Choosing a Metering Pump

Metering pumps move precise volumes of liquid in a specified time period to provide accurate flow rates. This class of pumps moves liquids in two stages: the suction stroke and the discharge stroke. During the suction stroke, liquid is pulled into the pump cavity past the inlet check valve. During the discharge stroke, the inlet valve closes; the outlet valve opens, and the liquid is pushed out.

Bellows Pumps move a bellows back and forth to displace liquid. These pumps do not require seals. Special nonclogging valves are available for abrasive or particulate applications.

Diaphragm Pumps pulse a flexible membrane to displace liquid with each stroke. These pumps require no seals, so you can pump abrasives and slurries if the valves are kept clean.

Peristaltic Pumps are designed so that the only material in contact with the fluid being pumped is the tubing. This allows the fluid to not contaminate the pump and the pump to not contaminate the fluid. These pumps provide flexibility through the wide variety of tubing materials available.

Piston Pumps use a reciprocating plunger to move liquid through the pump. These pumps require a seal to prevent leaks and are not recommended for use with abrasive fluids.

Syringe Pumps either draw in or push out liquid through a syringe to obtain a known volume as determined by the size of the syringe. Syringe pumps are great for low flow, low pressure applications.

Pump type	Advantages	Flow rating	Maximum pressure		Self-priming	Pulseless flow	Viscous fluids	Particulate matter	Run dry
			psi	bar					
Bellows	Can pump liquids or gases.	6 to 2475 mL/min	50	3.4	Good	Poor	Fair	Yes	No
Diaphragm	Ideal for high-accuracy applications, such as pH/ORP control.	0.08 to 4167 mL/min	5000	344.7	Good	Poor	Good	No	Yes
Peristaltic (tubing)	Noncontaminating; tubing is available in a wide variety of materials.	0.9 to 3400 mL/min	125	8.6	Excellent	Good at high rpm	Good	Yes	Yes
Piston	Highest pressure and accuracy; ideal for HPLC applications.	0.02 to 2901 mL/min	18,000	1241	Good	Poor	Fair	No	No
Syringe	Handle very low flow rates.	0.001 µL /min to 147 mL/min	100	6.9	N/A	Excellent	Poor	No	Yes

Cole-Parmer® Syringe Pumps

Optimize low-flow, low-pressure applications

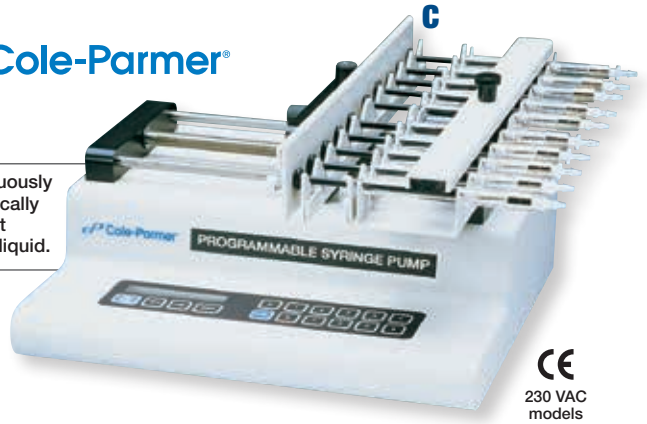
- Backlit alphanumeric LCD guides you through setup and operating procedures
- Don't lose your settings—nonvolatile memory retains settings even after pump is turned off

A. Single-Syringe Infusion Pump automatically selects display units based on syringe used, obtaining precise flow rates down to 0.2 µL/hr. A wide dynamic range (6000:1) provides excellent flexibility.

B. Multi-Syringe Pumps achieve flow rates down to 0.001 µL/hr. Easy programming via keypad—infusion/withdrawal pumps sequence operations. Control from a computer with RS-232 interface.†

C. Multi-Step Multi-Syringe Pumps allow flow rates to vary from a slow trickle to a steady stream down to 0.001 µL/hr. Program up to 8 commands and repeat up to 10 times. Pumps allow you to program flow rate hold, pause, and change of direction; each program can be run up to 12 hours. Pumps can also sequence operations. Operate your pump from a computer—great for daisy-chaining pumps!

Cole-Parmer®



Pump continuously and automatically delivers exact quantities of liquid.

Specifications

Accuracy: ±<1%
Reproducibility: ±0.1%

CE
230 VAC models

Description	Number of syringes accepted	Flow rate per syringe	Syringe size accepted	Linear force	Power (VAC, Hz)	Catalog number	Price
A. Single-syringe pump							
Infusion	1	0.2 µL/hr to 500 mL/hr	10 µL to 60 mL	20 lb (9.1 kg)	115, 50/60	GY-74900-00	
					230, 50/60	GY-74900-05	
B. Multi-syringe pumps							
Infusion	2	0.001 µL/hr to 147 mL/min	10 µL to 140 mL	40 lb (18.1 kg)	115, 50/60	GY-74900-10	
					230, 50/60	GY-74900-15	
	10				115, 50/60	GY-74900-30	
					230, 50/60	GY-74900-35	
Infusion/ withdrawal	2	0.001 µL/hr to 147 mL/min	10 µL to 140 mL	40 lb (18.1 kg)	115, 50/60	GY-74900-20	
					230, 50/60	GY-74900-25	
	10				115, 50/60	GY-74900-40	
					230, 50/60	GY-74900-45	
C. Multi-step multi-syringe pumps							
Infusion	2	0.001 µL/hr to 147 mL/min	10 µL to 140 mL	40 lb (18.1 kg)	115, 50/60	GY-74900-60	
					230, 50/60	GY-74900-65	
	10				115, 50/60	GY-74900-80	
					230, 50/60	GY-74900-85	
Infusion/ withdrawal	2	0.001 µL/hr to 147 mL/min	10 µL to 140 mL	40 lb (18.1 kg)	115, 50/60	GY-74901-00	
					230, 50/60	GY-74901-05	
	10				115, 50/60	GY-74901-10	
					230, 50/60	GY-74901-15	

†Order RS-232 cables separately.

