

UPCHURCH SCIENTIFIC
92154
IDEA
HEALTH & SCIENCE
Laboratory

Laboratory Pumps

PHILIPPO
Pump
4
ATR
PRECISION
ENGINEERED
FLUIDICS™

TWO THOUSAND
2007

2008

LABORATORY PUMPS INTRODUCTION

Liquid and air handling are common needs in most labs. With smaller dispense requirements and the need for longer, continuous duty operations, more accurate and robust pumping solutions are necessary. To meet these needs, we now offer pumping solutions from sister IDEX® Corporation business units: ISMATEC® peristaltic pumps, Sapphire Engineering™ syringe pump alternatives (PVMs and IPVs), and Gast® Manufacturing Air Compressor and Vacuum Pumps.

Features of Peristaltic Pumps (pages 136 – 143)

- » Pumping by Speed or Flow Rate
- » Dispensing by Volume or Time
- » Interval Dispensing with a Pause
- » Dispensing a Volume within a Pre-set Time
- » Interval Dispensing with a Pre-set Number of Dispensing Cycles
- » Roller Back-steps for Drip-free Dispensing
- » Contamination Free Pumping
- » Pumping Sterile Media
- » High Accuracy
- » High Repeatability
- » Multi-Channel Pumping



Features of Syringe Pump Alternatives (pages 144 – 146)

- » PVM (Pump Valve Module) Aspirating/Dispensing System
 - » For automated pipetting, diluting and dispensing
 - » Self-contained, stepper motor driven module
 - » Uses IPVs (see below)
 - » 100% software compatible with Cavo™ XP-3000 syringe pumps
 - » Many programmable functions
 - » RS-232, RS-485 and CAN BUS communication and control
 - » Selectively work with up to 15 PVMs
- » IPV (Integrated Piston/Valve)
 - » For use on PVMs and direct plug-in use on Cavo XP-3000 syringe pumps
 - » Accuracy and precision identical to traditional syringes and valves
 - » Lasts up to 20 times longer than traditional products, with significant lifetime cost savings
 - » Made of durable, chemically resistant materials
 - » Set-up in less than five minutes
 - » Requires no routine maintenance
 - » 50µL – 5.0mL volumes available, with or without a seal wash option



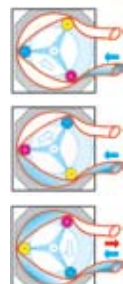
Please Note: See page 147 for Gast Manufacturing Air Compressor and Vacuum Pump models.

PERISTALTIC PUMPS INTRODUCTION

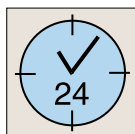
- » For a Broad Array of Applications

With a wide range of tubing available, ISMATEC peristaltic tubing pumps are capable of pumping almost any media, including corrosive or sterile fluids.

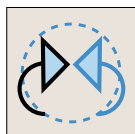
- » Many tubing materials available
- » Independent, yet simultaneous delivery of various media at different flow rates (multichannel pumps-up to 24 channels)
- » Self-priming from a depth of up to 8 m
- » Reversible rotation direction
- » Extremely accurate dispensing with calibrateable, microprocessor controlled drives
- » Inexpensive to Maintain
 - » Nearly maintenance-free
 - » Tubing is the only part to wear
 - » No expensive seals, valves or diaphragms
 - » Ready again after simple tubing change
 - » High quality and precision deliver optimum performance even after years of intensive use
- » Safe and Easy to Use
 - » Developed for continuous duty, 24 hrs./day, 7 days/week
 - » No contamination of the fluid or the pump
 - » Immune to dry-running
 - » No valves to clog, hang up or service
 - » No seals which can leak
 - » No syphoning effect when the pump stops
 - » No flushing and cleaning required
 - » Immediately adaptable to new application
 - » Fast filling and emptying thanks to a MAX key and reversible flow direction



The peristaltic pump principle of ISMATEC pumps.



Continuous Duty



Rotation Direction Reversible

Ismatec Peristaltic Pump Parameters:

The data in this table are for the ISMATEC pumps listed in this catalog. Please contact ISMATEC for more options (see page 168 for contact information).

Features

Max. Flow Rate	3,800 mL/min
Min. Flow Rate	0.0004 mL/min
Max. Diff. Pressure	1.5 bar (21 psi)
Suction Lift, Water	7 – 8 m
Dead Volume	practically none
Chemical Compatibility	depends on tubing
Accuracy, Repeatability	high
Self-Priming	yes
Dry-Running	yes
Maintenance	tubing replacement

Pumping

Multi-channel System	yes
Shearing Forces	low
Contamination Free	yes
Reverse Operation	yes
Pulsation Ratio	low to moderate

Media

Pump Particles	yes
Viscous Liquids	yes
Pump Living Cells	yes
Foaming	yes
Corrosive / Aggressive	yes
Gas	yes

LOW FLOW PERISTALTIC PUMPS

- » 4 to 24 Channels
- » 0.0004 to 44 mL/min Flow Rates
- » For Dispensing and Continuous Flow Applications
- » Lowest Pulsation, Highest Accuracy
- » Very High Repeatability on All Channels

ISMATEC® high accuracy, multichannel peristaltic tubing pumps are ideal for both continuous pumping and discrete dispensing applications. Smooth, low pulse and repeatable operation is ensured by a unique planetary drive system (see Note).

