

PHD Ultra™ Syringe Pumps

The **PHD Ultra™** will change the way you think about syringe pumps!

Smoothest and most accurate flow available

- New patents pending mechanical design for superior picoliter to hundreds of ml/min flows

Provides easy, intuitive operation for simple to complex applications

- Advanced high resolution, color touch-screen, with icons and GUI interface
- EZ PRO™ software provides preprogrammed Quick Start methods and advanced method templates for PC-like functions without a PC
- Creates and stores >50 programs for easy recall and reuse
- Pre-programmed operational modes: Bolus, Pulse Flow, Concentration (mg/kg)
- Exchange methods with peers by email and auto input to the pump, reducing method development

Unparalleled Versatility

- Broadest range of applications including nanofluidics, MS, reactors dosing, electrospinning, aerosols and more
- Multiple models: push-pull, remote, high force
- Syringe Racks from 2 to 10 syringes providing multi-channel or a large capacity reservoir
- Connectivity: USB, RS-232, RS-485, I/O

> *Versatility*



New Easy to Use Touch Screen Interface



Inspira - Advanced Safety Ventilator



NEW Inspira Safety Ventilator with Inspiratory Hold

- Ventilates mice to cats with one ventilator (15 g to 10 kg)
- Easy to use
- Two models available:
 - Volume-controlled
 - Pressure-controlled
- Airway pressure monitoring detects over/under pressurization of lungs
- Assist Mode helps wean animal off the ventilator
- Built in sigh breath maintains optimal lung functioning
- Adjustable I:E ratio (1:4 to 4:1)
- Ability to ventilate with air or non-flammable anesthetic gases
- Quiet

For more superior products to enhance your bioresearch work from **Harvard Apparatus**

Please Login : www.le.com.my

PHD ULTRA Specifications

Accuracy	± 0.35%
Reproducibility	± 0.05%
Syringes (Min./Max.)	0.5 µl / 140 ml
Flow Rate:	
Minimum (0.5 µl syringe)	1.56 µl/min
Maximum (140 ml syringe)	220.97 ml/min
Display	4.3" WQVGA TFT Color Display with Touchpad
Non-Volatile Memory	Stores all settings
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
Linear Force (Max):	34 kg (75 lbs) @ 100% Force Selection
Drive Motor	0.9° Stepper Motor
Motor Drive Control	Microprocessor with 1/16 microstepping
Number of Microsteps per one rev. of Lead Screw	12,800
Step Rate:	
Minimum	27.5 sec/µstep
Maximum	26 µsec/µstep
Pusher Travel Rate:	
Minimum	0.18 µm/min
Maximum	190.80 mm/min
Power	100-240 VAC:50/60 Hz 50 W, 0.5 A fuse
Dimensions	10.16 x 21.59 x 30.48 cm (4 x 8.5 x 12 in)
Weight	4.5 kg (10 lb)
Atmospheric Specifications	
Operating Temperature	4°C to 40°C (40°F to 104°F)
Storage Temperature	-10°C to 70°C (14°F to 158°F)
Humidity	20% to 80% RH, non condensing
Mode of Operation	Continuous
Classification	Class I
Pollution Degree	1
Installation Category	II
Supplier Name	Harvard Apparatus
Supplier Address	84 October Hill Pd., Holliston, MA 01746
Regulatory Certifications	CE, UL, SCA, CB Scheme, EU RoHS

