

OPERATOR'S MANUAL

HOT WATER PUMP

INCLUDING: OPERATION, INSTALLATION AND MAINTENANCE

RELEASED: 4-1-22
(REV: A)

HTW® 80
(1-1/2" x 1-1/4")

HTW® 120
(2" x 1-1/2")

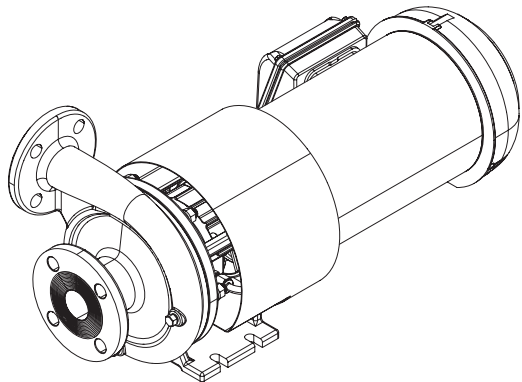
HTW® 180
(3" x 1-1/2")

HTW® 300
(3" x 2-1/2")

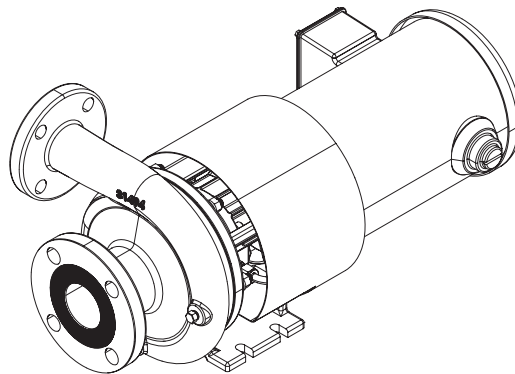


**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,
OPERATING OR SERVICING THIS EQUIPMENT.**

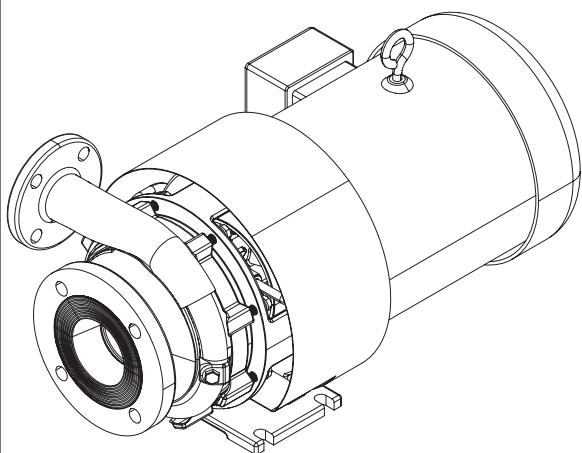
It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.



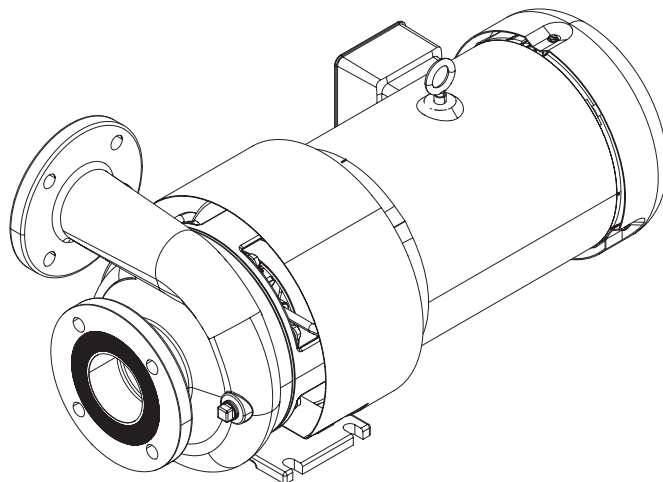
80 Series



120 Series



180 Series



300 Series

Figure 1

GENERAL DESCRIPTION

HTW 80, 120, 180 and 300 Series:

High Temperature Water – Centrifugal Pump Series

The pumps are air cooled and close coupled to standard NEMA C face motors.

MP Pumps offers a selection of hot water pumps suited for any application. Cooled by a cooling loop and a fan clamp, our hot water pumps can operate with a maximum seal chamber temperature of 170°F, while the process temperature is at 400°F.

SPECIFICATIONS

	HTW 80	HTW 120	HTW 180	HTW 300
Suction and Discharge	1-1/2" x 1-1/4" ANSI 150 or NPT	2" x 1-1/2" ANSI 150 or NPT	3" x 1-1/2" ANSI 150	3" x 2-1/2" ANSI 150
Application	Industrial, OEM			
Materials of construction	Ductile iron			
Flow	Up to 80 gpm (302.8 lpm)	Up to 200 gpm (757.1 lpm)	Up to 320 gpm (1211.3 lpm)	Up to 500 gpm (1892.7 lpm)
Head Feet	Up to 127 ft (38.7 m)	Up to 135 ft (41.1 m)	Up to 162 ft (49.4 m)	Up to 190 ft (57.9 m)
Impeller	5.9" (149.9 mm) Cast Iron, Enclosed	5.96" (151.3 mm) Cast Iron, Enclosed	6.45" (163.8 mm) Cast Iron, Enclosed	7.0" (177.8 mm) Cast Iron, Enclosed
Motor	Up to 3 HP (2.23 kw)	Up to 5 HP (3.72 kw)	Up to 10 HP (7.45 kw)	Up to 20 HP (14.91 kw)
Drive Options	Close coupled 56C, 145TC	Close coupled 145TC, 184C	Close coupled 184TC, 215TC	
Seal	Carbon / Silicon carbide / Viton		Carbon / Silicon carbide / Viton, Optional severe duty seal available	
Drive Sleeve	303 Stainless steel			
Temperature	400° F (204.4° C) max			
Features	Close coupled for a compact and lightweight design, Air cooled by integral fan / clamp Hollow carbon graphite isolator bushing, Hollow sleeve design Reduces the amount of process heat lost, No need for a water jacket or seal flush			

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.

