



Instruction Manual

Effective: June 01, 2011



Oildyne Miniature Piston Pumps and Cartridge Piston Pumps



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WARNING – USER RESPONSIBILITY

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

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

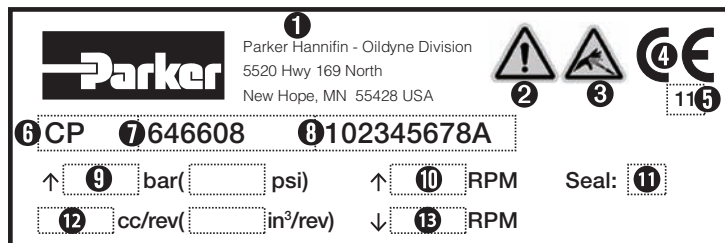
To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Offer of Sale

Please contact your Parker representation for a detailed 'Offer of Sale'.

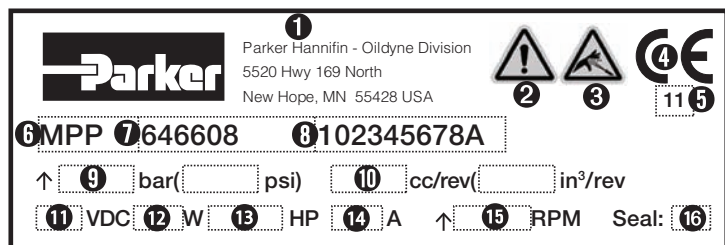
How to read the product label with the Cartridge and Miniature Piston Pumps

Standalone Miniature Piston Pump or Cartridge Piston Pump



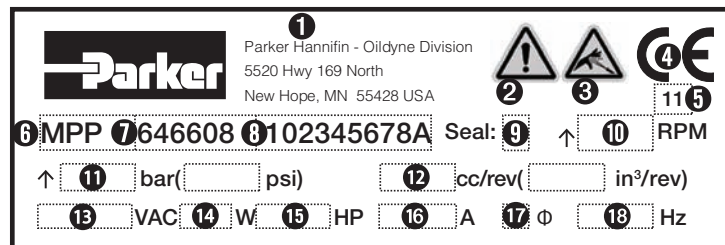
1. Name & address of manufacturer
2. WARNING - see page 4
3. WARNING - see page 4
4. CE Mark (if applicable)
5. Year of product manufacture (if CE marked)
6. Product type - CP or MPP
7. Part number
8. Unique identifier/serial number
9. Maximum pressure rating
10. Maximum speed rating
11. Seal material
12. Displacement
13. Minimum speed rating

Miniature Piston Pump with DC Motor



1. Name & address of manufacturer
2. WARNING - see page 4
3. WARNING - see page 4
4. CE Mark (if applicable)
5. Year of product manufacture (if CE marked)
6. Product type
7. Part number
8. Unique identifier/serial number
9. Maximum pressure rating
10. Displacement
11. Motor voltage
12. Motor rated watts
13. Motor rated horsepower
14. Motor Amperage draw
15. Motor maximum speed rating
16. Seal material

Miniature Piston Pump with AC Motor



1. Name & address of manufacturer
2. WARNING - see page 4
3. WARNING - see page 4
4. CE Mark (if applicable)
5. Year of product manufacture (if CE marked)
6. Product type
7. Part number
8. Unique identifier/serial number
9. Seal material
10. Motor maximum speed rating
11. Maximum pressure rating
12. Displacement
13. Motor voltage
14. Motor rated watts
15. Motor rated horsepower
16. Motor Amperage draw
17. Motor phase
18. Motor Hz

Introduction and Description

Introduction

This manual provides descriptive operation and maintenance instructions for Miniature Piston Pumps and Cartridge Piston Pumps manufactured by the Parker Hannifin Corporation, Oildyne Division. Any additional information may be obtained from Parker by referencing the unit's part number printed on the product label or by contacting your local authorized Parker Distributor.

Some of the Information in this manual may not apply to your piston pump. Information about custom units may require service and application information from other sources.

Warning

This Instruction Manual should be read in its entirety and understood prior to installing and operating the Parker Miniature Piston Pumps and Cartridge Piston Pumps.

It is imperative that personnel involved in the installation, service, and operation of the Oildyne units should be familiar with how the equipment is to be used. They should be aware of the limitations of the system and its component parts, and have knowledge of good hydraulic practices in terms of safety, installation, and maintenance.

Explanation of Warning Labels

The following labels will be used in this Instruction Manual and on all applicable Oildyne products.



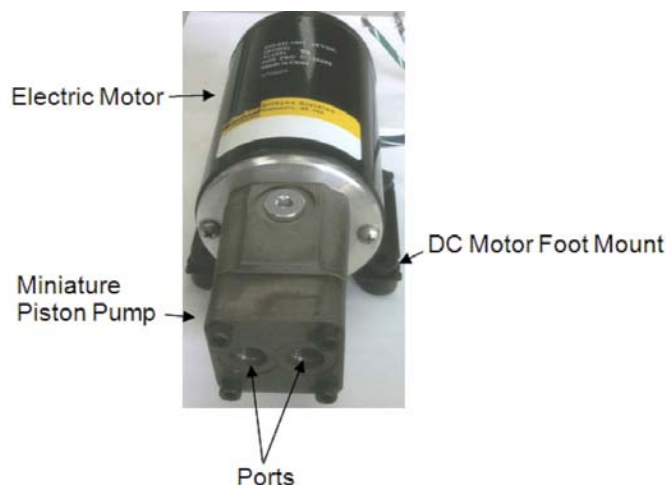
Be careful; take precautions; examine instructions before operation.



There may be hydraulic liquid under pressure. Do not open unit or break pipe connections until hydraulic pressure has been released.

Description

The Oildyne Miniature Piston Pump is a fixed displacement, axial piston design intended to operate with a variety of non-abrasive, non water-based fluids. This pump has five pistons and can be supplied both as a standalone pump and coupled to either an AC or DC electric motor. There are nine pump displacements available.

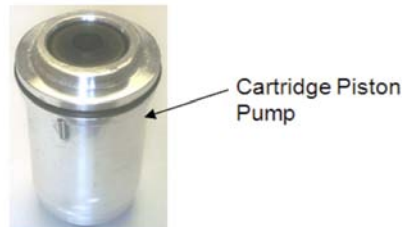


Instruction Manual

Miniature Piston and Cartridge Pumps

The Miniature Piston Pump has three ports, all SAE-4 (7/16-20). The main Pressure (P) and Tank (T) ports are in the port cap with an optionally used tank port located on the side of the pump housing. The bi-rotational model has a mandatory case drain port on the side of the pump housing. See pages 5 and 6 for Miniature Piston Pump dimensions.

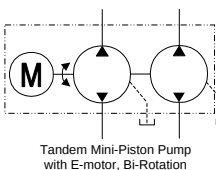
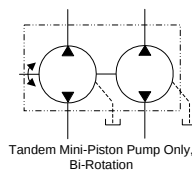
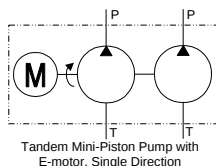
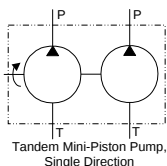
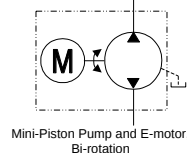
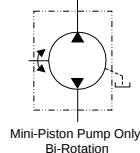
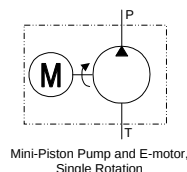
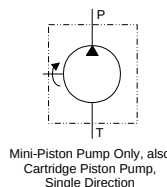
The Cartridge Piston Pump is also a fixed displacement, axial design but with three pistons. It is designed to be installed into a customer's cavity, and driven by a customer supplied (and mounted) electric motor. This cartridge pump is also capable of operating with a variety of non-abrasive, non water-based fluids. There are three pump standard pump displacements available for the Cartridge Piston Pumps.



The cartridge pump is designed to be mounted inside an Oildyne-specified cavity in the customer's manifold. The porting is contained within the manifold therefore the pump itself has no standard threaded ports. Please contact Parker Oildyne for the cavity details. See page 6 for Cartridge Piston Pump dimensions.

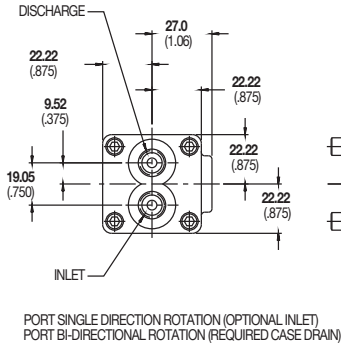
NOTE: The Parker Oildyne Piston Pumps, both Miniature 5-piston and Cartridge 3-piston designs, are not supplied with reservoirs, relief valves or other items. The customer is required to supply the necessary components in the circuit. A relief valve limiting the maximum pressure must be installed to protect the pump and system components.

