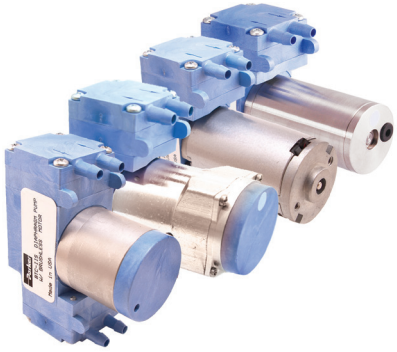
BTC-IIS Series

Miniature Diaphragm Pumps (air/gas)

Up to 11 LPM Free Flow



BTC-IIS Miniature Diaphragm Pumps are a series of brush and brushless DC motor driven pumps which are tailored to meet the specific application performance requirements. The innovative compact designs incorporate leading edge technologies that allow them to operate more efficiently than existing pump designs. BTC-IIS Pumps offer multiple component configurations allowing them to be used for either vacuum, pressure, or alternating vacuum and pressure operations. BTC-IIS is ideal for compact, high flow, wide pressure ranges, long-life, low noise applications.

Typical Applications

- Patient Monitoring
- Compression Therapy
- Hemodialysis
- Peritoneal Dialysis
- Respiratory Care
- Wound Therapy
- Medical/Training Mannequins
- Degassing

Features

- The BTC-IIS Series pump sets the highest benchmark for service-free performance with our unique brushless DC motor design and advanced proprietary diaphragm elastomer.
- Incorporating the lightweight EZ Mount accessory facilitates simple system assembly while dampening vibration and reducing noise levels.
- The BTC-IIS maximizes flexibility by offering several mount options,
- Our 100% oil and grease-free pump and compressor design maintains the purity of your system and are commonly used in FDA-approved systems.
- RoHS compliant.

Product Specifications

Physical Properties

Operating Environment[1]:
41 to 122°F (5 to 50°C)
Storage Environment:
-4 to 212°F (-20 to 100°C)
Media:
Air, Argon, Helium, Nitrogen, Oxygen, and other non-reacting gases
Humidity:
0 – 80% Relative Humidity
Noise Level[2]:
As low as 45 dB @ 12 in (30 cm) *Muffler recommended for additional noise reduction (see accessories)*
Pump Assembly Rated Life[3]:
PMDC Iron Core Brush - 3,000 hrs Brushless Slotted - 10,000 hrs Brushless Slotted (High Torque) - 10,000 hrs Brushless Slotless - 10,000 hrs
Weight:
8.0 oz. (227 g) PMDC Iron Core Brush 6.0 oz. (170 g) Brushless Slotted 11.6 oz. (330 g) Brushless Slotted (High Torque) 8.8 oz. (250 g) Brushless Slotless

Electrical

Motor Type (DC):
PMDC Iron Core Brush, Brushless Slotted (High Torque), Brushless Slotless
Nominal Motor Voltages[4]:
6, 12, or 24 VDC *Other voltages available upon request*
Electrical Termination:
PMDC Iron Core Brush: 22 AWG Wire Leads, Length 10” (254 mm) Brushless Slotted Motor: 22 AWG Wire Leads, Length 20” (508 mm) Brushless Slotted Motor (High Torque): 22 AWG Wire Leads, Length 20” (508 mm) Brushless Slotless: 22 AWG Wire Leads, Length 20” (508 mm)
Current Range[5]:
200 - 1400 mA

Wetted Materials

Diaphragm:
EPDM, AEPDM, FKM
Valves:
EPDM, FKM
Pump Head:
Vectra (Liquid Crystal Polymer)

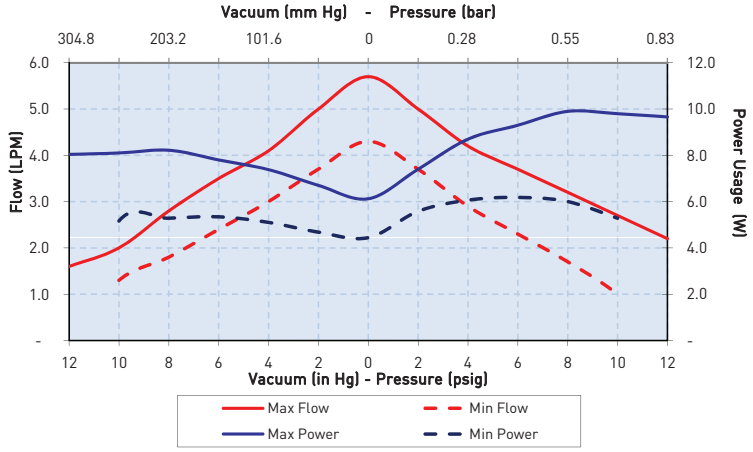
Pneumatic

Head Configuration:
Dual
Maximum Unrestricted Flow:
6 LPM (Series) 11 LPM (Parallel)
Pressure Range:
0 - 48 psig (0 - 3.31 bar) Series 0 - 28 psig (0 - 1.93 bar) Parallel
Vacuum Range:
0 - 25 in Hg (635 mm Hg) (Series) 0 - 20 in Hg (580 mm Hg) (Parallel)
Filtration:
40 microns - recommended
Efficiency at Free Flow[6]
PMDC Iron Core Brush: 0.9LPM/Watt (*PN: D743-21-01*) Brushless Slotted: 1.1LPM/Watt (*PN: D713-21-01*) Brushless Slotted: 1.0LPM/Watt (*PN: D737-23-01*) Brushless Slotless: 1.3LPM/Watt (*PN: D1019-22-01*)