STORAGE PRECAUTIONS

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

INSTALLATION

1. The pump must be installed in a horizontal shaft position.
2. The housing may be rotated to a horizontal or vertical discharge to fit the particular piping installation.
3. Rigid and supported piping must be used that will not strain the pump housing when temperature changes are made during the use of the pump.
4. The piping system must be free of foreign material and moisture before start-up.
5. Pipe thread sealing compound must be used on the NPT flanges that is compatible with the fluid being pumped and is rated for the temperature requirements.
6. The installation should permit adequate circulation of air to provide proper cooling of the motor and pump seal housing.
7. Do not install in a sealed enclosure or insulate the pump adapter and motor. The motor and/or pump seal may fail from excessive heat.
8. A good installation will have an enclosure that provides adequate air flow of ambient air to the motor of the pump.

START-UP:

1. Follow all requirements and recommendations from the heat transfer fluid manufacturer for fill, start-up and use.
2. Check for leaks before insulating the piping system.
3. Check for proper shaft rotation by jogging the power and observing the fan clamp. Rotation arrows are provided on pump housing.
4. The seal cavity inside the pump will internally vent during fill and start-up.
5. A small amount of oil may leak from the seal cavity at the shaft; this is normal for a new installation and will stop after approximately one hour.
6. Do not allow the pump to run dry, or continue to operate the pump when it is noisy, vibrating, or leaks are observed. These noticeable signs give a warning that something is wrong with the equipment and must be investigated to avoid possible damage or injury from burns caused by hot oil.

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 PumpPAK 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 PumpPAK. Slide the PumpPAK assembly onto the driver shaft, aligning the capscrew holes in the adaptor with the tapped holes in the driver mounting face until the adaptor contacts the mounting face.

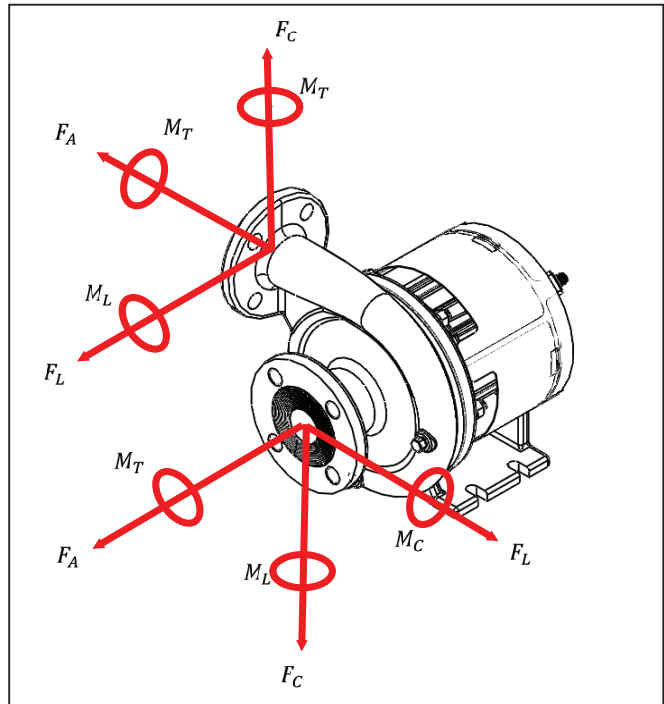
Install fasteners and tighten to secure PumpPAK assembly to the driver. First center then tighten the drive clamp assembly to lock the shaft sleeve onto the driver shaft.

After all fasteners are tight including the drive clamp assembly, rotate the driver slowly by hand to make certain that there is no rubbing.

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
5/8-18	85-95	N/A

INSTALLATION FOR HOT WATER PUMPS

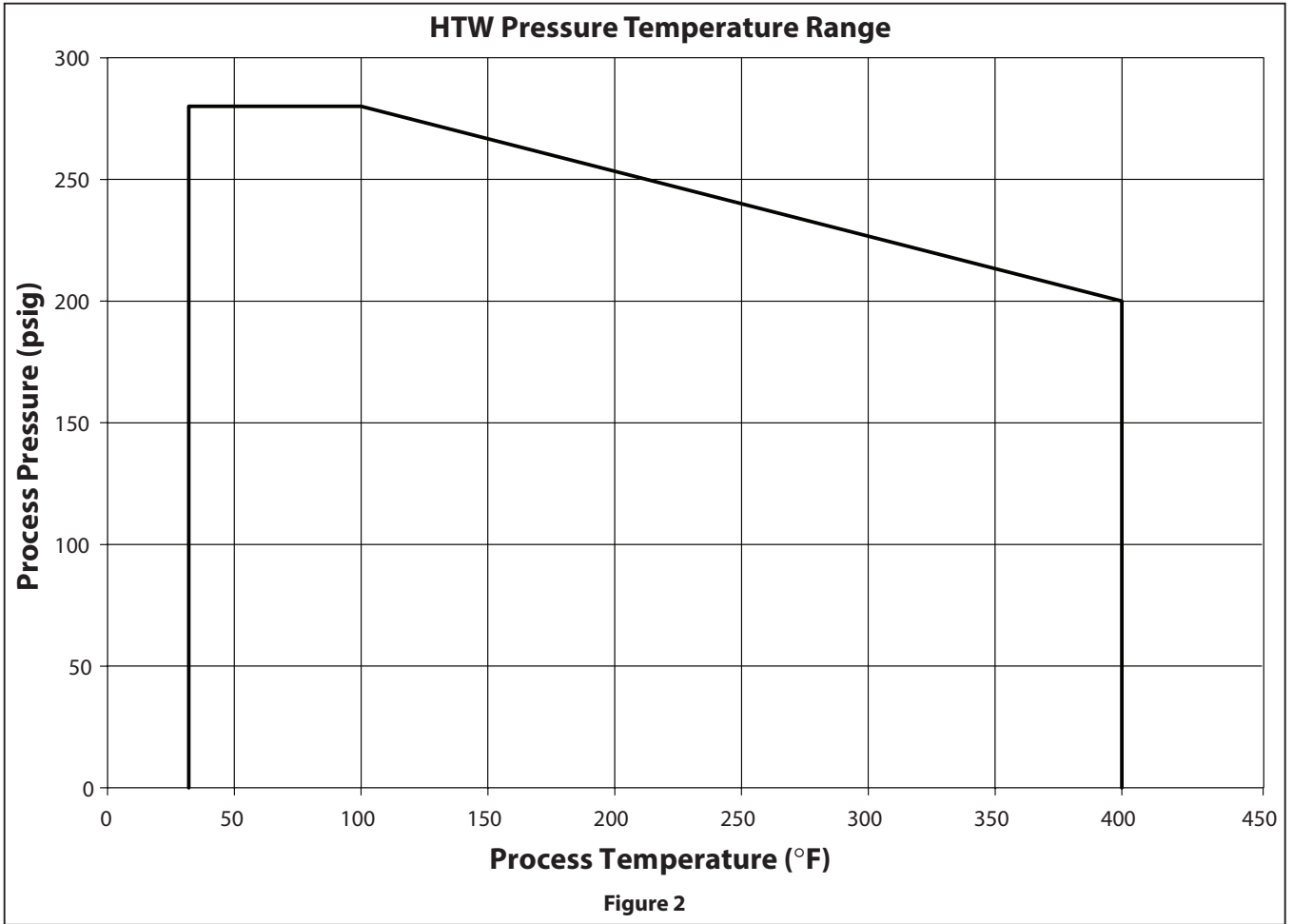
The permitted forces and moments on pump inlet and outlet.