Piston Pump and Cartridge Pump Hydraulic Schematics

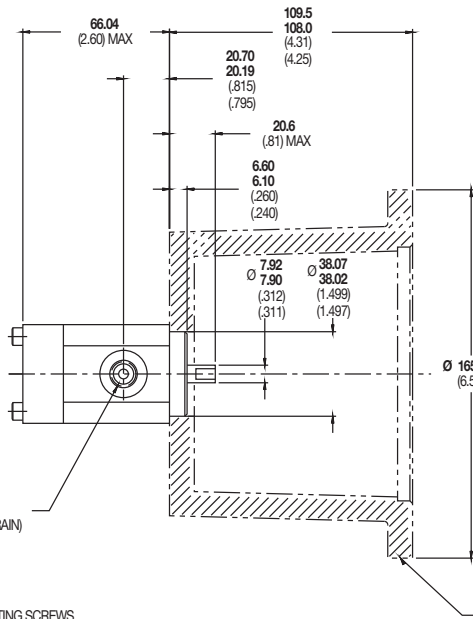


Dimensions

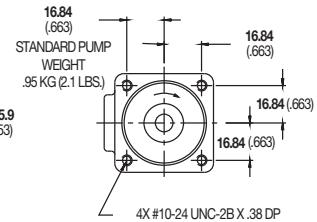
Miniature Piston Pump



ALL PORTS ARE #4 SAE 7/16-20 UNF-2B
 PUMP SHOWN IS CLOCKWISE ROTATION
 56C ADAPTER SUPPLIED WITH COUPLING AND MOUNTING SCREWS

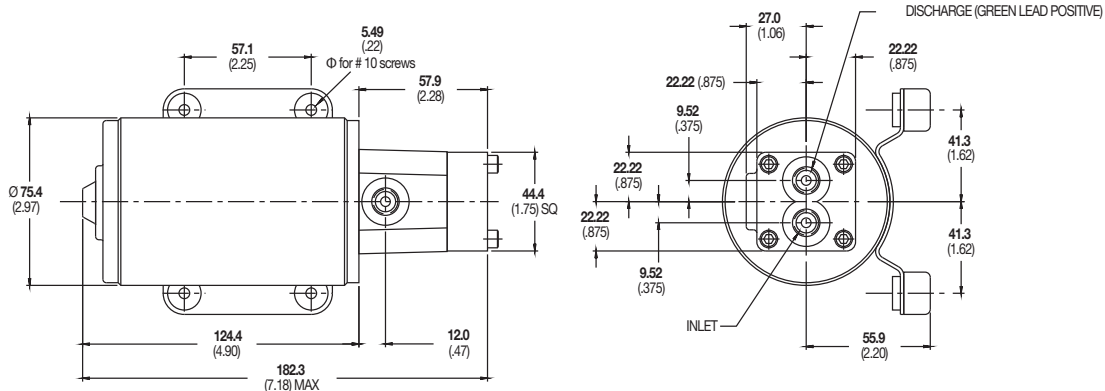


Basic Pump



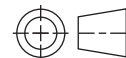
OPTIONAL 56C ADAPTER (REQUIRES LONG PUMP SHAFT)

Standard 1/3 HP DC Permanent Magnet Motor with Pump

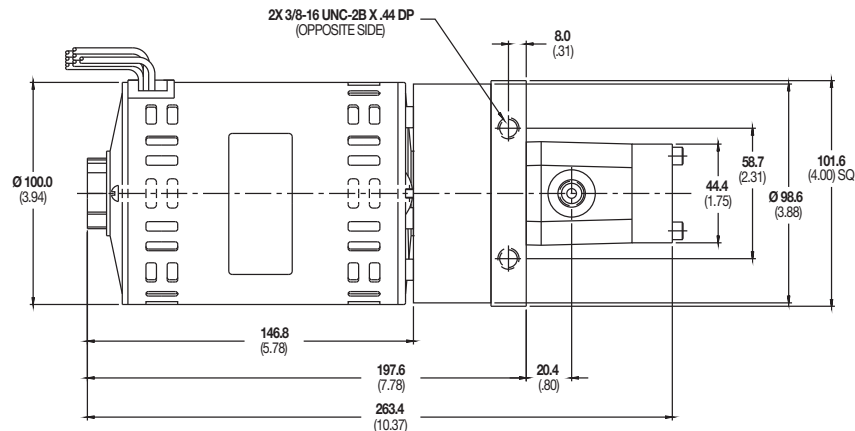


WEIGHT OF STANDARD MOTOR IS 1.82 KG (4 LBS)

THIRD ANGLE
 PROJECTION

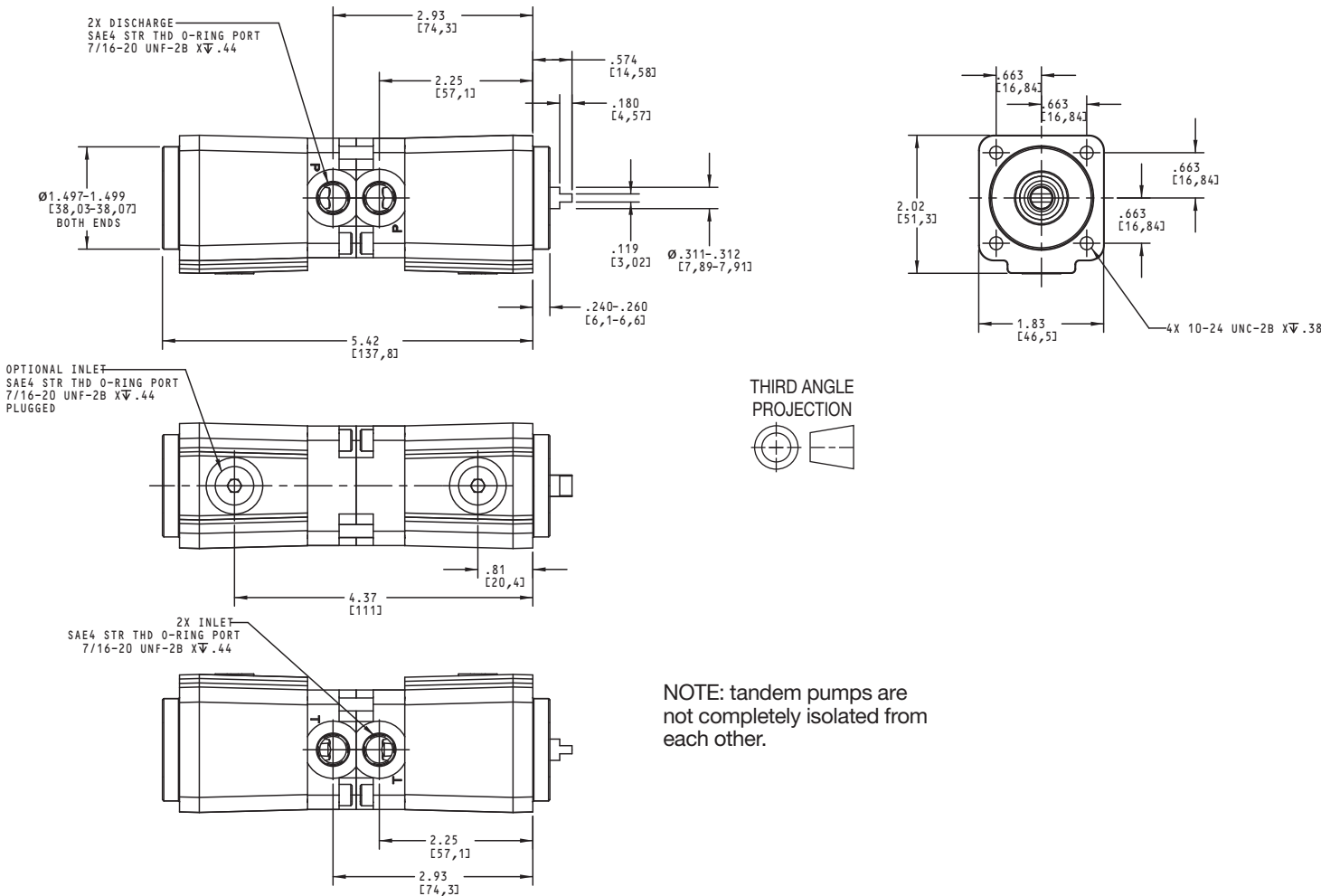


Standard 1/3 HP AC Motor with Pump

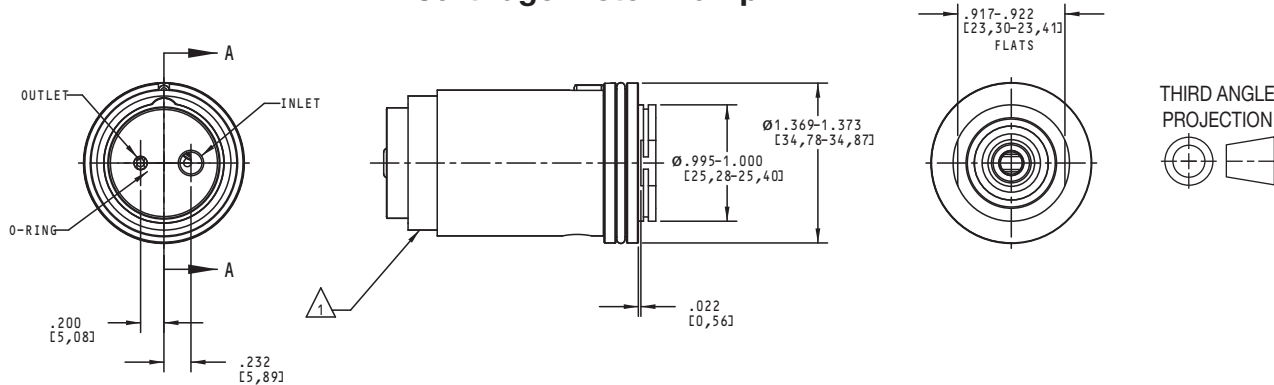


Note: All dimensions in mm (inches).

Tandem Miniature Piston Pump



Cartridge Piston Pump



All dimensions are shown in inches (millimetres).

The life expectancy of Parker Oildyne units is directly related to the frequency of use, the product in which it is incorporated and the application.

Shipping weights:

- Miniature Piston Pump: up to .7 kg (17 lbs) for a tandem Miniature Piston Pump with AC motor.
- Cartridge Piston Pump: .23 kg (.5 lbs)

Both types of piston pumps are designed to output pressurized fluids, as specified by the customer, up to 276 bar (4000 psi) when coupled to a properly sized electric motor, whether in AC or DC voltage.

Pressure capability (depends on pump displacement):

- Mini piston: up to 276 bar (4000 psi) maximum
- Cartridge: up to 276 bar (4000 psi) maximum

Pump displacements available:

- Mini piston (9): .156 - .865 cc/rev (.0098 - .0527 in³/rev)
- Cartridge (3): .17 - .33 cc/rev (.010 - .020 in³/rev)

Drive speeds (without supercharging inlet):

- Mini piston: 1000 to 4400 RPM
- Cartridge: 1000 to 5000 RPM

Motor ratings:

Standard AC motor is rated for 50/60 Hz use

- Standard AC motor 115/230 VAC: 246 W
- Standard DC PM 12 and 24 VDC: 300 W

Current ratings:

- Standard DC PM 12 VDC: 54 A
- Standard DC PM 24 VDC: 30 A

The Cartridge Piston Pumps are not supplied with electric motors of any type; the customer is responsible for supplying and mounting the motors.