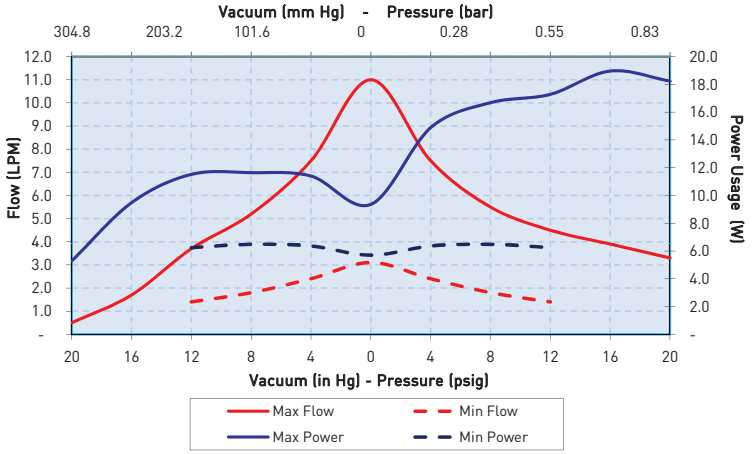
* See Appendix A for details.

Performance Specifications

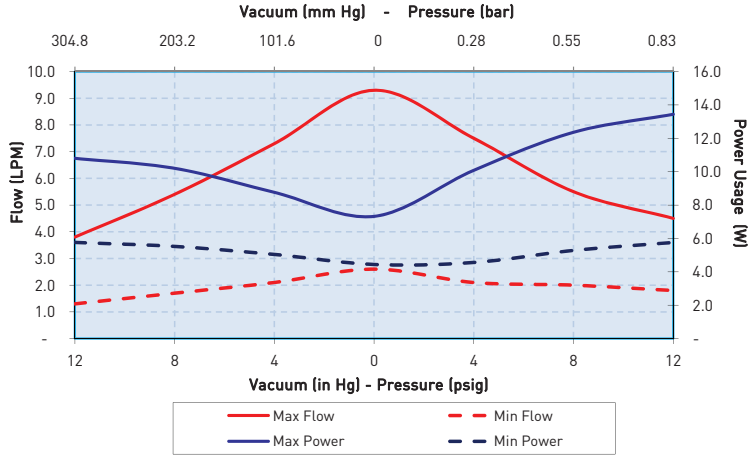
BTC-IIS - PMDC Iron Core Brush Motor



BTC-IIS - Brushless Slotted Motor



BTC-IIS - Brushless Slotless Motor



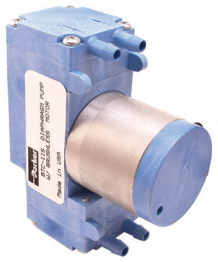
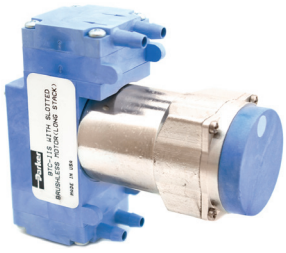
The above graph represents an example of performance for the pumps series handling air at 800 feet (244m) above sea level at 75°F (24°C). Performance will vary depending on barometric pressure and media temperature. Curves are representative of standard pump configurations. Pump configurations could be customized for higher or lower flows, depending on specific customer requirements.

Please contact Parker Precision Fluidics Applications Engineering for other considerations.

BTC-IIS Series

Miniature Diaphragm Pumps (air/gas)

Sizing and Selection

BTC-IIS Series	PMDC Iron Core Brush	Brushless Slotted Motor	Brushless Slotted Motor (High Torque)	Brushless Slotless Motor
				

	PMDC Iron Core Brush	Brushless Slotted	Brushless Slotted (High Torque)	Brushless Slotless
Efficiency[8]	Good	**Better** - Up to 60% motor efficiency at low loads	**Better** - up to 60% motor efficiency at high power levels with high torque capability	**Best** - Up to 75% motor efficiency at high power levels
Life[10]	Good - 3,000 hrs	**Best** - 10,000 hrs	**Best** - 10,000 hrs	**Best** - 10,000 hrs
Cost	Best	Better	Good	Premium
Noise	Good	Better	Best	Best

Mounting Guidelines:

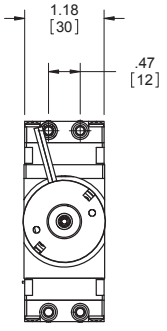
- Bracket options available for mounting consideration (*See EZ Mount catalog pages).*
- Hole in the center of the bottom of housing is for manufacturing only–not to be used for mounting.
- Mounting holes are drilled for #6-20 self-tapping screws with 1/4" (6 mm) thread engagement torque to 4 in-lbs.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

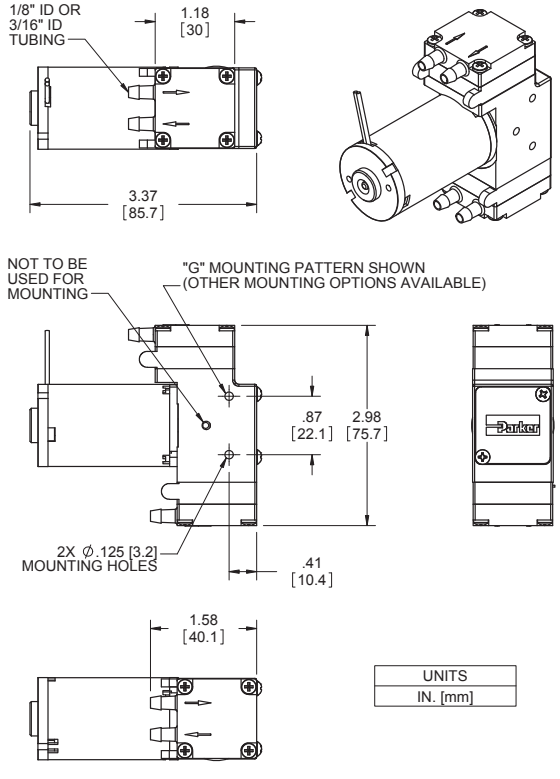
Port Connections:

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

Dimensions

PMDC Iron Core Brush

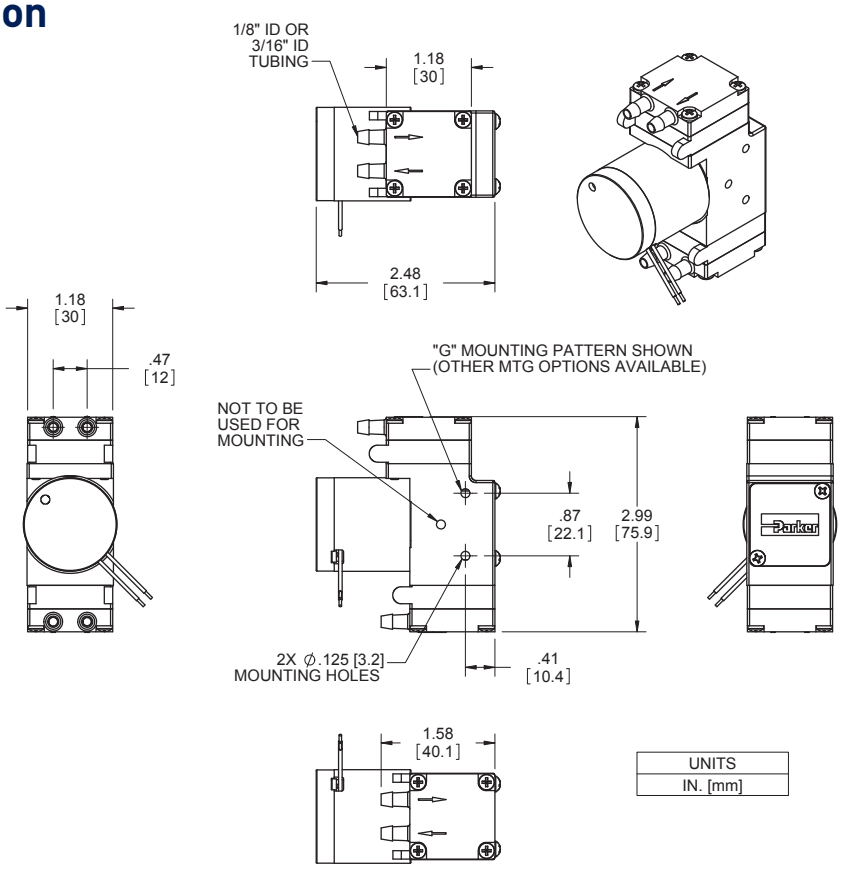




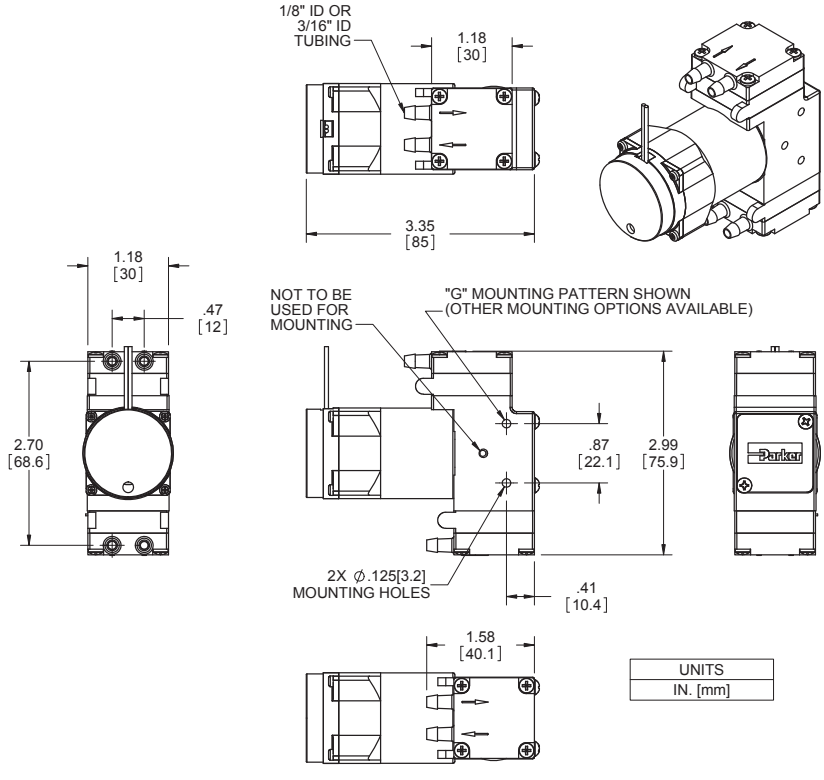
Mechanical Integration

Dimensions

Brushless Slotted Motor



Brushless Slotted
Motor (High Torque)

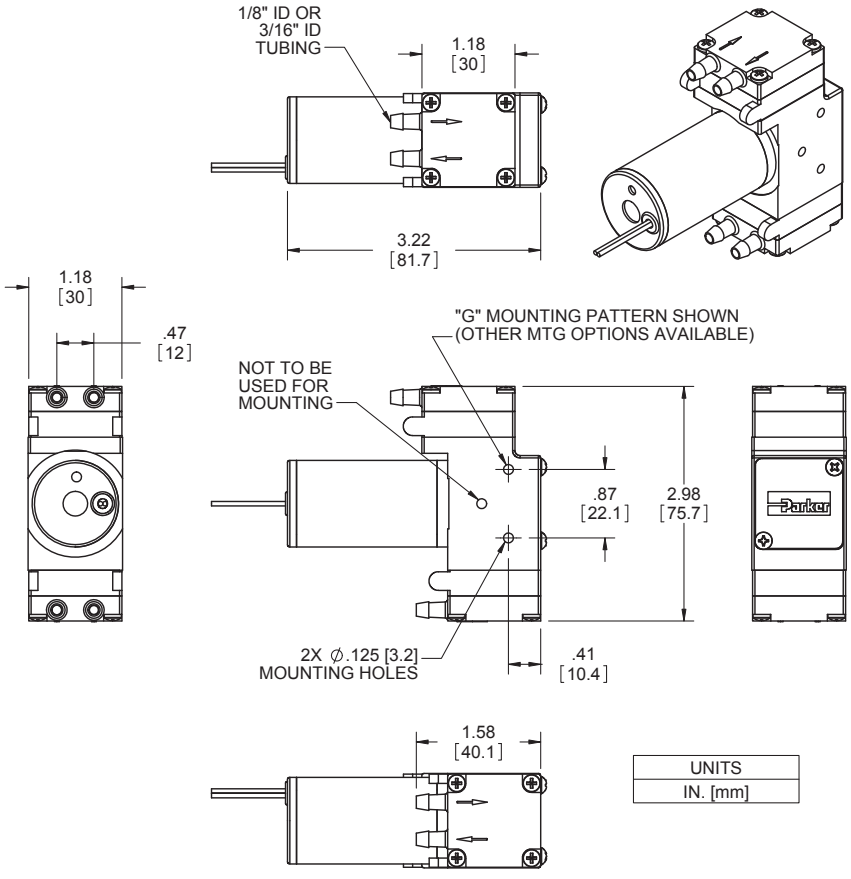


BTC-IIS Series

Miniature Diaphragm Pumps (air/gas)

Dimensions

Brushless
Slotless Motor



Electrical Integration and Motor Control

PMDC Iron Core Brush Motor

2 Wire	Red (+), Black (-)
Wire specification	22AWG, Insulation OD 0.051 in (1.30 mm), 10" (254 mm) Wire Leads

Brushless Motor Control Options

2 Wire	Red (+), Black (-)
3 Wire (Speed Control)	Red (+), Black (-), White (PWM) or Yellow (Analog)
4 Wire (Speed Control & Feedback)	Red(+), Black (-), White (PWM) or Yellow (Analog), Blue (Tachometer)
Wire specification	22AWG, Insulation OD 0.051 in (1.30 mm), 20" (508 mm) Wire Leads

Other Motor Control Considerations

The drive electronics for the BLDC motors are integrated into the motor itself, all that is needed is a power supply with the sufficient voltage and current.

Key Things to Remember

The pump is not a pressure holding device. An external check valve is recommended, if there is a pressure holding requirement.

