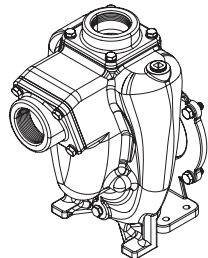


FLOMAX® 8 (Cast Iron 2" X 2")

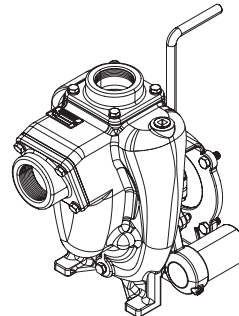


**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,
OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

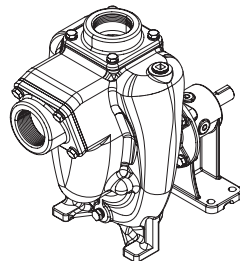


Standard Seal

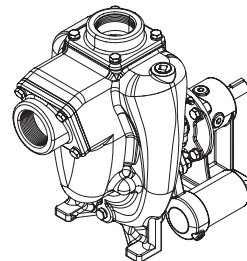


With Double Seal

CC Models

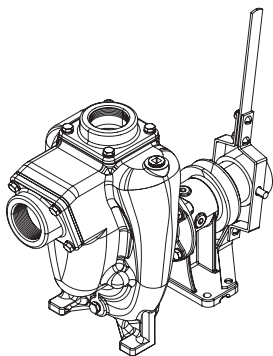


Standard Seal

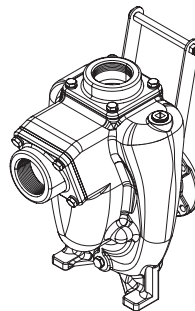


With Double Seal

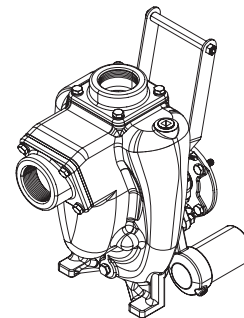
Pedestal Models



Clutch Models

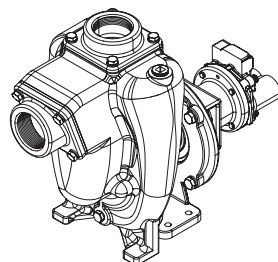


Standard Seal

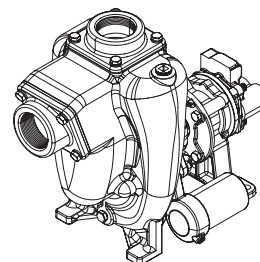


With Double Seal

Pedestal Engine Mount Models



Standard Seal



With Double Seal

Hydraulic Models

Figure 1

GENERAL DESCRIPTION

FLOMAX 8:

2" x 2" Self Priming, Hydraulic Self Priming Pump

Flomax® 8 pumps utilize a semi-open impeller design to allow for passage of larger solid sizes. Several seal options are available in addition to the standard type 2100 carbon / Ceramic / Viton mechanical seal.

SPECIFICATIONS

Suction And Discharge	2" x 2" NPT
Application	Agricultural, Commercial, Industrial, Marine, OEM
Materials of construction	Cast iron
Flow	
CC	Up to 150 gpm (548.8 lpm)
Hydraulic	Up to 200 gpm (662.4 lpm)
Double Seal	Up to 170 gpm (548.8 lpm)
Head Feet	
CC	Up to 100 ft (30.4 m)
Hydraulic	Up to 275 ft (70.1 m)
Double Seal	Up to 100 ft (30.4 m)
Suction lift	Up to a 25 ft (7.6 m)
Impeller	5" (127 mm) Semi-open
Motor	Up to 3 HP (2.24 kw)
Hydraulic Motor	0.37 cu.in. (3.60 ml) 0.45 cu.in. (6.06 ml) 0.58 cu.in. (7.3 ml)
Hydraulic System Pressure	Up to 1900 psi (175.8 bar)
Hydraulic Fluid Flow	Up to 12 gpm (41.6 lpm)
Maximum Solid Size	0.56" (14.2 mm) diameter
Drive Options	Close coupled 56C, Engine mount 5.5 HP, Engine mount 6.5 HP Close coupled 145TC Pedestal PumPAK® (without motor)
Seal	Standard carbon / Ceramic / Viton Special seal material combinations available (Consult factory)
Max Solid Size	0.56"
Drive Sleeve	316 stainless steel
Options	5 blade impeller available for higher flows, Base plate, Double seal available, Part number for Optional Discharge Flange Kit: MP36607 Flanges not included on SS models
Features	Renewable wear plate, Stainless steel drive sleeve, Stainless steel fasteners, Up to a 25 ft (7.6 m) suction lift
For Double Seal	
Application	Agricultural, Industrial, Marine, OEM
Impeller	4.88 Max Diameter Semi open impeller, Cast Iron, Semi-open, Balanced
Drive Options	Close coupled to 145TC, Close Coupled to 56C, Engine Mount, Hydraulic Drive, Pedestal Mount, PumPAK® (without motor)
Seal	Type 31, Silicon Carbide vs. Silicon Carbide (Inboard)
Port Sizes	Flomax 8: 2"x 2" NPT
Mounting Options	Electric Motor-145TC, Electric Motor-56C, Engine, Pedestal, PumPak®
Suction	2" NPT 150# Class Flat Flange
Discharge	2" ANSI 4-bolt flange connection, Part number for Optional Discharge Flange Kit: MP36607

OPERATING AND SAFETY PRECAUTIONS

READ, UNDERSTAND, AND FOLLOW THIS INFORMATION TO AVOID INJURY AND PROPERTY DAMAGE.



- ⚠ WARNING** Be sure hoses and other components can withstand fluid pressures developed by this pump. Check any hoses for damage or wear. Be certain dispensing device is clean and in proper working condition.
- ⚠ WARNING** **IMPROPER GROUNDING.** Can increase spark and electrical shock risk, resulting in severe injury or death. Ground pump and pumping system.
- The pumping system must be grounded when it is pumping, flushing, recirculating, or spraying flammable materials such as paints, solvents, lacquers, etc. or used in a location where surrounding atmosphere is conducive to spontaneous combustion. Ground the dispensing valve or device, containers, hoses, and any object to which material is being pumped.
 - Secure pump, connections, and all contact points to avoid vibration and generation of contact or static spark. Consult local building codes and electrical codes for specific grounding requirements. After grounding, periodically verify continuity of electrical path to ground. Test with an ohmmeter from each component (e.g., hoses, piping, pump, clamps, motor, base plate, etc.) to ground to ensure continuity. Ohmmeter should show 0.1 ohms or less.
- ⚠ WARNING** **HAZARDOUS PRESSURE.** Can result in serious injury or property damage. Do not service or clean pump while the system is pressurized.
- ⚠ WARNING** **HAZARDOUS MATERIALS.** Can cause serious injury or property damage. Do not attempt to return a pump to the factory or service center that contains hazardous material. Safe handling practices must comply with local and national laws and safety code requirements. Obtain Material Safety Data Sheets on all materials from the supplier for proper handling instructions.
- ⚠ CAUTION** Check pump seals, elastomers, and all wetted parts to assure compatibility before using commission of the product.
- Verify the chemical compatibility of the pump wetted parts and the substance being pumped, flushed or recirculated. Chemical compatibility may change with

temperature and concentration of the chemical(s) within the substances being pumped, flushed or circulated. For specific fluid compatibility, consult the chemical manufacturer.

- ⚠ CAUTION** Maximum temperatures are based on mechanical stress of seals and elastomers only. Certain chemicals will significantly reduce maximum safe operating temperature. Consult the chemical manufacturer for chemical compatibility and temperature limits.
- ⚠ CAUTION** Be certain all operators of this equipment have been trained for safe working practices, understand it's limitations, and wear safety goggles / equipment when required.
- ⚠ CAUTION** Do not use the pump for the structural support of the piping system. Be certain the system components are properly supported to prevent stress on the pump parts.
- ⚠ CAUTION** Prevent unnecessary damage to the pump. Do not allow pump to operate in a dry run condition or under cavitating conditions for extended periods.
- ⚠ CAUTION** Use only genuine MP Pumps® replacement parts to assure compatible pressure rating and longest service life.
- ⚠ CAUTION** The mechanical seal in the pump must not be operated dry.
- ⚠ CAUTION** If a pump will be idle in freezing weather it should be drained or filled with the proper anti-freeze.
- NOTICE** Pump should be installed in the position consistent with the manufactures specifications.
- NOTICE** Re-torque all fasteners before operation. Creep of housing and gasket materials may cause fasteners to loosen. Re-torque all fasteners to insure against fluid leakage.

- ⚠ WARNING** = Hazards or unsafe practices which could result in severe personal injury, death or substantial property damage.
- ⚠ CAUTION** = Hazards or unsafe practices which could result in minor personal injury, product or property damage.
- NOTICE** = Important installation, operation or maintenance information.

IOM INFORMATION NEEDED FOR CE

- ⚠ CAUTION** **NOISE HAZARD.** Long term noise exposure while in close proximity to an operating pump can lead to noise injuries and hearing loss. Noise cancelling PPE and/or sound insulation is recommended if long term exposure is unavoidable.
- ⚠ CAUTION** **HIGH SURFACE TEMPERATURE:** High surface temperatures that can result in burns may develop near the mechanical seal of the pump. Allow sufficient time for pump to cool or use proper PPE before interacting with the pump.
- ⚠ WARNING** **EXTREME ENVIRONMENT CONDITIONS.** Consult local building, electrical, and construction codes before installing pumps in environments prone to extreme weather and/or geological activity.
- ⚠ WARNING** **FLAMMABLE SUBSTANCES.** Grease and oil used in double seal pump is flammable. Avoid exposing double seal pumps to high temperatures. Grease Flashpoint 500°F (260°C). Oil flash point 300°F (149°C).
- ⚠ WARNING** **EXPLOSIVE ENVIRONMENTS.** Flomax is not ATEX Certified. Do not install pump in potentially explosive environments.
- ⚠ WARNING** **LIFTING AND TRANSPORT HAZARDS.** Persons that cannot lift more than 50lb (23Kg) should not attempt to lift pump assemblies by hand. Do not attempt to transport pumps by hand for large distances or from high elevations. Pump and engine assemblies should not be lifted or transported by hand.

STORAGE PRECAUTIONS

Do not store filled with fluid at or below freezing temp of process fluid.

INSTALLATION

INSTALLATION FOR FLOMAX SELF PRIMING PUMPS:

For optimum performance, place pump as close to liquid source as possible to reduce suction lift to a minimum. For best results, pump should be installed not more than 15 feet above the liquid supply. Set the unit on solid footing and as nearly level as possible.

Pipe or hose of the same size as flanges provided should be used. Reinforced rubber suction hose is recommended because it provides greater flexibility and prevents collapsing due to vacuum in the suction line when pump is in operation. Suction line should be as short as possible and have as few elbows or bends as possible to keep friction loss at a minimum. Use pipe dope on all connections and make certain that all fittings are tight, particularly on the suction line where an air leak can prevent priming or reduce pump capacity.

A good suction strainer should be used. Suction strainers are available from your MP Distributor. Refer to the accessory section of the GENERAL PUMP PRICE LIST for the correct part number

INSTALLATION FOR FLOMAX PUMPAKS:

Be sure that the pump housing is filled with liquid before starting the pump. **THE MECHANICAL SEAL IN THE PUMP MUST NOT BE OPERATED DRY.**

Pipe or hose of the same size (or larger) as inlet and outlet openings should be used on the installation. When using pipe, avoid sharp bends and use long radius elbows wherever possible. This will keep friction loss at a minimum and allow the pump to operate more effectively. Use pipe dope on all connections and be sure all fittings are airtight, especially on the suction side of the pump. An air leak on the suction side of the pump will prevent proper operation. A section of non-collapsible hose between piping and pump may be used as a vibration dampener.

BEARING INSTALLATION (PEDESTAL MODELS):

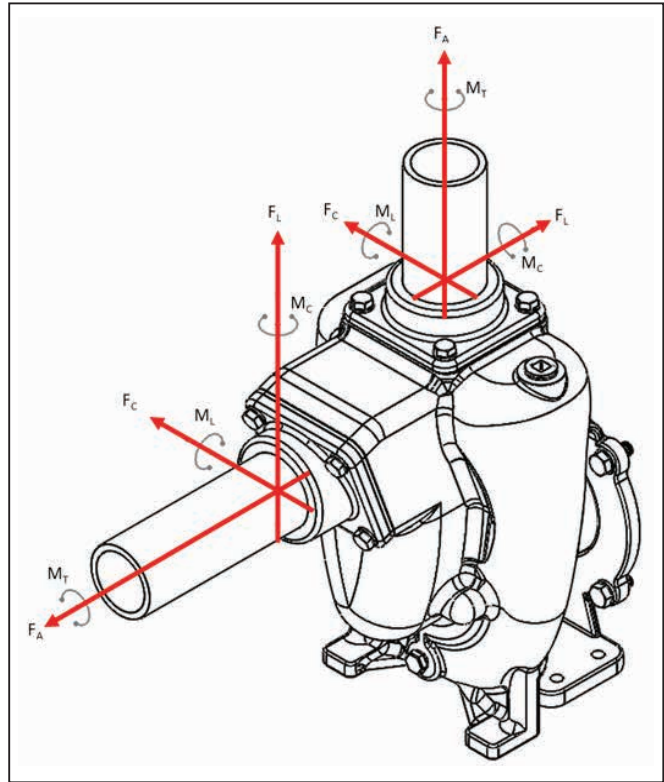
Check the shaft to insure that it rotates freely. Shafts should be aligned in accordance with the instructions of the coupling manufacturer. Final alignment must be performed after the pump has been completely installed and the pump and driver are at operating temperature. Proper shaft alignment is the responsibility of the installer.

Piping should include shutoff valves on both the discharge and suction to isolate the pump for maintenance. Provisions for suction and discharge pressure gages are recommended for trouble shooting. The suction line should be as short as possible, at least as large as the pump suction connection, include as few fittings as possible and those should be long radius to keep friction losses at a minimum.

Both suction and discharge piping should be supported independently of the pump. Never use excessive force to move the pipe into place. This may impose a strain that will result in misalignment between the pump and driver or otherwise adversely affect the operation of the pump. After connecting pipe to the pump rotate the shaft several times to check for rubbing or binding.

INSTALLATION FOR FLOMAX SELF PRIMING PUMPS

The permitted forces and moments on pump inlet and outlet.



LEGENDS

F_L	-	Longitudinal shear force
F_C	-	Circumferential shear force
F_A	-	Axial tension or compression force
M_L	-	Longitudinal bending force
M_C	-	Circumferential bending force
M_T	-	Torsional moment

ALLOWABLE NOZZLE LOADS

Nozzle Size (in)	Small Flomax Flanges					
	Force lbs (N)			Moment ft*lbs (N*m)		
	FL	FC	FA	ML	MC	MT
1.5"	405 (1800)	405 (1800)	303 (1350)	100 (135)	149 (203)	129 (176)
2"	540 (2400)	540 (2400)	405 (1800)	177 (240)	266 (360)	230 (312)

MOTOR MOUNTING

Check rotation of the driver to be sure it coincides with the required rotation of the pump. When viewed from the driver end the rotation of the pump is CLOCKWISE.

A Pumpak shaft sleeve is machined to precisely fit the shaft of your driver. No provision is made for drive key and none is required.

Loosen the drive clamp fasteners but do not remove. **NOTE:** If the driver shaft is keyed, remove the key before attempting to install the Pumpak. Slide the Pumpak assembly onto the driver shaft, aligning the Cap Screw holes in the adaptor with the tapped holes in the driver mounting face until the adaptor contacts the mounting face.

Install fasteners and tighten to secure Pumpak assembly to the driver. First center then tighten the drive clamp assembly to lock the shaft sleeve onto the driver shaft.

After all fasteners are tight including the drive clamp assembly, remove the Assembly shim from the suction connection. The shim was in place to establish clearance between the face of the impeller and pump housing. Rotate the driver slowly by hand to make certain that there is no rubbing.

Mounting Pumpak

Loosen impeller clamp nuts.

Do not use drive shaft key. Remove key if installed on drive shaft.

Slide PUMPAK assembly onto the drive shaft. **WARNING!** If PUMPAK does not slide freely STOP DO NOT HAMMER or force PUMPAK. Be sure impeller clamp is loose. PUMPAK assemblies should slide on with hand pressure. Check for and remove any burrs from drive shaft or bore of sleeve. Align holes in adapter with holes in driver mounting face and slide PUMPAK until adaptor contacts mounting face.

Attach Cap Screws and lockwashers and tighten to secure PUMPAK assembly to driver. Tighten impeller clamp nuts to lock impeller onto drive shaft.

TO ADJUST IMPELLER CLEARANCE:

NOTE: A shipping spacer was inserted at the factory for the purpose of establishing the proper clearance between the face of impeller and the wear plate.

1. Remove strip stock spacer only after tightening the impeller.
2. Clearance between the impeller and wear plate is now set to approximately 0.020".
3. Turn over slowly to make certain pump rotates freely.
4. Loosen impeller clamp to adjust clearance between impeller and wear plate using a feeler.
5. Gauge in place of spacer. After clearance has been established, tighten impeller clamp to lock impeller to shaft.

