

BTX-MVP

Miniature Diaphragm Pump



ENGINEERING YOUR SUCCESS.

Innovative solutions for health care success



ENGINEERING **YOUR** SUCCESS.

When you partner with the global leader in motion and control technologies, expect to move your business and the world forward. From miniature solenoid valves to highly integrated automation systems, our innovations are critical to life-saving medical devices and scientific instruments used for drug discovery and pathogen detection. Not to mention, critical to decreasing time to market and lowering your overall cost of ownership. So partner with Parker, and get ready to move, well, anything.



www.parker.com/precisionfluidics 1 603 595-1500

BTX-MVP Miniature Diaphragm Pump

Up to 8.4 LPM Free Flow




Parker's BTX-MVP pump combines best-in-class diaphragm pump design with an innovative motor solution offering exceptional value for applications requiring the low noise and controllability of a brushless DC motor, while also offering a more compact and lower weight solution to comparable brush motor pumps.

Applications

- Patient Monitoring
- Compression Therapy
- Water Quality Monitoring

Features

- Brushless DC motor with patented low noise bearing design
- Optimized pump balancing for reduced mechanical noise
- Isolation mounts available for simple mounting
- Motor and pump assembled in USA
- RoHS and REACH Compliant 

Product Specifications

Physical Properties

Operating Environment¹ :
41 to 122°F (5 to 50°C)
Media:
Air, Nitrogen, Oxygen, and other non-reacting gases
Humidity²:
0 - 80% Relative Humidity non-condensing
Weight
Single Head 4.6 oz (130 g)
Dual Head 5.7 oz (162 g)

Electrical

Motor Type (DC):
Brushless Slotted DC Motor
Nominal Motor Voltages³:
12 or 24 Vdc
Tachometer:
12 pulses per rotation 3.3V signal
PWM Speed Control:
Speed control is optional: 100% speed if pin is floating Open drain control, 20kHz frequency recommended. Motor has on-board 4.7kOhm Pull-up to 3.3Vdc Do not exceed 5.5Vdc external voltage on the PWM input
Wetted Materials
Diaphragm:
Long Life - Advanced EPDM
Valves:
EPDM
Pump Head:
PBT

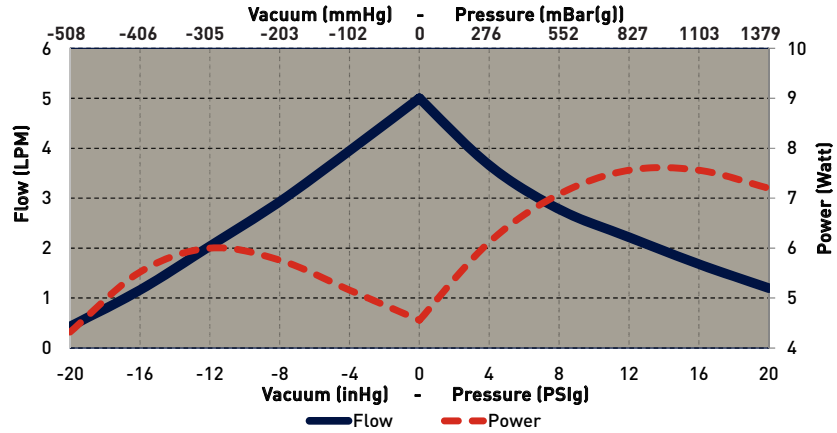
Pneumatic

Maximum Unrestricted Flow:
Single Head: Up to 5 LPM Dual Head: Up to 8.4 LPM
Pressure Range:
Continuous Duty: Up to 12 PSIG (0.8 Bar)
Vacuum Range:
Continuous Duty: Up to -21 inHg (-533 mmHg)
Filtration:
40 microns - recommended
Electrical Termination:
Mating Connector: JST PHR-4
Pin 1: PWM Input (White)
Pin 2: Tachometer Output (Blue)
Pin 3: -Ground (Black)
Pin 4: +DC Voltage Input (Red)