A 56C bell housing and flexible coupling are available with the Miniature Piston Pump allowing the customer to supply and mount his own 56 C with base motor. To mount the Miniature Piston Pump to the 56C bell housing, please see the Installation section later in this Manual.

Acceptable fluids for miniature and cartridge pumps:

- Automatic Transmission Fluid (ATF)
- DOT3 brake fluid
- Most mineral based hydraulic fluids
- Pentosin CHF-11S
- Must be non water-based
- Must be non abrasive

Ensure the fluid is compatible with the pump seals selected.

Viscosity range: 5 – 500 cSt (43 - 2270 SSU).

Please contact Parker Oildyne to discuss any alternate fluids.

Parker Oildyne takes no responsibility if unapproved alternatives are used.

Temperature ranges for Miniature Piston Pumps:

- Operating: -40 to +149°C (-40 to +300°F)
- Storage: -40 to +149°C (-40 to +300°F)

Temperature ranges for Cartridge Piston Pumps:

- Operating: -40 to +120°C (-40 to +250°F)
- Storage: -40 to +120°C (-40 to +250°F)

While these piston pumps are capable of operating continuously, **the standard AC and DC motors available with them are designed for intermittent operation only.**

The 115 and 230 VAC motors can operate for a maximum of 5 minutes ON, after which they must be OFF until they return to the ambient temperature, before starting up again. For the 12 and 24 VDC motors please see page 16 for Motor Duty Cycle Characteristics.

The intended use for the Miniature Piston Pumps and Cartridge Piston Pumps is as described above. Because these pumps are capable of using a wide variety of fluids please contact the Oildyne Division for questions regarding a specific fluid.

Parker Hannifin Corporation takes no responsibility for safety of any products if they are not used within the intended parameters detailed in this Instruction Manual.

Abnormal uses

Examples of abnormal use:

- Use of unit with higher pressure than that for which it was intended
- Use with a higher or more frequent duty cycle than that for which it was intended
- Use with higher or lower voltage than required for optimal use
- Use with higher drive speeds than specified
- Use of abrasive and/or water-based fluids

Preparation for Use

Unpacking and Checking

All units were carefully packed, in containers, boxes, and may or may not be on skids. In any case, do not remove anything from the skid or any packaging until it has been carefully checked for damage that may have occurred in transit. **Report all damage immediately to the carrier and send a copy to the vendor.**

All open ports on the Miniature Piston Pumps are plugged at the factory to prevent the entry of contamination. These plugs must not be removed until just before piping connections are made to the unit.

Storage

If the unit is not going to be installed immediately, it should be stored indoors, covered with a waterproof sheet, and all open ports plugged. If long term storage is expected (6 months or more) we recommend filling the pump completely with an approved, clean fluid to prevent the entry of moisture.

Installation

Locating Piston Pumps

The unit should preferably be installed indoors in a clean, dry environment with an ambient temperature of 15 to 37°C (60 to 100°F).

Parker Oildyne products should not be installed where they are at risk of objects falling from overhead or where there is any risk of impact with external objects.

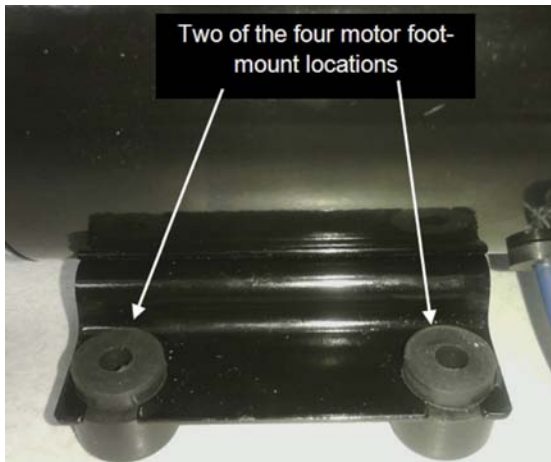
Mounting

The standalone Miniature Piston Pump provides four tapped holes in the shaft end for use by the customer to mount his own motor. These threaded holes are #10-24 UNC-2B x 9.65 mm (.38 in) deep. The pump shaft provides a flat onto which the customer may install a coupling.



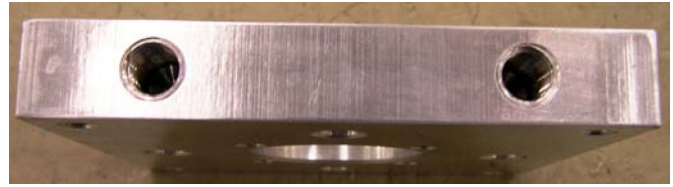
Mounting holes and shaft flat

The Miniature Piston Pump with DC electric motor is already close-couple mounted together. The DC motor foot provides four 5.49 mm (.216 in) diameter holes, through which the pump/motor be can mounted to the customer's structure. These four holes are suited for a #10 screw size or 5 mm fastener.



DC motor mounts

The Miniature Piston Pump with AC motor is already close-couple mounted together using two adapter plates, one circular, the other square. The square piece has two machined and tapped holes by which the customer can mount the pump/motor to his structure. The two holes are tapped 3/8-16 UNC-2B x 11.2 mm (.44 in) deep.



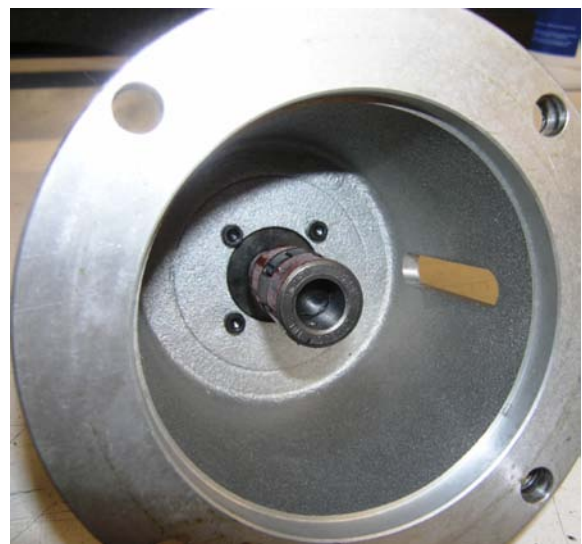
AC motor adapter mounting holes

The Miniature Piston Pump with 56C Bell Housing requires assembly by the customer. From Oildyne, the flexible coupling assembly is installed onto the pump shaft and the pump is mounted to the 56C bell housing shown here without the 56C bell housing.



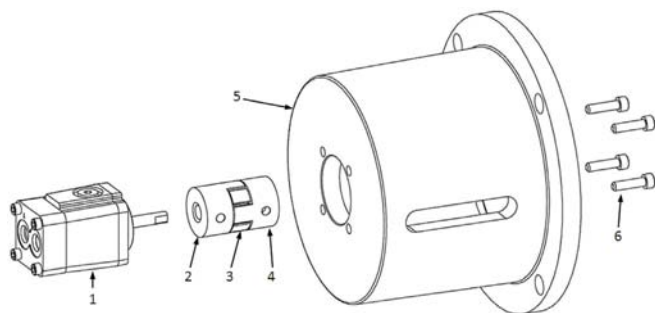
Flexible coupling on pump shaft

Pump, flexible coupling assembly and 56C bell housing as supplied by Oildyne are shown below. (Screws holding the pump to the 56C bell housing are shown; the pump is not seen, being on the other side of the housing).



Flexible coupling with 56C bell housing

To install the customer-supplied motor:



1. Loosen the set screw on the motor shaft end hub (Item 4) using a 3/32 in hex key, leaving about 3 mm (.125 in) visible inside the hub. This will ensure the hub is positioned in the motor shaft keyway.
2. Turn the flexible coupling assembly so the motor end hub set screw is facing the slot in the 56C bell housing (Item 5).
3. Turn the motor shaft so the keyway is facing the same way as the motor shaft end hub.
4. Move the 56C bell housing (with pump attached) toward the motor shaft positioning the motor end hub (Item 4) so the setscrew is located in the motor shaft keyway.
5. When the 56C bell housing is tight to the electric motor face, install and tighten the four motor mounting bolts (3/8-16 x 1.00 in, not shown above) through the bell housing into the electric motor, using a 14 mm (9/16 in) wrench/socket. Tighten to 20 +/- .5 Nm (180 +/- 5 in-lbs).
6. Locate the motor end hub setscrew within the slot of the 56C bell housing and, using a 3/32 in hex key, tighten the setscrew into the motor shaft keyway to 3.9 Nm (35 in-lbs).
7. Follow all installation and startup instructions.

The Cartridge Piston Pump is designed to be installed into an Oildyne-specified cavity, held in place by the flange and shaft of the customer-supplied motor.

It is strongly recommended that the surface to which the piston pump and motor is mounted is bonded to earth to provide proper grounding in the event of a lightning strike.

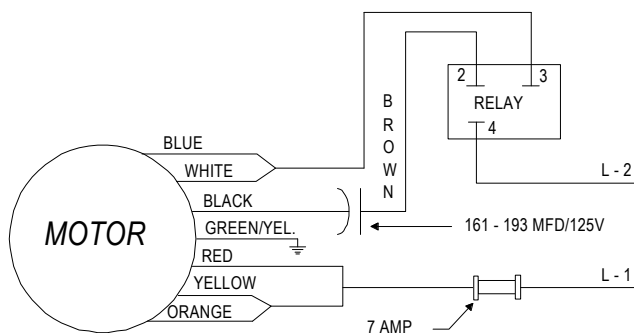
Electrical Service Connections

Miniature Piston Pumps

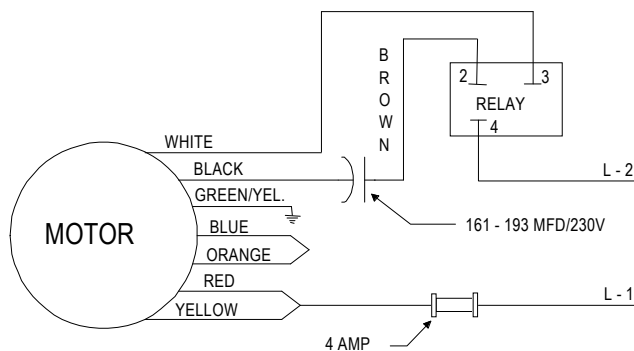
Connect the motor to the power source following the good practices as outlined in the National Electric Codes and any local codes which may apply. Verify that the available voltage is the same as the voltage identified on the label. Most AC motors have dual voltage ratings, so verify that the leads in the conduit box have been connected together as defined on the motor nameplate to match the facility power source available.