Cole-Parmer® Touch-Screen Syringe Pumps

Intuitive programming and control

- Control flow rates from 5 pL/min to 220 mL/min via touch-screen display
- Save space by positioning pump on side—display rotates automatically
- Daisy chain up to 99 pumps with built-in RS-485 connectivity
- Accepts any type of syringe

Model 74905-50 is an infuse only syringe pump. It accommodates up to two syringes. Flow rates are defined by the user and operation is based on a selectable target volume or time values to control the total infusion volume.

Model 74905-52 is an infuse/withdraw syringe pump. The pump accommodates up to two syringes. The unit will operate in the following modes: infuse only, withdraw only, infuse then withdraw, withdraw then infuse, and continuous. One program can be stored.

Model 74905-54 is a programmable version of the 74905-52 pump. It is programmed to accept up to 800 user-defined steps—up to 40 programs with 20 steps each can be stored in memory.

Model 74905-56 is a push/pull syringe pump. The pump accommodates up to two syringes for infusion and two syringes for withdrawal. This pump is designed to support infusion and withdrawal simultaneously at the user-defined flow rates. The unit operates in the following modes: infuse only, withdraw only, infuse then withdraw, withdraw then infuse, and continuous.

Model 74905-58 is a programmable version of the 74905-56 pump. It is programmed to accept up to 800 user-defined steps—up to 40 programs with 20 steps each can be stored into memory.

Cole-Parmer®

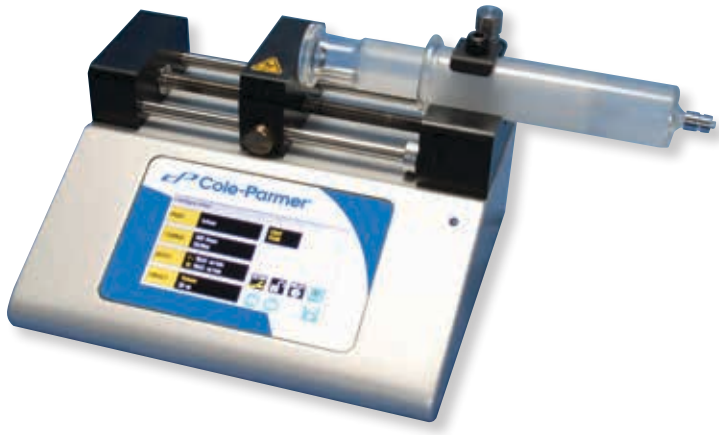
Specifications

Accuracy: ±0.355%
Reproducibility: ±0.05%
Syringe sizes accepted: 0.5 µL to 140 mL
Linear force: 75 lb (34 kg)
Output: RS-232, RS-485, USB, 15 pin D-sub connector

Description	Flow rate per syringe	Power (VAC, Hz)	Catalog number	Price
Infusion	5 pL/min to 220.97 mL/min	100 to 240, 50/60	GY-74905-50	
Infusion/withdrawal			GY-74905-52	
Infusion/withdrawal programmable			GY-74905-54	
Push/pull			GY-74905-56	
Push/pull programmable			GY-74905-58	

Cole-Parmer® Entry-Level Touch-Screen Syringe Pumps

Get more done simultaneously



- Accommodate two syringes for infusion and two syringes for withdrawal at the same time
- Control flow rates from 0.58 pL/min to 88.28 mL/min via full-color touch screen
- Daisy chain up to 99 pumps together with the built-in RS-485 connectivity
- Accept syringes from 0.5 µL to 60 mL

These pumps feature a continuous push and pull (infusion/withdrawal) pump. When used with check valves, the pump will draw fluid from a reservoir while opposite side is dispensing fluid. After dispensing the user-settable volume, the pump automatically switches direction and dispenses from the other side while the just-consumed side is being refilled.

Pump can be placed on its side to provide a smaller footprint with the display automatically rotating.

Cole-Parmer®

Specifications

Accuracy: ±0.5%
Reproducibility: ±0.05%
Linear force: 75 lb (34 kg)
Output: RS-232, RS-485, USB, 15 pin D-sub connector
Power: 100 to 240 VAC, 50/60 Hz

Number of syringes	Syringe sizes accepted	Flow rate per syringe	Catalog number	Price
Infusion only pumps				
1	0.5 µL to 60 mL	1.28 pL/min to 88.28 mL/min	GY-74905-02	
2	0.5 µL to 10 mL		GY-74905-06	
Infusion/withdrawal programmable pumps				
1	0.5 µL to 60 mL	1.28 pL/min to 88.28 mL/min	GY-74905-04	
2	0.5 µL to 10 mL	1.28 pL/min to 88.28 mL/min	GY-74905-08	
2	0.5 µL to 10 mL	0.58 pL/min to 11.70 mL/min	GY-74905-12	
1	0.5 µL to 1000 µL	3.66 pL/min 363 µL/min	GY-74905-34	

Cole-Parmer® Touch-Screen Continuous-Cycle Four-Syringe Pumps

Save time by pumping four channels at once

Cole-Parmer®

- Accuracy of ±0.35% and reproducibility of ±0.05%
- Hold two or four syringes from 0.5 µL to 140 mL
- Easily accommodate high back-pressure applications with up to 75 pounds of linear force

Hold up to four syringes; as two syringes are infusing, two syringes are simultaneously withdrawing at the same rate. Use three-way valves (sold separately in starter kit 74901-90 at right) to empty and refill syringes in continuous dispense.

Intuitive touch screen allows you to quickly create and recall configurations. Daisy chain up to 99 pumps together using the built in RS-485. Programmable/multi-step pump provides even greater flexibility in automating your process.

What's included: 6-ft (1.8-m) US power cord.