These pumps are easily calibrated and can be programmed to dispense by flow rate, volume or time, making them adaptable to many applications. A pause time of up to 999 hours can also be programmed between dispense volumes. There's even a back-step routine option to prevent drips as well as a stand-by mode.

The LED display indicates the current setting. Priming and flushing are accomplished with a simple push of a button on the membrane key pad, without affecting programmed settings.

Choose from ISMATEC's line of standard or low speed units, each available with 4, 8, 12 and 24 channels.

Speed	Model	Flow Rates (mL/min per channel)
Standard	IPC	0.002–44
Low	IPC-N	0.0004–11

Speed (rpm) coupled with the selection of tubing ID determines actual flow rate per channel. The standard Click 'n' go cassettes, supplied with each pump, feature an automatic pressure setting. Maximum differential pressure is 15 psi (1.0 bar), depending on tubing material. Tubing with small IDs and/or optional cassettes with pressure lever (page 141) may enable higher pressures.

Operations can be controlled via RS-232 computer interface. Analog input and output controls via contact closure include: speed control (0-5 or 0-10 V; 0-20 or 4-20mA), speed output (0-10 V or 0-11 kHz), start/stop, rotation direction and autostart. Download drivers for LabVIEW Software at no cost from www.ismatec.com, "Downloads".

Each unit is housed in lacquered stainless steel.

Typical applications for these Ismatec Peristaltic Tubing Pumps include:

- » Toxicological in-vitro use
- » Perfusion of animal tissue slices
- » Sampling from tablet dissolution systems
- » Flow injection analyzers

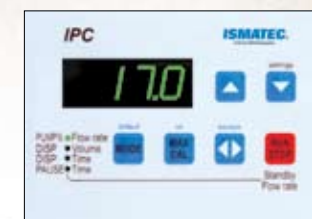
Analog and 16 channel units are available upon request. These items are not stocked items – please contact us for lead times.

Specifications:

Motor type	DC motor
Speed	IPC 0.4 – 45 rpm IPC-N 0.11 – 11.25 rpm
Speed setting	1 – 100%, resolution 0.1%
Flow rate setting	µL/min or mL/min
Power consumption	30 W
Power supply	230V _{AC} /50Hz, 115V _{AC} /60Hz adjustable
Protection rating	IP 30

DIMENSIONS / WEIGHT

	Depth/Width/Height (mm)	Weight (kg)
4 channels	180 x 175 x 130	4.6
8 channels	220 x 175 x 130	5.1
12 channels	260 x 175 x 130	5.8
24 channels	380 x 175 x 130	7.9



Standard Speed (IPC)



Note *

With the planetary drive system, all eight rollers are directly driven in unison by the central wheel. This design prevents axial push-pull friction on the tubing, resulting in increased tubing service life, lower pulsation and high repeatability.



Ordering Tubing & Accessories:

STANDARD ACCESSORY	PAGE
Tubing	2-Stop 142 - 143
Spare Cassettes ¹	CA Click'n'go 141
Foot Switch	ISM016 / IS10039 ² 141

¹ One set of cassettes provided with each pump.
² Depending on firmware (see page 141)



LOW FLOW PERISTALTIC TUBING PUMPS

Order No.	Model	Flow Rates (mL/min per channel)	Channels	Speed (rpm)
Standard Speed (IPC)				
ISM930	IPC 4	0.002–44	4	0.4–45
ISM931	IPC 8	0.002–44	8	0.4–45
ISM932	IPC 12	0.002–44	12	0.4–45
ISM934	IPC 24	0.002–44	24	0.4–45
Low Speed (IPC-N)				
ISM935	IPC-N 4	0.0004–11	4	0.11–11.25
ISM936	IPC-N 8	0.0004–11	8	0.11–11.25
ISM937	IPC-N 12	0.0004–11	12	0.11–11.25
ISM939	IPC-N 24	0.0004–11	24	0.11–11.25

COMPACT REGLO PERISTALTIC PUMPS

- » 2 and 4 Channels
- » 0.002–57mL/min Flow Rates
- » ISMATEC®'s Smallest Calibrateable Dispensing Pump
 - » Foot Print Only 178 x 100 mm and only 13.5cm high!
- » High Repeatability

ISMATEC® compact REGLO peristaltic tubing pumps offer two or four channels in a small footprint. The eight rollers of these variable-speed pumps provide smooth, consistent flow. Two control options are available — programmable digital and analog.

REGLO Digital Programmable Pumps with dispensing function

The digital pump version is easily calibrated and programmed via a 6-button membrane keypad and LED display interface. Dispense by flow rate, volume or time. A pause time of up to 999 hours can also be programmed between dispense volumes. Back-steps can also be programmed to prevent drips.

