

Sapphire Engineering™ V-Series

Precision Dispense Pumps

The V-Series is a family of maintenance-free positive displacement pump products designed for precise fluid dispensing in a variety of clinical and laboratory instruments.

The series includes:

- V17** 2 million cycles; less-demanding applications with lower duty cycle
- VP17** 5 million cycles; economical performance for higher duty cycle applications
- VFP17** 5 million cycles; long life plus numerous custom options

Each V-Series pump dispenses with excellent precision and accuracy by combining over 100 years of experience processing ultrahard piston materials with a long-life stepper motor. Every design element of the pump has been validated to perform over the expected life, eliminating preventive maintenance costs and maximizing uptime over the life of the instrument.

Technology and Performance Features

- ▶ Advanced piston processing and seal technologies demonstrated to last > 5M cycles
- ▶ Excellent, sustained dispense precision (< 1% CV) over pump lifetime
- ▶ Stationary seal with reciprocating piston for positive displacement
- ▶ Reliable 1.8 degree, bi-polar stepper motor, with optional encoder for optimum position control
- ▶ Standard 20 and 40 pitch lead screws enable higher-speed or higher-precision dispensing
- ▶ Flexible home position sensor location at either full aspiration or full dispense
- ▶ Optional Seal Wash extends seal life when using fluids that crystallize (e.g., saline)



VFP17, PEEK™ head

V17, VP17



Integrated pump, valve, and manifold assembly

Product Specifications



	V17	VP17	VFP17v5
Expected life Expected life based on pumping DI water at low pressure (30 psi)	2M Cycles	5M Cycles	5M Cycles
Inaccuracy	±0.4% at full dispense		
Precision	CV < 1% dispensing 2% of total volume Typical Precision*: CV < 0.5% dispensing 1.5% volume CV < 0.1% dispensing 50% volume		
System Pressure	Low Pressure only (< 100 psi)		Up to 1500 psi
Pump Volume	4 Sizes 50 µL, 100 µL, 500 µL, 1000 µL		8 Sizes 25 µl, 50 µl, 100 µl, 250 µl, 500 µl, 1000 µl, 2500 µl, 5000 µl
Port Configurations	2 Ports M6 or 1/4-28 Flat Bottom		Fully customizable
Head Material	Acrylic		8 Choices Acrylic (natural or black), PEEK™, PPS, Radel®, Teflon®, Udel®, Ultem®
Operating Temperature	5 °C–50 °C (41 °F–122 °F)		
Lead Screw Pitch More threads per inch increases dispense precision; slows dispense speed	20 TPI or 40 TPI		
Maximum Motor Drive Current	1.2 A		
Home Switch Position The optical homing sensor can be positioned at full extension or full retraction of the piston to initiate accurate step counts	Aspirate or Dispense		
Seal Wash Flushes salt build-up from the piston/seal interface for prolonged seal life	Option on all models		
Encoder Provides constant feedback on piston position regardless of step count for enhanced dispense accuracy	Option on all models, 400 PPR standard		
Integrated Valves Accommodates both solenoid and rotary valves mounted to the pump head for enhanced fluid control	N/A	Option—Consult Factory	

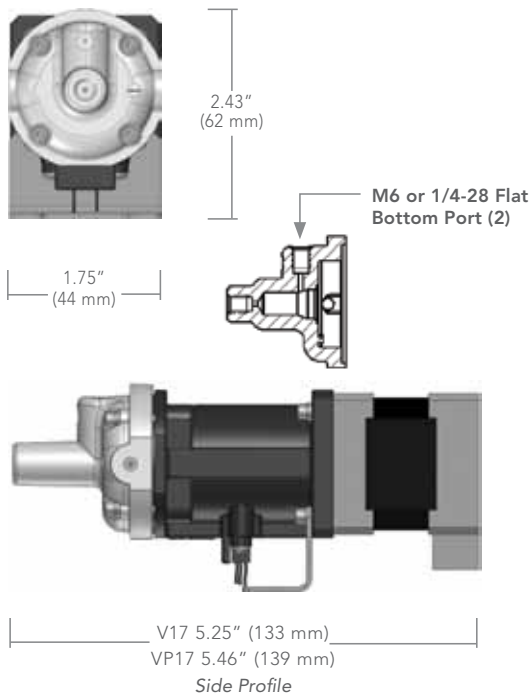
* Typical Precision results based on IDEX Health & Science standard qualification test protocol. Consult IDEX Health & Science for details. Specifications subject to change without notification.