Specifications

Accuracy: ±0.35%
Reproducibility: ±0.05%
Syringe sizes accepted: 0.5 µL to 140 mL
Linear force: 75 lb (34 kg)
Output: RS-232 9-pin D-sub connector, RS-485 IEEE-1394 6 pos, USB-Type B, I/O & TTL - 15 pin D-sub connector

Description	Flow rate per syringe	Power	Catalog number	Price
Simultaneous, continuous infusion / withdrawal	5.0 pL/min to 215.8 mL/min	110 to 240 VAC, 50/60 Hz	GY-74905-19	
Programmable simultaneous, continuous infusion / withdrawal	5.0 pL/min to 215.8 mL/min	110 to 240 VAC, 50/60 Hz	GY-74905-39	

Accessories

GY-74901-90 Continuous flow starter kit includes two check valves, two 10 mL plastic syringes, and a short length of tubing
GY-74901-91 Continuous low pressure PPS pinch valve box, max pressure 75 psi
GY-74901-93 Continuous medium pressure PTFE pinch valve box, max pressure 75 psi
GY-74901-95 Continuous high pressure stainless steel pinch valve box, greater than 200 psi
GY-74901-92 Autofill low pressure PPS pinch valve box, max pressure 75 psi
GY-74901-94 Autofill medium pressure PTFE pinch valve box, max pressure 75 psi
GY-74901-96 Autofill high pressure stainless steel pinch valve box, greater than 200 psi

Cole-Parmer® High-Pressure Syringe Pumps

Maintain precision even at high pressures

- Greater than 100 lb (45 kg) of linear force, with 1% or better accuracy
- RS-232 connectivity for interface to a remote computer
- Excellent for pumping viscous fluids

Ideal for fluid delivery to reactors in chemical applications or for working with viscous fluids.The robust syringe holder design ensures the syringe is kept level during delivery of fluid, whether smaller or larger syringes. Due to the higher force on the syringe we recommend the stainless steel syringes listed on page 906.

Both the standard and programmable pumps can operate in either an infusion or withdrawal mode. The programmable model can be set to a specific sequence of operations. These versatile pumps can be triggered remotely by a foot pedal or a switch—great for "hands-free" operation.

What's included: 6-ft (1.8-m) cord (115 VAC models have US standard plug; 230 VAC models have European plug).

Models 74903-06, -16

Specifications

Accuracy: ±<1%
Reproducibility: ±0.1%
Syringe sizes accepted: 10 µL to 140 mL
Linear force: >100 lb (>45 kg)
Output: RS-232

Cole-Parmer®

Description	Flow rate per syringe	Power (VAC, Hz)	Catalog number	Price
Infusion/withdrawal syringe pump	0.001 µL/hr to 145.5 mL/min	115, 50/60 230, 50/60 230, 50/60	GY-74903-00 GY-74903-05 GY-74903-06	
Infusion/withdrawal multi-step syringe pump	0.001 µL/hr to 145.5 mL/min	115, 50/60 230, 50/60 230, 50/60	GY-74903-10 GY-74903-15 GY-74903-16	

High-Precision, High-Pressure Piston Pumps

Deliver precise volumes at pressures up to 6000 psi

– Ideal for use in HPLC applications

– Pulse dampener significantly reduces pulsation with low dead volume

A

A. Economical Digital Pumps

Digital pumps provide precise, reproducible flow in an economical package. Single-piston pump significantly reduces pulsation through the use of an advanced electronic rapid-refill design. Microprocessor-controlled pump provides control signals to the motor drive circuits, interfaces with the keypad and digital LED display, receives signals to refill based on flow rate, and provides RS-232 communication. Other features include run/stop inputs, dual-voltage capabilities, self-flushing pump heads, and a motor stall detector. Both include a 6-ft (1.8-m) power cord with plug.

B

B. Constant-Flow HPLC Pump

Use this dual head pump for analytical to small-scale chromatography applications. Constant-flow pump can be used with columns from 2 to 22 mm ID. Drive features a linear cam and pressure compensation to provide accurate gradients in high- or low-pressure modes. Chemical-resistant keypad and digital LED display allow flow adjustments in 0.01-mL increments. Other features include RS-232 serial communication port, run/stop inputs, remote frequency and voltage controls, dual voltage capabilities, and real-time pressure monitoring. Includes a 6-ft (1.8-m) power cord with plug.

C

C. Isocratic Dispensing Pump

Use this single-head pump for isocratic, metering, research and development and quality assurance applications. The low dead volume pulse damper and rapid refill in the pump make the flow virtually pulse-free. Easy solvent changes are accomplished via the one-button purging/priming feature.

Linear cam and pressure compensation provide accurate gradients in high- or low-pressure modes. Chemical-resistant keypad and digital LED display allow flow adjustments in 0.01-mL increments. Other features include RS-232 serial communication port, run/stop inputs, remote frequency and voltage controls, dual-voltage capabilities, and real-time pressure monitoring.

D

D. Preparative High-Flow Pump

Preparative digital pump provides high flow rates and high pressure capabilities with consistent performance. Dual ball and seat check valves in each head reduce pulsation.

Microprocessor controls motor drive circuits, interfaces with the chemical-resistant keypad and digital LED display, receives signals to refill based on flow rate, and provides RS-232 communication. Pressure control feature provides real-time pressure monitoring with upper and lower pressure limits. Other features include prime/purge valves for easy solvent change and priming capabilities, auto-flush piston wash, run/stop inputs, and dual-voltage capabilities. Includes a 6-ft (1.8-m) power cord with plug.

Specifications

Accuracy: ±2%
Maximum temperature (fluid): 212°F (100°C)
Duty cycle: continuous
Self-priming: no
Power: 110 to 220 VAC, 50/60 Hz

Key	Flow range (mL/min)	Max psi (bar)	Pump head	Repeatability	Wetted parts	Catalog number	Price
A	0.01 to 10	3000 (206.8)	PEEK	±0.5%	PEEK check valve body and outlet tubing; synthetic ruby and sapphire check valve internals; sapphire piston; PTFE inlet tubing and pulse dampener diaphragm.	GY-74930-00	
A	0.01 to 10	3000 (206.8)	316 Stainless steel	±0.5%	316 SS check valve body and tubing; synthetic ruby and sapphire check valve internals and piston; fluorocarbon pulse dampener diaphragm.	GY-74930-05	
B	0.001 to 12	6000 (413.7)		±0.2%		GY-74930-25	
C	0.1 to 10	6000 (413.7)		±0.2%		GY-74930-15	
D	0.1 to 100	4000 (275.8)		±0.5%		GY-74930-20	

316 Stainless Steel Capillary Tubing

Applications: Great for high-pressure applications such as HPLC.
Characteristics: Offers great chemical resistance.
Certification: None.
Temperature range: –65 to 550°F (–53 to 289°C)
Sterilize: Autoclave, ethylene oxide, or gamma irradiation.

