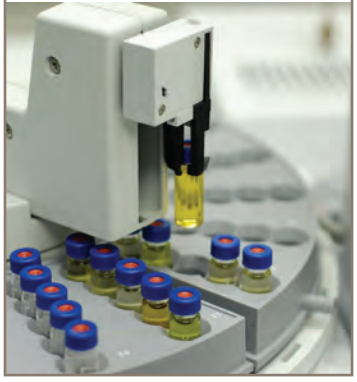
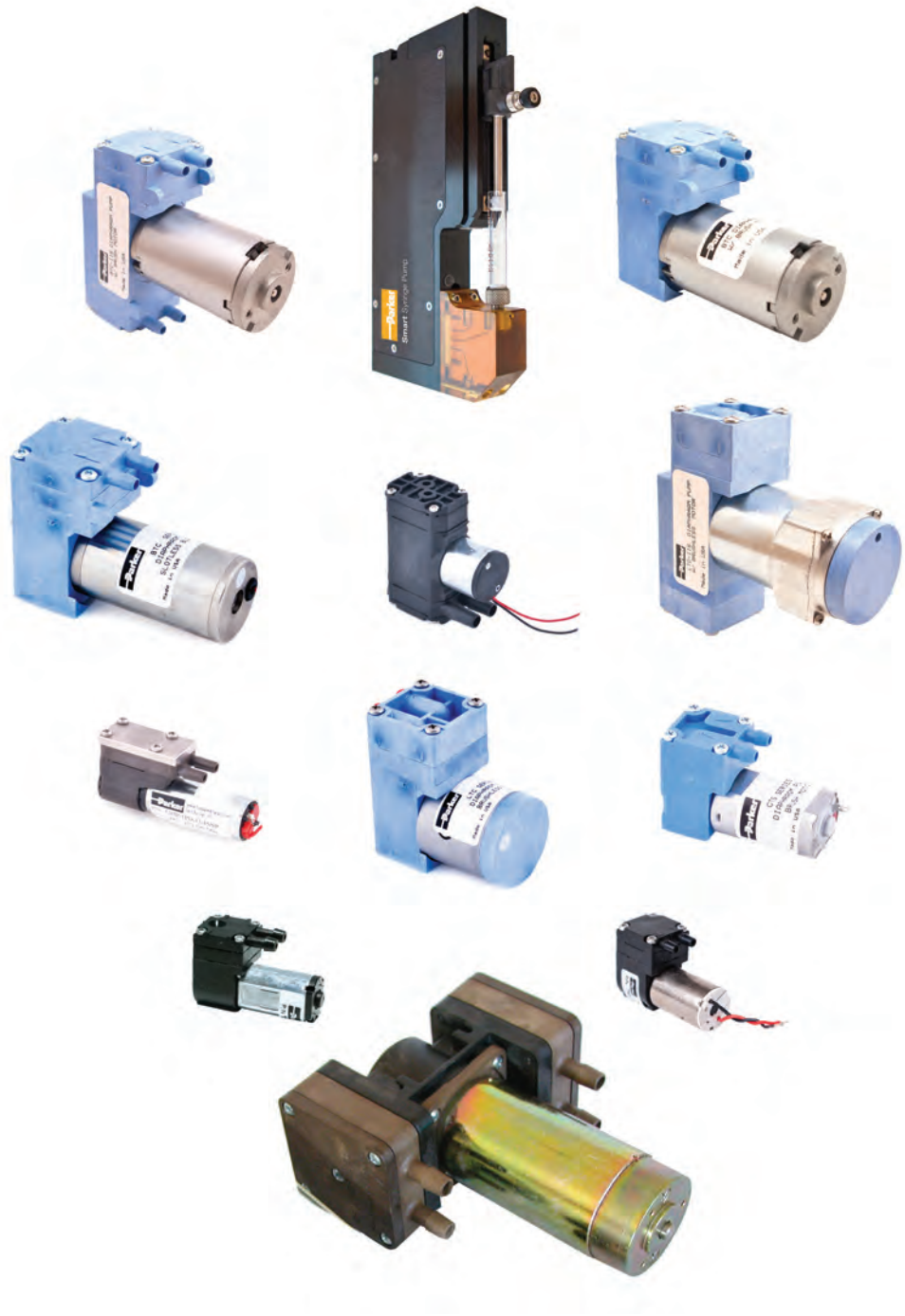


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Miniature Pumps

Precision Fluidics

Parker

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.

Parker

www.parker.com/precisionfluidics 1 800 525-2857

Table of Contents

Smart SyringePump

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.

Markets:

- Clinical Diagnostics
- Analytical Chemistry

Typical Applications

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

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

Product Specifications

Performance

Drive Type:
Lead nut screw with guide rail, Servo motor with high resolution encoder
Precision:
≤0.1% CV full stroke ≤0.5% CV 10% of full stroke at point of dispense (measured fluidically)
Accuracy:
± 1.0 % full stroke ± 2.0 % at 10% full stroke at point of dispense (measured fluidically)
Resolution:
228,495 steps full scale 0.22nL per step (50 µL syringe)
Minimum Flow Rate:
7.5 nL/sec (50 µL syringe), non pulsatile flow
Stroke Speed:
1 sec to 111 minutes full stroke
Valve Switching Speed:
<50 msec open/close
Pressure:
29 PSIG (2.0 bar)
Syringe Barrel Volumes Supported:
50 µL to 1mL, Standard 30 mm XP type syringe barrels

Physical Properties

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

Electrical

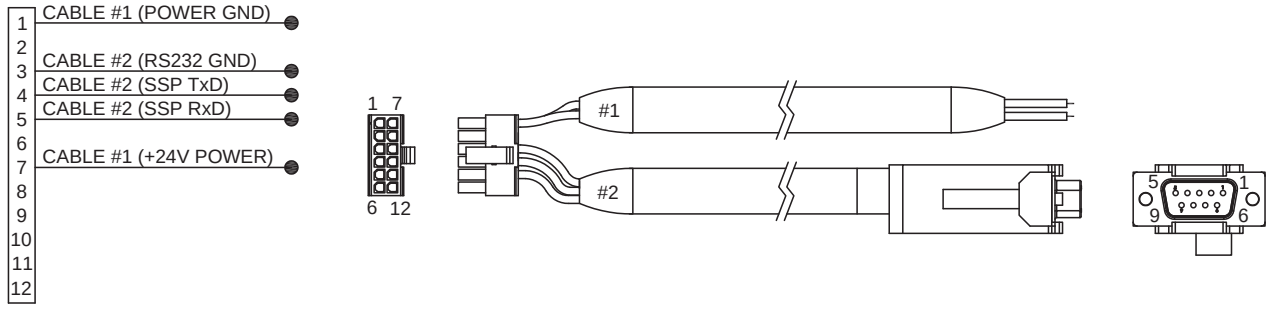
Electrical/Communications Termination:
12 Pin Molex® Micro-Fit Connector
Power:
24 VDC ± 5%,<1 Amp
Command Set:
Cavro® scripting language Smart Syringe Pump command library
Communications:
Interface: CAN, RS-232 Baud Rate: RS232: 9,600, 14,400, 19,200, 38,400, 57,600 and 115,200 CAN: 20K, 50K, 125K,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

Wetted Materials

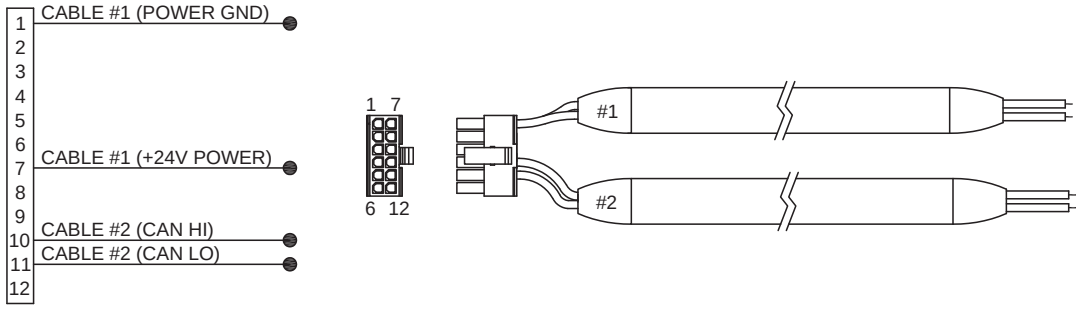
Manifold:	**Valve Body:**
Polyetherimide (ULTEM® 1000)	PEEK
Valve Diaphragm and Gasket:	
FFKM (KALREZ®)	

Electrical Interface

RS232 Wiring Diagram



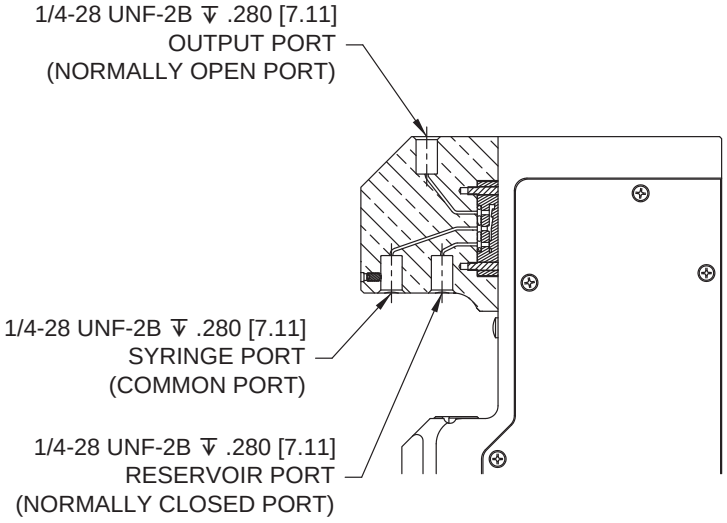
CAN Wiring Diagram

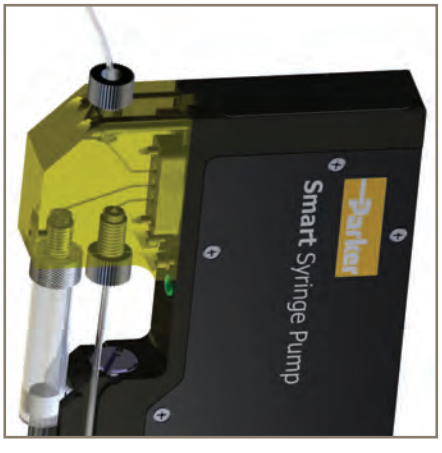


Molex® Connector, Female 12 position Micro – Fit 3.1, Molex® # 43025-1200

Molex® Terminal crimp socket, 20-24 AWG, Molex® # 43030-0007

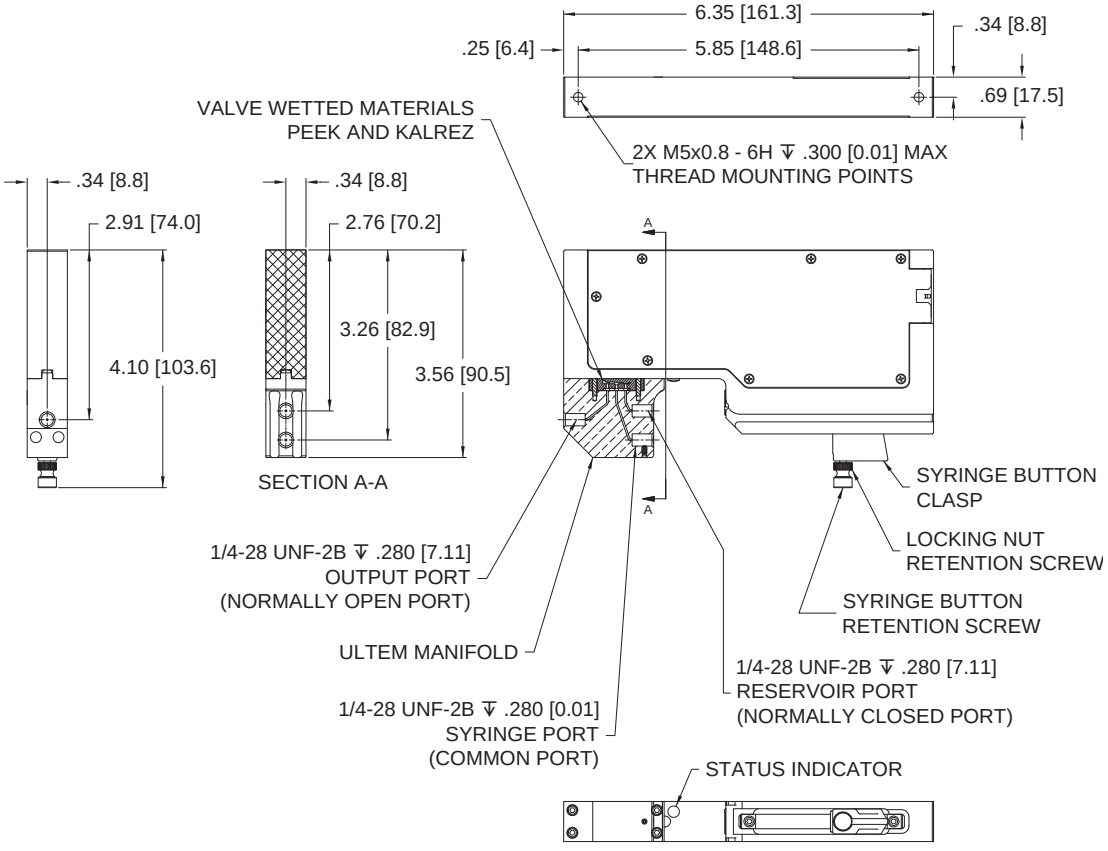
Fluidic Interface



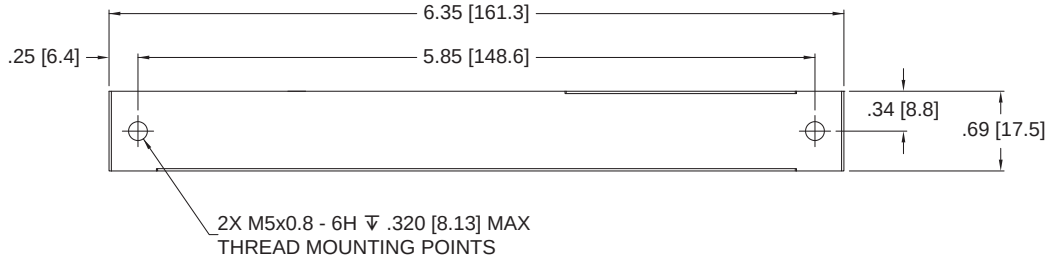


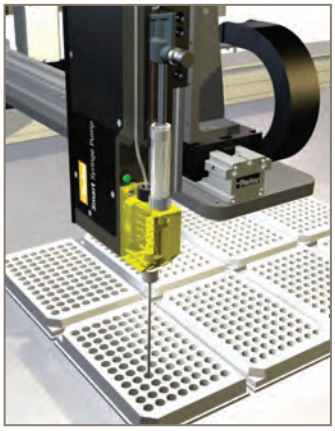
Leak diversion features built in to prevent damage to the pump in the event of leakage

Wetted Materials and Dimensions



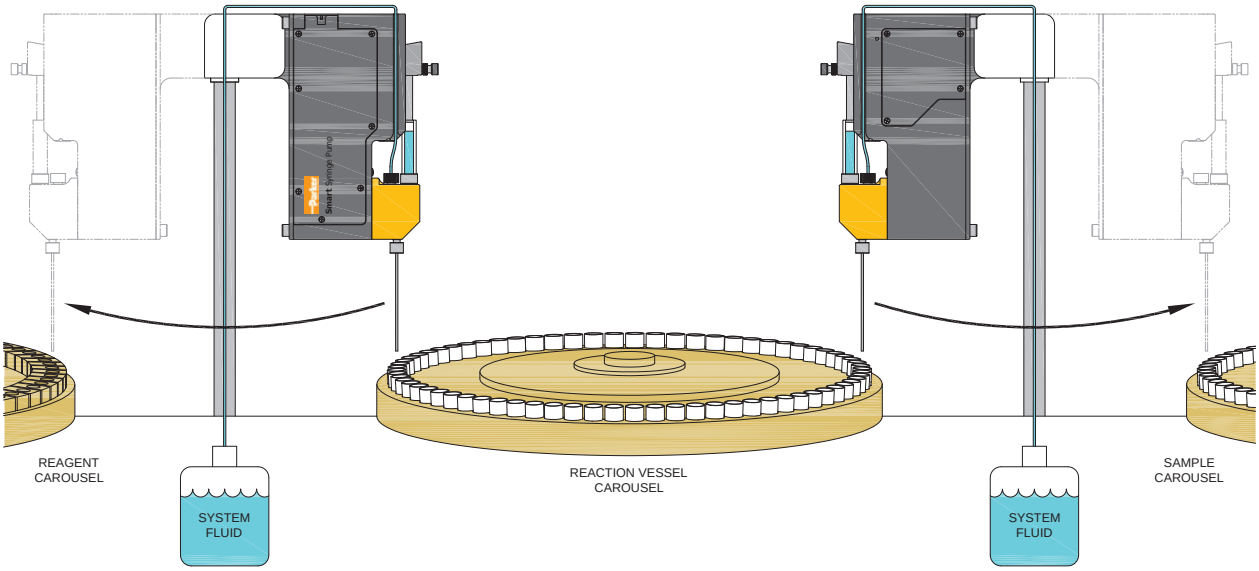
Mounting Dimensions





Typical Flow Diagram

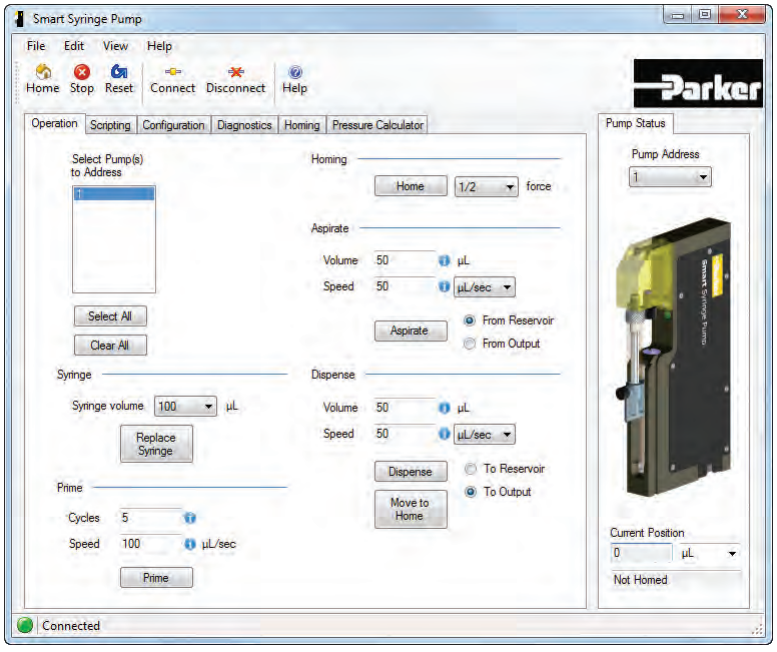
IVD Sampling & Reagent Addition System



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

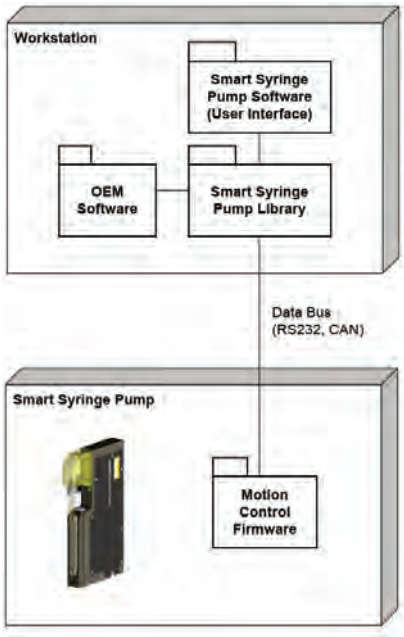
Software



- 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

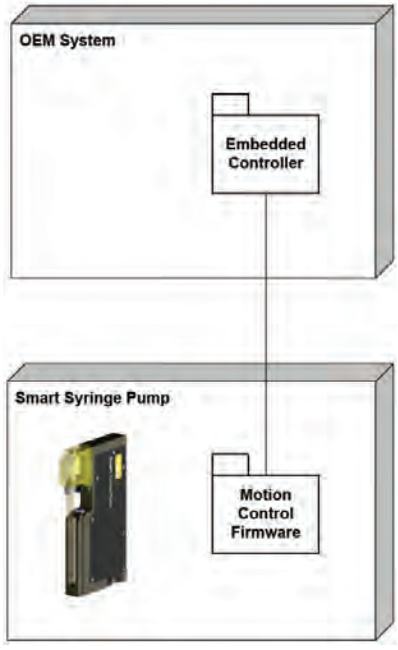
Smart Syringe Pump Software Libraries and Control

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

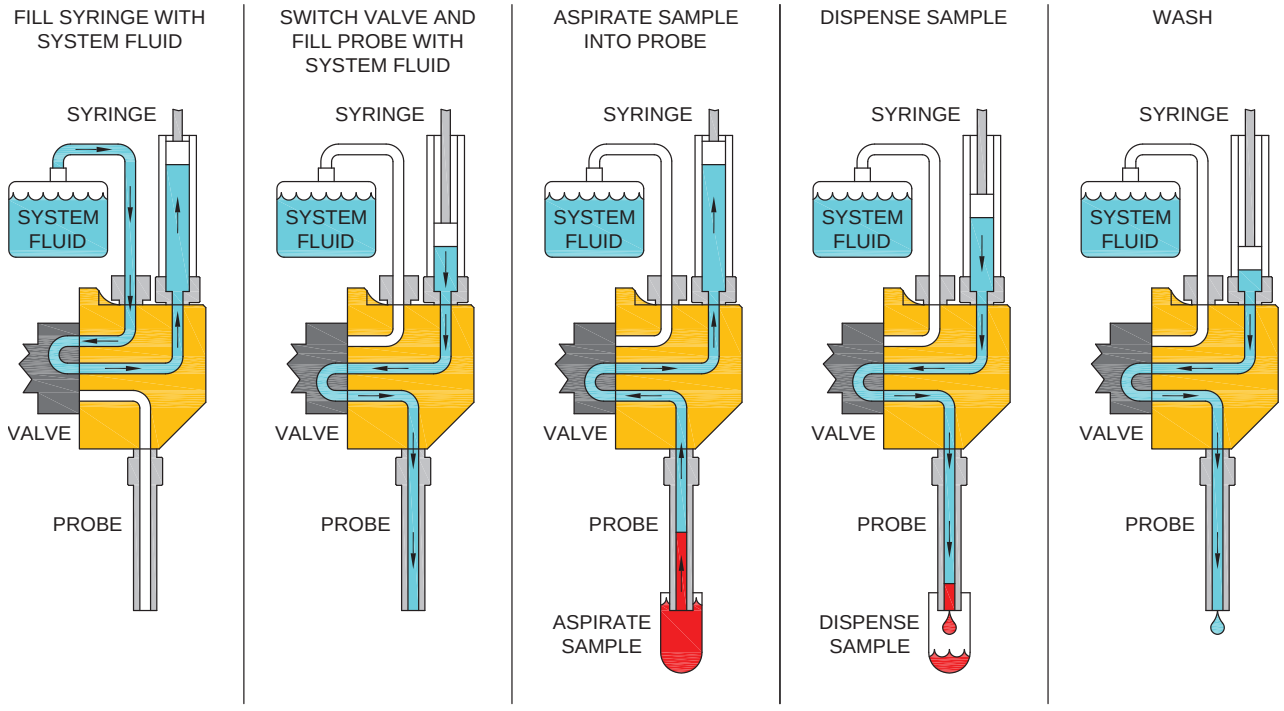


Smart Syringe Pump Using Embedded Controller

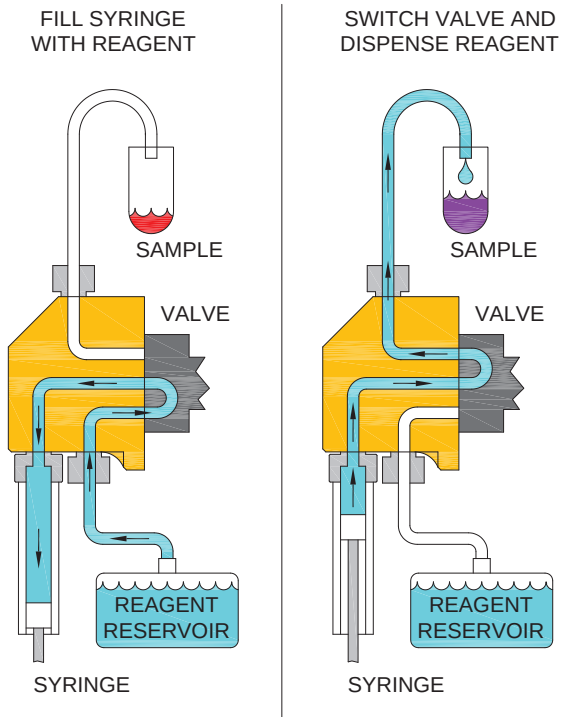
- Commands sent directly from the OEM System embedded controller to the motion control firmware built into the Smart Syringe Pump
- Supports RS232 and CAN communications

Fluid Flow Diagrams

Sampling



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
Organic Acids - Dilute	1	1	1-2
Non Organic Acids - Dilute	1	1	1
Bases - Dilute	1	1	1
Saline	1	1	1
Bleach 12%	2	1-2	4
Sodium Hydroxide 20%	1	1	4

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

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 not be considered

Regulatory

Regulatory: CE

EMC:

FCC Part 15 Subpart B, Class B

EMC Directive (2004/108/EC)

EN 61326-1:2006 Standard

- CISPR 11 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	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
990-000445-001	Evaluation Kit

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 graphicaluser 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) 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 ApplicationsEngineering:

- 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

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Precision Fluidics Division
26 Clinton Dr., Unit 103
Hollis, NH 03049
phone: +1 603 595 1500
email: ppfinfo@parker.com
www.parker.com/precisionfluidics

T2-05

Micro Diaphragm Pumps (air/gas)

Up to 800 mLPM Free Flow

Parker's T2-05 13.5 mm wide micro diaphragm pump is designed to fit where other pumps cannot due to its small, compact package size. The T2-05 flow path is optimized to deliver high flow with high efficiency resulting in extended battery life. The pump's low power, small size, and light weight play a critical role in portable gas detection and medical applications. The T2-05 pump HE and LI pump models enable intrinsic safety capabilities for sampling of hazardous gases, typical of industrial and mining operations. The T2-05-IC is designed for non-explosive environment gas detection instruments and for portable medical devices used in wound therapy and patient monitoring applications.

Typical Markets

- Safety
- Patient Therapy
- Patient Monitoring

Typical Applications

- Portable Gas Detection
- Gas Sampling
- Medical Instruments
- Trace Detection
- Sidestream CO_2
- Negative Pressure Wound Therapy

Features

- The valve design has been optimized to provide the highest flow rates available with the lowest current draw, allowing for longer battery life and smaller instrument size.
- The T2-05 model pump life ranges up to 10,000 rated hours depending on motor (HE, LI and IC) options
- The pump fits into the extremely tight spaces demanded of today's handheld instruments, such as portable gas detectors and portable negative pressure wound therapy devices for patient mobility. The lightweight design minimizes instrument weight.
- RoHS compliant.

Product Specifications*

Physical Properties

Operating Environment[1]:
-4 to 122°F (-20 to 50°C)
Storage Environment:
14 to 122°F (-10 to 50°C)
Media:
Air, Argon, Helium, Nitrogen, Oxygen, and other non-reacting gases
Humidity:
Most non-condensing gases 5-95% Relative Humidity
Noise Level[2]:
As low as 45dB
Pump Assembly Rated Life[3]:
Coreless Motor-Pump (HE): Up to 10,000 hours Coreless Motor-Pump (LI): Up to 4,000 hours PMDC Iron Core-Pump (IC): Up to 1,500 hours
Weight:
0.5 oz (14 g) HE and LI 0.4 oz (11 g) IC

Electrical

Motor Type (DC):
High Efficiency Coreless Brush (HE) Low Inductance Coreless Brush (LI) PMDC Iron Core Brush (IC)
Nominal Motor Voltages (DC)[4]:
3.3 VDC
Max Power at Nominal Voltage:
0.36 Watts
Electrical Termination:
HE: Wire Leads LI: Wire Leads IC: Solder Tabs
Current Range[5]:
34 - 105 mA
Inductance[6]:
HE: 0.28 mH maximum @ 1kHz/50mV LI: 0.05 mH maximum @ 1kHz/50mV IC: 4.07 mH maximum @ 1kHz/50 mV

Pneumatic

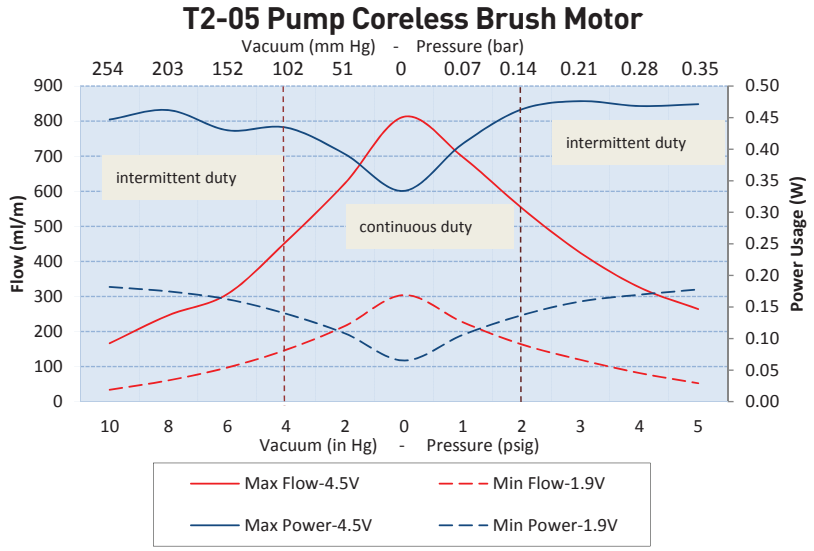
Head Configuration: Single
Maximum Flow:
HE, LI: 800 smlpm, IC: 700 smlpm
Maximum Intermittent Pressure[7]:
6.2 psi (430 mbar)
Maximum Continuous Pressure:
2.0 psi (138 mbar)
Maximum Intermittent Vacuum[7]:
10.8 in Hg (274 mm Hg)
Maximum Continuous Vacuum:
4.1 in Hg (104 mm Hg)
Filtration:
40 micron recommended
Efficiency at Free Flow[8]:
LPM/Watt: 4.66 @ 1.9 VDC (*P/N T5-1HE-03-1EEB*) LPM/Watt: 4.08 @ 1.9 VDC (*P/N T5-1LI-03-1EEB*) LPM/Watt: 3.12 @1.9 VDC (*P/N T5-1IC-03-1EEP*)

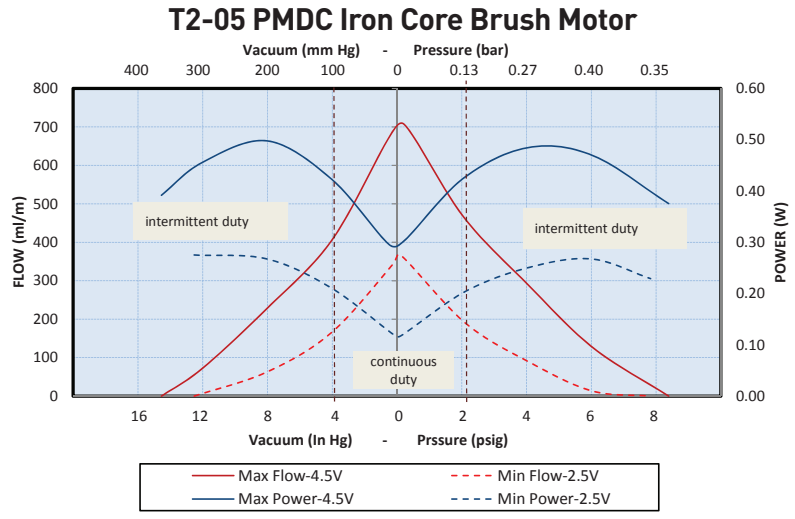
Wetted Materials

Diaphragm: EPDM	**Valves:** EPDM	**Pump Head:** ABS

* See Appendix A for details.

