

OEM Custom Pump Solutions

Mass Spectrometer Calibration
Chemical Synthesis Devices • Microfluidic Systems
Particle Characterization Instruments • Rheology Systems



Introduction

Harvard Apparatus offers a full line of OEM Pumps which can be integrated into an existing system or operate independently via computer control. Harvard Apparatus has a wealth of experience in the development and manufacture of specialized fluidic systems. We offer the broadest selection of fluidics components, systems and specials. Whether your requirement is for a single order/one time study or you need a fluidic module to integrate into your system, we have the solution. With our extensive experience and variety of stand alone pumps and modules we can customize a product for your application. If you do not find what you are looking for, please contact our expert technical staff so we can review your specifications and work with you to develop or modify a product to meet your needs.

Among the application areas where we have developed OEM Solutions are:

- Mass Spectrometer Calibration
 - Chemical Synthesis Devices
 - Microfluidic Systems
 - Rheology Systems
 - Particle Characterization Instruments
 - And More!
-

All of the Harvard Apparatus OEM modules are based upon our proven digital syringe pumps. They deliver the same accuracy and reproducibility as our stand alone pumps. We offer a wide range of flow rates and applied forces ranging from 6 lbs to 1,000 lbs.

Syringe diameter, flow rates and target volumes are stored in non-volatile memory. Serial communication is handled through either the RS-232 or USB ports depending upon the module. Every module is supplied with a serial cable. Some of the modules are available with or without a power supply while others come standard with a power supply.



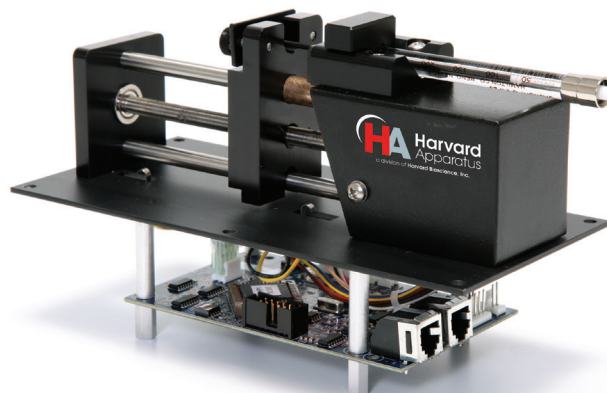
With more than 100 years of success behind us and a proven track record of designing and manufacturing high quality reliable syringe and peristaltic pumps, only Harvard Apparatus has the scientific depth and fluidics knowledge to recommend the right pump and accessories for your application. Our superior technical experts are available to assist you from start to finish. Harvard Apparatus invented the lead screw based syringe pump in the 1950's and introduced the first microprocessor pump, the now legendary Pump 22, in the 1980's. Our syringe pumps are so accurate, that even at low flow rates they have become the standard for mass spectrometry calibration, physiological research and anywhere accurate volumes must be delivered.

OEM Syringe Pump Modules

General Features and Capabilities

- All of our OEM modules are based upon our proven digital syringe pump technology delivering the same accuracy and reproducibility as our stand alone pumps.
- The modules consist of 3 basic components – a drive mechanism assembly, a motor assembly, and a circuit board assembly. In standard configurations, all are mounted to a base plate. These sub-assemblies can be purchased individually if required.
- All units have the ability to run in either direction (infuse/withdraw) at separate rates and target volumes.
- Although computer control is most commonly used for communication, a voltage level control for start/stop and change of direction is available. Our PHD ULTRA™ and Pump 11 Elite based modules can be rate controlled using an external DC 0-10 volt signal.
- All systems will accept input voltages over the range of 12-30 volts DC.
- Modification to accommodate existing designs or future designs is available.
- Modules can be linked together in a daisy chain fashion for complete computer control of up to 16 separate pumps at once. The PHD ULTRA™ based versions can control up to 99 pumps simultaneously.
- Our advanced syringe pump design incorporates a stable mechanism, has an extended pushing block, larger guide rods, and easily adjustable capturing brackets and limit stops which fully protect the syringe and prevent siphoning. All syringe pumps offer adjustable force. These also offer a more enhanced I/O control and a USB serial port.
- We can configure our modules to support directional control valves, heating and cooling devices, custom syringes, and more.

