


# Smart Syringe Pump Precision Aspirate and Dispense Syringe Pump



At one third the size and weight of standard 30mm syringe pumps, the Parker Smart Syringe Pump improves the performance of Clinical Diagnostic and Analytical Chemistry systems by improved resolution and bringing the pump to the point of dispense. This long life pump is designed to a minimum of 5 million cycles, improving system reliability and reducing downtime. Its lightweight and compact size enables smaller instrument designs, decreasing instrument costs and footprint.

## Features

- Designed to a minimum of five million cycle life
- Encoded Servo motor with 228,495 step resolution improves low volume and low flow performance
- Non Pulsatile flow down to 7.5 nL/sec
- Can be mounted directly on motion systems placing it directly at the point of aspirate and dispense
- Eliminates transfer lines; simplifies fluidic designs, reduces footprint and instrument cost
- Easy drop in replacement for existing Syringe Pumps
- CE and RoHS Compliant 

## Markets:

- Clinical Diagnostics
- Analytical Chemistry

## Typical Applications

- Sampling
- Reagent Addition
- Liquid Handling
- Precision Flow Control

## Product Specifications

### Performance

<b>Drive Type:</b>	Lead nut screw with guide rail, Servo motor with high resolution encoder
<b>Precision:</b>	≤0.1% CV full stroke ≤0.5% CV 10% of full stroke at point of dispense (measured fluidically)
<b>Accuracy:</b>	± 1.0 % full stroke ± 2.0 % at 10% full stroke at point of dispense (measured fluidically)
<b>Resolution:</b>	228,495 steps full scale
<b>Minimum Flow Rate:</b>	7.5 nL/sec (50 µL Syringe), non pulsatile flow
<b>Stroke Speed:</b>	1 sec to 111 minutes full stroke
<b>Valve Switching Speed:</b>	<50 msec open/close
<b>Pressure:</b>	29PSIG (2.0 bar)
<b>Syringe Barrel Volumes Supported:</b>	50 µL to 1mL, Standard 30 mm XP type syringe barrels

### Physical Properties

<b>Operating Environment:</b>	15° to 40° C, 20% to 90% Relative Humidity (non-condensing)
<b>Storage Environment:</b>	-20° to 70° C, 20% to 90% Relative Humidity (non-condensing)
<b>Drive Dimensions:</b>	0.69" (17.5 mm) x 4.1" (104 mm) x 6.35" (162 mm)
<b>Weight:</b>	0.81 lbs (367g)
<b>Valve:</b>	3 way diaphragm isolated solenoid valve
<b>Pump Assembly Rated Life:</b>	5 Million Cycles
<b>Fittings:</b>	¼-28 flat bottom female fittings for fluid connections and syringe
<b>Recommended Filtration:</b>	100 mesh or 150 µm
<b>Wetted Materials</b>	
<b>Manifold:</b>	Polyetherimide (ULTEM® 1000)
<b>Valve Diaphragm and Gasket:</b>	FFKM (KALREZ®)