Control operations remotely via RS-232 computer interface. An analog speed output signal is available (see REGLO Analog, below). Activate start/stop and autostart with analog contact closure input signals. Drivers for LabVIEW Software are available at no cost from www.ismatec.com, "Downloads."

REGLO Analog Pumps without dispensing function

Flow for the analog version is controlled by setting the pump speed (rpm). Speed is adjustable from 1-99% in 1% steps via a 2-digit potentiometer.

Analog input and output controls via contact closure include: speed control (0-5 or 0-10 V; 0-20 or 4-20mA), speed output (2-channel: 0-8 kHz; 4-channel: 0-5 kHz), start/stop and rotation direction.

The combination of pump speed (rpm) and the ID of the selected tubing determines actual flow rate per channel. Standard Click 'n' go cassettes, supplied with each pump, feature an automatic pressure setting. Maximum differential pressure is 15 psi (1.0 bar), depending on tubing material. Tubing with small IDs and/or optional cassettes with pressure lever (see page 141) may enable higher pressures.

REGLO pumps with 6 and 12 rollers are available in each version, with two or four channels. These pumps are not stocked items – please contact us for lead times.



Specifications:

	REGLO Digital	REGLO Analog
Motor type	DC motor	DC motor
Speed	2-channel 1.6–160 rpm 4-channel 1.0–100 rpm	3.2–160 rpm 2.0–100 rpm
Speed setting	rpm, resolution 0.1 rpm	2-99%, resolution 1% 2-digit potentiometer
Flow rate setting	µL/min or mL/min	NA
Power consumption	20 W	20 W
Power supply	85 – 264V _{AC} / 47 – 60Hz	230V _{AC} /50Hz, 115V _{AC} /60Hz, adjustable
Protection rating	IP 30	IP 30
Depth/Width/Height	2-channel 178 x 100 x 135 mm 4-channel 190 x 100 x 135 mm	178 x 100 x 143 mm 190 x 100 x 143 mm
Weight	2-channel 2.0 kg 4-channel 2.1 kg	2.0 kg 2.1 kg

Ordering Tubing & Accessories:

STANDARD ACCESSORY	PAGE
Tubing	3-Stop 142 – 143
Spare Cassettes ¹	MS/CA Click'n'go 141
Foot Switch	Digital: ISM894 141 Analog: ISM891 141

¹ One set of cassettes provided with each pump.

COMPACT REGLO PERISTALTIC TUBING PUMPS

Order No.	Model	Flow rates (mL/min per channel)	Channels	Rollers	Speed (rpm)
Digital					
ISM832	MS-2/08	0.002–57	2	8	1.6–160
ISM834	MS-4/08	0.002–35	4	8	1.0–100
Analog					
ISM829	MS-2/08	0.004–57	2	8	3.2–160
ISM827	MS-4/08	0.003–35	4	8	2.0–100

FIXED-SPEED, RACK-MOUNT PERISTALTIC PUMPS

- » Compact Size
- » 2 and 4 Channels
- » 0.021 to 21.0 mL/min Flow Rates

ISMATEC® Fixed Speed, Rack-Mount Peristaltic Pumps are ideal for limited space applications. These compact, 2 or 4 channel economical pumps are simple to operate – a quick flick of the on/off switch and the eight rollers and synchronous motor ensure steady, reproducible flow rates. Tubing changes are equally simple, and can even be accomplished while the pump is running.

The flow rate of these fixed speed pumps is determined by the inner diameter of the selected tubing. Each pump is supplied with a set of standard Click 'n' go tubing cassettes, with automatic pressure setting. Maximum differential pressure is 15 psi (1.0 bar), depending on tubing material. Tubing with small IDs and/or optional cassettes with pressure lever (see page 141) may enable higher pressures. Pumps are also supplied with a 6-foot cord and mounting rod (5 1/2" L x 1/2" diameter).

Typical applications for these pumps are multichannel delivery processes requiring a constant flow rate, such as:

- » Pump seal wash (see Application Note on this page for more information)
- » Sipper pump for flow-through cuvettes
- » Long-term determination of environmental influences
- » Feeding of overflow level control systems

Fixed Speed, Rack-Mounted pumps are available with 6 rollers and flow rates from 0.028 - 26 mL/min. These pumps are not stocked items – please contact us for lead times.

Specifications:

Motor type	Synchronous motor
Speed	20, 40 or 60 rpm
Power consumption	8 W
Power supply	115V _{AC} (50/60 Hz) or 230V _{AC} (50/60 Hz)
Protection rating	IP 30
Depth/Width/Height	2-channel 125 x 88 x 135 mm 4-channel 145 x 88 x 135 mm
Weight	2-channel 1.2 kg 4-channel 1.3 kg



Use the card in the back of this catalog to request the complete Ismatec Catalog. This catalog includes ISMATEC's full line of peristaltic, gear and rotary piston pumps and accessories.



Application Note

Mobile phase buffers are used in many liquid chromatography and syringe pump (see page 144 – 146) applications. When using highly concentrated buffer solutions (>0.01 M), buffer salts may precipitate, reducing the life of the pump pistons and seals. Solve this problem by using one channel of an ISMATEC 2-channel Fixed-Speed Rack-Mount Pump to continuously rinse the back of the seals. This set-up also provides a barrier of liquid to isolate process fluids from the atmosphere.