Performance Specifications



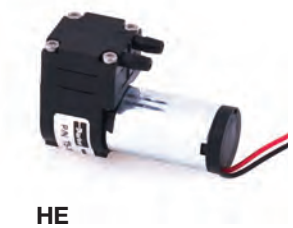


The above graphs represent examples of performance for the pumps series handling air at 800 feet (244M) above sea level at 75° F (24° C). Performance will vary depending on barometric pressure and media temperature. Curves are representative of standard pump configurations. Pump configurations could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

Please contact Parker Precision Fluidics Applications Engineering for other considerations

T2-05 Micro Diaphragm Pumps (air/gas)

Sizing and Selection

T2-05 Series	Coreless Brush Motor (High Efficiency)	Coreless Brush Motor (Low Inductance)	PMDC Iron Core Motor (Iron Core)
			
	HE	**LI**	**IC**
Inductance[6]	Better	Best	Good
Efficiency at Free Flow[8]	Best	Best	Better
Life[3]	Best	Better	Good
Cost	Good	Better	Best

Mounting Guidelines:

- Parker recommends using a nylon cable tie with a length of at least 4" (100 mm).

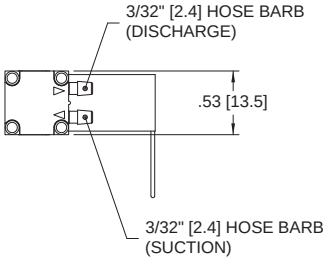
Port Connections:

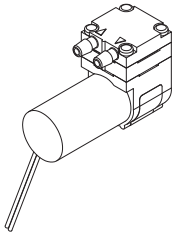
- Barbs are sized for 3/32" ID tubing.

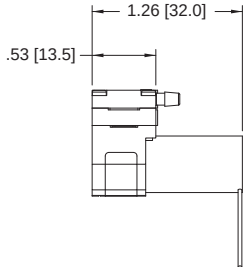
Mechanical Integration

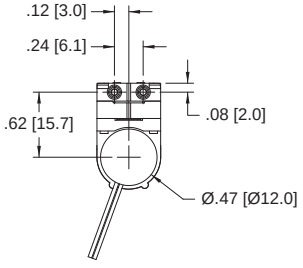
Dimensions

Coreless Brush/HE Version



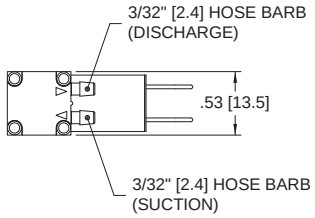


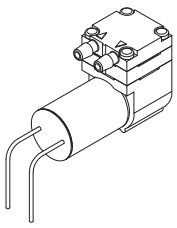




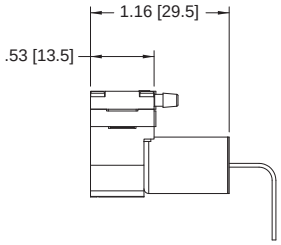
Mechanical Integration

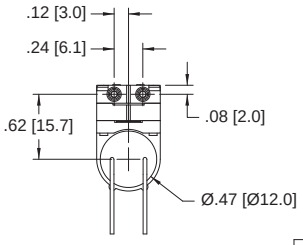
Dimensions





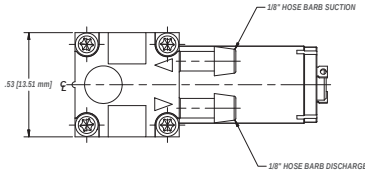
Coreless Brush/LI Version

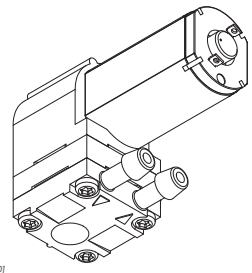


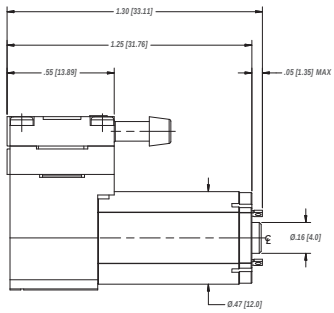


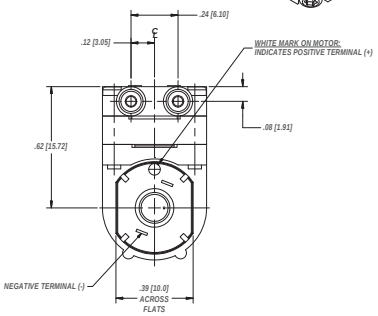
UNITS
IN. [mm.]

PMDC Iron Core/IC Version









INITS
IN. [mm]

Electrical Integration and Motor Control

Coreless Brush Motor (HE, LI)

2 Wire	Red (+), Black (-)
Wire specification	28 AWG 5.7" (145 mm) Wire Leads

PMDC Iron Core Brush Motor (IC)

Tabs	Standard solder tabs for electrical connection

Key Things to Remember

5.7" (145 mm) flying Leads are the standard electrical connection method to the pump. Contact Parker Engineering for other connection requirements.

Pump life is highly dependent on operating conditions. It is not recommended to run the pump continuously, 100% duty cycle, at higher than 2 psig.

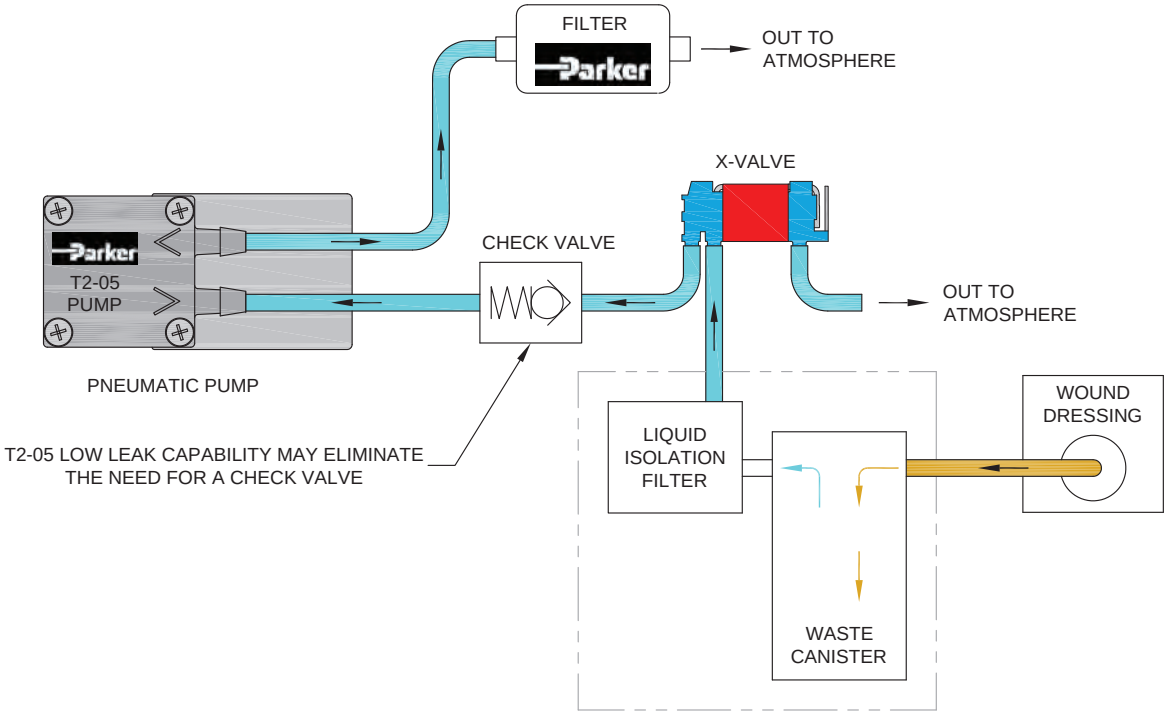
The pump flow and pressure can be controlled by adjusting the input voltage from zero to maximum rated voltage.

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.

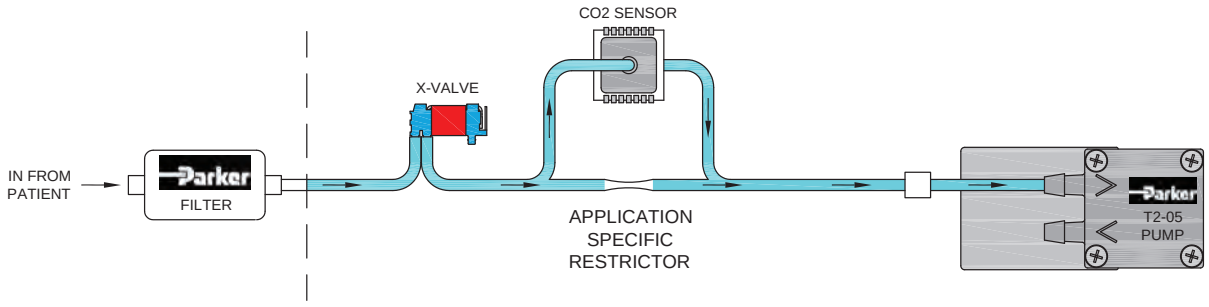
Typical Flow Diagram

Negative Pressure Wound Therapy Diagram



Typical Flow Diagram

Side Stream Capnography Diagram



Ordering Information

T2-05 Micro Pumps

Configuration	Vacuum: LPM @ Load			Free Flow	Pressure: LPM @ Load			Max				PCD*	Wetted Materials
	12 in Hg 305 mm Hg	8 in Hg 203 mm Hg	4 in Hg 102 mm Hg	0	2 psig 134 mbar	4 psig 276 mbar	6 psig 414 mbar	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
T5-1HE-03-1EEB		0.2	0.5	**0.8**	0.6	0.3		10.8	6.2	Coreless Brush	4.5	438	EPDM
T5-1LI-03-1EEB		0.2	0.5	**0.8**	0.6	0.3		10.8	6.2	Coreless Brush	4.5	438	EPDM
T5-1IC-03-1EEP		0.2	0.5	**0.7**	0.5	0.3		10.0	6.2	PMDC	4.5	240	EPDM

*PCD: Peak Current Draw

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

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/t5) to configure your T2-05 Micro Diaphragm Pump.

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

ORDER ON-LINE

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. Inductance is an indicator of induced voltage with change in current and it is a key parameter to enable customers' low energy intrinsic safety systems

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. 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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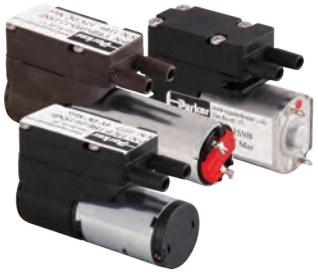
Notes

T2-03

Micro Diaphragm Pumps (air/gas)

Up to 2.5 LPM Free Flow



T2-03 micro diaphragm pump series is ideal for higher performance, fixed and portable air and gas detection, and medical applications requiring flow up to 2.5 lpm. T2-03 pumps are proven in fixed and portable applications for sampling of hazardous gases and vapors typical of industrial and mining operations.

Typical Applications

- Gas Sampling
- Fixed Gas Detectors
- Medical Instruments
- Aerosols and Particle Analysis
- Combustion Analyzers

Features

- The valve design has been optimized to provide the highest flow rates available with the lowest power draw in this package size. Lower power results in longer battery life and smaller instrument size.
- The wear components of these pumps have been designed to provide maximum life. Many applications for these pumps require 10,000+ hours of operation.
- The pumps fit into the extremely tight spaces demanded of today's handheld instruments, such as portable gas detectors and portable instruments such as handheld gas detectors and medical devices. The lightweight design minimizes instrument weight.
- RoHS compliant.

Product Specifications*

Physical Properties

Operating Environment[1]:
32 to 122°F (0 to 50°C)
Storage Environment:
14 to 122°F (-10 to 50°C)
Humidity:
5-95% Relative Humidity
Noise Level[2]:
As low as 45dB
Pump Assembly Rated Life[3]:
eCompact - 5,000 hrs Compact - 10,000 hrs HP - 10,000 hrs *Pressure and speed dependent.*
Weight:
1.2 oz. (33 g) eCompact 1.2 oz. (33 g) Compact 1.5 oz. (42 g) HP

Wetted Materials

Diaphragm:
Neoprene, EPDM, FKM
Valves:
Silicone, FKM
Pump Head:
ABS, PPS

Electrical

Motor Type:
PMDC Iron Core Brush, Coreless Brush
Nominal Motor Voltages[4]:
4, 5.6, 8.3, 12.4 VDC
Max Power at Nominal Voltage:
eCompact - PMDC Iron Core Brush
2.4 Watts (298 mA @ 8VDC)
Compact - Coreless Brush Motor 2.3 Watts (386 mA @ 6 VDC)
HP - Coreless Brush Motor 0.7 Watts (88 mA @ 8 VDC)
Electrical Termination:
PMDC Iron Core Brush - Solder Tabs Coreless Brush - 5.7 in (145 mm) Wire Leads
Current Range[5]:
18 - 411 mA
Inductance[6]:
eCompact: 18.64 mH max@1kHz/50mV Compact: 0.47 mH max@1kHz/50mV HP: 3.4 mH max@1kHz/50mV

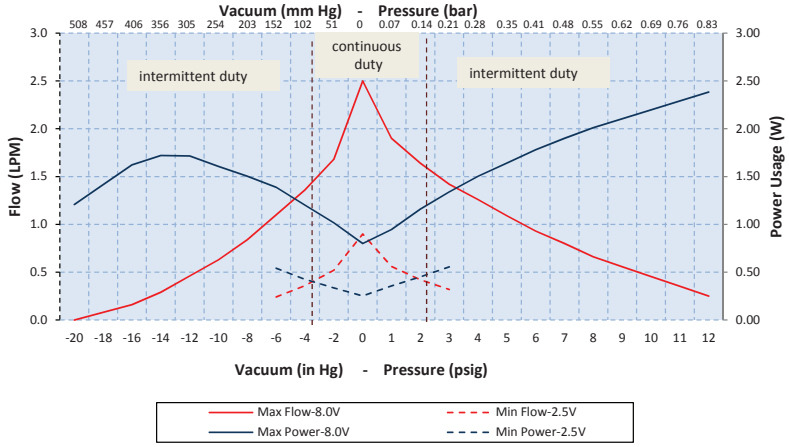
Pneumatic

Head Configuration:
Single
Maximum Flow:
2.5 LPM
Maximum Intermittent Pressure[7]:
12 psi (832 mbar)
Maximum Continuous Pressure:
2 psi (138 bar) - eCompact PMDC Iron Core Brush, Compact Coreless Brush Motor 8 psi (555 mbar) - HP Coreless Brush Motor
Maximum Intermittent Vacuum[7]:
20.8 in Hg (527 mm Hg)
Maximum Continuous Vacuum:
eCompact PMDC Iron Core Brush 4 psi (102 mbar) Compact Coreless Brush Motor 4 psi (102 mbar) HP Coreless Brush Motor 12 psi (305 mbar)
Filtration:
40 micron recommended
Efficiency at Free Flow[8]:
eCompact PMDC Iron Core Brush Motor: 3.56 LPM/Watt (*P/N: T3EP-1ST-05-3FFP*) Compact Coreless Brush Motor: 11.92 LPM/Watt (*P/N: T3CP-1HE-04-2SEB*) HP Coreless Brush Motor: 15.28 LPM/Watt (*P/N: T3HP-1PD-12-1SNP*)

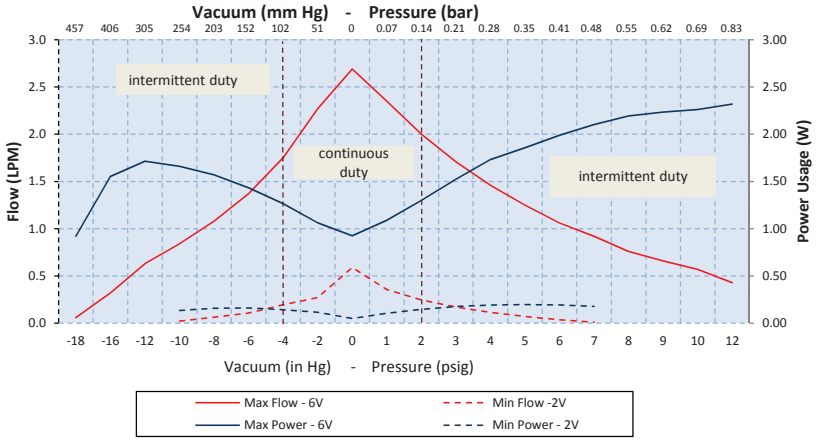
* See Appendix A for details.

Performance Specifications

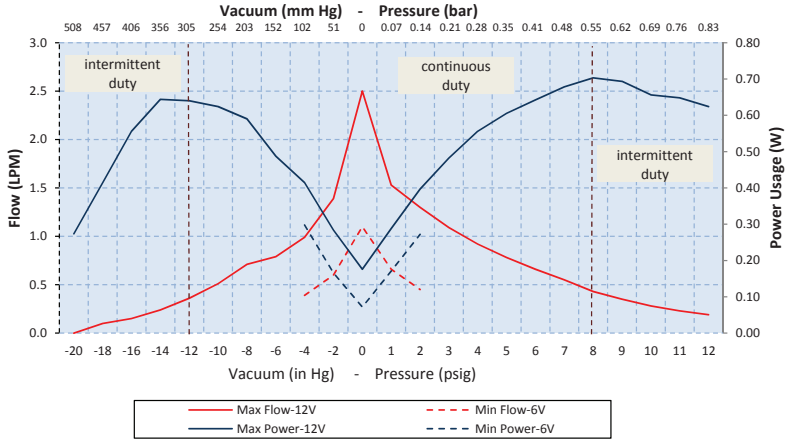
T2-03 e-Compact - PMDC Iron Core Motor



T2-03 Compact Pump - Coreless Brush Motor



T2-03 HP - Coreless Brush Motor



The above graphs represent examples 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.

T2-03 Micro Diaphragm Pumps (air/gas)

Sizing and Selection

T2-03 Series	PMDC Iron Core Brush Motor (eCompact)	Coreless Brush Motor (Compact)	Coreless Brush Motor (HP)
			
	eCompact	**Compact**	**HP**
Inductance[6]	Good	Best	Better
Efficiency at Free Flow[8]	Good	Better	Best
Life[3]	Good - 5,000 hours	Best - 10,000 hours	Best - 10,000 hours
Size/Weight	Better	Best	Good
Cost	Best	Better	Good

Mounting Guidelines:

- For eCompact, Parker recommends mounting with (2) #1 screw or using a nylon cable tie with a length of at least 4" (100 mm)
- For Compact & HP, Parker recommends using a nylon cable tie with a length of at least 4" (100 mm)

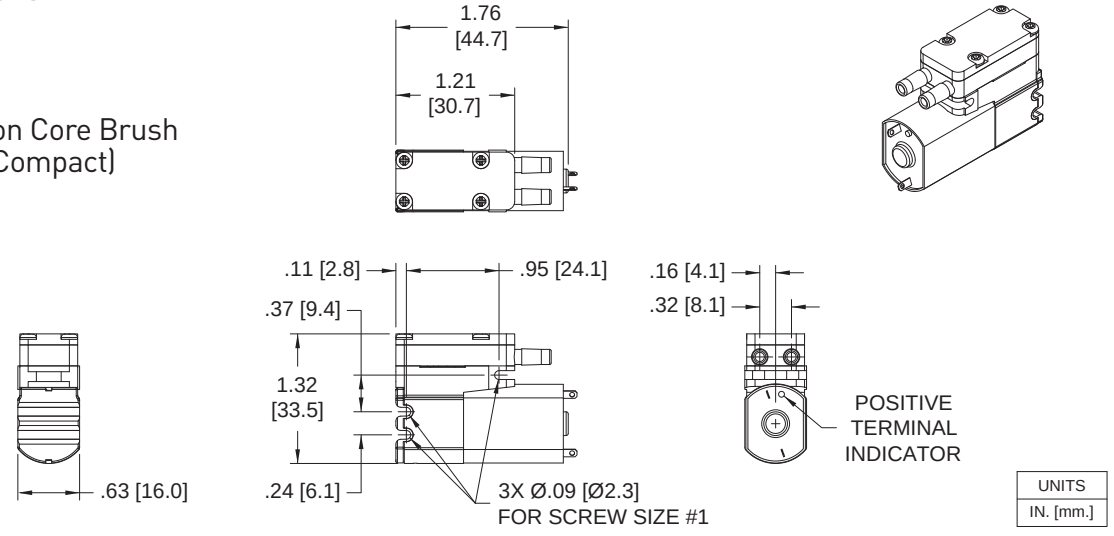
Port Connections:

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

Mechanical Integration

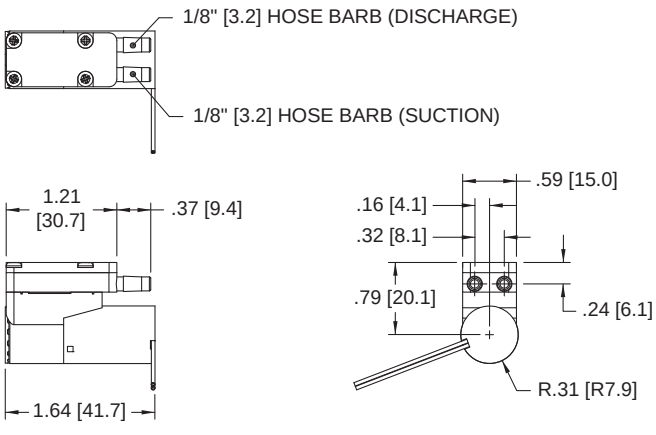
Dimensions

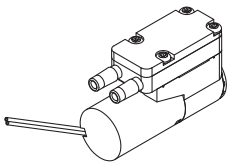
PMDC Iron Core Brush Motor (eCompact)



Dimensions

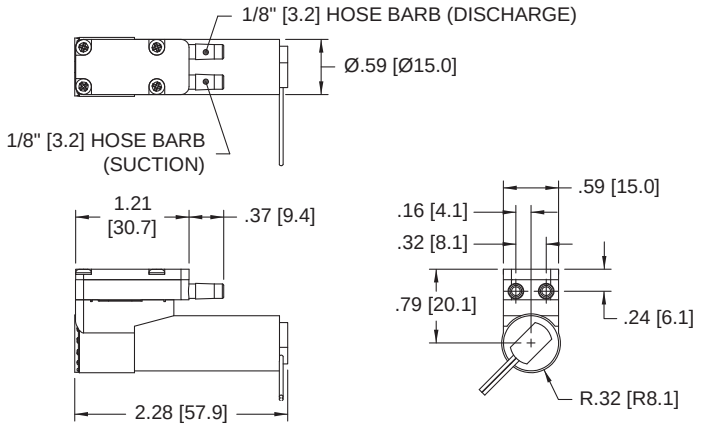
Coreless Brush Motor (Compact)

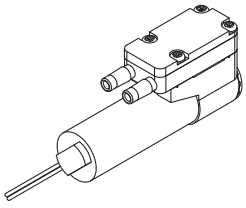




UNITS
IN. [mm.]

Coreless Brush Motor (HP)





UNITS
IN. [mm.]

Electrical Integration and Motor Control

If application requires variable flow, motor control options are available, as follows:

PMDC Iron Core Brush Motor (eCompact)

2 Solder Tabs	Positive terminal marked on pump motor

Coreless Brush Motor (Compact & HP)

2 Wire	Red (+), Black (-)
Wire specification	28 AWG Wire lead length 5.7” (145 mm)

Electrical Integration and Motor Control cont'd

Key Things to Remember

5" (127 mm) flying Leads are the standard electrical connection method to the pump (eCompact standard connection is tabs). Contact Applications for other connection requirements.

The pump lead wires are non-polarized.

The pump can be controlled by DC voltage or PWM. The minimum recommended PWM frequency is 20kHz.

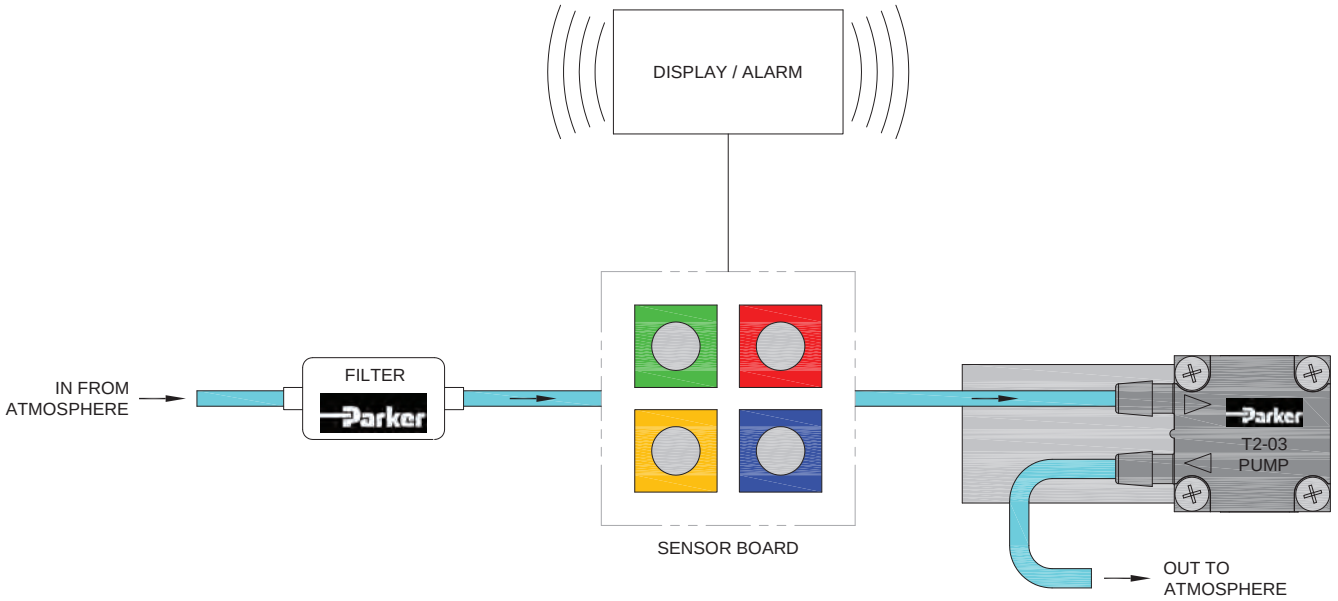
The pump flow and pressure can be controlled by adjusting the input voltage from zero to maximum rated voltage.

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.

Typical Flow Diagram

Hand Held Gas Detection



Ordering Information

T2-03 Micro Pumps

Configuration	Vacuum: LPM @ Load					Free Flow	Pressure: LPM @ Load					Max				PCD[1]	Wetted Materials[2]
	18 in Hg 457 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	2 psig 134 mbar	4 psig 276 mbar	6 psig 414 mbar	8 psig 552 mbar	10 psig 689 mbar	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
T3CP-1HE-04-1SNB				0.3	0.9	**2.5**	1.1	0.5				8.6	4.5	Coreless Brush	4	313	CR, VMQ, CR
T3CP-1HE-04-2SEB				0.1	0.3	**1.1**	0.5	0.2				10.4	5.5	Coreless Brush	4	103	EPDM, VMQ, CR
T3CP-1HE-06-1SNB				0.6	1.2	**2.8**	1.5	0.8	0.5			12.2	6.5	Coreless Brush	6	317	CR, VMQ, CR
T3EP-1ST-05-3FFP			0.3	0.6	0.8	**1.5**	1.2	0.7	0.6	0.4		16.7	11.7	PMDC Brush	5.6	411	FKM
T3EP-1ST-08-1SNB		0.2	0.6	0.7	1.3	**2.5**	1.6	1.2	0.7	0.6		20.8	10.5	PMDC Brush	8.3	385	CR, VMQ, CR
T3HP-1PD-12-1SNP		0.2	0.4	0.7	1.0	**2.5**	1.3	0.9	0.7	0.4	0.3	18.0	12	Coreless Brush	12.4	97	CR, VMQ, CR

1. PCD: Peak Current Draw 2. CR: Neoprene, VMQ: Silicone, FKM: Fluorocarbon, EPDM: Ethylene Propylene Diene Monomer

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/t3) to configure your T2-03 Micro Diaphragm Pump.

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

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. Inductance can be used to measure the viability of a component in a device requiring intrinsic safety.

