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 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.

Max Power at Nominal Voltage:
See Performance Specification Curves

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 (See Performance Specifications)

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: E257-11*)

Wetted Materials

Diaphragm:
EPDM, AEPDM, FKM

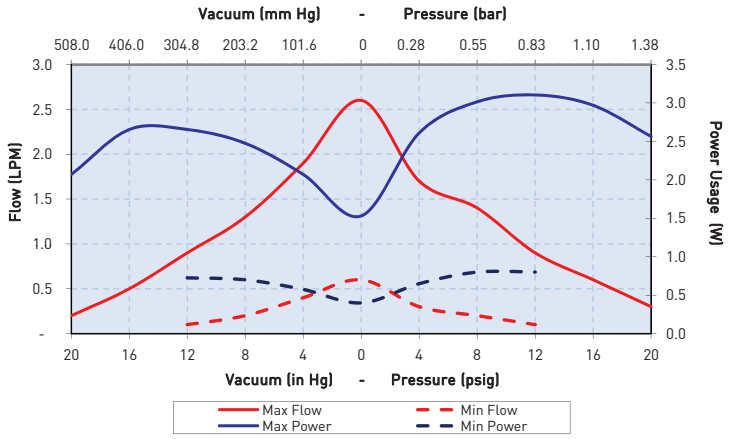
Valves:
EPDM, AEPDM, FKM

Pump Head:
PSU (Polysulfone)

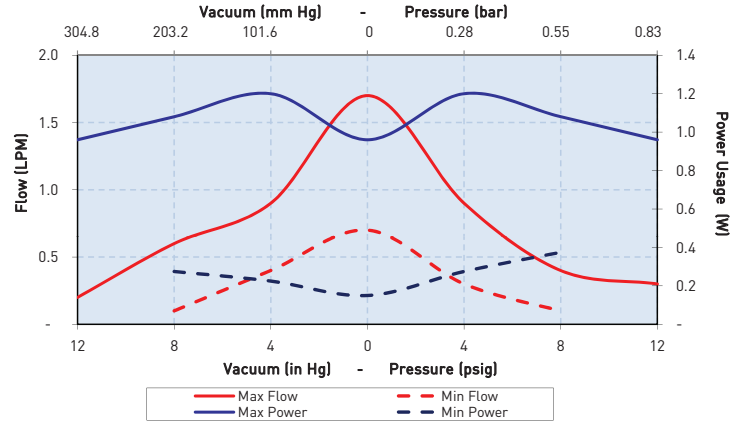
* See Appendix A for details.

Performance Specifications

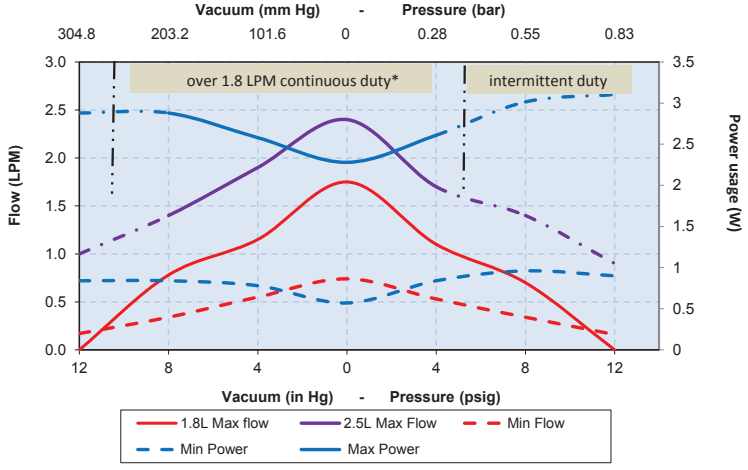
CTS - PMDC Iron Core Brush



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.

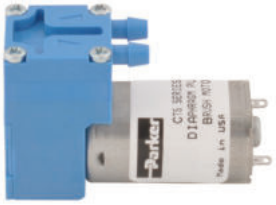
* Continuous duty pressure/vacuum range for Brushless performance above 1.8LPM

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 or using a nylon cable tie with a length of at least 4" (100 mm).
- Hole in the center of the bottom of housing is for manufacturing only–not to be used for mounting.