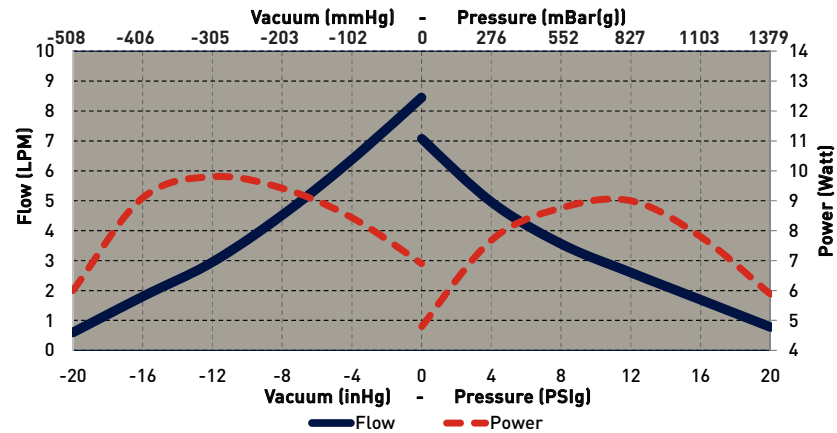
BTX-MVP Miniature Diaphragm Pump Typical Flow Curve



BTX-MVP Single Head
Typical Performance



BTX-MVP Dual Head
Typical Performance



- Single head curve shows maximum flow capability with a 0.090" (2.29 mm) pump offset, which are vacuum or pressure only
- Pumps capable of alternating pressure and vacuum are available with 0.050" (1.27 mm) pump offset or less. See ordering table below for a list of available standard options
- Dual head performance shown with pump heads connected in parallel with 0.090" (2.29 mm) pump offset for vacuum, and 0.070" (1.78 mm) pump offset for pressure
- Detailed performance specification sheets are available for each part number
- Contact Parker Precision Fluidics Applications Engineering team for other performance options

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety, and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from at Parker or its subsidiaries or authorized distributor.

The above graphs represent an example of performance for the pump series handling air at 800 feet (244 m) above sea level at 75 °F (24 °C). Performance will vary depending on barometric pressure and media temperature. A variety of configurations can be accommodated to meet application requirements.

Please contact Parker Precision Fluidics Applications Engineering for other considerations.

BTX-MVP Miniature Diaphragm Pump BTX Family Selection

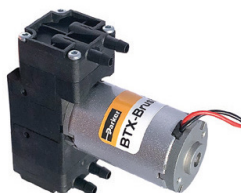
BTX-Brush

BTX-MVP

BTX-Connect

BTX-Brush Dual Head
Brush Motor

B2B



BTX-MVP Dual Head
Brushless Motor

B2M



BTX-Connect Dual Head
Compact BLDC Motor

B2C



BTX-Connect Dual Head
Slotless BLDC Motor

B2S and B2H



BTX-Brush Single Head
Brush Motor

B1B



BTX-MVP Single Head
Brushless Motor

B1M



BTX-Connect Single Head
Compact BLDC Motor

B1C



BTX-Connect Single Head
Slotless BLDC Motor

B1S and B1H



Efficiency	Good	Better	Better	Best
Flow Rate	Up to 6.1 L/min	Up to 8.4L/Min	Up to 9.5 L/min	Up to 11L/Min
Life	Good	Better	Best	Best
Control	On/Off	On/Off, PWM	On/Off, Digital, PWM, 0-5V	On/Off, Digital, PWM, 0-5V
Protection	—	Reverse Polarity	Reverse Polarity, Temp, Current	Reverse Polarity, Temp, Current
Cost	Best	Better	Good	Good

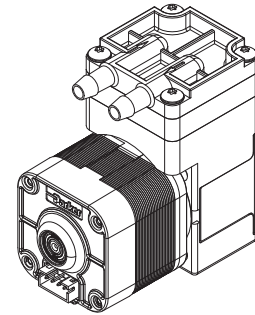
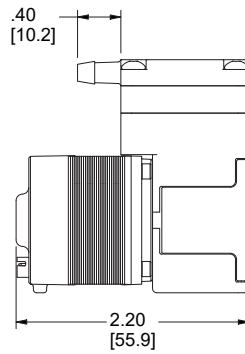
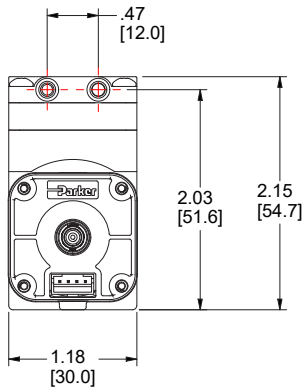
Mounting Guidelines:

- Bracket options available for mounting consideration (See *EZ Mount catalog pages*).
- Hole in the center of the bottom housing is for manufacturing only—not to be used for mounting.
- Mounting holes are drilled for #6-20 self-tapping screws with 1/4" (6 mm) thread engagement torque to 4 in-lbs (0.45 N-m).