Torque Specifications		
Size	Stainless Steel (ft-lbs)	Steel GR5 (ft-lbs)
5/16" - 18"	10 - 14	14 - 20
3/8" - 16"	20 - 26	26 - 32
1/2" - 13"	34 - 42	70 - 80
1/2" - 20"	40 - 48	N/A
5/8" - 11"	75 - 85	N/A

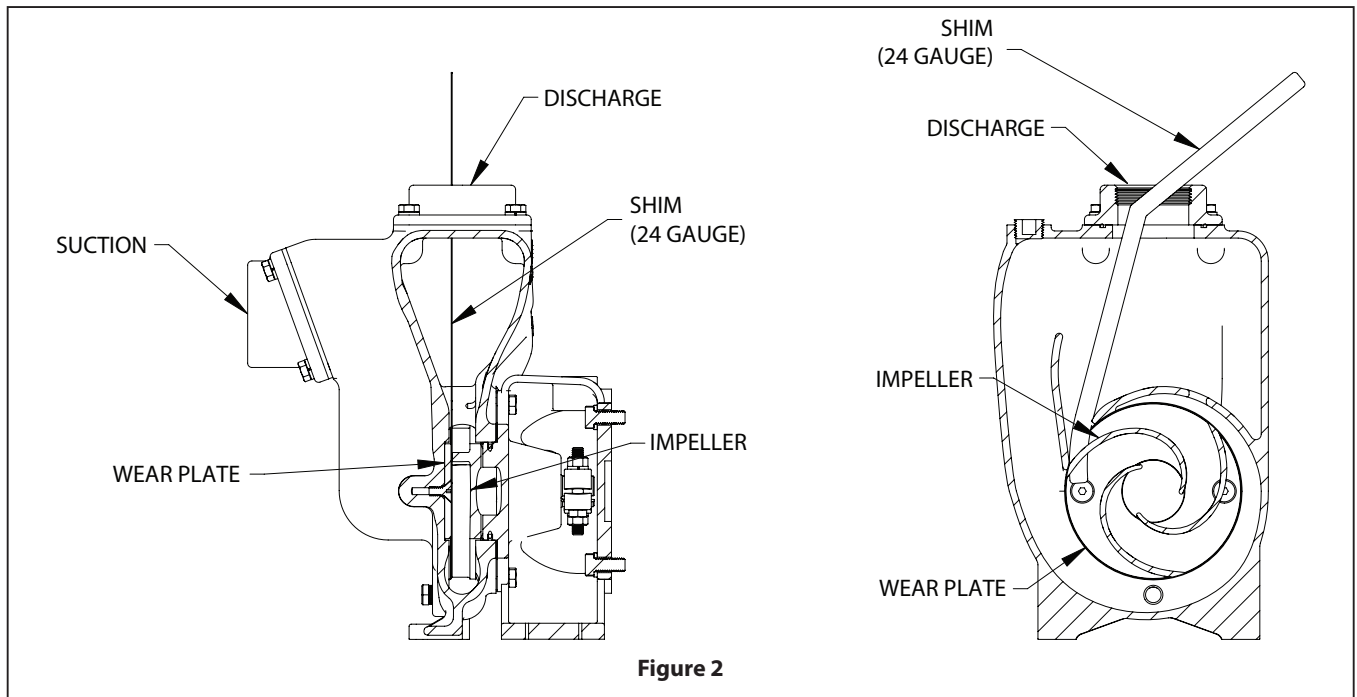


Figure 2

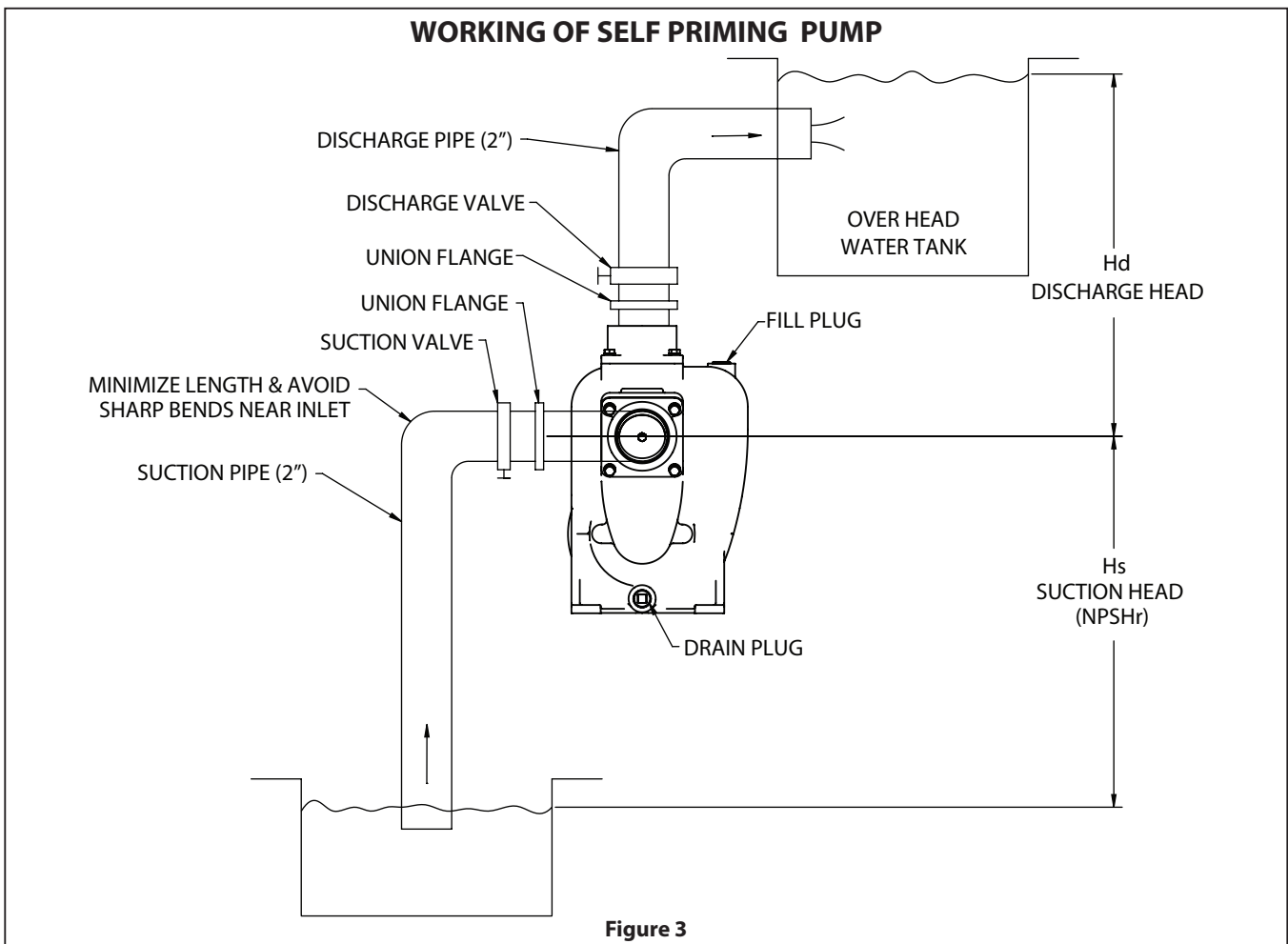


Figure 3

OPERATING INSTRUCTIONS

The FLOMAX pump is a self-priming centrifugal pump and only requires priming prior to its initial start. The pump will retain sufficient liquid for self priming thereafter.

Provision for a priming plug can be made by using a close nipple and tee on the discharge opening.

A pipe plug installed in the top opening of the tee is easily removed when necessary to prime pump. Prime pump by filling pump housing with liquid

If pump fails to prime or stops pumping, check for the following possible causes:

1. No liquid in the pump housing.
2. Air leak in the suction line due to loose connections or pin holes in the hose.
3. Collapsed suction line or clogged strainer.
4. Seal worn and leaking air.
5. Worn impeller - too much clearance between impeller and wear plate.
6. Pump not running fast enough.
7. Suction lift is too high.
8. Trying to prime against too high a discharge head

Inspect the Pumpak as soon as it is received to make certain that no parts are missing or have been broken in shipment. Damage should be reported immediately to the shipping company. **CAUTION: Do not disturb the assembly shim** in the opening of the pump housing until after the Pumpak has been completely assembled to the driver.

The Pumpak utilizes a single self-adjusting type mechanical seal that is lubricated and cooled by the liquid in the pump.

NOTE: The Pump Must Never Be Operated Without Liquid In The Housing.

WORKING OF SELF PRIMING PUMP:

A centrifugal pump operates through the transfer of rotational energy from one or more driven rotors, called impellers. The action of the impeller increases the fluid's velocity and pressure and directs it towards the pump outlet.

WEAR AND INSPECTION POINTS

Shaft: Inspect threads, keyways and shoulders. Replace if damaged.

Ball bearings (Pedestal and hydraulic models): Replace if worn, loose, or rough and noisy when rotated. If dirty, clean with solvent, dry and coat with a good lubricant. New bearings should not be unwrapped until ready for use.

Impellers: Replace if excessively worn or corroded. The impeller should have been statically and dynamically balanced at the factory, and static and dynamic balance must be maintained for proper operation of your equipment.

Mechanical seals: Should be inspected for, lack of lubrication, misalignment, overheating, abrasive materials damage, and corrosion.

Alignment: Proper alignment between pump shaft and motor shaft is key to the performance of shaft seals and bearings. Improper alignment can lead to premature pump failure.

Pedestal Style: Inline shaft to shaft spacing is dependent upon the coupling being used. Check the alignment carefully between the pump and the drive.

SEAL REPLACEMENT INSTRUCTIONS

DISASSEMBLE THE PUMP:

Drain the system of liquid, break suction and discharge pipe unions, and, if necessary, remove all piping from the suction and discharge openings. Remove the fasteners holding the pump adaptor to the driver, loosen the drive clamp assembly, and remove the PUMPAK.

To disassemble, remove the washers and hexnuts holding the motor adaptor to the housing. Remove the housing. The impeller, drive sleeve, seal bellows, and the spring assembly will now slide forward Free of the pump adaptor.

The seal seat and seat cup will remain in the pump adaptor. If not damaged or worn, do not remove. If necessary, remove from the adaptor counter bore with a piece of wood or a screwdriver handle inserted through the adaptor from the drive end. A sharp tap or two is usually sufficient to knock out the seal seat. Use caution in removing the seal seat so as not to crack a ceramic seat.

REMOVE IMPELLER

Remove seal bellows and spring assembly. On some models, spring keeper can also be removed now before removing impeller.

NOTE: The seal bellows will be bonded to the shaft sleeve and will require some patience and caution in removal in order not to damage the seal bellow and cage.

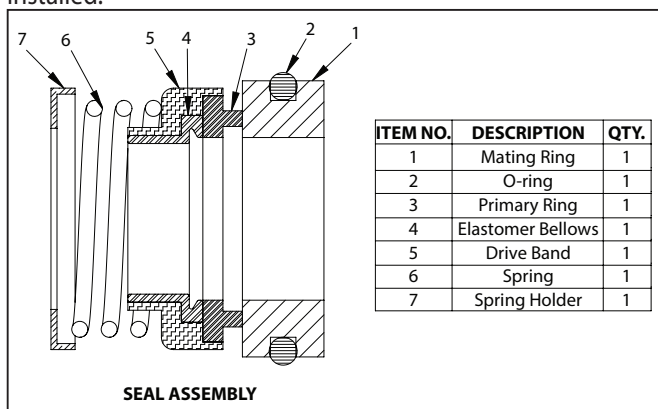
MP Pumps rebuild kits include a new drive sleeve to avoid the possibility of damaging the drive sleeve. See back of manual for list of seal kits and corresponding rebuild kits. Impellers are also available if wear or damage is present.

Remove locknut from shaft; unscrew the impeller from the shaft sleeve counter-clockwise from the impeller end.

INSPECTION:

Check all parts for wear. For ease of reassembly shaft sleeve should have all nicks and burrs removed. Clean with light crocus cloth. Replace damaged parts with new parts.

Inspect the seal seat and washer, seat cup, and seal bellows for grooves, cuts, scuffmarks, or other deterioration. If any of the parts are damaged, a complete new assembly should be installed.



inspect the lapped sealing face of carbon washer (Part 3) for wear which would necessitate replacement.

Inspect lapped sealing face of floating seat (Part 4) in adapter housing counterbore for scuffing or cracks. If necessary to replace, press out old seat and ring, and proceed as outlined in paragraph on MOUNTING ADAPTER.

If spring and/or bellows (Part 1 and 2) are damaged and require replacement, lubricate the impeller sleeve with a clean light oil and slide parts off sleeve.

REASSEMBLY:

All dirt and foreign matter should be removed. Recommend only using new seals and elastomers when reassembling a pump.

Lubricate seal seat cup with liquid soap (P-80 emulsifier) or clean grease and press seal seat into adaptor counter bore, seating it firmly and squarely. Use caution so as not to mar the lapped face of the seal seat.

Assemble shaft sleeve; seal spring keeper, impeller and impeller nut. Before installing seal bellows and spring assembly, lubricate the shaft sleeve and rubber bellows with liquid soap (P-80 emulsifier) or clean grease and press bellows and spring assembly onto the shaft sleeve. The spring should engage the spring keeper at the impeller end of the shaft sleeve.

To be properly positioned the washer must be firmly against the rubber bellows member and the driving lugs of the washer properly engaged. The raised shoulder on the seal washer should be facing away from the impeller to contact the lapped surface of the seal seat in the adaptor.

Slide impeller and seal assembly into the adaptor. Install drive clamp assembly on the shaft sleeve but do not tighten.

Make sure the shim is installed between the impeller and the wear plate. Do not remove the shim material before the drive sleeve clamp has been tightened to the motor drive shaft.

INSTRUCTIONS FOR SET SCREW TYPE SEAL:

Do not remove the seal retaining clips. Slide the seal into place on the shaft. The end of the shaft will be recessed approximately $0.080" \pm .020"$ from the end of the seal. The proper seal working height is achieved when the seal faces are set flush with the seal clips in place.

With the seal clips still in place tighten the seal fasteners with a ball end allen wrench. It is important that the allen wrench not rest upon the seal housing during tightening as this may affect the position of the seal on the shaft. After the seal fasteners have been tightened the seal clips should be removed and saved.

Do not use the seal shim with setscrew type seal.

For bellows seal install the seal spacer on the backside of the impeller. Use a light grease or similar tacky material. Thread impeller onto shaft. Install jam nut. Place o-ring onto seal plate. Install impeller/bearing housing assembly into pump housing. Install lock washers and hex nuts. Rotate the shaft several times to check for rubbing or binding.

BEARING REPLACEMENT INSTRUCTIONS (PEDESTAL MODELS)

The pump utilizes a single self-adjusting type mechanical seal that is lubricated and cooled by the liquid in the pump.

THE PUMP MUST NEVER BE OPERATED WITHOUT LIQUID IN THE HOUSING.

Check rotation of the driver to be sure it coincides with the required rotation of the pump. When viewed from the driver end the rotation of the pump is CLOCKWISE.

The pump's grease lubricated bearings are sealed. They have been pre-lubricated at the factory and require no further lubrication or maintenance for the life of the bearing.

Electric motors or other rotating equipment used to drive the pump should be lubricated in accordance with the manufacturer's instructions.

DISASSEMBLY:

Drain the housing by removing the drain plug. Remove the hex nuts and lock washers from the housing studs. Slide the bearing housing/impeller assembly out of the housing. It may be necessary to rotate the driver shaft out of the way.

With the bearing /impeller assembly on a bench secure shaft, unthread impeller nut then unthread impeller. Remove the seal from the shaft. Lift off the seal plate. Place the seal plate face down on the bench and press the seal seat out.

Remove the snap ring from the backside of the bearing housing. With a soft mallet, loosen the shaft assembly by tapping the impeller end then slide the bearing assembly from the housing. Press the bearings from the shaft.

ASSEMBLY:

Press bearings onto the shaft. Slide the shaft / bearing assembly into the bearing housing and install the snap ring. Place seal housing face up on bench. Lubricate non-PTFE seal seat with water-soluble lubricant and gently press into seal housing. If pinned seat is used be certain that pin is in place, lined up with groove in seal seat. Place seal housing onto pilot of bearing housing. Lubricate shaft with water-soluble lubricant. Slide seal onto shaft.

MAINTENANCE

The FLOMAX pump is of simple construction with only one moving part. The impeller on the FLOMAX 8 is threaded to a stainless steel drive sleeve. The sleeve slips over the drive shaft and is locked to the drive shaft with a two-piece clamp. This means you use a standard drive shaft - no special tapers or threads. It's easy to adjust or remove the impeller. FLOMAX pumps are available with either a self-lubricated shaft seal, or a grease lubricated shaft seal. The self-lubricated seal is lubricated by the liquid in the pump. Operating the pump dry will seriously damage the seal.

To lubricate the grease lubricated seal, turn the wing nut on the grease cup to the left - counter clockwise. If the pump is to be left standing idle for any length of time in freezing conditions, the pump housing should be drained. Draining is provided for by a drain plug located at the base of the pump housing.

DISASSEMBLY

Disconnect power (or spark plug wire) to prevent accidentally starting.

Disconnect lines and drain pump housing.

TO REMOVE PUMP HOUSING

Remove Cap Screws and nuts holding pump housing to mounting base (where used).

Remove nuts and lockwashers holding pump housing to the adapter.

Loosen the housing and remove carefully to prevent tearing gaskets.

TO REMOVE IMPELLER

If pump is equipped with a grease lubricated seal, relieve pressure in grease cup by turning wing handle to the right - clockwise.

Remove impeller clamp nuts and clamp to unlock impeller drive sleeve from drive shaft.

Use two "jimmy" bars or large screwdrivers diagonally across from each other between adapter and end of drive sleeve.

Pry the sleeve off the drive shaft.

Before removing the seal from the impeller, inspect the carbon washer. If nicked or worn - replace it with a new one. Inspect the seal seat (still in the pump adapter). If no nicks, scratches or cracks appear and surface is clean and smooth, there is no need to replace it. If replacement is necessary, remove adapter by removing four hex nuts and washers. Place adapter on flat surface, with impeller side down. Press out seal seat by using wooden end of a screw driver or similar tool.

TO REPLACE IMPELLER

On the two-piece impeller it is not necessary to remove the seal. Place impeller drive sleeve between two pieces of wood in a vise. Hold impeller sleeve carefully so you do not damage the seal assembly. Hold firmly and unthread impeller by turning counterclockwise - left hand. Replace with a new impeller. Be sure seal spring fits over hub on back of impeller.

TO REMOVE ADAPTER

Remove the four nuts and lockwashers. Loosen and remove adapter.

TO REMOVE WEAR PLATE

After pump housing has been removed from the adapter, inspect the wear plate. If wear plate is badly worn, it should be replaced. To remove wear plate, loosen and remove acorn nuts and gaskets on the outside of the pump housing.

CAUTION: When replacing wear plate, be sure to use new gaskets under acorn nuts to seal against air leaking in on suction side during priming cycle.

INSPECTION

After pump has been disassembled, check all parts over carefully for wear or damage. When ordering parts for your pump, be sure to specify model and serial numbers shown on name plate.

REASSEMBLY

MOUNTING ADAPTER

Before mounting adapter, clean counterbore with cleanser. Clean and lubricate with light oil the synthetic rubber member on seal seat and press (do not drive) the assembly into the adapter counterbore, seating it firmly and squarely. Install adapter. Install lockwashers and tighten four nuts evenly.

CAUTION: In handling, avoid dropping seat and take particular care not to scratch the lapped face.

MOUNTING SELF-LUBRICATED SEAL ASSEMBLY

Mount seat and seat ring (Part 4 and 5) as outlined above. Inspect impeller sleeve for nicks and burrs. Polish sleeve with fine emery or crocus cloth. Then clean and lubricate with a clean light oil.

Slip the coil spring (Part 1) onto the impeller sleeve making certain that it is seated properly on the shoulder of the impeller.

Lubricate the inside of the washer and bellows assembly (Part 2 and 3) with a clean light oil and slide it onto the impeller drive sleeve only until it clears the chamfer.

Slide the seal bellows and washer assembly onto the impeller drive sleeve. Push the seal down over the drive sleeve with even pressure. Pull the seal head back up to the position where there is no spring load. This insures proper assembly on the drive sleeve.

Before sliding the impeller onto the drive shaft, wipe the lapped sealing faces of the floating seat (Part 4) in the adapter counterbore and the carbon washer (Part 3) on the bellows assembly perfectly clean. Then lubricate both faces with a clean light oil.

NOTE: The assembly of impeller and seal to the drive shaft should take place as soon as the bellows assembly is slipped on the impeller sleeve so as to avoid bonding of the bellows to the sleeve at improper working height.

CAUTION: Foreign matter between sealing faces will cause leakage and shorten the life of the seal.

