10–2,000 0.7–137.9	0.5% FS	1/4" NPT	40.3x10.7x18.4 in 102x27x47 cm	0.01–265
500HLf	507 mL	1.0 µL–204	0.5% of Setpoint	10–3750 0.7–258.6	0.5% FS	1/8" NPT	40.3x10.7x18.4 in 102x27x47 cm	0.001–132
260HLf	266 mL	0.001–107	0.5% of Setpoint	10–7,500 0.7–517	0.5% FS	1/8" Valco	39.8x10.7x18.4 in 101x27x47 cm	0.001–70
100HLf	102 mL	0.01 µL–60	0.3% of Setpoint	10–10,000 0.7–689.5	0.5% FS	1/8" Valco	39.8x10.7x18.4 in 101x27x47 cm	0.00001–16

SYRINGE PUMP STANDARD INFORMATION:

All SyriXus and HLf pumps use 100 Vac, 117 Vac, 234 Vac, 50/60 Hz power supply.

External Interfacing: RS-232, analog voltage inputs, digital contact closure for RUN/STOP, REFILL/DELIVER 4–20 mA In/Out, and analog voltage output options available, USB, Ethernet.

Each Teledyne ISCO SyriXus and HLf syringe pump is bench tested at the factory, prior to delivery. All SyriXus and HLf pumps are UL certified to EN 61326 and EN 61010-1 standards. They are UL listed and CE compliant.

** Maximum and minimum flows are dependent on optimizing your pump system. Consult a Teledyne ISCO Product Specialist to determine the best method for your application. For additional information, please consult the factory. Teledyne ISCO is continuously improving its products and reserves the right to change specifications without notice. All brand or product names mentioned herein are trademarks or registered trademarks of their respective holders.*

*** Flow rate accuracy are based on select conditions of fluid type, pressure and leakage rate.*

SyriXus Controller

Precision control that you demand

ONE CONTROLLER OPERATION

Up to four pumps can be operated with one "Smart key" controller. The possible configurations, as displayed below, are: single, dual, three, or four pump.

Single pump—constant flow, constant pressure, or dispensing mode

Dual pump—continuous constant flow or pressure or two pump independent modes

Three pump—independent constant flow or pressure or one dual pump mode

Four pump—independent constant flow, or pressure, control of up to four pumps working independently or two dual air pump systems

EASY TO USE

"Smart key" programming makes setting up and running your pump system easy and can be learned in just a few minutes. All SyriXus pumps, regardless of configuration or operating mode, utilize the same controller, which can be operated up to 15 meters (50 feet) from the pump modules with optional extension cables. Multiple pumps can be controlled with a single program, a configured program, or independently with varied programs. With complete front panel function and front panel accessability, status, flow rate, and pressure parameters are continuously displayed.

One button access for:

- Start or Stop
- Dispense mode
- Operating parameters such as flow rate, pressure or refill
- Accessory function

User-selectable options for:

- Modes of operation
- Operating units
- Valve selection

Large selection of operating modes:

- Constant flow
- Constant pressure
- Flow or pressure gradients
- Dispensing
- Receiving
- Dual pump concentration gradients

SyriXus Controller

COMPUTER CONTROL

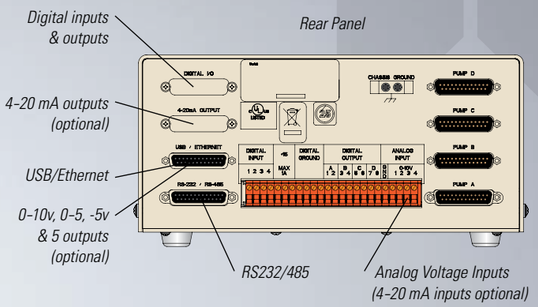
Pump operation by computer control is available to access Start/Stop and set point for pressure or flow.

Standard control interfaces include:

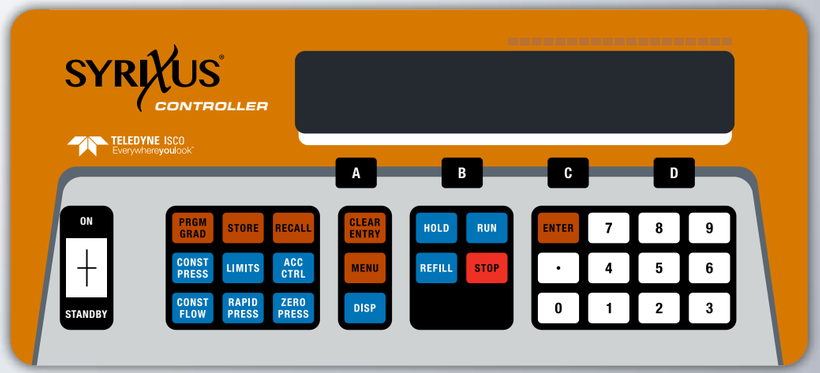
- USB/RS232 Serial
- 0–10 Vdc, 0–5 Vdc & -5 to +5 Vdc Inputs
- RS485/Ethernet—Modbus RTU

Optional interfaces include:

- 0–10 Vdc, 0–5 Vdc & -5 to +5 Vdc Outputs
- 4–20 mA inputs and outputs



KEY CONTROLLER FUNCTIONS



PRGM GRAD: Program Gradient: Puts pump in gradient mode and accesses gradient programming.