Ordering Tubing & Accessories:

STANDARD ACCESSORY	PAGE
Tubing	3-Stop 142 – 143
Spare Cassettes ¹	MS/CA Click'n'go 141

¹ One set of cassettes provided with each pump.



ISMATEC FIXED-SPEED, RACK-MOUNT PUMPS

Order No.	Model	Flow rates (mL/min per channel)	Channels	Rollers	Speed (rpm)
115 Volts (North American)					
ISM847-115V	MS-CA 2/820	0.021–7.1	2	8	20
ISM849-115V	MS-CA 2/860	0.064–21.0	2	8	60
ISM852-115V	MS-CA 4/820	0.021–7.1	4	8	20
ISM853-115V	MS-CA 4/840	0.043–14.0	4	8	40
230 Volts (European)					
ISM847	MS-CA 2/820	0.021–7.1	2	8	20
ISM849	MS-CA 2/860	0.064–21.0	2	8	60
ISM852	MS-CA 4/820	0.021–7.1	4	8	20
ISM853	MS-CA 4/840	0.043–14.0	4	8	40



Single Channel Peristaltic Pumps

SINGLE CHANNEL PERISTALTIC PUMPS

Ismatec® Single Channel Peristaltic Pumps are cost-effective, space-saving and ideally suited for applications where simple fluid transfer and/or filling are required.

REGLO Quick

- » 1 Channel, 4 Rollers
- » 2.1-230 ml/min Flow Rates
- » Fast Tubing Change-over
- » Compact Size - 178 x 100 mm x 14.3 cm High

This single channel, variable speed pump-head is popular in applications where frequent tubing change-over is required. The easily accessible tube-bed has a wide opening angle, enabling users in changing out their tubing configurations without difficulty. Its compact and innovative design features a transparent protective covering.

Flow is controlled through an analog interface by setting the pump speed, adjustable from 1-99%, in 1% steps via a 2-digit potentiometer. Use only the recommended standard tubing without stoppers, as specified below.

Please Note: Only tubing with a 3.2mm ID or 4.8mm ID can be used with the REGLO Quick. See pages 142 – 143 for more information.



REGLO Quick
2-digit potentiometer
1-99%, resolution 1%
(for speed setting)

Specifications:

REGLO Quick	
Motor type	DC motor
Speed	3.2-160 RPM
Speed setting	1-99%, resolution 1% 2-digit potentiometer
Power consumption	30 W
Power supply	230V _{AC} /50Hz, 115V _{AC} /60Hz adjustable
Protection rating	IP 30
Depth/Width/Height	178 x 100 x 143mm
Weight	2.2 kg

Ordering Tubing & Accessories:

STANDARD ACCESSORY		PAGE
Tubing	Standard (no-stop)	142 - 143
Foot Switch ¹	ISM891	141

¹ One set of cassettes provided with each pump.

Ecofluidic

- » 1 Channel, 3 Rollers
- » 100-3,800 ml/min. per Channel Flow Rates
- » Cost-effective
- » Variable Speed Control, with Forward and Reverse

The Ecofluidic is a user-friendly, variable speed pump that provides smooth, consistent flow for simple fluid transfer applications. Its inventive and industrial design is well suited for filling applications as well as for a variety of other uses. The pump's small foot print and compact form lend it increased functionality, perfect for use in modern laboratory environments. The Ecofluidic is safety switch equipped and only runs when the pumphead is closed. The outer housing is made of PPS and stainless steel.



Specifications:

Ecofluidic	
Motor type	DC motor
Speed	80-670 rpm, closed loop control
Speed setting	Variable speed setting via single multi-function control knob
Power consumption	Max. 150 W
Power supply	230V _{AC} /50Hz +/- 10% 115V _{AC} /60Hz +/- 10%
Protection rating	IP 31
Depth/Width/Height	235 x 128 x 242 mm
Weight	6.3 kg

Ordering Tubing & Accessories:

STANDARD ACCESSORY		PAGE
Tubing	Standard (no-stop)	142 - 143

PERISTALTIC TUBING PUMPS

Order No.	Flow rates (ml/min per channel)	Channels	Rollers	Speed (rpm)
REGLO Quick				
ISM897	2.1-230	1	4	3.2-160
Ecofluidic				
ISM1200	100-3800	1	3	80-670

ISMATEC

ISMATEC

TUBING CASSETTES

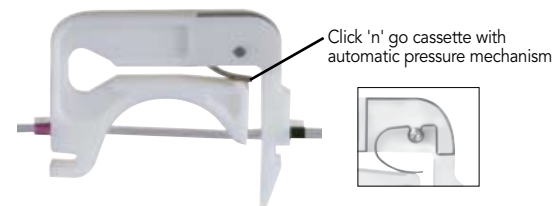
- » Developed and Consistently Improved by ISMATEC®

Click 'n' go Cassettes (Standard)¹

Advantages:

- » Automatic tubing pressure; no readjustment necessary
- » Ideal for non-monitored, long-time use

Please Note: Click 'n' go cassettes are not suitable for differential pressure greater than 1 bar (15 psi). For these conditions you should choose the pressure lever cassettes.