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. 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

CTS Series

Micro Diaphragm Pumps (air/gas)

2.5 LPM Free Flow

Parker's CTS Micro Diaphragm Pump Model delivers up to 2.5 slpm of flow into a compact 20 mm wide package. Configurable with three different motors to meet your application's specific needs and life expectations

Typical Applications:

- Gas Analyzers
- Patient Monitoring
- CO_2 Monitors
- Compression Therapy
- Negative Pressure Wound Therapy
- Surgical Instruments
- Medical Consumer Devices

Features

- CTS Series Pumps set the highest benchmark for service free life-expectancy with our advanced proprietary diaphragm elastomer.
- CTS Series Pumps have a unique, compact, and lightweight design making it ideal for portable applications.
- Our 100% oil and grease-free pump and compressor design maintains the purity of your system and are commonly used in FDA-approved systems.
- CTS Series Pumps are uniquely balanced to minimize noise and vibration and to maximize life.
- 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 - 1,500 hrs
Coreless Brush - 3,000 hrs
Brushless Slotless - 10,000 hrs
Weight:
1.7 oz. (48 g) PMDC Iron Core Brush
1.6 oz. (45 g) Coreless Brush
2.2 oz. (62 g) Brushless Slotless

Electrical

Motor Type (DC):
PMDC Iron Core Brush
Coreless Brush
Brushless Slotless
Nominal Motor Voltages[4]:
PMDC Iron Core Brush: 6, 9, 12, 24 VDC
Coreless Brush: 6, 9, 12, 24 VDC
Brushless Slotless: 6, 9, or 12 VDC
Other voltages available upon request.
Electrical Termination:
Iron Core Brush: Metal Terminals
Brush: 24 AWG Wire Leads, Length 20" (508 mm)
Brushless Slotless: 24 AWG Wire Leads, Length 20" (508 mm)
Current Range[5]:
240 - 880 mA

Pneumatic

Head Configuration:
Single
Maximum Unrestricted Flow:
2.5 LPM
Pressure Range:
0 - 24 psig (0 - 1.65 bar)
Vacuum Range:
0 - 20 in Hg (0 - 508 mm Hg)
Filtration:
40 microns - recommended
Efficiency at Free Flow[6]:
PMDC Iron Core Brush: 1.7 LPM/Watt (*PN: E107-12-090*)
Coreless Brush: 2.8 LPM/Watt (*PN: E165-11-060*)
Brushless Slotless: 1.8 LPM/Watt (*PN: E247-12*)

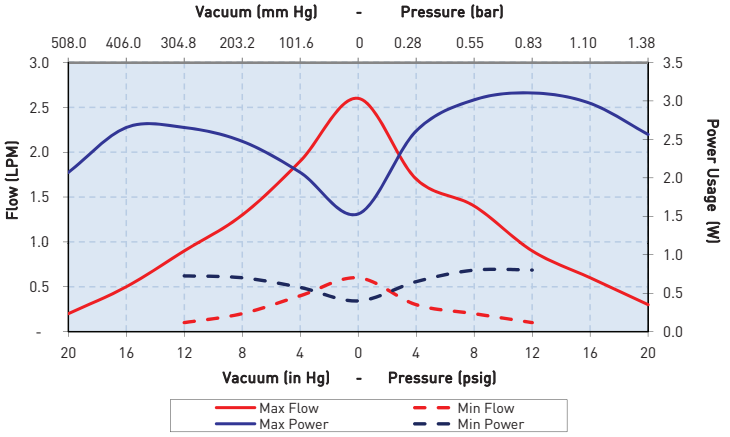
Wetted Materials

Diaphragm:
EPDM, AEPDM, Viton
Valves:
EPDM, AEPDM, Viton
Pump Head:
PSU (Polysulfone)

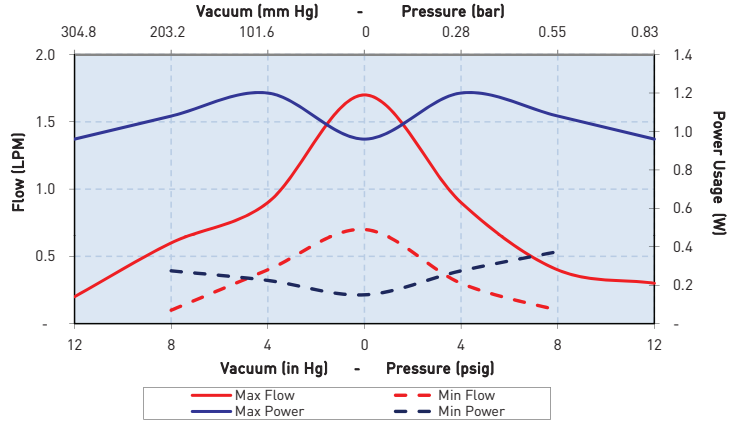
* See Appendix A for details.

Performance Specifications

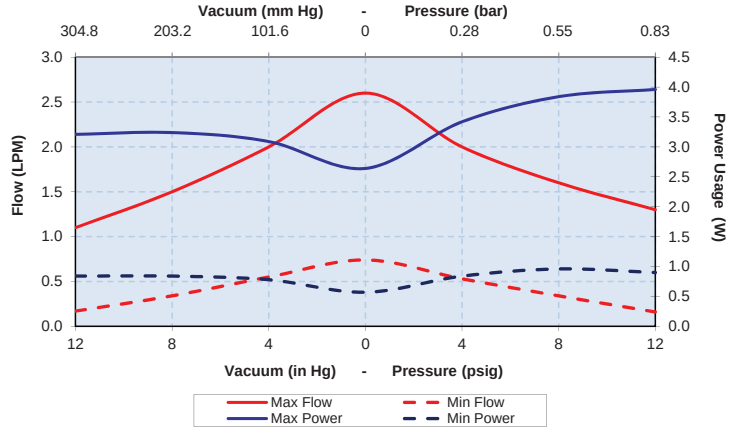
CTS - PMDC Iron Core Brush



CTS - Coreless Brush Motor



CTS - Brushless Slotless Motor



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. 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.

CTS Series

Micro Diaphragm Pumps (air/gas)

Sizing and Selection

CTS Series	PMDC Iron Core Brush	Coreless Brush Motor	Brushless Slotless Motor
			
	PMDC Iron Core Brush	**Coreless Brush Motor**	**Brushless Slotless Motor**
Efficiency[1]	Good	**Best** - Brush Motor Efficiency Up to 90% motor efficiency	**Better** Up to 75% motor efficiency
Life[2]	Good - 1,500 hrs	**Better** - 3,000 hrs	**Best** - 10,000 hrs
Cost	Best	Better	Premium
Noise	Good	Better	Best

See Appendix A for details.

Mounting Guidelines:

- Mounting may be accomplished by using double-sided tape or wire zip ties secured to the motor housing.
- Hole in the center of the bottom of housing is for manufacturing only–not to be used for mounting.

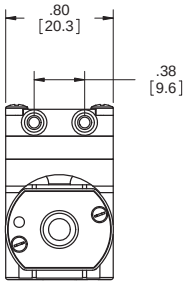
Port Connections:

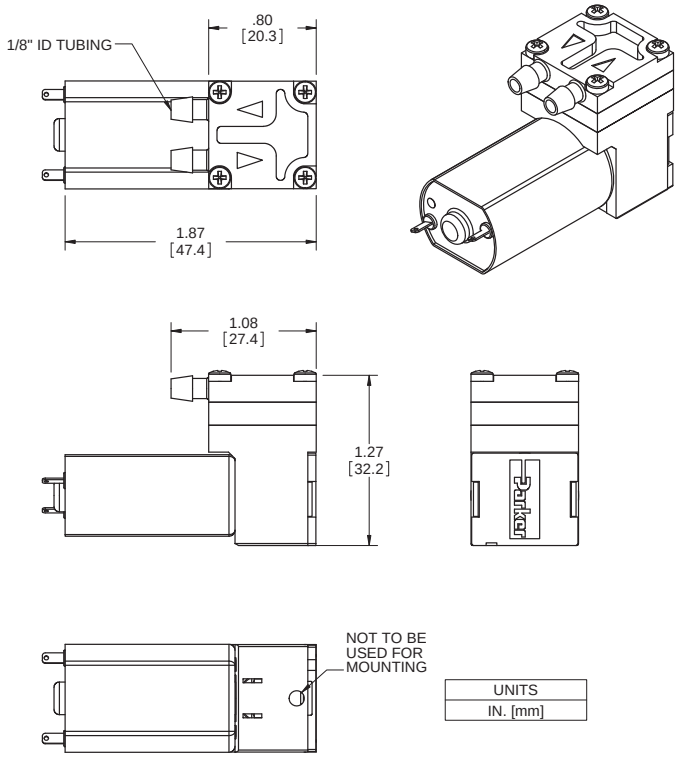
- Barbs are sized for 1/8" (3 mm) ID tubing, 70-80 durometer recommended.
- Flow direction is marked on the pump head with arrows.

Mechanical Integration

Dimensions

PMDC Iron Core Brush

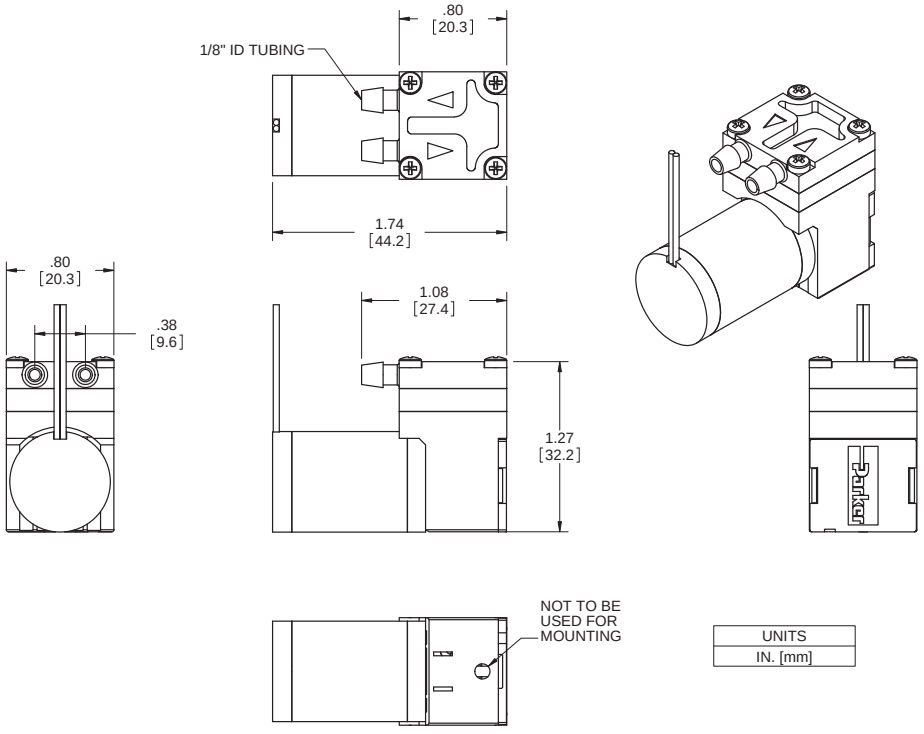




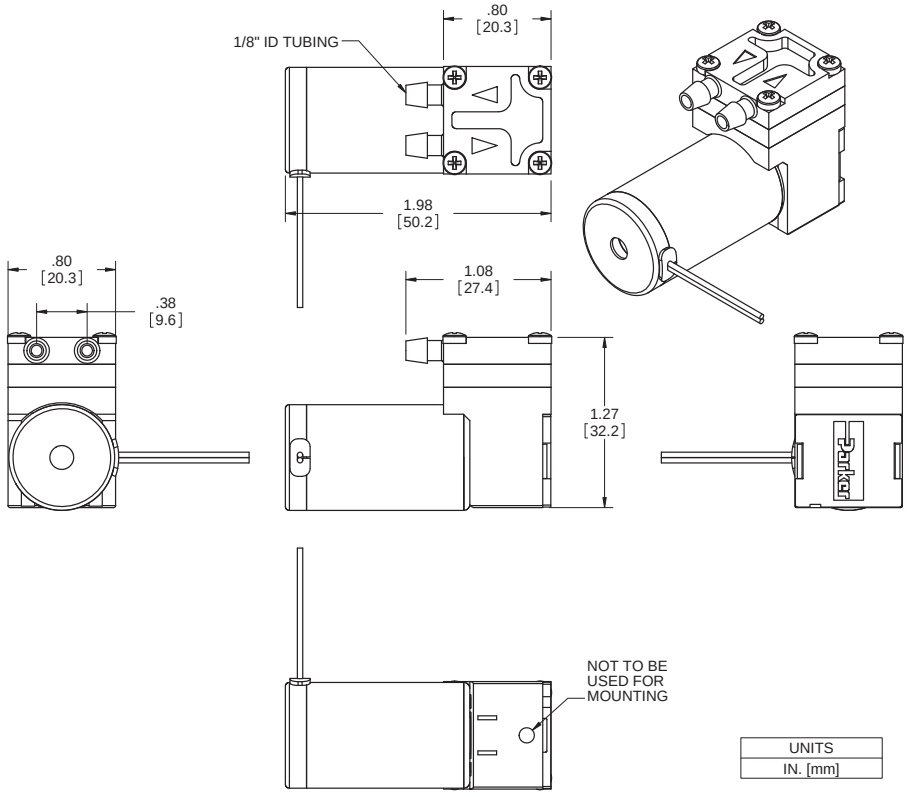
Mechanical Integration

Dimensions

Coreless Brush Motor



Brushless Slotless



CTS Series Micro Diaphragm Pumps (air/gas)

Electrical Integration and Motor Control

PMDC Iron Core Brush Motor

Metal Terminals	Polarity of the terminals is marked on the motor with the red dot marking the positive terminal.

Coreless Brush Motor

2 Wire	Red (+), Black (-)
Wire specification	24AWG, Insulation OD 0.038 in (0.97 mm), 20" (508 mm) Wire Leads

Brushless Slotless

2 Wire	Red (+), Black (-)
Wire specification	24AWG, Insulation OD 0.042 in (1.07 mm), 20" (508 mm) Wire Leads

Key Things to Remember

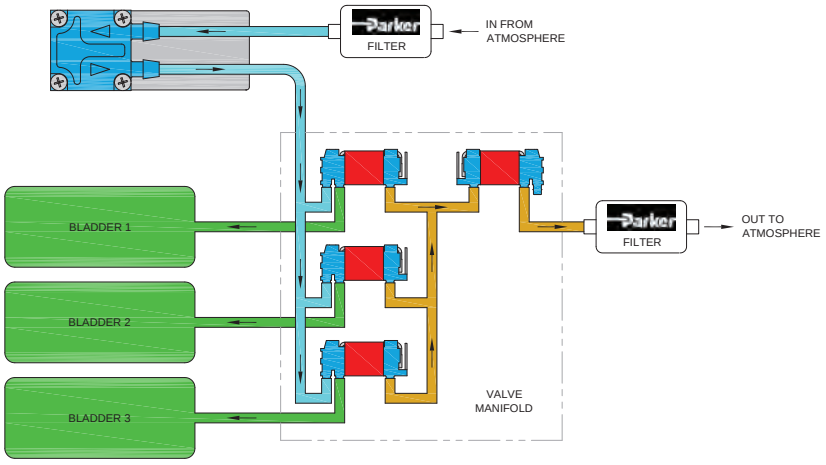
The pump is not a pressure holding device. An external check valve is recommended, if there is a pressure holding requirement.

Onboard PWM control is not provided with this pump.

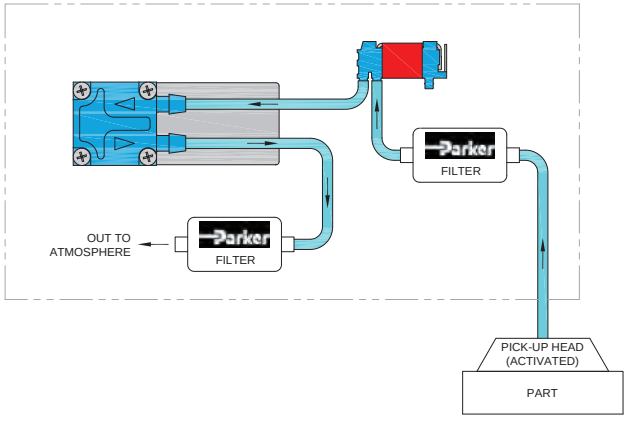
Pump orientation does not affect performance or life.

Typical Flow Diagram

Compression Therapy Prevention (DVT)



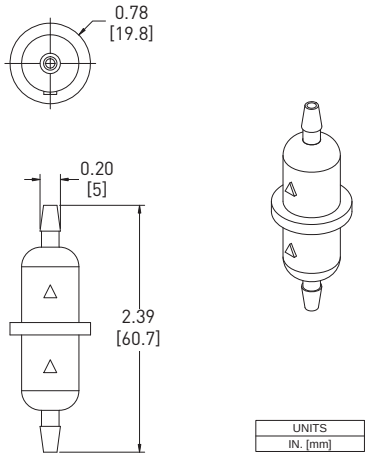
Pick-up Head



Accessory Information

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

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



Variations in motor type, operating voltage, flow, pressure, diaphragm design, stroke length. head orientation, and wetted materials provide multiple choices for an optimal application to meet customer requirements.

Ordering Information

CTS Single Head Pumps - General Purpose

Part No.	Vacuum: LPM @ Load						Free Flow	Pressure: LPM @ Load							Max		Motor Type	VDC	PCD*	Wetted Materials
	24 in Hg 588 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	28 psig 1931 mbar	Vac in Hg	Press psig				Diaphragm Valves-Gasket
E107-12-090		0.2	0.5	0.9	1.3	1.9	**2.6**								22.5		Brush PMDC	9	295	EPDM, EPDM
E129-13-120							**2.6**	1.8	1.4	1.0	0.8	0.5				21.5	Brush PMDC	12	345	AEPDM, EPDM
E107-13-090							**2.5**	1.7	1.4	0.9	0.6	0.3				23.5	Brush PMDC	9	345	AEPDM, EPDM
E129-12-120		0.2	0.5	0.9	1.4	1.9	**2.5**								22.0		Brush PMDC	12	265	EPDM, EPDM
E129-12-090		0.1	0.4	0.6	1.0	1.4	**2.0**								22.0		Brush PMDC	9	250	EPDM, EPDM
E129-13-090							**2.0**	1.3	1.0	0.7	0.5	0.4	0.2			30.0	Brush PMDC	9	330	AEPDM, EPDM
E163-11-120				0.2	0.8	1.2	**2.0**	1.1	0.6	0.3					16.0	14.5	Brush PMDC	12	180	AEPDM, EPDM
E107-12-050			0.1	0.3	0.6	0.9	**1.8**								20.5		Brush PMDC	5	270	EPDM, EPDM
E107-12-060			0.2	0.4	0.7	1.0	**1.8**								20.5		Brush PMDC	6	265	EPDM, EPDM
E257-11					0.8	1.2	**1.8**	1.1	0.7						15.5	14.0	BLDC Slotless	12	175	AEPDM, EPDM
E134-11-120				0.2	0.6	0.9	**1.7**	0.9	0.4	0.3					14.0	14.0	Coreless Brush	12	100	AEPDM, EPDM
E155-11-120				0.3	0.6	1.1	**1.7**	1.2	0.8	0.2					15.0	15.0	Brush PMDC	12	180	EPDM, EPDM
E161-11-060				0.2	0.6	0.9	**1.7**	1.0	0.5	0.1					15.5	15.0	Brush PMDC	6	300	AEPDM, EPDM
E162-11-090				0.3	0.7	1.1	**1.6**	1.0	0.6	0.3					15.5	15.0	Brush PMDC	9	200	AEPDM, EPDM
E165-11-090				0.3	0.7	1.1	**1.6**	1.1	0.7	0.4					15.5	13.5	Coreless Brush	9	140	AEPDM, EPDM
E164-11-060			0.1	0.3	0.6	1.0	**1.5**	1.0	0.6	0.3	0.1				17.0	17.5	Coreless Brush	6	200	AEPDM, EPDM
E155-11-090				0.2	0.5	0.8	**1.3**	0.8	0.4	0.2					15.0	15.0	Brush PMDC	9	170	EPDM, EPDM
E242-12			0.3	0.5	0.7	1.0	**1.3**								22.0		BLDC Slotless	6	300	AEPDM, EPDM
E129-12-060			0.1	0.3	0.5	0.8	**1.2**								20.0		Brush PMDC	6	275	EPDM, EPDM
E134-11-090				0.1	0.4	0.6	**1.2**	0.6	0.3	0.2					14.0	14.0	Coreless Brush	9	70	AEPDM, EPDM
E244-11				0.3	0.5	0.9	**1.2**	0.9	0.6	0.3					16.0	16.0	BLDC Slotless	9	160	AEPDM, EPDM

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.

*PCD: Peak Current Draw

CTS Series Micro Diaphragm Pumps (air/gas)

Ordering Information

CTS Single Head Pumps - General Purpose

Part No.	Vacuum: LPM @ Load						Free Flow	Pressure: LPM @ Load							Max					PCD*	Wetted Materials
	24 in Hg 588 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 55 mbar	12 psig 827 mbar	16 psig 1103 mbar	20 psig 1379 mbar	24 psig 1655 mbar	28 psig 1931 mbar	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
E161-11-050				0.2	0.4	0.8	**1.1**	0.8	0.4	0.2					16.5	16.5	Brush PMDC	5	300	AEPDM, EPDM
E165-11-060				0.2	0.4	0.7	**1.1**	0.7	0.4	0.2					13.5	13.5	Coreless Brush	6	135	AEPDM, EPDM
E162-11-060				0.2	0.4	0.7	**1.0**	0.6	0.4	0.2					16.0	16.0	Brush PMDC	6	190	AEPDM, EPDM
E258-11					0.3	0.7	**1.0**	0.7	0.2						11.0	9.5	BLDC Slotless	12	135	AEPDM, EPDM
E134-11-060				0.1	0.2	0.4	**0.9**	0.3	0.2	0.1					14.0	14.0	Coreless Brush	6	80	AEPDM, EPDM
E193-11-120					0.3	0.5	**0.9**	0.5	0.1						12.5	10.0	Brush PMDC	12	110	AEPDM, EPDM
E155-11-060				0.1	0.3	0.5	**0.7**	0.4	0.2	0.1					15.0	15.0	Brush PMDC	6	160	EPDM, EPDM
E243-11				0.2	0.3	0.6	**0.7**	0.5	0.3	0.2					16.0	14.5	BLDC Slotless	6	160	AEPDM, EPDM
E134-11-050				0.1	0.2	0.4	**0.5**	0.3	0.2						15.5	15.5	Coreless Brush	5	90	AEPDM, EPDM

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.

*PCD: Peak Current Draw

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.							

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/cts) to configure the CTS 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
- 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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Hollis, NH 03049
phone: +1 603 595 1500
email: ppfinfo@parker.com
www.parker.com/precisionfluidics

BTC Series

Up to 6 LPM Free Flow

Miniature Diaphragm Pumps (air/gas)

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

Typical Applications

- Gas Analysis
- Anesthesia Monitors
- CO_2 Monitors
- Patient Monitoring
- Wound Therapy
- Urinalysis
- Medical/Training Mannequin

Features

- Innovative and efficient engineering designs enable the BTC Series to push the performance envelope in a lightweight, compact size.
- Using our proprietary advanced diaphragm elastomer and superior brushless motor design sets the highest benchmark for service-free operation that exceeds 10,000 hours.
- Incorporating the lightweight EZ Mount Accessory facilitates simple system assembly while dampening vibration and reducing noise levels.
- 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 Slotless - 10,000 hrs
Weight:
6.5 oz. (184 g) PMDC Iron Core Brush 4.5 oz. (128 g) Brushless Slotted 7.4 oz. (210 g) Brushless Slotless

Electrical

Motor Type (DC):
PMDC Iron Core Brush, Brushless Slotted, 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 Slotless: 22 AWG Wire Leads Length 20" (508 mm)
Current Range[5]:
50 - 900 mA

Wetted Materials

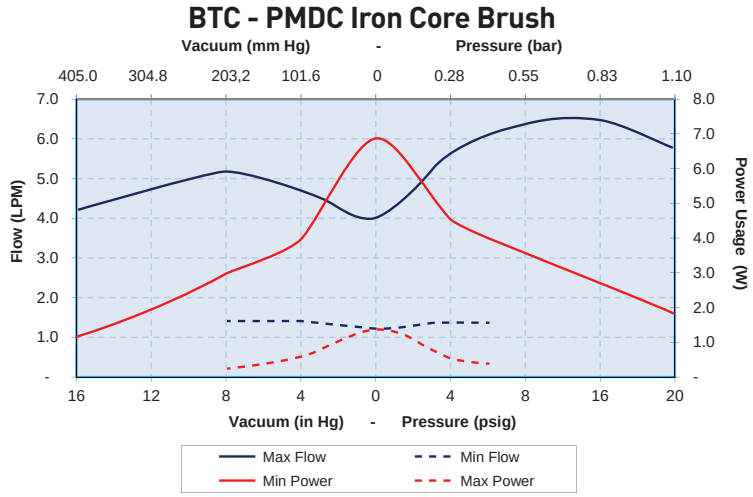
Diaphragm:
EPDM, AEPDM, FKM
Valves:
EPDM, FKM
Pump Head:
Vectra (Liquid Crystal Polymer)

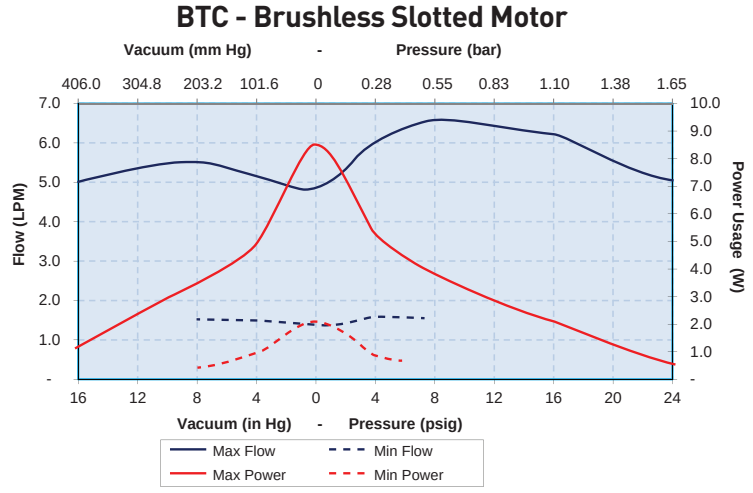
Pneumatic

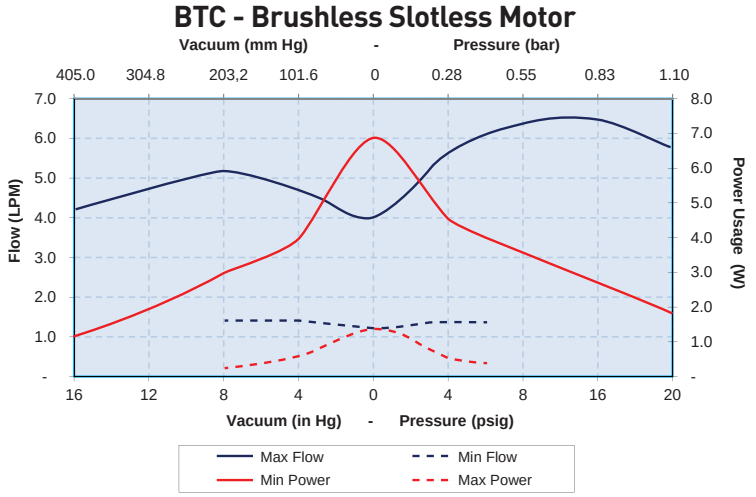
Head Configuration:
Single
Maximum Unrestricted Flow:
Flow: 6 LPM
Pressure Range:
0 - 30 psig (0-1.93 bar) Flat 0 - 20 psig (0-1.38 bar) Convoluted
Vacuum Range:
0 - 23 in Hg (0-584 mm Hg) Flat 0 - 20 in Hg (0-508 mm Hg) Convoluted
Filtration:
40 microns - recommended
Efficiency at Free Flow[6]:
PMDC Iron Core Brush: 1.2 LPM/Watt (*PN: C103E-13*) Brushless Slotted: 1.4 LPM/Watt (*PN: C134D-13*) Brushless Slotless: 1.5 LPM/Watt (*PN: C190-12*)

* See Appendix A for details.

Performance Specifications







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

Miniature Diaphragm Pumps (air/gas)

Sizing and Selection

BTC Series	PMDC Iron Core Brush	Brushless Slotted Motor	Brushless Slotless Motor
			
	PMDC Iron Core Brush	**Brushless Slotted Motor**	**Brushless Slotless Motor**
Efficiency[1]	Good	**Better** - Up to 60% motor efficiency at low loads	**Best** - Up to 75% motor efficiency at high power levels
Life[2]	Good - 3,000 hrs	**Best** - 10,000 hrs	**Best** - 10,000 hrs
Cost	Best	Better	Premium
Noise	Good	Better	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).

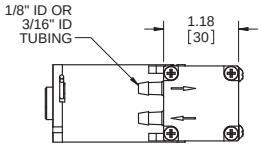
Port Connections:

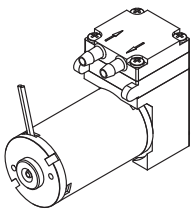
- Barbs are sized for 1/8" (3 mm) ID tubing, 70-80 durometer recommended.
- Flow direction is marked on the pump head with arrows.

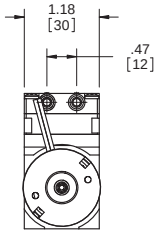
Mechanical Integration

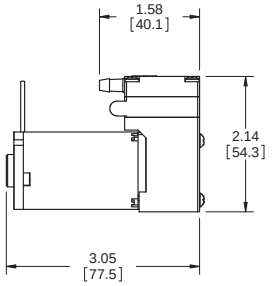
Dimensions

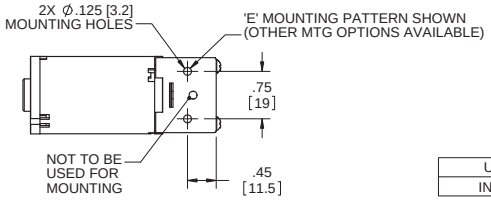
PMDC Iron Core Brush







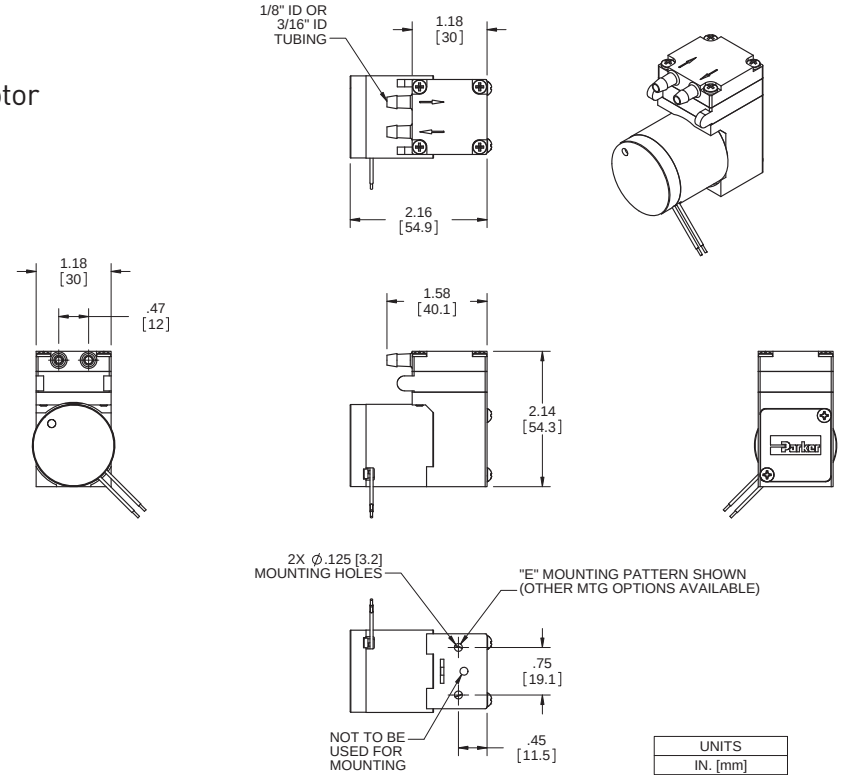




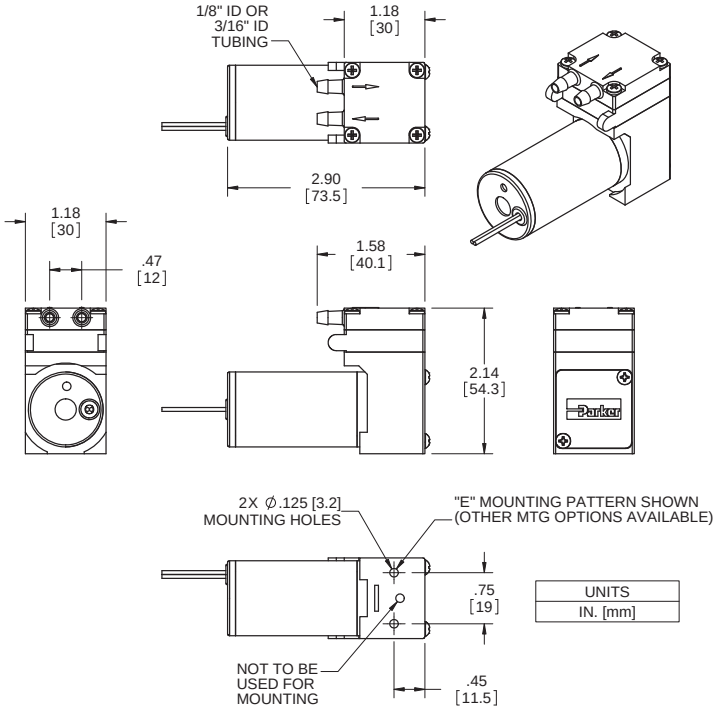
Mechanical Integration

Dimensions

Brushless Slotted Motor



Brushless Slotless Motor



BTC Series Miniature Diaphragm Pumps (air/gas)

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)

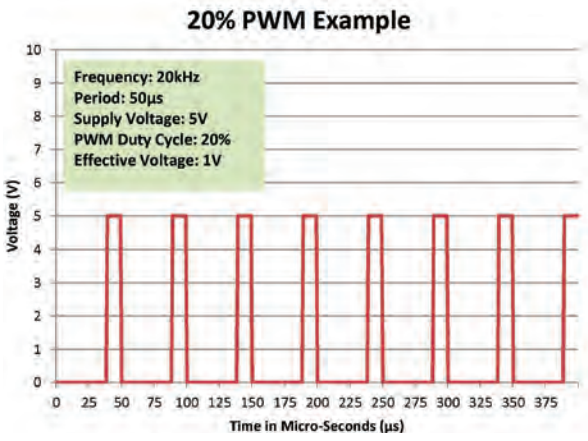
Pulse-width modulation is a commonly used technique for controlling DC motors.