Refer to the performance curves for your particular model (see pages 14 to 17) to determine the current ratings needed for your electrical controls. Oildyne does not supply controls for the Piston Pumps. However, the AA and AD (both AC) motors are shipped with a start relay and a start capacitor assembly specific to the motor voltage being used. These two components **MUST** be included in the controls circuit designed by the customer. Attempting to operate the HA and HD motors without the supplied start relay and start capacitor will result in unsatisfactory performance and excessive motor heat. Oildyne will not warranty a power unit which has not been wired properly.

Electrical Wiring Instructions



115 VOLTAGE CONNECTION



230 VOLTAGE CONNECTION

Wiring diagrams shown above are for the Clockwise pump callout, "HR" in the model code. For Counterclockwise rotation, callout "HL" in the model code, interchange the Red and Black leads from those shown in the wiring diagrams above. For Bi-rotational models, callout "HB" in the model code, relays or switchgear must be provided by the customer to achieve the interchanging of the Red and Black leads. The standard AC motor leads are 18 gauge.

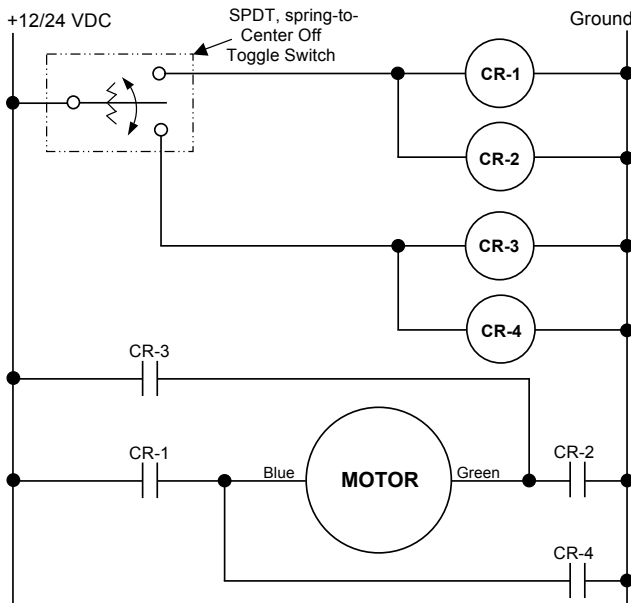
Standard DC motors, model codes OR and OM

Wire the DC motor with the BLUE wire (+) and GREEN wire (-) for pumps with model codes starting with "HR". For pumps with model codes starting with "HL", the GREEN wire must be (+) and the BLUE wire (-). This wiring will be correct for both the 12 and 24 VDC permanent magnet motors. The standard DC motor leads are 12 gauge.

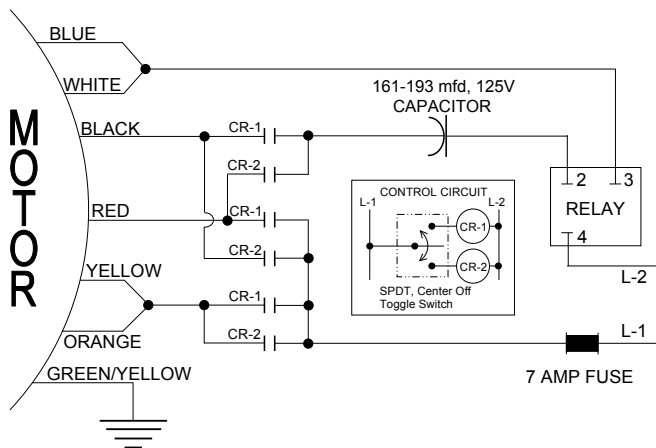
Cartridge Piston Pumps

Parker Oildyne does not supply any electric motors for Cartridge Piston Pumps. Customers using these pumps must heed the wiring instructions supplied by their motor vendors. The selected motor must have the shaft and flange configured to meet the Parker Oildyne specifications.

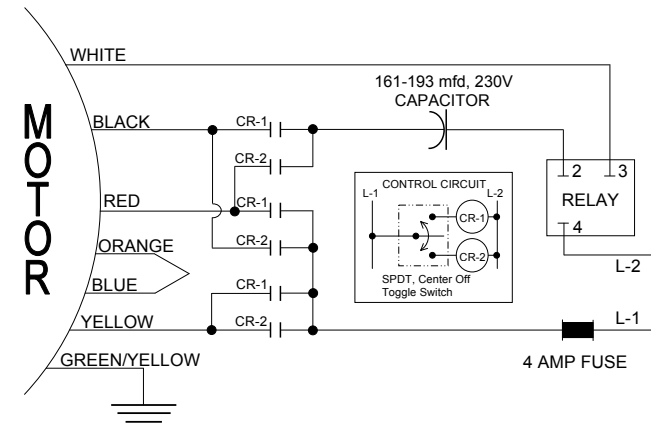
**Suggested Reversing Electrical Schematics
Piston Pump OR/OM motors (12/24 VDC)**



**Suggested reversing electrical schematics
Piston Pump AA Motors (115 VAC)**



Piston Pump AD Motors (230 VAC)



Supply and Return Connections

Miniature Piston Pumps

The Miniature Piston Pump has three SAE-4 (7/16-20) ports configured based per the model code:

HR and HL code: Pressure and tank ports are on the end of the pump opposite the shaft end. The ports are marked P and T. An optional T port is located on the side wall of the piston pump housing. For optimal pump feeding, the T port on the end of the pump is recommended, keeping the side port plugged.

HB code: Two ports are on the end of the pump, opposite the shaft end. The ports are marked A and B. The port located on the side wall of the piston pump housing is the case drain and **MUST** be piped to the customer supplied reservoir with a maximum of 6 bar (90 psi) back pressure. Operating with a greater back pressure will cause the pump **shaft seal to leak and fail**. Fluid connectors and conductors installed by the customer should be selected based on an acceptable safety margin for the maximum pressure required in the application. A 10 micron suction line filter is recommended to protect the piston pump and the customer's system.

Cartridge Piston Pumps

The Cartridge Piston Pumps have no threaded ports but instead, rely on the correct interface of the customer's manifold cavity as was specified in the Parker Oildyne cavity drawing. **A 10 micron suction line filter is recommended to protect the cartridge piston pump and the system.**

Warning

Check to insure that the proper rated hose or pipe is used on pressure lines.

One of the key ingredients for good service and long life from a hydraulic system is cleanliness, and since most dirt infiltrates a hydraulic system during installation, we recommend the following:

1. All open ports on the power unit, cylinders, etc. must remain plugged with tape or plastic plugs until just before the hydraulic connections are made.
2. All interconnecting tubing, pipe, or hose should be clean, and free of rust, scale and dirt. The ends of all connectors should be plugged until just before they are to be installed in the system.
3. All openings in the reservoir such as the filler breather or access end covers holes must remain closed during installation.

Reservoir Filling

Acceptable fluids for Miniature and Cartridge Piston Pumps:

- Automatic Transmission Fluid (ATF)
- DOT3 brake fluid
- Most mineral based hydraulic fluids
- Pentosin CHF-11S
- Must be non water-based
- Must be non abrasive

Ensure the fluid is compatible with the pump seals selected.

Viscosity range: 5 – 500 cSt (43 - 2270 SSU).

Please contact Parker Oildyne to discuss any alternate fluids.

Parker Oildyne takes no responsibility if unapproved alternatives are used.

Follow all vendor-supplied instructions for safe handling, use and disposal of the fluid selected for operation with these piston pumps.

It is strongly recommended that the customer have available the MSDS for the fluid chosen for use with these Parker Oildyne piston pumps. Heed all instructions should the fluid be spilled or come in contact with an operator.

The cleanliness of the fluid going into the reservoir is very important, and in some cases, even new fluid out of the drum is not adequate. We recommend that any fluid being transferred into the reservoir be done with the transfer pump with a 10 micron filter installed. A Parker filter cart is available for this purpose.

Start-Up Procedures

The product label accompanying the Miniature Piston Pump provides the maximum current (Amperes) that the Oildyne-supplied motor will draw at full power.

For the AA and AD motors used, fuses and circuit breaker protection must conform to the National Electrical Code and your local codes and practices.

For DC motors, refer to the piston pump model code (see page 12) and the performance curves (see page 15) to determine the maximum current your pump and motor combination will draw at your relief valve setting(s). Fuses and circuit breaker protection must conform to the National Electrical Code and your local codes and practices.

A relief valve must be installed by the customer to limit the maximum pressure developed by the Miniature Piston Pumps and Cartridge Piston Pumps. The relief valve setting must be no more than the rating of the specific pump used and should be based on the maximum pressure required by the customer's system.

Functional testing is considered complete with the successful priming of these pumps.

Miniature Piston Pump

If using the T port on the end of the pump, remove the plug from the side port and fill the pump housing with the clean, approved fluid. Reinstall the side port plug and tighten to 6.7 +/- .5 Nm (60 +/- 5 in-lbs). Connect a supply of clean fluid to the end port on the pump marked 'T'. Do not tighten the connection at the T port until fluid from the reservoir is present at the fitting. If using the port on the housing side for the T port, prefill the housing with the clean approved fluid. Connect a supply of clean fluid to the side port and do not tighten the connection until fluid from the reservoir is present at the fitting. Tighten an SAE-4 port plug into the T port in the pump end and torque to 6.7 +/- .5 Nm (60 +/- 5 in-lbs).

Briefly jog the electric motor on and off to prime the pump. When oil is present at the P port, tighten the connection from the P port to the customer's system. If no oil is present at the P port, verify the correct electrical connections for the pump circuit being used. Repeat the jogging process. The pump is now primed and can be used to fill the system.

Cartridge Piston Pump

Insert the customer-supplied motor's shaft through the shaft seal opening turning the motor shaft as necessary to ensure the motor's male tang fully engages the pump's internal slot. When fully engaged the pump pilot diameter (approximately 25 mm/1 in) will be inside the motor face. Using the hole in the side of cartridge pump case, prefill the pump prior to installing

the pump into the customer-supplied manifold cavity. Ensure the locator pin on the outside of the cartridge pump is aligned with the locator notch in the cavity and insert the pump into the cavity until the motor face is tight to the manifold. Depending on the motor design it could be held to the manifold by through-bolts or by motor flange fasteners.