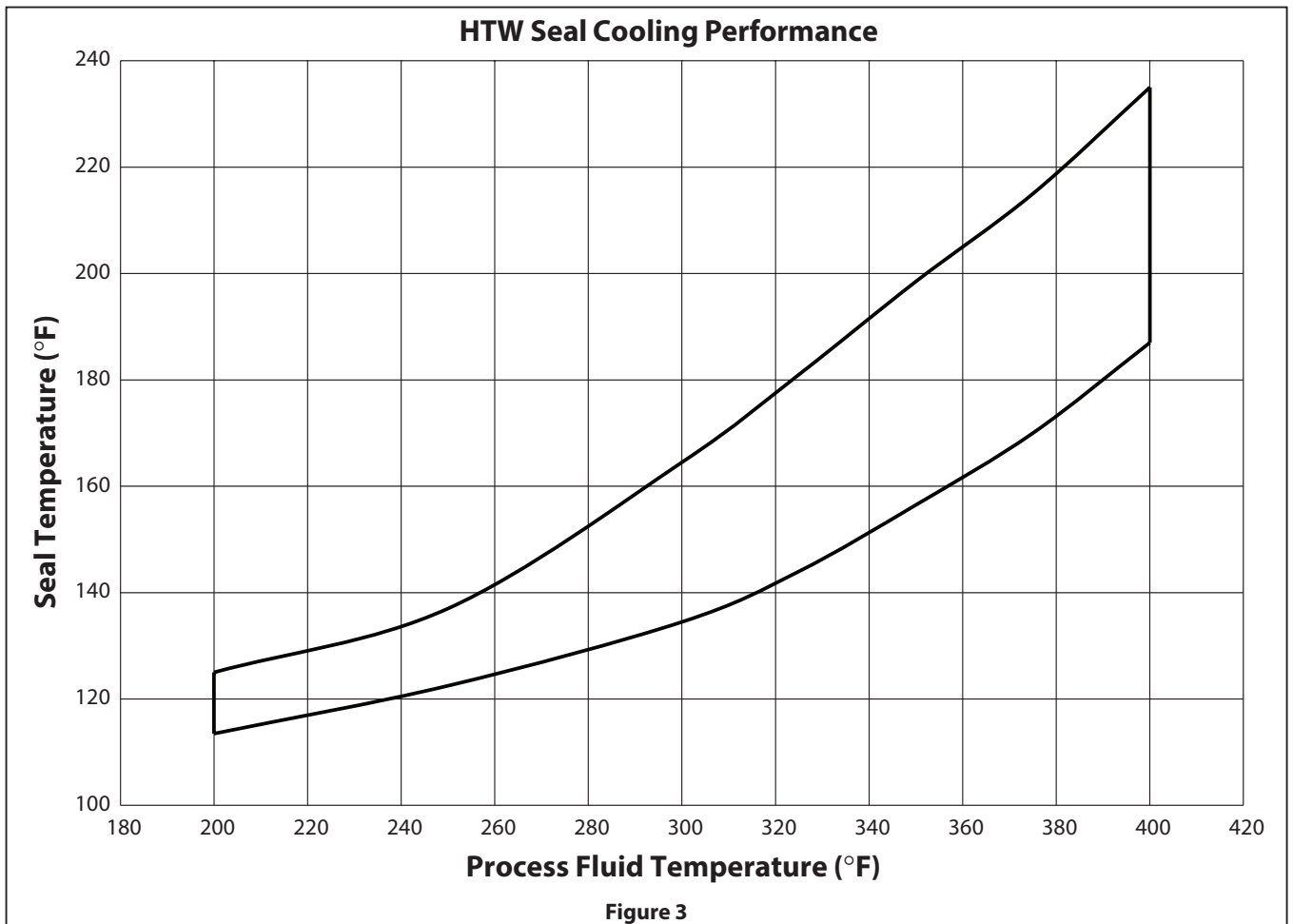
LEGENDS		
F_L	-	Longitudinal shear force
F_C	-	Circumferential shear force
F_A	-	Axial tension or compression force
M_L	-	Longitudinal bending force
M_C	-	Circumferential bending force
M_T	-	Torsional moment

ALLOWABLE NOZZLE LOADS						
Nozzle Size (in)	HOT WATER PUMP					
	Force lbs (N)			Moment ft*lbs (N*m)		
	FL	FC	FA	MC	MT	ML
1.25"	337 (1500)	337 (1500)	253 (1125)	69 (93.75)	104 (141)	69 (122)
1.5"	405 (1800)	405 (1800)	303 (1350)	100 (135)	149 (203)	100 (176)
2"	540 (2400)	540 (2400)	405 (1800)	177 (240)	266 (360)	177 (312)
2.5"	674 (3000)	674 (3000)	506 (2250)	277 (375)	415 (563)	277 (488)
3"	809 (3600)	809 (3600)	607 (2700)	398 (540)	597 (810)	398 (702)