Dimensions (in.)			Hydrostatic pressure ratings	1-ft length		3-ft length	
ID	OD	Wall		Catalog number	Price	Catalog number	Price
0.005	0.0625	0.0287	11,442 psi	GY-95220-00		GY-95220-10	
0.01	0.0625	0.0262	11,155 psi	GY-95220-02		GY-95220-12	
0.015	0.0625	0.02375	10.684 psi	GY-95220-04		GY-95220-14	
0.02	0.0625	0.0212	10,041 psi	GY-95220-06		GY-95220-16	
0.03	0.0625	0.0162	8292 psi	GY-95220-08		GY-95220-18	

Low-Flow Piston Pump Systems

Remote flow rate control via analog signal or RS-232

– Flow down to 0.002 mL/min; pressure up to 6000 psi (414 bar)
– Smooth fluid delivery from intra RPM stepper motor control
– Integrated piston wash to rinse away crystallized chemicals

Software control of refill rates and compressibility compensation add to the versatility of the pumps and enhance pump performance. Precise metering is attained by a positive-displacement reciprocating piston assembly. The high-resolution stepper motor is used to maximize flow output and minimize pulsation.

Choose pumps with an integrated pulse damper to further reduce pulsation. Pumps also feature the ability to monitor pressure and set high and low limits.

Specifications

Viscosity: 500 cp max
Repeatability: typically ±0.3%
Duty cycle: continuous
Maximum fluid temperature: 248°F (120°C)
Power: 110 to 220 VAC, 50/60 Hz

Flow rate (mL/min)		Max pressure psi (bar)	Wetted parts		Connection		Standard		Integrated pulse damper	
Min	Max		Body	Piston	Inlet	Outlet	Catalog number	Price	Catalog number	Price
0.002	2.5	6000 (413)	316 SS	PE	¼" fitting for ⅛" tubing	Ferrule for 1/16" tubing	GY-73150-00		GY-73150-02	
0.003	5	6000 (413)					GY-73150-10		GY-73150-12	
0.01	20	3000 (206)			⅛" Swagelok®	⅛" Swagelok	GY-73150-20		—	—
0.003	5	6000 (413)	316 SS	PE	¼" fitting for ⅛" tubing	Ferrule for 1/16" tubing	GY-73150-30		GY-73150-32	
0.01	10	6000 (413)					GY-73150-40		GY-73150-42	
0.02	40	1500 (103)			⅛" Swagelok	⅛" Swagelok	GY-73150-50		—	—
0.01	10	3000 (206)	316 SS	PE	¼" fitting for ⅛" tubing	Ferrule for 1/16" tubing	GY-73150-60		—	—
0.01	20	1500 (103)					GY-73150-70		—	—
0.04	80	750 (52)			⅛" Swagelok	⅛" Swagelok	GY-73150-80		—	—

Temperature-Controlled Pump Head

Maintain fluid temperatures easily

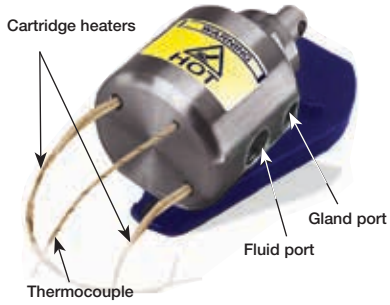
– Operating temperature up to 350°F (177°C)
– Wetted materials of ceramic, PTFE, and 316 SS

Suitable for applications to maintain process fluid temperatures or pump viscous solutions (such as waxes, pastes, or cosmetics). Run wash fluids, gases, or steam through gland ports to provide a barrier between process fluids and the seal area (atmosphere). Using this barrier maintains temperatures and pressures required of slurries, particulates, crystal formers and anaerobics.

Control and monitor the temperature of the pump head with a temperature controller, two standard ¼" x 1" cartridge heaters and one thermocouple (order separately below).

REQUIRED System Components

1) Pump heads
2) Drive
Optional:
3) Thermocouple and temperature controller
4) Cartridge heater



07107-00 shown with cartridge heaters and thermocouple (not included—order below)

1. Pump Head

Flow range (mL/min)	Piston diameter	Maximum pressure psig (bar)	Maximum temperature	Connections		Wetted materials	Catalog number	Price
				Fluid ports	Gland ports			
0 to 576	¼"	100 (6.9)	350°F (176°C)	¼" NPT(F)	⅛" NPT(F)	Ceramic, PTFE, and 316 SS	GY-07107-00	
0 to 1296	⅜"	50 (3.45)					GY-07107-05	

2. Masterflex® L/S® Drives†

Motor specifications						Configuration		Max psi for given piston dia		Dimensions (L x W x H)	Catalog number	Price
rpm	hp	Rating	Voltage	Hz	Amps	Console	Modular	¼"	⅜"			
20 to 600	1/20	IP22	90 to 130 VAC	50/60	1.5	•	—	100	100	9" x 7" x 7"	GY-07554-90	
			180 to 260 VAC		0.8	•	—				GY-07554-95	
6 to 600	1/10	Controller: IP53	90 to 130 VAC	50/60	1.5	—	•	100	100	Controller: 4 15/16" x 7 1/16" x 4 1/16"	GY-07557-00	
		Drive: IP56	180 to 260 VAC		0.5	—	•			Drive: 7⅛" x 3 13/16" x 4⅝"		
6 to 600	1/10	IP31	90 to 260 VAC	50/60	1.8	•	—	100	100	11½" x 7" x 7"	GY-07528-30	

†Masterflex L/S drives require the Masterflex adapter kit, 07104-48, order below.

GY-07104-48 **Masterflex® adapter kit.** Required to mount pump head to Masterflex L/S drive

3. Temperature Monitoring Options

Monitor the temperature of pump head with one thermocouple probe and temperature controller.

GY-08466-81 **FEP-insulated thermocouple probe** with FEP-coated junction, type J with 10-ft (3.0-m) L cable
GY-89550-00 **Universal input controller,** 90 to 264 V

4. Temperature Control Options

To control temperature, order a thermocouple probe and controller (at left) plus two cartridge heaters.