Ensure the manifold has a supply of clean approved fluid to feed the pump. The cartridge pump requires a counterclockwise (CCW) rotation to function. Jog the electric motor on and off until fluid appears at the outlet to the manifold. The pump is now primed. If oil does not appear after jogging the motor, verify the motor rotation is correct and then repeat the priming process. The cartridge piston pump is now ready for service.

Additional Testing

If required, any tests for radiated and conducted emissions should be performed in accordance with the Electromagnetic Compatibility (EMC) Generic Emissions standards for environments appropriate to the end use product to confirm compliance with the EMC Directive.

If required, any tests for radiated and conducted immunity should be performed in accordance with the Electromagnetic Compatibility (EMC) Generic Immunity standards for environments appropriate to the end use product to confirm compliance with the EMC Directive.

Special Tools

All normal service and maintenance on standard piston pump and motors can be accomplished with standard hand tools. No special tools are required.

Safe Operating Procedures

Should a failure of the electrical power supply occur, power should not be returned to these power units without a conscious action by the operator.

Oildyne supplied AC and DC motors used with these Miniature Piston Pumps should be well under 70 dB(A).

In the unlikely event of noise levels exceeding 70 dB(A) it is recommended that ear defenders should be worn. If noise levels should exceed 80 dB(A) it is necessary to take measures to reduce noise. This is normally achieved by placing machinery in an acoustically lined enclosure.

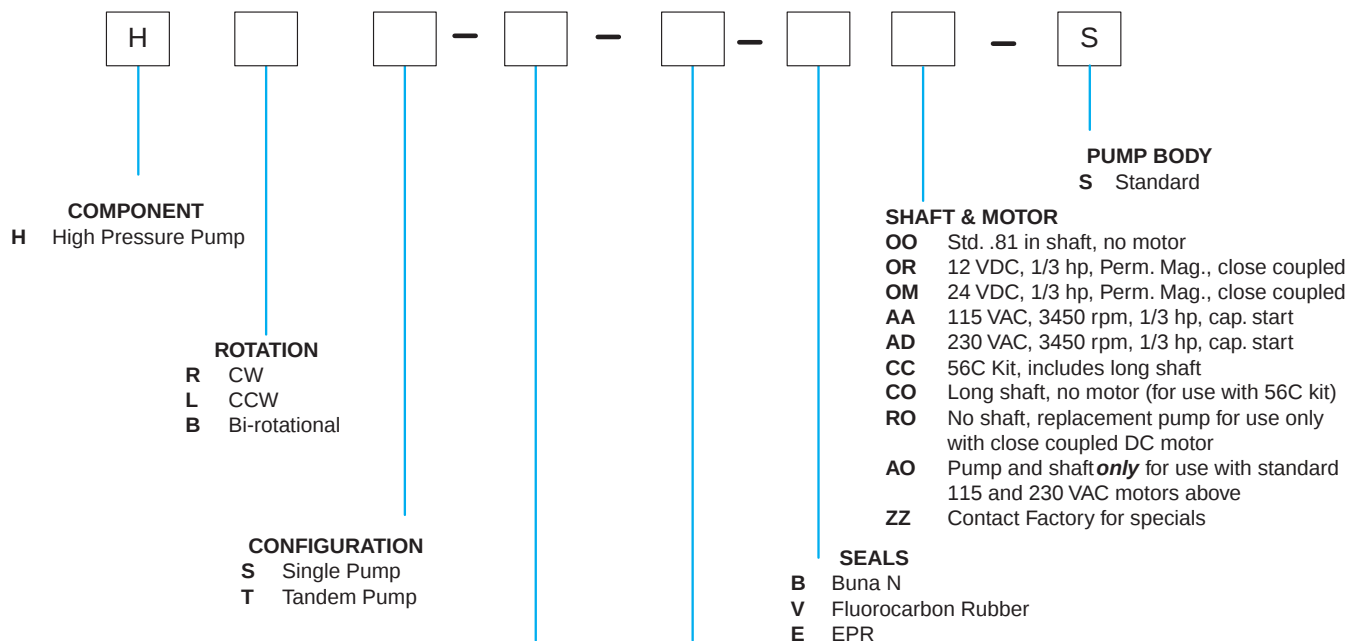
While these piston pumps are capable of operating continuously, **the standard AC and DC motors available with them are designed for intermittent operation only.** The 115 and 230 VAC motors can operate for a maximum of 5 minutes ON, after which they must be OFF until they return to the ambient temperature, before starting up again. For the 12 and 24 VDC motors please see page 16 for Motor Duty Cycle Characteristics.

Under no circumstances should the Miniature Piston Pump nor Cartridge Piston Pump be operated at a relief valve setting for an extended time due to a quick buildup of heat. Ensure the fluid temperature never exceeds the operating temperature range given in this Manual.

If the customer has provided his own electric motor incorporating the Oildyne-supplied 56C bell housing and flexible coupling, the duty cycle of the selected motor must be followed.

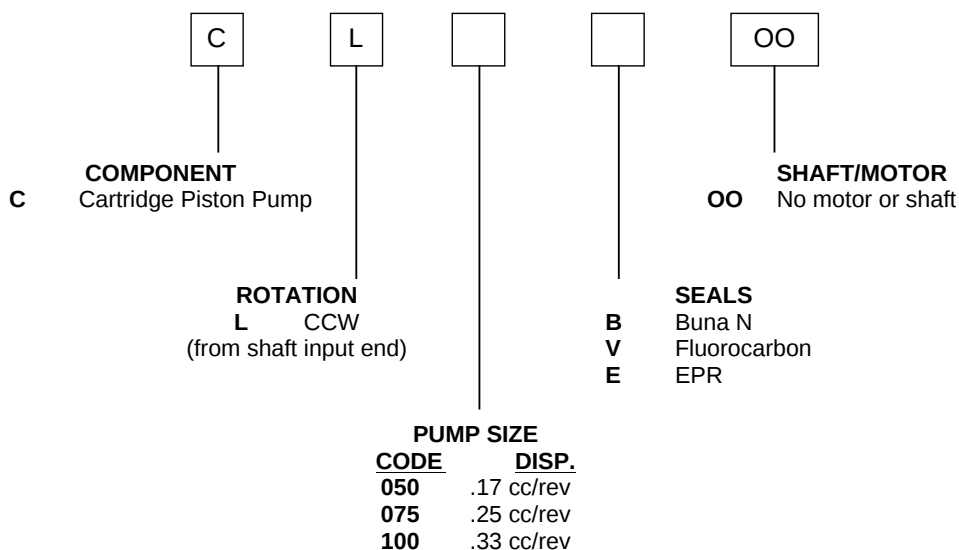
Temperature ranges for Miniature Piston Pumps:
Operating: -40 to +149°C (-40 to +300°F).
Storage: -40 to +149°C (-40 to +300°F).

Miniature Piston Pump Standard Product Model Code



SINGLE or 1st PUMP SIZE		2nd PUMP SIZE	
CODE	DISP.	CODE	DISP.
156	.156 cc/rev	156	.156 cc/rev
206	.206 cc/rev	206	.206 cc/rev
259	.259 cc/rev	259	.259 cc/rev
311	.311 cc/rev	311	.311 cc/rev
346	.346 cc/rev	346	.346 cc/rev
417	.417 cc/rev	417	.417 cc/rev
519	.519 cc/rev	519	.519 cc/rev
692	.692 cc/rev	692	.692 cc/rev
865	.865 cc/rev	865	.865 cc/rev

Cartridge Pump Standard Product Model Code



Temperature ranges for Cartridge Piston Pumps:

Operating: -40 to +120°C (-40 to +250°F).

Storage: -40 to +120°C (-40 to +250°F).

Removal From Service

If, for some reason, the piston pump must be removed from service, follow these instructions:

1. Wear protective eye gear.
2. Remove electrical power from the motor.
3. Put a rag around the piston pump port fittings and loosen the port connections slowly to release any pressure. The rag will absorb oil leakage as any locked pressure is relieved.
4. Immediately cap the fluid conductor ends and the piston pump ports to prevent the introduction of contaminants until the piston pump is reconnected.
5. When reinstalling the piston pump, follow all the procedures and startup instructions given previously.

Operation

Suitable lighting requirements for operation of this unit are the responsibility of installing manufacturer.

See pages 14 to 17 for performance information.

See page 16 for DC Motor Duty Cycle Characteristics.

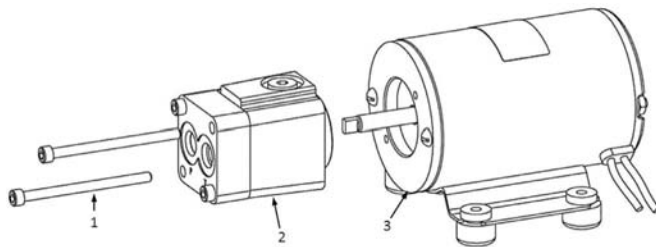


There may be hydraulic liquid under pressure. Do not open unit or break pipe connections until hydraulic pressure has been released.

Maintenance

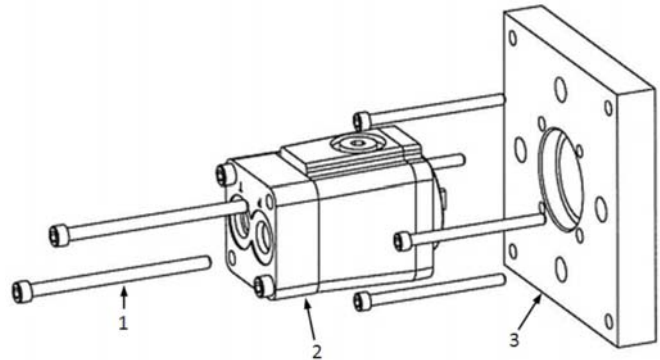
Miniature Piston Pumps and Cartridge Piston Pumps are not considered serviceable items. If a pump seizes the cause must be identified and corrected before a replacement pump is installed.