Port Connections:

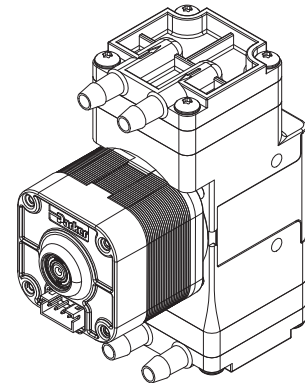
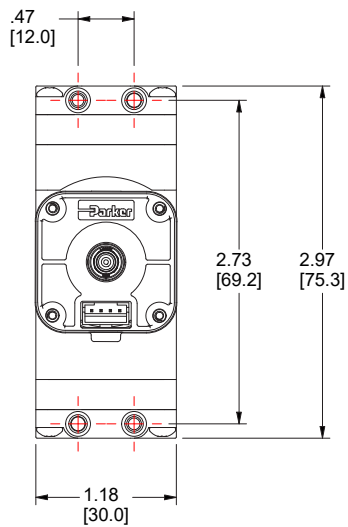
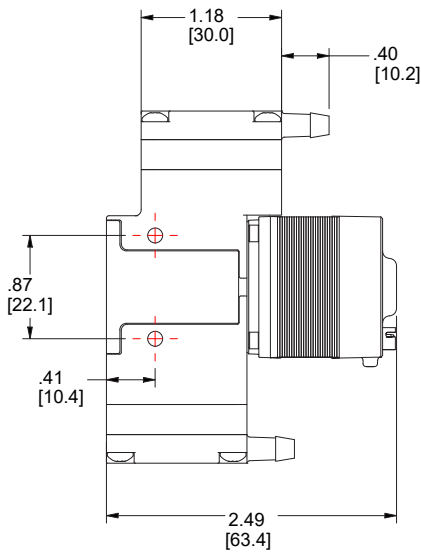
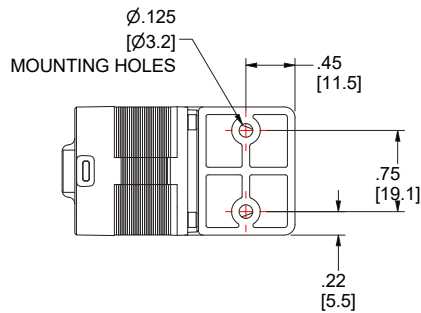
- Barbs are sized for 1/8" (3 mm) ID tubing, 70-80 durometer recommended.
- Flow direction is marked on the pump head with arrows.

BTX-MVP Miniature Diaphragm Pump Mechanical Drawings

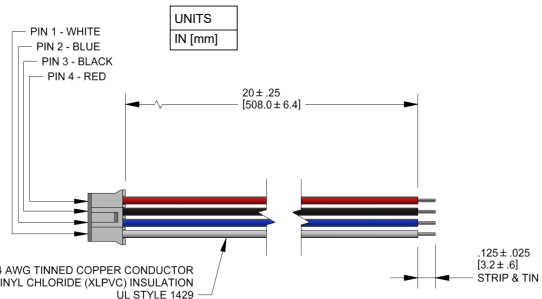


UNITS
IN [mm]

NOTES:
MOUNTING HOLES ARE DRILLED FOR #6-20 SELF-TAPPING SCREWS WITH 1/4" THREAD ENGAGEMENT. [torque to 4 in-lbs.]