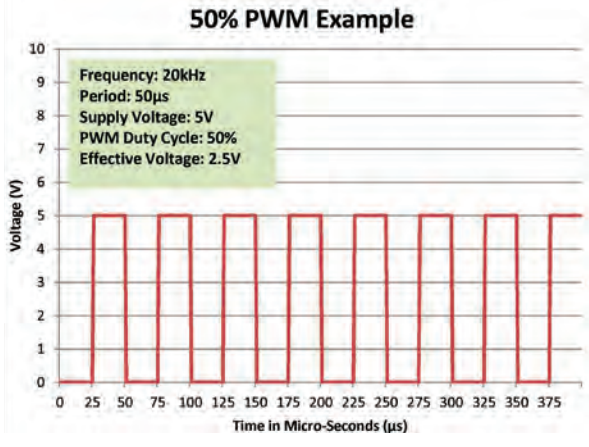
The average value of the voltage fed to the motor is controlled by turning a switch between the voltage supply and the motor on-and-off at a fast pace. The longer the switch is on compared to the off time, the higher the power supplied to the motor.

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.

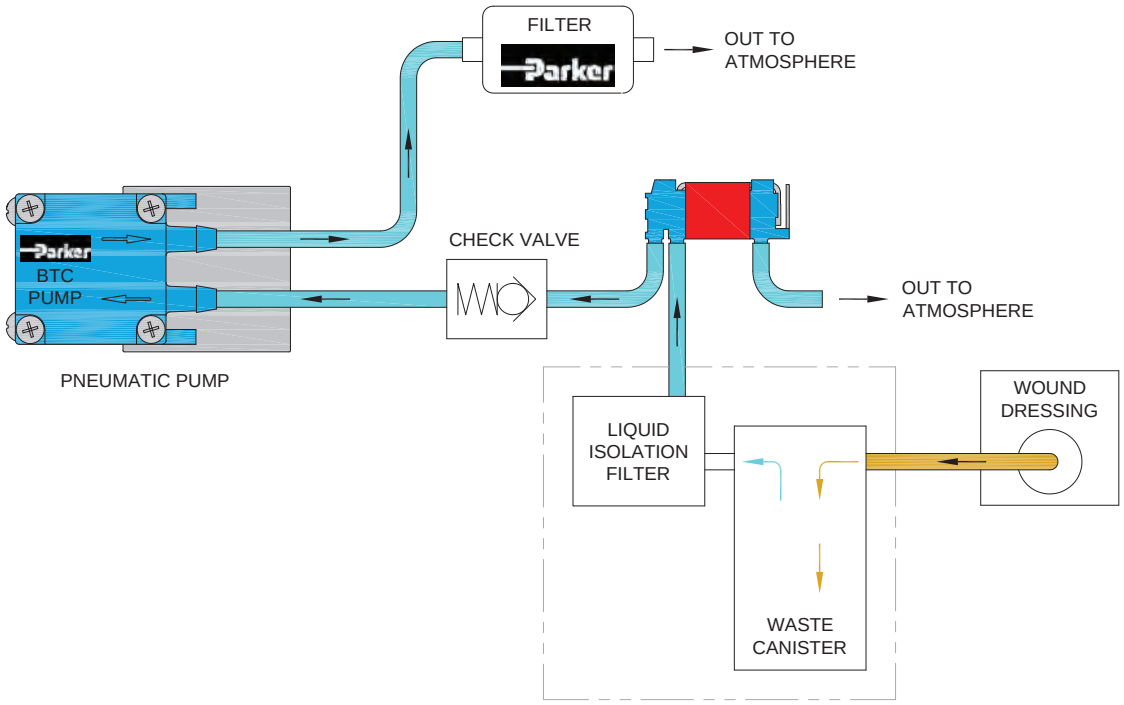
The advantage of PWM is the reduction of power-loss due to switching versus other control methods. Parker Hannifin recommends controlling the pump using 15kHz - 20 kHz frequency range.





Typical Flow Diagram

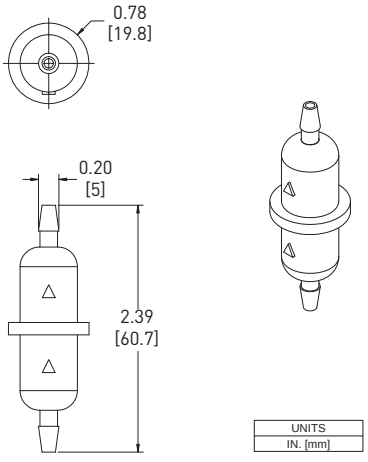
Negative Pressure Wound Therapy



Ordering Information

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

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

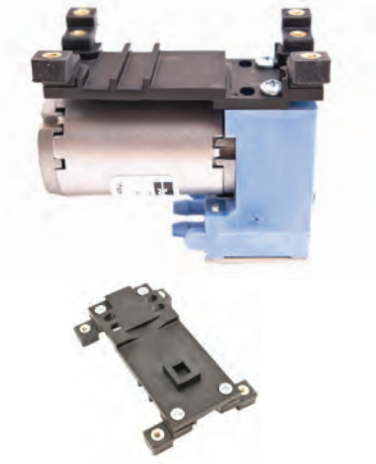


BTC Series

Miniature Diaphragm Pumps (air/gas)

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 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 pumps to ease integration into your system.

Physical Properties

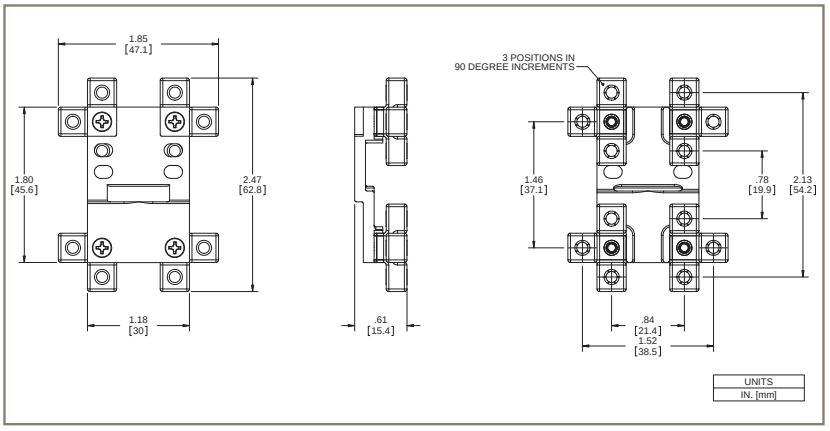
Operating Environment:
41 - 158°F (5 - 70°C)
Humidity:
0 - 95% Relative Humidity
Base Plate:
Noryl GTX830
Feet:
Silicone
Feet Insert:
Brass
Hardware:
Zinc-Plated Steel

EZ Mount kits include all necessary hardware and detailed instructions.

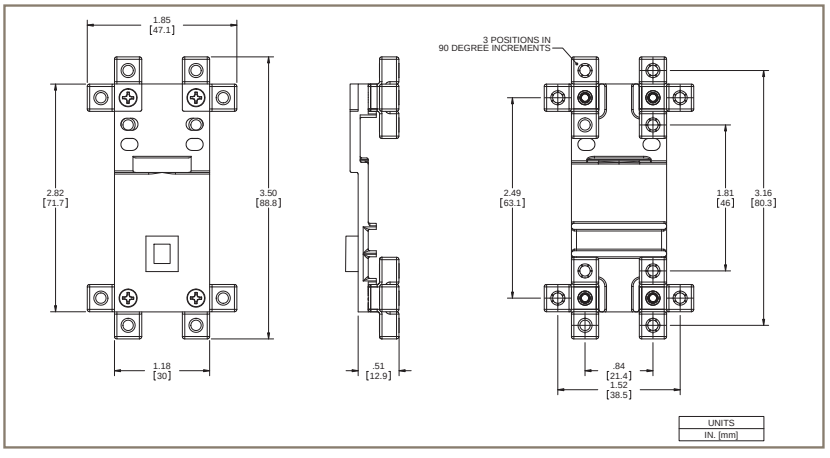
Isolation Feet are available in either threaded or thru-hole clearance for standard #4-40 or #6-32 (M3 for clearance hole only) hardware and can be mounted in any of three ninety-degree planes.

Dimensions

Style A



Style B - PMDC Iron Core Brush Motor



Ordering Information

BTC Single Head Pumps - General Purpose

Part No.	Vacuum: LPM @ Load					Free Flow	Pressure: LPM @ Load							Max					PCD*	Wetted Materials
	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 55 mbar	12 psig 827 mbar	16 psig 1103 mbar	20 psig 1379 mbar	24 psig 1655 mbar	28 psig 1931 mbar	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
H022C-11		0.3	0.9	1.4	1.8	**3.2**	2.0	1.4	1.1	0.9	0.5	0.2		18.0	24.0	Brushless Slotted	12	380	AEPDM,EPDM,EPDM
H041B-11		0.3	0.9	1.4	1.8	**3.2**	2.0	1.4	1.1	0.9	0.5	0.2		18.0	24.0	Brush PMDC	6	665	AEPDM,EPDM,EPDM
H054B-11		0.3	0.9	1.4	1.8	**3.2**	2.0	1.4	1.1	0.9	0.5	0.2		18.0	24.0	Brushless Slotted	24	220	AEPDM,EPDM,EPDM
H084-11		0.3	0.9	1.4	1.8	**3.2**	2.0	1.4	1.1	0.9	0.5	0.2		18.0	24.0	Brush-PMDC	24	180	AEPDM,EPDM,EPDM
H085-11		0.3	0.9	1.4	1.8	**3.2**	2.0	1.4	1.1	0.9	0.5	0.2		18.0	24.0	Brush-PMDC	12	370	AEPDM,EPDM,EPDM
H127-11		0.3	0.7	1.4	2.1	**2.7**	2.2	1.8	1.4	1.0	0.6	0.3		18.0	24.0	Brushless Slotless	24	205	AEPDM,EPDM,EPDM
H124-11		0.3	0.9	1.4	2.1	**2.6**	2.1	1.7	1.3	1.0	0.6	0.3		18.0	24.0	Brushless Slotless	12	380	AEPDM,EPDM,EPDM
H004C-11			0.6	1.0	1.7	**2.5**	1.7	1.2	0.8	0.3				16.0	20.0	Brushless Slotted	12	350	AEPDM,EPDM,EPDM
H037A-11			0.7	1.2	1.8	**2.5**	1.7	1.2	0.8					16.0	17.0	Brush-PMDC	12	265	AEPDM,EPDM,EPDM
H050D-11			0.6	1.1	1.7	**2.5**	1.7	1.2	0.9	0.5				16.0	20.0	Brushless Slotted	24	175	AEPDM,AEPDM,EPDM
H061-11			0.5	0.9	1.6	**2.5**	1.6	1.1	0.8	0.4				16.0	20.0	Brush-PMDC	6	620	AEPDM,EPDM,EPDM
H070A-11			0.6	1.1	1.8	**2.5**	1.7	1.2	0.8					16.0	17.0	Brush-PMDC	24	125	AEPDM,AEPDM,EPDM
L008C-11				0.3	0.7	**1.5**	0.6	0.3**						10.0	7.0	Brushless Slotted	12	195	AEPDM,AEPDM,EPDM
L037B-11				0.4	0.9	**1.5**	0.9	0.3						12.0	10.0	Brush-PMDC	24	95	AEPDM,AEPDM,EPDM
L045B-11				0.4	0.7	**1.5**	0.7	0.3						12.0	10.0	Brushless Slotted	24	110	AEPDM,AEPDM,EPDM
L052C-11				0.4	1.0	**1.5**	0.9	0.3						12.0	10.0	Brush-PMDC	12	160	AEPDM,AEPDM,EPDM
L074-11				0.2	0.5	**1.2**	0.5	0.3*						9.0	7.0	Brush-PMDC	6	270	AEPDM,AEPDM,EPDM

* PCD: Peak Current Draw ** @ 6psi (414 mbar)

BTC Single Head Pumps - High Flow

Part No.	Vacuum: LPM @ Load					Free Flow	Pressure: LPM @ Load							Max					PCD*	Wetted Materials
	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 55 mbar	12 psig 827 mbar	16 psig 1103 mbar	20 psig 1379 mbar	24 psig 1655 mbar	28 psig 1931 mbar	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
C134D-12		0.9	1.7	2.5	3.4	**6.0**								20.0		Brushless Slotted	12	485	AEPDM,EPDM,EPDM
C117H-12		0.9	1.7	2.5	3.5	**6.0**								20.0		Brushless Slotted	24	400	AEPDM,EPDM,EPDM
C190-12		0.7	1.5	2.5	3.5	**4.7**								19.0		Brushless Slotless	12	400	AEPDM,EPDM,EPDM
C191-12		1.0	1.8	2.7	3.7	**4.4**								21.0		Brushless Slotless	24	250	AEPDM,EPDM,EPDM
C103E-12		0.9	1.8	3.0	3.9	**6.0**								20.0		Brush-PMDC	12	510	AEPDM,AEPDM,EPDM
C153A-12		1.0	1.7	2.6	3.5	**6.0**								20.0		Brush-PMDC	24	245	AEPDM,AEPDM,EPDM
C134D-13						**6.0**	3.8	3.0	2.4	1.9	1.4	1.0			24.0	Brushless Slotted	12	700	AEPDM,EPDM,EPDM
C117H-13						**6.0**	3.7	2.7	2.0	1.5	0.9	0.4			24.0	Brushless Slotted	24	390	AEPDM,EPDM,EPDM
C190-13						**4.3**	3.4	2.7	2.0	1.6	1.2				22.5	Brushless Slotless	12	530	AEPDM,EPDM,EPDM
C191-13						**4.0**	3.2	2.6	1.9	1.4	1.0				21.0	Brushless Slotless	24	260	AEPDM,EPDM,EPDM
C103E-13						**6.0**	3.9	3.0	2.2	1.4	0.6				24.0	Brush-PMDC	12	670	AEPDM,AEPDM,EPDM
C153A-13						**6.0**	4.0	3.1	2.4	1.6	1.1				24.0	Brush-PMDC	24	310	AEPDM,AEPDM,EPDM

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.

*PCD: Peak Current Draw

BTC Series Miniature Diaphragm Pumps (air/gas)

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 Single Head Pump with PMDC Iron Core Brush Motor

Part Number	Style	Description
00329-10-A45S	B	#4-40 Threaded
00329-10-B45S	B	#4 Clearance
00329-10-D45S	B	#6-32 Threaded
00329-10-C45S	B	#6 / M3 Clearance

EZ Mount for BTC Single Head Pump with Brushless Slotted Motor

Part Number	Style	Description
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

EZ Mount for BTC Single Head Pump with Brushless Slotless Motor

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

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/btc) to configure the BTC-II 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
- 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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Hollis, NH 03049
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www.parker.com/precisionfluidics

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)

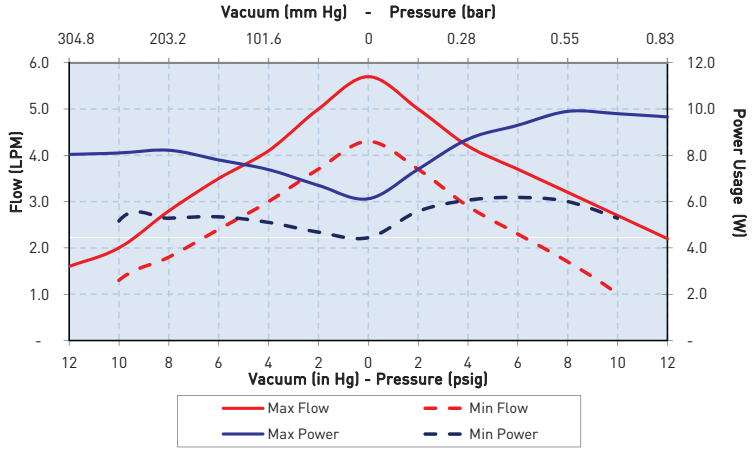
Pneumatic

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*)

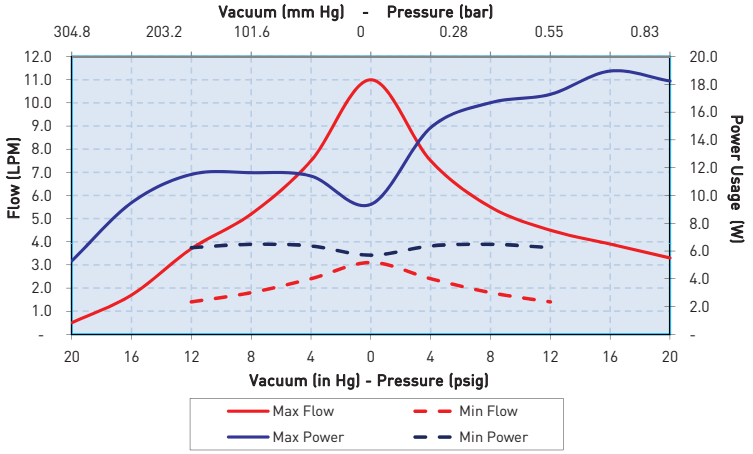
* See Appendix A for details.

Performance Specifications

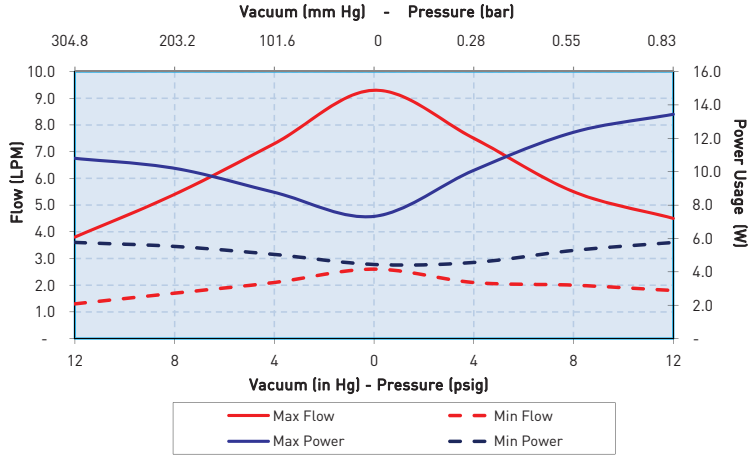
BTC-IIS - PMDC Iron Core Brush Motor



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:

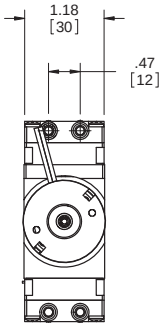
- Bracket options available for mounting consideration (*See EZ Mount catalog pages).*
- Hole in the center of the bottom of housing is for manufacturing only–not to be used for mounting.
- Mounting holes are drilled for #6-20 self-tapping screws with 1/4" (6 mm) thread engagement torque to 4 in-lbs.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

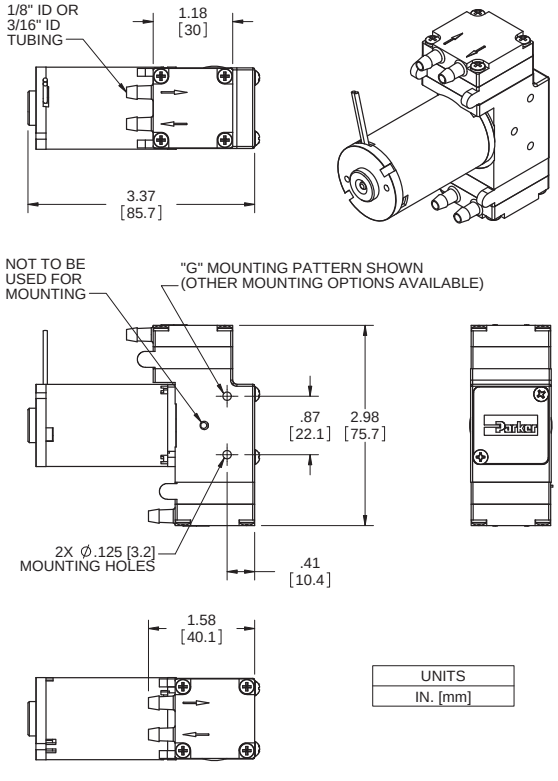
Port Connections:

- 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

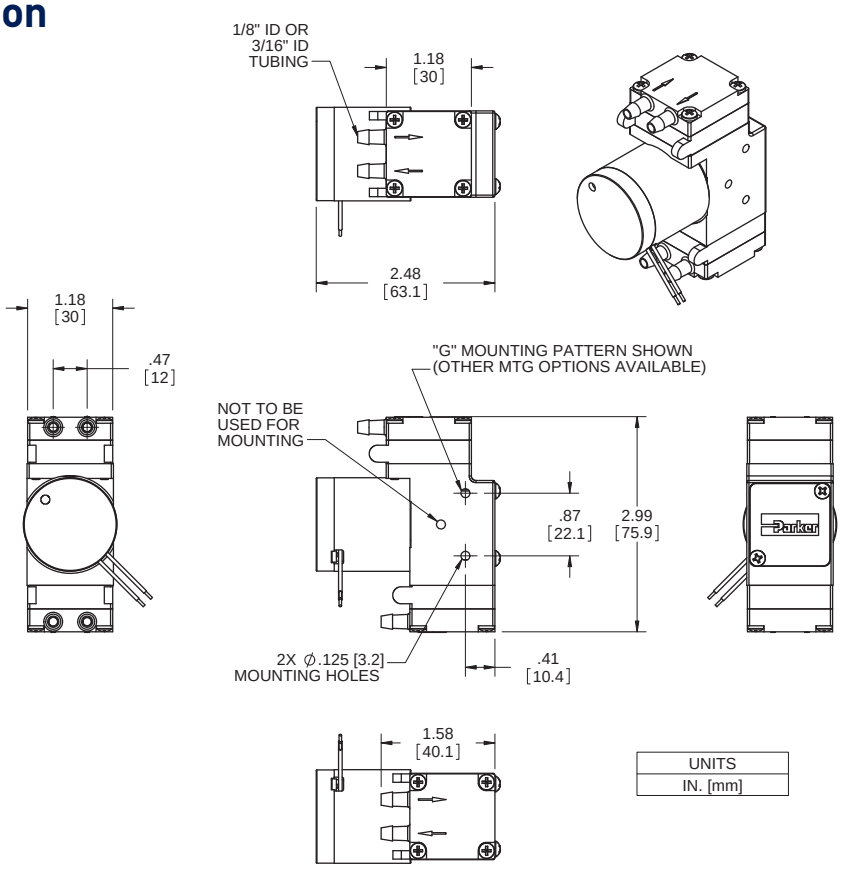




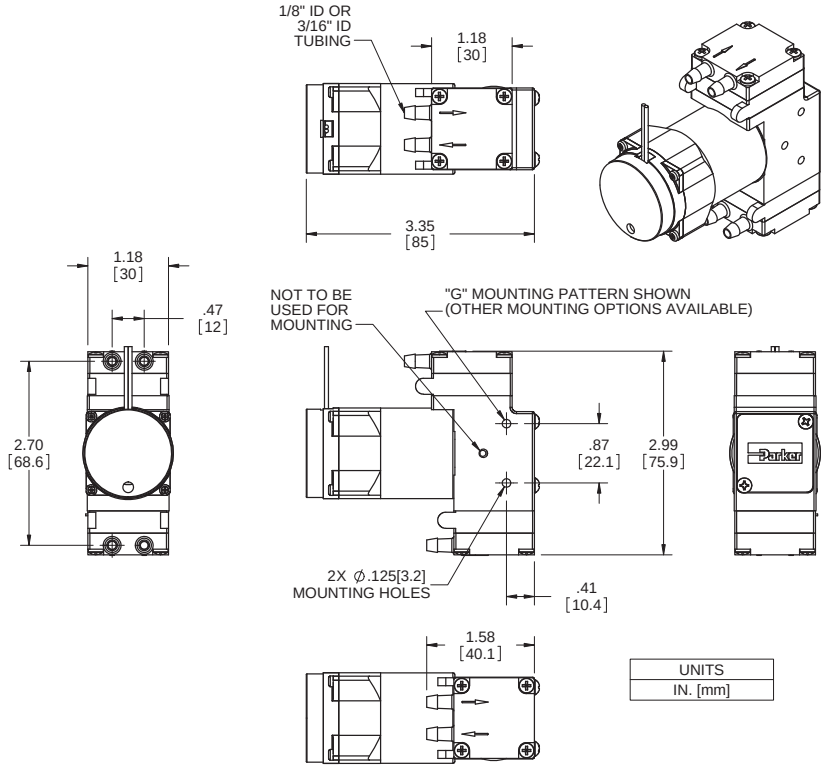
Mechanical Integration

Dimensions

Brushless Slotted Motor



Brushless Slotted
Motor (High Torque)

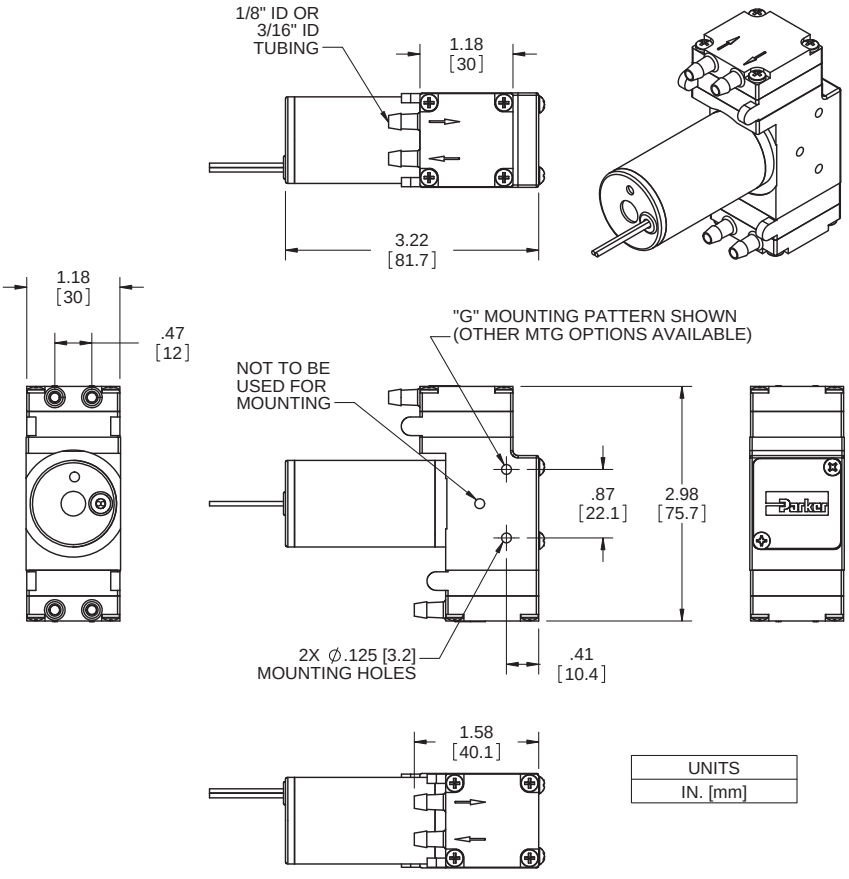


BTC-IIS Series

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)

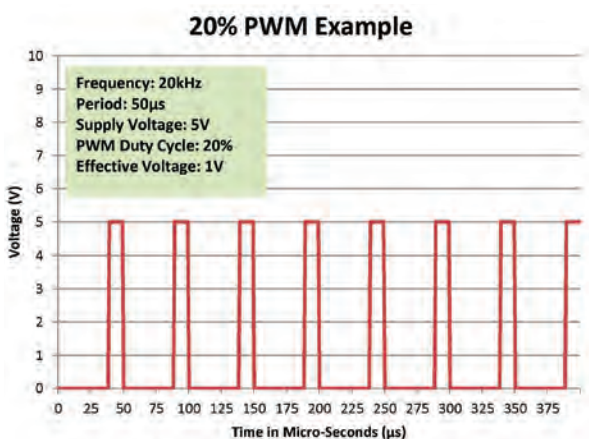
Pulse-width modulation is a commonly used technique for controlling DC motors.

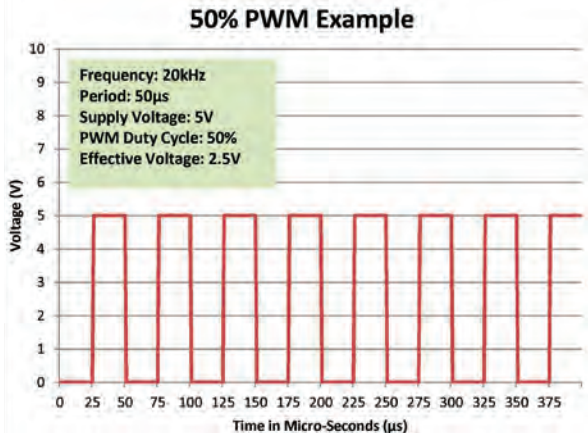
The average value of the voltage fed to the motor is controlled by turning a switch between the voltage supply and the motor on-and-off at a fast pace. The longer the switch is on compared to the off time, the higher the power supplied to the motor.

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.