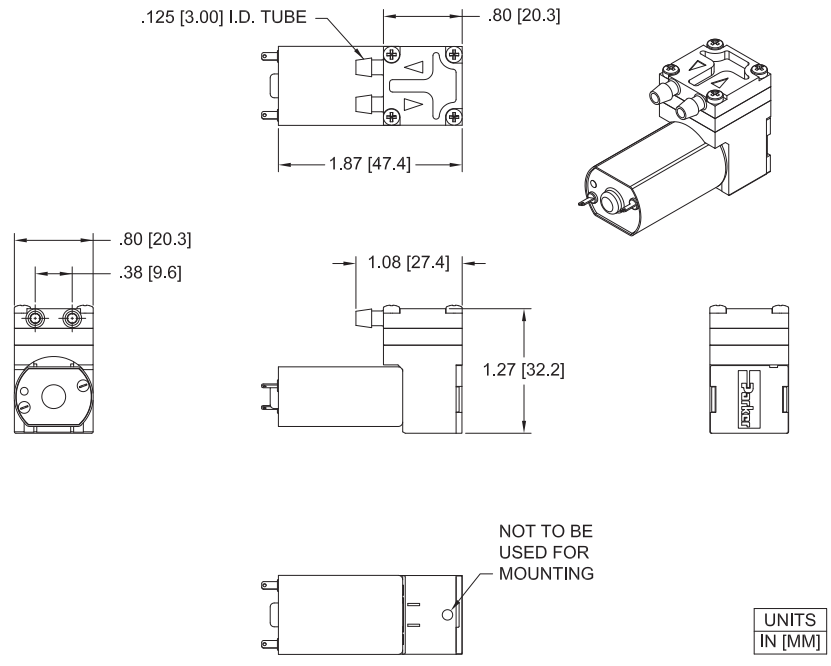
Port Connections:

- 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

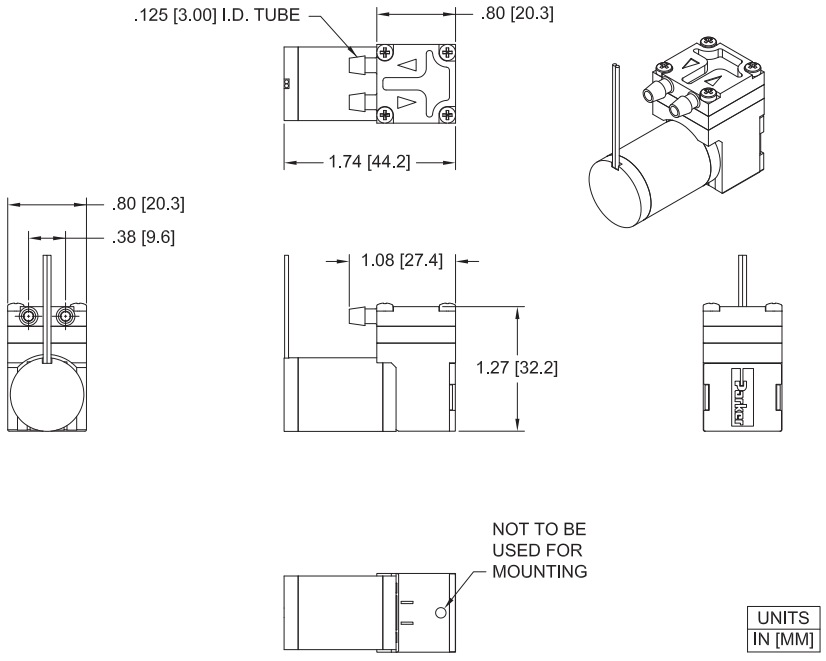
PMDC Iron Core Brush



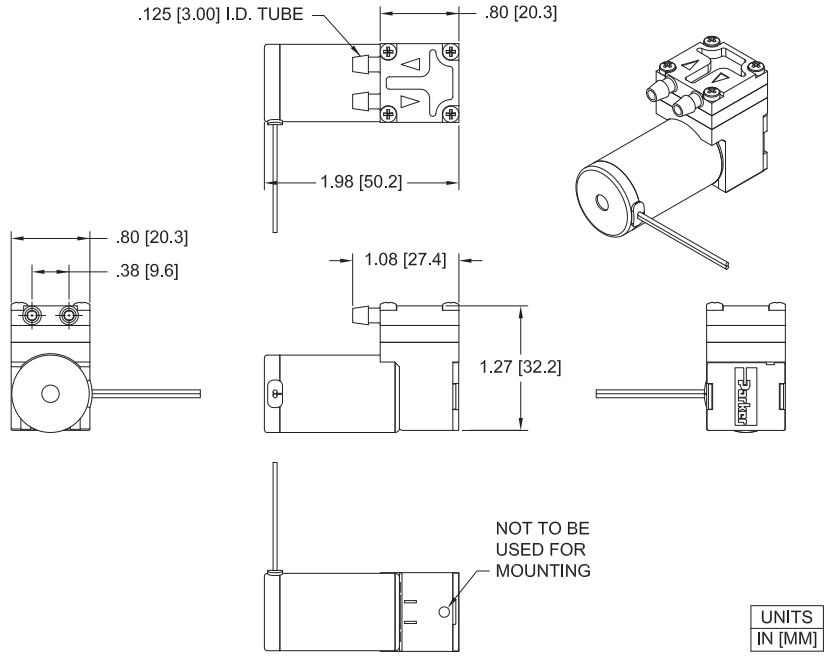
Mechanical Integration

Dimensions

Coreless Brush Motor



Brushless Slotless Motor



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

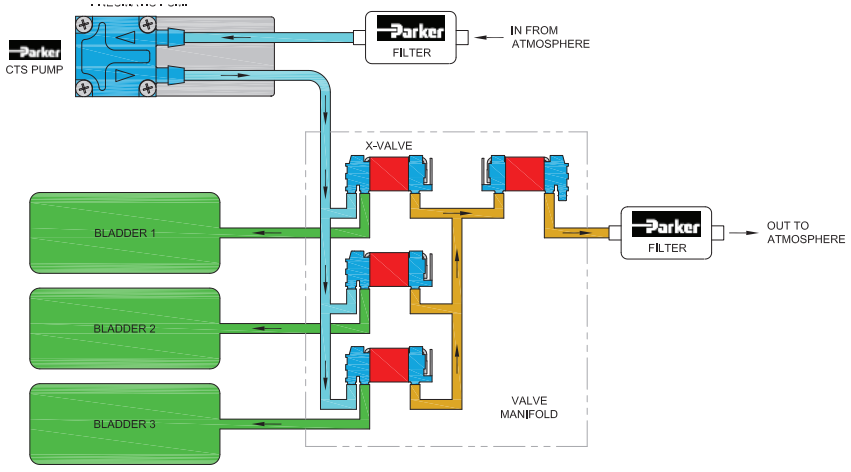
The pump is not a pressure holding device. An external check valve is recommended, if there is a pressure holding requirement.

Onboard PWM control is not provided with this pump.

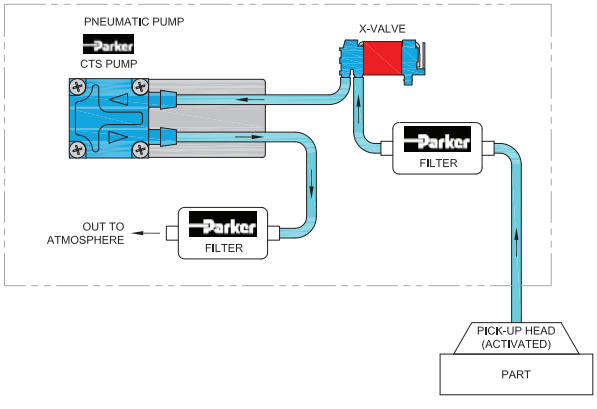
Pump orientation does not affect performance or life.