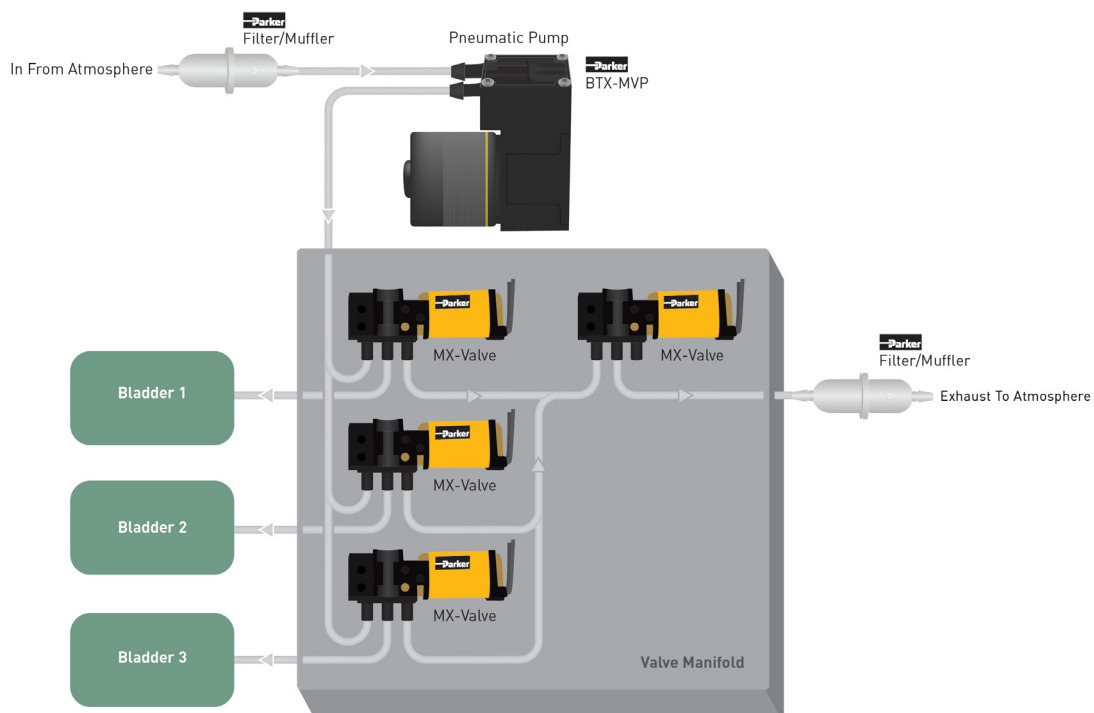


NOTES:
MOUNTING HOLES ARE DRILLED FOR #6-32 SELF-TAPPING SCREWS WITH 1/4" THREAD ENGAGEMENT [TORQUE TO 4 in-lbs]

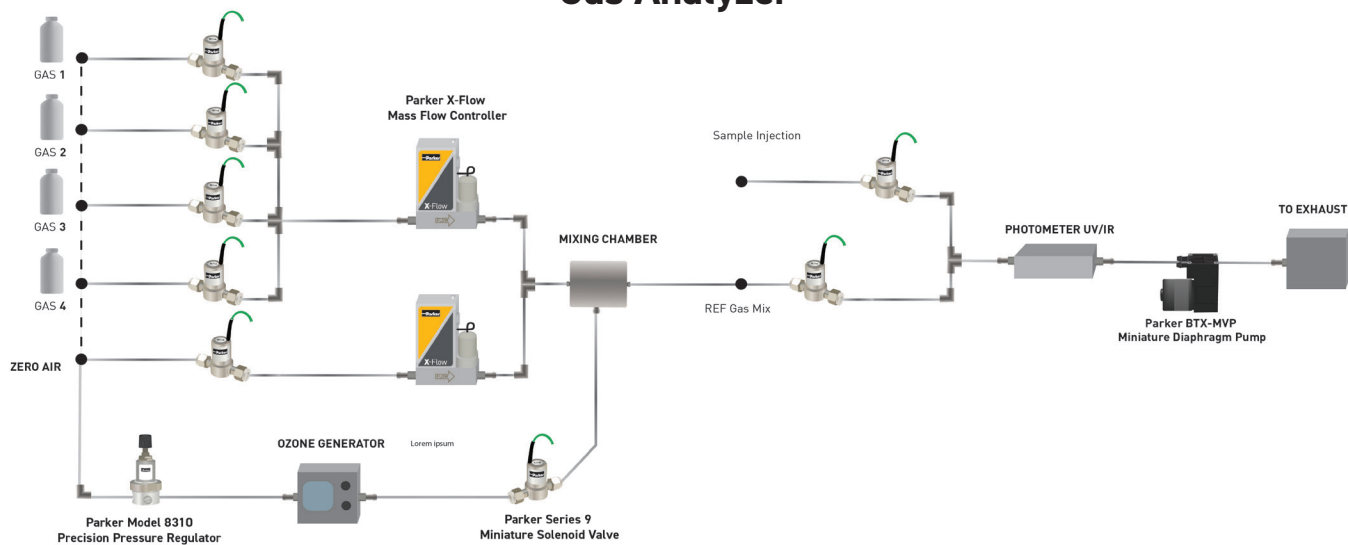


BTX-MVP Miniature Diaphragm Pump Typical Flow Diagram

Compression Therapy Prevention (DVT)