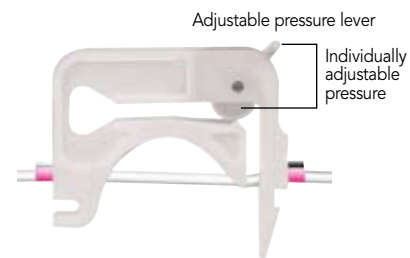
MS/CA Click 'n' go



CA Click 'n' go

Pressure Lever Cassettes (Optional)

The optional pressure lever allows you to set a different tubing pressure for each channel. Depending on the application, tubing material and diameter, an optimally adjusted tubing pressure can be set. To maintain constant flow rates it may be necessary to periodically adjust the tubing pressure.



MS/CA pressure lever (optional)



CA pressure lever (optional)

Peristaltic Pump Accessories

FOOT SWITCH

The ISMATEC foot switch for start/stop is very practical for use with pumps as dispensing systems, e.g. for filling tubes, bottles etc. A foot switch provides the start/stop signal required, allowing hands-free activation of the filling system. The switch's protection rating is IP21 (higher safety categories, e.g. IP67 on request). A 6-foot (1.8m) cable is included.



ISMATEC offers a wide variety of peristaltic, gear and rotary piston pump solutions for instrument manufacturers. Please contact ISMATEC today to discuss your OEM needs (see page 168).

TUBING CASSETTES AND ADAPTERS

Click 'n' go Spare Cassettes¹

Order No.	Model	Material	Adapters Req'd?
IS3510	MS/CA Click 'n' go	POM-C	No
IS3710	CA Click 'n' go	POM-C	Yes ²

Pressure Lever Optional Cassettes

Order No.	Model	Material	Adapter Req'd?
IS0649	MS/CA Pressure Lever	POM-C	No
IS3629	MS/CA Pressure Lever	PVDF ³	No
IS0122	CA Pressure Lever	POM-C	Yes ²
IS3820	CA Pressure Lever	PVDF ³	Yes ²

Replacement Adapters for CA Cassettes²

Order No.	Model	Material
IS0123	Adapter for CA Cassettes	POM-C
IS3861	Adapter for CA Cassettes	PVDF ³

FOOT SWITCH

Order No.	Foot switch suitable for pump models:
ISM016	IPC and IPC-N (firmware version older than 4.00)
IS10039	IPC and IPC-N (from firmware version 4.00)
ISM891	REGLO Analog, REGLO Quick
ISM894	REGLO Digital

¹ Included with all Ismatec cassette-style pumps.

² When ordering replacement CA Cassettes, two Adapters per cassette must also be ordered.

³ PVDF offers higher chemical resistance.

ORDER Tel: 800.426.0191 / 360.679.2528 · www.upchurch.com

ORDER Tel: 800.426.0191 / 360.679.2528 · www.upchurch.com

PUMP AND VALVE MODULE (PVM)

- » Complete Aspirating/Dispensing System
- » Uses Long Life IPVs

The compact digital PVM is a self-contained, stepper motor driven module. This product is designed for various liquid handling applications such as automated pipetting, diluting and dispensing.

The PVM uses the patented IPV (Integrated Piston/Valve), which meets and exceeds the precision accuracy of traditional syringe/plug valve systems while offering up to 20x the life. This translates into a major cost savings. Please see pages 145 – 146 for more information regarding IPVs.

The PVM is 100% software compatible with the Cavro™ XP-3000 syringe pump (standard resolution). It can be operated as a stand-alone module or in automated instruments controlled by an external computer or microprocessor. Each pump has RS-232, RS-485 and CAN BUS connections for communication with a controlling device using Data Terminal protocol.

SOFTWARE FEATURES

- » 100% software compatible with Cavro XP-3000 syringe pumps
- » Resolution of 3,000 full steps per stroke
- » Programmable ramps, cut-offs, backlash compensation, plunger speeds, delays and loops
- » Select piston speed
- » Absolute and relative positioning of pistons
- » Start and terminate piston movement
- » Check pump with self-test
- » Selectively work with up to 15 PVMs

The performance of each PVM is tested and documented before shipment. The PVM meets the CE EMC Class B specifications. Please see the table on this page for more specifications.

The PVM can be used with your choice of IPV, from 50µL – 5.0mL volumes, with or without optional seal wash ports. See page 145 for replacement IPVs.

Please contact Sapphire Engineering (see page 168) regarding custom solutions for instrument manufacturers. Custom options include alternative materials and configurations.