Typical Flow Diagram

Compression Therapy Prevention (DVT)

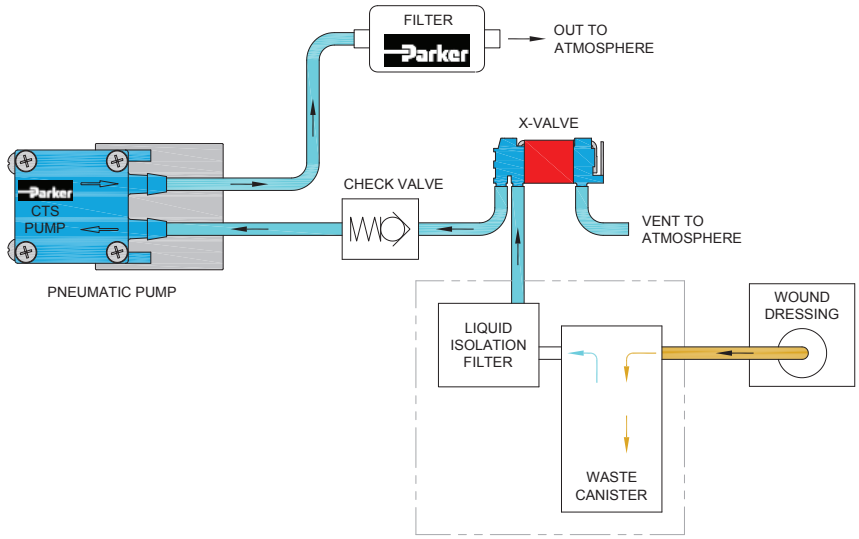


Pick-up Head

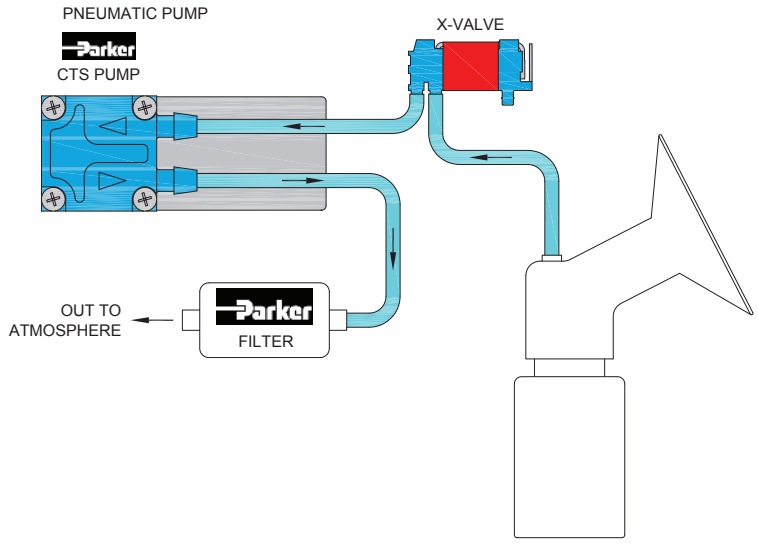


Typical Flow Diagram

Negative Pressure Wound Therapy (NPWT)



Breast Pump

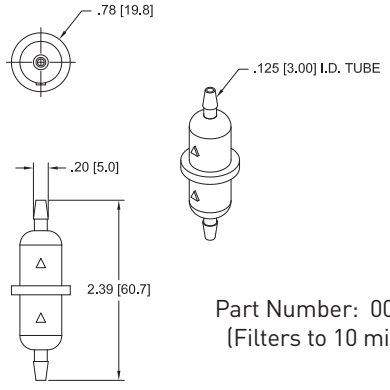


CTS Series Micro Diaphragm Pumps (air/gas)

Accessory Information

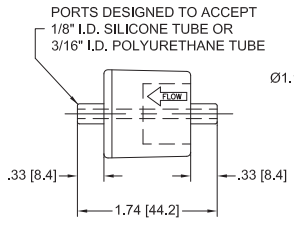
A **Filter-Muffler** is always recommended in the air inlet or outlet to reduce noise and risk of debris that may affect pump performance. See ***Typical Flow Diagrams*** for installation guidelines and Note 2 in Appendix at the end on noise

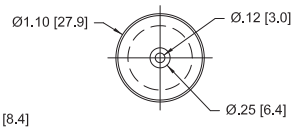
Typically a 40 micron filter is recommended to be supplied by the customer. Following are three other options of filtering specifications