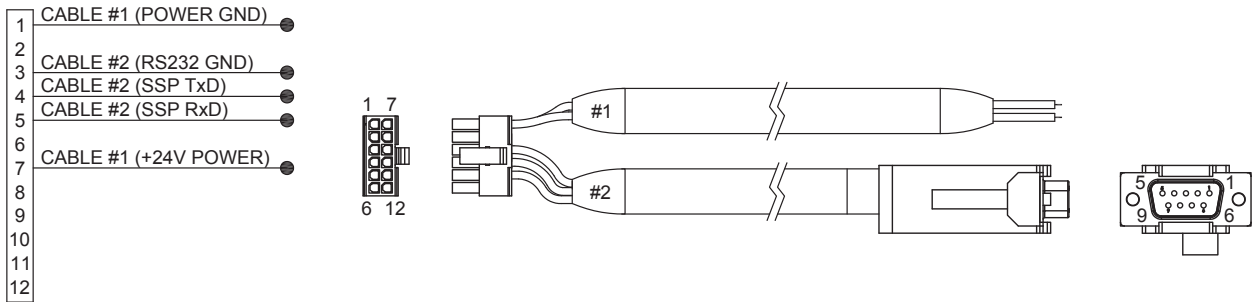
### Electrical

<b>Electrical/Communications Termination:</b>	12 Pin Molex® Micro-Fit Connector
<b>Power:</b>	24 VDC ± 5%, <1 Amp
<b>Command Set:</b>	Cavro® scripting language Smart Syringe Pump command library
<b>Communications:</b>	Interface: CAN, RS-232 Baud Rate: RS232: 9,600, 14,400, 19,200, 38,400, 57,600 and 115,200 CAN: 20K, 50K, 125K, 250K, 500K, 800K and 1M bits per second
<b>Addressing:</b>	Up to 127 pumps can be daisy chained and addressed individually.
<b>RS 232 Format:</b>	Data Bits: 8, Parity: None, Stop Bits: 1, Half Duplex

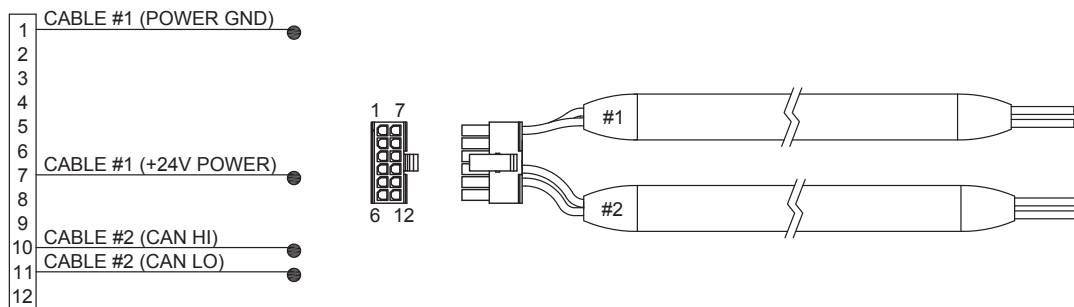


## Electrical Interface

### RS232 Wiring Diagram



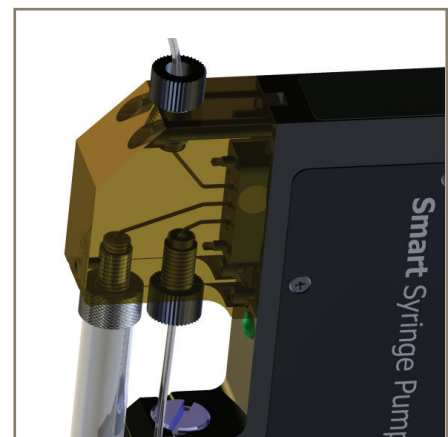
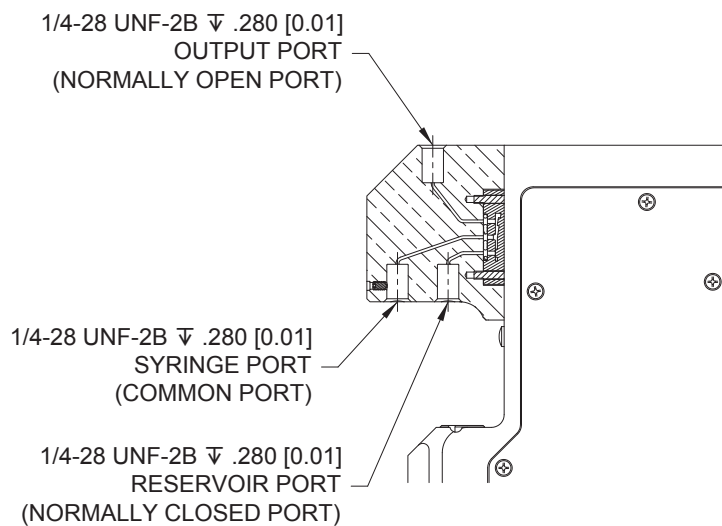
### CAN Wiring Diagram