PVM Specifications:

Piston Drive	DC stepper motor with a step control sensor, self lubricating, 30mm stroke length
Motor Resolution	3,000 steps, standard resolution
Dispense Speed (full stroke)	1.1 sec – 600 sec
Valve Drive	DC stepper motor with optical encoder
Valve Drive Speed	250ms between adjacent ports
Valve Tubing Connections	1/4-28 flat bottom fittings (pages 55 – 57)
Power Requirements	24 VDC ± 5%; 1.2A
Baud Rate	9,600 to 38,400 (RS-232, RS-485)
Input/Output	2 input TTL; 3 output TTL
Dimensions	5.00" H x 1.80" W x 4.50" D (127mm H x 45mm W x 114mm D)
Weight	2.5 lbs. (1.1 kg)
Operating Range	
Temperature	17° to 37° C
Humidity	10 – 85% R.H. noncondensing
Storage Range	
Temperature	5° to 45° C
Humidity	10 – 95% R.H. noncondensing



PVM with IPVs



PVM / IPV KITS¹

With IPV

81-1003K-4908-50-07	PVM with 50µL IPV
81-1003K-4908-100-07	PVM with 100µL IPV
81-1003K-4908-250-07	PVM with 250µL IPV
81-1003K-4908-500-07	PVM with 500µL IPV
81-1003K-4908-1000-07	PVM with 1.0mL IPV
81-1003K-4908-2500-07	PVM with 2.5mL IPV
81-1003K-4908-5000-07	PVM with 5.0mL IPV

With IPV and Seal Wash Port

81-1003K-4908W-50-07	PVM with 50µL IPV
81-1003K-4908W-100-07	PVM with 100µL IPV
81-1003K-4908W-250-07	PVM with 250µL IPV
81-1003K-4908W-500-07	PVM with 500µL IPV
81-1003K-4908W-1000-07	PVM with 1.0mL IPV
81-1003K-4908W-2500-07	PVM with 2.5mL IPV
81-1003K-4908W-5000-07	PVM with 5.0mL IPV

Please contact Upchurch Scientific® regarding lead times for these products.

¹ Includes one PVM pump with IPV, power supply, cabling, software and user manual.

INTEGRATED PISTON/VALVES (IPV)

For PVM and Cavro™ XP-3000 Syringe Pumps

- » Accuracy and Precision Identical to Traditional Syringes and Valves
- » Significant Lifetime Cost Savings
- » Direct Plug-in Products
- » Made of Durable, Chemically Resistant Materials

The Sapphire Engineering™ Integrated Piston/Valves (IPVs) offer precision and accuracy equivalent to traditional glass barrel/DuPont Teflon® brand resin syringes with Kel-F®/Teflon plug valves (see the Dispense Precision and Accuracy chart, page 146). However, extensive tests show the IPV will outlast traditional syringe/valves by as much as 20 fold, yielding major lifetime cost savings (see the Lifetime Savings Comparison chart, page 146). By selecting the seal wash option, you can extend IPV life even longer when using it with aggressive or difficult fluids (such as salt buffer solutions – see Application Note on page 139 for a seal wash pump). The IPV requires no routine preventive maintenance such as cleaning and nut tightening, essential with conventional syringes.

How does the IPV deliver such dramatic savings? The IPV uses patented piston technology to pump fluid via positive displacement in lieu of a traditional syringe. Secondly, a ceramic-on-ceramic shear valve replaces the more-common polymer plug valve. These innovations, combined with proprietary surface finishing processes on the ultra-hard piston, rotor and stator surfaces, mean significantly less wear, less downtime and reduced cost of ownership.

Select an IPV for use on a PVM (Pump and Valve Module page 144), or as a direct plug-in replacement for an existing syringe/valve on a Cavro XP-3000 syringe pump. Getting up and running takes as little as five minutes. Choose from the available 50µL - 5.0mL volumes, with or without a seal wash option.

Use IPVs in traditional syringe valve applications, i.e. to aspirate/dispense small, precise volumes, such as:

- » Automated pipetting
- » Lab-on-a-chip infusion
- » FIA (Flow Injection Analysis) dosing
- » Titrations
- » System rinse/wash

The wetted materials of the IPV are Ultem®, Tefzel®, TZP (Zirconia) ceramic, Alumina ceramic, UHMWPE and Viton®. Please contact Sapphire Engineering (see page 168) regarding custom solutions for instrument manufacturers, including alternative materials and configurations.



IPV with Seal Wash Port Option, shown mounted on a Cavro XP-3000 pump



REPLACEMENT IPVs FOR PVM

With 3-Way Ceramic "Y" Valve

98-4908-50-07	50µL IPV
98-4908-100-07	100µL IPV
98-4908-250-07	250µL IPV
98-4908-500-07	500µL IPV
98-4908-1000-07	1.0mL IPV
98-4908-2500-07	2.5mL IPV
98-4908-5000-07	5.0mL IPV

With 3-Way Ceramic "Y" Valve and Seal Wash Port

98-4908W-50-07	50µL IPV
98-4908W-100-07	100µL IPV
98-4908W-250-07	250µL IPV
98-4908W-500-07	500µL IPV
98-4908W-1000-07	1.0mL IPV
98-4908W-2500-07	2.5mL IPV
98-4908W-5000-07	5.0mL IPV