Microliter Syringe Pump Module



KEY FEATURES

- Accuracy of $\pm 0.5\%$
- Footprint of 4.5 x 9.25 x 3.25 in
- 0.001 μl to 1.33 ml/min
- CE, WEEE, & RoHS

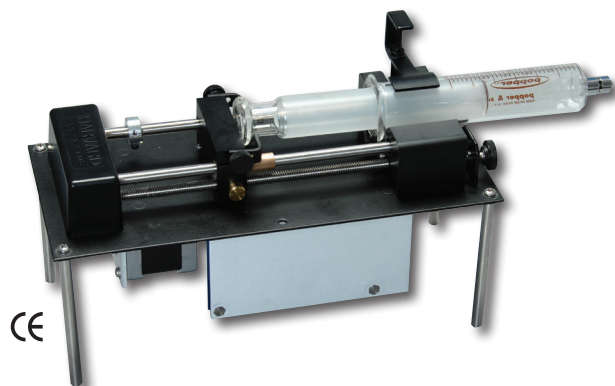
Microliter Syringe Pump Module Specifications

TYPE	Microprocessor single syringe, infusion/withdrawal
ACCURACY	$\pm 0.5\%$
SYRINGE TYPE	Glass or plastic
SYRINGE SIZE:	
Size Minimum	0.5 μl
Size Maximum	1 ml
FLOW RATE:	
Minimum	0.001 ml/hr
Maximum	1.33 ml/min
AVERAGE LINEAR FORCE	2.73 kg (6 lbs) @ 100% force selection
CONNECTORS:	
RS-232	4-pin RJ11 telephone jack; dual RS-232 ports
DC Power	2-pin Header (friction lock)
POWER	+12VDC, 5%, 1A (12W) (User supplied)
DIMENSIONS:	
Overall, H x W x D	11.4 x 18.4 x 8.3 cm (4.5 x 7.25 x 3.25 in)
Mounting	22.2 x 7.0 cm (8.75 x 2.75 in) - Mounting holes for (4) #8 screws
WEIGHT	0.84 kg (1.85 lbs)

Order #	Product
70-2220	Microliter Syringe Pump Module without Power Supply
70-2225	Microliter Syringe Pump Module with Power Supply

OEM Syringe Pumps

Milliliter Syringe Pump Module



KEY FEATURES

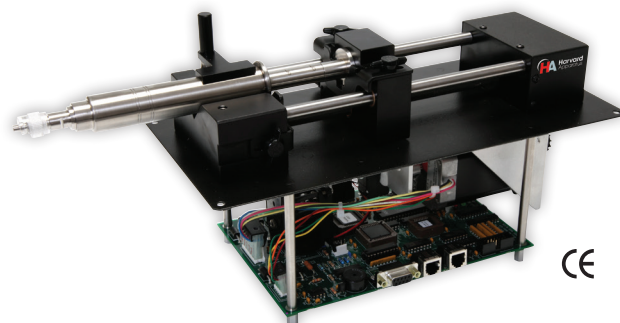
- Accuracy of $\pm 0.5\%$
- Footprint of 5.3 x 9.5 x 4.25 in
- 0.001 $\mu\text{l/hr}$ to 44.28 ml/min
- CE, WEEE, & RoHS