Gas Analyzer



BTX-MVP Miniature Diaphragm Pump Application Notes Chemical Compatibility Chart*

BTX-MVP		
Chemical Compatibility of Wetted Path Materials		
Chemical	AEPDM	PBT
Air	1	1
Ozone (1000 ppm)	1	1
Oxygen	1	1
Ethylene (Ethene)	1	1
Methane	4	2
Nitrogen	1	1
Carbon Dioxide	2	1
Acetone (Vapor/Cleaning)	1	1(5%), 3(100%)

Compatibility Legend

- EXCELLENT**
Minimal or no effect
- GOOD**
Possible swelling and/or loss of physical properties
- LIMITED**
Moderate or severe swelling and loss of physical properties
- NOT RECOMMENDED**
Severe effect and should not be considered

Note: Consult factory for other gases.

*The above is an Abbreviated Chemical Compatibility Chart. Please consult factory for details.

Pulse Width Modulation (PWM)

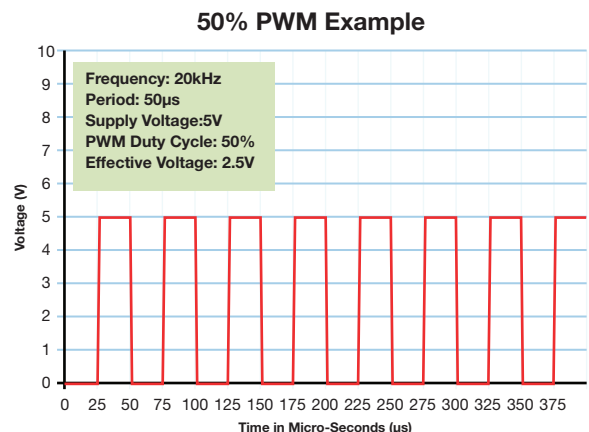
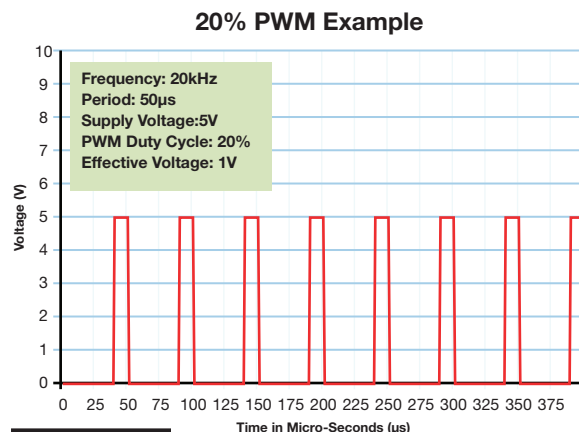
Pulse-width modulation is a commonly used technique for controlling DC motors.

The average value of the voltage fed to the motor is controlled by turning a switch between the voltage supply and the motor on-and-off at a fast pace. The longer the switch is on compared to the off time, the higher the power supplied to the motor.

The PWM switching frequency varies for different types of devices, and is selected based on how it affects the device. For example, some applications require a faster switching frequency to prevent audible noise or electrical noise.

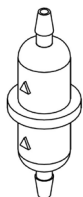
The term duty cycle describes the ratio of on-time to the period (one complete on-and-off cycle). Duty cycle is normally expressed as a percentage of on-time, 100% being full-power and 50% being half-power.

The advantage of PWM is the reduction of power-loss due to switching versus other control methods. Parker Hannifin recommends controlling the pump using 15kHz - 20 kHz frequency range.



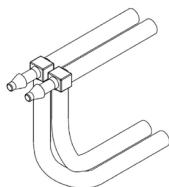
BTX-MVP Miniature Diaphragm Pump

Accessories Information



P/N: 00492-15
(10 micron Filter)

A Filter-Muffler is always recommended in the air inlet or outlet to reduce noise and risk of debris that may affect pump performance. Parker recommends 40 micron or better filtration to be used with this pump series.