GY-03123-00 **Cartridge heater;** 120 VAC, 70 W, ¼" dia x 1½"L

Ismatec® High-Pressure Programmable Piston Pumps

No valves to clog or wear out

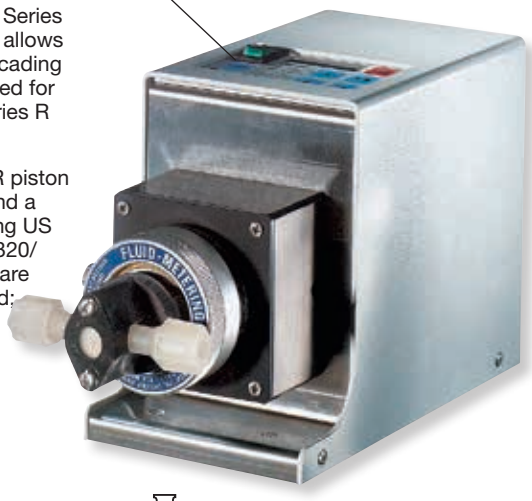
- Six dispensing modes—volume within a preset time, volume in steps, time, intermittent in time or volume, drip-free, or valve operation
- Control speed, start/stop flow, or change fluid direction manually or remotely

Up to four sets of operating parameters can be stored in the pump (for pumps with Series Q pump heads only). RS-232 interface allows for control of pump via a PC or for cascading up to eight pumps. Housing is IP65 rated for Series Q pumps and IP30 rated for Series R pumps.

Pumps include: a Series Q or Series R piston pump head with mounting hardware and a 6-ft (1.8-m) power cord with three-prong US plug. 230 VAC models include an IEC 320/CEE 22 European plug. These models are shipped with country specific plug/cord; please specify ultimate destination when ordering.

A
High-pressure piston pump 78021-12 with Series Q 316 SS pump head

B
High-pressure piston pump 78021-52 with Series R pump head



Series Q PVDF pump head included with high-pressure piston pump 78021-20

3A Models 78021-28, -30

Specifications

Accuracy: ±0.1%
Suction lift: 15 ft (4.6 m) H_2O
Remote control inputs: 0 to 5 VDC, 0 to 10 VDC, 0 to 20 mA, or 4 to 20 mA via DB15 female port; RS-232 via DB9 female port; start/stop and reverse direction via contact closure; footswitch via three-pin DIN port
Power: 115/230 VAC, 50/60 Hz
Viscosity: 500 cp

Don't Forget...

Fittings
pages 301–342

Tubing
pages 988–1017

Flow range (mL/min)	Piston dia	Max pressure psi (bar)	Max temp °F (°C)	Pump head materials of construction: Piston	Cylinder body	Cylinder liner	Autoclavable pump head	Connections	Catalog number	Price
A. High-pressure piston pumps with Series Q pump head										
0.04 to 144	1/8"	100 (6.8) 60 (4.1)	140 (60)	316 SS	316 SS PVDF	Carbon	Yes No	1/4" NPT (F) with 3/8" barb adapter 1/4" OD compression	GY-78021-00 GY-78021-02	
0.13 to 576	1/4"	60 (4.1) 100 (6.8) 60 4.1)	140 (60) 140 (60) 212 (100)	316 SS 316 SS Ceramic	PVDF 316 SS PVDF	Carbon Carbon Ceramic	No Yes No	1/4" OD compression 1/4" NPT (F) with 3/8" barb adapter 1/4" OD compression	GY-78021-04 GY-78021-06 GY-78021-08	
0.13 to 576	1/4"	60 (4.1) 100 (6.8) 100 (6.8)	212 (100) 350 (177) 350 (177)	Ceramic	PVDF 316 SS 316 SS	Carbon Ceramic Carbon	No Yes Yes	1/4" OD compression 1/4" NPT (F) with 3/8" barb adapter 1/4" NPT (F) with 3/8" barb adapter	GY-78021-10 GY-78021-12 GY-78021-14	
0.29 to 1300	3/8"	60 (4.1) 100 (6.8) 60 (4.1)	140 (60) 140 (60) 212 (100)	316 SS 316 SS Ceramic	PVDF 316 SS PVDF	Carbon Carbon Ceramic	No Yes No	1/4" OD compression 1/4" NPT (F) with 3/8" barb adapter 1/4" OD compression	GY-78021-16 GY-78021-18 GY-78021-20	
0.29 to 1300	3/8"	60 (4.1) 100 (6.8) 100 (6.8)	212 (100) 350 (177) 350 (177)	Ceramic	PVDF 316 SS 316 SS	Carbon Ceramic Carbon	No Yes Yes	1/4" OD compression 1/4" NPT (F) with 3/8" barb adapter 1/4" NPT (F) with 3/8" barb adapter	GY-78021-22 GY-78021-24 GY-78021-26	
B. High-pressure piston pumps with Series Q pump head, meet 3A Sanitary Standard 02-08A1 for use with foods										
0.04 to 144 0.13 to 576	1/4" 3/8"	100 (6.8)	350 (177)	Ceramic	316 SS	Ceramic	Yes	1/4" NPT (F) with 3/8" barb adapter	GY-78021-28 GY-78021-30	
B. High-pressure piston pump with Series R pump head										
0.4 to 180	1/4"	100 (6.8)	212 (100)	Ceramic	PVDF	Ceramic	No	1/4" OD compression	GY-78021-52	

High-Performance Dual-Piston Pumps

Handle high pressure without the pulsation

- Precise flow rates from 0.001 to 250.0 mL/min
- Pressure is 9000 psi (612 bar) from 0 to 210 mL/min or 6500 psi from 211 to 250 mL/min
- Flow precision of 0.5% RSD and an accuracy of ≤2% of set point

Thoughtful design is shown through the whole pump—from the dual pump heads allowing for very accurate flow rates and low pulsation to the readily accessible check valves, pistons and seals making for fast and easy maintenance. Pump features a servo motor, LCD keypad, and RS-232 interface. Standard pump has an all stainless steel fluid path; for a titanium fluid path, contact your local dealer.