Milliliter Syringe Pump Module Specifications

TYPE	Microprocessor single syringe, infusion/withdrawal
ACCURACY	$\pm 0.5\%$
SYRINGE TYPE	Glass or plastic
SYRINGE SIZE:	
Size Minimum	0.5 μl
Size Maximum	50/60 ml
FLOW RATE:	
Minimum	0.001 ml/hr
Maximum	44.283 ml/min
AVERAGE LINEAR FORCE	11.36 kg (25 lbs) @ 100% force selection
CONNECTORS:	
RS-232	4-pin RJ11 telephone jack; dual RS-232 ports
DC Power	2-pin Header (friction lock)
POWER	+15 to +40VDC (12W min)
DIMENSIONS:	
Overall, H x W x D	13.5 x 24.27 x 10.8 cm (5.3 x 9.56 x 4.25 in)
Mounting	22.9 x 9.5cm (9.0 x 3.75 in) - Mounting holes for (4) #8 Screws
WEIGHT	1.27 kg (2.8 lbs)

Order #	Product
70-2219	Milliliter Syringe Pump Module without Power Supply
70-2226	Milliliter Syringe Pump Module with Power Supply

High Force Syringe Pump Module



KEY FEATURES

- Accuracy of $\pm 0.5\%$
- Average Linear Force of 90.91 kg (200 lbs)
- 3.06 $\mu\text{l/min}$ to 215.8 ml/min
- CE, WEEE, & RoHS

PHD ULTRA™ 4400 Syringe Pump Component

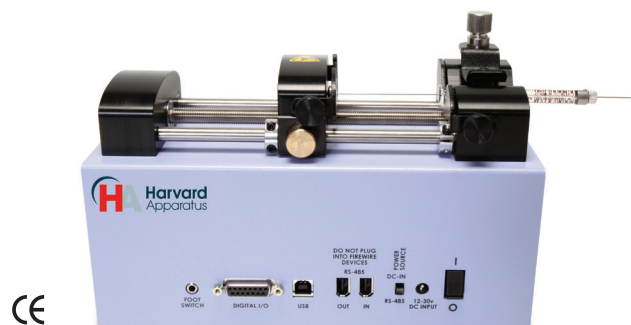
TYPE	Microprocessor single syringe, infusion/withdrawal
ACCURACY	$\pm 0.5\%$
SYRINGE TYPE	Plastic, glass or stainless steel
SYRINGE SIZE:	
Size Minimum	0.5 μl
Size Maximum	140 ml
FLOW RATE:	
Minimum	3.06 $\mu\text{l/min}$
Maximum	215.8 ml/min
AVERAGE LINEAR FORCE	90.91 kg (200 lbs)
CONNECTORS:	
RS-232	9 pin D-Sub Connector
RS-485	IEEE-1394, 6 pos
USB	Type B
I/O & TTL	15 pin D-Sub Connector
DIMENSIONS & WEIGHT:	

Contact Harvard Apparatus for specifications.

Order #	Product
70-3610	PHD ULTRA™ 4400 Pump Component

OEM Syringe Pumps

Pump 11 Elite OEM Module



CE

KEY FEATURES

- Accuracy of $\pm 0.35\%$ - $\pm 0.50\%$
- Footprint of 6.5 x 9.5 x 4.25 in
- 0.54 pl/min - 88.28 ml/min (model dependent)
- CE, ETL (UL, CSA), WEEE, EU RoHS & CB Scheme

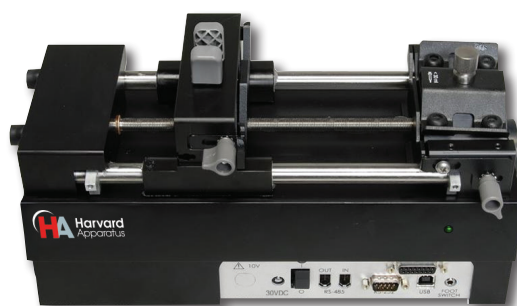
Pump 11 Elite/Pico Plus Elite OEM Module Specifications