MOUNTING GREASE LUBRICATED SEAL ASSEMBLY

Apply P80 to seal seat bore in seal housing and around O-ring on carbon seal seat. Then press seal seat, by hand, into seal seat bore making sure marked side of seal seat is down. Clean and inspect for cracks, chips and deformities.

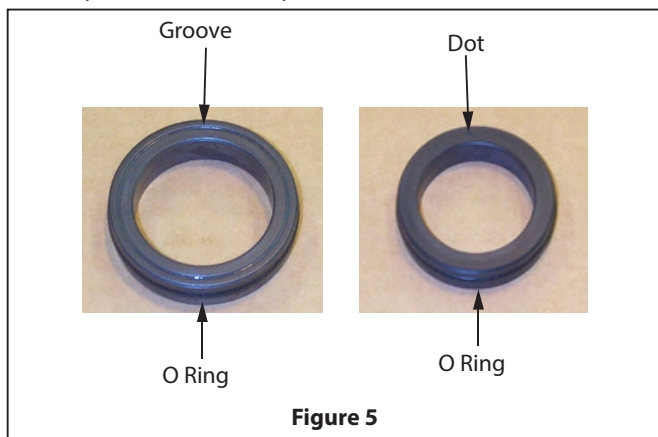


Figure 5

Place gasket over studs and O-ring into groove then install seal housing over studs with seal facing up with ¼ NPT holes at 2 o'clock and 7 o'clock position. Inspect and wipe clean if needed. Apply P80 to impeller drive sleeve and to interior of seal bellows, and push onto drive sleeve with seal pusher with silicon carbide seal facing downward towards impeller. The silicon carbide face is a matte light gray. The carbon face is a very dark gray/black. See the picture below. Some seals have the same primary seal face and therefor the direction does not matter.

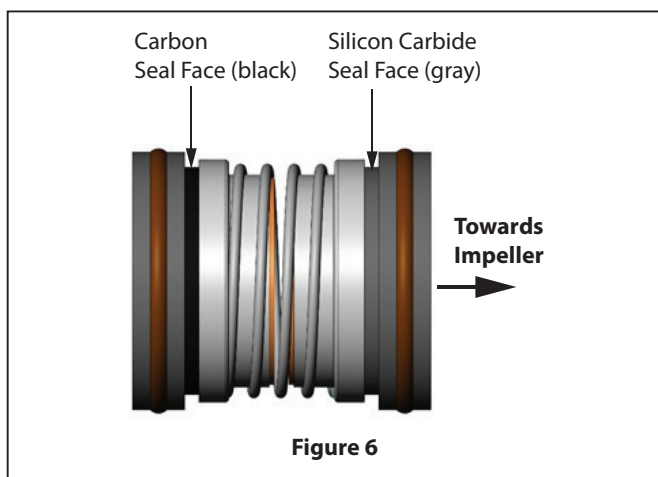


Figure 6

Install seal spring over drive sleeve onto backside of silicon carbide seal. Apply P80 to interior seal bellows of carbon seal and push over drive sleeve with seal pusher carbon face up. Inspect and wipe clean, if necessary. Install gasket over studs onto seal housing. Apply P80 to seal seat bore of adapter and around O-ring on seal seat. Push seal seat, by hand, into seal bore – clean and inspect.

Install O-ring into adaptor groove. Apply P80 to O-ring. Place adapter onto seal housing gasket, handle hole up, and attach using 6 hex nuts and lock washers. Assemble clamp assembly over drive sleeve. Leave loose.

Apply Gasoila onto threads of grease fitting and install to lower pipe fitting hole at 10 o'clock position in seal housing and tighten by hand. **NOTE:** Do not get sealant into grease fitting. Apply Gasoila to 1/8" NPT plug and install into pipe fitting at 5 o'clock position. Apply Gasoila to pressure release valve threads and install into upper pipe fitting hole at the 10 o'clock position.

Fill seal cavity with grease until it comes out of the reservoir hole. Assemble grease reservoir into adaptor as shown below. Place smaller O-ring over the piston. Place the large O-ring over the reservoir cover. Install the piston into the adaptor hole. Place the spring within the piston. Thread the cover into the adaptor.

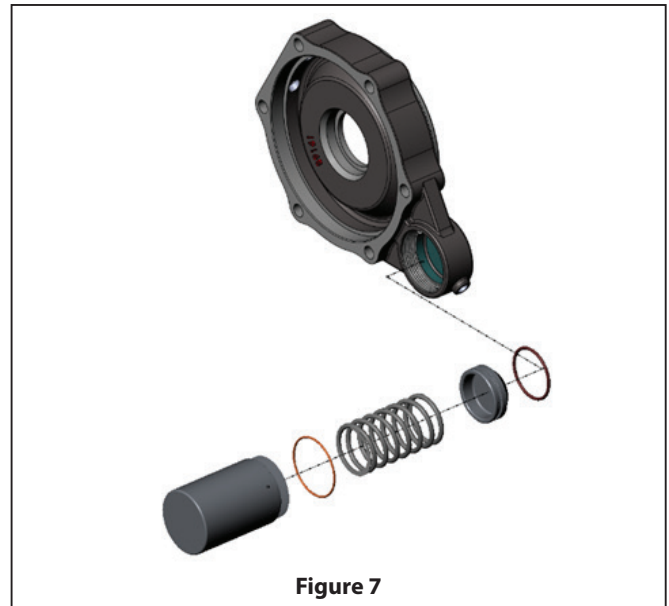


Figure 7

Continue filling seal cavity until high-pressure grease reservoir is full. **NOTE:** When grease reservoir is full it will spit out of the pressure release valve.

MOUNTING SEVERE-SERVICE SEAL ASSEMBLY

The MP PUMPS Severe-Service Seal is a precision assembly requiring care in installation. To insure proper operation it is necessary to install this seal as follows:

1. Thoroughly clean the seal seat cavity in the pump adapter.
2. Lubricate the seal seat O-Ring with light oil and carefully install the seat into the seal cavity that is inside the adapter.
3. Using a soft clean cloth, clean and lubricate both seal faces with light oil.
NOTE: Any foreign matter between seal faces will cause leakage and shorten seal life.
4. Complete assembly of seal and pump - see above.
5. Rotate by hand before start up.

MOUNTING IMPELLER

Do not use drive key between drive shaft and impeller sleeve. The clamp will drive the sleeve. Slide the impeller sleeve onto the drive shaft. Replace impeller clamp and capscrews, lockwashers and nuts.

Before tightening clamp adjust clearance between back face of impeller and adapter allowing from 0.015" (0.381 mm) to 0.020" (0.508 mm) clearance. Tighten impeller clamp to lock impeller onto drive shaft. This automatically sets face clearance of impeller when housing is mounted.

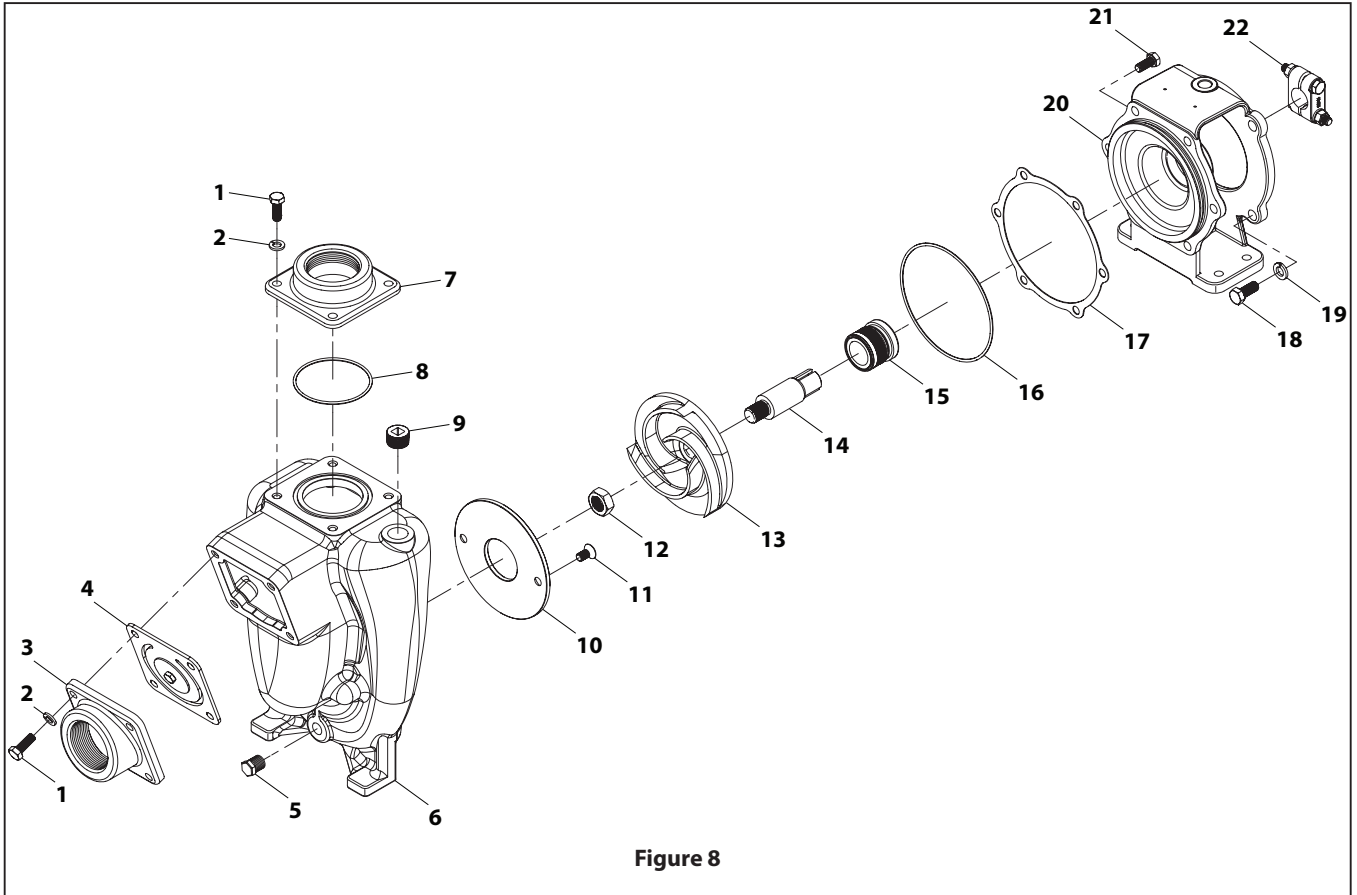
MOUNTING PUMP HOUSING

Replace gaskets on pump housing and mount housing on the adapter. Replace two lockwashers and nuts on studs diagonally across from each other and tighten. Turn drive shaft over slowly by hand and listen at outlet opening on housing for any rubbing of impeller on the housing or wear plate.

The clearance between the impeller and wear plate can be checked with a feeler gauge. Normal clearance is 0.015" (0.381 mm) to 0.020" (0.508 mm). If clearance exceeds 0.025" (0.635 mm) readjust impeller. If the impeller rubs use an additional gasket to space impeller.

After clearance has been established, replace lockwashers and nuts on remaining studs and tighten. If capscrews and nuts are used to hold housing to mounting base, replace these and tighten.

PARTS LIST / FLOMAX 8 CC (56C and 145TC)



PARTS LIST / FLOMAX 8 (56C and 145TC)

Item	Description (size)	Qty	Part No.	Mtl
1	Cap Screw (HH 5/16"-18" x 7/8")	8	MP21242	304 SS
2	Lockwasher (5/16" x 18")	10	MP21238	304 SS
3	Suction Flange (2")	1	MP22387	Cast Iron
4	Flapper Assembly	1	MP23022	Buna
5	Pipe Plug (1/4" NPT)	1	MP41475	Steel
6	Housing	1	MP22251	Cast Iron
7	Flange (2")	1	MP22311	Cast Iron
8	O-Ring (AS-149)	1	MP37141	Viton
	O-Ring (AS-149)	1	MP37142	Epdm
9	Pipe Plug (1/2" NPT)	1	MP37140	Zinc Plated Steel
10	Wear Plate	1	MP22260	Steel
	Wear Plate	1	MP22259	Brass
	Wear Plate	1	MP27978	316 SS
11	Screw (FHS 5/16"-18" x 5/8")	2	MP37137	304 SS
12	Hex Jam Nut	1	MP22655	304 SS

Item	Description (size)	Qty	Part No.	Mtl
13	Impeller (5.0")	1	MP22293	Cast Iron
	Impeller (5.0")	1	MP22292	Federalloy I-836
	Impeller (5.0")	1	MP22294	CF8M
14	Drive Sleeve (7/8")	1	MP25664	303 SS
	Drive Sleeve (5/8")	1	MP22253	303 SS
15	See Table for seal options			
16	O-Ring (AS-568-158)	1	MP34555	Viton
	O-Ring (AS-586-158)	1	MP36911	EPDM
17	Gasket	1	MP22255	Lexide Ni-2085
18	Cap Screw (3/8"-16 x 7/8")	4	MP21251	304 SS
19	Lockwasher (3/8 x 1/8)	4	MP21266	304 SS
20	Adaptor	1	MP25904	Cast Iron
21	Cap Screw (5/16"-18" x 3/4" Patch)	6	MP24965	304 SS
22	Clamp Assembly (7/8")	1	MP23003	303 SS
	Clamp Assembly (3/4" and 5/8")	1	MP23002	303 SS

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP22273	21	1"	Ceramic	Carbon	Viton	316 SS

PARTS LIST / FLOMAX 8 CC (56C and 145TC) (DOUBLE SEAL)

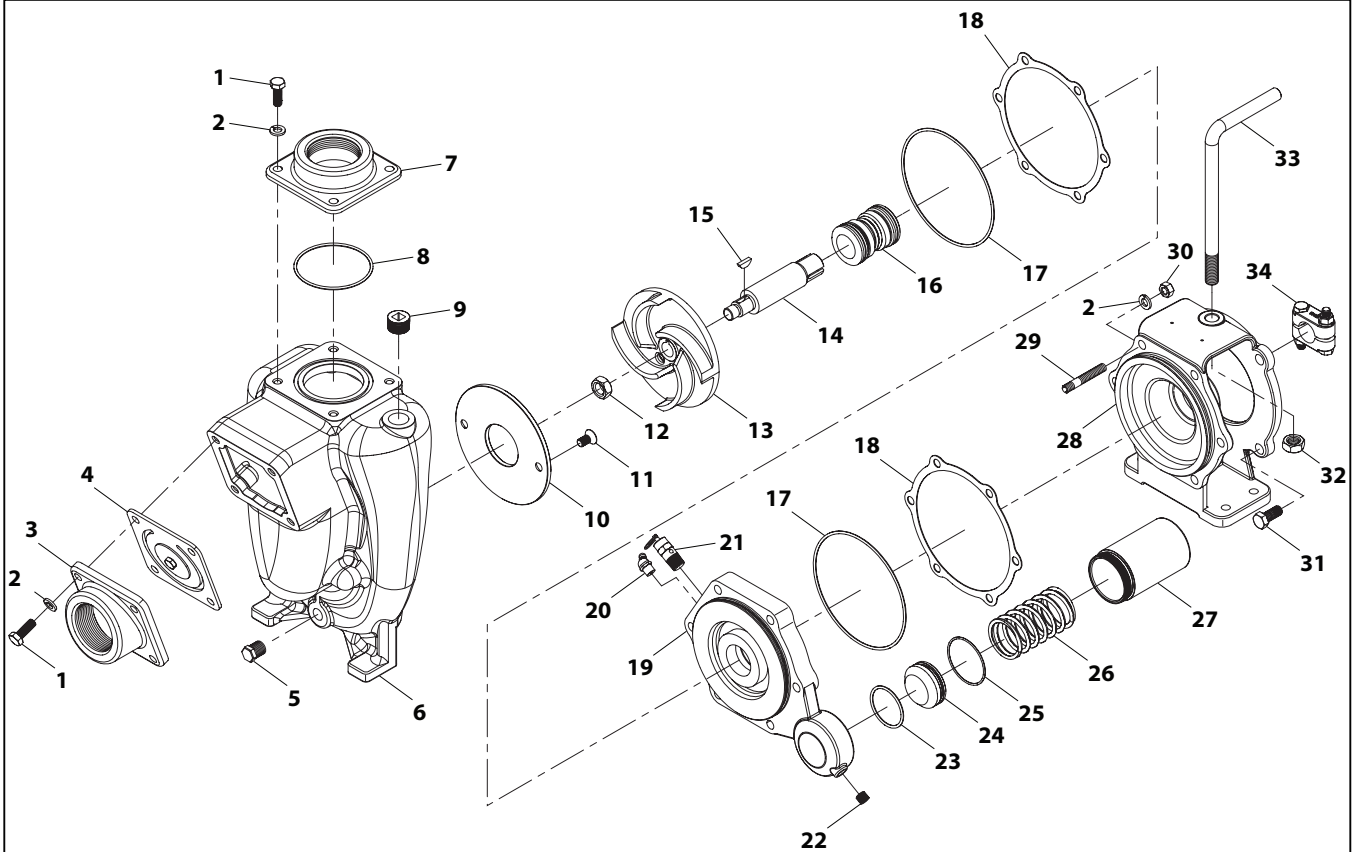


Figure 9

PARTS LIST / FLOMAX 8 CC (56C and 145TC) (DOUBLE SEAL)

Item	Description (size)	Qty	Part No.	Mtl
1	Cap Screw (HH 5/16"-18" x 7/8")	8	MP21242	304 SS
2	Lockwasher (5/16" x 18")	16	MP21238	304 SS
3	Suction Flange	1	MP22387	Cast Iron
4	Flapper Assembly	1	MP23022	Buna
5	Pipe Plug (1/4" NPT)	1	MP41475	Steel
6	Housing	1	MP22251	Cast Iron
7	Flange	1	MP22311	Cast Iron
8	O-Ring (AS-149)	1	MP37141	Viton
9	Pipe Plug (1/2" NPT)	1	MP37140	Zinc Plated Steel
10	Wear Plate	1	MP22260	Steel
11	Screw (FHS 5/16" - 18" x 5/8")	2	MP37137	304 SS
12	Hex Jam Nut (1/2" - 20")	1	MP22621	304 SS
13	Impeller (3.25")	1	MP39710	Cast Iron
	Impeller (3.87")	1	MP28669	Cast Iron
	Impeller (4.47")	1	MP28667	Cast Iron
	Impeller (4.66")	1	MP28668	Cast Iron
	Impeller (4.84")	1	MP28512	Cast Iron
14	Drive Sleeve (7/8")	1	MP33204	316 SS
	Drive Sleeve (5/8")	1	MP33526	316 SS
	Drive Sleeve (3/4")	1	MP33205	316 SS
15	Woodruff Key (5/8" x 5/32")	1	MP21163	304 SS
16	See Table for seal options			

