

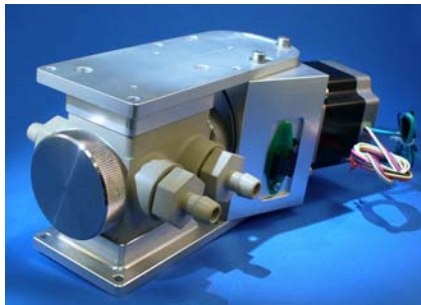
## Product Datasheet: Precision Series Piston Pumps

All pumps are customized to suit your requirements: the information below represents one of the possibilities...



9mm Piston Pump with Adjustable Displacement

The Precision series piston pumps were developed specifically for applications requiring a very exact flow at a fast dispense rate. The piston geometry isolates the outlet and inlets without the need for internal check valves, simplifying the construction and reducing flow restriction. The pumps are typically provided in a “fixed” position to deliver a set flow-per-stroke. An adjustable mounting frame is optional, allowing the pump displacement to be altered in the field and then locked in position. Speed sensing options include encoders, hall sensors, and/or photo detectors. The displacement algorithm is well-defined, allowing the end user to correlate motor position with the amount of fluid dispensed.



19mm Piston Pump with Adjustable Displacement

- Simple construction reduces cost
- Positive Displacement: accurate and repeatable flow rates
- Mounting Versatility: Mounting brackets are customized for each application
- Chemically inert wetted materials
- Select from five piston diameters
- Available with stepper, brush-less DC, and brush-type DC motors
- 100% tested to customer requirements



6.34mm Piston Pump with Electronic Dosing Control



Piston pumps undergoing long-term life testing

### Specifications

#### Performance:

Max. continuous pressure: 4 bar  
 Max. intermittent pressure: 6 bar  
 Max. static case pressure: 6 bar  
 Inlet: Self-priming  
 Accuracy: within 1% of full scale  
 Precision: Typically < 0.5%  
 Speed range: 0-1500 rpm  
 Fluid viscosity range: 0.3 to 1000 cps

#### Electrical:

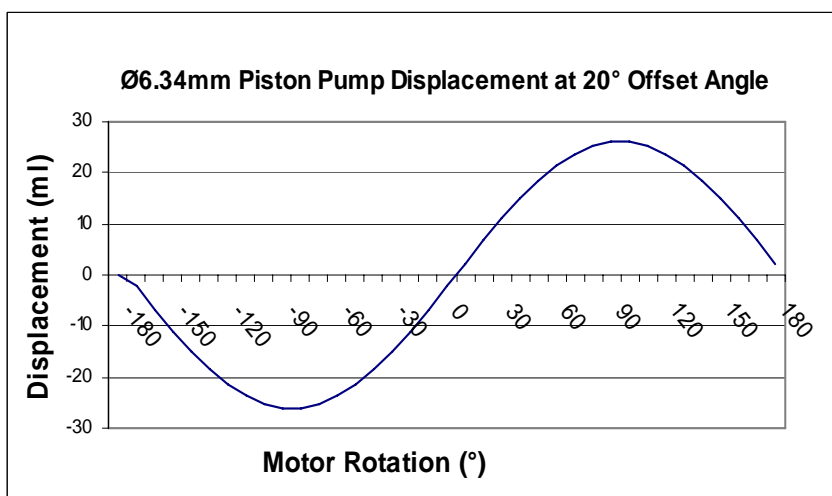
Motor type: typically stepper motor, but also available in brush and brush-less DC.  
 Rotation: Reversible  
 Max. current: Dependent on motor type  
 Max. output power: Dependent on motor type  
 Connection: Flying wires, cable, or tabs  
 Motor rating: Motor specific  
 Speed sensing: Optional

#### Temperature:

Fluid temp. range: -20 to +100°C  
 Ambient air temp. range: 0-60°C  
 Relative humidity range: 0-95% non-condensing

#### Construction:

Standard: PVDF, Ceramic (alumina), PTFE.  
 Optional: PEEK®, Polysulfone, Polypropylene  
 Rinse ports: Optional  
 Inlet/Outlet: 3mm barbed tube (standard);  
 Optional: 8mm tube, 1/4-28 UNF bottom-sealing threads.  
 Permanent laser-mark identification for 100% traceability.  
 Mass: Dependent on pump size and motor

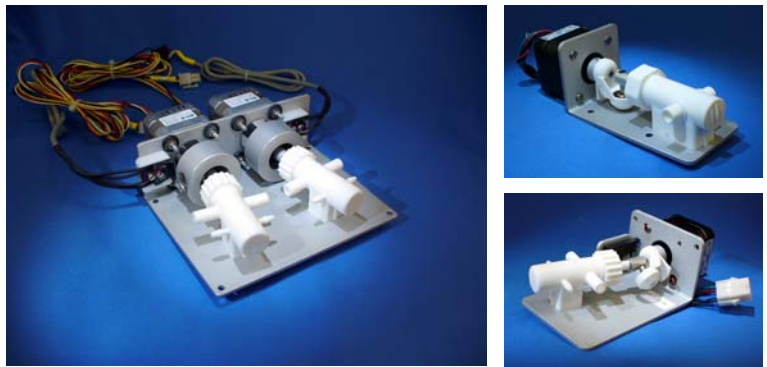


Graph showing the inlet and outlet strokes of a typical pump as a function of the motor rotation. The intake/dispense follows a cosine curve.