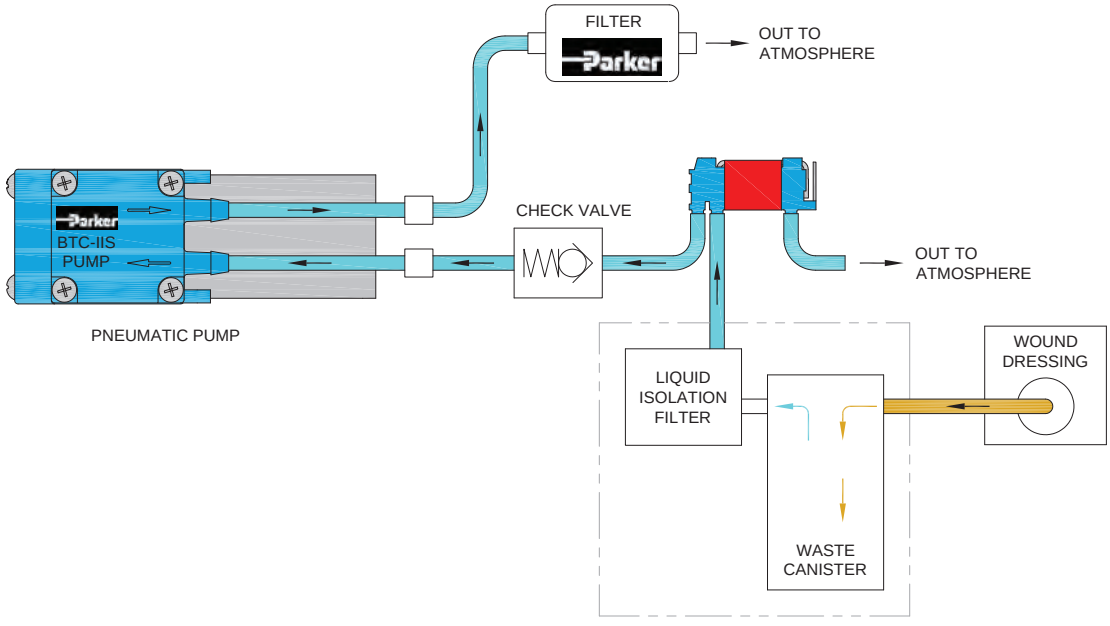
The advantage of PWM is the reduction of power-loss due to switching versus other control methods. Parker Hannifin recommends controlling the pump using 15kHz - 20 kHz frequency range.





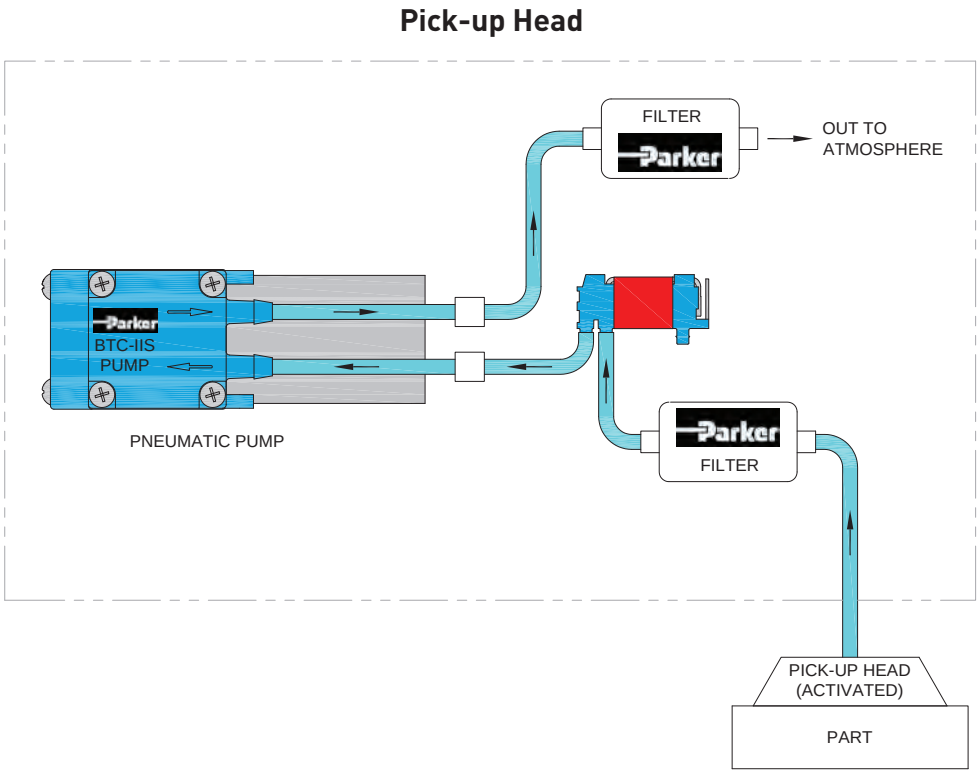
Typical Flow Diagram

Negative Pressure Wound Therapy



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

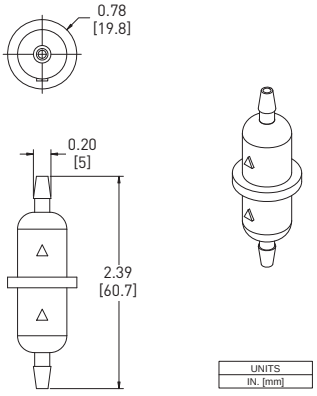
Typical Flow Diagram



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

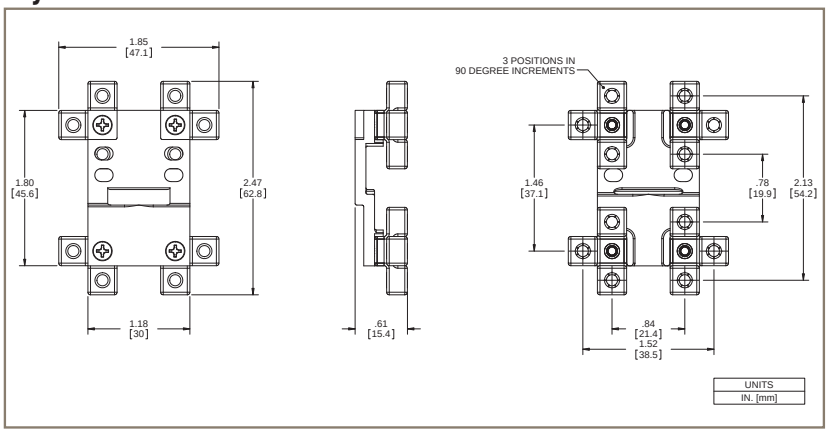
Operating Environment:
41 - 158°F (5 - 70°C)
Humidity:
0 - 95% Relative Humidity
Base Plate:
Noryl GTX830
Feet:
Silicone
Feet Insert:
Brass
Hardware:
Zinc-Plated Steel

EZ Mount kits include all necessary hardware and detailed instructions.

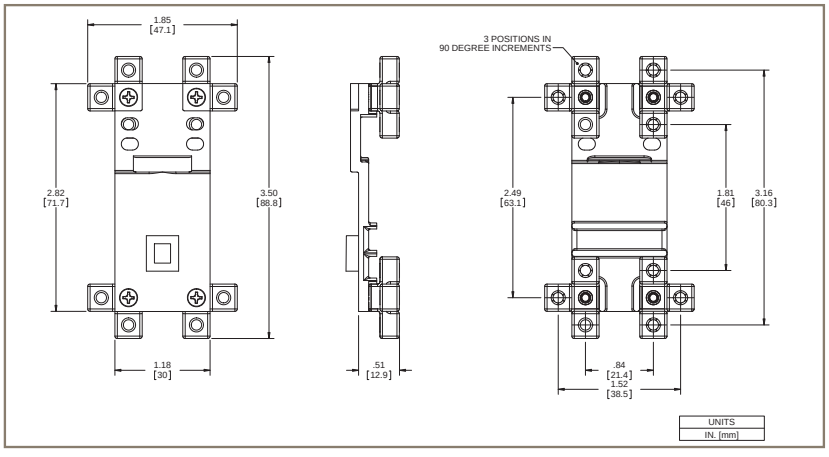
Isolation Feet are available in either threaded or thru-hole clearance for standard #4-40 or #6-32 (M3 for clearance hole only) hardware and can be mounted in any of three ninety-degree planes.

Dimensions

Style A - Brushless Slotted Motor



Style B - PMDC Iron Core Brush Motor



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 Clearance
00332-10-D45S	B	#6-32 Threaded
00332-10-C45S	B	#6 / M3 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 Clearance
00328-10-D45S	B	#6-32 Threaded
00328-10-C45S	B	#6 / M3 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 Clearance
00331-10-D45S	B	#6-32 Threaded
00331-10-C45S	B	#6 / M3 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 Clearance
01074-10-D45S	A	#6-32 Threaded
01074-10-C45S	A	#6 / M3 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

TTC Series

Up to 6 LPM Free Flow

Miniature Diaphragm Pumps (air/gas)

TTC Miniature Diaphragm Pumps are a series of brush and brushless DC motor driven pumps, which are tailored to meet specific application performance requirements. An innovative compact design incorporates leading edge technologies that allow them to operate more efficiently than existing pump designs. TTC Pumps offer multiple component configurations for use in either vacuum, pressure, or alternating vacuum and pressure operations. TTC Series is best for compact and low pressure applications that require high efficiency.

Typical Applications

- Gas Analysis
- Anesthesia Monitors
- Compression Therapy
- CO_2 Monitors
- Wound Therapy
- Trace Detection
- Medical/Training Mannequins
- Degassing

Features:

- TTC Series' innovative and efficient design pushes the performance envelope in a lightweight, compact size which allows it to operate at the highest performance/size ratio.
- Highest efficiency in class. The TTC supports low power for portable and battery powered instruments.
- Using our proprietary advanced diaphragm elastomer and superior brushless motor design sets the highest benchmark for service-free operation that exceeds 10,000 hours.
- Incorporating the lightweight EZ Mount accessory facilitates simple system assembly while dampening vibration and reducing noise levels.
- 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% Realtive 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 Slotless - 10,000 hrs
Weight:
7.2 oz. (206 g) PMDC Iron Core Brush 5.0 oz. (142 g) Brushless Slotted 7.7 oz. (218 g) Brushless Slotless

Electrical

Motor Type (DC):
PMDC Iron Core Brush, Brushless Slotted, 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 Slotless - 22 AWG Wire Leads, Length 20" (508 mm)
Current Range[5]:
300-800 mA

Pneumatic

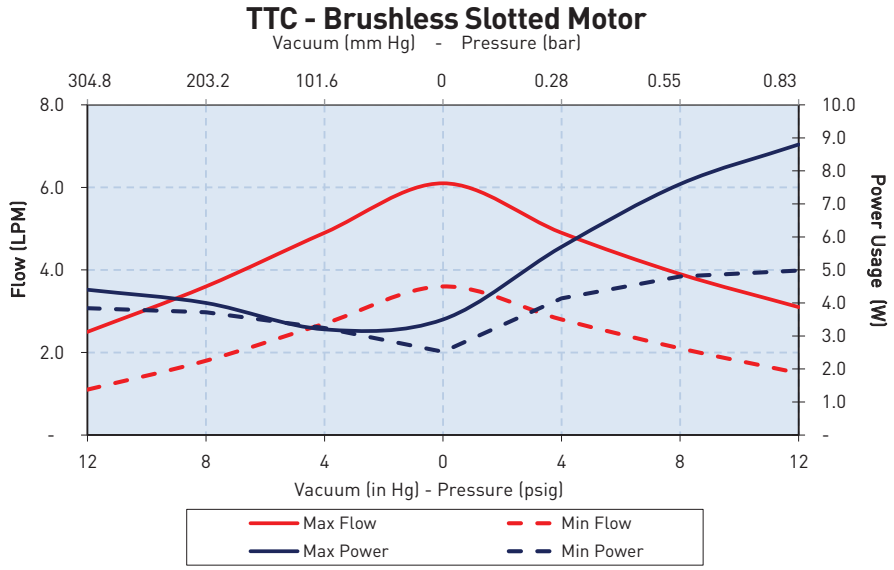
Head Configuration:
Single
Maximum Unrestricted Flow:
6 LPM
Pressure Range:
0 - 10 psig (0 - 0.7 bar)
Vacuum Range:
0 - 16 in Hg (0 - 406 mm Hg)
Filtration:
40 microns - recommended
Efficiency at Free Flow[6]
PMDC Iron Core Brush: 0.8 LPM/Watt (*PN: TS008-13*) Brushless Slotted: 1.4 LPM/Watt (*PN: TS003-11*) Brushless Slotless: 1.8 LPM/Watt (*PN: TS001-13*)

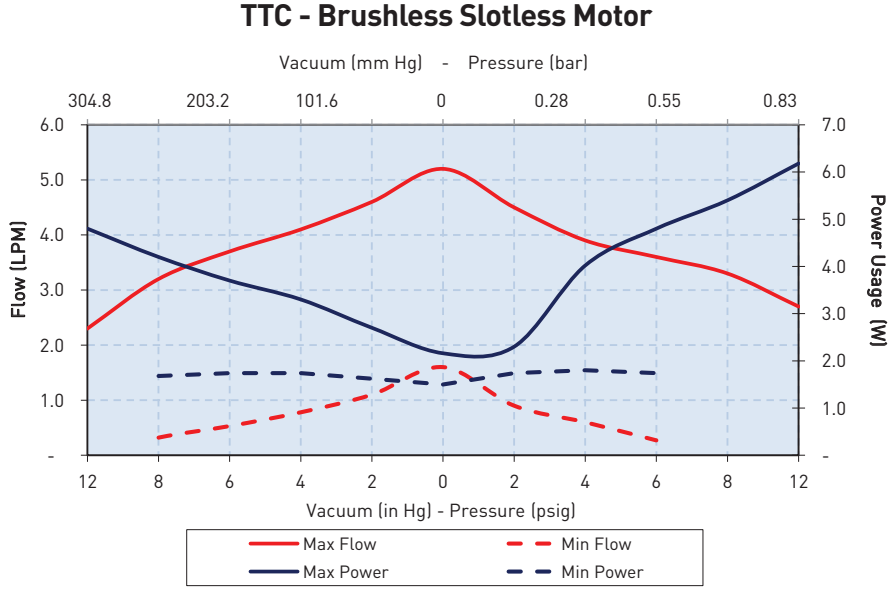
Wetted Materials

Diaphragm:	**Pump Head:**
EPDM, AEPDM, FKM	Vectra (Liquid Crystal Polymer)
Valves & Gaskets:	**Valve Cover:**
EPDM, FKM	303 Stainless Steel

* See Appendix A for details.

Performance Specifications





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.

TTC Series

Miniature Diaphragm Pumps (air/gas)

Sizing and Selection continued

TTC Series	PMDC Iron Core Brush	Brushless Slotted Motor	Brushless Slotless Motor
			
	PMDC Iron Core Brush	**Brushless Slotted Motor**	**Brushless Slotless Motor**
Efficiency[1]	Good	**Better** - Up to 60% motor efficiency at low loads	**Best** Up to 75% motor efficiency
Life[2]	Good - 3,000 hrs	**Best** - 10,000 hrs	**Best** - 10,000 hrs
Cost	Best	Better	Premium
Noise	Good	Better	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).

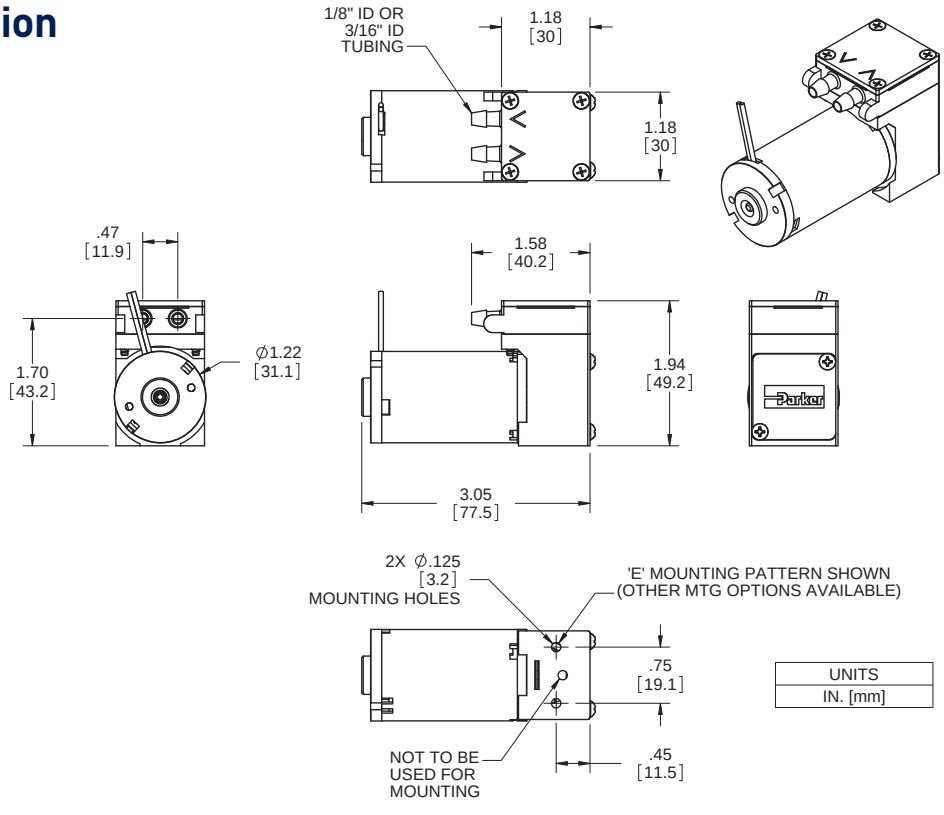
Port Connections:

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

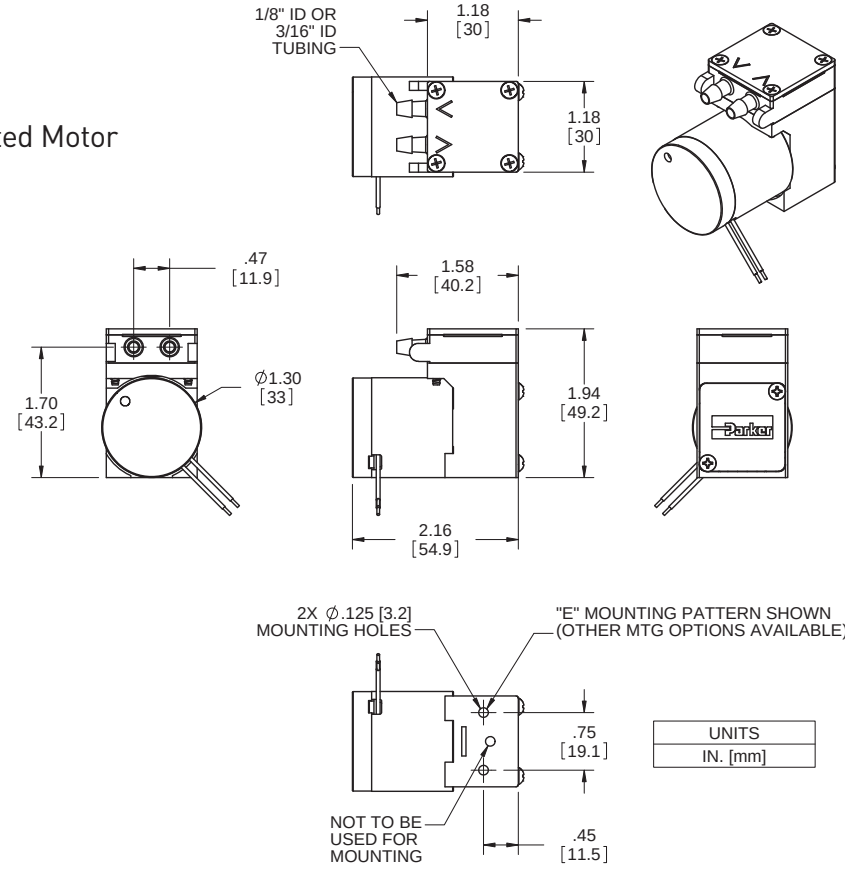
Mechanical Integration

Dimensions

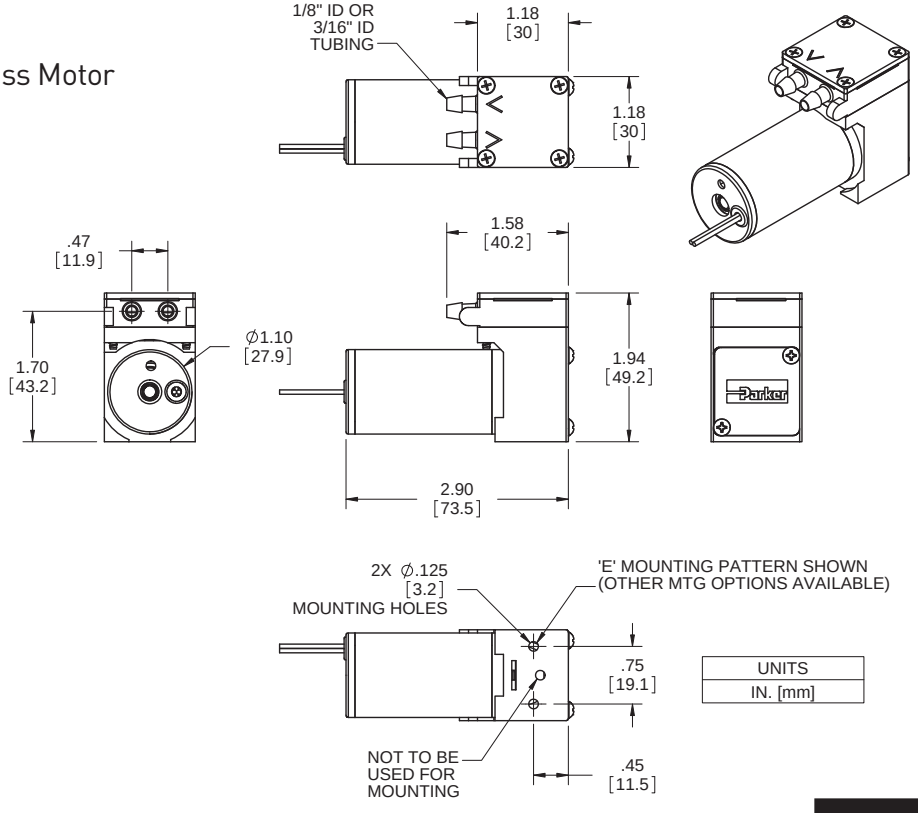
PMDC Iron Core Brush



Brushless Slotted Motor



Brushless Slotless Motor



TTC Series Miniature Diaphragm Pumps (air/gas)

Electrical Integration and Motor Control

PMDC Iron Core Brush Motor

2 Wire	Red (+), Black (-)
Wire specification	22 AWG, 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	22 AWG, 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)

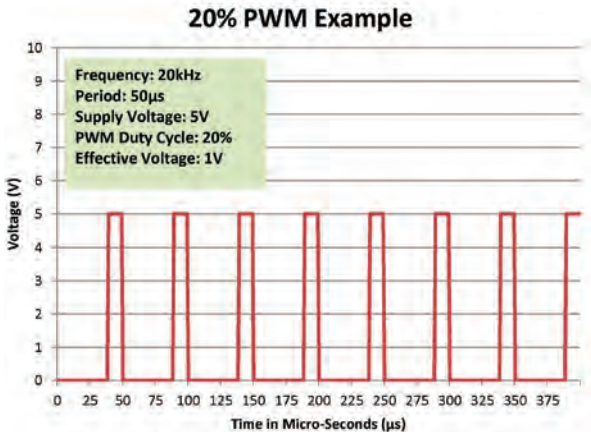
Pulse-width modulation is a commonly used technique for controlling DC motors.

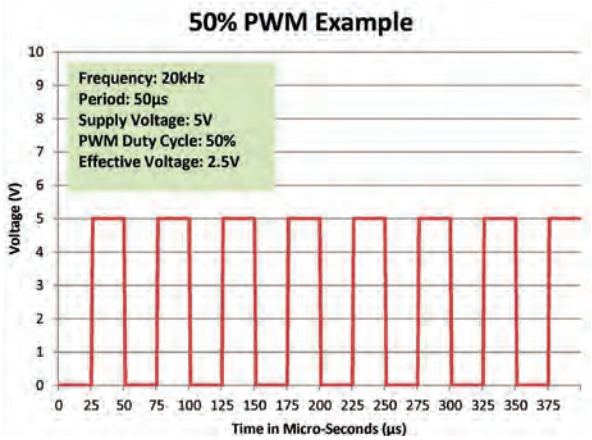
The average value of the voltage fed to the motor is controlled by turning a switch between the voltage supply and the motor on-and-off at a fast pace. The longer the switch is on compared to the off time, the higher the power supplied to the motor.

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.

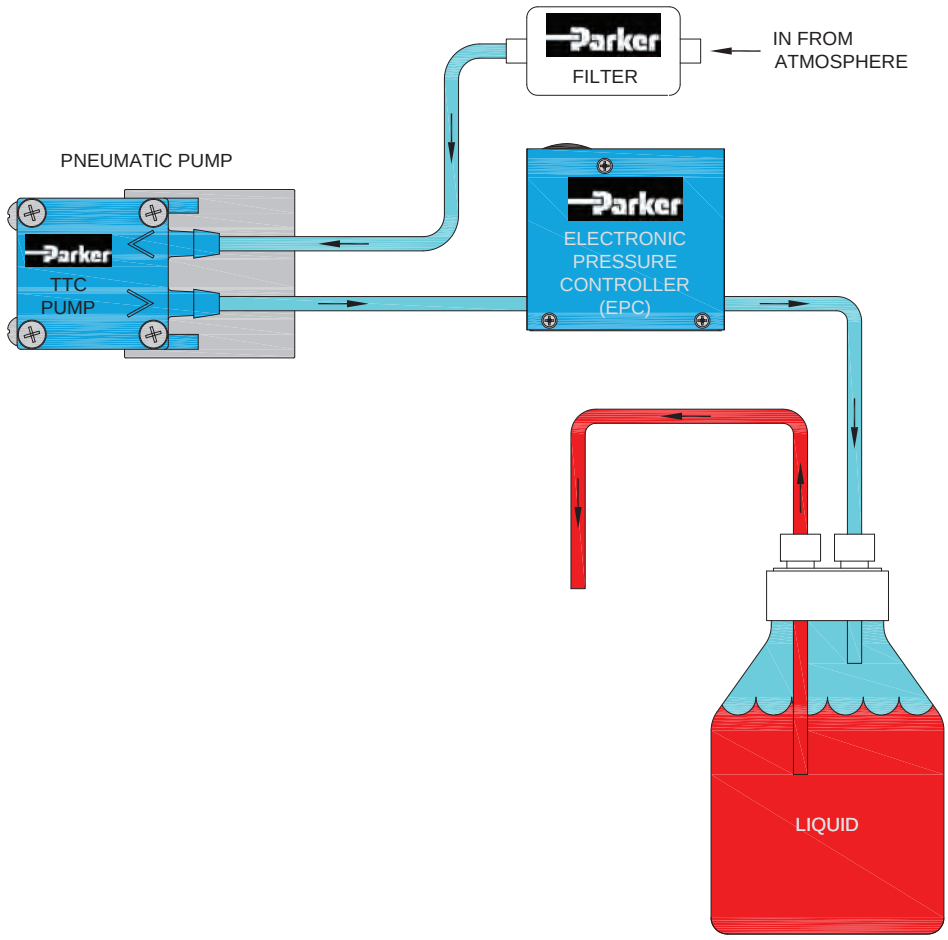
The advantage of PWM is the reduction of power-loss due to switching versus other control methods. Parker Hannifin recommends controlling the pump using 15kHz - 20 kHz frequency range.





Typical Flow Diagram

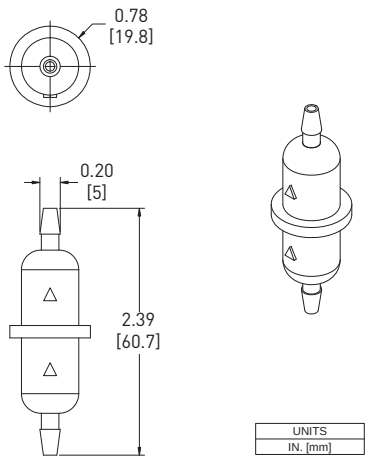
Air-Over-Liquid Flow Control



Accessory Information

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

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



TTC Series Miniature Diaphragm Pumps (air/gas)

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 TTC 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 TTC pumps to ease integration into your system.

Physical Properties

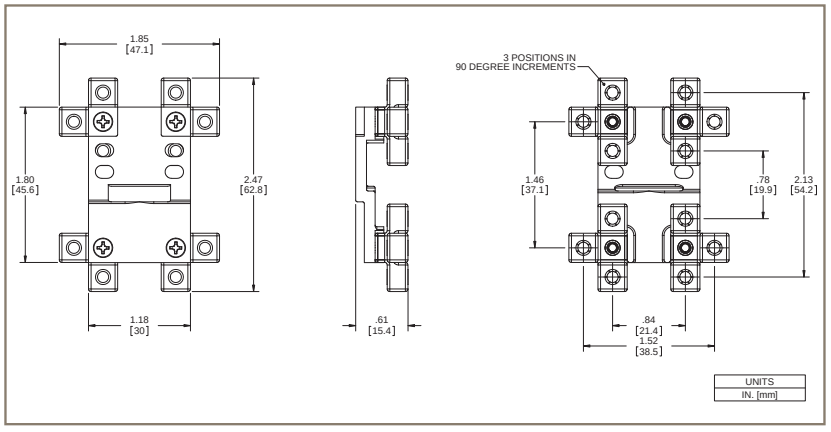
Operating Environment:
41 - 158°F (5 - 70°C)
Humidity:
0 - 95% Relative Humidity
Base Plate:
Noryl GTX830
Feet:
Silicone
Feet Insert:
Brass
Hardware:
Zinc-Plated Steel

EZ Mount kits include all necessary hardware and detailed instructions.

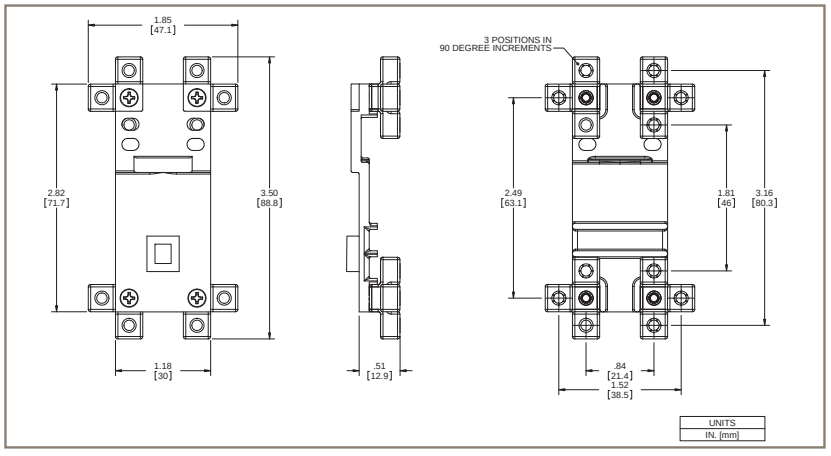
Isolation Feet are available in either threaded or thru-hole clearance for standard #4-40 or #6-32 (M3 for clearance hole only) hardware and can be mounted in any of three ninety-degree planes.

Dimensions

Style A - Brushless Slotted Motor



Style B - PMDC Iron Core Brush Motor



Ordering Information

TTC Single Head Pumps - General Purpose

Part No.	Vacuum: LPM @ Load				Free Flow	Pressure: LPM @ Load				Max				PCD*	Wetted Materials
	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	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
TS002-12		2.5	3.6	5.9	**6.1**					16.0		Brushless Slotted	12	520	EPDM
TS001-13					**6.0**	4.9	3.9	3.1			16.0	Brushless Slotted	12	735	EPDM
TS008-13					**6.0**	4.7	3.9	3.2			16.0	PMDC Brush	12	660	EPDM
TS008-12		2.5	3.6	4.8	**5.8**					16.0		PMDC Brush	12	500	EPDM
TS005-13					**5.2**	3.9	3.3	2.7			16.0	Brushless Slotless	12	515	EPDM
TS006-12		2.3	3.2	4.1	**5.1**					16.0		Brushless Slotless	12	400	EPDM
TS003-11		1.1	1.8	2.7	**3.6**	2.8	2.1	1.5		12.0	16.0	Brushless Slotted	12	415	EPDM
TS007-11			0.3	0.8	**1.6**	0.6	0.3*			16.0		Brushless Slotless	12	150	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.