MolexR Connector, Female 12 position Micro – Fit 3.1, MolexR # 43025-1200

MolexR Terminal crimp socket, 20-24 AWG, MolexR # 43030-0007

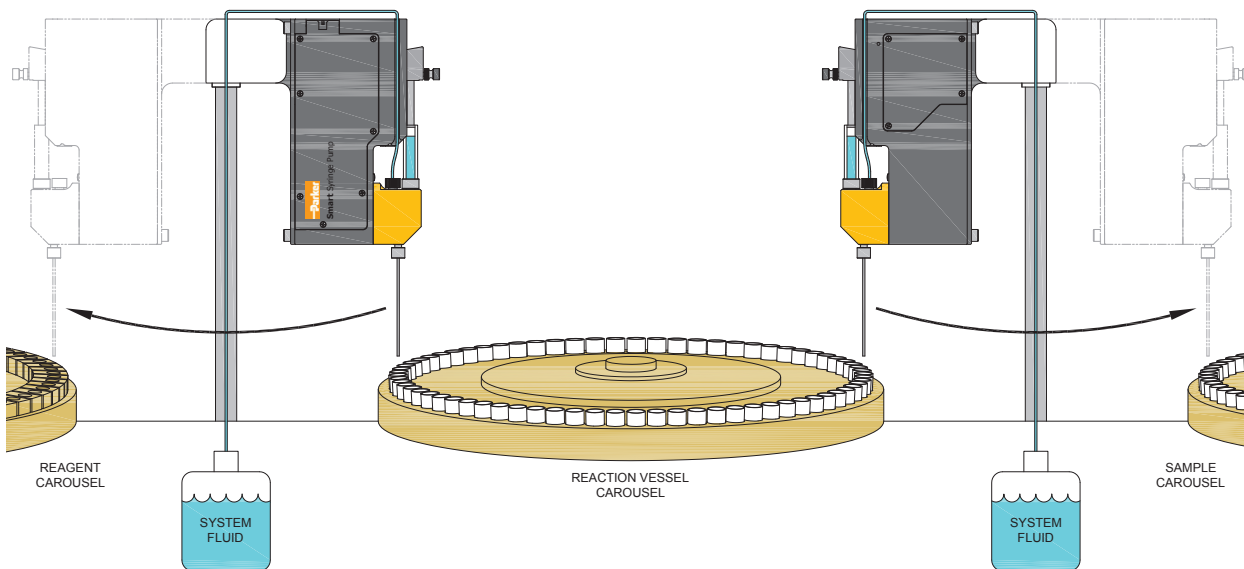
## Fluidic Interface



Leak diversion features built in to prevent damage to the pump in the event of leakage

### Typical Flow Diagram

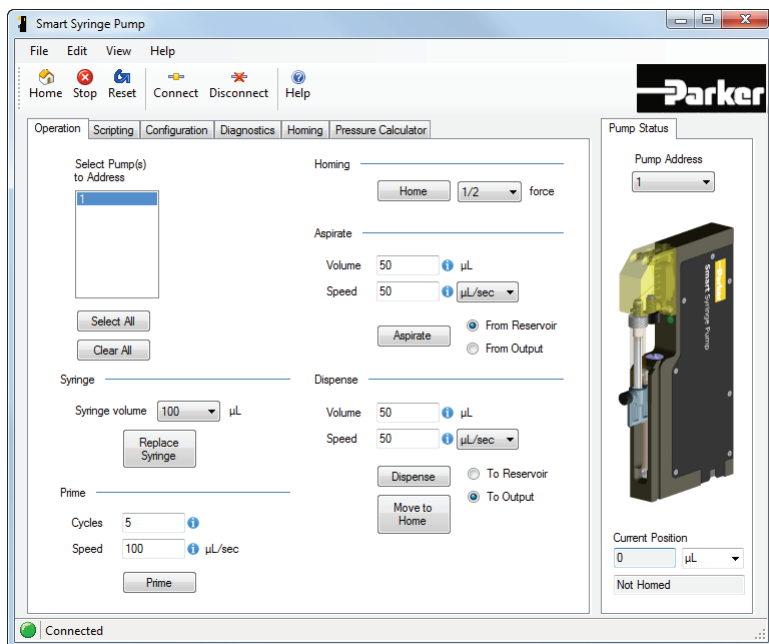
#### IVD Sampling & Reagent Addition System