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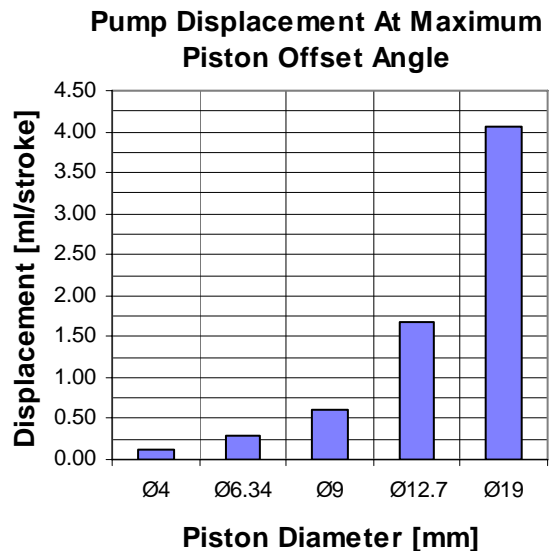
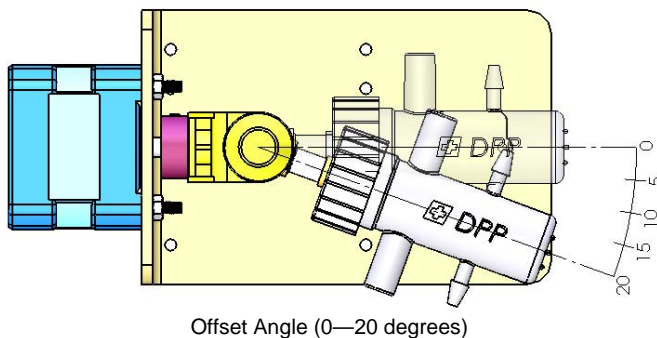
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Displacement [milliliters/stroke] vs. Piston Offset Angle					
Offset Angle [degrees]	Piston Diameter [mm]				
	Ø4	Ø6.34	Ø9	Ø12.7	Ø19
0	0.000	0.000	0.000	0.000	0.000
1	0.006	0.015	0.031	0.086	0.208
2	0.012	0.031	0.062	0.172	0.416
3	0.018	0.046	0.092	0.259	0.623
4	0.024	0.061	0.123	0.345	0.831
5	0.030	0.076	0.154	0.431	1.038
6	0.036	0.092	0.184	0.516	1.245
7	0.042	0.107	0.215	0.602	1.451
8	0.049	0.122	0.246	0.688	1.657
9	0.055	0.137	0.276	0.773	1.863
10	0.061	0.152	0.306	0.858	2.068
11	0.067	0.167	0.337	0.943	2.272
12	0.072	0.182	0.367	1.027	2.476
13	0.078	0.197	0.397	1.111	2.679
14	0.084	0.212	0.427	1.195	2.881
15	0.090	0.227	0.457	1.279	3.082
16	0.096	0.241	0.486	1.362	3.282
17	0.102	0.256	0.516	1.444	3.482
18	0.108	0.271	0.545	1.527	3.680
19	0.113	0.285	0.574	1.608	3.877
20	0.119	0.299	0.603	1.690	4.073



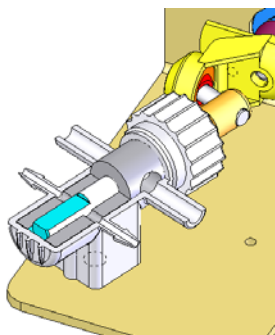
The chart at left shows the pump displacement at offset angles varying between 0 and 20 degrees. Select an offset angle and piston size and find the pump stroke displacement (try to select a piston size to deliver the required flow at motor speeds of between 100 and 300 rpm.) Offset angles are defined in the illustration below. The actual displacement may vary depending on pressure, temperature, and fluid type.

The chart below shows the relative displacement of each piston size. The piston size is defined by the diameter of the piston (in mm).

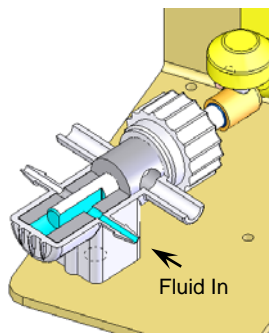


### Operating Principle:

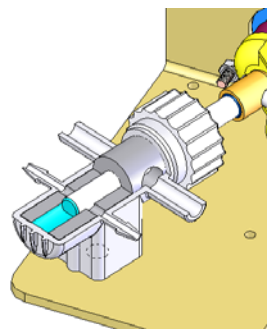
Position 1: Piston at top-dead-center, ready for intake



Position 2: Piston retracting, pulling fluid into pump



Position 3: Piston at bottom-dead-center, ready to dispense



Position 4: Piston pushes fluid out through dispense stroke