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 TTC Single Head Pump with PMDC Iron Core Brush Motor

Part Number	Style	Description
00329-10-A45S	B	#4-40 Threaded
00329-10-B45S	B	#4 Clearance
00329-10-D45S	B	#6-32 Threaded
00329-10-C45S	B	#6 / M3 Clearance

EZ Mount for TTC Single Head Pump with Brushless Slotless Motor

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

EZ Mount for TTC Single Head Pump with Brushless Slotted Motor

Part Number	Style	Description
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

TTC Series Miniature Diaphragm Pumps (air/gas)

Ordering Information

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/ttc) to configure the TTC Miniature Diaphragm Pump in 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
- 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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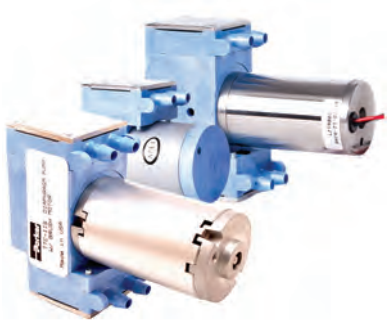
Notes

TTC-IIS Series

Miniature Diaphragm Pumps (air/gas)

Up to 11 LPM Free Flow



TTC-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. An innovative compact design incorporates leading edge technologies that allow them to operate more efficiently than existing pump designs. TTC-IIS pumps offer multiple component configurations allowing them to be used for either vacuum, pressure, or alternating vacuum and pressure operations. The TTC-IIS Series is best for compact and low pressure applications that require high efficiency.

Typical Applications

- Gas Analysis
- Anesthesia Monitors
- CO_2 Monitors
- Patient Monitoring
- Wound Therapy
- Urinalysis
- Trace Detection
- Medical/Training Mannequins
- Degassing

Features:

- TTC-IIS Series' innovative and efficient design pushes the performance envelope in a lightweight, compact size which allows it to operate at the highest performance/size ratio.
- Highest efficiency in class. The TTC-IIS supports low power for portable and battery powered instruments.
- Using our proprietary advanced diaphragm elastomer and superior brushless motor design sets the highest benchmark for service-free operation that exceeds 10,000 hours.
- Incorporating the lightweight EZ Mount accessory facilitates simple system assembly while dampening vibration and reducing noise levels.
- 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 45dB @ 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 Slotless - 10,000 hrs
Weight:
8.6 oz. (244 g) PMDC Iron Core Brush 6.2 oz. (176 g) Brushless Slotted 9.0 oz. (255 g) Brushless Slotless

Electrical

Motor Type (DC):
PMDC Iron Core Brush, Brushless Slotted, 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 Slotless: 22 AWG Wire Leads, Length 20" (508 mm)
Current Range[5]:
240 - 880 mA

Wetted Materials

Diaphragm:
EPDM, AEPDM, FKM
Valves & Gaskets:
EPDM, FKM
Pump Head:
Vectra (Liquid Crystal Polymer)
Valve Cover:
303 Stainless Steel

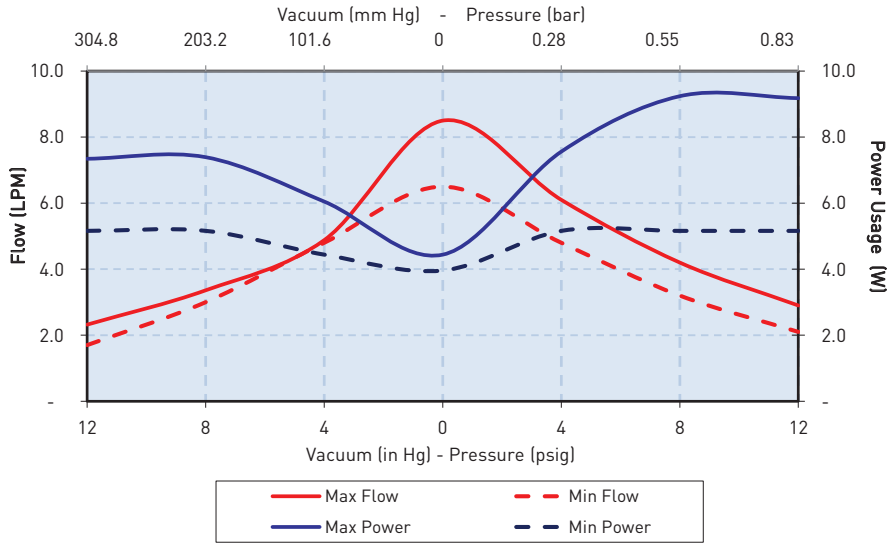
Pneumatic

Head Configuration:
Dual
Maximum Unrestricted Flow:
6 LPM (Per head), 11 LPM (Parallel)
Pressure Range:
0 - 12 psig (0 - 0.8 bar) Parallel
Vacuum Range:
0 - 16 in Hg (0 - 406 mm Hg)
Filtration
40 microns - recommended
Efficiency at Free Flow[6]
PMDC Iron Core Brush: 1.2 LPM/Watt (*PN: TD001-13*) Brushless Slotted: 1.6 LPM/Watt (*PN: TD003-11*) Brushless Slotless: 1.5 LPM/Watt (*PN: TD005-12*)

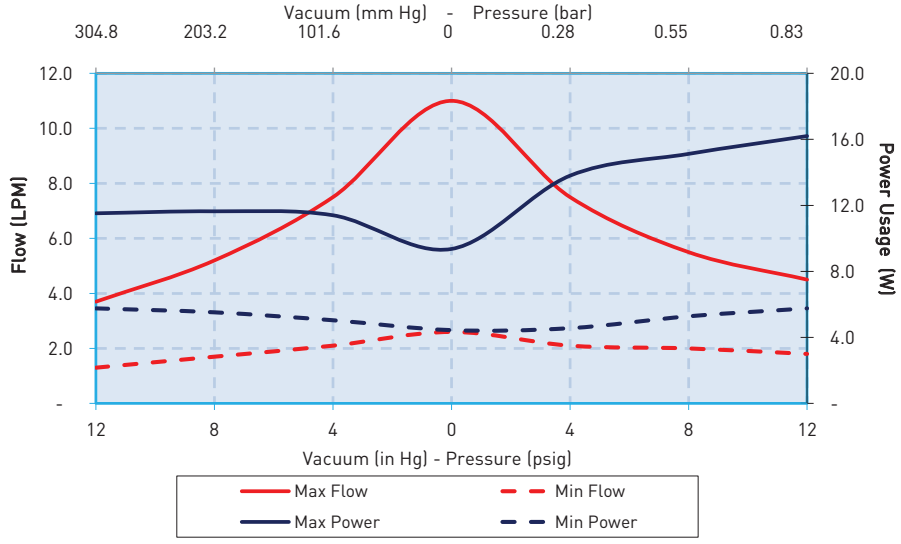
* See Appendix A for details.

Performance Specifications

TTC-IIS - Brushless Slotted Motor



TTC-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.

TTC-IIS Series

Miniature Diaphragm Pumps (air/gas)

Sizing and Selection

TTC-IIS Series	PMDC Iron Core Brush	Brushless Slotted Motor	Brushless Slotless Motor
			
	PMDC Iron Core Brush	**Brushless Slotted Motor**	**Brushless Slotless Motor**
Efficiency[1]	Good	**Better** - Up to 60% motor efficiency at low loads	**Best** - Up to 75% motor efficiency at high power levels
Life[2]	**Good** - 3,000 hrs	**Best** - 10,000 hrs	**Best** - 10,000 hrs
Cost	Best	Better	Premium
Noise	Good	Better	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 4 in-lbs. (0.45 N-m).

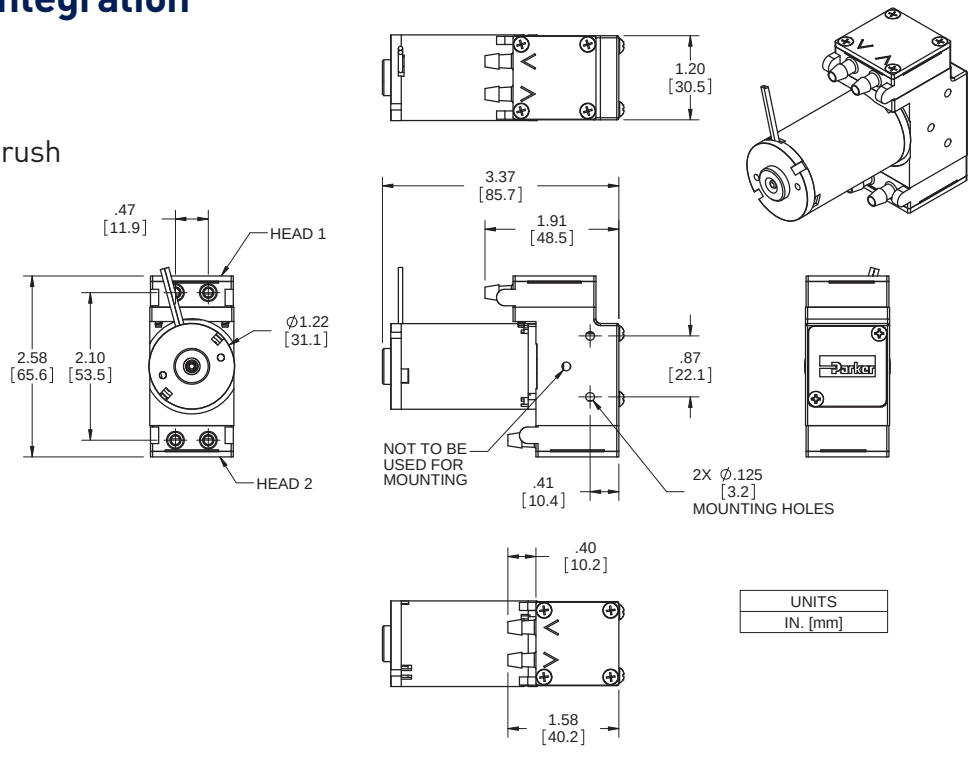
Port Connections:

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

Mechanical Integration

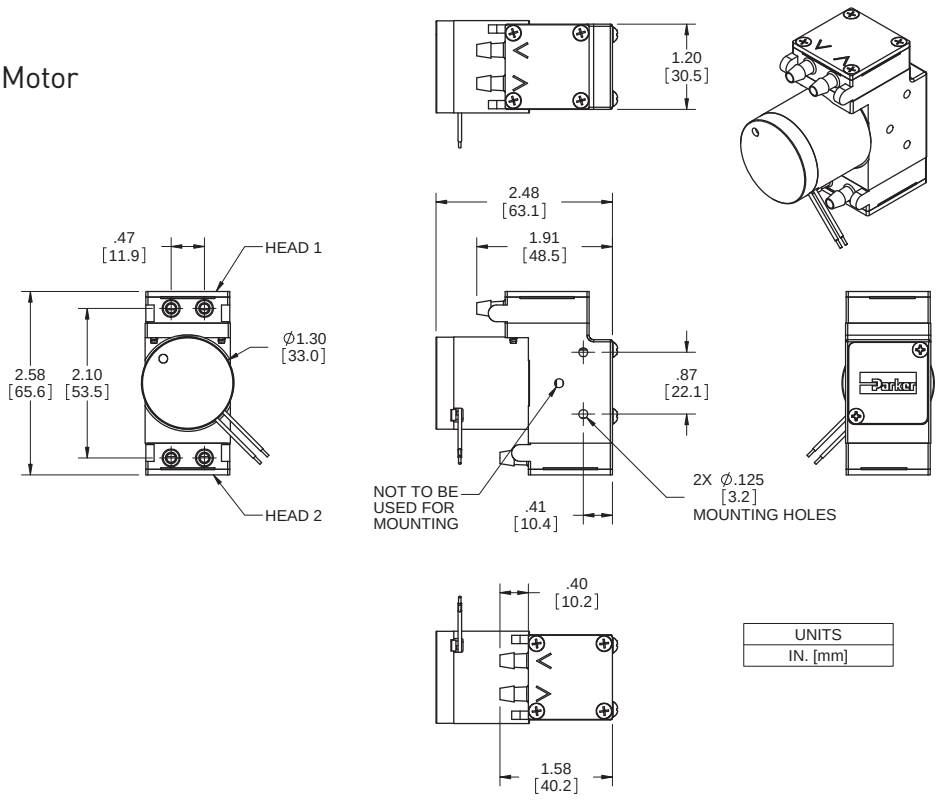
Dimensions

PMDC Iron Core Brush

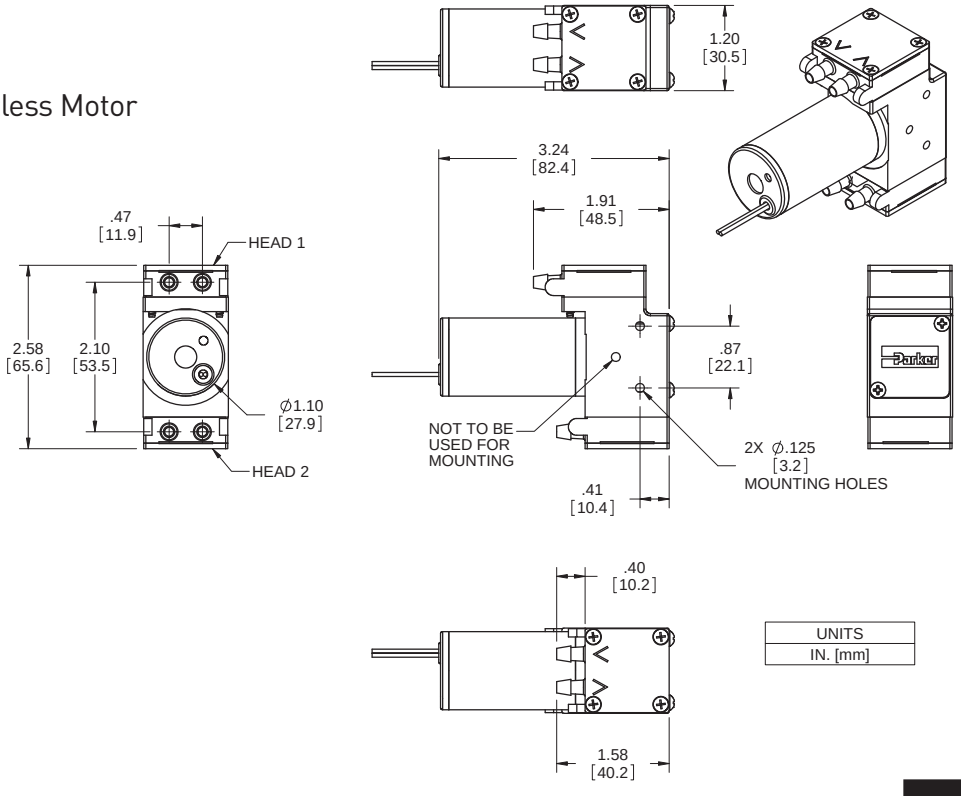


Mechanical Integration

Brushless Slotted Motor



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)

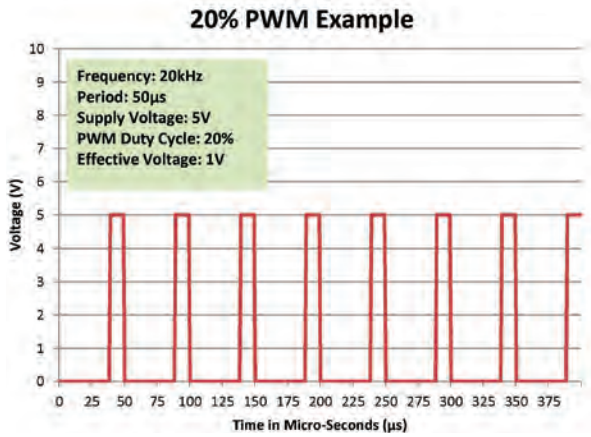
Pulse-width modulation is a commonly used technique for controlling DC motors.

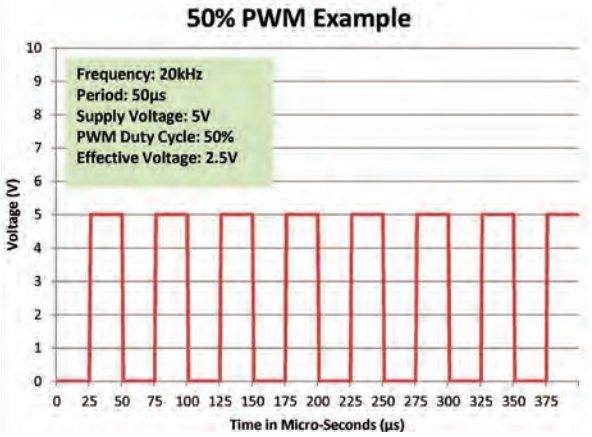
The average value of the voltage fed to the motor is controlled by turning a switch between the voltage supply and the motor on-and-off at a fast pace. The longer the switch is on compared to the off time, the higher the power supplied to the motor.

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.

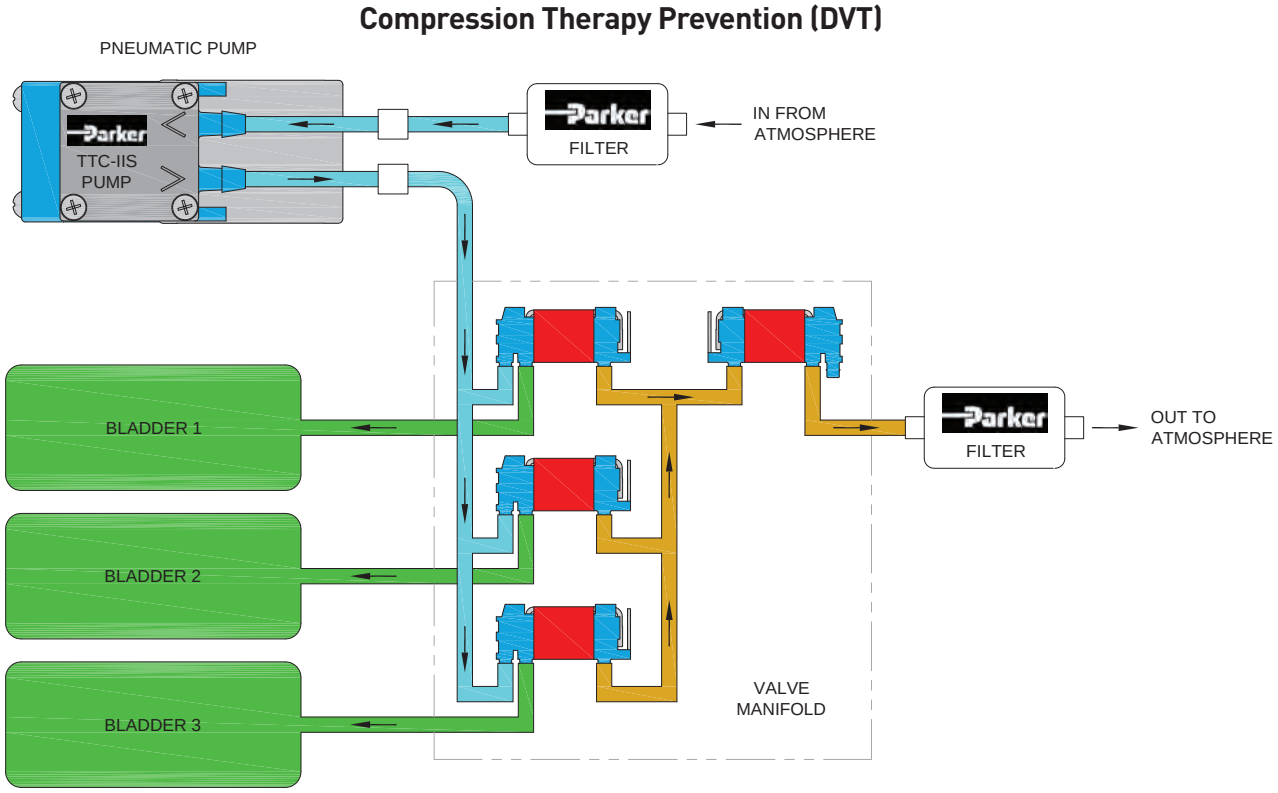
The term duty cycle describes the ratio of on-time to the period (one complete on-and-off cycle). Duty cycle is normally expressed as a percentage of on-time, 100% being full-power and 50% being half-power.

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.





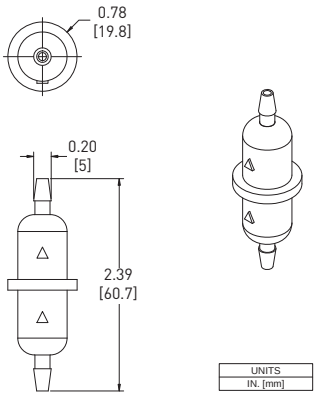
Typical Flow Diagram



Accessory Information

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

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



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

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 TTC-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 TTC-IIS pumps to ease integration into your system.

Physical Properties

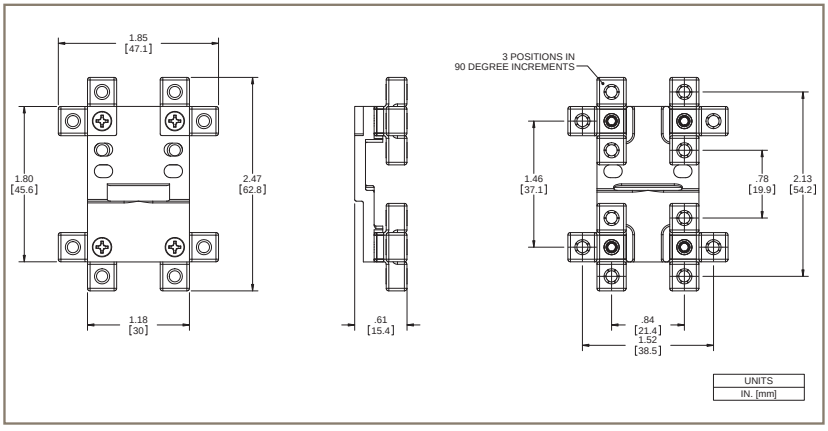
Operating Environment:
41 - 158°F (5 - 70°C)
Humidity:
0 - 95% Relative Humidity
Base Plate:
Noryl GTX830
Feet:
Silicone
Feet Insert:
Brass
Hardware:
Zinc-Plated Steel

EZ Mount kits include all necessary hardware and detailed instructions.

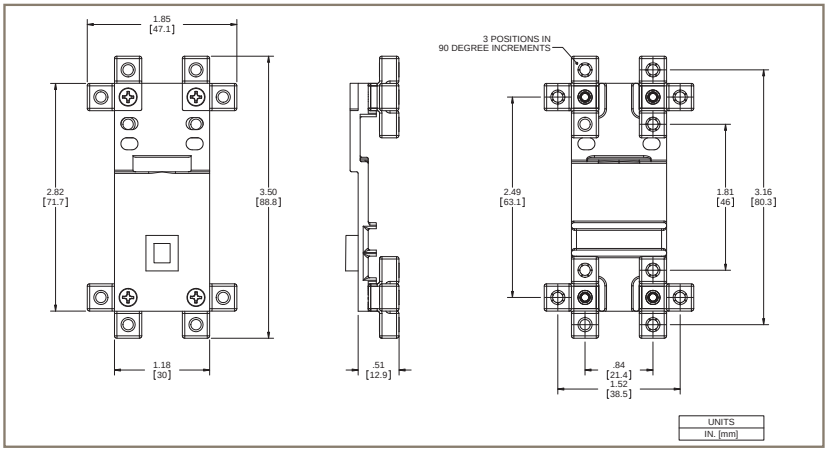
Isolation Feet are available in either threaded or thru-hole clearance for standard #4-40 or #6-32 (M3 for clearance hole only) hardware and can be mounted in any of three ninety-degree planes.

Dimensions

Style A - Brushless Slotted Motor



Style B - PMDC Iron Core Brush Motor



Ordering Information

TTC-IIS Dual Head Pumps - General Purpose

Part No.	Vacuum: LPM @ Load				Free Flow	Pressure: LPM @ Load				Max					PCD*	Wetted Materials
	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 55 mbar	12 psig 827 mbar	16 psig 1103 mbar	Vac in Hg	Press psig	Motor Type	VDC	mA		Diaphragm, Valves, Gasket
TD003-11		1.7	3.0	4.8	**6.5**	4.8	3.2	2.1		12.0	16.0	Brushless Slotted	12	570		AEPDM, EPDM, EPDM

* PCD: Peak Current Draw

TTC-IIS Dual Head Pumps - High Flow

Part No.	Vacuum: LPM @ Load				Free Flow	Pressure: LPM @ Load				Max					PCD*	Wetted Materials
	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 55 mbar	12 psig 827 mbar	16 psig 1103 mbar	Vac in Hg	Press psig	Motor Type	VDC	mA		Diaphragm, Valves, Gasket
TD001-13					**6.8**	4.9	3.4	2.4	1.5		16.0	PMDC Brush	12	630		EPDM
TD004-13					**8.5**	6.1	4.2	2.9			16.0	Brushless Slotted	12	880		EPDM
TD005-12					**8.8**	7.4	5.5	3.8			16.0	Brushless Slotless	12	630		EPDM
TD002-13					**8.5**	6.1	4.2	2.9			16.0	Brushless Slotted	12	770		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.

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 TTC-IIS Dual Head Pump with PMDC Iron Core Brush Motor

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

EZ Mount for TTC-IIS Dual Head Pump with Brushless Slotted Motor

Part Number	Style	Description
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

EZ Mount for TTC-IIS Dual Head Pump with Brushless Slotless Motor

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

Ordering Information

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/ttciis) to configure the TTC-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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www.parker.com/precisionfluidics

Notes

T2-04

Up to 7.0 LPM Free Flow

Micro Diaphragm Pumps (air/gas)

The T2-04 is a high flow and ultra compact pump that is ideal for portable air and gas detection applications.. Delivering flow up to 7.0 lpm, the pump works well in environments where high efficiency for extended batter life, high performance, low cost, minimal weight, and compact size are critical.

Features

- The pump with patented valve design is optimized to provide best-in-class efficiency/size ratio especially for low vacuum applications. Low power consumption enables longer battery life for small instruments.
- The pump fits into the tight spaces demanded of today's battery-powered instruments. The lightweight design keeps the instrument weight minimized.
- The high efficiency coreless brush motor can satisfy intrinsic safety requirements. It has been proven in applications for sampling of medical gases, hazardous gases, particles, and aerosols in a range of fixed and portable instruments.
- Compact dual head design with internal flow paths that require only one set of barbs for intake and discharge simplifies plumbing requirements
- RoHS Compliant

Typical Applications

- Particle Detection
- Pathogen Detection
- Compression Therapy
- Wound Therapy
- Fuel Cell

Product Specifications*

Physical Properties

Operating Environment[1]:
32 to 122°F (0 to 50°C)
Storage Temperature:
14 to 122°F (-10 to 50°C)
Media:
Air, Argon, Helium, Nitrogen, Oxygen, and other non-reacting gases
Humidity:
5-95% Relative Humidity
Noise Level[2]:
As low as 45dB
Pump Assembly Rated Life[3]:
Up to 5,000 hrs
Weight:
3.3 oz (94 g)

Electrical

Motor Type:
High Efficiency Coreless Brush
Nominal Motor Voltages[4]:
6 VDC
Max Power at Nominal Voltage:
0.36 Watts
Electrical Termination:
28 AWG Wire Leads lead length 5" (127 mm)
Current Range[5]:
50 - 900 mA
Inductance[6]:
Coreless Brush: 0.266 mH max @ 1kHz/50mV

Pneumatic

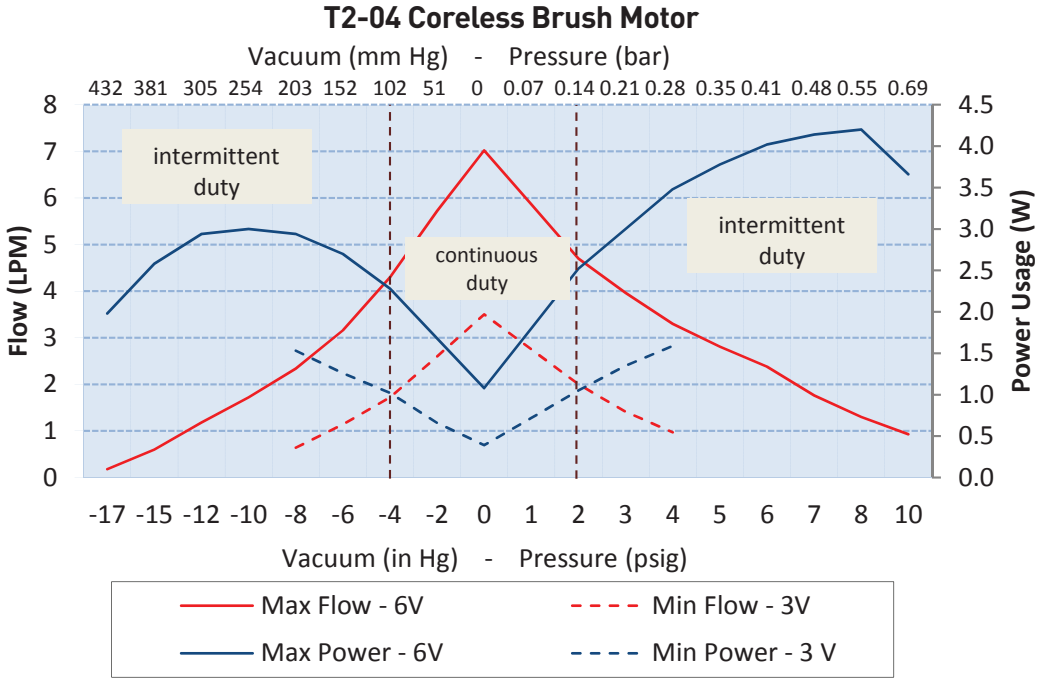
Head Configuration:
Dual (Single Ported)
Maximum Flow:
7.0 lpm
Maximum Intermittent Pressure[7]:
11.9 psi (820 mbar)
Maximum Continuous Pressure:
2 psi (138 mbar)
Maximum Intermittent Vacuum[7]:
17.6 in Hg (596 mbar)
Maximum Continuous Vacuum:
4 in Hg (138 mbar)
Filtration:
40 micron recommended
Efficiency at Free Flow[8]:
Coreless Brush Motor: 8.9 LPM/Watt (*P/N: T4-2HE-06-1SNA*)

Wetted Materials

Diaphragm:	**Pump Head:**
Neoprene Rubber	Polyphthalamide (PPA)
Valves:	
Silicone	

* See Appendix A for details.

Typical Flow Curve



The above graphs represent examples 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

Sizing and Selection

T2-04 Series Coreless Brush Motor

Mounting Guidelines:

- Parker recommends using a nylon cable tie with a length of at least 4" (100 mm).