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

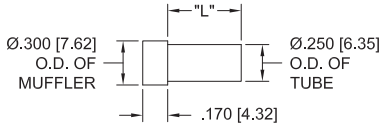
UNITS
IN [MM]

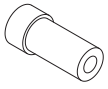




Part Number: 00085-15

UNITS
IN [MM]





Part Number: 1504-10

PART NUMBER	TUBING DUROMETER	TUBING LENGTH "L"
01504-10-0001	50	.500 [12.70]
01504-10-0002	70	.500 [12.70]
01504-10-0003	70	.650 [16.51]

Chemical Compatibility Chart*

	Chemical Compatibility of Wetted Path Materials			
Chemical	**FKM**	**EPDM**	**AEPDM**	**PSU**
Air	1	1	1	1
Ozone (1000 ppm)	4	4	4	1
Oxygen	1	1	1	1
Ethylene (Ethene)	1	4	1	1
Acetylene	1	1	1	1
Propane	1	4	4	1
Methane	1	4	4	1
Nitrogen	1	1	1	1
Carbon Dioxide	1	2	2	1
Halothane (Up to 5%)	1	4	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

Note: Consult factory for other gases.

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 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	Motor Type	VDC	mA	Diaphragm Valves-Gasket
E107A-12-090		0.2	0.5	0.9	1.3	1.9	**2.6**								22.5		Brush PMDC	9	295	EPDM, EPDM
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
E222-13							**2.5**	1.8	1.4	1.1	0.9	0.7	0.5			12.0	Brush PMDC	9	395	AEPDM, EPDM
E177A-12		0.1	0.5	0.8	1.2	1.7	**2.3**								22.5		Brush PMDC	12	410	EPDM, EPDM
E138-13							**2.1**	1.6	1.3	1.0	0.7	0.5	0.3			28.0	Brush PMDC	12	410	AEPDM, EPDM
E189-12		0.2	0.6	0.9	1.2	1.5	**2.1**								22.5		Brush PMDC	6	450	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
E107-12-060			0.2	0.4	0.7	1.0	**1.8**								20.5		Brush PMDC	6	265	EPDM, EPDM
E249-13							**1.8**	1.4	1.0	0.8	0.6					10.0	BLDC Slotless	9	250	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
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
E163-11-090				0.2	0.5	0.8	**1.5**	0.8	0.5	0.2					15.5	15.0	Brush PMDC	9	165	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
E206-11				0.1	0.4	0.9	**1.5**	1.0	0.5	0.2					14.0	13.0	Brush PMDC	24	110	AEPDM, EPDM
E232-13							**1.5**	1.1	0.8	0.5	0.4					12.0	Brush PMDC	5	550	AEPDM, AEPDM
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
E240-13							**1.3**	1.0	0.8	0.2						10.0	BLDC Slotless	9	350	EPDM, EPDM
E242-12			0.3	0.5	0.7	1.0	**1.3**								22.0		BLDC Slotless	6	300	AEPDM, EPDM
E164-11-050			0.1	0.3	0.5	0.8	**1.2**	0.8	0.5	0.3	0.1				17.5	17.0	Coreless Brush	5	215	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	**1.4**	0.9	0.6	0.2					16.0	16.0	BLDC Slotless	9	180	AEPDM, EPDM
E230-13							**1.2**	0.7	0.5	0.3						12.0	Brush PMDC	5	320	AEPDM, EPDM
E248-13							**1.1**	0.9	0.6	0.5	0.3					10.0	BLDC Slotless	6	320	EPDM, EPDM
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	175	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

*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.

CTS Series Micro Diaphragm Pumps (air/gas)

Accessory Ordering Information

Part No.	Filtering Level (Micron)	Filter Area	Operating Limitations:			Wetted Materials
00492-15	10	1.71 in sq (11 sq cm)	Max Temperature 80° C	Min Temperature 32° C	Max Pressure 65 PSI	Polypropylene
01504-10	75-90	.02 in sq (16 sq mm)	80° C	32° C	65 PSI	Polyethylene
00085-15	0.01	.39 in sq (252 sq mm)	110° C	32° C	125PSI	Nylon
	Filter-Mufflers: To assist with filtration and optimize noise reduction. Tubing: Recommendation 1/8" 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.

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