PRESSURE - TEMPERATURE LIMITS



SEAL COOLING PERFORMANCE



WORKING OF END SUCTION CENTRIFUGAL PUMP

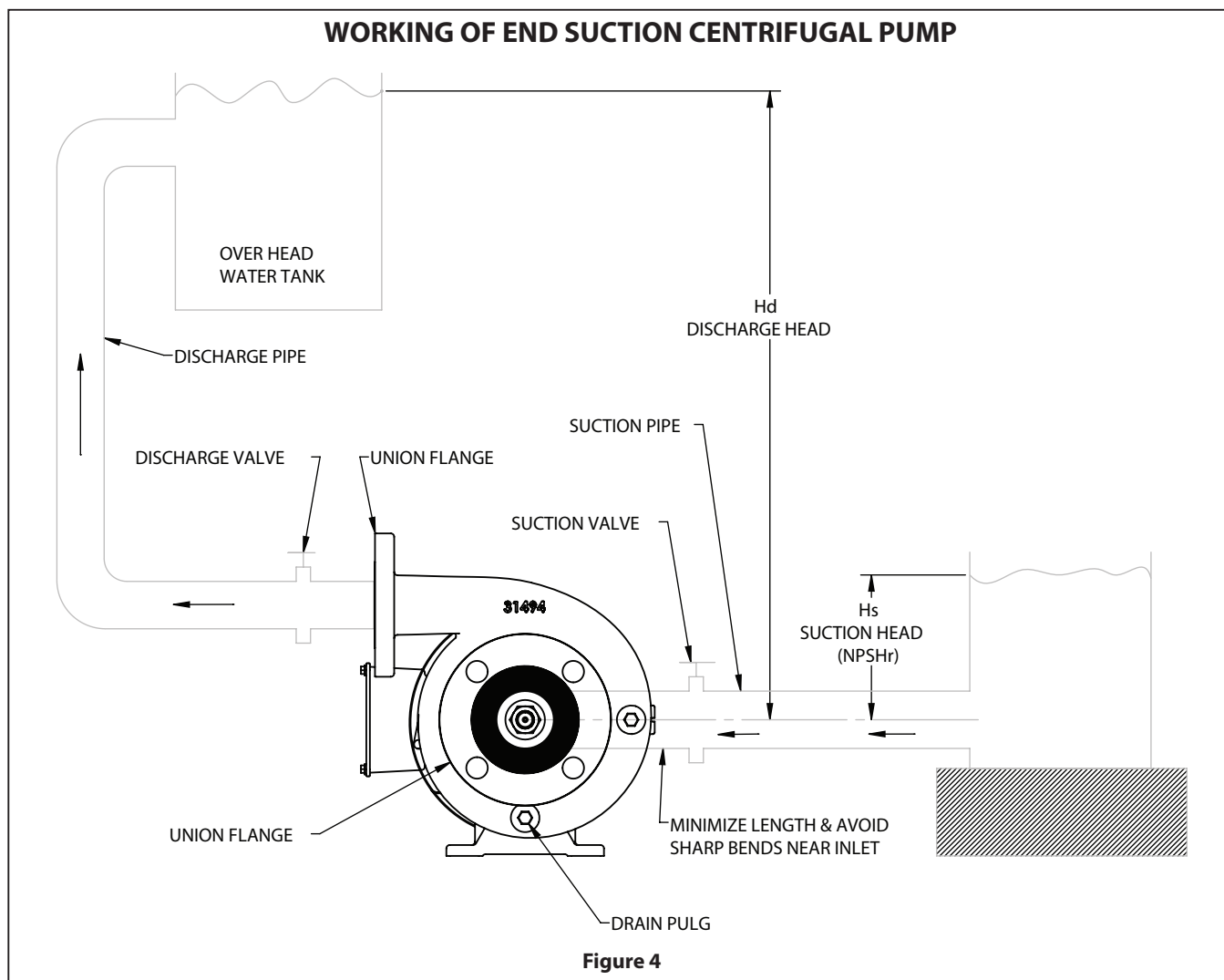


Figure 4

OPERATING INSTRUCTIONS

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.

The PumPAK 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.**

WORKING OF CENTRIFUGAL 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.

OPERATION AND MAINTENANCE

Thermal oil vapors leaking from a system can be highly flammable.

Any system leak should be repaired immediately.

Do not insulate the pump or system piping with porous flammable insulation. Fluid may wick, decompose and spontaneously ignite. Ideal mechanical seal life is 20,000 hours. Reduced seal life may be experienced from extreme conditions.

At disassembly, check the impeller and other wear items for unusual wear. Replace if necessary.

When servicing the pump, care should be taken that the pump has cooled to a sufficient temperature to permit disassembly. The product should be drained from the pump housing and disposed in accordance with the fluid manufacturer's recommendations. Operating personnel should be warned to exercise care and utilize eye and skin protection when servicing the pump.

WEAR AND INSPECTION POINTS

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

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.

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 bellows and cage.

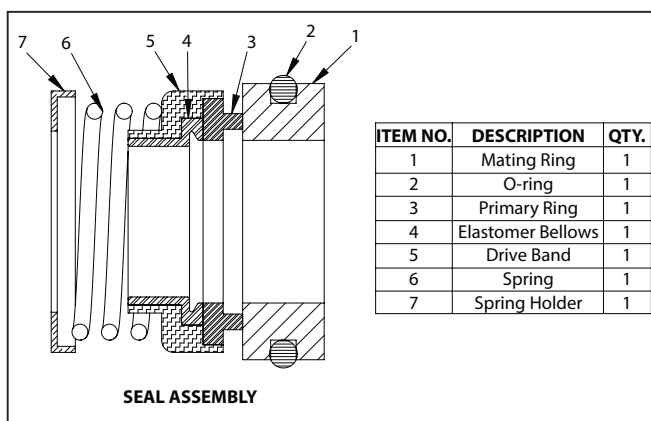
MP Pumps rebuild kits include a new drive sleeve to avoid the possibility of damaging the drive sleeve. See back of manual for list of seal kits and corresponding rebuild kits. Impellers are also available if wear or damage is present.

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.

MAINTENANCE

The HTW pump is of simple construction with only one moving part. The impeller on the HTW 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. HTW pumps are available with a selflubricated shaft seal. The self-lubricated seal is lubricated by the liquid in the pump. Operating the pump dry will seriously damage the seal.

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 to prevent accidentally starting.
Disconnect lines and drain pump housing.

TO REMOVE PUMP HOUSING

Remove capscrews 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

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 six nuts and lockwashers. Loosen and remove adapter.

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 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

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 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 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 in the adapter counterbore and the carbon washer 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.