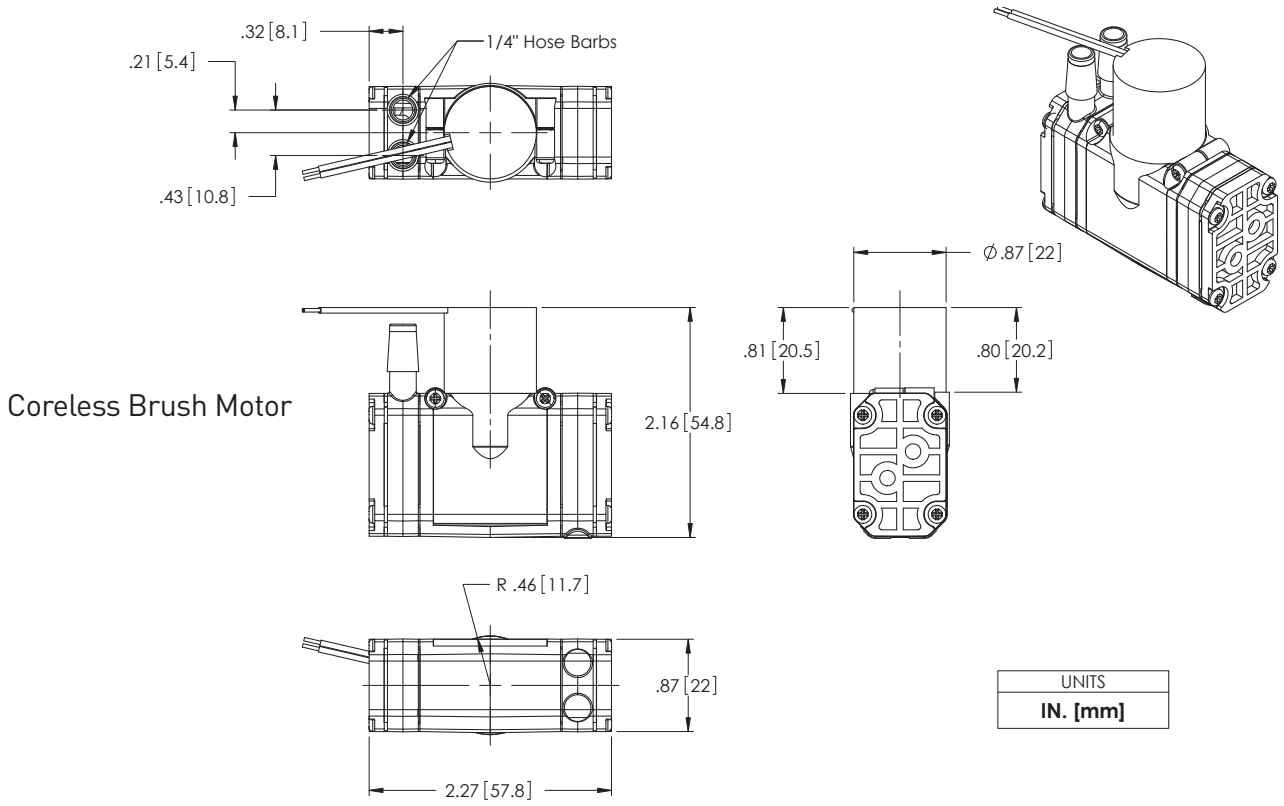
Port Connections:

- Barbs are sized for 1/4" ID tubing, 70-80 durometer recommended

Mechanical Integration

Dimensions

Coreless Brush Motor



Electrical Integration and Motor Control

If application requires variable flow, motor control options are available, as follows:

Brush Motor

2 Wire	Red (+), Black (-)
Wire specification	28 AWG 5" (127 mm) Wire Leads

Key Things to Remember

5" (127mm) flying Leads are the standard electrical connection method to the pump. Contact Applications for other connection requirements.

The pump lead wires are non-polarized.

The pump can be controlled by DC voltage or PWM through a control board supplied by the customer. The minimum recommended PWM frequency is 20kHz.

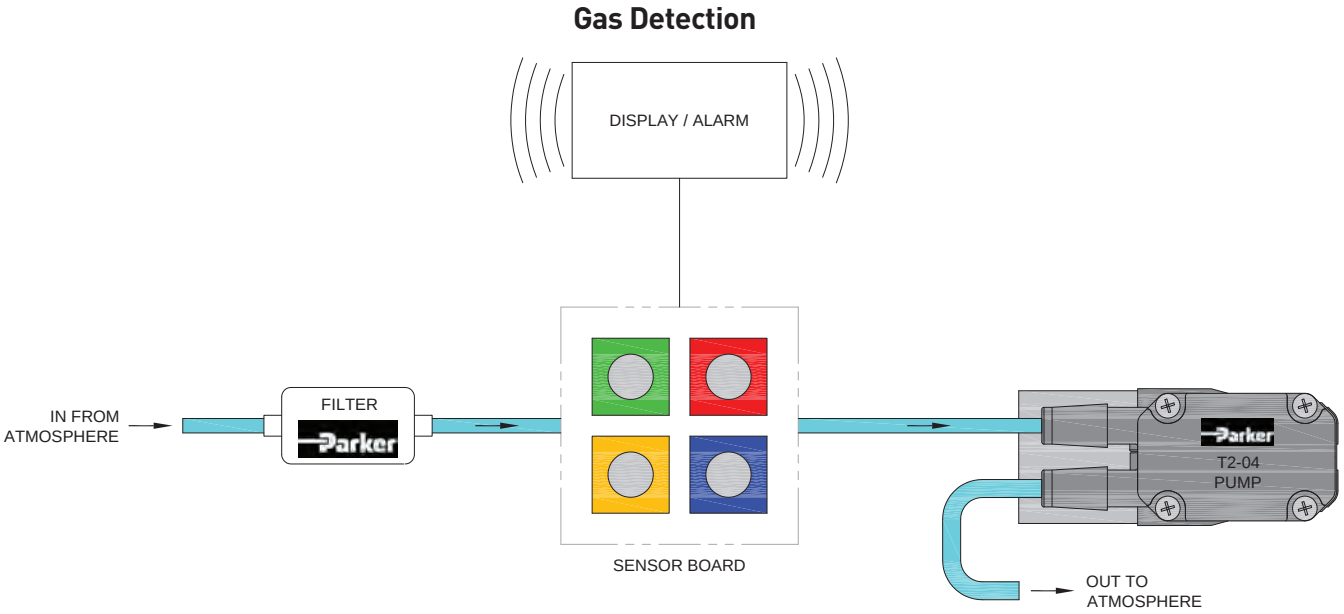
The pump flow and pressure can be controlled by adjusting the input voltage.

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.

T2-04 Micro Diaphragm Pumps (air/gas)

Typical Flow Diagram



Ordering Information

T2-04 Mini Pumps

Configuration	Vacuum: LPM @ Load				Free Flow	Pressure: LPM @ Load			Max			PCD[1]		Wetted Materials[2]
Part No.	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	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
T4-2HE-06-1SNA		1.0	2.3	4.1	**7.5**	3.5	0.9		17.6	11.9	Coreless Brush	6	583	CR, VMQ, EPDM

Note: Other part number could be available for specific application configurations

1. Peak Current Draw
2. CR: Neoprene, VMQ: Silicone, EPDM: Ethylene Propylene Diene Monomer

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/t4) to configure the T2-04 micro 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
- Function in the Application
- Size
- Motor Control
- Media
- Voltage

ORDER ON-LINE

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. Inductance can be used to measure the viability of a component in a device requiring intrinsic safety.
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. 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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www.parker.com/precisionfluidics

Notes

LTC Series

Miniature Diaphragm Pumps (liquid)

Up to 650 mLPM Free Flow

LTC Miniature Diaphragm Pumps are offered in both brush and brushless DC motor drives that can be configured for your specific performance requirements and handle a wide range of liquid media over a wide range of pressures. LTC's patented Fluid-Blok™ Advanced Sealing Technology provides redundant sealing capabilities to eliminate potential leaks. Monolithic diaphragm design enables maximum suction, priming, and continuous dry operation. Ideal for waste, transfer and bulk movement of liquids.

Typical Markets

- Clinical Diagnostics
- Analytical Chemistry
- Printing

Typical Applications

- Clinical Chemistry
- Wash and Waste Circuits
- Urinalysis
- Liquid Chromatography
- Large Format Printers
- Photo Processing Printers

Features

- LTC Series Pumps set the highest benchmark for service free life-expectancy with our advanced proprietary diaphragm elastomer.
- Port design allows for top or bottom face seal and is molded for 1/4-28 UNF threaded fittings.
- Overmolded diaphragm eliminates metal components in the wetted path resulting in a design that is inert to variety of media.
- Incorporating the lightweight EZ Mount Accessory facilitates simple system assembly while dampening vibration and reducing noise levels.
- 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:
Most Gases and Liquids
Humidity:
0 – 95% Relative Humidity
Pump Assembly Rated Life[2]:
PMDC Iron Core Brush - 3,000 hrs
Brushless Slotted - 10,000 hrs
Weight:
7.0 oz. (198 g) PMDC Iron Core Brush
5.0 oz. (142 g) Brushless Slotted

Electrical

Motor Type (DC):
PMDC Iron Core Brush,
Brushless Slotted
Nominal Motor Voltages[3]:
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)
Current Range[4]:
240 - 880 mA

Pneumatic

Head Configuration:
Single
Maximum Unrestricted Flow:
650 mLPM
Pressure Range (Liquid):
0 - 30 psig (0 - 193 kPa)
Vacuum Range (Air):
0 - 14.5 in Hg (0 - 368 mm Hg)
Filtration:
40 microns - recommended
Efficiency at Free Flow[5]:
PMDC Iron Core: 0.1 LPM/Watt (*PN: W311-11*)
Brushless Slotted: 0.1 LPM/Watt (*PN: W312-11*)

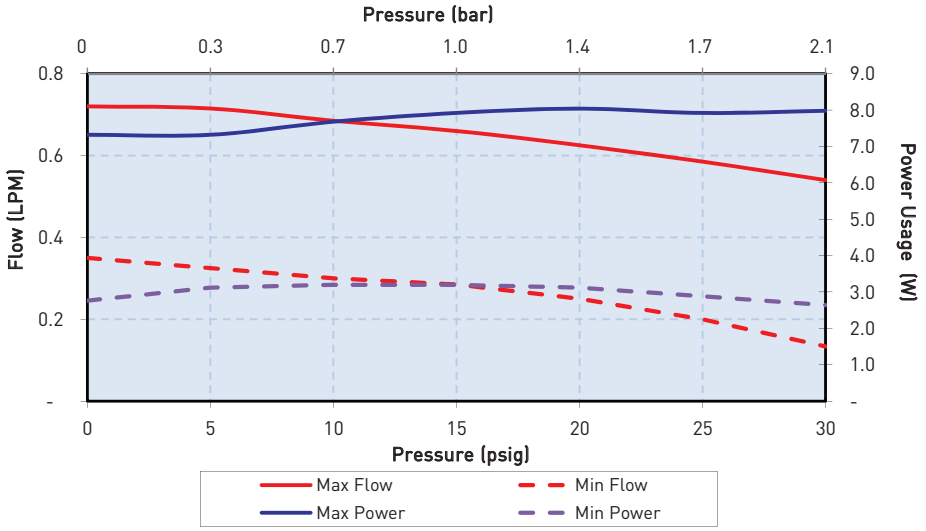
Wetted Materials

Diaphragm:	**Pump Head:**
EPDM, AEPDM, FKM, Teflon/EPDM Laminate	Vectra (Liquid Crystal Polymer)
Valves:	
EPDM, AEPDM, FKM, FFKM	

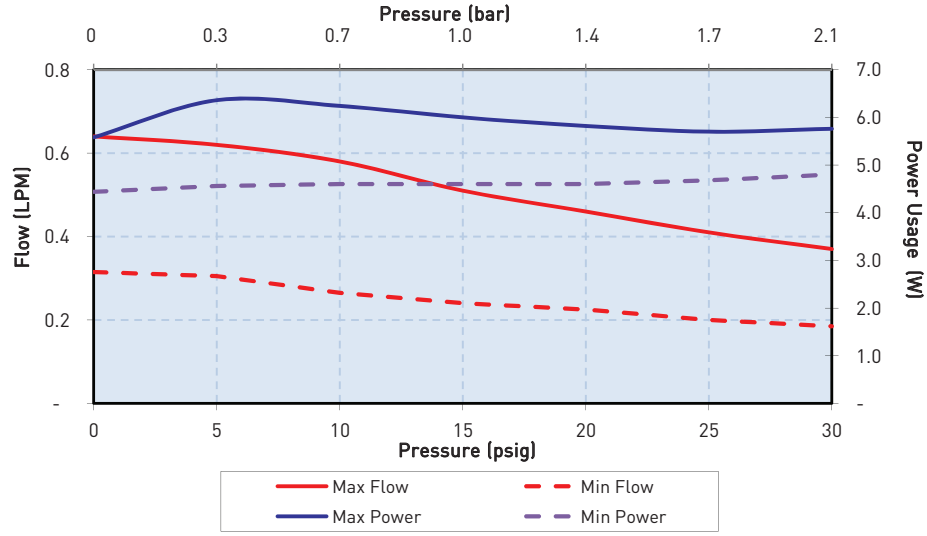
* See Appendix A for details.

Performance Specifications

LTC - PMDC Iron Core Brush Motor



LTC - Brushless Slotted Motor



The above graph represents an example of performance for the pumps series handling water 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.

LTC Series — Miniature Diaphragm Pumps (liquid)

Sizing and Selection

LTC Series	PMDC Iron Core Brush	Brushless Slotted Motor
		
	PMDC Iron Core Brush	**BLDC Slotted Motor**
Efficiency[1]	Good	Better
Life[2]	Good - 3,000 hrs	Best - 10,000 hrs
Cost	Best	Better

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).

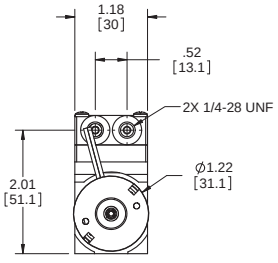
Port Connections:

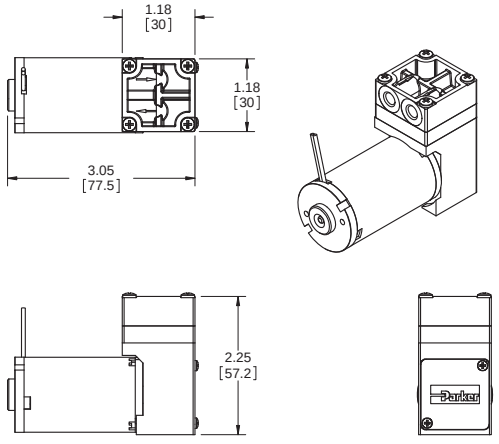
- Flow direction is marked on the pump head with arrows.
- Ports are sized for 1/4"-28 UNF male fittings.

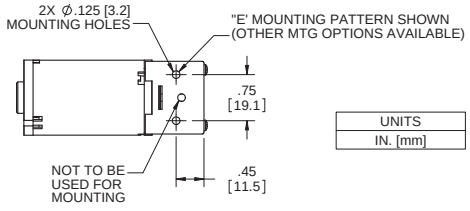
Mechanical Integration

Dimensions

PMDC Iron Core Brush



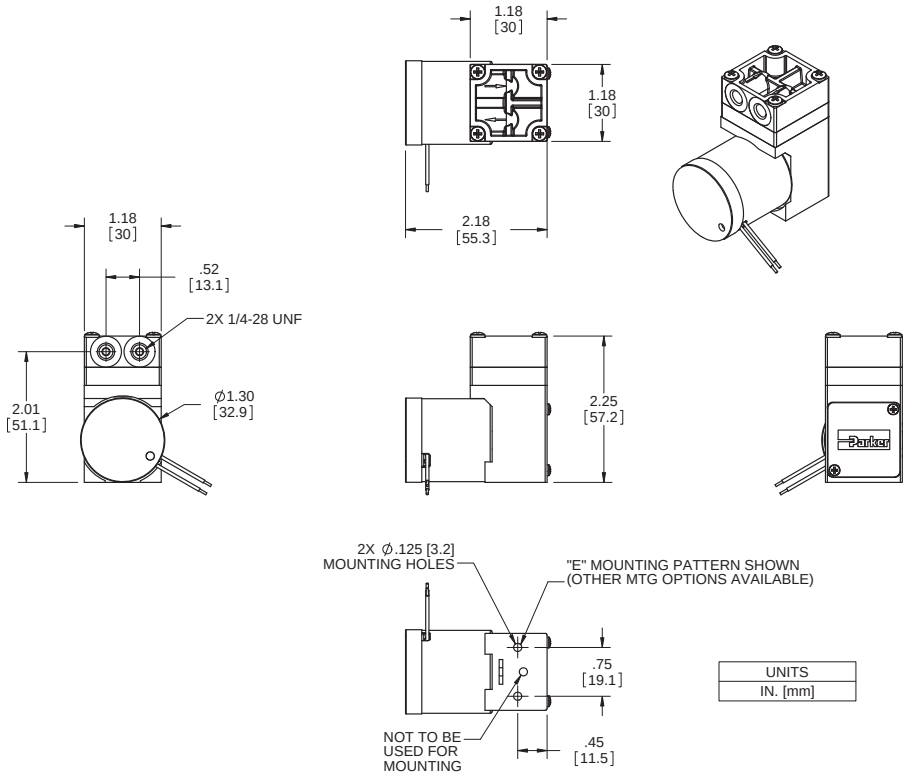




Mechanical Integration

Dimensions

Brushless Slotted 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 Slotted Motor Control Options

2 Wire	Red (+), Black (-)
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.

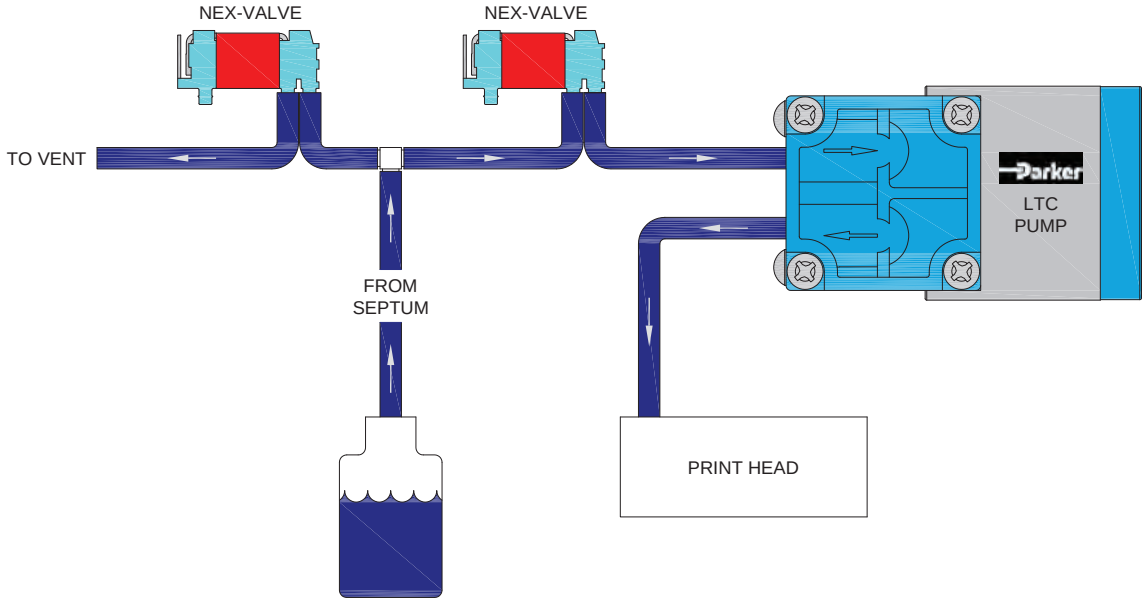
Pump orientation does not affect performance or life.

LTC Series

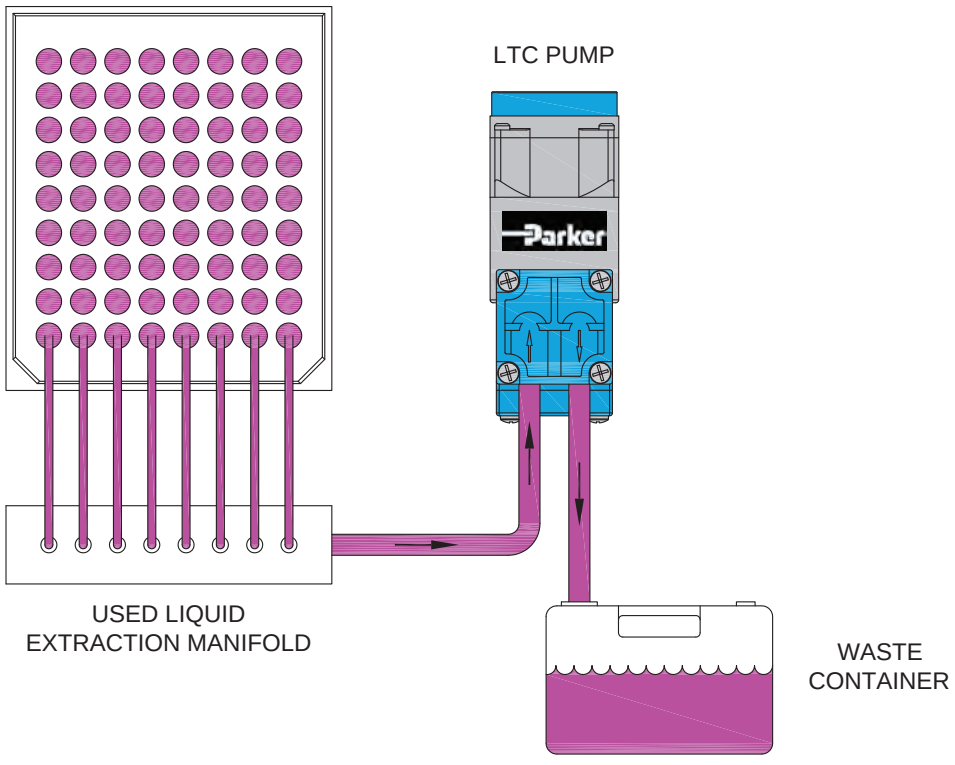
Miniature Diaphragm Pumps (liquid)

Typical Flow Diagram

LTC pump used for liquid transfer in a printing application



LTC Waste Pump



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 LTC 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 LTC pumps to ease integration into your system.

Physical Properties

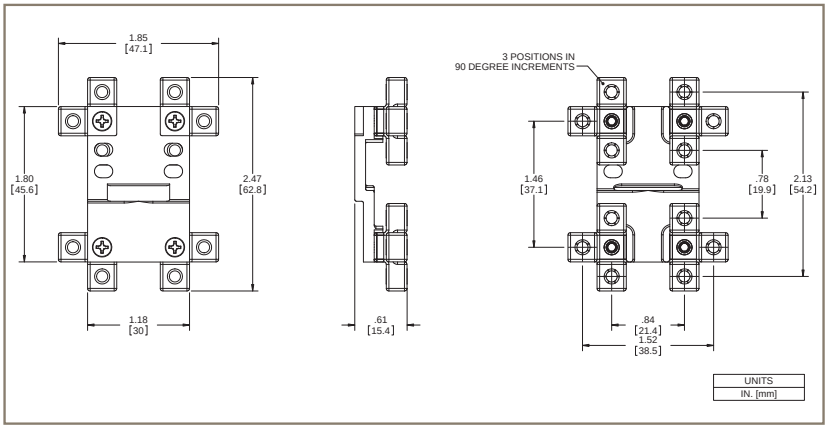
Operating Environment:
41 - 158°F (5 - 70°C)
Humidity:
0 - 95% Relative Humidity
Base Plate:
Noryl GTX830
Feet:
Silicone
Feet Insert:
Brass
Hardware:
Zinc-Plated Steel

EZ Mount kits include all necessary hardware and detailed instructions.

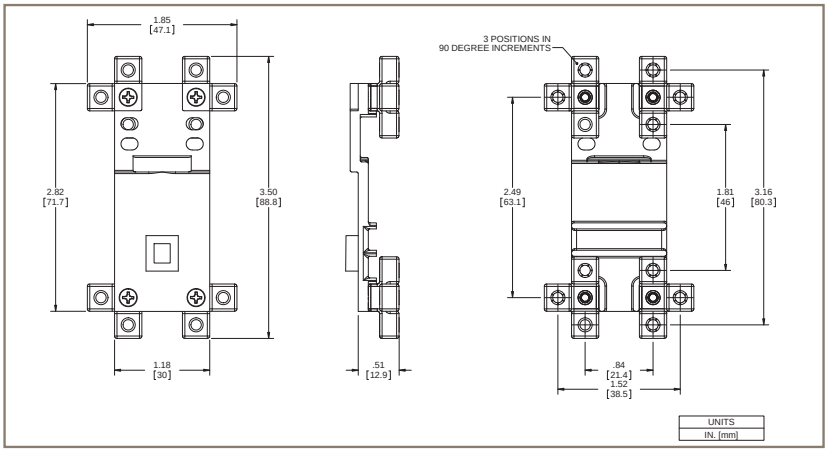
Isolation Feet are available in either threaded or thru-hole clearance for standard #4-40 or #6-32 (M3 for clearance hole only) hardware and can be mounted in any of three ninety-degree planes.

Dimensions

Style A - Brushless Slotted Motor



Style B - PMDC Iron Core Brush Motor



LTC Series Miniature Diaphragm Pumps (liquid)

Ordering Information

LTC Liquid Single Head Pumps

Part No.	Free Flow	Liquid Flow (Water) mLPM @ Load						Max				PCD*	Wetted Materials
	0 psig 0 mbar	5 psig 345 mbar	10 psig 689 mbar	15 psig 1034 mbar	20 psig 1379 mbar	25 psig 1724 mbar	30 psig 2068 mbar	Vac in Hg	Countinuous psig [Liquid]	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
W309-11	**720**	715	685	660	625	585	540	14.5	30.0	Brush PMDC	24	335	EPDM, AEPDM, EPDM
W311-11	**670**	650	600	550	505	450	390	14.5	30.0	Brush PMDC	12	530	EPDM, AEPDM, EPDM
W312-11	**640**	630	570	510	455	415	375	14.5	30.0	Brushless Slotted	24	305	EPDM, AEPDM, EPDM
W313-11	**640**	620	580	510	460	410	370	14.5	30.0	Brushless Slotted	12	530	EPDM, AEPDM, EPDM

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.

*PCD: Peak Current Draw

EZ Mount for LTC Single Head Pump with PMDC Iron Core Brush Motor

Part Number	Style	Description
00329-10-A45S	B	#4-40 Threaded
00329-10-B45S	B	#4 Clearance
00329-10-D45S	B	#6-32 Threaded
00329-10-C45S	B	#6 / M3 Clearance

EZ Mount for LTC Single Head Pump with Brushless Slotted Motor

Part Number	Style	Description
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

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/ltc) to configure your LTC Miniature Diaphragm Pump.

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. Life rating can vary depending on application and operating conditions.
3. 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
4. Current range is dependent on motor type, voltage, pressure/vacuum and flow requirement. Lower levels possible depending on application.
5. 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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www.parker.com/precisionfluidics

LTC-IIS Series

Miniature Diaphragm Pumps (liquid)

Up to 1.5 LPM Free Flow

Parker's LTC-IIS Miniature Diaphragm Pumps are offered in brushless DC motor drives that can be configured for your specific performance requirements and handle a wide range of liquid media over a range of pressures. LTC-IIS patented Fluid-Blok™ Advanced Sealing Technology provides redundant sealing capabilities to eliminate potential leaks. Monolithic diaphragm design enables maximum suction, priming, and continuous dry operation. Ideal for waste, transfer and bulk movement of liquids.

Typical Markets

- Clinical Diagnostics
- Analytical Chemistry
- Printing

Typical Applications

- Clinical Chemistry
- Wash and Waste Circuits
- Urinalysis
- Liquid Chromatography
- Large Format Printers
- Photo Processing Printers

Features

- LTC-IIS Series Pumps set the highest benchmark for service free life expectancy with our advanced proprietary diaphragm elastomer.
- Port design allows for top or bottom face seal and is molded for 1/4-28 UNF threaded fittings.
- Overmolded diaphragm eliminates metal components in the wetted path resulting in a design that is inert to variety of media.
- Incorporating the lightweight EZ Mount Accessory facilitates simple system assembly while dampening vibration and reducing noise levels.
- 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:
41 to 122°F (5 to 50°C)
Media:
Most Liquids and Gases
Humidity:
0 – 95% Relative Humidity
Pump Assembly Rated Life[2]:
Brushless Slotted - 10,000 hrs
Weight:
11.7 oz. (333 g) Brushless Slotted

Electrical

Motor Type (DC):
Brushless Slotted
Nominal Motor Voltages[3]:
12, or 24 VDC *Other voltages available upon request*
Electrical Termination:
Brushless Slotted Motor: 22 AWG Wire Leads, Length 20" (508 mm)
Current Range[4]:
350 - 1025 mA

Wetted Materials

Diaphragm:
EPDM, AEPDM, FKM, Teflon/ EPDM Laminate
Valves:
EPDM, AEPDM, FKM, FFKM
Pump Head:
Vectra (Liquid Crystal Polymer)

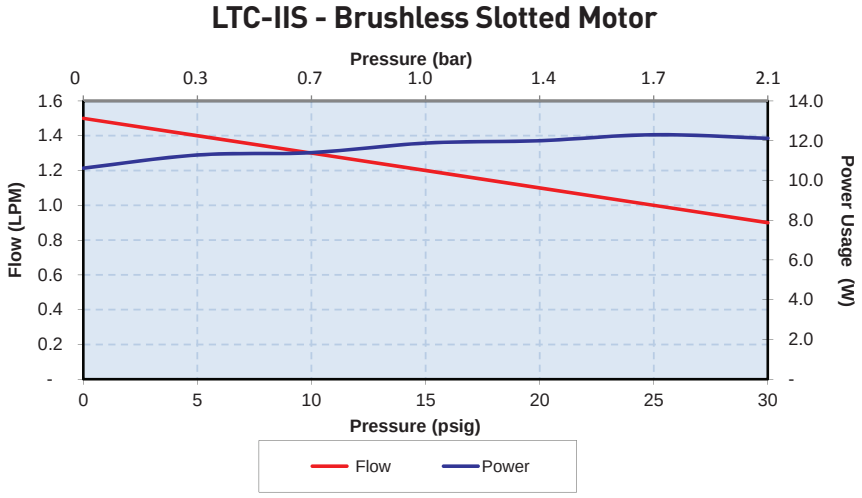
Pneumatic

Head Configuration:
Dual
Maximum Unrestricted Flow:
1.5 LPM
Pressure Range (Liquid):
0 - 30 psig (0 - 2.07 bar)
Vacuum Range (Air):
0 - 11.5 in Hg (0 - 292 mm Hg)
Filtration:
40 microns - recommended
Efficiency at Free Flow[5]:
Brushless Slotted: 0.1 LPM/Watt (*PN: V015-11*)

* See Appendix A for details.

LTC-IIS Series Miniature Diaphragm Pumps (liquid)

Performance Specifications



The above graph represents an example of performance for the pump series handling water at 800 feet (244 m) above sea level at 75 degree 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.

Sizing and Selection

LTC-IIS Series Brushless Slotted (High Torque) Motor

Brushless Slotted (High torque) Motor

Efficiency[1]	High Efficiency at high loads
Life[2]	10,000 hrs

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"thread engagement (torque to 4 in-lbs).