Inspira Safety Ventilator Specifications

Animal Size	15 g to 10 kg
Volume	0.1 to 100ml
Port Sizes	1/8"-27 NPT threaded nylon barbed ports, accommodates 1/16", 1/8", 3/16" ID Tubing (Default = 1/8" ID Tubing)
Control Modes	Volume or Assist
Breathing Rate	5 to 200 bpm
Resolution	1 breath/min
% Inspiratory Time	20 to 80% of cycle time (Default 50%)
I:E Ratio	4:1 to 1:4 (Default = 1:1)
Inspiratory Flow	0 to 12 SLPM
Gas Supply	Room air or nonflammable mixed gas
Inspiration Pressure:	IEEE-1394, 6 pos
Full Range	5 to 50 cmH ₂ O
Safe Range	15 to 25 cmH ₂ O
Accuracy	+/- 1 cmH ₂ O
Resolution	1 cmH ₂ O
Sigh Frequency	1 in 5 to 1 in 250 breaths (Default = No Sigh)
Sigh Pressure:	
Full Range	Insp. Pressure to 50 cmH ₂ O
Safe Range	Insp. Pressure to (Insp. Pressure + 10 cmH ₂ O) or 35 cmH ₂ O, whichever is less
Respiratory Assist	Available
Assist Trigger	-1 to -10 cmH ₂ O (Default = -5cmH ₂ O)
Signal Inputs:	
External Trigger Input	0 to +5 V digital pulse, active low
Signal Outputs:	
Sync Out (ASV _v)	0 to +5 V digital pulse, 20 ± 10 ms wide, active low
Sync Out (ASV _p)	V _{OH} for Inspiration Duration V _{OL} for Expiration Duration
AnalogOut1	0 to +5 V analog (Default = Airway Pressure Signal)
Airway Pressure Signal	
Pressure Range	± 67 cmH ₂ O (± 50 mm Hg)
Sensitivity	30 mV/cmH ₂ O, typical (40.0 mV/mHg, typical)
Signal Level	+0.5 to +4.5 V
Offset	+2.5V ±0.05 V
Response	1 ms max
AnalogOut2	0 to +5 V analog (Default = Not Used)
Remote Communications	RS232
Display	2 line x 20 character Vacuum Fluorescent Display (VFD)
Power	AC 100 to 240 V, 50/60 Hz, 75 watts
Dimensions, H x W x D	17.8 x 25.4 x 40.6 cm (8 x 10 x 17.25 in)
Weight	9.1 kg (20 lb)

PHD ULTRA™ Ordering Information

Order#	Order#	Product
Stand Alone	Remote	
Standard Version		
70-3005	70-3105	PHD ULTRA™ Infuse Only
70-3006	70-3106	PHD ULTRA™ Infuse/Withdraw
70-3007	70-3107	PHD ULTRA™ Infuse/Withdraw Programmable
Push/Pull Versions		
70-3008	70-3108	PHD ULTRA™ with Push/Pull Mechanism
70-3009	70-3109	PHD ULTRA™ Programmable with Push/Pull Mechanism
Other Versions		
70-3010	70-3110	PHD ULTRA™ 4400 Syringe Pump I/W Programmable
-	70-3111	PHD ULTRA™ Remote Hpsi Syringe Pump I/W Programmable
-	70-3112	PHD ULTRA™ Remote Hpsi Syringe Pump I/W Programmable with 10x140 Rack
70-3030	-	PHD ULTRA™ Option RS-232 RJ11 Connectors
70-3033	-	PHD ULTRA™ Option Analog Control Input
70-3031	-	PHD ULTRA™ Option Internal Pinch Valve
70-3032	-	PHD ULTRA™ Option Internal 3-way Isolation Valve
70-3034	-	PHD Ultra Option Internal Fan

Specials available on request for: Different racks, custom flow ranges and flow characteristics in those ranges, special accessories

Rack Options

70-3020	6x10 Multi Syringe Rack for PHD ULTRA™
70-3021	4x140 Multi Syringe Rack for PHD ULTRA™
70-3022	Micro Dialysis Rack for PHD ULTRA™ holds 4 syringes
70-3023	Anti-Siphon Kit for PHD Ultra

Upgrades

70-4010	Upgrade Infuse Only to I/W *
70-4011	Upgrade Infuse Only to Programmable *
70-4012	Upgrade I/W to Programmable *

Accessories

70-4000	RS-485 Cable for Pump-to-Pump Communication, 0.5m
70-4001	RS-485 Cable for Pump-to-Pump Communication, 2m
70-4002	USB Cable for PC-to-Pump Communication, 2m
70-4003	USB Cable for PC-to-Pump Communication, 5m
70-4004	RS-232 Cable for PC-to-Pump Communication, 9 pin D-sub, 2m
72-0199	Remote Extension Cable, 1.5m (5ft)
72-1405	Remote Extension Cable, 9.1m (30ft)
70-4005	Adapter, PHD Digital I/O
70-4006	Adapter, D-sub 15 to Term. Blk
72-8340	Adapter, USB to Serial
70-2215	Footswitch (w/ Phono Plug)
55-7002	Auto Fill Valve Box, Normal Pressure, 30 psi
55-7004	Auto Fill Valve Box, High Pressure, 200 psi
55-7760	Cable Assy, Daisy-chain, Legacy RS-232 RJ-11, 2 ft
72-2478	Cable Assy, Daisy-chain, Legacy RS-232 RJ-11, 7 ft
2401-086	Adapter for 25ml, 50ml, 100ml Hamilton GasTight™ Syringes