PARTS LIST / HTW 80

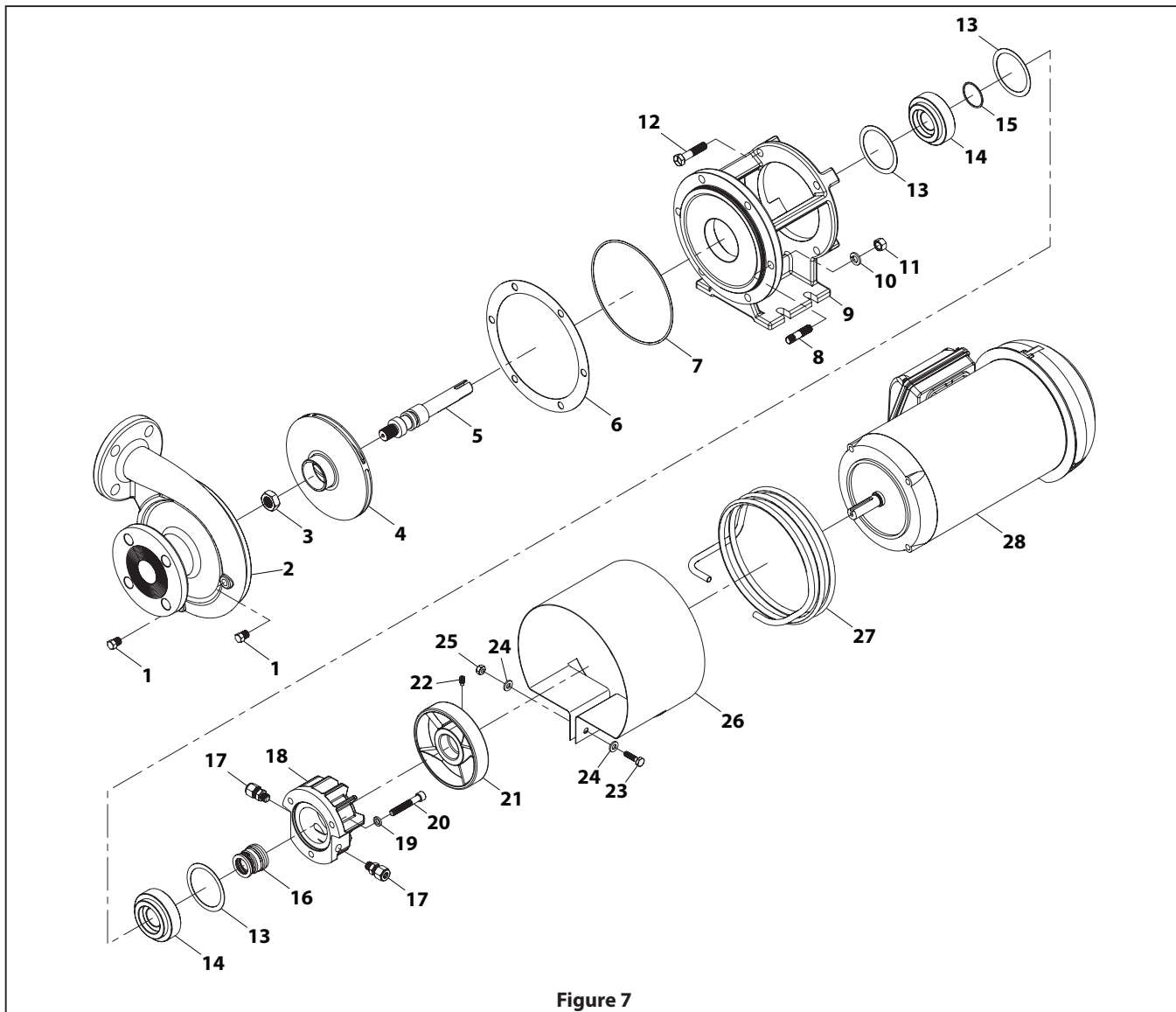


Figure 7

PARTS LIST / HTW 80

Item	Description (size)	Qty	Part No.	Mtl
1	Pipe Plug (1/8" NPT)	2	MP21585	Zinc Plated Steel
2	Housing	2	MP31871	Ductile Iron
	Housing	1	MP25666	Ductile Iron
3	Hex Jam Nut	1	MP22655	304 SS
4	Impeller	1	MP25910	Cast Iron
	Impeller	1	MP26487	Cast Iron
	Impeller	1	MP25975	Carbon Steel
	Impeller	1	MP29430	Cast Iron
	Impeller	1	MP50497	Cast Iron
5	Drive Sleeve	1	MP29166	303 SS
	Drive Sleeve	1	MP29781	303 SS
6	Gasket (0.032" X 6")	1	MP31518	Grafoil
7	O-Ring (AS-568-162)	1	MP50524	AFLAS
8	Stud (SS: 3/8" - 16 x 1.63)	6	MP21261	304 SS
9	Adaptor	1	MP36624	Ductile Iron
10	Lockwasher (3/8" x 1/8")	6	MP21266	304 SS
11	Hexnut (3/8" - 6")	6	MP21268	304 SS
12	Capscrew (3/8" - 16" x 1.75")	4	MP41259	Steel
13	Gasket	3	MP29165	Grafoil

Item	Description (size)	Qty	Part No.	Mtl
14	Isolator	2	MP29158	Carbon Graphite
15	O-Ring (1.301" ID x 0.070")	1	MP29230	Viton
16	See Table for seal options			
17	ADP Fitting	2	MP36645	304 SS
18	Housing Seal	1	MP36633	Ductile Iron
	Housing Seal	1	MP36628	Ductile Iron
19	Washer Flat (0.50" x 0.327" x 0.093")	3	MP29765	Steel
20	Capscrew (5/16" - 18" x 2.0")	3	MP29178	Steel
21	Clamp Fan	1	MP29164	Ductile Iron
	Clamp Fan	1	MP29775	Ductile Iron
22	Set Screw (1/4"-28" x 1/2")	1	MP33417	Steel
23	Capscrew (1/4"-20" x 1")	2	MP33563	304 SS
24	Washer	4	MP27261	Steel
25	Hexnut (1/4" - 20")	2	MP21241	304 SS
26	Shield	1	MP36640	Zinc Plated Steel
27	HE Coil	1	MP36641	304 SS
28	Electric Motor	1	MP26197	TEFC