Item	Description (size)	Qty	Part No.	Mtl
17	O-Ring (AS-568-158)	2	MP34555	Viton
18	Gasket	2	MP22255	Lexide Ni-2085
19	Adapter	1	MP38357	Cast Iron
20	Zerk Fitting (1/8" NPT)	1	MP22208	Steel Zinc Plated
21	Relief Valve (1/4" NPT)	1	MP31733	Brass
22	Pipe Plug (1/8" NPT)	1	MP30824	Steel
23	O-Ring (AS-586-129)	1	MP38362	Viton
24	Piston	1	MP38360	Aluminum T-3 2011
25	O-Ring (AS-586-032)	1	MP38363	Viton
26	Spring	1	MP38358	Music Wire
27	Reservoir	1	MP50166	Al T-3 2011 Black Anodized
28	Adaptor	1	MP25904	Cast Iron
29	Stud (5/16"-18" x 2.13")	6	MP33201	303 SS
30	Hexnut (5/16"-18" x 1/2")	8	MP21284	304 SS
31	Cap Screw (3/8-16 x 7/8)	4	MP21251	304 SS
32	Hex Jam Nut (1/2" - 13")	1	MP22637	Steel
33	Handle	1	MP21938	Steel
34	Clamp Assembly (3/4" and 5/8")	1	MP23002	303 Ss
	Clamp Assembly (7/8")	1	MP23003	303 SS

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP33176	31	1"	Silicon Carbide	Silicon Carbide	Viton	300 SS

PARTS LIST / FLOMAX 8 PEDESTAL

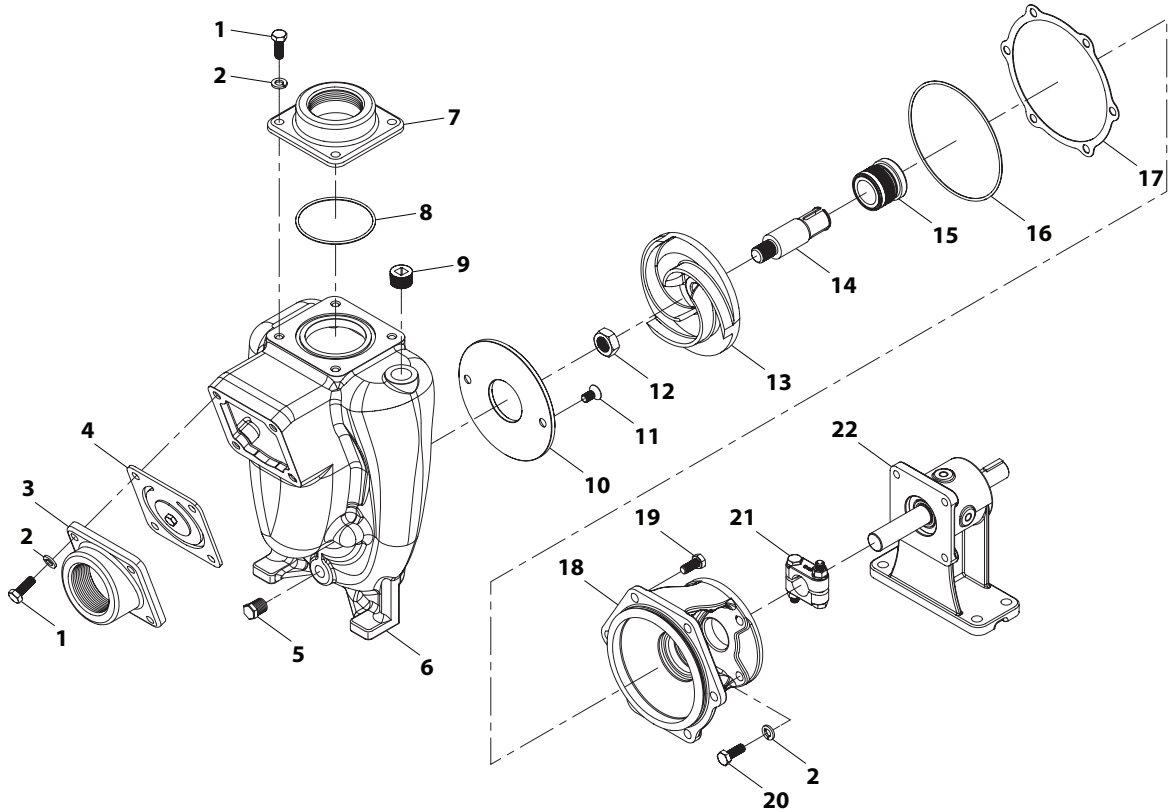


Figure 10

PARTS LIST / FLOMAX 8 PEDESTAL

Item	Description (size)	Qty	Part No.	Mtl	Item	Description (size)	Qty	Part No.	Mtl
1	Cap Screw (HH 5/16" - 18" x 7/8")	8	MP21242	304 SS	13	Impeller (5.0")	1	MP22293	Cast Iron
2	Lockwasher (5/16" x 18")	12	MP21238	304 SS		Impeller (5.0")	1	MP22292	Federalloy I-836
3	Suction Flange	1	MP22387	Cast Iron		Impeller (5.0")	1	MP22294	CF8M
4	Flapper Assembly	1	MP23022	Buna		Impeller (5.0") (5BL)	1	MP33333	CF8M
	Flapper Assembly	1	MP33624	Viton		Impeller (5.0")	1	MP22291	A356
	Flapper Assembly	1	MP26098	EPDM		Impeller (5.0") (5BL)	1	MP36408	Cast Iron
5	Pipe Plug (1/4" NPT)	1	MP41475	Steel	14	Drive Sleeve (3/4")	1	MP22286	303 SS
6	Housing	1	MP22251	Cast Iron	15	See Table for seal options			
7	Flange	1	MP22311	Cast Iron	16	O-Ring (AS-568-158)	1	MP34555	Viton
	O-Ring (AS-149)	1	MP37141	Viton		O-Ring (AS-568-158)	1	MP36911	EPDM
	O-Ring (AS-149)	1	MP37142	EPDM		O-Ring (AS-568-158)	1	MP36910	Buna
8	O-Ring (AS-149)	1	MP37141	Viton	17	Gasket	1	MP22255	Lexide Ni-2085
	O-Ring (AS-149)	1	MP37142	EPDM	18	Adapter	1	MP22247	Cast Iron
	O-Ring (AS-149)	1	MP39183	Buna	19	Cap Screw (5/16" - 18" x 3/4" Patch)	6	MP24965	304 SS
9	Pipe Plug (1/2" NPT)	1	MP37140	Zinc Plated Steel	20	Cap Screw SS (HH 5/16" - 24" x 0.88")	4	MP21278	304 SS
10	Wear Plate	1	MP22260	Steel	21	Clamp Assembly	1	MP23002	304 SS
	Wear Plate	1	MP27978	316 SS	22	Pedestal Assembly	1	MP26142	Cast Iron
11	Screw (FHS 5/16" - 18" x 5/8")	2	MP37137	304 SS					
12	Hex Jam Nut	1	MP22655	304 SS					

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP22273	21	1"	Ceramic	Carbon	Viton	316 SS

PARTS LIST / FLOMAX 8 PEDESTAL (DOUBLE SEAL)

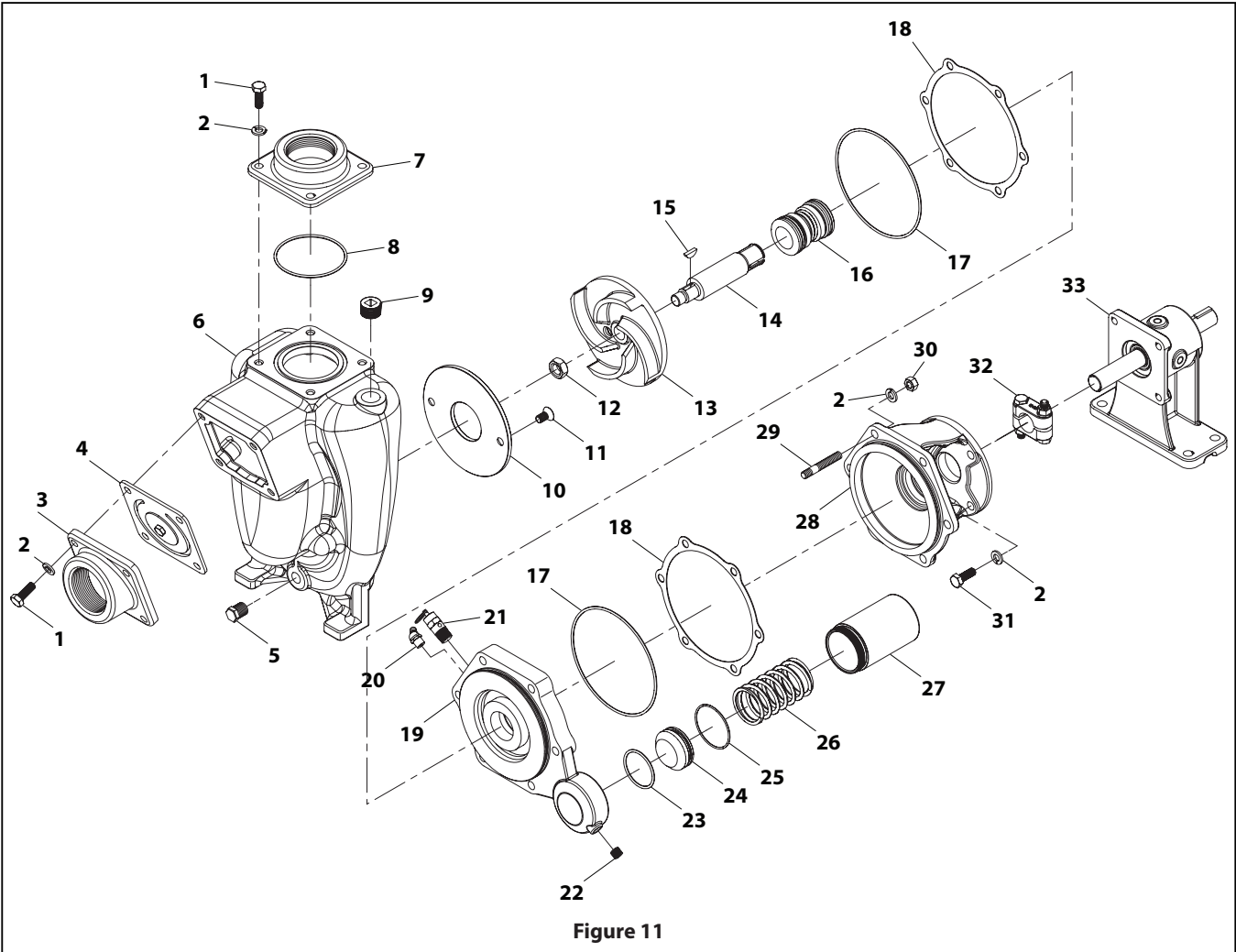


Figure 11

PARTS LIST / FLOMAX 8 PEDESTAL (DOUBLE SEAL)

Item	Description (size)	Qty	Part No.	Mtl
1	Cap Screw (HH 5/16" - 18" x 7/8")	8	MP21242	304 SS
2	Lockwasher (5/16" x 18")	18	MP21238	304 SS
3	Suction Flange	1	MP22387	Cast Iron
4	Flapper Assembly	1	MP23022	Buna
5	Pipe Plug (1/4" NPT)	1	MP41475	Steel
6	Housing	1	MP22251	Cast Iron
7	Flange	1	MP22311	Cast Iron
8	O-Ring	1	MP39183	Buna
9	Pipe Plug (1/2" NPT)	1	MP37140	Zinc Plated Steel
10	Wear Plate	1	MP22260	Steel
	Wear Plate	1	MP50403	FNC
	Wear Plate	1	MP27978	316 SS
11	Screw Fhs (5/16" - 18" x 5/8")	2	MP37137	304 SS
12	Hex Jam Nut (1/2" - 20")	1	MP22621	304 SS
13	Impeller (4.84")	1	MP28512	Cast Iron
	Impeller (4.66")	1	MP28668	Cast Iron
	Impeller (4.84")	1	MP50171	FNC
	Impeller (4.10")	1	MP33249	Cast Iron
14	Drive Sleeve (SS 3/4" FLO S SDS)	1	MP33205	316 SS
15	Woodruff Key (5/8" x 5/32")	1	MP21163	304 SS

Item	Description (size)	Qty	Part No.	Mtl
16	See Table for seal options			
17	O-Ring	2	MP36910	Buna
18	Gasket	2	MP22255	Lexide Ni-2085
19	Adapter	1	MP38357	Cast Iron
20	Zerk Fitting (1/8" NPT)	1	MP22208	Zinc Plated Steel
21	Relief Valve (1/4" NPT)	1	MP31733	Brass
22	Pipe Plug (1/8" NPT)	1	MP30824	Steel
23	O-Ring (AS-586-129)	1	MP38362	Viton
24	Piston	1	MP38360	Aluminum T-3 2011
25	O-Ring (AS-586-032)	1	MP38363	Viton
26	Spring	1	MP38358	Music Wire
27	Reservoir	1	MP38361	Aluminum T-3 2011
28	Adapter	1	MP22247	Cast Iron
29	Stud (5/16" - 18" x 2.13")	6	MP33201	303 SS
30	Hexnut (5/16" - 18" x 1/2")	6	MP21284	304 SS
31	Cap Screw SS (HH 5/16" - 24" x 0.88")	4	MP21278	304 SS
32	Clamp Assembly	1	MP23002	304 SS
33	Pedestal Assembly	1	MP26142	Cast Iron

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP33176	31	1"	Silicon Carbide	Silicon Carbide	Viton	300 SS

PARTS LIST / FLOMAX 8 CLUTCH

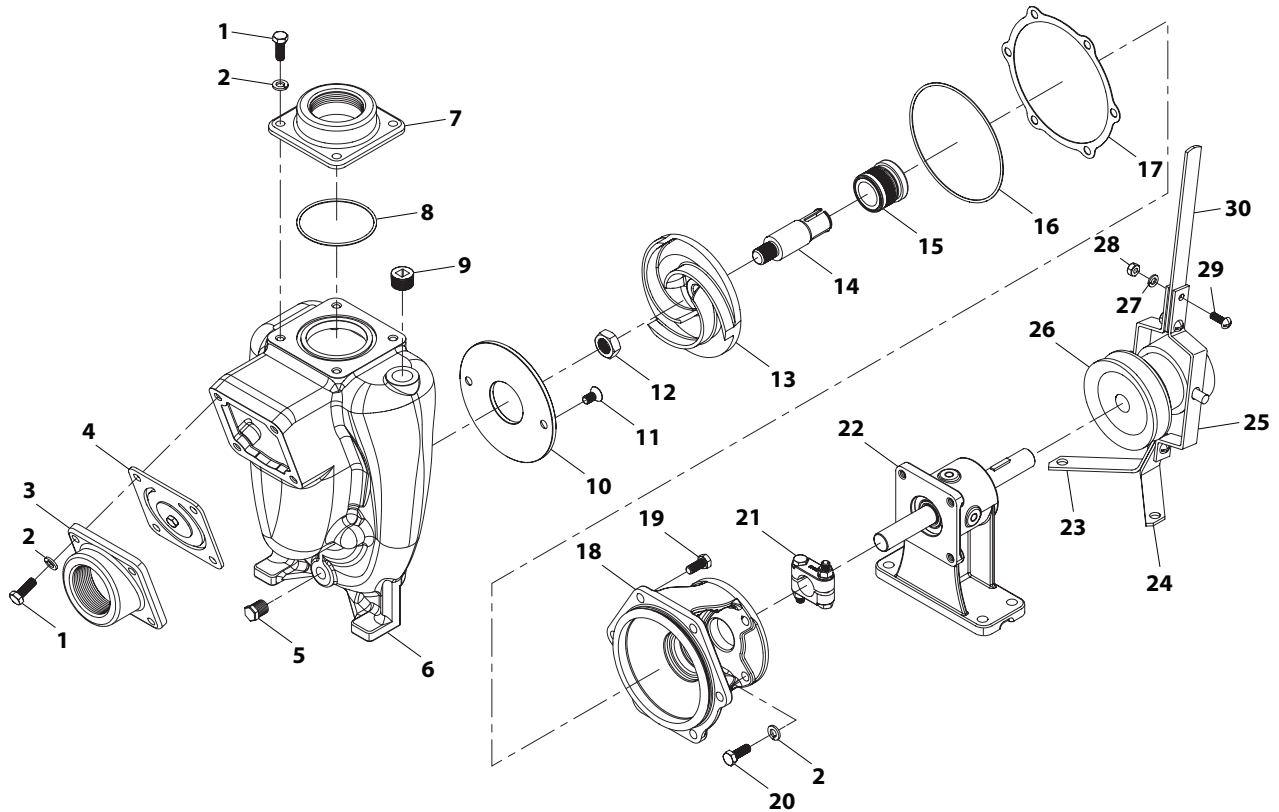


Figure 12

PARTS LIST / FLOMAX 8 CLUTCH

Item	Description (size)	Qty	Part No.	Mtl
1	Cap Screw (HH 5/16" - 18" x 7/8")	8	MP21242	304 SS
2	Lockwasher (5/16" x 18")	12	MP21238	304 SS
3	Suction Flange	1	MP22387	Cast Iron
4	Flapper Assembly	1	MP23022	Buna
5	Pipe Plug (1/4" NPT)	1	MP41475	Steel
6	Adapter	1	MP22247	Cast Iron
7	Flange	1	MP22311	Cast Iron
8	O-Ring (AS-149)	1	MP37141	Viton
9	Pipe Plug (1/2" NPT)	1	MP37140	Zinc Plated Steel
10	Wear Plate	1	MP22260	Steel
11	Screw (FHS 5/16" - 18" x 5/8")	2	MP37137	304 SS
12	Hex Jam Nut	1	MP22655	304 SS
13	Impeller	1	MP22293	Cast Iron
14	Drive Sleeve	1	MP22286	303 SS
15	See table for seal options			
16	O-Ring (AS-568-158)	1	MP34555	Viton

Item	Description (size)	Qty	Part No.	Mtl
17	Gasket	1	MP22255	Lexide Ni-2085
18	Adapter	1	MP22247	Cast Iron
19	Cap Screw (5/16" - 18" x 3/4" Patch)	6	MP24965	304 SS
20	Cap Screw SS (HH 5/16" - 24" x 0.88")	4	MP21278	304 SS
21	Clamp Assembly	1	MP23002	304 SS
22	Pedestal Assembly	1	MP26289	Cast Iron
23	Clutch Bracket (Right)	1	MP24434	Cold Rolled Steel
24	Clutch Bracket (Left)	1	MP24433	Cold Rolled Steel
25	Yoke	2	MP24430	Zinc Plated Steel
26	Clutch (A-B Belt)	1	MP28905	Steel
27	Lockwasher (1/4")	3	MP33564	304 SS
28	Hexnut (1/4" - 20")	3	MP21241	304 SS
29	Screw (1/4" - 20" x 3/4")	3	MP21247	304 SS
30	Handle	1	MP24431	Zinc Plated Steel

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP22273	21	1"	Ceramic	Carbon	Viton	316 SS