Pump orientation does not affect performance or life.

Pulse Width Modulation (PWM)

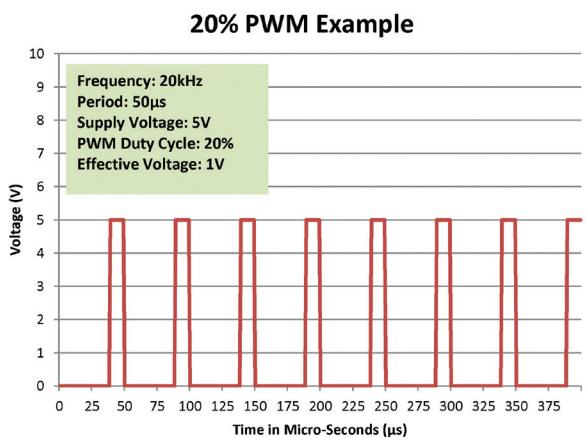
Pulse-width modulation is a commonly used technique for controlling DC motors.

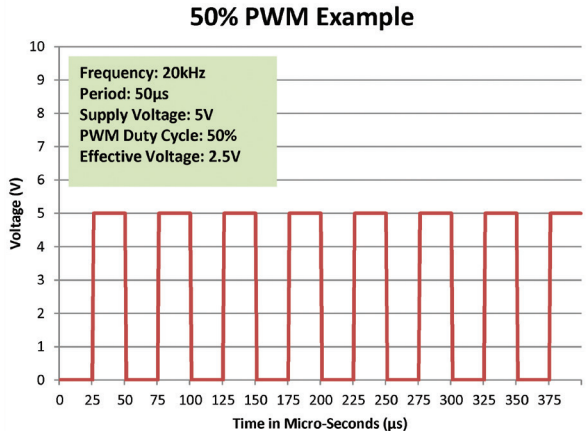
The average value of the voltage fed to the motor is controlled by turning a switch between the voltage supply and the motor on-and-off at a fast pace. The longer the switch is on compared to the off time, the higher the power supplied to the motor.

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.

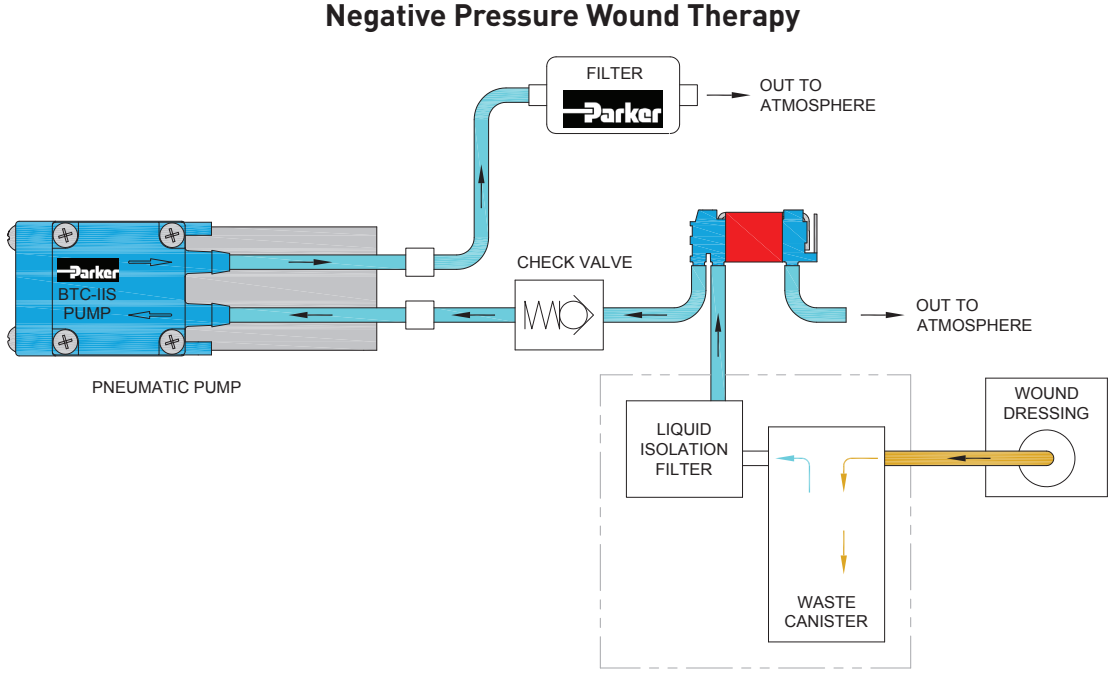
The term duty cycle describes the ratio of on-time to the period (one complete on-and-off cycle). Duty cycle is normally expressed as a percentage of on-time, 100% being full-power and 50% being half-power.

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.