TYPE	Microprocessor dual syringe, infusion/withdrawal
ACCURACY	$\pm 0.5\%$ (Pump 11 Elite) ; $\pm 0.35\%$ (Pico Plus Elite)
SYRINGE TYPE	Plastic, glass or stainless steel
SYRINGE SIZE:	
Size Minimum	0.5 μ l
Size Maximum	60 ml (10 ml dual)
FLOW RATE:	
Minimum (both single & dual syringe models)	1.26 pl/min (Pump 11 Elite); 0.54 pl/min (Pico Plus Elite)
Maximum (single syringe model)	88.28 ml/min (Pump 11 Elite); 39.77 pl/min (Pico Plus Elite)
Maximum (dual)	26.03 ml/min (Pump 11 Elite); 11.70 pl/min (Pico Plus Elite)
AVERAGE LINEAR FORCE	16 kg (35 lbs) @ 100% force selection
CONNECTORS:	
RS-232	9 pin D-Sub Connector
RS-485	IEEE-1394, 6 position
USB	Type B
I/O & TTL	15 pin D-Sub Connector
DIMENSIONS:	
Overall, H x W x D	17.15 x 24.1 x 10.8 cm (9.5 x 6.75 x 4.25 in)
WEIGHT	2.3 kg (5.1 lbs)

Order #	Product
70-4800	Pump 11 Elite OEM Single Syringe
70-4801	Pump 11 Elite OEM Dual Syringe
70-4802	Pump 11 Pico OEM Dual Syringe
70-4803	Pump 11 Pico OEM Single Syringe

All 70-48XX come with Power Supply

PHD ULTRA™ Syringe Pump Module



CE

KEY FEATURES

- Accuracy of $\pm 0.25\%$
- Footprint of 11.75 x 5.5 x 6.5 in
- 3.06 pl/min to 215.8 ml/min
- CE, ETL (UL, CSA), WEEE, EU RoHS & CB Scheme

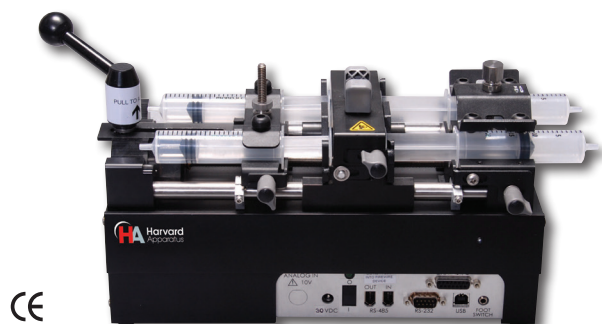
PHD ULTRA™ Syringe Pump Module Specifications

TYPE	Microprocessor dual syringe, infusion/withdrawal
ACCURACY	$\pm 0.25\%$
SYRINGE TYPE	Plastic, glass or stainless steel
SYRINGE SIZE:	
Size Minimum	0.5 μ l
Size Maximum	140 ml
FLOW RATE:	
Minimum	3.06 pl/min
Maximum	215.8 ml/min
AVERAGE LINEAR FORCE	34 kg (75 lbs) @ 100% force selection
CONNECTORS:	
RS-232	9 pin D-Sub Connector
RS-485	IEEE-1394, 6 pos
USB	Type B
I/O & TTL	15 pin D-Sub Connector
DIMENSIONS:	
Overall, H x W x D	29.8 x 14.0 x 16.5 cm (11.75 x 5.5 x 6.5 in)
WEIGHT	5.1 kg (11.2 lbs)
REGULATORY CERTIFICATIONS	CE, ETL (UL, CSA), WEEE, EU RoHS & CB Scheme