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP29773	2	1"	Silicon Carbide	Carbon	Viton	316 SS
MP29168	2	0.75"	Silicon Carbide	Carbon	Viton	316 SS
MP35384	2	1"	Silicon Carbide	Carbon	Viton	316 SS

PARTS LIST / HTW 120

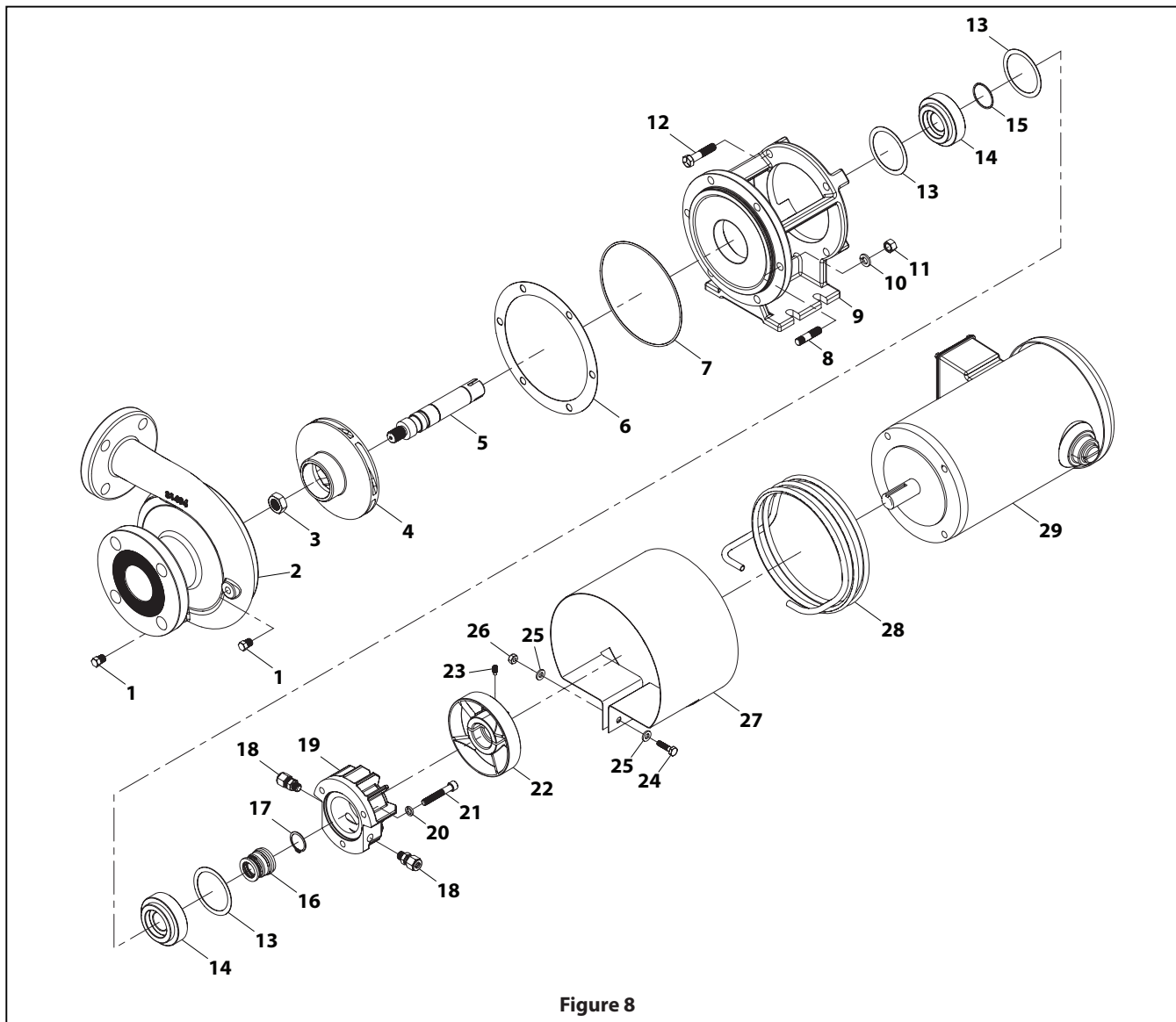


Figure 8

PARTS LIST / HTW 120

Item	Description (size)	Qty	Part No.	Mtl
1	Pipe Plug (1/8" NPT)	2	MP21585	Zinc Plated Steel
2	Housing	1	MP31492	Ductile Iron
	Housing	1	MP26587	Ductile Iron
3	Hex Jam Nut	1	MP22655	304 SS
4	Impeller	1	MP29770	Cast Iron
	Impeller	1	MP30223	Cast Iron
	Impeller	1	MP31769	Cast Iron
5	Drive Sleeve	1	MP29781	303 SS
6	Gasket (0.032" X 6")	1	MP31518	Grafoil
7	O-Ring (AS-568-162)	1	MP50524	AFLAS
8	Stud (SS: 3/8 - 16 x 1.63)	6	MP21261	304 SS
9	Adaptor	1	MP36624	Ductile Iron
10	Lockwasher (3/8" x 1/8")	6	MP21266	304 SS
11	Hexnut (3/8" - 6")	6	MP21268	304 SS
12	Capscrew (3/8" - 16" x 1.75")	4	MP41259	Steel
13	Gasket	3	MP29165	Grafoil
14	Isolator	2	MP29158	Carbon Graphite

Item	Description (size)	Qty	Part No.	Mtl
15	O-Ring (1.301" ID x 0.070")	1	MP29230	Viton
16	See Table for seal options			
17	Snap Ring	1	MP29782	Steel
18	ADP Fitting	2	MP36645	304 SS
19	Housing Seal	1	MP36628	Ductile Iron
20	Washer Flat (0.50" x 0.327" x 0.093")	3	MP29765	Steel
21	Capscrew (5/16" - 18" x 2.0")	3	MP29178	Steel
22	Clamp Fan	1	MP29775	Ductile Iron
23	Set Screw (1/4" - 28" x 1/2")	1	MP33417	Steel
24	Capscrew (1/4" - 20" x 1")	2	MP33563	304 SS
25	Washer	4	MP27261	Steel
26	Hexnut (1/4" - 20")	2	MP21241	304 SS
27	Shield	1	MP36640	Zinc Plated Steel
28	HE Coil	1	MP36641	304 SS
29	Electric Motor	1	MP25920	TEFC