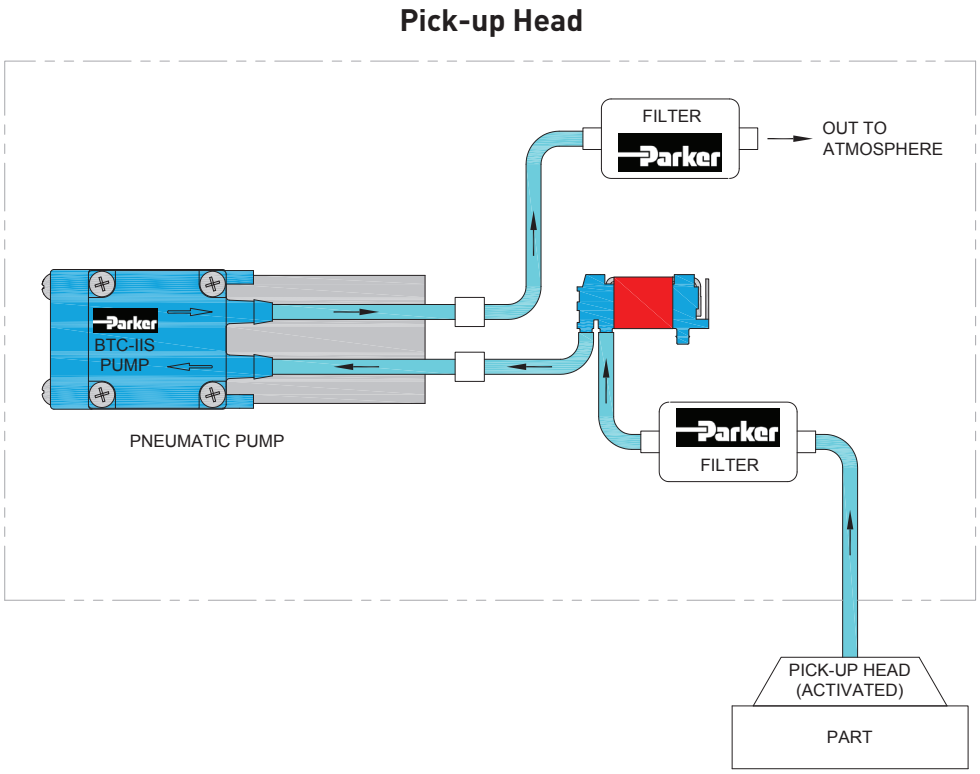


Typical Flow Diagram



BTC-IIS Series Miniature Diaphragm Pumps (air/gas)

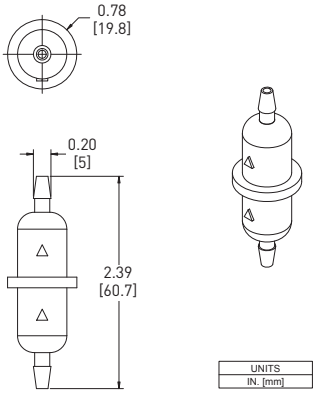
Typical Flow Diagram



Accessory Information

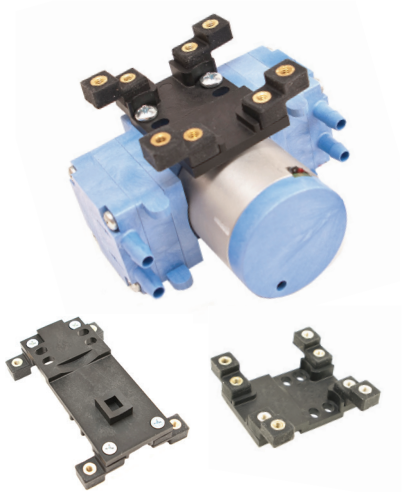
Filter-Mufflers also available to assist with filtration and optimize noise reduction.

Part Number: 00492-15
(Filters to 10 microns)



Accessory Information

EZ Mount available



EZ Mount provides ease of installation and effective control of vibration transfer. EZ Mount was designed to mount easily to the Precision Fluidic BTC-IIS 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 weights are: Style A - 0.63 oz (18 g), Style B - 0.71 oz (20 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.
- Engineered for Parker BTC-IIS pumps to ease integration into your system.

Physical Properties

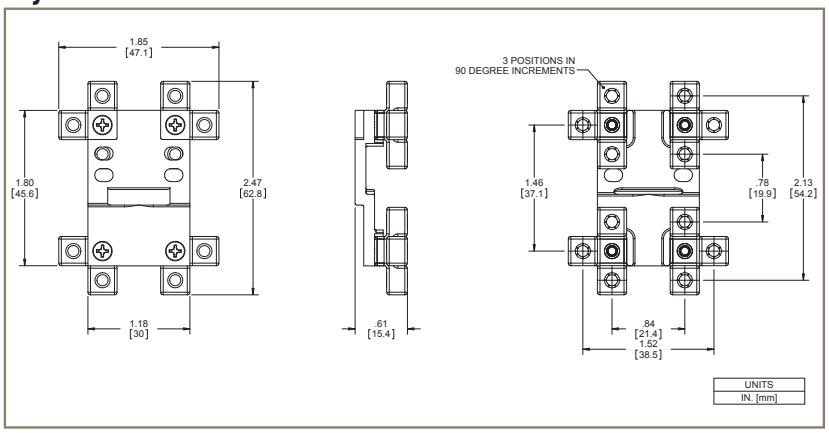
Operating Environment:
41 - 158°F (5 - 70°C)
Humidity:
0 - 95% Relative Humidity
Base Plate:
Noryl GTX830
Feet:
Silicone
Feet Insert:
Brass
Hardware:
Zinc-Plated Steel

EZ Mount kits include all necessary hardware and detailed instructions.