Specifications

Wetted parts: stainless steel
Accuracy: ≤2% set point
Maximum temperature: 212°F (100°C)
Duty cycle: continuous
Self-priming: no
Power: 110 to 220 VAC, 50/60 Hz

Type	Flow range (mL/min)	Max psi (bar)	Repeatability	Pump head	Catalog number	Price
Constant flow	0.001 to 250.0	9000 (612)	0.5% RSD	316 SS	GY-74930-01	
Constant pressure					GY-74930-02	

Cole-Parmer® Self-Priming Micro Diaphragm Pumps

Ensure accuracy in microvolume pumping

- Accurate volumetric dispensing of 20 to 250 µL
- Pumps up to 20 million dispense cycles
- Low power consumption
- Positive shut-off with pressures less than 1 psi

Cole-Parmer®

Based upon the pump and cycle rate, flow rates can reach up to 25 mL/min while maintaining a high level of accuracy with a deviation from set point being less than ±1% (for 50 mL and larger). The fixed displacement diaphragm pumps are solenoid operated and self priming. Initially, the suction created by the larger pumps is sufficient to pull liquids from an unpressurized container located up to four feet below the pump. Once primed, pumps will maintain up to 5 psi pressure.

73120-10 73120-30

Specifications

Self-priming: yes
Suction lift: 4 ft (1.2 m)
Particulates: no
Run dry: yes
Port: ¼"–28

Dispense setting	Minimum "on" time	Minimum "off" time	Max cycle rate	Max fluid pressure	Max fluid temperature	Wetted parts			Power	Dimensions (L x W x H)	Catalog number	Price
						Body	Diaphragm	Check valve				
20 µL	150 msec	350 msec	2.0 Hz	5 psi (0.35 bar)	158°F (70°C)	PPS	EPDM	EPDM	12 VDC 24 VDC	2½" x 1 7/16" x 1" (64 x 36 x 25 mm)	GY-73120-10 GY-73120-12	
30 µL									12 VDC 24 VDC		GY-73120-14 GY-73120-16	
40 µL									12 VDC 24 VDC		GY-73120-18 GY-73120-20	
50 µL									12 VDC 24 VDC		GY-73120-22 GY-73120-24	
20 µL	150 msec	350 msec	1.6 Hz	5 psi (0.35 bar)	158°F (70°C)	PTFE	PTFE	Perfluorelastomer	12 VDC 24 VDC	2 13/16" x 1½" x 1" (69 x 38 x 25 mm)	GY-73120-30 GY-73120-32	
30 µL									12 VDC 24 VDC		GY-73120-34 GY-73120-36	
40 µL									12 VDC 24 VDC		GY-73120-38 GY-73120-40	

Cole-Parmer® High-Pressure Peristaltic Pumps

Don't let back pressure affect output

- Pump at flow rates up to 158.5 GPH and pressures up to 125 psi
- Self priming even against maximum line pressure
- NEMA 4X and IP66 rated for washdown
- Multiple I/O control and alarm modes
- Maintenance-free, brushless DC motor with a 2500:1 turndown ratio

Choose a pump to achieve flow rates up to 158.5 GPH (600 LPH) and pressures up to 125 psi (8.6 bar) depending on your particular application. The pump performance allows for 30 feet (9 meters) of suction lift using water. Keeping chemical compatibility as simple as possible, the tubing is the only material in contact with the fluid. These pumps can achieve maximum pressure via a clockwise or counterclockwise rotation, giving great flexibility to your installation situation.

Operator-friendly digital touch pad with menu-driven software make these pumps very easy to operate. The VGA graphic multicolor, backlit LCD displays remote/local control status, motor speed, output rate, input signal values, and service and alarm status. Multilingual display can present the information in English, Spanish, French, or German. A Tube Failure Detection (TFD) system senses tube failure by detecting the presence of the pumped chemical in the head. Built-in error correction prevents false triggering.

Pumps come standard with Norprene® tube sets. Norprene tubing meets FDA criteria for food and offers excellent chemical resistance.

What's included: Norprene tube set, 10 ft (3 m) of PVC suction tubing, 10 ft (3 m) of PE discharge tubing, injection fitting, foot strainer, mounting brackets and power cord (115 VAC models have US standard plug; 220 VAC CE-marked models have EU plug).

Cole-Parmer®

Pumps with Norprene Chemical tubing (for superior chemical resistance) and Tygothane® tubing (for use with oils, greases, and fuels) are available. Contact ColeParmer.com

Specifications

Wetted parts: Norprene tube set, PVDF fittings, clear PVC suction tubing, LLDPE discharge tubing

Accuracy: ±0.5% full scale

Repeatability: ±0.5%

Suction lift: 30 ft water, 0 psig (4.5 m water, 0 bar)

Max fluid viscosity: 12,000 cp

Duty cycle: continuous

Input signals: 4 to 20 mA, 0 to 10 VDC, pulse inputs for remote external speed control, and 0 to 30 VDC for contact closure remote start/stop

Output signals: Scalable 4 to 20 mA or pulse; one 250 VAC/6 amp relay; three 115 VAC/1 amp contact closures assignable to monitor up to 17 different pump functions including TFD, FVS, remote/local control setting, motor on, fault, current operating mode, and others

Connections
Standard-capacity models: ⅜" compression
Large-capacity models: ½" barb

Standard-Capacity Pumps

Flow range			Max rpm	Max pressure		Maximum temperature	115 VAC, 60 Hz		220 VAC, 50 Hz		Norprene tube sets	
GPH	LPH	mL/min		psi	bar		Catalog number	Price	Catalog number	Price	Catalog number	Price
Norprene tube models for CIP, SIP												
0.001 to 2.10	0.003 to 7.8	0.05 to 132	125	125	8.6	185°F (85°C)	GY-74203-01		GY-74203-21		GY-74204-01	
0.007 to 17.4	0.026 to 66.0	0.4 to 1097	125	125	8.6	185°F (85°C)	GY-74203-02		GY-74203-22		GY-74204-02	
0.010 to 25.3	0.038 to 96.0	0.6 to 1596	125	125	8.6	185°F (85°C)	GY-74203-03		GY-74203-23		GY-74204-03	
0.013 to 33.3	0.050 to 126	0.8 to 2100	125	125	8.6	185°F (85°C)	GY-74203-04		GY-74203-24		GY-74204-04	
Norprene tube model for extra-long life at low pressures												
0.013 to 33.3	0.050 to 126	0.8 to 2100	125	30	2.1	185°F (85°C)	GY-74203-06		GY-74203-26		GY-74204-06	