P/N: 01881-KT
(Parallel Tubing)

Parallel Tubing connections connect the inlet and outlet of dual head pumps to combine the flow from both heads.

EZ Mount provides ease of installation and effective control of vibration transfer. EZ Mount was designed to mount easily to the Precision Fluidic BTX Family of diaphragm pumps.



Features

- Isolation feet on the EZ mount can be rotated in any one of three ninety-degree planes and is designed for top-down or bottom-up mounting providing simple installation.
- EZ Mount was designed to minimize weight added to the pump assembly. Approximate weight is: 0.63 oz (18 g).
- Effectively absorbs vibration to minimize most vibration-induced noise and vibration transfer into an instrument.
- Designed to keep height and size to a minimum.
- All necessary hardware to attach to a BTX pump is included.

Physical Properties

Operating Environment:

41 - 158°F (5 - 70°C)

Humidity:

0 - 95% Relative Humidity

Base Plate:

Noryl GTX830

Feet:

Silicone

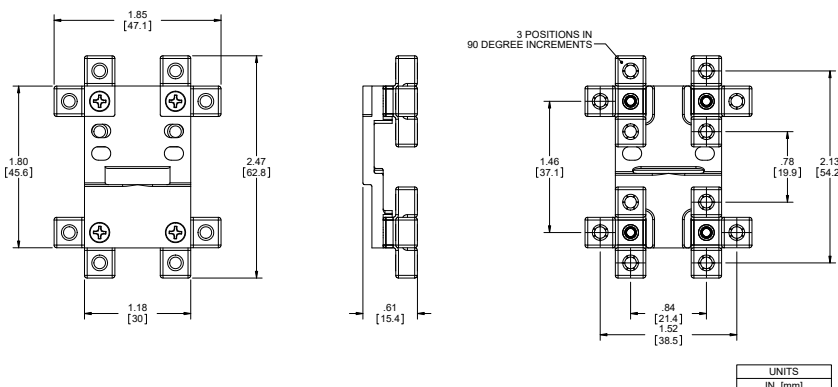
Feet Insert:

Brass

Hardware:



Zinc-Plated Steel


Style A Dimensions



- Isolation Feet are available in either threaded or thru-hole clearance for standard #4-40 or #6-32 (M3 for clearance hole only).

BTX-MVP Miniature Diaphragm Pump Ordering Information

Configuration	Voltage	Part Number	-16 inHg -406 mmHg	-12 inHg -305 mmHg	-8 inHg -203 mmHg	-4 inHg -102 mmHg	0 Free Flow	4 PSIg 276 mbar	8 PSIg 552 mbar	12 PSIg 827 mbar	16 PSIg 1103 mbar
B1M BTX-MVP Single Head 	12	B1M-050A12AN-03	0.6	1.2	1.7	2.4	3.2	2.4	2.0	1.6	1.3
	12	B1M-090P12AN-03	-	-	-	-	5.0	3.7	2.8	2.2	1.7
	12	B1M-090V12AN-03	1.2	2.0	2.9	4.0	4.8	-	-	-	-
	24	B1M-050A24AN-03	0.6	1.2	1.7	2.4	3.2	2.4	2.0	1.6	1.3
	24	B1M-090P24AN-03	-	-	-	-	5.0	3.7	2.8	2.2	1.7
	24	B1M-090V24AN-03	1.2	2.0	2.9	4.0	4.8	-	-	-	-
	<hr/>										
B2M BTX-MVP Dual Head 	12	B2M-050A12AN-03	1.1	2.0	3.0	4.2	5.3	4.1	3.2	2.5	1.9
	12	B2M-070P12AN-03	-	-	-	-	7.1	5.0	3.6	2.6	1.7
	12	B2M-090V12AN-03	1.8	3.0	4.5	6.4	8.5	-	-	-	-
	24	B2M-050A24AN-03	1.1	2.0	3.0	4.2	5.3	4.1	3.2	2.5	1.9
	24	B2M-070P24AN-03	-	-	-	-	7.1	5.0	3.6	2.6	1.7
	24	B2M-090V24AN-03	1.8	3.0	4.5	6.4	8.5	-	-	-	-
	<hr/>										