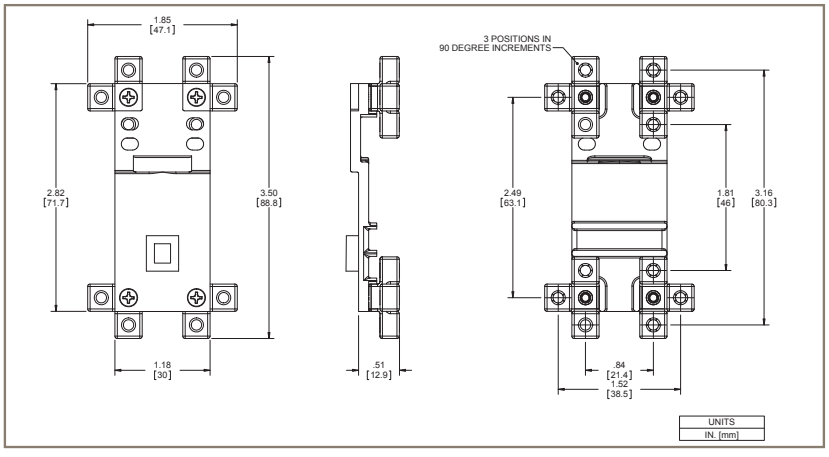
Isolation Feet are available in either threaded or thru-hole clearance for standard #4-40 (M3.5 for clearance hole only) or #6-32 hardware and can be mounted in any of three ninety-degree planes.

Dimensions

Style A



Style B



BTC-IIS Series Miniature Diaphragm Pumps (air/gas)

Ordering Information

BTC-IIS Dual Head Pumps - General Purpose

Part No.	Vacuum: LPM @ Load						Free Flow	Pressure: LPM @ Load						Max					PCD*	Wetted Materials
	24 in Hg 609 mm Hg	20 in Hg 508 mm Hg	16 in Hg 406 mm Hg	12 in Hg 305 mm Hg	8 in Hg 203 mm Hg	4 in Hg 102 mm Hg	0 0	4 psig 276 mbar	8 psig 552 mbar	12 psig 827 mbar	16 psig 1103 mbar	20 psig 1379 mbar	24 psig 1655 mbar	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
D713-21-01			0.5	1.4	2.7	4.0	5.5	4.2	3.0	2.1	1.4	0.9		16.0	20.0	Brushless Slotted	12	700	AEPDM, EPDM, EPDM
D716A-21-01			0.6	1.4	2.5	3.9	5.5	4.2	3.0	2.1	1.4	0.9		18.0	22.0	Brushless Slotted	24	400	AEPDM, EPDM, EPDM
D743-21-01			0.6	1.4	2.8	4.0	5.5	4.2	3.0	2.1	1.4	0.9		18.0	22.0	Brush PMDC	12	800	AEPDM, EPDM, EPDM
D1023-21-01			0.7	1.7	2.8	3.9	5.0	4.0	3.2	2.4	1.4	1.0		18.0	26.0	Brushless Slotless	24	340	AEPDM, EPDM, EPDM
D1008-21-01			0.1	1.3	2.3	3.5	4.6	3.6	2.7	1.5	0.9			16.0	20.0	Brushless Slotless	12	510	AEPDM, EPDM, EPDM
D713-22-01		0.5	1.0	1.5	2.1	2.6	3.5							24.0		Brushless Slotted	12	700	AEPDM, EPDM, EPDM
D716A-22-01		0.5	1.0	1.5	2.1	2.6	3.5							24.0		Brushless Slotted	24	400	AEPDM, EPDM, EPDM
D743-22-01		0.5	1.0	1.5	2.1	2.6	3.5							24.0		Brush PMDC	12	800	AEPDM, AEPDM, EPDM
D1023-22-01		0.4	0.9	1.3	1.7	2.1	2.6							24.0		Brushless Slotless	24	245	AEPDM, EPDM, EPDM
D1008-22-01		0.3	0.7	1.1	1.5	2.0	2.4							24.0		Brushless Slotless	12	370	AEPDM, EPDM, EPDM