IPVS FOR CAVRO XP-3000 PUMPS

With 3-Way Ceramic "Y" Valve

98-4911-50-07	50µL IPV
98-4911-100-07	100µL IPV
98-4911-250-07	250µL IPV
98-4911-500-07	500µL IPV
98-4911-1000-07	1.0mL IPV
98-4911-2500-07	2.5mL IPV
98-4911-5000-07	5.0mL IPV

With 3-Way Ceramic "Y" Valve and Seal Wash Port

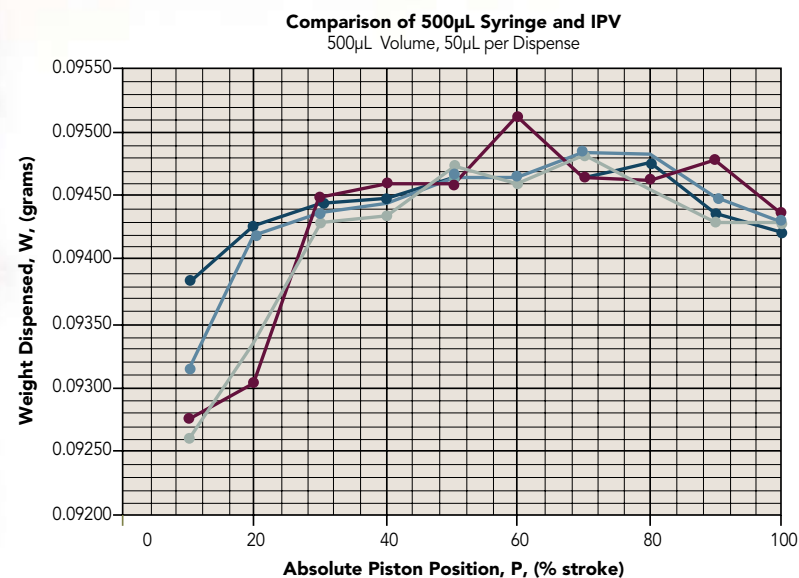
98-4911W-50-07	50µL IPV
98-4911W-100-07	100µL IPV
98-4911W-250-07	250µL IPV
98-4911W-500-07	500µL IPV
98-4911W-1000-07	1.0mL IPV
98-4911W-2500-07	2.5mL IPV
98-4911W-5000-07	5.0mL IPV

Please contact Upchurch Scientific® regarding lead times for these products.

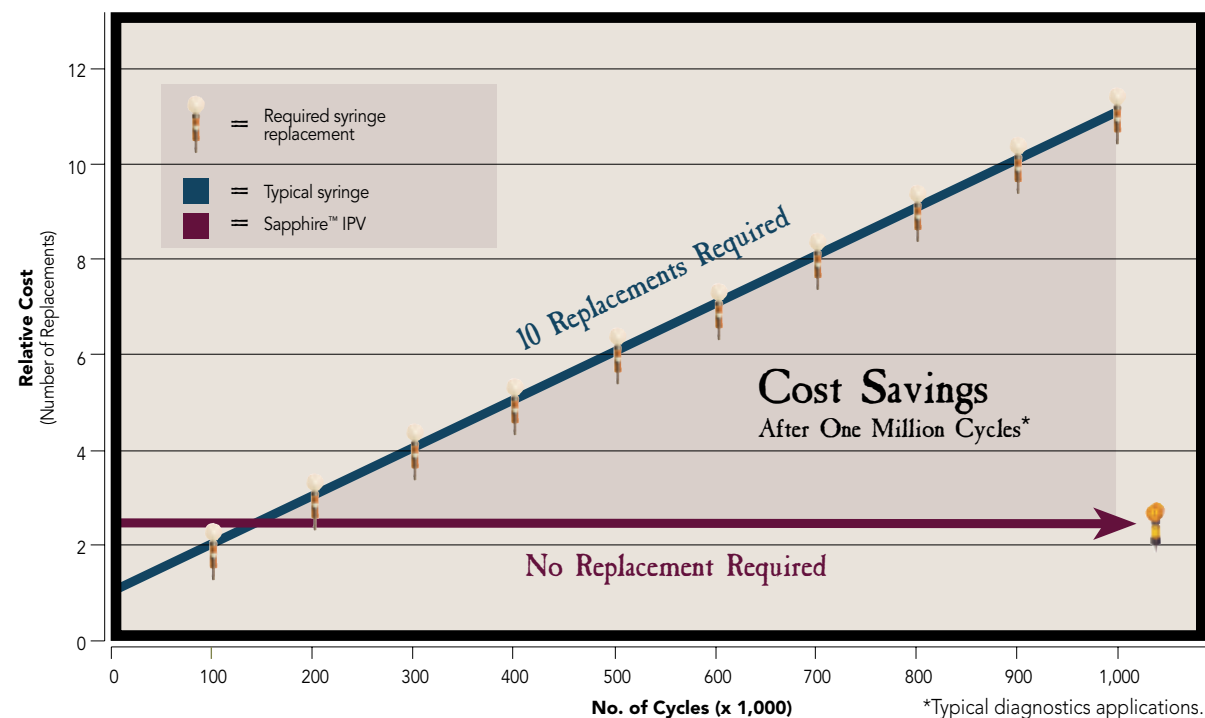
IPV(CONT.)