	Part Number	Style	Feet Type
EZ Mount for BTX- MVP single Head (B1M) and Dual Head (B2M) 	00328-10-A45S	A	#4-40 Threaded
	00328-10-B45S	A	#4 Clearance
	00328-10-D45S	A	#6-32 Threaded
	00328-10-C45S	A	#6 / M3 Clearance

BTX-MVP Miniature Diaphragm Pump Ordering Information

Accessories Ordering Table

Part No.	Description	Comments
00492-15	Filter-Muffler	Filter to 10 microns. Not included with pump
01881-KT	Tubing Assembly	As needed for parallel flow. Not included with pump

BTX Part Number Description (see Appendix A comment 9)

B	1	M	-	090	P	12	A	N	-	03
Model	Pump Heads	Motor Type		Pump Offset	Diaphragm Configuration	Voltage	Material	Tubing		Special
B - BTX	1 - Single Head	M - MVP BLDC Motor		050 - 0.050" Offset	P - Pressure Only	12 - 12 Vdc	A - 80D AEPDM Diaphragm & low noise Valves	N - None		03 - Factory Standard
	2 - Dual Head			070 - 0.070" Offset	V - Vacuum Only	24 - 24 Vdc				
				090 - 0.090" Offset	A - Universal Pressure & Vacuum (High Compression Chamber)					

BTX-MVP Miniature Diaphragm Pump Ordering Information

Please refer to sizing and selection chart for identifying which one will fit your application

Serviceable – PPF products are designed for use through the rated life and Parker does not sell replacement parts, nor is it recommended to service these in the field

Note: In addition to Parker's innovative and flexible pump designs, we offer applications engineering expertise to our customers in order to configure and recommend the optimal pump for the application. Contact Parker Applications Engineering to discuss and configure alternate pump configurations to meet your specific application requirements. Providing information on the following requirements will assist us in developing an optimal solution for your application:

- Noise
- Operating Pressure / Vacuum
- Power Consumption
- Life Requirement
- Size
- Motor Control
- Media
- Voltage

Parker Hannifin Precision Fluidics Division reserves the right to make changes. Drawings are for reference only.

Appendix A

All performance data is typical based on standard conditions: 70°F and 14.7 psia (21°C and 1 bar).

1. Duty Dependent. For operation above 122°F (50°C) consult factory
2. Noise is dependent on the configuration and operation of the pump in the application. Parker has the ability to tailor the pump configuration when noise is a critical criterion in the effort to meet the performance requirements of the application.
3. Life rating can vary depending on application and operating conditions.
4. Custom motor options available. Custom motors may require a significant application potential. The standard motors can be configured with a special winding to meet a particular operation point at a specified voltage
5. Current range is dependent on motor type, voltage, pressure/vacuum and flow requirement. Lower levels possible depending on application.
6. Condensation at the pump outlet can be expected in high humidity environments.
7. Maximum intermittent pressure/vacuum data is a pump capability guideline for applications that go beyond the maximum continuous levels for short periods of time. Please consult customer specific requirements with the factory or Applications Engineering.
8. Part number description for reference only, not all configurations are available or configurable. Contact Parker Precision Fluidics Applications Engineering team for other performance options.

BTX-MVP Miniature Diaphragm Pump

Serving a broad spectrum of life science, air quality, and process instrumentation OEM fluidic needs



Providing Pressure and Vacuum:
Broad range of diaphragm pumps for Gas and Liquid



Gas Flow Control:
High to Low Flow Proportional Valves



On/Off & Channel Selection Capabilities:
Gas and Liquid Solenoid Valves



High Precision Thermal Flow Control:
Mass Flow Controllers and Meters

Below are some common specifications that are helpful to have on hand to accelerate your product selection:

- Gas Type
- Maximum Flow Rate
- Inlet and Outlet Pressures
- Operating Temperature
- Standard Reference Conditions
- Process Connection Size and Type
- Set Point Signal
- Digital Communication Protocol Preferences

For more information call +1 603 595 1500 or email ppf.technical@support.parker.com

Visit www.parker.com/precisionfluidics

Recommendations on application design and material selection are based on available technical data and are offered as suggestions only. Each user should conduct their own tests to determine the suitability for their own use. Parker offers no express or implied warranties concerning the form, fit, or function of a product in any application.