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP29773	2	1"	Silicon Carbide	Carbon	Viton	316 SS

PARTS LIST / HTW 180

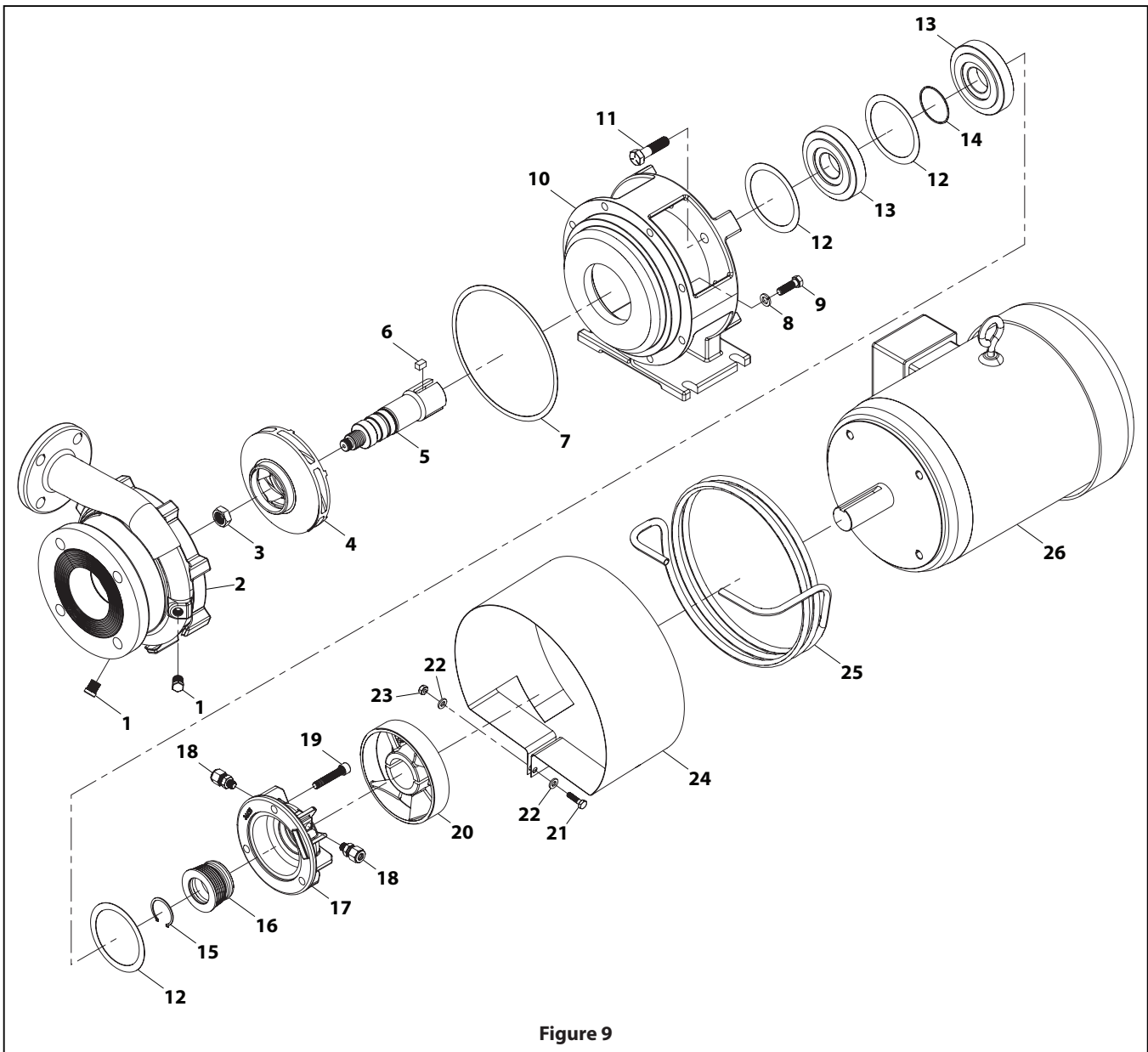


Figure 9

PARTS LIST / HTW 180

Item	Description (size)	Qty	Part No.	Mtl
1	Pipe Plug (1/8" NPT)	2	MP41475	Steel
2	Housing	1	MP33503	Ductile Iron
3	Hex Jam Nut	1	MP25168	304 SS
4	Impeller	1	MP34459	Ductile Iron
	Impeller	1	MP34460	Ductile Iron
	Impeller	1	MP33505	Ductile Iron
5	Drive Sleeve	1	MP33505	303 SS
	Drive Sleeve	1	MP33510	303 SS
6	Square Key	1	MP29831	Steel
7	Gasket	1	MP36662	Klinger TOP-SIL
8	Lockwasher	8	MP30626	Steel
9	Capscrew (3/8"-16" x 1.25")	8	MP41257	Steel
10	Adaptor	1	MP36656	Ductile Iron
11	Capscrew (1/2"-13 x 2")	4	MP41279	Steel
12	Gasket	3	MP36661	Klinger TOP-SIL

Item	Description (size)	Qty	Part No.	Mtl
13	Isolator	2	MP30842	Carbon Graphite
14	O-Ring (1.301" ID x 0.070")	1	MP30841	Viton
15	Snap Ring	1	MP29826	PH 15-7 Mo SS
16	See Table for seal options			
17	Housing Seal	1	MP36639	Ductile Iron
18	ADP Fitting	2	MP36646	304 SS
19	Capscrew (3/8"-16" x 2")	3	MP39600	304 SS
20	Clamp Fan	1	MP29833	Ductile Iron
	Clamp Fan	1	MP33509	Ductile Iron
21	Capscrew (1/4"-20" x 1")	2	MP33563	304 SS
22	Washer	4	MP27261	Steel
23	Hexnut (1/4" - 20")	2	MP21241	304 SS
24	Shield	1	MP36652	Steel
25	HE Coil	1	MP36635	304 SS
26	Electric Motor	1	MP31293	TEFC

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP34933	2	1.5"	Silicon Carbide	Carbon	Viton	316 SS
MP33507	2	1.25"	Silicon Carbide	Carbon	Viton	18-8 SS