PARTS LIST / FLOMAX 8 PEDESTAL ENGINE MOUNT

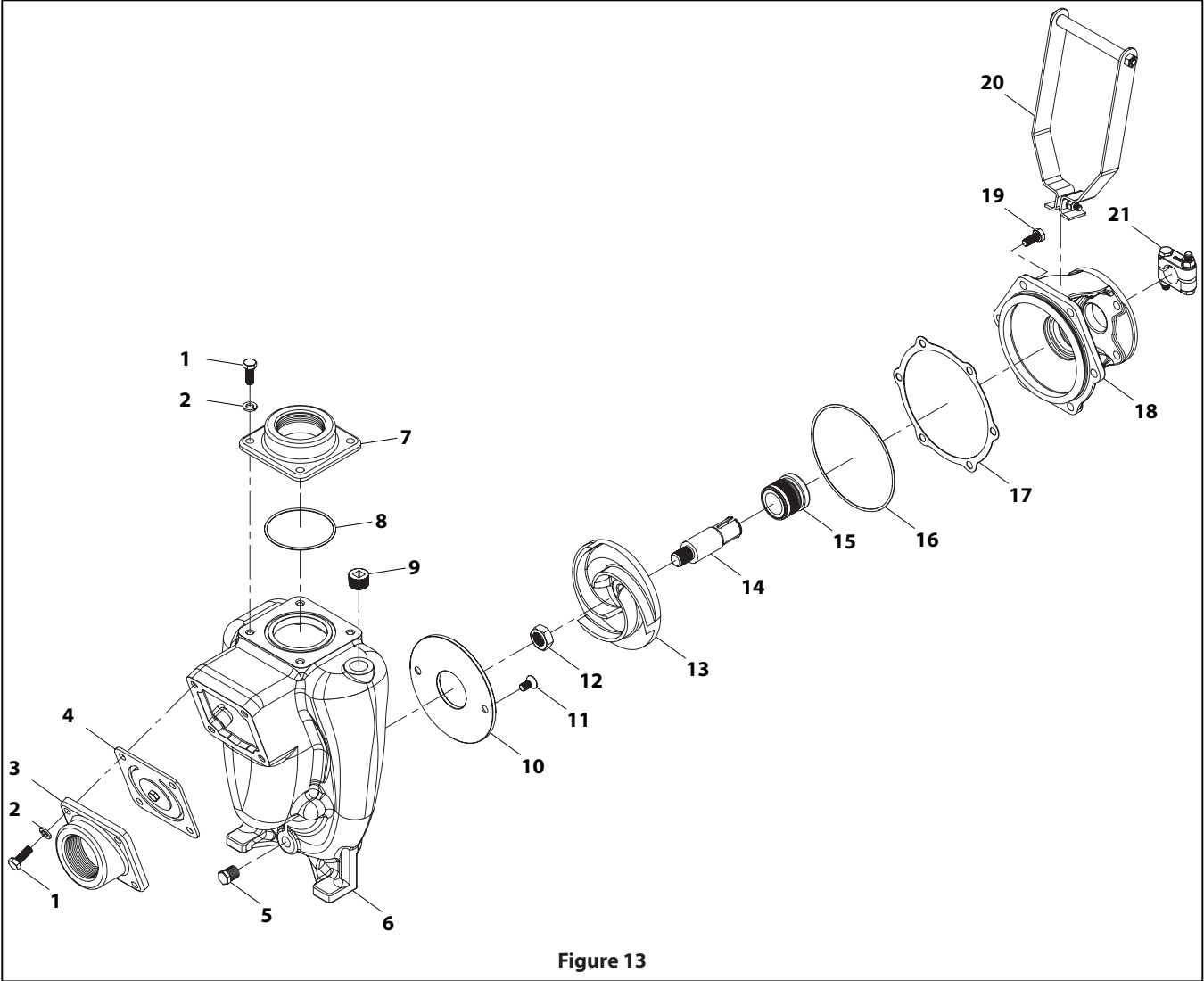


Figure 13

PARTS LIST / FLOMAX 8 PEDESTAL ENGINE MOUNT

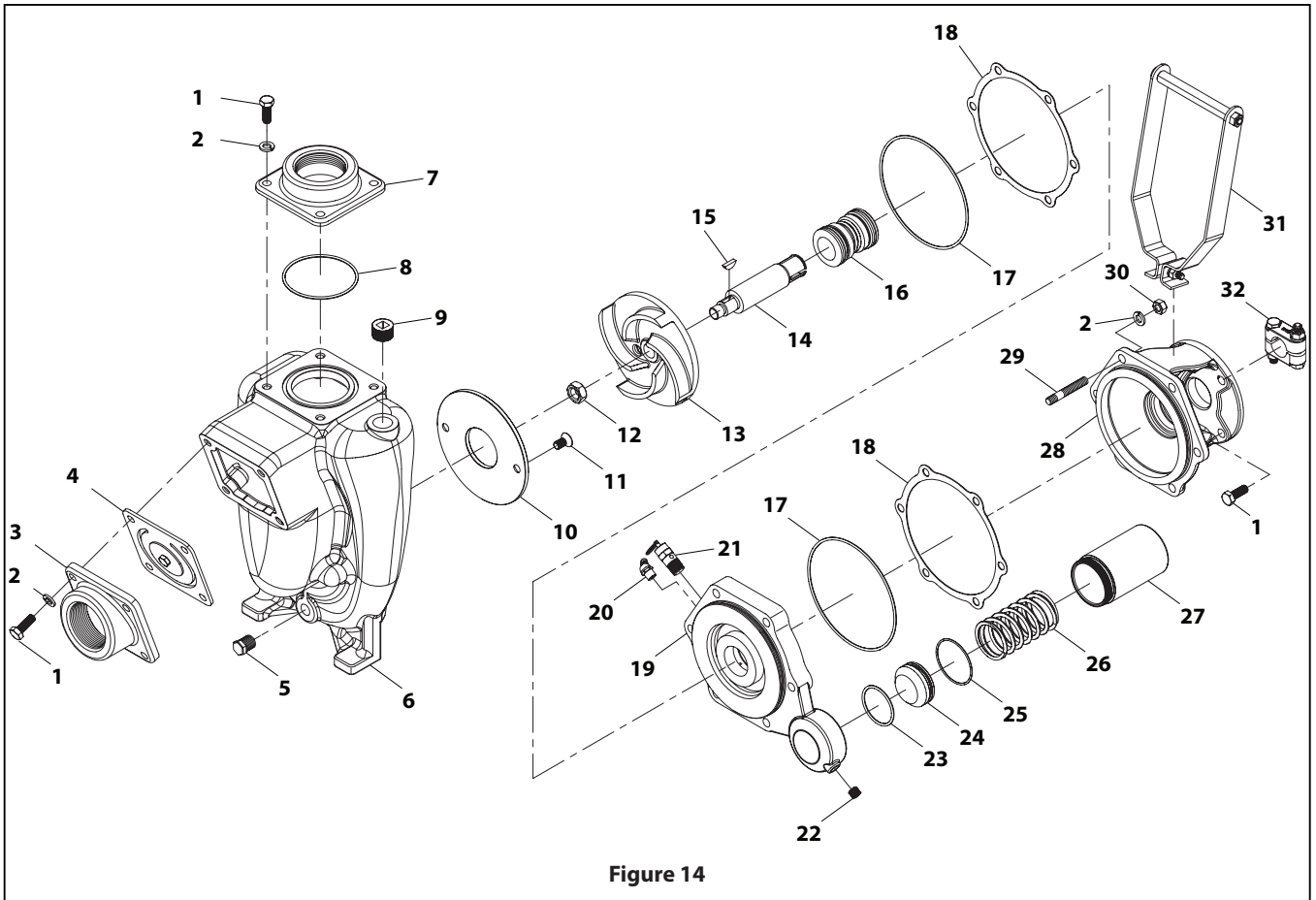
Item	Description (size)	Qty	Part No.	Mtl
1	Cap Screw (HH 5/16" - 18" x 7/8")	8	MP21242	304 SS
2	Lockwasher (5/16" x 18")	8	MP21238	304 SS
3	Suction Flange	1	MP22387	Cast Iron
4	Flapper Assembly	1	MP23022	Buna
5	Pipe Plug (1/4" NPT)	1	MP41475	Steel
6	Housing	1	MP22251	Cast Iron
7	Flange	1	MP22311	Cast Iron
8	O-Ring (AS-149)	1	MP37141	Viton
	O-Ring (AS-149)	1	MP37142	Epdm
9	Pipe Plug (1/2" NPT)	1	MP37140	Zinc Plated Steel
10	Wear Plate	1	MP22260	Steel
	Wear Plate	1	MP22259	Brass
	Wear Plate	1	MP27978	316 SS
11	Screw (FHS 5/16" - 18" x 5/8")	2	MP37137	304 SS
12	Hex Jam Nut	1	MP22655	304 SS

Item	Description (size)	Qty	Part No.	Mtl
13	Impeller (5.0")	1	MP22293	Cast Iron
	Impeller (5.0")	1	MP22292	Federalloy I-836
	Impeller (5.0")	1	MP22294	CF8M
	Impeller (5.0") (5BL)	1	MP36408	Cast Iron
14	Drive Sleeve (3/4")	1	MP22286	303 SS
	Drive Sleeve (5/8")	1	MP22253	303 SS
15	See table for seal options			
16	O-Ring (AS-568-158)	1	MP34555	Viton
	O-Ring (AS-568-158)	1	MP36911	EPDM
17	Gasket	1	MP22255	Lexide Ni-2085
18	Adapter	1	MP22247	Cast Iron
19	Cap Screw (5/16"-18" x 3/4" Patch)	6	MP24965	304 SS
20	Handle Kit	1	MP39768	Zinc Plated Steel
21	Clamp Assembly	1	MP23002	304 SS

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP22273	21	1"	Ceramic	Carbon	Viton	316 SS

PARTS LIST / FLOMAX 8 PEDESTAL ENGINE MOUNT (DOUBLE SEAL)



PARTS LIST / FLOMAX 8 PEDESTAL ENGINE MOUNT (DOUBLE SEAL)

Item	Description (size)	Qty	Part No.	Mtl
1	Cap Screw (HH 5/16" - 18" x 7/8")	12	MP21242	304 SS
2	Lockwasher (5/16" x 18")	16	MP21238	304 SS
3	Suction Flange	1	MP22387	Cast Iron
4	Flapper Assembly	1	MP23022	Buna
5	Pipe Plug (1/4" NPT)	1	MP41475	Steel
6	Housing	1	MP22251	Cast Iron
7	Flange	1	MP22311	Cast Iron
8	O-Ring	1	MP39183	Buna
9	Pipe Plug (1/2" NPT)	1	MP37140	Zinc Plated Steel
10	Wear Plate	1	MP22260	Steel
	Wear Plate	1	MP50403	FNC
11	Screw (FHS 5/16" - 18" x 5/8")	2	MP37137	304 SS
12	Hex Jam Nut (1/2" - 20")	1	MP22621	304 SS
13	Impeller (4.84")	1	MP28512	Cast Iron
	Impeller (4.84")	1	MP50171	FNC
14	Drive SI (SS 3/4 FLO S SDS)	1	MP33205	316 SS
15	Woodruff Key (5/8" x 5/32")	1	MP21163	304 SS
16	See Table for seal options			

Item	Description (size)	Qty	Part No.	Mtl
17	O-Ring	2	MP36910	Buna
18	Gasket	2	MP22255	Lexide Ni-2085
19	Adapter	1	MP38357	Cast Iron
20	Zerk Fitting (1/8" NPT)	1	MP22208	Zinc Plated Steel
21	Relief Valve (1/4" NPT)	1	MP31733	Brass
22	Pipe Plug (1/8" NPT)	1	MP30824	Steel
23	O-Ring (AS-586-129)	1	MP38362	Viton
24	Piston	1	MP38360	Aluminum T-3 2011
25	O-Ring (AS-586-032)	1	MP38363	Viton
26	Spring	1	MP38358	Music Wire
27	Reservoir	1	MP38361	Aluminum T-3 2011
28	Adapter	1	MP22247	Cast Iron
29	Stud (5/16" - 18" x 2.13")	6	MP33201	303 SS
30	Hexnut (5/16" - 18" x 1/2")	9	MP21284	304 SS
31	Handle Kit	1	MP39768	Zinc Plated Steel
32	Clamp Assembly	1	MP23002	303 SS

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP33176	31	1"	Silicon Carbide	Silicon Carbide	Viton	18-8 SS

PARTS LIST / FLOMAX 8 HYDRAULIC (0.45)

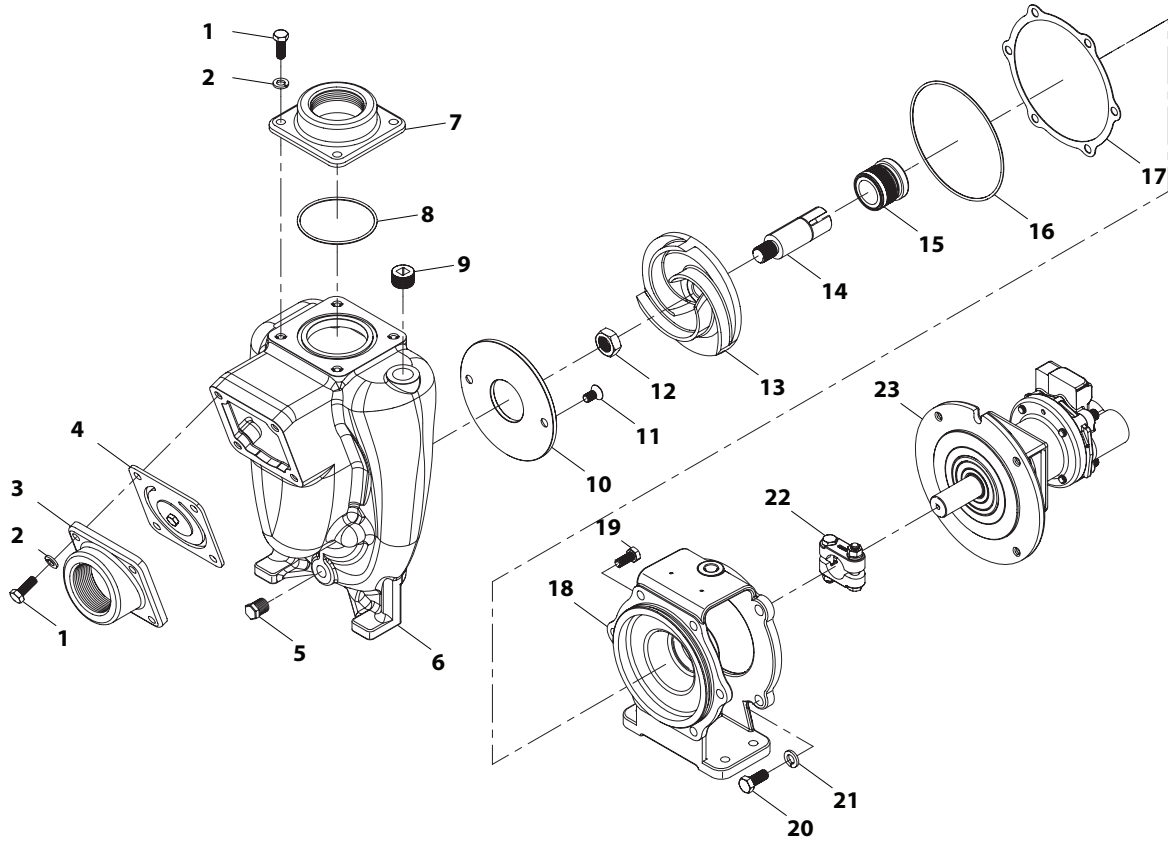


Figure 15

PARTS LIST / FLOMAX 8 HYDRAULIC (0.45)

Item	Description (size)	Qty	Part No.	Mtl
1	Cap Screw (HH 5/16" - 18" x 7/8")	8	MP21242	304 SS
2	Lockwasher (5/16" x 18")	10	MP21238	304 SS
3	Suction Flange (1.5" NPT)	1	MP22263	Cast Iron
4	Flapper Assembly	1	MP23022	Buna
5	Pipe Plug (1/4" NPT)	1	MP41475	Steel
6	Housing	1	MP22251	Cast Iron
7	Discharge Flange (1.5" NPT)	1	MP22266	Cast Iron
8	O-Ring (AS-149)	1	MP37141	Viton
9	Pipe Plug (1/2" NPT)	1	MP37140	Zinc Plated Steel
10	Wear Plate	1	MP22260	Steel
11	Screw FHS (5/16" - 18" x 5/8")	2	MP37137	304 SS

Item	Description (size)	Qty	Part No.	Mtl
12	Hex Jam Nut	1	MP22655	304 SS
13	Impeller (5.0")	1	MP22293	Cast Iron
14	Drive Sleeve (3/4")	1	MP22286	303 SS
15	See Table for seal			
16	O-Ring (AS-568-158)	1	MP34555	Viton
17	Gasket	1	MP22255	Lexide Ni-2085
18	Adapter	1	MP22247	Cast Iron
19	Cap Screw (5/16" - 18" x 3/4" Patch)	6	MP24965	304 SS
20	Cap Screw (SS HH 5/16" - 24" x 0.88")	4	MP21278	304 SS
21	Lockwasher (3/8" x 1/8")	4	MP21266	304 SS
22	Pedestal Assembly	1	MP36041	Cast Iron

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP22273	21	1"	Ceramic	Carbon	Viton	316 SS

PARTS LIST / FLOMAX 8 HYDRAULIC (0.37, 0.45 and 0.58) (DOUBLE SEAL)