#### Aspirate and Dispense control of sample and reagent fluids:

- Smart Syringe Pumps mounted directly to motion systems eliminating need for transfer lines between pumps and probes.
- Easily programmed to aspirate and dispense variable amounts and dispense multiple aliquots
- Three way valve allows the use of a system fluid to isolate the pump from samples and reagents
- System fluid can be used to clean inside of probe after dispense

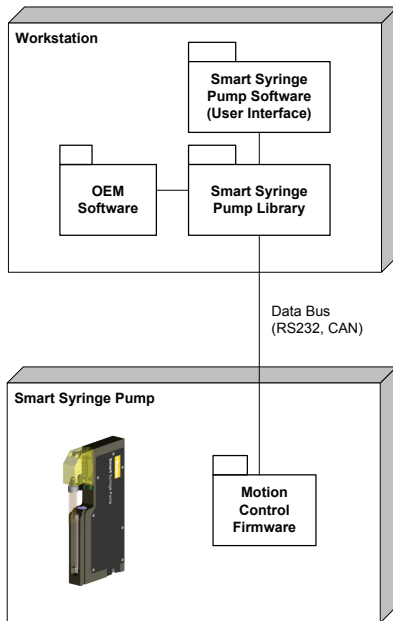
### Software



- Easy to use Smart Syringe Pump Windows® based software simplifies control and testing of the Smart Syringe Pump
- Easy to test, with the Parker Smart Syringe Pump evaluation kit you can be testing in fifteen minutes. Pump, cables, tubing and software all included
- User-friendly graphical user interface for pump evaluation or optimization.
- Simple point and click interface allows access to all Smart Syringe Pump capabilities
- Simplifies bench level testing
- Scripting interface makes developing scripts easy

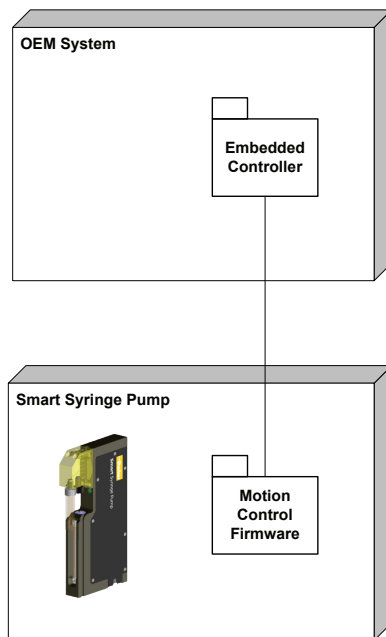
## Smart Syringe Pump Software libraries and Control