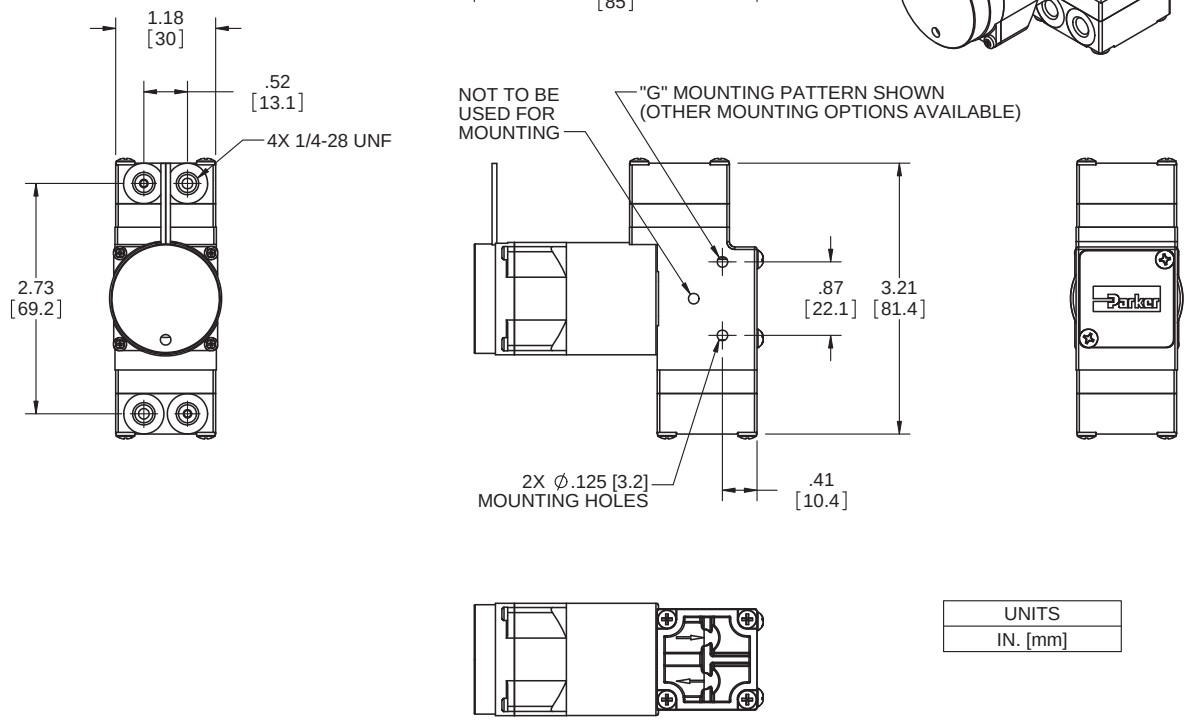
Port Connections:

- Ports are sized for 1/4-28 UNF threaded fittings. The design allows for top or bottom face seal.
- Flow direction is marked on the pump head with arrows.

Mechanical Integration

Dimensions

Brushless Slotted
(High Torque) Motor



UNITS
IN. [mm]

Electrical Integration and Motor Control

Brushless Motor Control Options

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

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.

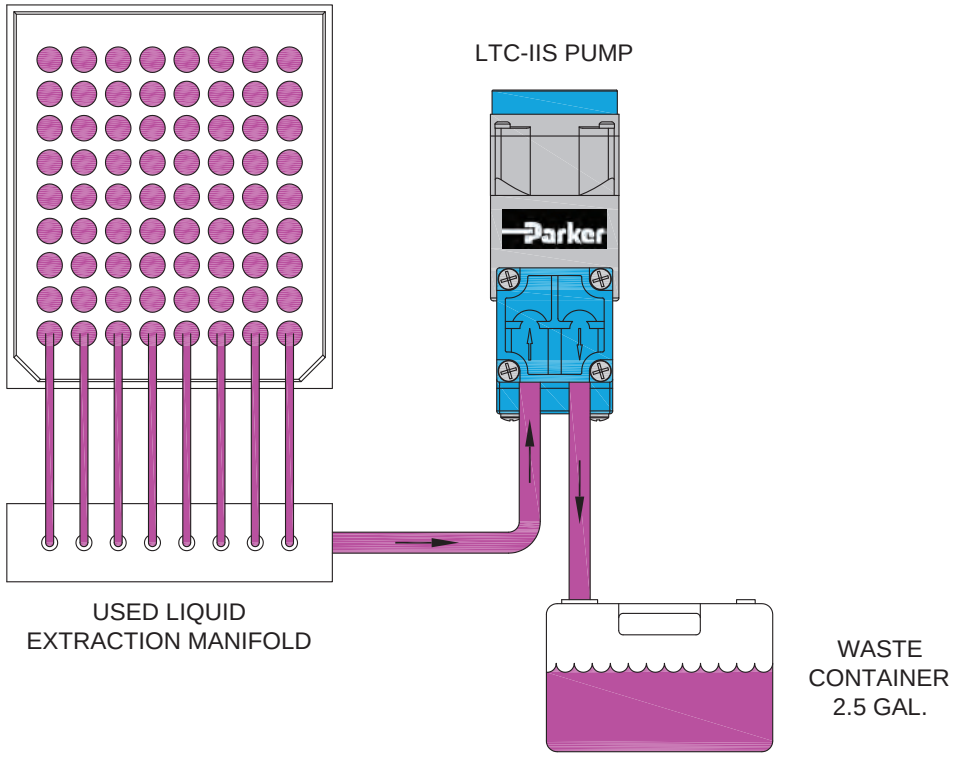
Key Things to Remember

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.

Typical Flow Diagram

LTC-IIS Waste Pump



LTC-IIS Series

Miniature Diaphragm Pumps (air/gas)

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 LTC-IIS Family of diaphragm pumps.

Features

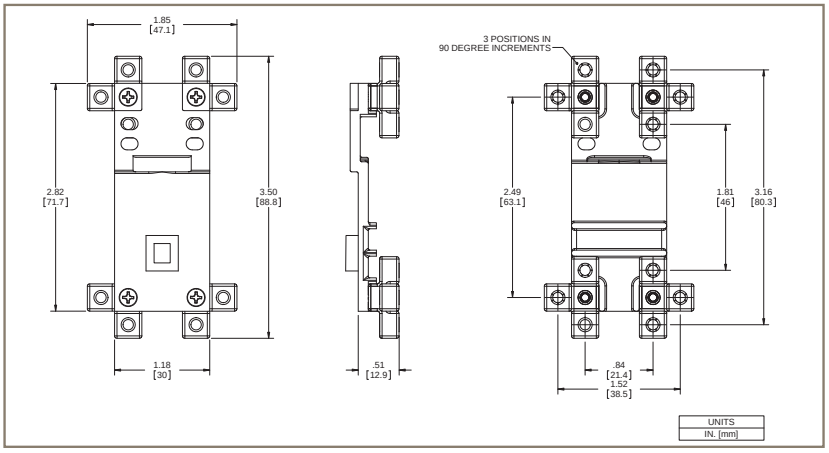
- Isolation feet on the EZ mount can be rotated in any one of three ninety-degree planes and is designed for top-down or bottom-up mounting providing simple installation.
- EZ Mount was designed to minimize weight added to the pump assembly. Approximate weights is: Style B - 0.71 oz (20 g).
- Effectively 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 LTC-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

Dimensions

Style B - Brushless Slotted (High Torque) Motor



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 or #6-32 (M3 for clearance hole only) hardware and can be mounted in any of three ninety-degree planes.

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

Ordering Information

LTC-IIS Liquid Dual Head Pumps

Configuration	Liquid Flow (Water) mLPM @ Load						FF	Max			PCD*	Wetted Materials
	0 psig 0 mbar	5 psig 345 mbar	10 psig 689 mbar	15 psig 1034 mbar	20 psig 1379 mbar	25 psig 1724 mbar	30 psig 350 mbar	Vac in Hg	Countinuous psig [Liquid]	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
V015-11	**1,500**	1,400	1,300	1,200	1,100	1,000	900	11.5	30.0	BLDC Slotted	12	1025	EPDM, AEPDM,EPDM
V016-11	**1,500**	1,400	1,300	1,200	1,100	1,000	900	11.5	30.0	BLDC Slotted	24	505	EPDM, AEPDM,EPDM

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.

*PCD: Peak Current Draw

EZ Mount for LTC-IIS Dual Head Pump with Brushless Slotted (High Torque) Motor

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

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/ltciis) to configure the LTC-IIS miniature liquid 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. Life rating can vary depending on application and operating conditions.
3. 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
4. Current range is dependent on motor type, voltage, pressure/vacuum and flow requirement. Lower levels possible depending on application.
5. 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

T2-01

Up to 66 LPM Free Flow

High Flow Diaphragm Pumps (air/gas)

Parker's T2-01 series are high performance and high efficiency diaphragm pumps. Compact and lightweight package configurations make the T2-01 series the technology of choice for fixed and portable high-capacity air and gas applications.

Typical Markets

- Respiratory
- Agent Detection
- Clinical Diagnostics

Typical Applications

- Portable Aspirators
- Wash and Waste Circuits
- Transport Ventilators
- Medical Instruments
- Air-over-liquid or Vacuum Pressure Supply
- Industrial Agent Detection

Features

- Parker's patented highly efficiency dynamic valve design provides high capacity in a compact package
- Pumps provide up to 32LPM in a single head version and 66 LPM in a dual head version
- Provides the highest flow rates available with lowest power consumption.
- The most compact and lightweight package within its performance range.
- RoHS Compliant

Product Specifications*

Physical Properties

Operating Environment[1]:
32 to 122°F (0 to 50°C)
Storage Environment:
14 to 122°F (-10 to 50°C)
Media:
Air, Argon, Helium, Nitrogen, Oxygen, and other non-reacting gases
Humidity:
5-95% Relative Humidity
Noise Level[2]:
As low as 50dB
Pump Assembly Rated Life[3]:
PMDC Iron Core Brush - Up to 2,400 hrs Brushless- Minimum 3,500 hrs
Weight:
53 oz. (1502 g) - Single Head with PMDC Iron Core Brush Motor 61 oz. (1729 g) - Twin Head with PMDC Iron Core Brush Motor 49 oz. (1381 g) - Twin Head with Brushless Motor

Electrical

Motor Type:
PMDC Iron Core Brush, Brushless
Nominal Motor Voltages[4]:
12, 24 VDC
Max Power at Nominal Voltage:
39 Watts - Single Head PMDC Iron Core Brush 69 Watts - Twin Head PMDC Iron Core Brush 72 Watts - Twin Head Brushless
Electrical Termination:
2-wire (analog or PWM) - PMDC Iron Core Brush Multi-wire 24V Power, 0-5V Speed Control - Twin Head Brushless
Current Range[5]:
1.0 - 5.7 A
Inductance[6]:
PMDC Iron Core Brush Motor: 12 VDC: 0.50 mH max @ 1kHz/50mV 24 VDC: 2.0 mH max @ 1kHz/50mV Brushless Motor: 24 VDC: 0.73 mH max @ 1kHz/50mV

Pneumatic

Head Configuration:
Single, Twin
Maximum Flow:
32 LPM - Single Head 66 LPM - Twin Head
Maximum Intermittent Pressure[6]:
22 psi (1517 mbar)
Maximum Continuous Pressure:
8 psi (552 mbar)
Maximum Intermittent Vacuum[6]:
24 in Hg (610 mm Hg)
Maximum Continuous Vacuum:
12 in Hg (310 mm Hg)
Filtration:
40 micron - recommended
Efficiency at Free Flow[7]
Single Head PMDC Iron Core Brush Motor: 3.6 LPM/Watt (*P/N: T1-1HD-12-1NEA*) Twin Head PMDC Iron Core Brush Motor: 3.6 LPM/Watt (*P/N: T1-2HD-12-1NEA*) Twin Head Brushless Motor: 4.4 LPM/Watt (*P/N: T1-2BL-24-1NEA*)

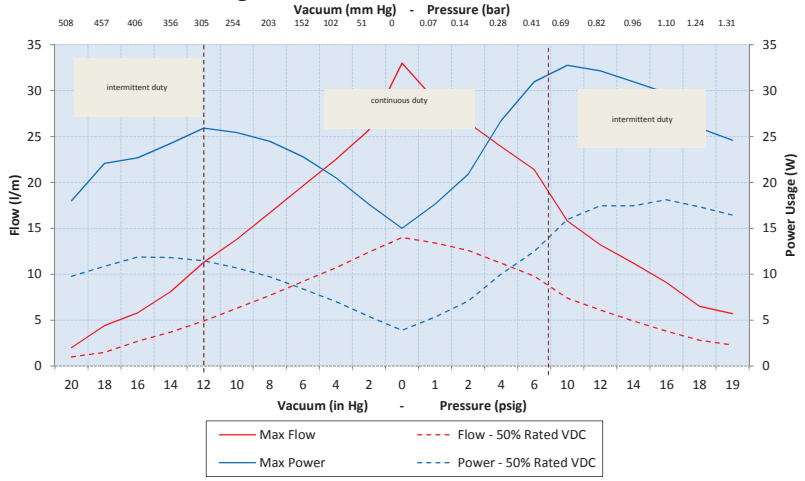
Wetted Materials

Diaphragm: EPDM	**Valves & Gasket:** Neoprene	**Head:** PPS, PTFE

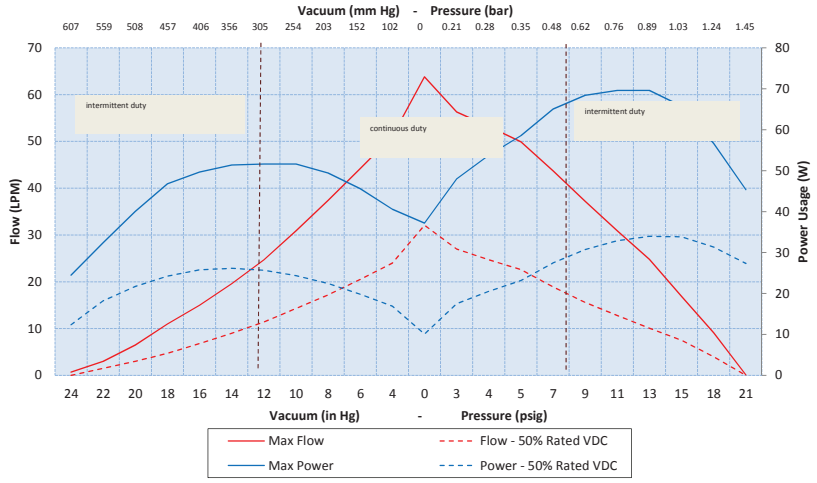
* See Appendix A for details.

Typical Flow Curves

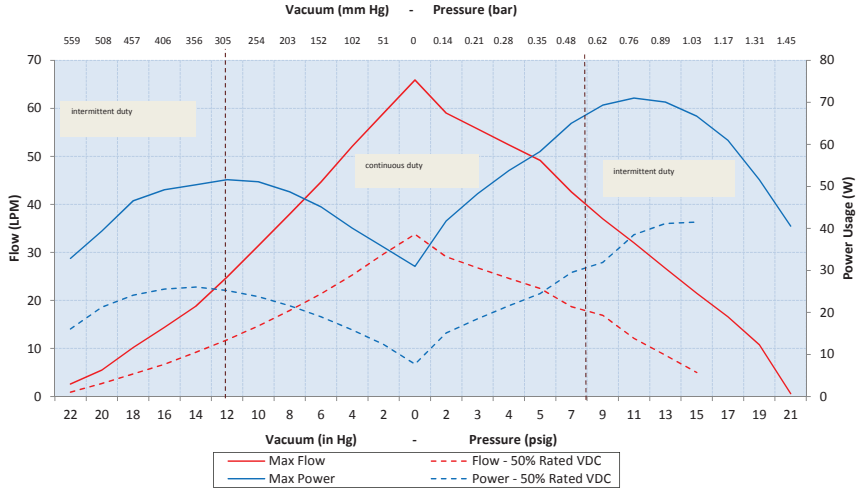
T2-01 Single Head - PMDC Iron Core Motor



T2-01 Twin Head - PMDC Iron Core Motor



T2-01 Twin Head - Brushless Motor



The above graphs represent examples 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

T2-01 High Flow Diaphragm Pumps (air/gas)

Sizing and Selection

T2-01 Series	PMDC Iron Core Brush Motor (Twin Head)	Brushless Motor (Twin Head)
		
	Twin Head	**Twin Head**
Efficiency[8]	Better	Best
Life[3]	Better - up to 2400 hrs	Best - Minimum 3,500 hrs
Size/Weight	Good	Better
Cost	Better	Good

Mounting Guidelines:

- Pump can be mounted using #8-32 screws and nuts on the pump body mounting ears.

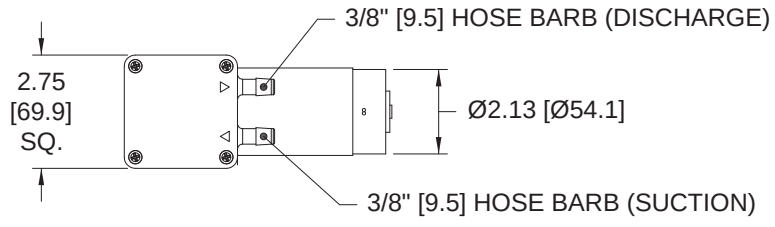
Port Connections:

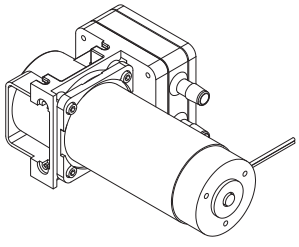
- Barbs are sized for 3/8" ID tubing, 70-80 durometer recommended.
- Flow direction is marked on the pump head with arrows.

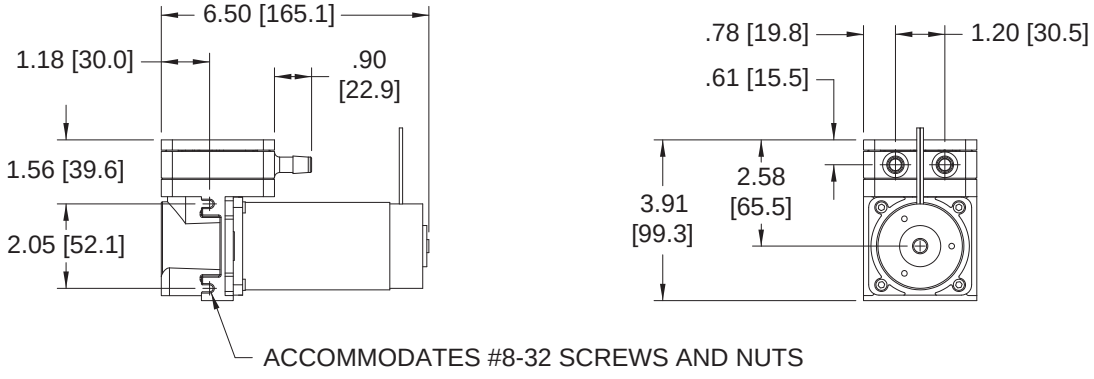
Mechanical Integration

Dimensions

PMDC Iron Core Brush Motor (Single Head)



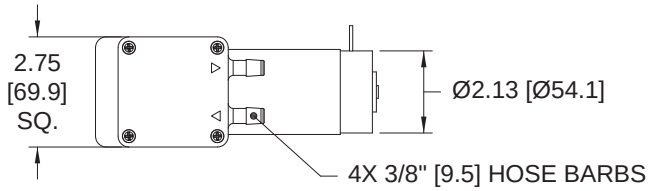


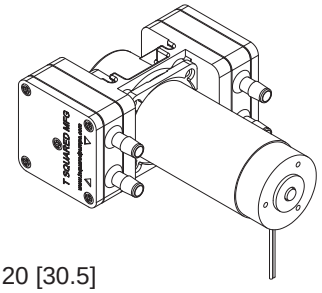


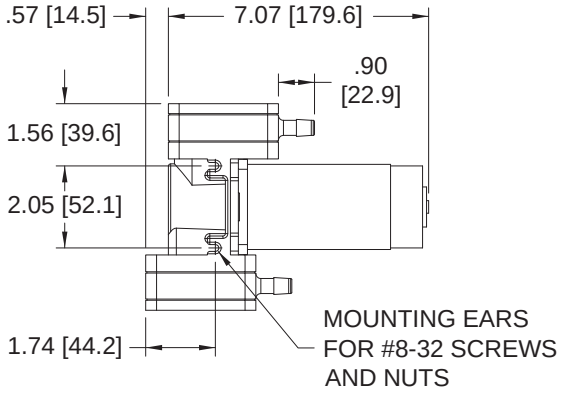
UNITS
IN. [mm.]

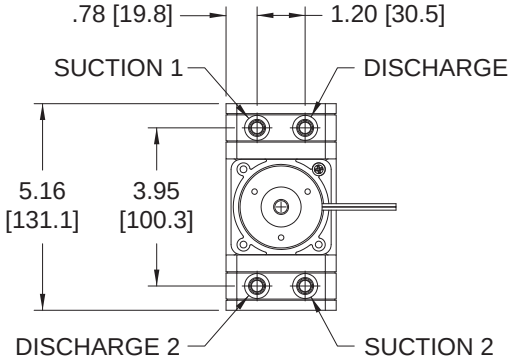
T2-01 High Flow Diaphragm Pumps (air/gas)

PMDC Iron Core Brush Motor (Twin Head)









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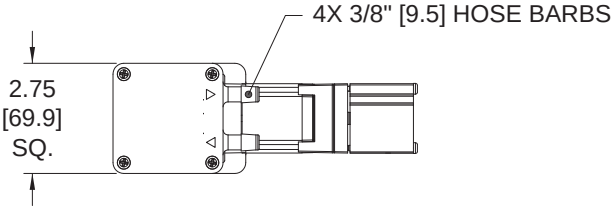
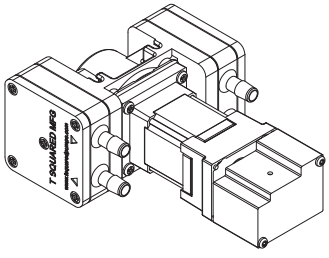
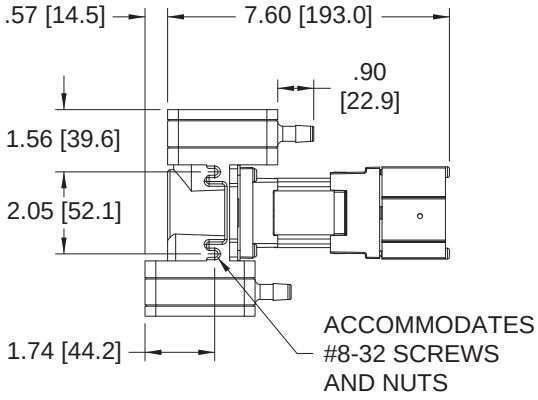
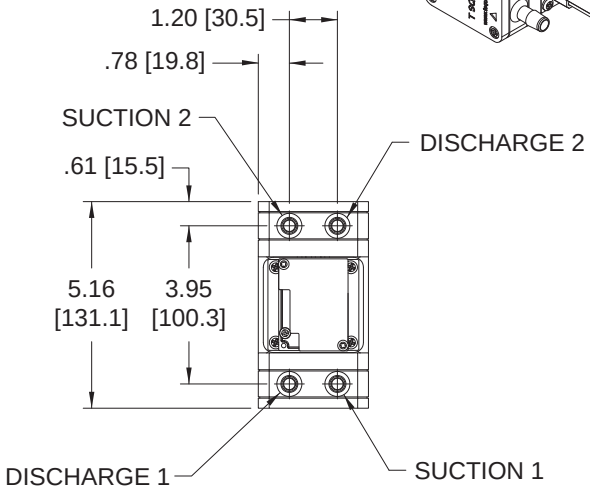
Brushless Motor (Twin Head)









UNITS
IN. [mm.]

Electrical Integration and Motor Control

If application requires variable flow, motor control options are available, as follows:

PMDC Iron Core Brush Motor

2 Wire	Red (+), Black (-)
Wire specification	20 AWG Wire lead length 18" ± 0.5" (457 mm ± 13 mm)

Brushless Motor

Mutli Wire Connector	24V Power, 0-5V Speed Control
Wire specification	22 AWG Wire lead length 24" ± 0.5" (610 mm + 13 mm)

Key Things to Remember

Flying Leads are the standard electrical connection method to the pump. Contact Applications for other connection requirements.

The pump lead wires are non-polarized.

The pump can be controlled by DC voltage or PWM through a control board supplied by the customer. The minimum recommended PWM frequency is 20kHz.

The pump flow and pressure can be controlled by adjusting the input voltage. (See typical flow curve for reference).

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

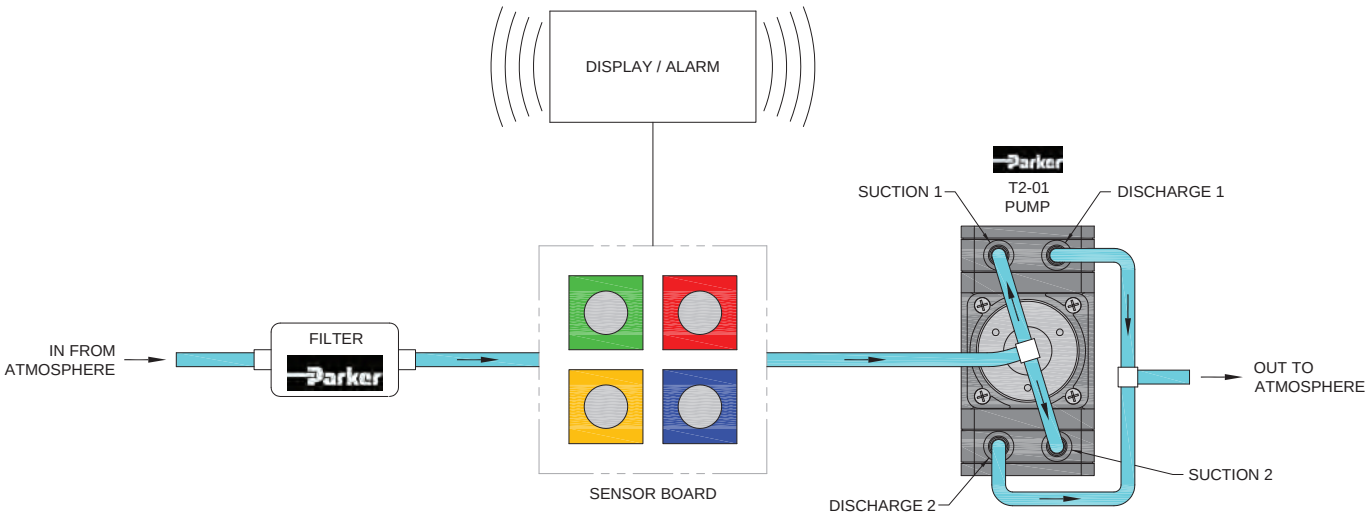
Pump orientation does not affect performance or life.

Brushless Motor Control Connector Pin Function

Pin	Description
1	24V Power Input
2	24V Power Return
1	Tachometer
2	0-5VDC Motor Control Input
3	PWM
4	Encoder "B"
5	Encoder "A"
6	Direction Indicator
7	Direction (Fwd/Rev)
8	Enable
9	0-5VDC Motor Control Output
10	+5Volt Out

Typical Flow Diagram

Industrial Gas Detection



Ordering Information

T2-01 High Capacity Pumps

Configuration	Vacuum: LPM @ Load							Free Flow	Pressure: LPM @ Load						Max				PCD*	Wetted Materials
0 psig	28 in Hg	24 in Hg	20 in Hg	16 in Hg	12 in Hg	8 in Hg	4 in Hg	0	4 psig	8 psig	12 psig	16 psig	20 psig	24 psig	Vac in Hg	Press psig	Motor Type	VDC	mA	Diaphragm, Valves, Gasket
0 mbar	711 mm Hg	609 mm Hg	508 mm Hg	406 mm Hg	305 mm Hg	203 mm Hg	102 mm Hg		276 mbar	552 mbar	827 mbar	1103 mbar	1379 mbar	1655 mbar						
T1-1HD-12-1NEA		2.0	4.0	7.0	12.0	17.0	25.0	**32.0**	26.0	21.0	16.0	5.0			25.0	20.0	PMDC Brush	12	3083	EPDM, N, N
T1-1HD-24-1NEA			4.0	7.0	12.0	17.0	25.0	**32.5**	28.0	22.0	17.0	10.0			23.8	22.0	PMDC Brush	24	1625	EPDM, N, N
T1-2BL-24-1NEA			4.0	24.0	33.0	37.0	50.0	**66.0**	55.0	41.0	25.0	18.0			24.0	20.0	Brushless	24	3041	EPDM, N, N
T1-2HD-12-1NEA			4.0	17.0	29.0	34.0	48.0	**62.5**	52.0	41.0	28.0	18.0			24.4	21.7	PMDC Brush	12	5750	EPDM, N, N
T1-2HD-24-1NEA			4.0	17.0	29.0	34.0	48.0	**64.5**	53.0	42.0	28.0	18.0	10.0		25.0	22.0	PMDC Brush	24	3021	EPDM, N, N

Note: Other part number could be available for specific application configurations

*PCD: Peak Current Draw

Please click on the Order On-line button below (or go to www.parker.com/precisionfluidics/t1) to configure the T2-01 high flow 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. Inductance can be used to measure the viability of a component in a device requiring intrinsic safety. Inductance values are for motor winding only.
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. 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

EZ-Mount

Vibration Isolation Mounting System

For BTC/TTC/LTC Series Pumps

*Pictured **EZ Mounts** shown fully assembled with baseplate and isolation feet.*

EZ Mount provides ease of installation and effective control of vibration transfer. EZ Mount was designed to mount easily to all Precision Fluidic BTC, TTC and LTC 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, TTC and LTC 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

Product Assemblies

BTC/LTC/TTC

PMDC Iron Core Brush Motor

BTC IIS/LTC IIS

Brushless Slotted (High Torque) Motor

BTC IIS /TTC IIS

Brushless DC Motor

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 or #6-32 (M3 for clearance hole only) hardware and can be mounted in any of three ninety-degree planes.

Product Specifications

BTC/LTC/TTC Single Head Pump with PMDC Iron Core Brush Motor

Part Number	Style	Description
00329-10-A45S	B	#4-40 Threaded
00329-10-B45S	B	#4 Clearance
00329-10-D45S	B	#6-32 Threaded
00329-10-C45S	B	#6 / M3 Clearance

BTC/LTC/TTC Single Head Pump with Brushless Slotless Motor

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

BTC /LTC/TTC Single Head Pump and BTCIIS/TTC IIS Dual Head Pump with Brushless Slotted Motor

Part Number	Style	Description
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

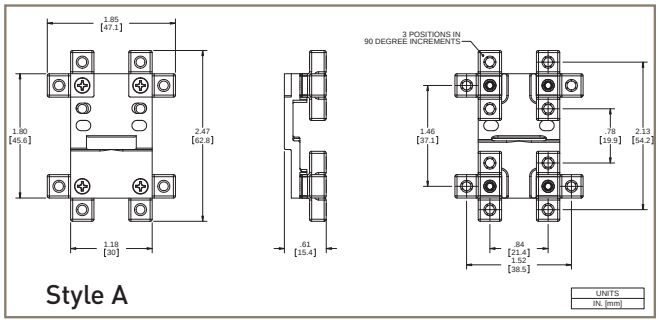
BTC-IIS/LTC-IIS Dual Head Pump with Brushless Slotted Motor (High Torque)

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

BTC-IIS/TTC-IIS Dual Head Pump with PMDC Iron Core Brush Motor

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

Dimensions



Ordering Information

Please click on the Order On-line button
(or go to www.parker.com/precisionfluidics/ezmount) to select
your EZ Mount Accessory.

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WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE.

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PPF MDP - 002/US October 2013

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