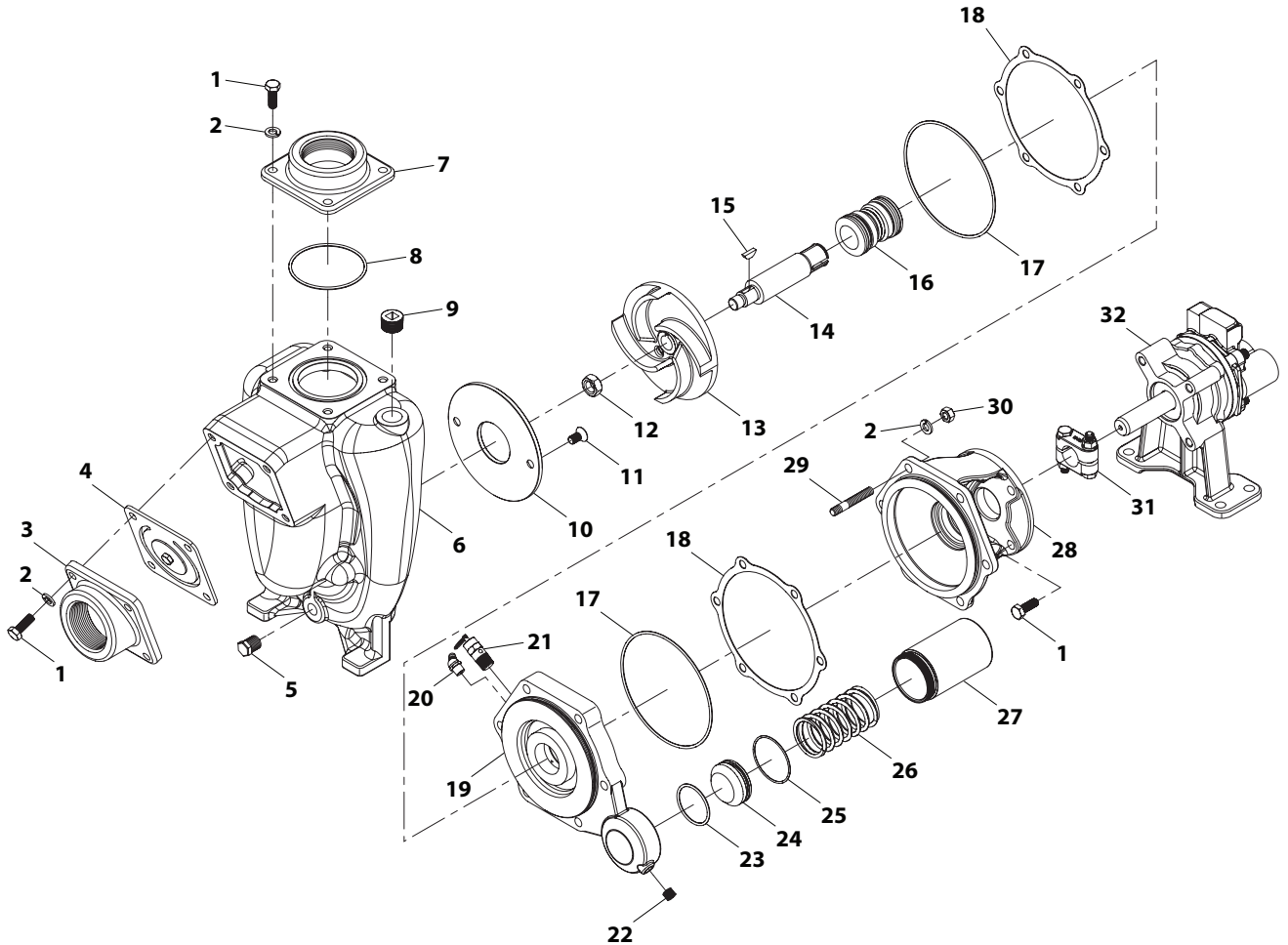


Figure 16

PARTS LIST / FLOMAX 8 HYDRAULIC (0.37, 0.45 and 0.58) (DOUBLE SEAL)

Item	Description (size)	Qty	Part No.	Mtl
1	Cap Screw (HH 5/16" - 18" x 7/8")	8	MP21242	304 SS
2	Lockwasher (5/16" x 18")	16	MP21238	304 SS
3	Suction Flange	1	MP22387	Cast Iron
4	Flapper Assembly	1	MP23022	Buna
5	Pipe Plug (1/4" NPT)	1	MP41475	Steel
6	Housing	1	MP22251	Cast Iron
7	Flange	1	MP22311	Cast Iron
8	O-Ring (AS-149)	1	MP37141	Viton
9	Pipe Plug (1/2" NPT)	1	MP37140	Zinc Plated Steel
10	Wear Plate	1	MP22260	Steel
11	Screw (FHS 5/16" - 18" x 5/8")	2	MP37137	304 SS
12	Hex Jam Nut (1/2" - 20")	1	MP22621	304 SS
13	Impeller	1	MP28512	Cast Iron
14	Drive SI (SS 3/4" FLO S SDS)	1	MP33205	316 SS
15	Woodruff Key (5/8" x 5/32")	1	MP21163	304 SS
16	See Table for seal options			
17	O-Ring (AS-568-158)	2	MP34555	Viton

Item	Description (size)	Qty	Part No.	Mtl
18	Gasket	2	MP22255	Lexide Ni-2085
19	Adapter	1	MP38357	Cast Iron
20	Zerk Fitting (1/8" NPT)	1	MP22208	Zinc Plated Steel
21	Relief Valve (1/4" NPT)	1	MP31733	Brass
22	Pipe Plug (1/8" NPT)	1	MP30824	Steel
23	O-Ring (AS-586-129)	1	MP38362	Viton
24	Piston	1	MP38360	Aluminum T-3 2011
25	O-Ring (AS-586-032)	1	MP38363	Viton
26	Spring	1	MP38358	Music Wire
27	Reservoir	1	MP38361	Aluminum T-3 2011
28	Adapter	1	MP22247	Cast Iron
29	Stud (5/16" - 18" x 2.13")	6	MP33201	303 SS
30	Hexnut (5/16"-18" x 1/2")	8	MP21284	304 SS
31	O-Ring (AS-586-032)	1	MP38363	Viton
32	Pedestal Assembly (0.37)	1	MP36447	Cast Iron
	Pedestal Assembly (0.45)	1	MP35996	Cast Iron

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP33176	31	1"	Silicon Carbide	Silicon Carbide	Viton	300 SS

SERVICE KITS

PUMP MODEL	PUMP DESCRIPTION	SEAL KIT	IMPELLER KIT	BEARING KIT
MP37878	FM8PMP C:1.5-1 56C 115/230 XP 4.1	MP51310	----	----
MP26553	FM8PMP C:1.5-1 56C FA 4.1	MP51310	----	----
MP50606	FM8PMP C:1.5-1 56C FA 4.1CSI	MP51310	----	----
MP37886	FM8PMP C:1.5-3 56C 1750 4.84 T-31 DS WBA	MP51312	----	----
MP39712	FM8PMP C:1.5-3 56C 3.25 T-31 DS	MP51312	----	----
MP26552	FM8PMP C:1.5-3 56C FA 4.1	MP51310	----	----
MP37167	FM8PMP C:1.5-3 56C FA 4.62	MP51310	----	----
MP39577	FM8PMP C:1.5-3 56C FA 4.1BI BWP WBA	MP51310	----	----
MP50536	FM8PMP C:1.7 24VDC 56C 3200 FA 4.62	MP51310	----	----
MP38692	FM8PMP C:1/2-1 56C 1750 5.0 WBA	MP51310	----	----
MP33466	FM8PMP C:1/2-3 56C 1750 5.0 WBA	MP51310	----	----
MP38547	FM8PMP C:1/2-3 56C XP 1750 5.0 WBA	MP51310	----	----
MP33668	FM8PMP C:2-1 145TC MB 4.62 WBA	MP51310	----	----
MP34758	FM8PMP C:2-1 56C FA 4.1BI	MP51310	----	----
MP26555	FM8PMP C:2-1 56C FA 4.62	MP51310	----	----
MP28732	FM8PMP C:2-1 56C FA 4.62 WBA	MP51310	----	----
MP39685	FM8PMP C:2-3 145TC 1750 FA 5.0	MP51310	MP51316	----
MP38206	FM8PMP C:2-3 145TC 3.87 T-31 DS	MP51312	----	----
MP51086	FM8PMP C:2-3 145TC 3450 FA 4.1	MP51310	----	----
MP39130	FM8PMP C:2-3 145TC 3450 FA 4.62 BALDOR	MP51310	----	----
MP26478	FM8PMP C:2-3 145TC 4.62 WBA	MP51310	----	----
MP30390	FM8PMP C:2-3 145TC FA 4.7SI SSWP WBA	MP51310	----	----
MP50975	FM8PMP C:2-3 145TC FA 5.0	MP51310	MP51316	----
MP38338	FM8PMP C:2-3 56C FA 5.0 T-2100	MP51310	----	----
MP35922	FM8PMP C:2-3 56C ODP 4.62	MP51310	----	----
MP38583	FM8PMP C:3/4-3 56C 1750 5.0 WBA	MP51310	----	----
MP51237	FM8PMP C:3-1 145TC 7/8 FA 5.0	MP51310	MP51316	----
MP35783	FM8PMP C:3-1 182T 4.1 WBA	MP51310	----	MP51315
MP38305	FM8PMP C:3-1 184C XP 208-230 FA 5.0	MP51310	MP51316	----
MP50732	FM8PMP C:3-1 56C FA 4.62 WBA	MP51310	----	----
MP50119	FM8PMP C:3-1 56C FA 5.0	MP51310	----	----
MP51236	FM8PMP C:3-1 56C FA 5.0 WBA	MP51310	----	----
MP38603	FM8PMP C:3-1 56C MTO 4.1SI SSWP	MP51310	----	----
MP30935	FM8PMP C:3-1 56C MTO FA 5.0	MP51310	----	----
MP38470	FM8PMP C:3-3 145TC 3.87 T-31 DS WBA	MP51312	----	----
MP35527	FM8PMP C:3-3 145TC 4.84 T-31 DS	MP51312	----	----
MP33043	FM8PMP C:3-3 145TC 5.0 T-21 CCS WBA	----	MP51316	----
MP28714	FM8PMP C:3-3 145TC 5.0BI BWP WBA	MP51310	----	----
MP33259	FM8PMP C:3-3 145TC 5.0SI SSWP WBA	MP51310	----	----
MP35481	FM8PMP C:3-3 145TC 50HZ 2850 5.0 WBA	MP51310	MP51316	----
MP51174	FM8PMP C:3-3 145TC 575V 5.0 CCS	MP51310	MP51316	----
MP50135	FM8PMP C:3-3 145TC FA 4.4HF WBA	MP51310	----	----
MP29624	FM8PMP C:3-3 145TC FA 4.62 WBA	MP51310	----	----
MP31107	FM8PMP C:3-3 145TC FA 5.0 T-2 STC WBA	----	MP51316	----
MP34427	FM8PMP C:3-3 145TC FA 5.0 T-21 EPDM WBA	----	MP51316	----
MP25923	FM8PMP C:3-3 145TC FA 5.0 WBA	MP51310	MP51316	----
MP39428	FM8PMP C:3-3 145TC FA 5.0 WBA DIV2	MP51310	MP51316	----
MP36059	FM8PMP C:3-3 145TC WDM 4.47 T-31 DS	MP51312	----	----
MP39880	FM8PMP C:3-3 145TC XP 5.0SI WBA	MP51310	----	----
MP29030	FM8PMP C:3-3 145TC XP FA 5.0 WBA	MP51310	MP51316	----
MP22870	FM8PMP C:3-3 182T 5.0 WBA	MP51310	MP51311	MP51315
MP38183	FM8PMP C:3-3 182T 5.0SI SSWP BCF	MP51310	----	MP51315
MP50636	FM8PMP C:5-1 184C 5.0SSI	MP51310	----	----

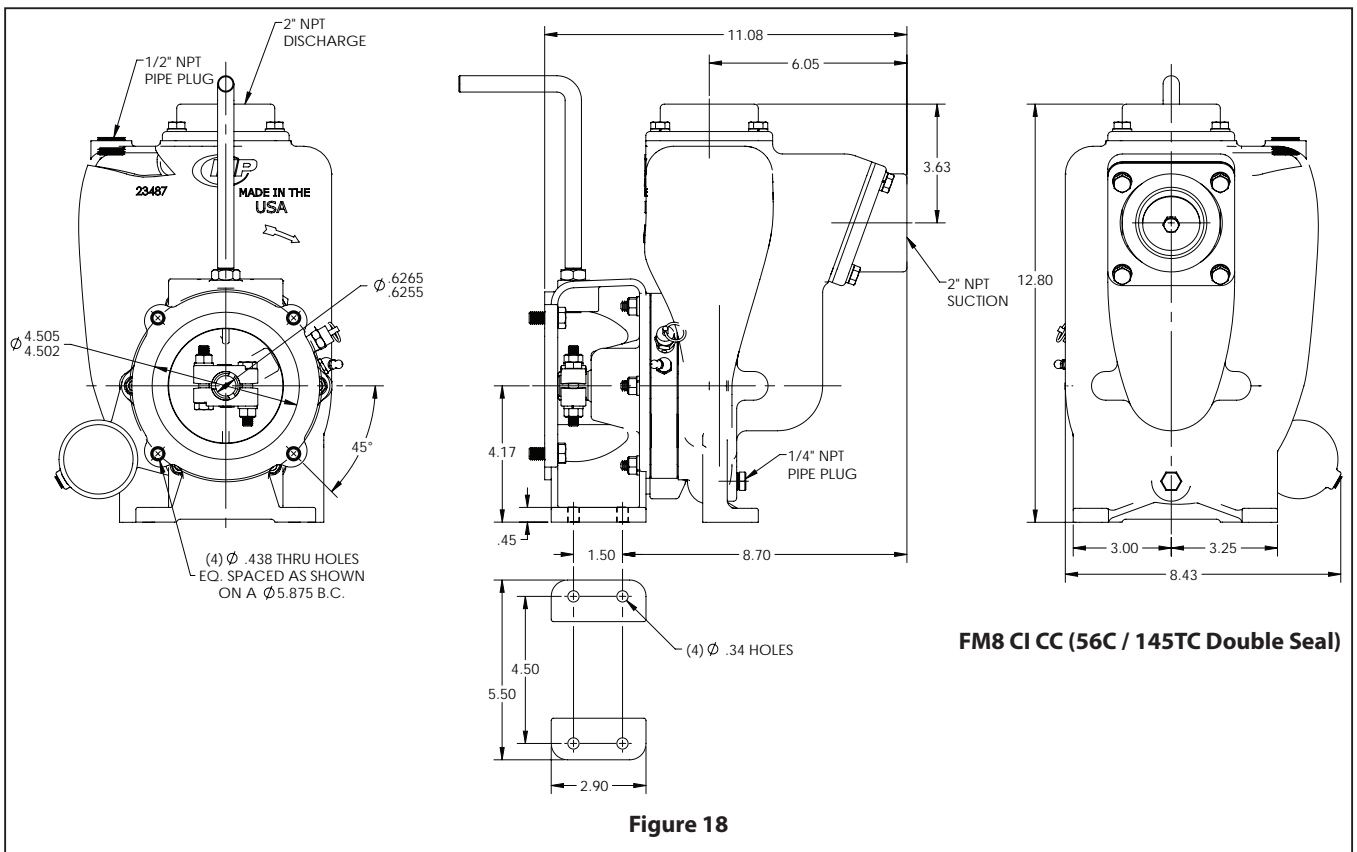
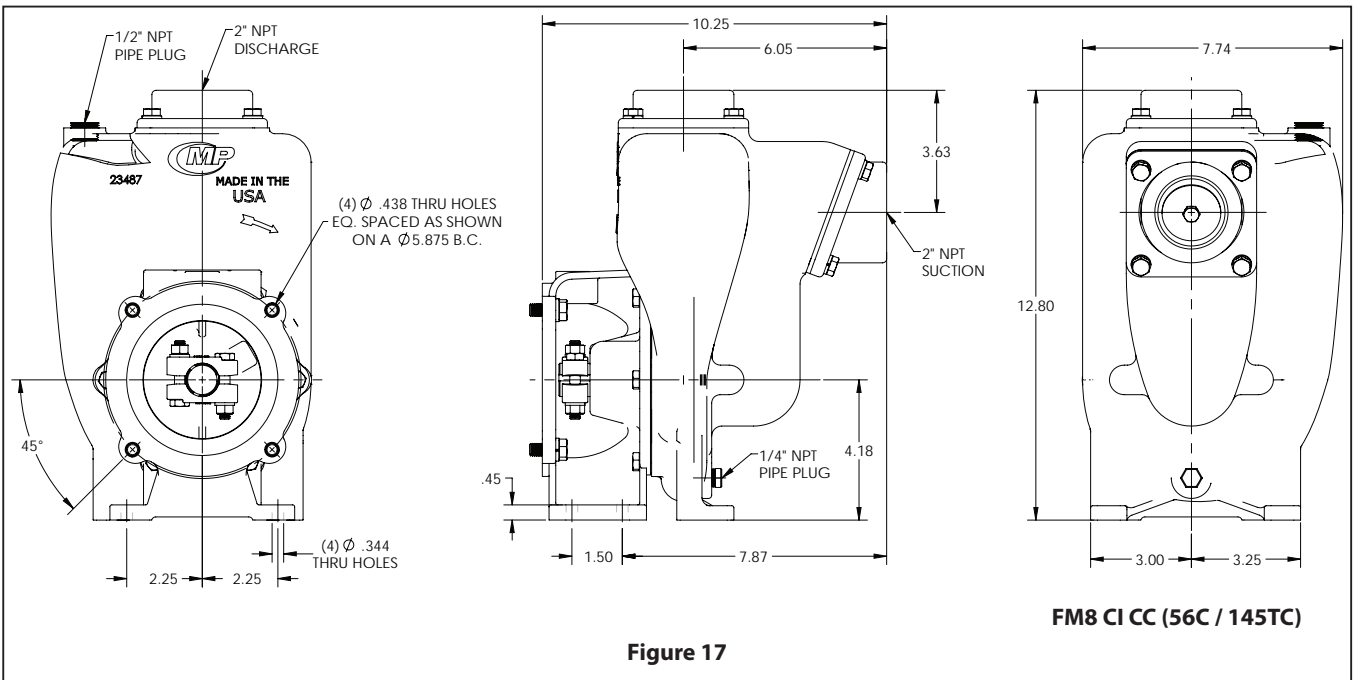
SERVICE KITS