Dispense Precision & Accuracy

As this graph and data indicate, the Sapphire Engineering™ IPV compares favorably with a standard Cavo™ mounted syringe — both well under 1 percent CV.



Lifetime Cost Savings With Sapphire Engineering IPV Compared to a Typical Syringe



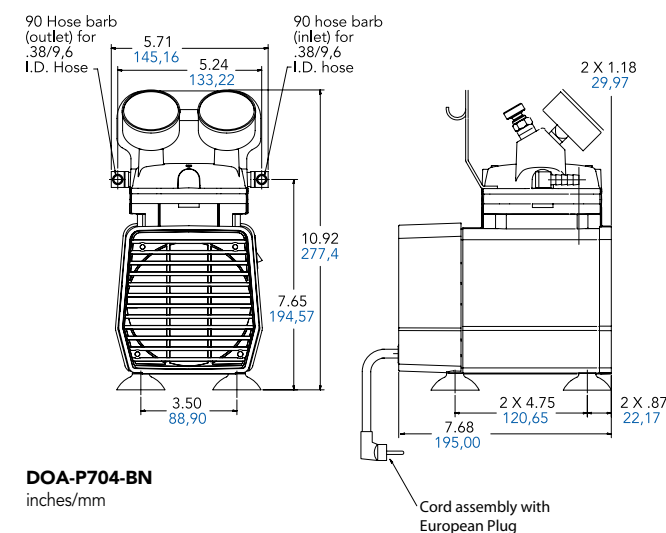
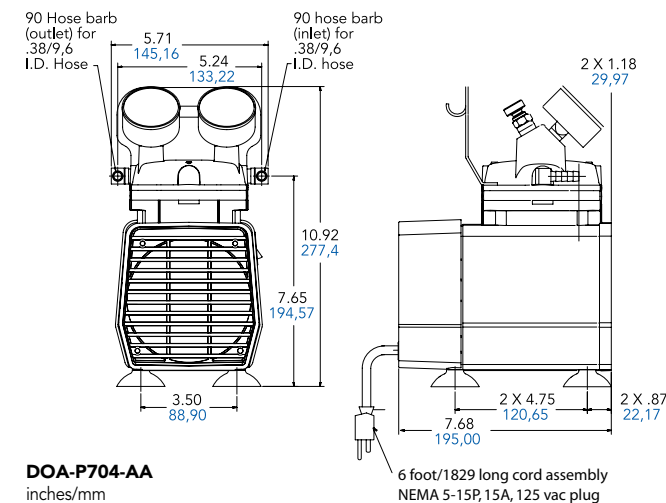
AIR COMPRESSOR/VACUUM PUMPS

DOA Lab Models

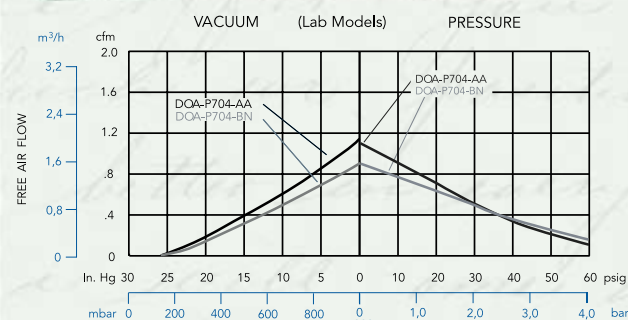
- » Pressure to 60 psi (4.2 bar)
- » Vacuum to 25.5" Hg (31 mbar)
- » Open Flow to 1.1 CPM (60 Hz)

Oilless Diaphragm Air Compressors from Gast® Manufacturing are the perfect solution for laboratory applications that require a small, quiet source of cooler air vacuum or pressure. The mounted shaded pole motors carry 1/8 HP (0,09 kW) of horsepower and consume a relatively low level of power. Their compact size and light weight enable them to fit well into streamlined laboratory environments. Additionally, these pumps are constructed of rugged, corrosion resistant materials and are easy to maintain. A repair kit is available for purchase below.

Pumps come equipped with vacuum and pressure gauges, hose barbs, vacuum and pressure regulators, rubber feet and a convenient carrying handle. Please contact Gast for replacement parts (see page 168 for contact information).



Product Performance:



Specifications:

Model Number	Motor	Motor Type	RPM 60 Hz 50Hz	HP	kW	Lbs.	Kg	Regulatory
DOA-P704-AA	115-60-1	Shaded Pole	1575	1/8	0,09	16.0	7.3	UL/CNL
DOA-P704-BN	220/240-50-1	Shaded Pole	1275	1/8	0,09	16.0	7.3	CE

CNL UL listed for use in Canada
CE conforms to European Standards

AIR COMPRESSOR/VACUUM PUMPS

	Speed (rpm)	HP
DOA-P704-AA	50 Hz, 1575	1/8
DOA-P704-BN	60 Hz, 1275	1/8

REPAIR KIT

K294J Repair Kit for DOA Lab Models