Options for integration into OEM instrumentation



### Smart Syringe Pump Using Workstation Control

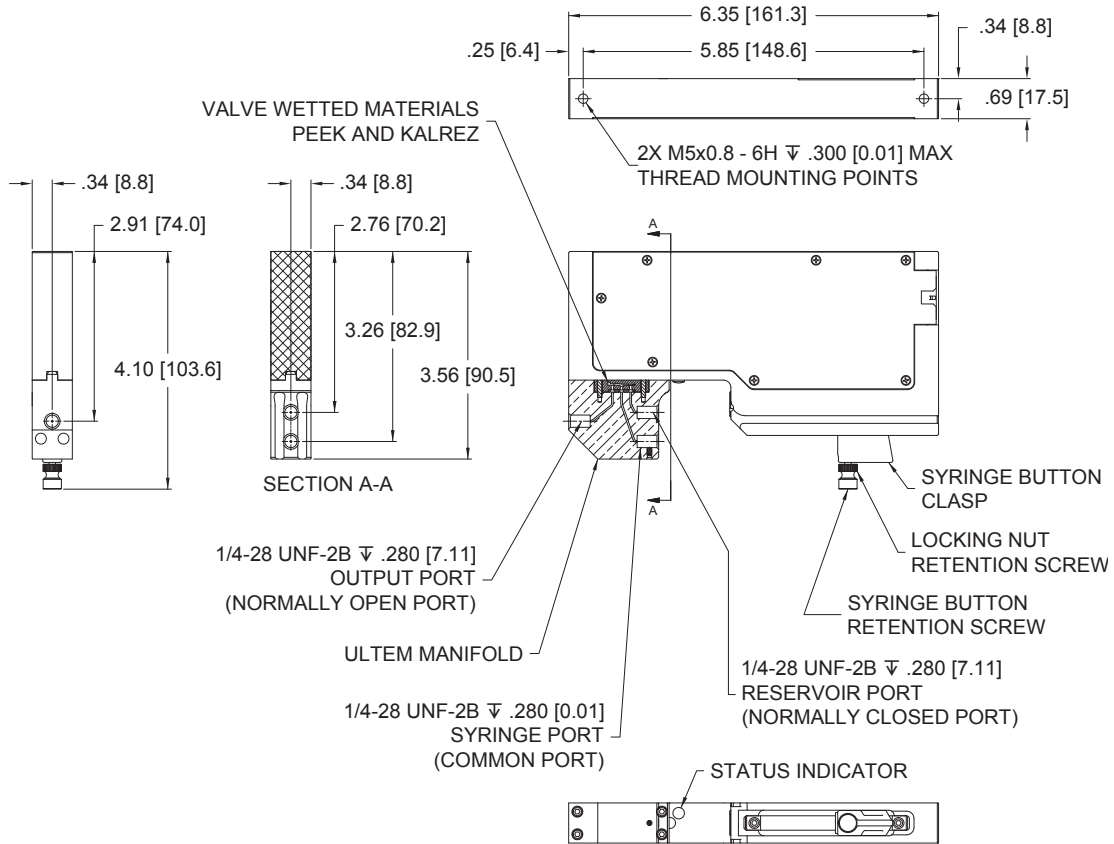
- Supports Cavro® scripting commands
- Enhanced Smart Syringe Pump scripting commands available
- Allows for calibrated syringe volumes to be used
- Enables commands to be sent in fluid volumes rather than motor steps
- Smart Syringe Pump and Cavro® commands can be used in combination
- Full control and configuration through library commands



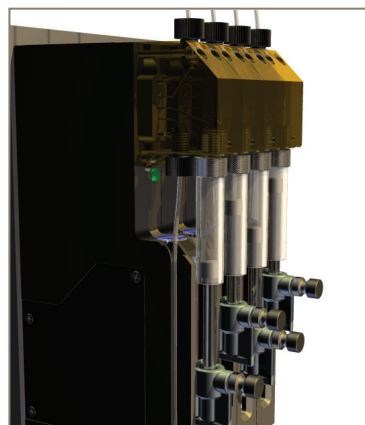
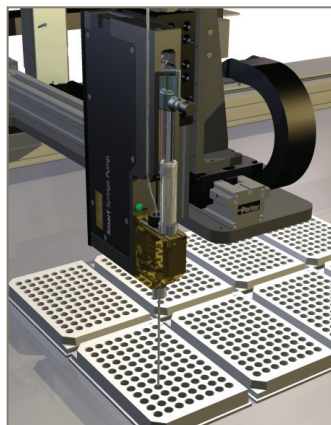
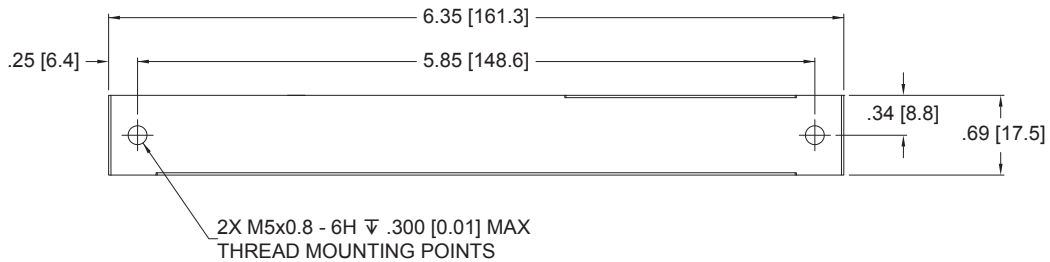
### Smart Syringe Pump Using Embedded Controller

- Commands sent directly from the OEM System embedded controller to the motion control firmware built into the Smart Syringe Pump
- Supports RS232 and CAN communications