STORE: Store: Stores current gradient program in nonvolatile memory.

RECALL: Recall: Replaces current gradient program with one recalled from nonvolatile memory.

CONST PRESS: Constant Pressure: Puts pump in constant pressure mode.

LIMITS: Limits: Enables changes to maximum and minimum pressure and flow limits.

ACC CTRL: Accessory Control: Manually operates accessories such as valves.

CONST FLOW: Constant Flow: Puts pump in constant flow rate mode.

ZERO PRESS: Zero Pressure: Sets pressure display to zero. Active only from -750 to +750 psi.

RAPID PRESS: Rapid Pressure: Allows rapid pressurization to the stable pressure point.

CLEAR ENTRY: Clear Entry: Clear the last digit entered from the numeric key.

MENU: Menu: Provides access to operational modes, units, and optional parameters.

DISP: Dispense Mode: Activates Dispense Mode.

HOLD: Hold: Freezes the program clock. The unit will continue at the current gradient.

REFILL: Refill: Pump drive motor moves piston downward at a programmed rate.

RUN: Run: Turns on pump driver motor to move piston upward.

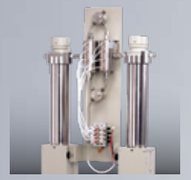
STOP: Stop: Stops the drive motor.

A **B** **C** **D**

A, B, C, D: Soft keys used to select display options

SyriXus
Accessories

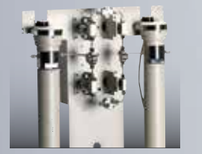
Do more with these accessories



Air powered valves for continuous flow

AIR-POWERED VALVES

For absolute pulse-less fluid delivery, pneumatic valves are reliable for any fluid, including viscous and/or corrosive solutions. Made of 100% Hastelloy construction.



Electric valves for continuous flow

ELECTRIC VALVES

Electric valves are driven by the pump controller and doesn't require external actuation. Valves are stem-and-ball type, very reliable, and feature a unique one-way flow path design, which offers added protection against catastrophic back flow. This valve is capable of handling a wide range of corrosive fluids, liquefied gasses, volatile fluids, and viscous solutions.

TEMPERATURE CONTROL JACKET

Controls cylinder temperature by circulating heated or cooled fluid. Cylinder cooling allows fast, complete filling with a liquefied gas and is recommended when a continuous flow system is used for rapid delivery of such fluids. Temperatures range from -30 °C to 100 °C.

HIGH-TEMPERATURE & HIGH ACCURACY PACKAGE

Suitable for operation to 200 °C, this package includes a Honeywell/Sensotec TJE high-temperature transducer, a new cap assembly, and special high-temperature seals and accuracy transducer to 0.1% of full scale.

CORROSION RESISTANCE

Corrosive resistant materials can be pumped using optional Hastelloy package

PeriXus
Peristaltic Pump

Small footprint, but large capabilities

The PeriXus was developed with your lab or manufacturing plant in mind. With its compact and modular design, this space-saving pump uses peristaltic technology to help reduce the possibility of contamination making it a great pump to use when handling volatile materials. Also, the ability to quickly change hoses allows you to switch from pumping one material to another in minutes, maximizing application flexibility. The available hose options are designed to handle even the toughest materials, including highly viscous fluids. The PeriXus needs minimal maintenance over the life of the pump, which will enhance your return on investment.

SPECIFICATIONS

RPM	0.1 to 300
Flow Rate	0.005–184 mL/min (L/S 16 tubing) 0.005–381 mL/min (L/S 25 tubing)
Speed Control (Repeatability)	±0.1%
Reversible Motor	Yes
IP Rating	IP33
Dimensions	9.4" x 5.5" x 6.2" (23.9 x 14.0 x 15.7 cm)
Power	90 to 260, 50/60 Hz
Amps	0.34 at 115 VAC, 0.2 at 230 VAC

KEY MARKETS:

- Pharmaceutical/Biotechnology
- Research and Development
- Petrochemical
- Reaction Chemistry

PERIXUS

ReaXus Series
Reciprocating Pumps

The right pump for the right job

The ReaXus reciprocating pump product line provides many options to meet your application needs. Maintenance is minimal and the quality is high, which over the life of the product, saves you money. The availability of many options allows you to select the exact pump you need to optimize the results of your application. The ReaXus line of pumps comes in either single piston or dual piston versions along with multiple material choices.