Order #	Product
70-3506	PHD ULTRA™ Syringe Pump Module with Power Supply

OEM Syringe Pumps

PHD ULTRA™ Push/Pull Syringe Pump Module



CE

KEY FEATURES

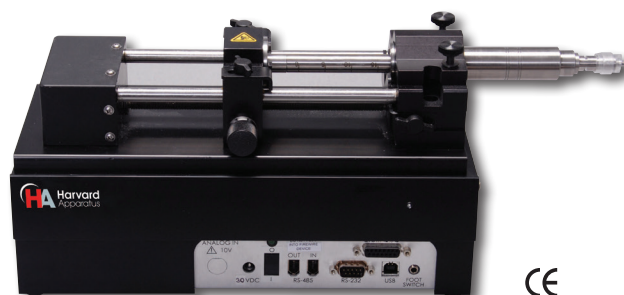
- Accuracy of $\pm 0.25\%$
- Footprint of 11.75 x 5.5 x 6.5 in
- 3.06 pl/min to 215.8 ml/min
- CE, ETL (UL, CSA), WEEE, EU RoHS & CB Scheme

PHD ULTRA™ Push/Pull Syringe Pump Module Specifications

TYPE	Microprocessor four syringe, push/pull infusion/withdrawal
ACCURACY	$\pm 0.25\%$
SYRINGE TYPE	Plastic, glass or stainless steel
SYRINGE SIZE:	
Size Minimum	0.5 μ l
Size Maximum	140 ml
FLOW RATE:	
Minimum	3.06 pl/min
Maximum	215.8 ml/min
AVERAGE LINEAR FORCE	34 kg (75 lbs) @ 100% Force Selection 30 VDC Input
CONNECTORS:	
RS-232	9 pin D-Sub Connector
RS-485	IEEE-1394, 6 pos
USB	Type B
I/O & TTL	15 pin D-Sub Connector
DIMENSIONS	
Overall, H x W x D	29.8 x 14.0 x 16.5 cm (11.75 x 5.5 x 6.5 in)
WEIGHT	5.1 kg (11.2 lbs)
REGULATORY CERTIFICATIONS	CE, ETL (UL, CSA), WEEE, EU RoHS & CB Scheme

Order #	Product
70-3508	PHD ULTRA™ Push/Pull Syringe Pump Module with Power Supply

PHD ULTRA™ 4400 Syringe Pump Module



CE

KEY FEATURES

- Accuracy of $\pm 0.35\%$
- Footprint 11.75 x 5.5 x 6.5 in
- 3.06 pl/min to 215.8 ml/min
- CE, ETL (UL, CSA), WEEE, EU RoHS & CB Scheme

PHD ULTRA™ 4400 Syringe Pump Module Specifications

TYPE	Microprocessor single syringe, infusion/withdrawal
ACCURACY	$\pm 0.35\%$
SYRINGE TYPE	Plastic, glass or stainless steel
SYRINGE SIZE:	
Size Minimum	0.5 μ l
Size Maximum	140 ml
FLOW RATE:	
Minimum	3.06 pl/min
Maximum	215.8 ml/min
AVERAGE LINEAR FORCE	91 kg (200 lbs) @ 100% Force Selection
CONNECTORS:	
RS-232	9 pin D-Sub Connector
RS-485	IEEE-1394, 6 pos
USB	Type B
I/O & TTL	15 pin D-Sub Connector
DIMENSIONS	
Overall, H x W x D	29.8 x 14.0 x 16.5 cm (11.75 x 5.5 x 6.5 in)
WEIGHT	5.3 kg (11.2 lbs)
REGULATORY CERTIFICATIONS	CE, ETL (UL, CSA), WEEE, EU RoHS & CB Scheme

Order #	Product
70-3510	PHD ULTRA™ 4400 Syringe Pump Module with Power Supply

OEM Syringe Pumps

PHD ULTRA™ XF Syringe Pump Module



KEY FEATURES

- Accuracy of $\pm 0.5\%$
- Footprint of 16 x 12 x 8.5 in
- 50.79 nl/min to 144.08 ml/min
- CE, ETL (UL, CSA), WEEE, EU RoHs & CB Scheme