Removal and Reinstallation of Miniature Piston Pumps with DC motors



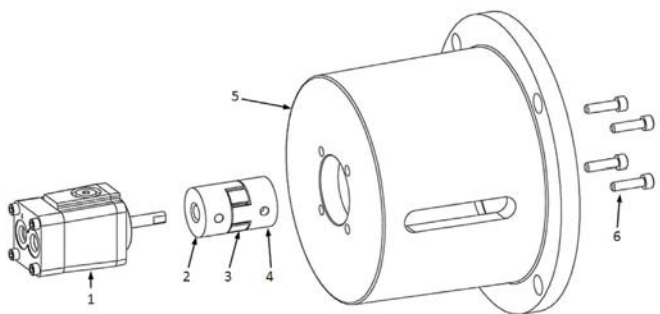
1. Remove the two through-bolts (Item 1) using a 5-32 in hex key.
2. Gently pull the pump (Item 2) from the motor (Item 3).
3. Install replacement pump gently guiding the motor shaft into the shaft seal at the pump pilot, taking care to not cut the shaft seal.
4. Once through the shaft seal, rotate the pump as needed to align the motor shaft tang with the internal pump slot.
5. When fully engaged, rotate the pump so the two through-bolts align with the threaded holes in the motor face.
6. Start the screws by hand, then torque to 6.2 +/- .5 Nm (55 +/- 5 in-lbs).
7. Follow all installation and startup procedures.

Removal and Reinstallation of Miniature Piston Pumps with AC motors



1. Remove the two through-bolts (Item 1) using a 5/32 in hex key.
2. Gently pull the pump (Item 2) from the motor adapter plate (Item 3).
3. If install the replacement pump it is best to turn the AC motor and adapter plate upright so the pump shaft installs downward.
4. Inside the motor adapter opening is a coupling with a slot. Place some heavy grease (such as wheel bearing grease) in the slot.
5. Face the pump shaft into the motor adapter opening and rotate the pump as necessary to engage the male shaft tang of the pump with the slot of the coupling.
6. When fully engaged, rotate the pump so the two through-bolts align with the threaded holes in the motor adapter plate.
7. Start the screws by hand, then torque to 6.2 +/- .5 Nm (55 +/- 5 in-lbs).
8. Follow all installation and startup procedures.

Removal and Reinstallation of Miniature Piston Pumps with 56C Bell Housing

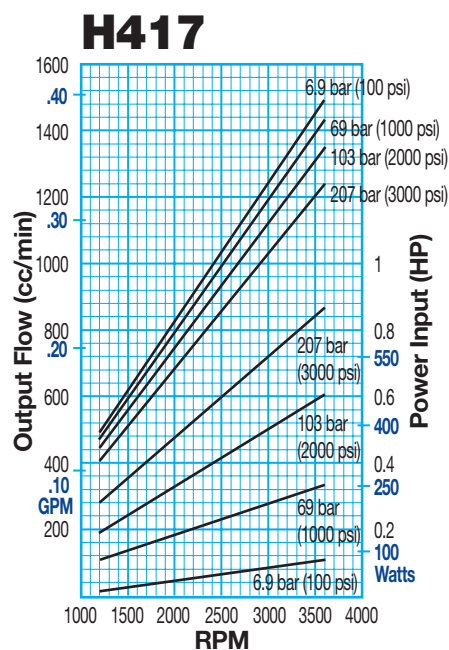
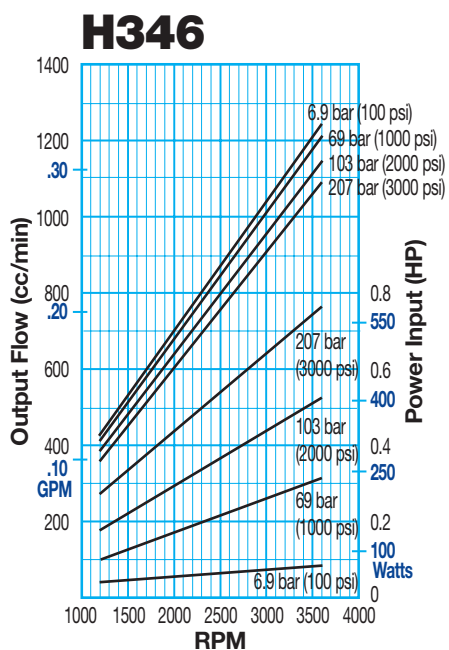
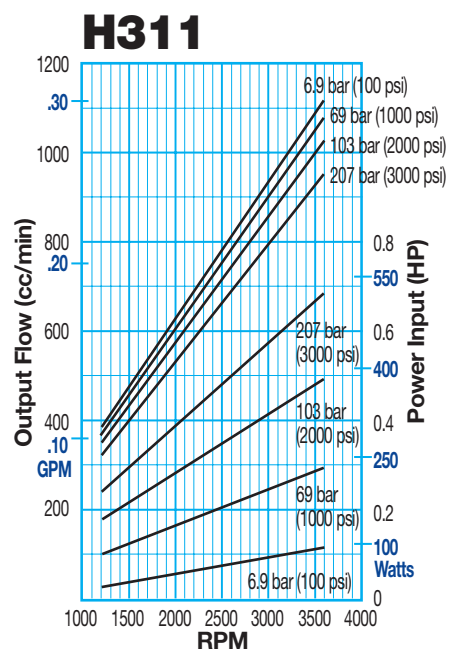
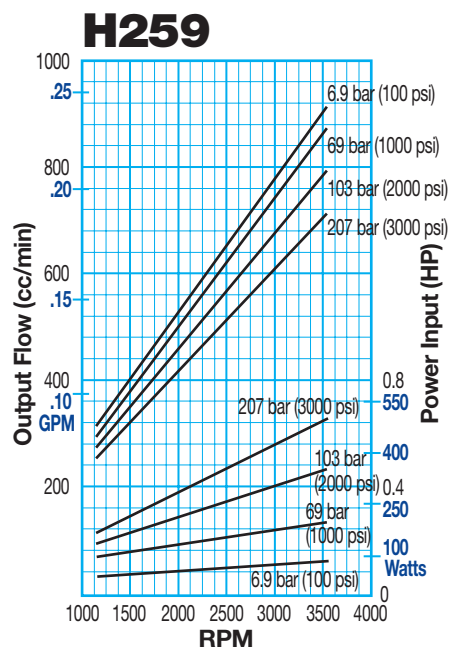
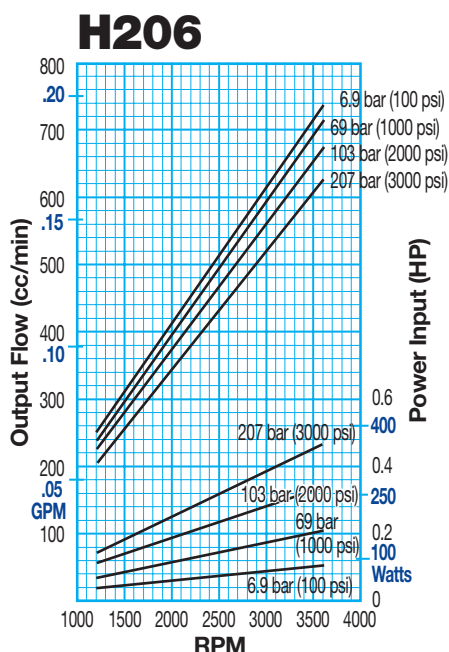
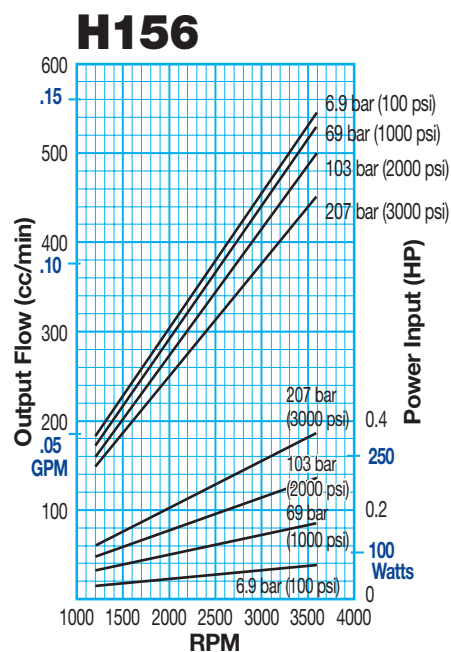


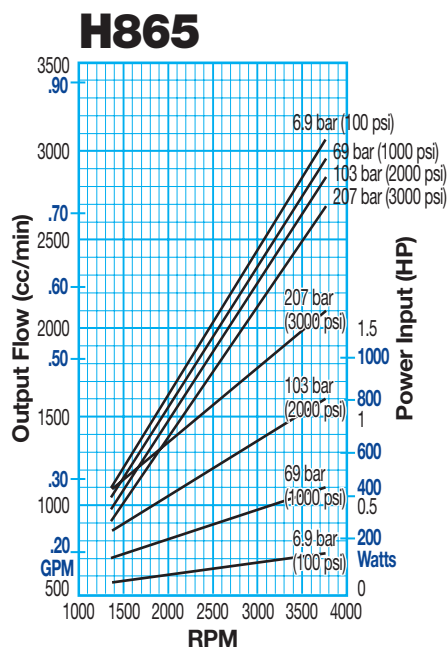
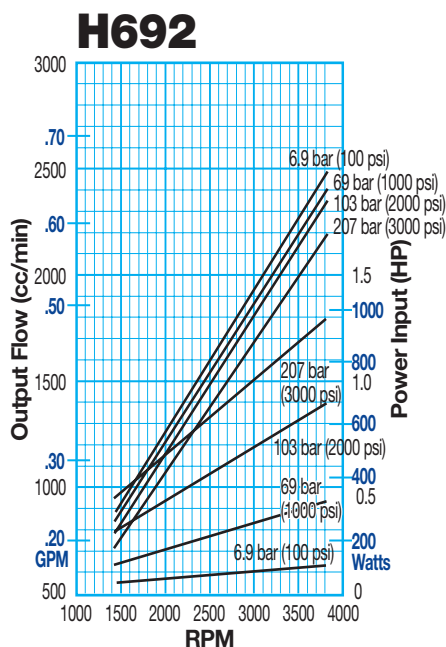
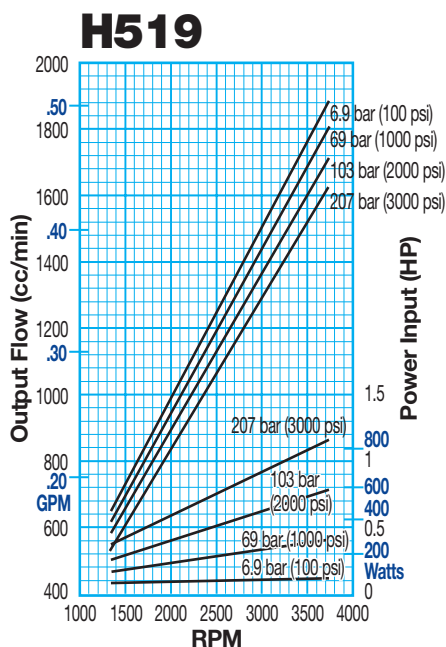
1. Through the open slot in the 56C bell housing (Item 5) use a 3/32 in hex key to loosen the set screw holding the hub (Item 4) to the electric motor shaft, just enough to disengage the motor shaft keyway. The flexible coupling (Items 2, 3, 4) may have to be turned through the slot to locate the set screw.
2. Remove the four bolts holding the electric motor to the 56C bell housing and gently pull the 56C housing away from the motor.
3. Using a 5/32 in hex key, remove the four pump mounting screws (Item 6) from inside the 56C bell housing and, pulling the pump away from the bell housing, guide the flexible coupling assembly through the opening in the 56C bell housing.