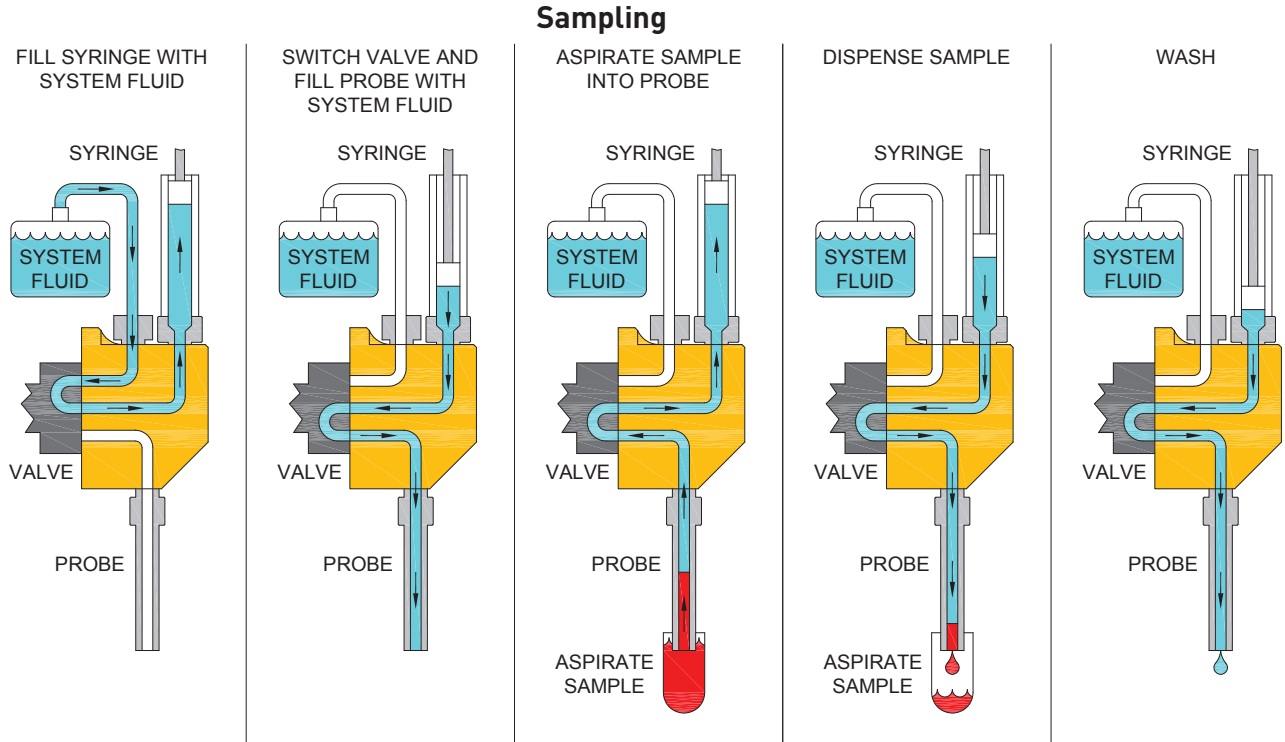
Wetted Materials and Dimensions



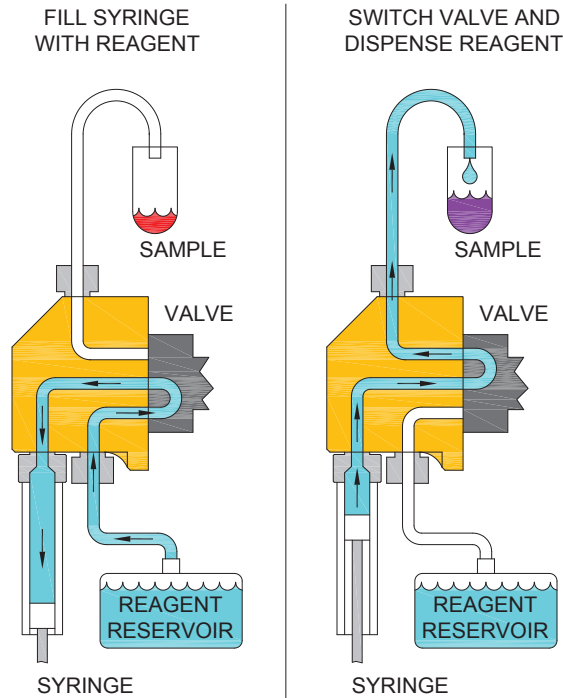
Mounting Dimensions



### Fluid Flow Diagrams



### Reagent Addition



## Chemical Compatibility Chart\*

Chemical	Valve Diaphragm	Other Wetted Materials	
	FFKM (Kalrez®)	PEEK	Ultem®
DI Water	1	1	1
Methanol	1	1	1
Isopropanol	1	1	1
Ethanol	1	1	1
Acetonitrile	1	1	4
Tetrahydrofuran	1	1	1
Toluene	1	1	2
Bases - Dilute	1	1	1
Saline	1-2	1	1
Bleach 12%	2	1-2	4
Sodium Hydroxide 20%	1	1	4

### Compatibility Legend

1. EXCELLENT  
Minimal or no effect
2. GOOD  
Possible swelling and/or loss of physical properties
3. DOUBTFUL  
Moderate or severe swelling and loss of physical properties
4. NOT RECOMMENDED  
Severe effect and should be considered

\*The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for a complete list.

## Regulatory

**Regulatory:** CE

**EMC:**


FCC Part 15 Subpart B, Class B

EMC Directive (2004/108/EC)

EN 61326-1:2006 Standard

- AS/NZ CISPR Radiated Emissions Class B
- IEC 61000-4-2:2008 Electrostatic Discharge Criterion A
- IEC 61000-4-3:2006 Radiated RF Immunity Criterion A
- IEC 61000-4-8:2009 Power Frequency Magnetic Field Immunity Criterion A

**Safety:** IEC 61010-2-101 (design review)

**Hazardous Materials:** RoHS Directive (2002/95/EC) 

## Ordering Information

Manifold	Porting	Valve	Pressure Rating	Internal Control Board	Part Number
Ultem®	1/4 - 28 Female	3 Way FFKM	Vac - 29PSI (2.0 bar)	Yes	401-101111-000

### Accessories

Part Number	Description
990-000452-001	50µL Syringe Barrel with Teflon® Plunger tip
990-000452-002	100µL Syringe Barrel with Teflon® Plunger tip
990-000452-003	250µL Syringe Barrel with Teflon® Plunger tip