PHD ULTRA™ Push/Pull Syringe Pump Module Specifications	
TYPE	Microprocessor dual syringe, infusion/withdrawal
ACCURACY	$\pm 0.5\%$
SYRINGE TYPE	Stainless steel or plastic
SYRINGE SIZE:	
Size Minimum	20 ml
Size Maximum	200 ml
FLOW RATE:	
Minimum	50.79 nl/min
Maximum	144.08 ml/min
AVERAGE LINEAR FORCE	454 kg (1000 lbs) @ 100% force selection
CONNECTORS:	
RS-232	9 pin D-Sub Connector
RS-485	IEEE-1394, 6 position
USB	Type B
I/O & TTL	15 pin D-Sub Connector
DIMENSIONS	
Overall, H x W x D	40.64 x 30.48 x 21.6 cm (16 x 12 x 8.5 in)
WEIGHT	20 kg (44 lbs)
REGULATORY CERTIFICATIONS	CE, ETL (UL, CSA), WEEE, EU RoHs & CB Scheme

Order #	Product
70-3514	PHD ULTRA™ XF Syringe Pump Module with Power Supply

User I/O Connections

Direction Control Input	Set pump to infuse or withdraw	Footswitch Input	Start and stop a pump
Trigger Input	Connect an external device to start or stop a pump or Method	USB and RS-232 Serial Inputs	Control your pump with a computer
Trigger 1 & 2 Output	Signal another device to start and stop a pump or Method	RS-485 Connectors	Connect multiple pumps together (up to 99)
Sync Output	Synchronize other devices		Connect remote mechanism
Valve Output	External valve control		Connect satellite pumps to the Master pump for binary or ternary gradient system (% composition)
Run Indicator	Connect an external LED or monitoring device to a pump	RS 232 RJ-11 Connectors (optional), Order # 70-3030	Connect multiple pumps together (daisy chain)
Analog Control (optional), Order # 70-3033	Analog control of the motor speed (0 to 10 v). This option must be ordered at the same time the pump is ordered.		

Contact us for more information!



CMA Microdialysis, AB

Torshamnsgatan 30A
SE-164 07 Kista, Sweden

phone +46.8.470.10.00
e-mail cma@microdialysis.se
web www.microdialysis.se



Harvard Apparatus

84 October Hill Road
Holliston, MA 01746, USA

phone +1.508.893.8999
toll free +1.800.272.2775 (USA Only)
fax +1.508.429.5732
e-mail support@hbiosci.com
web www.harvardapparatus.com



Harvard Apparatus Canada

6010 Vanden Abeele
Saint-Laurent, Quebec H4S 1R9

phone +1.514.335.0792
toll free +1.800.361.1905
fax +1.514.335.3482
e-mail sales@harvardapparatus.ca
web www.harvardapparatus.ca



Harvard Apparatus China

Room 8C, Zhongxi Tower
121 Jiangsu Road,
Changning District
Shanghai, China, 200050

phone +86.21.6226.0239



Biochrom Limited - Harvard Apparatus UK

East Wing, Building 1020
Cambourne Business Park, Cambourne
Cambridge, CB23 6DW, United Kingdom

phone +44.1732.864001
fax +44.1732.863356
e-mail sales@harvardapparatus.co.uk
web www.harvardapparatus.co.uk



Harvard Apparatus, S.A.R.L.

6 Avenue des Andes
Miniparc - Bat. 8
F-91952, Les Ulis Cedex

phone +33.1.64.46.00.85
fax +33.1.64.46.94.38
e-mail info@harvardapparatus.fr



HUGO SACHS ELEKTRONIK

a division of Harvard Bioscience, Inc.

Hugo Sachs Elektronik / Harvard Apparatus, GmbH

Gruenstrasse 1
March-Hugstetten D-79232, Germany

phone +49.0.7665.9200.0
fax +49.0.7665.9200.90
e-mail info@hugo-sachs.de
web www.hugo-sachs.de

Panlab

Panlab, S.L. / Harvard Apparatus Spain

C/Energia, 112 08940 Cornellà
Barcelona, Spain

phone +34.934.750.697 (International Sales)
+34.934.190.709 (Sales in Spain)
fax +34.934.750.699
e-mail info@panlab.com
web www.panlab.com