Performance Data

Performance data shown are the average results based upon a series of laboratory tests of production units and are not necessarily representative of any one unit. Tests were run with Mil-H-5606 fluid at room temperature.

In accordance with our policy of continuing product development, we reserve the right to change specifications shown without notice.



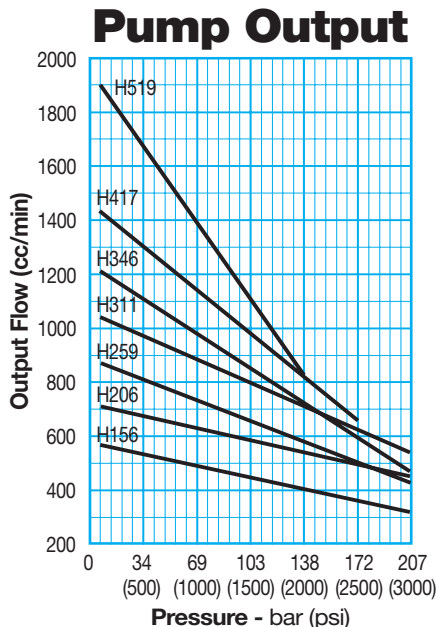
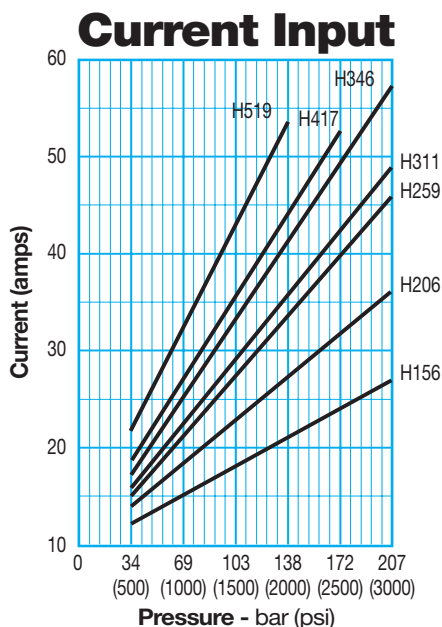


Typical Performance Data

at 12 VDC as assembled with a standard DC motor

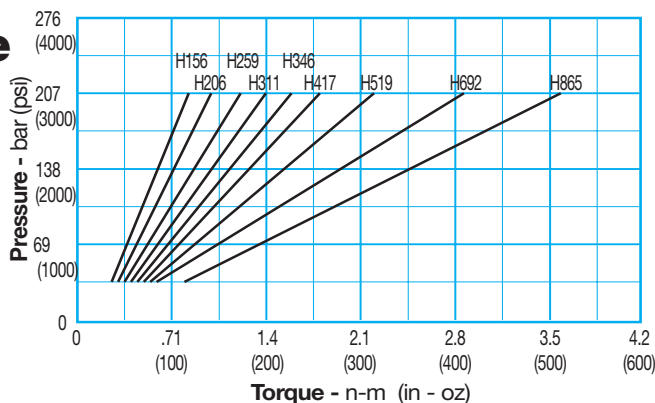
NOTE: 24 VDC motor current will be approximately 1/2 of the 12 VDC current shown here.

Max current for continuous operation is:
12 VDC: 12.6 A
24 VDC: 9.6 A



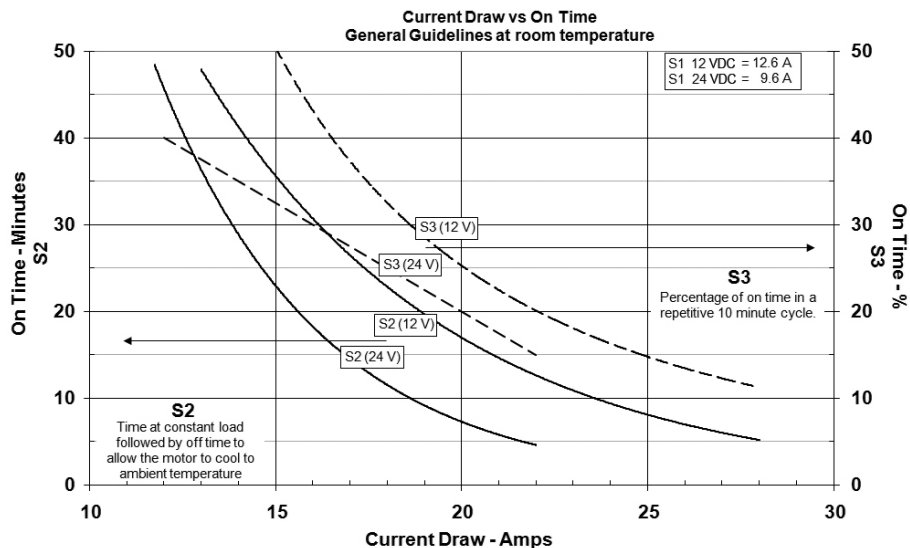
Average Input Torque

Speed: 3000 RPM



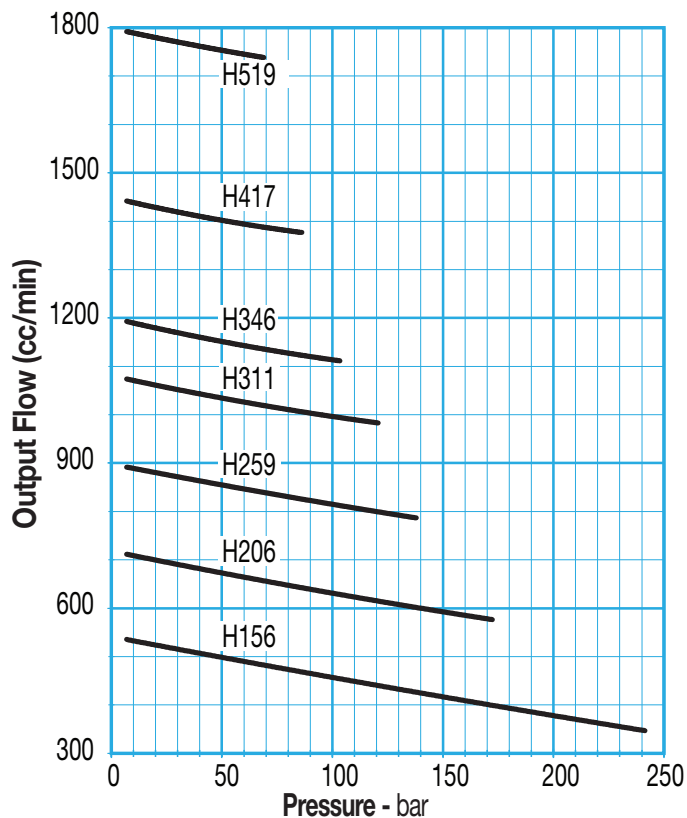
Performance Data

DC Motor Duty Cycle Characteristics

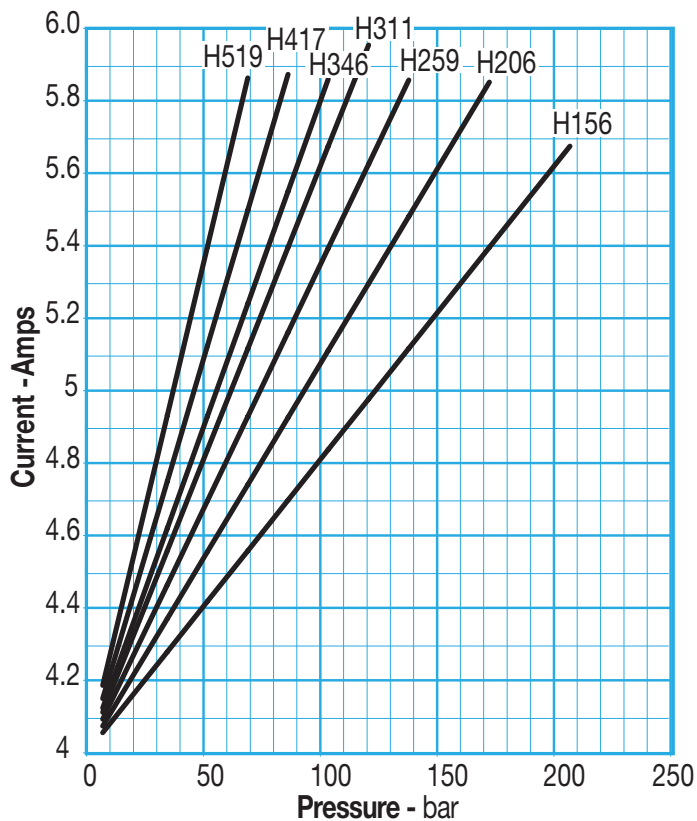


AC Motor and Miniature Piston Pump Performance

115 VAC Motor Flow Rate 60 Hz



115 VAC Motor Current 60 Hz



NOTES:

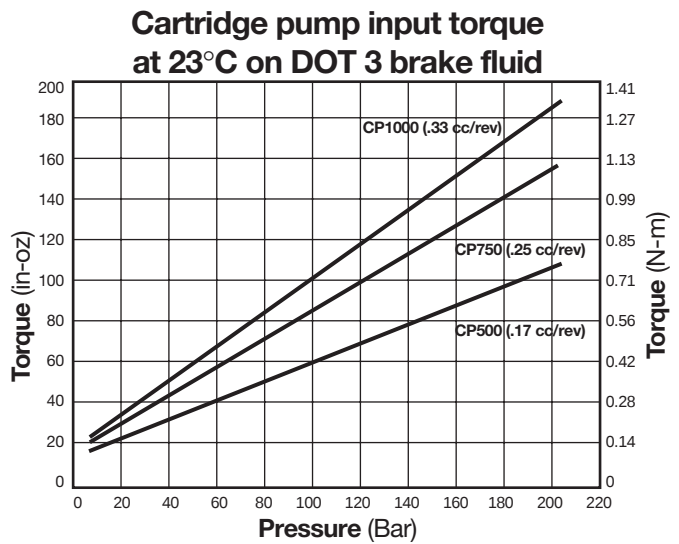
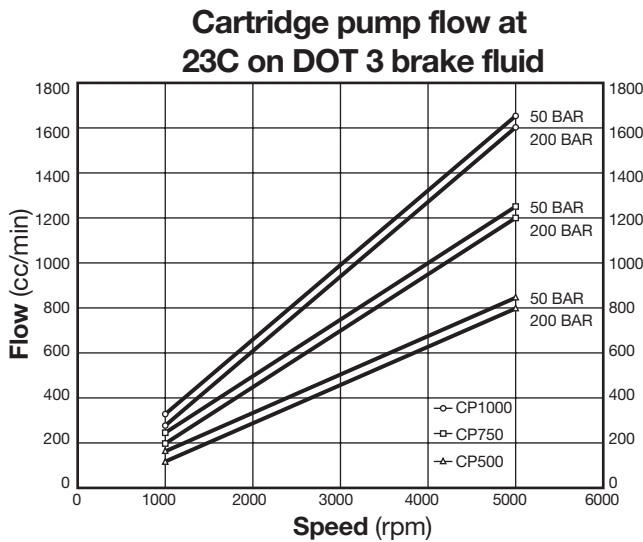
The 115 VAC performance shown is at 60 Hz.

At 230 VAC the current draw will be approximately 1/2 of that shown.

At 50 Hz, the flow will be about 5/6 of that shown and the current will be about 25% higher than the 60 Hz values.

Performance data shown is for reference only.

Cartridge Piston Pump Performance



Miniature Piston Pump Basic Specifications

Model	156	206	259	311	346	417	519	692	865
Displacement									
In ³ per rev.	.0095	.0126	.0158	.0190	.0211	.0255	.0317	.0422	.0527
cc /rev	.156	.206	.259	.311	.346	.417	.519	.692	.865
Max RPM @ rated pressure W/O supercharge	4400	4200	4000	3800	3800	3700	3700	3600	3500
Operating Pressure (psi)									
Continuous bar (psi)	241 (3500)	241 (3500)	241 (3500)	241 (3500)	241 (3500)	241 (3500)	241 (3500)	224 (3250)	207 (3000)
Intermittent bar (psi)	258 (3750)	258 (3750)	258 (3750)	258 (3750)	258 (3750)	258 (3750)	258 (3750)	241 (3500)	241 (3500)
Maximum bar (psi)	276 (4000)	276 (4000)	276 (4000)	276 (4000)	276 (4000)	276 (4000)	276 (4000)	258 (3750)	241 (3500)

Troubleshooting

- Using a 1/8 in hex key, loosen the set screw holding the pump-side hub (Item 2) from the shaft and remove the flexible coupling from the pump.
- With the replacement pump, install the flexible coupling assembly on the pump shaft positioning the pump end hub (Item 2) so the set screw tightens onto the flat on the pump shaft. Torque this set screw to 10.1 Nm (90 in-lbs).
- Turn the flexible coupling assembly so the motor end hub set screw is facing the slot in the 56C bell housing (Item 5).
- Turn the motor shaft so the keyway is facing the same way as the motor shaft end hub.
- Move the 56C bell housing (with pump attached) toward the motor shaft positioning the motor end hub (Item 4) so the setscrew is located in the motor shaft keyway.
- When the 56C bell housing is tight to the electric motor face, install and tighten the four motor mounting bolts (3/8-16 x 1.00 in, not shown above) through the bell housing into the electric motor, using a 14 mm (9/16 in) wrench/socket. Tighten to 20 +/- .5 Nm (180 +/- 5 in-lbs).
- Locate the motor end hub setscrew within the slot of the 56C bell housing and, using a 3/32 in hex key, tighten the setscrew into the motor shaft keyway to 3.9 Nm (35 in-lbs).
- Follow all installation and startup instructions.

Suction Strainers

Should be cleaned after 10 hours of operation initially and every 100 hours thereafter.

Reservoirs

Maintain oil level at all times. The oil should be checked after the first 100 hours and verified that the class of oil meets the requirements of the pump being used. Change the oil every 1000 to 2000 hours depending on the application and operation environment.

Hydraulic Fluids

Both the Miniature Piston Pumps and Cartridge Piston Pumps can operate with a variety of non-abrasive, non water-based fluids, ranging from: 5 – 500 cSt (43 – 2270 SSU). Commonly used fluids include Automotive Transmission Fluid, hydraulic oils, DOT3 brake fluid and Pentosin. If users wish to use alternative oil, hydraulic fluid, ATF, or other they are warned to check that they have the same properties as those recommended. **Parker Oildyne takes no responsibility if unapproved alternatives are used.**

Follow all vendor-supplied instructions for safe handling, use and disposal of the fluid selected for operation with these piston pumps.

It is strongly recommended that the customer have available the MSDS for the fluid chosen for use with these Parker Oildyne piston pumps. Heed all instructions should the fluid be spilled or come in contact with an operator.

Maintenance Suggestions

- Never return to the system any fluid which has leaked out.
- Always keep the supply of fresh fluid covered tightly.
- Use clean containers, hoses, and funnels when filling the reservoir. Use of a filter cart when adding oil is highly recommended.
- Use common sense precautions to prevent entry of dirt into components that have been temporarily removed from the circuit.
- Make sure that all breather cap filters on the reservoir are properly fastened.

Miniature Piston and Cartridge Pumps

- Do not run the system unless all normally provided suction strainers are in place.
- Make certain that the fluid used in the system is of a type recommended by the manufacturers of the system or components.
- Parker offers an oil sampling kit which can be used to ascertain the condition of the system fluid.

Check Oil Samples Periodically

Checking oil temperature periodically is good preventive maintenance. The practice of periodically siphoning an oil sample from the reservoir, and comparing it with a sample of clean, new oil is recommended.

Oil that has been running too hot will look darker and feel thinner than new oil. It may also smell burned. Normally this oil will contain more contaminants, because hot oil leads to accelerated wear of component parts.

Recommended Spare Parts

The Miniature Piston and Cartridge Piston Pumps are not considered field serviceable therefore there are no recommended spare parts.

Troubleshooting

Personnel involved with maintaining these units are advised to wear gloves and protective clothing.

Motor won't run:

- Check electrical connections and power supply to motor.
- Verify fusing is not blown.

Pump won't produce any flow:

- Verify the motor is running and in the correct rotation.
- Verify the customer-supplied reservoir is connected to the pump and has adequate fluid.
- If the 56C bell housing is used, verify the motor shaft and pump shafts are connected properly with the flexible coupling assembly.

Pump won't build enough pressure:

- Ensure the customer-supplied relief valve is set high enough for the system requirements.
- Ensure the connections to the pump are correct – reservoir to T port, system to P port.

Unusually high current draw:

- Ensure an adequate fluid supply to the pump.
- Ensure electric motor is operating at the correct voltage.
- Ensure the system pressure is within the operating parameters of the pump and electric motor combination.

Pump won't turn:

- Verify the electric motor is functioning properly.
- If pump has seized, determine cause, address the cause, then install a replacement pump.

Conclusive Unit Failure

If the operation of the unit cannot be restored after attempts at the trouble shooting suggestions listed previously, please contact your local distributor or the Oildyne Division directly to arrange for warranty replacement/repair if within the warranty period.

EC Declaration of Incorporation.**Manufacturer's Name:** Parker Hannifin Corporation**Manufacturer's Address:** Oildyne Division

5520 Highway 169 North

New Hope, MN 55428 USA

Declare that the partially complete machinery described below conforms to applicable health and safety requirements of Part 1 of Annex 1 of Machinery Directive 2006/42/EC taking full account of requirements for pressure equipment. This partly completed machinery must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive. Confidential technical documentation has been compiled as described in Part B of Annex VII of Machinery Directive 2006/42/EC and is available to European national authorities on written request. If a request is received documentation will be transmitted either electronically or by post.

Description: Oildyne Piston and Cartridge Pumps**Model Number:** As Applies**Sizes:** All**Serial Number:** All

The following standards have either been referred to or complied with in part or in full as relevant:

ENISO 12100 – 2	Machinery Safety	-	Basic concepts, general principles for design – Part 2: Technical principles and specifications.
EN13849	Machinery Safety	-	Safety Related Parts of Control Systems – Part 1: General Principles for Design.
EN 982:1996	Machinery Safety	-	Safety requirements for fluid power systems and their components – Hydraulics.

Full Name of responsible person Van Mancuso**Place of signing:**

Parker Hannifin Corporation
Oildyne Division
5520 Highway 169 North
New Hope, MN 55428 USA

Position General Manager, Oildyne Division**Signature** **Date** March 17, 2011**Full Name of Authorized European Representative** Stephen Fryer**Place of signing:**

Parker Hannifin Ltd.
Cylinder Division Europe
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Watford, Hertfordshire. WD24 7QA, UK

Position General Manager, Cylinder Division Europe**Signature** **Date** March 17, 2011

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