PISTON CONFIGURATION

Single-Piston pumps offer an economical option for metering, dispensing, and general fluid-transfer applications. Single-piston pumps have a 'rapid-refill' feature drawing liquid into the pumping chamber quickly regardless of the metered dispensing rate. This helps minimize flow pulsation. Often, these pumps are configured with a secondary pulse dampener to further smooth fluid flow.

Pump Classes: LS, M1, MX

Dual-Piston pumps have two pistons operating in parallel, fully out-of-phase with each other, to produce naturally-smooth fluid flow. This is critical for many analytical chromatography applications. Dual pistons are also preferred for higher flow pumps (typically above 100 mL/min).

Pump Classes: CP, HF, LD, PR

DRIVE TYPE

ReaXus pumps can be further categorized by the mechanics translating rotation of the pump motor into the reciprocating (back-and-forth) motion of the piston(s).

Direct-Drive mechanisms produce linear piston motion by use of a bearing mounted eccentrically to a rotating motor shaft. This simple arrangement is cost effective, but has limited pressure capabilities.

Pump Classes: M1, MX

Belt-Drive mechanisms produce linear piston motion through a cam mounted on a shaft. A belt-and-pulley configuration connects the pump motor to this cam shaft. The provided mechanical advantage allows for higher pressure capabilities.

Pump Classes: CP, HF, LD, LS, PR

ReaXus LS-Class

FLOW/PRESSURE CONTROL ALGORITHMS

Reciprocating piston pumps have the ability to produce consistent volumetric fluid flow under very high-pressure conditions. However, they do not produce pressure. System pressure results from flowing liquid through a resistive circuit (column, tubing, reactor vessel, etc.).

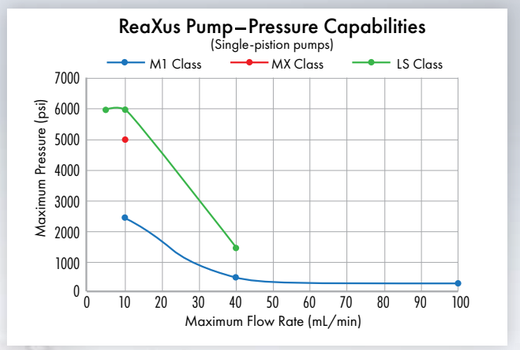
The pump's firmware either contains constant-flow or constant-pressure control algorithms. Construction is similar between pumps with flow or pressure control, but component options (e.g. pulse dampeners) are limited when a constant-pressure algorithm is required.

Constant-Flow pumps produce precise and predictable fluid flow dependent on system resistive pressure and the fluid being pumped. Flow accuracy is specified for typical application parameters. Improved accuracy across a larger range of conditions is achieved for pumps with pressure monitoring capabilities by integrated automatic pressure compensation and solvent selection features.

Pump Classes: HF, LD, LS, M1, MX, PR

Constant-Pressure pumps monitor system pressure and use an internal PID feedback loop to modulate fluid low in order to maintain constant pressure. Default PID parameters are suitable for many applications but may be set by the user to optimize pump response for unique system conditions.

Pump Class: CP, LD, LS



WETTED MATERIALS

ReaXus pumps are available in a variety of wetted materials. In addition to the primary fluid path material, other wetted materials may include: synthetic ruby, synthetic sapphire, alumina, zirconia, fluoropolymers, and UHMWPE.

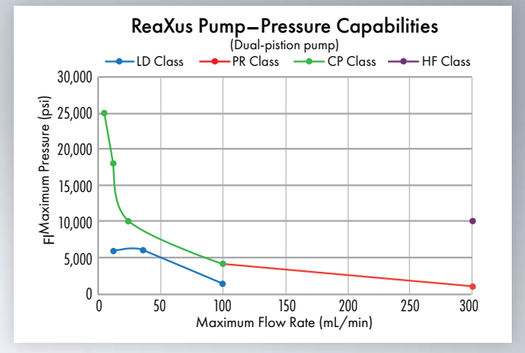
Stainless Steel fluid paths are most common with broad acceptance in HPLC, processing, and metering applications. Corrosion resistance, high-pressure capability, and general ruggedness make stainless steel the primary choice of materials.

PEEK fluid paths offer broad chemical compatibility and are typically used in applications where a metal-free fluid path is desired.

Hastelloy pumps are used for highly-corrosive applications where stainless steel is not chemically compatible. "Jacketed" heads are included on all Hastelloy pumps.

