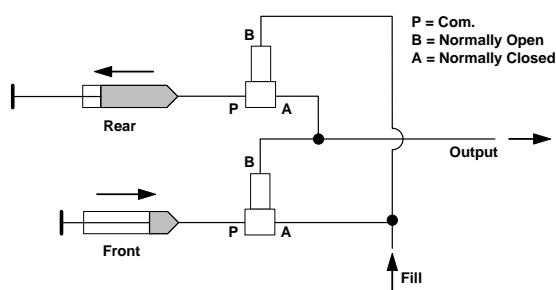


Precision Syringe Pumps

Pump 33 Dual Syringe Pump



- Two independent pumps in a single package
- Operate each pump independently at its own flow rate to either infuse or withdraw
- Synchronize the two pumps for all types of exchange procedures and dilutions of identical amounts
- Deliver or withdraw continuously, 24 hours a day
- 2 year warranty

continuous delivery of a peristaltic or piston pump with the accuracy, absence of pulsation and low flow rates of a syringe pump.

The Harvard 33 Dual Syringe Pump opens up whole new pumping possibilities. These are some of the applications of this pump:

- The injection of dyes, perfumes and flavoring in industrial applications
- Applications with liquids or viscous materials in micro-manufacturing
- Continuous injections of reactants into reactor vessels
- Simultaneous samplings from two sites
- Continuous injection for long term toxicology testing

Several modes of operation are available to accommodate a range of setups and experimental protocols. A unique movable limit switch mechanism is used to change direction or stop operation of the pump depending on the mode of operation.

The Harvard 33 Dual Syringe Pump offers continuous infusion or withdrawal, 24 hours a day, 365 days a year with the accuracy and low flow of a Harvard syringe pump.

The Harvard 33 Dual Syringe Pump is a breakthrough in pumping technology. The 33 has two independent pumping channels linked through hardware and software. When combined with a valve box, it provides the

Reciprocal/Parallel Mode - Syringe mechanisms can run in the same or opposite directions (i.e. both infusing/withdrawing at the same time or one infusing and the other withdrawing)

Proportional Mode - Different flow rates and syringe diameters can be set for each syringe mechanism

AutoStop Mode - Pump stops operation when a limit switch is activated.

Continuous Run Mode - When a limit switch is activated each syringe mechanism reverses direction.

The pump has high pressure capability and TTL and RS-232 interface for data acquisition and control. The communication ports enable daisy-chaining of up to 100 pumps.

Specifications

Type	Microprocessor dual drive, single syringe, infusion/withdrawal
Accuracy	±0.35%
Reproducibility	±0.1%
Syringe sizes:	
Minimum	0.5 µl
Maximum	140 ml
Flow Rate:	
Minimum	0.0004 µl/hr
Maximum	106.6 ml/min
Non Volatile Memory	Storage of all settings
RS-232	RJ11-4 conductor
TTL	9-pin connector
Average Linear Force	57 lbs
Drive Motor	2 motors, each 0.9° stepper motors
Motor Drive Control	Microprocessor controlled from 1/2 to 1/4 microstepping
Motor Step per Revolution of Lead Screw	1600 at 1/2 stepping or 3200 at 1/4 stepping
Step Rate:	
Minimum	27.3 sec/step
Maximum	416.7 µsec/step
Pusher Travel Rate:	
Minimum	0.726699 µm/min
Maximum	95.25 mm/min
Power	45 W, 1.0 A fuse
Voltage Range	95 to 130 VAC, 60 Hz; 220 to 260 VAC, 50 Hz, selectable
Dimensions, H x W x D	15.2 x 31.1 x 28.6 cm (6 x 12.5 x 11.25 in)
Weight	6.8 kg (15 lb)

Catalog No.	\$	Product
BS4 55-3333		Harvard 33 Dual Syringe Pump

For Accessories, see page A19.