*PCD: Peak Current Draw

BTC-IIS Dual Head Pumps - High Flow

Part No.	Vacuum: LPM @ Load						Free Flow	Pressure: LPM @ Load						Max					PCD*	Wetted Materials
	24 in Hg 609 mm Hg	20 in Hg 508 mm Hg	16 in Hg 406 mm Hg	12 in Hg 305 mm Hg	8 in Hg 203 mm Hg	4 in Hg 102 mm Hg	0	4 psig 276 mbar	8 psig 552 mbar	12 psig 827 mbar	16 psig 1103 mbar	20 psig 1379 mbar	24 psig 1655 mbar	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
D736A-23-02							11.0	7.5	5.5	4.5					12.0	Brushless Slotted	24	750	AEPDM, AEPDM, EPDM
D737-23-01							11.0	7.5	5.5	4.5	3.9	3.3			20.0	Brushless Slotted	12	1500	AEPDM, AEPDM, EPDM
D1020-23-01							9.1	7.4	6.1	4.9					12.0	Brushless Slotless	12	1120	AEPDM, AEPDM, EPDM
D1025-23-01							9.0	7.2	5.8	4.6					12.0	Brushless Slotless	24	585	AEPDM, AEPDM, EPDM
D737B-22-01		0.5	1.7	3.7	5.2	7.5	11.0							20.0		Brushless Slotted	12	1000	AEPDM, AEPDM, EPDM
D736-22-02		0.8	2.1	3.6	5.4	7.5	10.0							20.0		Brushless Slotted	24	750	AEPDM, AEPDM, EPDM
D1019-22-01		0.8	2.3	3.7	5.4	7.4	9.3							21.0		Brushless Slotless	12	860	AEPDM, AEPDM, EPDM
D1024-22-01		0.9	2.2	3.8	5.4	7.3	9.3							21.0		Brushless Slotless	24	450	AEPDM, AEPDM, EPDM

*PCD: Peak Current Draw

BTC-IIS Dual Head - High Pressure or Vacuum

Part No.	Vacuum: LPM @ Load						FF	Pressure: LPM @ Load						Max					PCD*	Wetted Materials
	24 in Hg 609 mm Hg	20 in Hg 508 mm Hg	16 in Hg 406 mm Hg	12 in Hg 305 mm Hg	8 in Hg 203 mm Hg	4 in Hg 102 mm Hg	0	8 psig 552 mbar	16 psig 1103 mbar	24 psig 1655 mbar	32 psig 2206 mbar	40 psig 2758 mbar	45 psig 3103 mbar	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
D1008-23-01							2.4	2.0	1.6	1.3	1.1	0.8			50.0	Brushless Slotless	12	620	AEPDM, EPDM, EPDM
D746A-22-01	0.1	0.5	1.0	1.4	1.8	2.4	3.1							26.0		Brushless Slotted	24	300	AEPDM, AEPDM, EPDM
D754C-22-01	0.1	0.5	1.0	1.4	1.8	2.4	3.1							26.0		Brushless Slotted	12	540	AEPDM, AEPDM, EPDM

*PCD: Peak Current Draw

Note: The Ordering Information Section includes a few selected part numbers for the product line. Other performances and configurations are available. Please contact your Sales Representative or an Application Engineer to discuss your application needs.

Ordering Information

Accessory Information

Part No.	Filtering Level (Micron)		Filter Area	Internal Volume	Operating Limitations:			Wetted Materials
00492-15	10		1.71 in^2 (11 cm^2)	0.24 in^3 (3.9 cm^3)	Max Temperature 80°C	Min Temperature 32°C	Max Pressure 65 PSI (4.48 bar)	Polypropylene
	Filter-Mufflers: To assist with filtration and optimize noise reduction. Tubing: Recommendation 1/8" (3mm) ID.							

EZ Mount for BTC-IIS with PMDC Iron Core Brush Motor

Part Number	Style	Description
00332-10-A45S	B	#4-40 Threaded
00332-10-B45S	B	#4 / M3.5 Clearance
00332-10-D45S	B	#6-32 Threaded
00332-10-C45S	B	#6-32 Clearance

EZ Mount for BTC-IIS with Brushless Slotted Motor

Part Number	Style	Description
00328-10-A45S	B	#4-40 Threaded
00328-10-B45S	B	#4 / M3.5 Clearance
00328-10-D45S	B	#6-32 Threaded
00328-10-C45S	B	#6-32 Clearance

EZ Mount for BTC-IIS with Brushless Slotted (High Torque) Motor

Part Number	Style	Description
00331-10-A45S	B	#4-40 Threaded
00331-10-B45S	B	#4 / M3.5 Clearance
00331-10-D45S	B	#6-32 Threaded
00331-10-C45S	B	#6-32 Clearance

EZ Mount for BTC-IIS with Brushless Slotless Motor

Part Number	Style	Description
01074-10-A45S	A	#4-40 Threaded
01074-10-B45S	A	#4 / M3.5 Clearance
01074-10-D45S	A	#6-32 Threaded
01074-10-C45S	A	#6-32 Clearance

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/btciis) to configure the BTC-IIS Miniature Diaphragm Pump for 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
- Description of pump function in the application
- Size
- Motor Control
- Media
- Voltage

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. Noise level is tested to Parker protocol P-105.
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. Pump efficiency is a measure of the flow rate generated per unit of power consumed. Efficiency may change dependent on application and operating condition at free flow.

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Notes