The pump head is machined with a secondary fluid cavity in close thermal proximity to the main pumping chamber. An external circulating bath can be connected to this secondary cavity to heat or cool the pump head. Heating the head allows for pumping of fluids normally too viscous for operation at room temperature.

Other materials available on request.



ReaXus Series
Reciprocating Pumps

SINGLE HEAD

DUAL HEAD

	FLOW RANGE (ML/MIN)	FLOW ACCURACY	PRESSURE LIMIT (PSI)	STROKE VOLUME (µL)	WITH TEMP JACKET	CONSTANT FLOW / CONSTANT PRESSURE	PRESSURE MONITORING	RS232 CONTROL	REMOTE RUN/STOP	ANALOG INPUT (0-10V; 4-20mA)	DRIP TRAY AND SENSOR	DIMENSIONS AND WEIGHT
 **M1 CLASS** **Material: Stainless Steel, PEEK** An economical, compact single piston pump designed to provide great performance at a competitive price. The M1 Series is perfect for transferring material, and day-to-day fluid movement.	0.0–10.0	5%	2,500	25.1	No	Flow						5.6"H x 3"W x 10.6"D (14.2 x 7.6 x 26.9 cm) 6 lbs (2.7 kg)
	0.0–40.0	5%	500	100	No	Flow	No	Yes	Yes	No	No	
	0.0–100.0	5%	250	226	No	Flow						
 **MX CLASS** **Material: Stainless Steel** A single piston pump that is designed for more challenging applications. The higher pressure capability and increased flow rate makes this a pump that can stand up to a tougher workload.	0.0–10.0	2%	5,000	25.1	No	Flow	Yes	Yes	Yes	Yes	Yes	6.4"H x 7.0"W x 16.0"D (16.1 x 17.8 x 40.6 cm) 14.2 lbs (6.4 kg)
 **LS CLASS** **Material: Stainless Steel, PEEK** A high pressure capable, single piston pump that out performs the more expensive pumps on the market. The LS Series is designed to minimize pulsation during fluid movement, something that many experiments require to be successful.	0.0–5.0	2%	5,000 PEEK 6,000 SS	25.1	No	Flow						
	0.0–10.0	2%	5,000 PEEK 6,000 SS	50.3	No	Flow	Yes	Yes	Yes	Yes	Yes	6.4"H x 7"W x 16"D (16.3 x 17.8 x 40.6 cm) 15.5 lbs (7.0 kg)
	0.0–40.0	2%	1,500	201.1	No	Flow						
 **LD CLASS** **Material: Stainless Steel, PEEK, Hastelloy** A dual piston pump perfectly aligned for continuous processing applications offering high pressure capability and virtually pulse free operation.	0.0–12.0	2%	5,000 PEEK 6,000 SS	30.0	Yes/No	Flow						
	0.0–36.0	2%	5,000 PEEK 6,000 SS,Hastelloy	62.8	Yes/No	Flow	Yes	Yes	Yes	Yes	Yes	6.4"H x 9.9"W x 17.5"D (16.3 x 25.1 x 44.5 cm) 21.4 lbs (9.7 kg)
	0.0–100.0	2%	1,500	251.0	Yes/No	Flow						
 **PR CLASS** **Material: Stainless Steel, PEEK, Hastelloy** A dual headed pump that provides higher flow rates and high pressure capability. The PR Series is well suited for the tougher reaction chemistry applications across many markets.	0.0–100.0	3%	4,000	251	Yes/No	Flow	Yes	Yes	Yes	Yes	Yes	6.4"H x 9.9"W x 17.7"D (16.1 x 25.1 x 45 cm) 26.3 lbs (11.9 kg)
	0.0–300.0	3%	1,000	565	Yes/No	Flow						
 **CP CLASS** **Material: Stainless Steel, Hastelloy** A dual-headed, positive displacement piston pump with constant pressure control, covering a wide range of flows. Used for LC Column packing, as well as many process applications.	0.0–5.0	2%	25,000`	15.0	No	Pressure	Yes					
	0.0–12.0	2%	18,000	31.4	No	Pressure	Yes	Yes	Yes	Yes	Yes	6.4"H x 9.9"W x 17.5"D (16.3 x 25.1 x 44.5 cm) 30 lbs (13.6 kg)
	0.0–24.0	2%	10,000	62.8	Yes/No	Pressure	Yes					
	0.0–100.0	2%	4,000	251	No	Pressure	Yes					
 **HF CLASS** **Material: Stainless Steel** A dual-headed piston pump with servo motors, belt drives, and reliable eccentric cams. Widely used for LC Column packing, as well as many process applications.	0.0–300.0	5%	10,000	452	No	Flow	Yes	Yes	No	No	No	8.9"H x 13.9"W x 22.1"D (22.6 x 35.3 x 56.1 cm) 50.0 lbs (22.7 kg)

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L-7143 Rev 6.1
10/21