990-000452-004	500µL Syringe Barrel with Teflon® Plunger tip
990-000452-005	1mL Syringe Barrel with Teflon® Plunger tip
191-000264-001	Clasp Screw
193-000029-001	Clasp Screw Locking Nut
590-000111-001	Cable, Smart Syringe Pump
190-006055-004	P Clamp
191-000115-001	P Clamp Screw for Tubing
890-001099-001	Probe Tip, Sized for 100µL Syringe Barrel
790-007025-001	Smart Syringe Pump Software

### Smart Syringe Pump Evaluation kit:

The Parker Smart Syringe Pump Evaluation kit contains everything needed to set up and start testing the Smart Syringe Pump in less than 15 minutes time. The Smart Syringe Pump Windows® based software provides a fast and easy way to evaluate pump performance using a simple point and click graphical user interface. Install the software on any Windows® PC, connect the RS232 cable to a serial port (or USB to Serial adapter) and connect the power cable to your 24 V power supply and start testing. It couldn't be easier.

### The kit includes:

- Parker Smart Syringe Pump
- Software
- Power and communication cables
- Syringe Barrels (100 µL and 1000µL)
- Probe tip
- Tubing and fittings
- Contact Parker to order at 603.595.1500

Please click on the Order On-line button below (or go to [www.parker.com/ppf/smartsyringepump](http://www.parker.com/ppf/smartsyringepump)) for more information on the Parker Smart Syringe Pump.

NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Accuracy and Precision Required
- Operating Pressure
- Power Consumption
- Life Requirement
- Description of pump function in the application
- Size
- Flow Rate Required
- Liquids
- Voltage
- Communications Protocol
- Motion Required