Dimensions

Dimensions given in inches and millimeters.

V17 (2M Cycles)
High precision

VP17 (5M Cycles)
Longer life

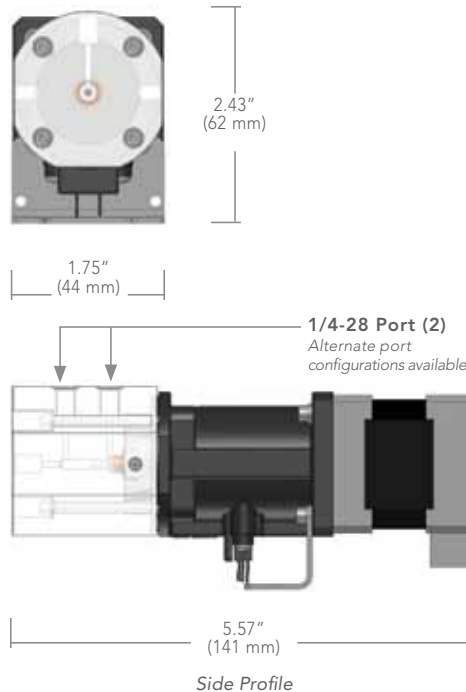


Control Parameters

Stepper driver is required for all V-Series pumps.

VFP17 (5M Cycle with v5*)
Fully customizable

*V5 is an updated version of the VFP17 that will be capable of achieving 5M cycles.



Standard V-Series Pump Specifications

Total Pump Volume (µL)	Lead Screw Pitch (TPI)	Resolution (µL/full step)	Min. Dispense for 1% CV (µL)	Time to Fully Dispense (sec)		Max. Backlash to Total Volume (%)	Unswep Volume (µL)		Seal Wash Volume (µL)	
				V17	VP17, VFPv5		V17, VP17	VFPv5	V17, VP17	VFPv5
25	20	0.0125	0.5	N/A	0.8	1	N/A	27	N/A	25
	40	0.0063	0.5	N/A	1.5					
50	20	0.0250	1	0.7	0.8	1	97	53	45	32
	40	0.0125	1	1.3	1.5					
100	20	0.0501	2	0.7	0.8	1	131	70	55	42
	40	0.0251	2	1.3	1.5					
250	20	0.1250	5	N/A	0.8	1	N/A	130	N/A	41
	40	0.0625	5	N/A	1.5					
500	20	0.2499	10	0.7	0.8	1	316	211	105	89
	40	0.1250	10	1.3	1.5					
1000	20	0.5000	20	0.7	0.8	1	507	295	159	145
	40	0.2500	20	1.3	1.5					
2500	20	1.2496	50	N/A	1.0	1	N/A	492	N/A	247
	40	0.6248	50	N/A	1.8					
5000	20	2.4996	100	N/A	1.2	1	N/A	683	N/A	376
	40	1.2498	100	N/A	2.4					