PUMP MODEL	PUMP DESCRIPTION	SEAL KIT	IMPELLER KIT	BEARING KIT
MP22845	FM8PMP C:5-1 184T 5.0 WBA	MP51310	MP51311	MP51315
MP28446	FM8PMP C:5-3 182T XP 5.0BI WBA	MP51310	----	MP51315
MP51071	FM8PMP C:5-3 184C 4.47 T-31 DS WBA	MP51312	----	----
MP38751	FM8PMP C:5-3 184C 4.84 T-31 DS WBA	MP51312	----	----
MP35337	FM8PMP C:5-3 184C 4.84 T-31 DS SSWP WBA	MP51312	----	----
MP39241	FM8PMP C:5-3 184C FA 5.0	MP51310	MP51316	----
MP39758	FM8PMP C:5-3 184C FA 5.0 WBA	MP51310	MP51316	----
MP39556	FM8PMP C:5-3 184C FA 5.0 SBL	MP51310	----	----
MP50747	FM8PMP C:5-3 184T XP 5.0 WBA	MP51310	MP51311	MP51315
MP22849	FM8PMP C:5-3 184T 5.0 WBA	MP51310	MP51311	MP51315
MP38413	FM8PMP C:5-3 184T 5.0HF WBA	MP51310	----	MP51315
MP50746	FM8PMP C:H-5.5R 4.84 T-31 DS OIL	----	MP51313	----
MP36243	FM8PMP C:H-5.5R 4.84 T-31 DSC GREASE	MP51312	MP51313	----
MP39707	FM8PMP C:H-5.5R 5.0 CCS WBA	----	MP51311	----
MP50971	FM8PMP C:H-5.5R 5.0 NRS WBA	----	MP51311	----
MP29635	FM8PMP C:H-5.5R 5.0 WBA	MP51310	MP51311	----
MP36938	FM8PMP C:H-5.5R ES 5.0 WBA	MP51310	MP51311	----
MP50407	FM8PMP C:LF-7.0R 5.0 NRS WBA	----	MP51311	----
MP34013	FM8PMP C:PED 4.1	MP51310	----	MP51315
MP36674	FM8PMP C:PED 4.1 T-31 DS	MP51312	MP51313	MP51315
MP38404	FM8PMP C:PED 4.1CBI	MP51310	----	MP51315
MP50513	FM8PMP C:PED 4.62	----	----	MP51315
MP28128	FM8PMP C:PED 4.62BI V-GSK SUC/DIS	----	----	MP51315
MP33631	FM8PMP C:PED 4.66 EPDM T-31 DS MURRAY	----	MP51313	MP51315
MP34241	FM8PMP C:PED 4.66 EPDM T-31 DS RD MEI	----	MP51313	MP51315
MP38528	FM8PMP C:PED 4.66 SSWP DS T-31 GREASE RD	MP51312	----	MP51315
MP35503	FM8PMP C:PED 4.66 T-31 DS GREASE MURRAY	----	MP51313	MP51315
MP35105	FM8PMP C:PED 4.84	MP51310	MP51311	MP51315
MP33961	FM8PMP C:PED 4.84 T-31 DS OIL	----	MP51313	MP51315
MP38580	FM8PMP C:PED 4.84 T-31 DSC GREASE	MP51312	MP51313	MP51315
MP21339	FM8PMP C:PED 5.0	MP51310	MP51311	MP51315
MP35250	FM8PMP C:PED 5.0 AI V-GSK SUC/DIS	----	----	MP51315
MP35248	FM8PMP C:PED 5.0 BI V-GSK SUC/DIS	----	----	MP51315
MP35211	FM8PMP C:PED 5.0 BI V-GSK SUC/DIS	----	----	MP51315
MP51184	FM8PMP C:PED 5.0 BI VITON FLP	----	----	MP51315
MP33228	FM8PMP C:PED 5.0 EPDM NO FLP	----	MP51311	MP51315
MP26315	FM8PMP C:PED 5.0 EPDM-FLP	----	MP51311	MP51315
MP37983	FM8PMP C:PED 5.0 HF	MP51310	----	MP51315
MP32042	FM8PMP C:PED 5.0 T-2 STC	----	MP51311	MP51315
MP33047	FM8PMP C:PED 5.0 T-21 CCS	----	MP51311	MP51315
MP36061	FM8PMP C:PED 5.0 T-21 SSC	----	MP51311	MP51315
MP21340	FM8PMP C:PED 5.0SI	MP51310	----	MP51315
MP39073	FM8PMP C:PED 5.0SI 5BL HF	MP51310	----	MP51315
MP29126	FM8PMP C:PED 5.0SI SSWP	MP51310	----	MP51315
MP38124	FM8PMP C:PED/CL 12V4.84T-31DSN-FLG DWFNC	MP51312	MP51313	----
MP24551	FM8PMP C:PED/CL 5.0	MP51310	MP51311	MP51315
MP27170	FM8PMP C:PED/CL NO CL 5.0	MP51310	MP51311	MP51315
MP36010	FM8PMP C:PED/HYD .45 DISP 5.0	MP51310	MP51311	----
MP38447	FM8PMP C:PED/HYD .45 DISP 5.0 HF	MP51310	----	----
MP36694	FM8PMP C:PED/HYD .37 4.84 T-31 DSC	MP51312	MP51313	----
MP36588	FM8PMP C:PED/HYD .37 DISP 5.0	MP51310	MP51311	----
MP37967	FM8PMP C:PED/HYD .37 DISP 5.0 SSC	----	MP51311	----

PUMP MODEL	PUMP DESCRIPTION	SEAL KIT	IMPELLER KIT	BEARING KIT
MP36962	FM8PMP C:PED/HYD .37 DISP 5.0BI	MP51310	----	----
MP39176	FM8PMP C:PED/HYD .37 DISP 5.0BI BWP	MP51310	----	----
MP36042	FM8PMP C:PED/HYD .37 W/FC 5.0	MP51310	MP51311	----
MP50341	FM8PMP C:PED/HYD .45 4.84 T-31 DS OIL	----	MP51313	----
MP39466	FM8PMP C:PED/HYD .45 4.84 T-31 DSC	MP51312	MP51313	----
MP36475	FM8PMP C:PED/HYD .45 DISP W/FC 5.0	MP51310	MP51311	----
MP36011	FM8PMP C:PED/HYD .58 DISP 5.0	MP51310	MP51311	----
MP36477	FM8PMP C:PED/HYD .58 DISP W/FC 5.0	MP51310	MP51311	----
MP36592	FM8PMP C:PED/HYD HS .37 DISP FA 5.0	MP51310	MP51316	----
MP39777	FM8PMP C:PED/HYD HS .37 DISP FA 5.0SI	MP51310	----	----
MP36474	FM8PMP C:PED/HYD HS .37 DISP W/FC FA 5.0	MP51310	MP51316	----
MP36008	FM8PMP C:PED/HYD HS .45 DISP FA 5.0	MP51310	MP51316	----
MP36017	FM8PMP C:PED/HYD HS .58 DISP FA 5.0	MP51310	MP51316	----
MP39239	FM8PMP D:3-3 145TC XP 5.0 T-2 CSC EP	----	MP51316	----
MP28090	FM8PPK C:CCMTR 5/8 FA 4.1	MP51310	----	----
MP29416	FM8PPK C:CCMTR 5/8 FA 4.1BI	MP51310	----	----
MP35237	FM8PPK C:CCMTR 5/8 FA 4.1BI BWP	MP51310	----	----
MP31982	FM8PPK C:CCMTR 5/8 FA 4.1SI SSWP	MP51310	----	----
MP28181	FM8PPK C:CCMTR 5/8 FA 4.62	MP51310	----	----
MP37062	FM8PPK C:CCMTR 5/8 FA 4.84 T-31 DS GR	MP51312	----	----
MP38506	FM8PPK C:CCMTR 5/8 FA 4.84 T-31 DSC GR	MP51312	----	----
MP26079	FM8PPK C:CCMTR 5/8 FA 5.0	MP51310	----	----
MP31064	FM8PPK C:CCMTR 5/8 FA 5.0BI BWP	MP51310	----	----
MP34028	FM8PPK C:CCMTR 5/8 FA 5.0SI SSWP	MP51310	----	----
MP51085	FM8PPK C:CCMTR 7/8 FA 4.1	MP51310	----	----
MP38421	FM8PPK C:CCMTR 7/8 FA 4.1BI	MP51310	----	----
MP36050	FM8PPK C:CCMTR 7/8 FA 4.1BI BWP	MP51310	----	----
MP27677	FM8PPK C:CCMTR 7/8 FA 4.62	MP51310	----	----
MP50290	FM8PPK C:CCMTR 7/8 FA 4.62SI	MP51310	----	----
MP38127	FM8PPK C:CCMTR 7/8 FA 4.63BI BWP	MP51310	----	----
MP36545	FM8PPK C:CCMTR 7/8 FA 4.7SI SSWP	MP51310	----	----
MP33202	FM8PPK C:CCMTR 7/8 FA 4.84 T-31 DSC GR	MP51312	----	----
MP38507	FM8PPK C:CCMTR 7/8 FA 4.84 T-31 DSC GR	MP51312	----	----
MP25922	FM8PPK C:CCMTR 7/8 FA 5.0	MP51310	MP51316	----
MP28483	FM8PPK C:CCMTR 7/8 FA 5.0 T-2 STC	----	MP51316	----
MP30921	FM8PPK C:CCMTR 7/8 FA 5.0 T-21 NRS	----	MP51316	----
MP35463	FM8PPK C:CCMTR 7/8 FA 5.0 V-FLP	----	MP51316	----
MP25951	FM8PPK C:CCMTR 7/8 FA 5.0BI	MP51310	----	----
MP30277	FM8PPK C:CCMTR 7/8 FA 5.0BI BWP	MP51310	----	----
MP38608	FM8PPK C:CCMTR 7/8 FA 5.0HF	MP51310	----	----
MP39526	FM8PPK C:CCMTR 7/8 FA 5.0SI	MP51310	----	----
MP29348	FM8PPK C:CCMTR 7/8 FA 5.0SI SSADP SSWP	MP51310	----	----
MP33422	FM8PPK C:CCMTR 7/8 FA 5.0SI SSWP	MP51310	----	----
MP39520	FM8PPK C:CCMTR 7/8 FA EPDM-FLP T-21NI	----	MP51316	----
MP34269	FM8PPK C:PEM 3/4 4.84 T-31 DS OIL	----	MP51313	----
MP33203	FM8PPK C:PEM 3/4 4.84 T-31 DSC GREASE	MP51312	MP51313	----
MP38761	FM8PPK C:PEM 3/4 4.84 T-31DSCN-DFLDW	MP51312	MP51313	----
MP50432	FM8PPK C:PEM 3/4 4.84 T-31DSCN-DFLDW FNC	MP51312	MP51313	----
MP21327	FM8PPK C:PEM 3/4 5.0	MP51310	MP51311	----
MP50185	FM8PPK C:PEM 3/4 5.0 EPDM	----	MP51311	----
MP36585	FM8PPK C:PEM 5.0 HF 5BL	MP51310	----	----
MP37097	FM8PPK C:PEM 5.0 HF 5BL BLACK	MP51310	----	----
MP36311	FM8PPK C:PEM 5.0 T-21 CCS	----	MP51311	----
MP34291	FM8PPK C:PEM 5.0 T-21 NRS	----	MP51311	----

PUMP MODEL	PUMP DESCRIPTION	SEAL KIT	IMPELLER KIT	BEARING KIT
MP39955	FM8PPK C:PEM 5.0 T-21 NRS V-FLP	----	MP51311	----
MP37198	FM8PPK C:PEM 5.0 V-FLG 37200	MP51310	MP51311	----
MP21332	FM8PPK C:PEM 5.0 WBA	MP51310	MP51311	----
MP21328	FM8PPK C:PEM 5.0BI	MP51310	----	----
MP28415	FM8PPK C:PEM 5.0BI BRWP WBA	MP51310	----	----
MP39155	FM8PPK C:PEM 5.0HF 5BL BSP	MP51310	----	----
MP29318	FM8PPK C:PEM 5.0SI SSWP WBA	MP51310	----	----
MP37056	FM8PPK C:PEM 5/8 SL 5.0	MP51310	----	----