Large-Capacity Pumps

Flow range			Max rpm	Max pressure		Maximum temperature	115 VAC, 60 Hz		220 VAC, 50 Hz		Norprene tube sets	
GPH	LPH	mL/min		psi	bar		Catalog number	Price	Catalog number	Price	Catalog number	Price
Norprene tube models for CIP, SIP												
0.01 to 28.5	0.04 to 108	0.7 to 1800	125	125	8.6	185°F (85°C)	GY-74203-41		GY-74203-61		GY-74204-41	
0.2 to 44.4	0.07 to 168	1.1 to 2800	125	125	8.6	185°F (85°C)	GY-74203-42		GY-74203-62		GY-74204-42	
0.02 to 50.7	0.08 to 192	1.3 to 3200	125	125	8.6	185°F (85°C)	GY-74203-43		GY-74203-63		GY-74204-43	
0.02 to 54.0	0.9 to 204	1.4 to 3400	125	125	8.6	185°F (85°C)	GY-74203-44		GY-74203-64		GY-74204-44	
0.04 to 100.0	0.15 to 378	2.5 to 6300	125	125	8.6	185°F (85°C)	GY-74203-46		GY-74203-66		GY-74204-46	
0.06 to 158.5	0.24 to 600	4.0 to 10000	125	125	8.6	185°F (85°C)	GY-74203-47		GY-74203-67		GY-74204-47	
Norprene tube models for extra-long life at low pressures												
0.02 to 50.7	0.07 to 192	1.3 to 3200	125	30	2.1	185°F (85°C)	GY-74203-48		GY-74203-68		GY-74204-48	
0.04 to 111	0.17 to 420	2.8 to 7000	125	30	2.1	185°F (85°C)	GY-74203-49		GY-74203-69		GY-74204-49	

Economical Peristaltic Pumps

Dose without worries

- Easy maintenance and no contamination—tubing is the only wetted part
- Easy tube change-out minimizes downtime between tubing set changes
- Inherent degassing function and rugged gear train offer many years of reliable service

74130-01

Choose from fixed-speed models for straightforward pumping applications or Adjustable-speed models to adjust the pump on/off cycle time from 0 to 100%. The variable-speed models feature a microprocessor that allows a variety of input signal types and controls different timer programs. The electronics system matches the variable-speed motor to the real-time dosing requirements as directed by either a 4 to 20 mA signal, Hall Effect or dry contact pulse input, external stop or manual operation in fixed-speed mode. Program pumps with a cycle timer to run automatically at set intervals, or with a daily timer to add chemical based on days of the week. Features intuitive program selection, parameter display, and pumped volume reporting.

What's included: pump head, two Norprene® tubing assemblies, and a 6-ft (1.8-m) US power cord.

ISO 9001:2008 CERTIFIED SUPPLIER

Specifications

Wetted parts: Norprene® tubing, PVC connectors, and customer-supplied ¼" OD rigid tubing

Max temperature: 125°F (51°C)

Accuracy: ±2%

Max viscosity: 300 cp

Enclosure: NEMA 3R / IP31 (in horizontal position)

Flow range		Max pressure		Dimensions (W x H x D)	Pumps (115 VAC, 60 Hz)		Pumps (230 VAC, 50 Hz)		Service kits		Replacement tubing assemblies	
GPD	L/hr	psi	bar		Catalog number	Price	Catalog number	Price	Catalog number	Price	Catalog number	Price
Fixed-speed models												
4	0.6	100	6.8	8¼" x 9 13/16" x 10 15/16" (209 x 249 x 277 mm)	GY-74130-11		GY-74130-81		GY-74130-52		GY-74130-42	
7	1.1	100	6.8		GY-74130-12		GY-74130-82		GY-74130-52		GY-74130-42	
9	1.4	100	6.8		GY-74130-13		GY-74130-83		GY-74130-53		GY-74130-43	
15	2.4	100	6.8		GY-74130-14		—	—	GY-74130-53		GY-74130-43	
23	3.6	100	6.8	8¼" x 9 13/16" x 10 15/16" (209 x 249 x 277 mm)	GY-74130-16		GY-74130-86		GY-74130-54		GY-74130-44	
30	4.7	80	5.4		GY-74130-17		GY-74130-87		GY-74130-55		GY-74130-45	
50	7.9	80	5.4		GY-74130-18		GY-74130-88		GY-74130-55		GY-74130-45	
80	12.6	15	1.7		—	—	GY-74130-89		GY-74130-56		GY-74130-46	
Adjustable-speed models												
4	0.6	100	6.8	8¼" x 9 13/16" x 10 15/16" (209 x 249 x 277 mm)	GY-74130-01		GY-74130-71		GY-74130-52		GY-74130-42	
7	1.1	100	6.8		GY-74130-02		GY-74130-72		GY-74130-52		GY-74130-42	
9	1.4	100	6.8		GY-74130-03		GY-74130-73		GY-74130-53		GY-74130-43	
15	2.4	100	6.8		GY-74130-04		GY-74130-74		GY-74130-53		GY-74130-43	
23	3.6	100	6.8	8¼" x 9 13/16" x 10 15/16" (209 x 249 x 277 mm)	GY-74130-06		GY-74130-76		GY-74130-54		GY-74130-44	
30	4.7	80	5.4		GY-74130-07		GY-74130-77		GY-74130-55		GY-74130-45	
50	7.9	80	5.4		GY-74130-08		GY-74130-78		GY-74130-55		GY-74130-45	
80	12.6	25	1.7		GY-74130-09		GY-74130-79		GY-74130-56		GY-74130-46	
Variable-speed models												
8	1.2	100	6.8	8¼" x 9 13/16" x 10 15/16" (209 x 249 x 277 mm)	—	—	GY-74130-91		GY-74130-52		GY-74130-42	
17	2.6	100	6.8		—	—	GY-74130-92		GY-74130-53		GY-74130-43	
33	5.2	100	6.8		—	—	GY-74130-93		GY-74130-54		GY-74130-44	
55	8.6	80	5.4		GY-74130-24		GY-74130-94		GY-74130-55		GY-74130-45	
100	15.7	25	1.7		GY-74130-26		GY-74130-96		GY-74130-56		GY-74130-46	

Calibration Columns

Check pump flow rates easily

Graduated in both mL/min and GPH. Made of schedule 40 PVC with a double boPET polyester-film lamination to protect the scale from chemical attack.