Motor Specifications

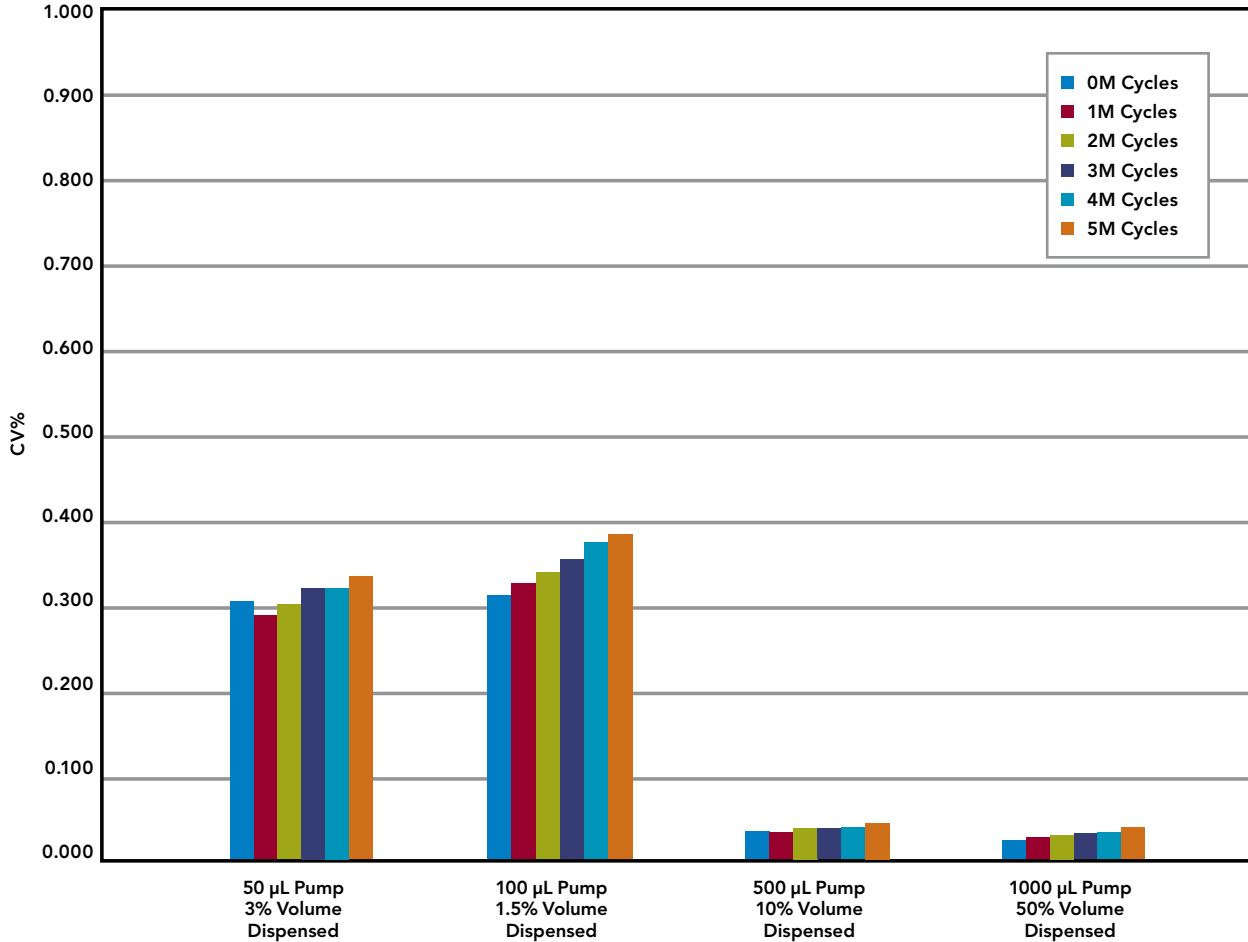
	High Speed Motor (Low Pressure)
Phase Voltage	24 VDC
Phase Current	1.2 AMP
Phase Resistance	3.3 Ohms
Phase Inductance	3.2 mH
Other Info	BiPolar, 1.8 Degree Stepper Motor

Maximize Instrument Uptime

Maintenance-free Sapphire Engineering™ V-Series pumps provide life-of-the-instrument performance and reliability. Eliminating costly preventative maintenance increases instrument uptime, lowers the cost of ownership, and helps preserve revenue from reagent sales.

Reliable Lifetime Performance

CV% Results Summary for VP17 Life Test Units



PEEK™ polymer is a trademark of Victrex plc.
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