DIMENSIONAL DATA



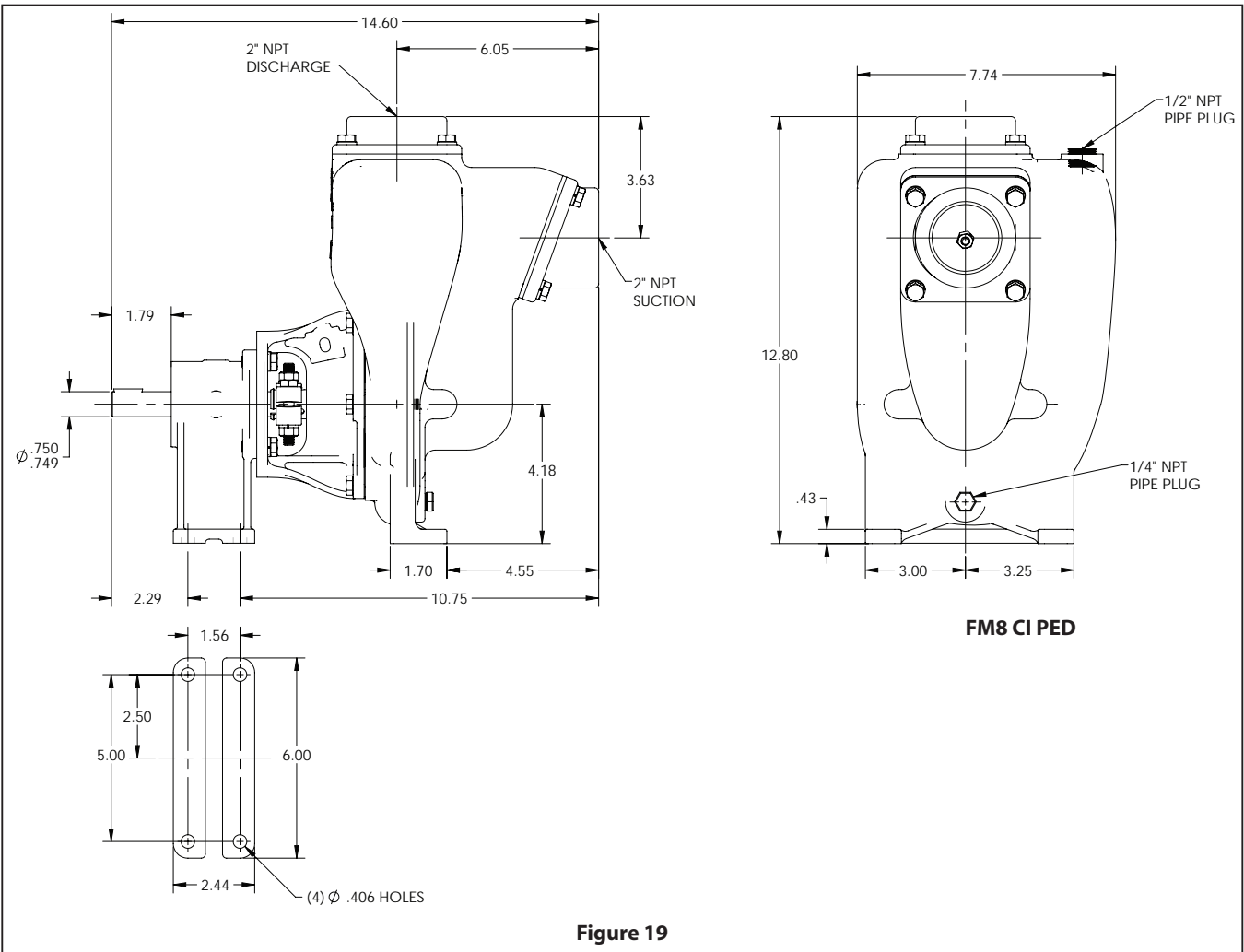


Figure 19

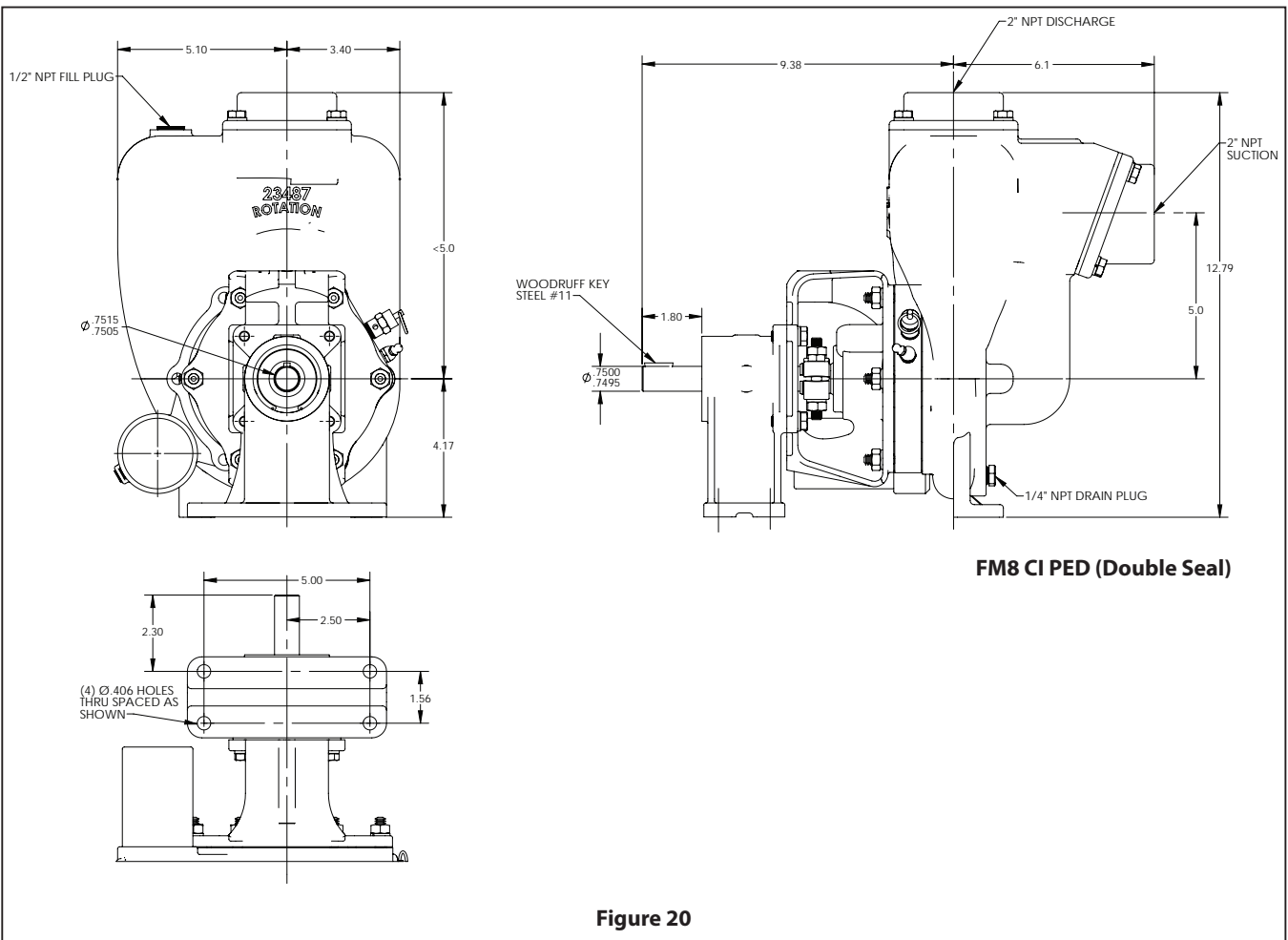
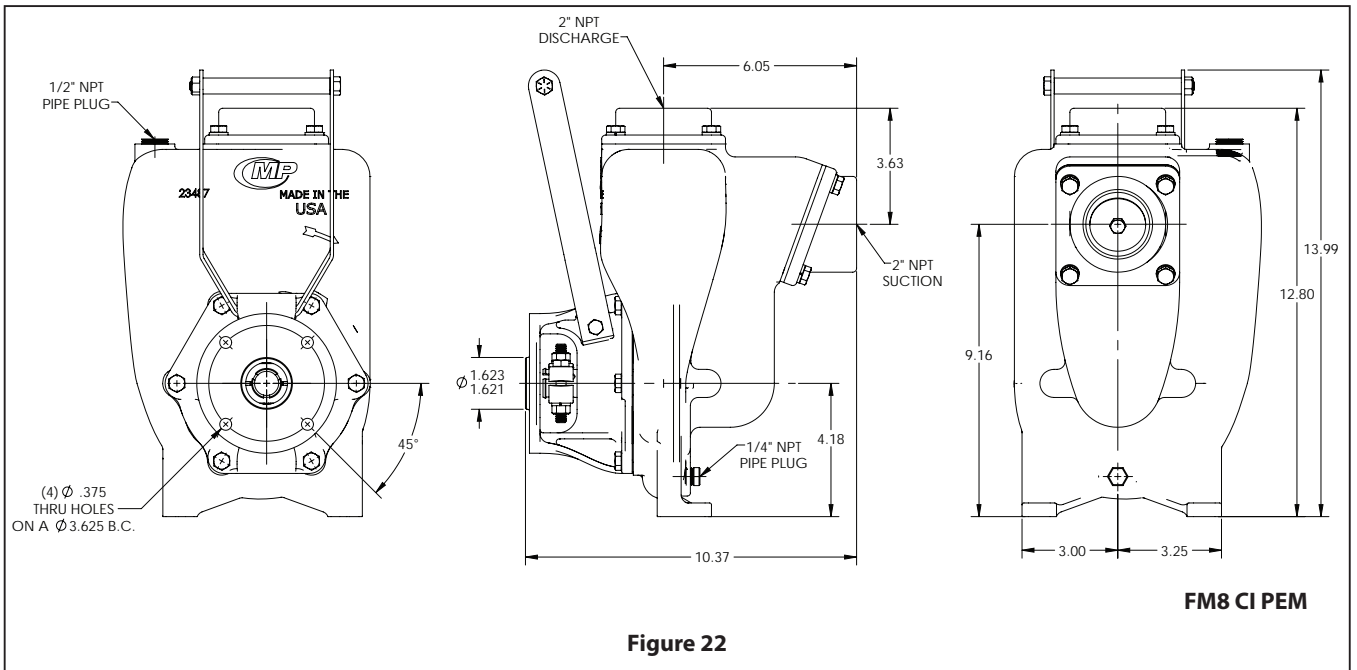
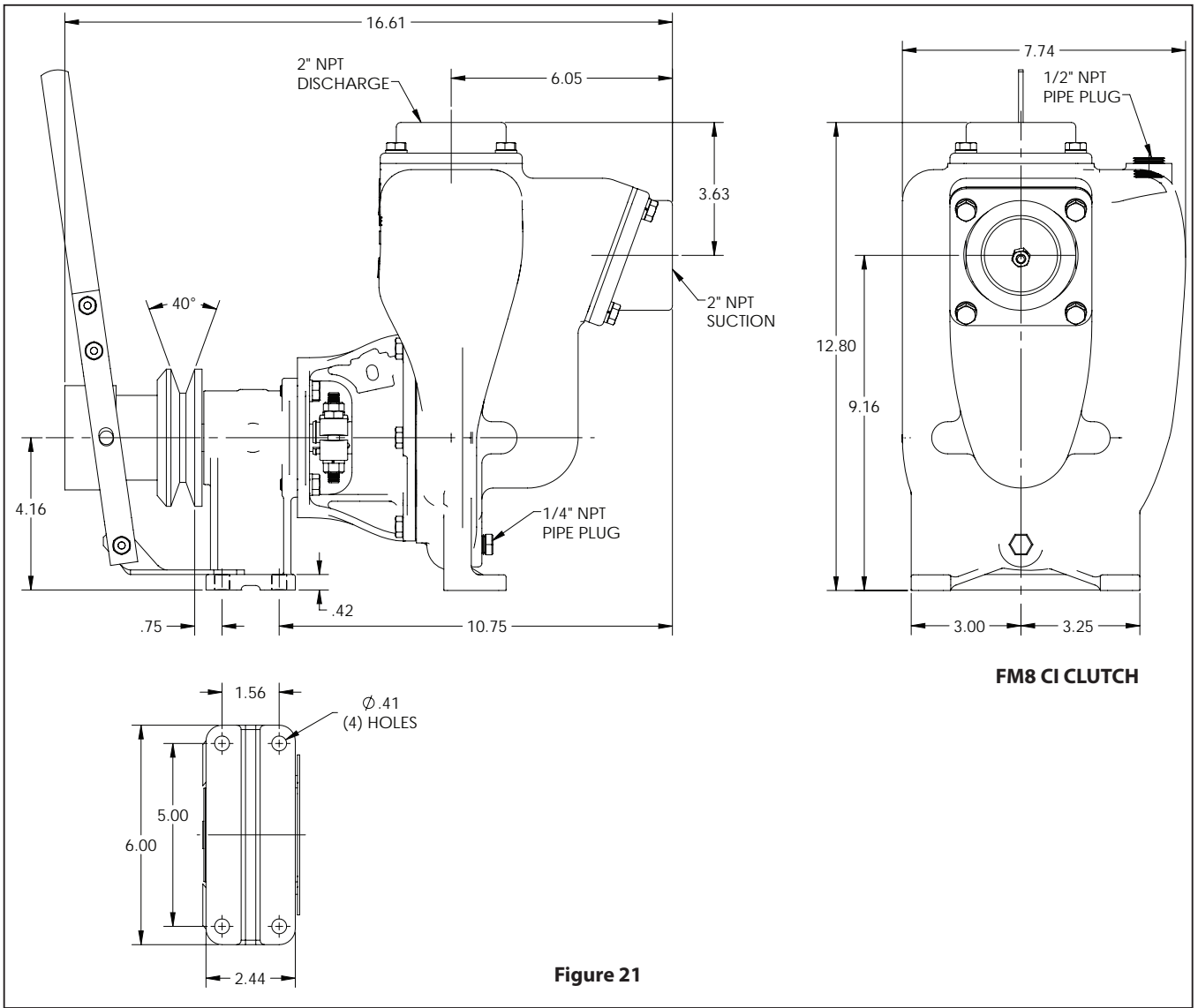
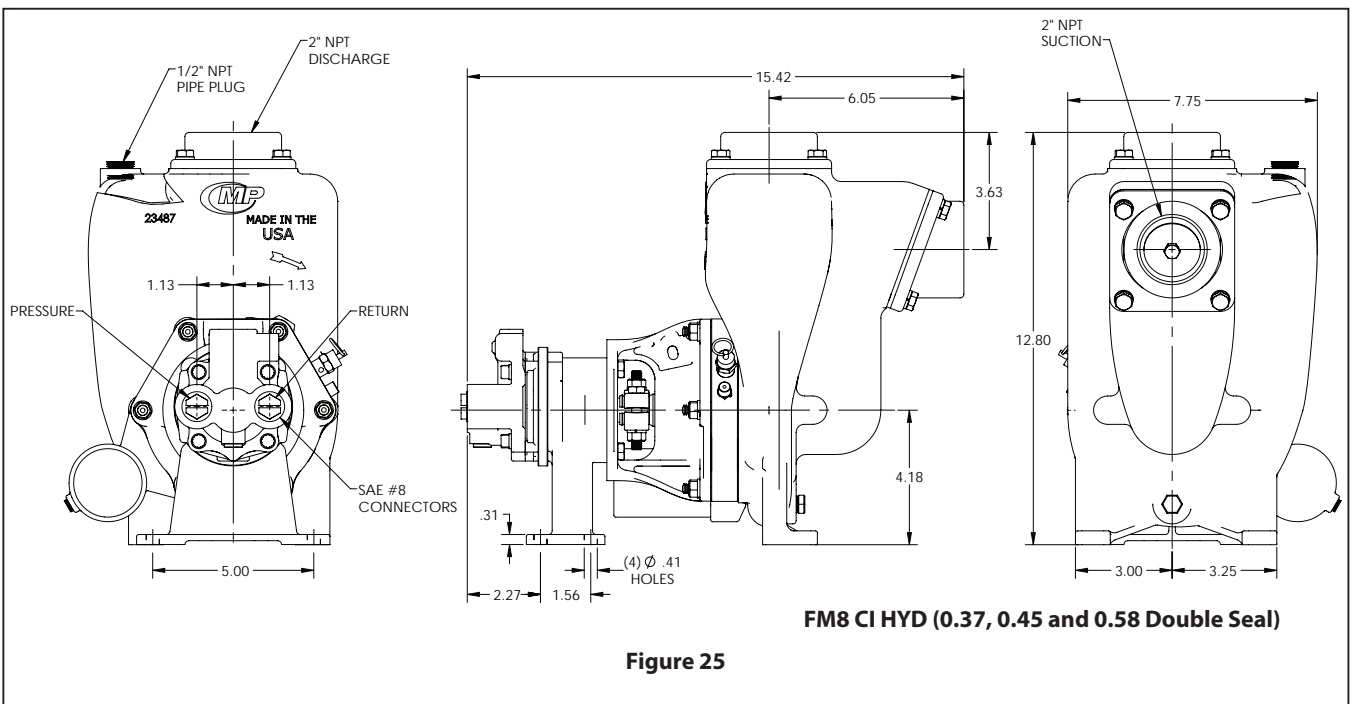
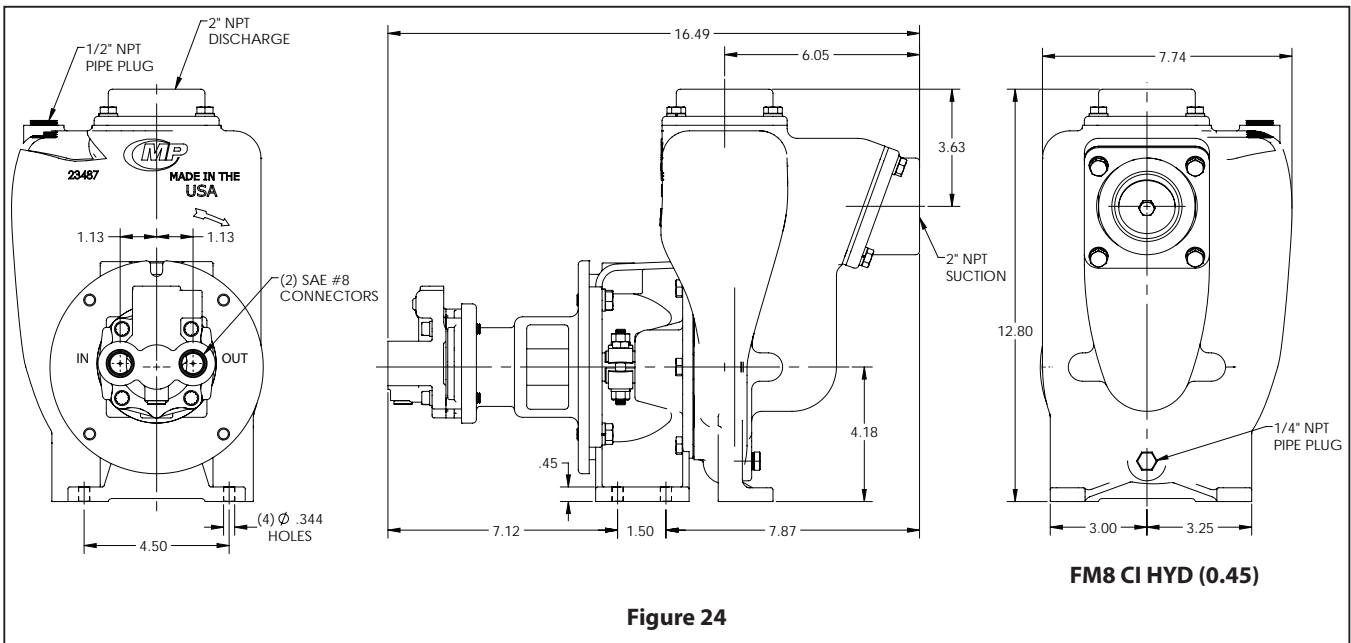
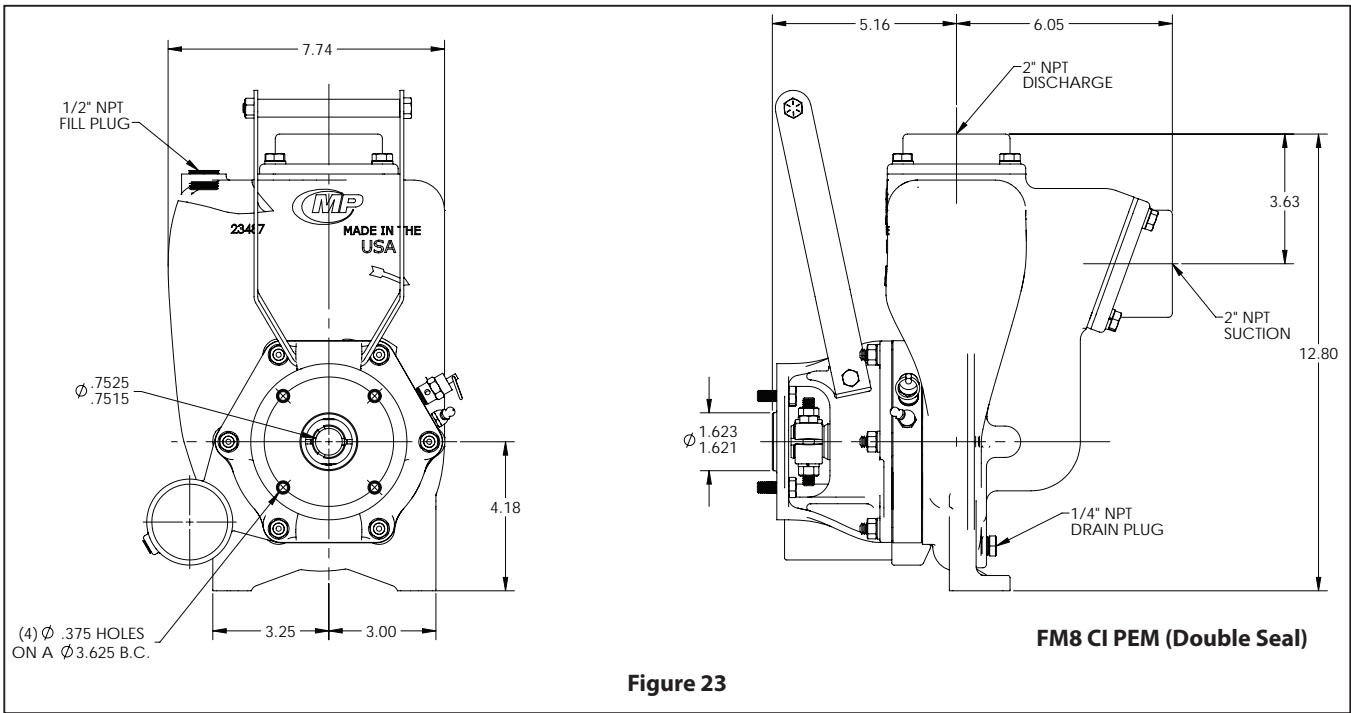


Figure 20





TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	REMEDY
No liquid delivered.	1. Pump not primed.	1. Reprime pump, check that pump and there are no obstructions in the suction line.
	2. Discharge valve closed	2. Check discharge valve.
	3. Suction line clogged.	3. Remove obstructions.
	4. Wrong direction of rotation.	4. Change rotation to concur with direction indicated on bearing housing or pump casing.
	5. Total head is too high	5. Re-evaluate head conditions.
	6. Driver is not operating at rated speed.	6. Check electric motor voltage; check engine rpm
	7. Pump is vapor bound	7. Provide additional pressure on liquid being pumped by elevating liquid source.
	8. Foot valve or suction pipe opening not submerged enough	8. Consult factory for proper depth. Use baffle to eliminate vortices.
Pump not producing rated flow or head.	1. Air leak through gasket.	1. Replace gasket.
	2. Air leak through stuffing box.	2. Replace or adjust packing/mechanical seal.
	3. Impeller partly clogged.	3. Back flush pump to clean impeller.
	4. Worn suction side plate or wear rings.	4. Replace defective parts as required.
	5. Pump is not properly primed.	5. Reprime pump, check that pump and there are no obstructions in the suction line. Check NPSHa to ensure that there is enough liquid for pump operation.
	6. Driver is not operating at rated speed.	6. Check electric motor voltage; check engine rpm
	7. Pump is vapor bound	7. Provide additional pressure on liquid being pumped by elevating liquid source. or consider installing an air release valve in the discharge line to remove the air to allow the pump to become dynamic.
	8. Insufficient suction head.	8. Ensure that suction line shutoff valve is fully open and line is unobstructed.
	9. Worn or broken impeller.	9. Inspect and replace if necessary.
Pump starts then stops pumping.	1. Excessive air in liquid.	1. Clean and tighten all suction connections; relocate suction inlet in liquid source.
	2. Defective packing or seal.	2. Replace packing or seal.
	3. Pump is vapor bound.	3. Provide additional pressure on liquid being pumped by elevating liquid source. or consider installing an air release valve in the discharge line to remove the air to allow the pump to become dynamic.
	4. Air or vapor pockets in suction line.	4. Rearrange piping to eliminate air pockets.
	5. Air leak in suction line.	5. Repair leak.
Bearings run hot.	1. Improper alignment.	1. Re-align pump and drive.
	2. Improper lubrication.	2. Check lubricate for suitability and level.
	3. Lube cooling.	3. Check cooling system

PROBLEM	PROBABLE CAUSE	REMEDY
Pump is noisy or vibrates.	1. Improper pump/driver alignment.	1. Align shafts.
	2. Partly clogged impeller causing imbalance.	2. Back-flush pump to clean impeller.
	3. Broken or bent impeller or shaft.	3. Replace as required.
	4. Foundation not rigid.	4. Tighten bolts of pump and motor or adjust stilts
	5. Worn bearings.	5. Replace.
	6. Suction or discharge piping not anchored or properly supported.	6. Anchor per Hydraulic Institute Standards Manual recommendation.
	7. Pump is cavitating.	7. Check NPSHa, Air leaks to ensure that there is enough liquid for pump operation.
Excessive leakage from stuffing box/seal chamber.	1. Worn mechanical seals.	1. Replace worn parts.
	2. Overheating mechanical seal.	2. Check lubrication and cooling lines.
	3. Shaft sleeve scored.	3. Remachine or replace as required
Motor requires excessive power.	1. Head lower than rating; pumps too much liquid.	1. Consult factory. Install throttle valve, trim impeller diameter.
	2. Speed is too high.	2. Electric motor wiring is wrong. Replace motor.
	3. Wrong direction of rotation.	3. Check wiring diagram.
	4. Impeller is clogged.	4. Back flush pump to clean impeller.
	5. Impeller is binding.	5. Relieve strain on casing; adjust impeller clearance.
	6. Driver and pump are misaligned.	6. Realign driver with pump.
	7. Power frame shaft is bent.	7. Replace shaft.
	8. Worn suction side plate or wear rings.	8. Replace defective parts as required.
	9. Liquid heavier than expected.	9. Check specific gravity and viscosity.
	10. Stuffing box too tight.	10. Readjust packing. Replace if worn.
	11. Rotating parts bind.	11. Check internal wearing parts for proper clearances
Pump fails to prime or loses its prime.	1. Air leaks in suction line.	1. Clean and tighten all suction connections; relocate suction inlet in liquid source.
	2. Suction strainer is clogged. Suction lift is too high.	2. Clean debris from strainer. Re-evaluate pump requirements and correct suction conditions.
	3. Defective priming valve.	3. Replace valve.
	4. Defective seal.	4. Replace seal.
Insufficient pressure.	1. Excessive air in liquid.	1. Clean and tighten all suction connections; relocate suction inlet in liquid source.
	2. Driver is not operating at rated speed.	2. Check electric motor voltage; check engine rpm
	3. Wrong direction of rotation.	3. Change rotation to concur with direction indicated on bearing housing or pump casing.
	4. Total head is too high.	4. Re-evaluate head conditions.
	5. Worn suction side plate or wear rings.	5. Replace defective parts as required.
	6. Broken or bent impeller or shaft.	6. Replace as required.
	7. Air leak through gasket.	7. Replace gasket.
	8. Liquid is vaporizing	8. Provide additional pressure on liquid being pumped by elevating liquid source. Check temperature of liquid being pumped'