Max flow rate mL/min (GPH)	Port size NPT(F)	Column length	Catalog number	Price
100 (1.5)	1/2"	12 1/2" (31.8 cm)	GY-74600-01	
250 (4.0)	1/2"	16 1/4" (41.3 cm)	GY-74600-00	
500 (8.0)	3/4"	16" (40.6 cm)	GY-74600-02	
1000 (16.0)	3/4"	25" (63.5 cm)	GY-74600-04	
2000 (32.0)	1"	24" (61 cm)	GY-74600-05	
4000 (64.0)	1"	34" (86.4 cm)	GY-74600-06	
10,000 (158.8)	2"	27" (68.6 cm)	GY-74600-07	
20,000 (317.0)	2"	46" (116.8 cm)	GY-74600-08	

Reduced Pulsation Diaphragm Metering Pumps

Ensure accuracy and purity

NEW

- Quiet, reliable, accurate, and virtually maintenance-free
- Pumps can run dry continuously without damage
- Use either local or external contact capabilities, including 0 to 10 VDC, start/via TTL contact, and output fault alarm

Compact and resistant to chemical attack. Offers longest possible lifetime when pumping corrosive liquids, gases, and vapors.

What's included: 6-ft power cord with three prong plug.

CE IP65

Specifications

Wetted parts: PP, PVDF, or PTFE head, FFPM valves, PTFE-coated diaphragm
Temperature range: 41 to 176°F (5 to 80°C)
Maximum pressure: 90 psi (6.2 bar)
Suction lift: 10 ft H_2O
Run dry: yes
Power: 100 to 230 VAC, 50/60 Hz

Flow range		Port size	PP head		PVDF head		PTFE head	
GPH	mL/min		Cat. no.	Price	Cat. no.	Price	Cat. no.	Price
3 to 19.5	200 to 1300	⅜" hose connector	GY-78166-40		GY-78166-42		GY-78166-44	
7.5 to 45	500 to 3000	½" hose connector	GY-78166-41		GY-78166-43		GY-78166-45	

Remote-Control Diaphragm Liquid Dosing Pumps

Get more uniform flow

NEW

78167-08

- Quiet, reliable, accurate, and virtually maintenance-free
- Pumps can run dry continuously without damage
- Flow rates up to 100 mL/min and volumes up to 1000 mL
- Simple and intuitive design
- Easy calibration and cycle modes for uninterrupted laboratory dosing
- Rated IP65 against splashes
- Maximum uniformity of discharge and low-pulsation fluid transfer
- Use local or external control capabilities for start/stop and reset/prime via TTL contact and output signal fault alarm
- Optional RS-232 port for connectivity available

What's included: 5-ft (1.5-m) power cord and two 3-ft (1-m) pieces of FEP inlet/outlettubing (⅛" OD x 1⁄16" ID) with UNF ¼"-28 fittings. Models with RS-232 port alsoinclude a cable with D-Sub-9 connector.

CE IP65

Specifications

Wetted parts: PP, PVDF, PTFE, or stainless steel head; FFKM valves and gaskets; PTFE-coated diaphragm
Temperature range: 41 to 176°F (5 to 80°C)
Maximum pressure: 85 psi (5.8 bar)
Run dry: yes
Power: 100 to 230 VAC, 50/60 Hz

Flow range		Dosing volume (mL)	Port size	Suction lift	PP head		PVDF head		PTFE head		Stainless steel head	
GPH	mL/min				Cat. no.	Price	Cat. no.	Price	Cat. no.	Price	Cat. no.	Price
0.0005 to 0.3	0.03 to 20	0.03 to 999	¼"-28 UNF	6.6 ft H_2O	GY-78167-00		GY-78167-01		GY-78167-02		GY-78167-03	
0.0005 to 0.3	0.03 to 20	0.03 to 999			GY-78167-04†		GY-78167-05†		GY-78167-06†		GY-78167-07†	
0.015 to 1.5	1 to 100	1 to 1000		9 ft H_2O	GY-78167-08		GY-78167-09		GY-78167-10		—	—

†These models feature an RS-232 port and RS-232 cable with D-Sub 9 connector.

Accessories

GY-78167-50 **PVDF filter** for models 78167-00 through -07
GY-78167-51 **PEEK filter** for models 78167-00 through -07
GY-78167-52 **PVDF filter** for models 78167-08, -09, -10
GY-78167-53 **PEEK filter** for models 78167-08, -09, -10
GY-78167-54 **Connection set,** UNF ¼"-28, 1/8" OD tubing, 3 ft (1 m), 2 ferrules and 2 fittings
GY-78167-55 **Hose, FEP,** ⅛" OD x 1⁄16" ID x 3 ft (1 m), UNF ¼"-28
GY-78167-56 **Hose, FEP,** ⅛" OD x 1⁄16" ID x 6 ft (2 m), UNF ¼"-28
GY-78167-57 **Fine dosing hose, FEP,** 1⁄16" OD x 1⁄32" ID x 3 ft (1m), UNF ¼"-29
GY-78167-58 **Pressure control valve set, PP,** when feeding tank is above the pump
GY-78167-59 **Pressure control valve set, PVDF,** when feeding tank is above the pump
GY-78167-60 **Pressure control valve set, PTFE,** when feeding tank is above the pump
GY-78167-61 **Foot switch,** for impulse start and stop
GY-78167-62 **Valve kit,** FFPM
GY-78167-63 **Valve kit,** Chemraz® for certain chemicals