PARTS LIST / HTW 300

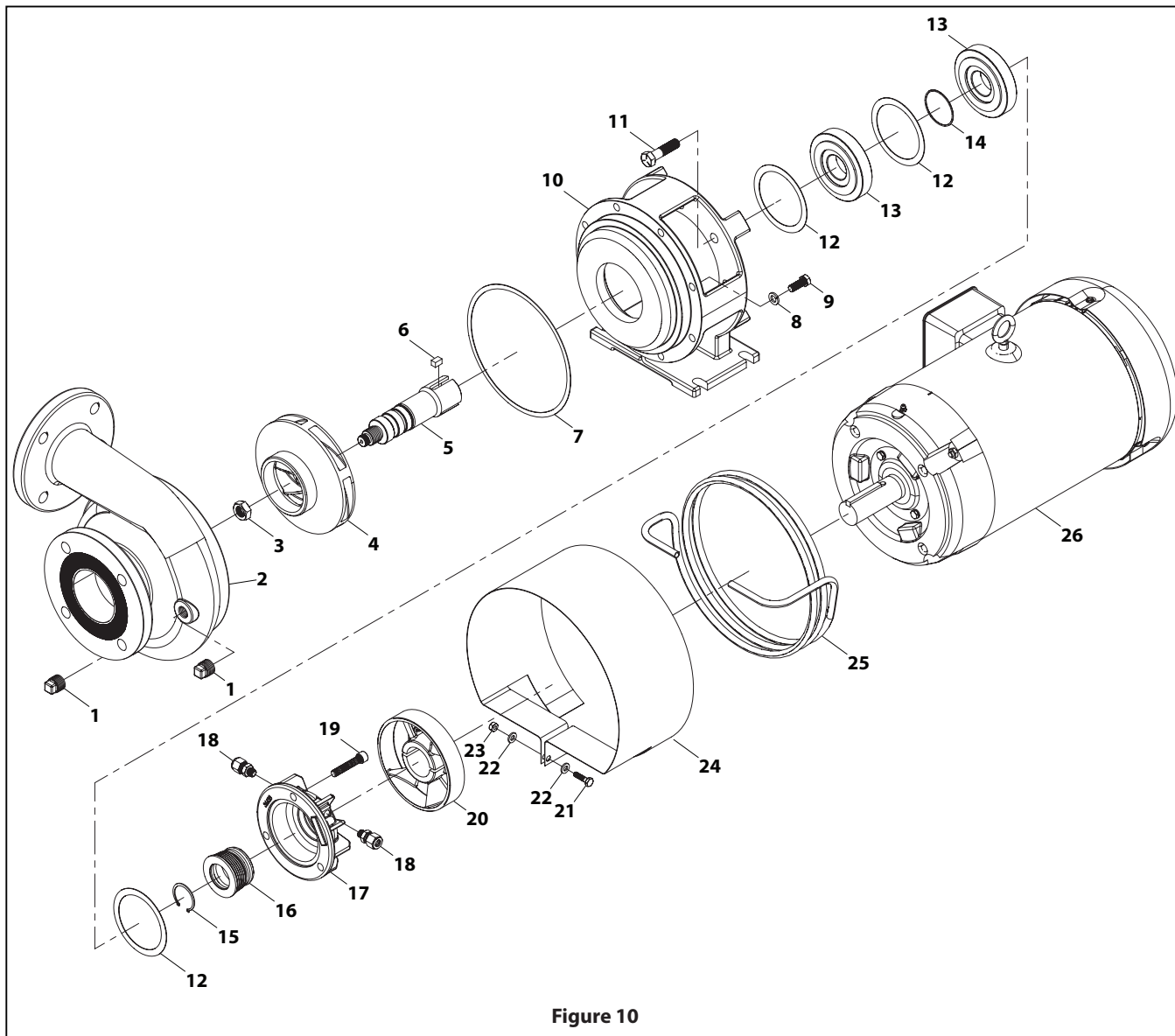


Figure 10

PARTS LIST / HTW 300

Item	Description (size)	Qty	Part No.	Mtl
1	Pipe Plug (1/2" NPT)	2	MP41479	Steel
2	Housing	1	MP26733	Ductile Iron
3	Hex Jam Nut	1	MP25168	304 SS
4	Impeller	1	MP30837	Cast Iron
	Impeller	1	MP29823	Cast Iron
	Impeller	1	MP33032	Cast Iron
	Impeller	1	MP31404	Cast Iron
5	Drive Sleeve	1	MP29822	303 SS
6	Square Key	1	MP29831	Steel
7	Gasket	1	MP36662	Klinger TOP-SIL
8	Lockwasher	8	MP30626	Steel
9	Capscrew (3/8"-16" x 1.25")	8	MP41256	Steel
10	Adaptor	1	MP36660	Ductile Iron
11	Capscrew (1/2"-13 x 2")	4	MP41279	Steel
12	Gasket	3	MP36661	Klinger TOP-SIL

Item	Description (size)	Qty	Part No.	Mtl
13	Isolator	2	MP30842	Carbon Graphite
14	O-Ring (1.301" ID x 0.070")	1	MP30841	Viton
15	Snap Ring	1	MP29826	PH 15-7 Mo SS
16	See Table for seal options			
17	Housing Seal	1	MP36639	Ductile Iron
18	ADP Fitting	2	MP36646	304 SS
19	Capscrew (3/8"-16" x 2")	3	MP39600	304 SS
20	Clamp Fan	1	MP29833	Ductile Iron
21	Capscrew (1/4"-20" x 1")	2	MP33563	304 SS
22	Washer	4	MP27261	Steel
23	Hexnut (1/4" - 20")	2	MP21241	304 SS
24	Shield	1	MP36652	Steel
25	HE Coil	1	MP36635	304 SS
26	Electric Motor	1	MP31294	TEFC

SEAL TYPE OPTIONS

Seal PN	Seal Type	Shaft Dia.	Mating Ring	Material		
				Primary Ring	Elastomer	Components
MP34933	2	1.5"	Silicon Carbide	Carbon	Viton	316 SS

SERVICE KITS

PUMP MODEL	PUMP DESCRIPTION	SEAL KIT
MP50918	HTW80PMP D: 2-3 145TC 5.25 T-2 F48 FF VD	MP51575

DIMENSIONAL DATA

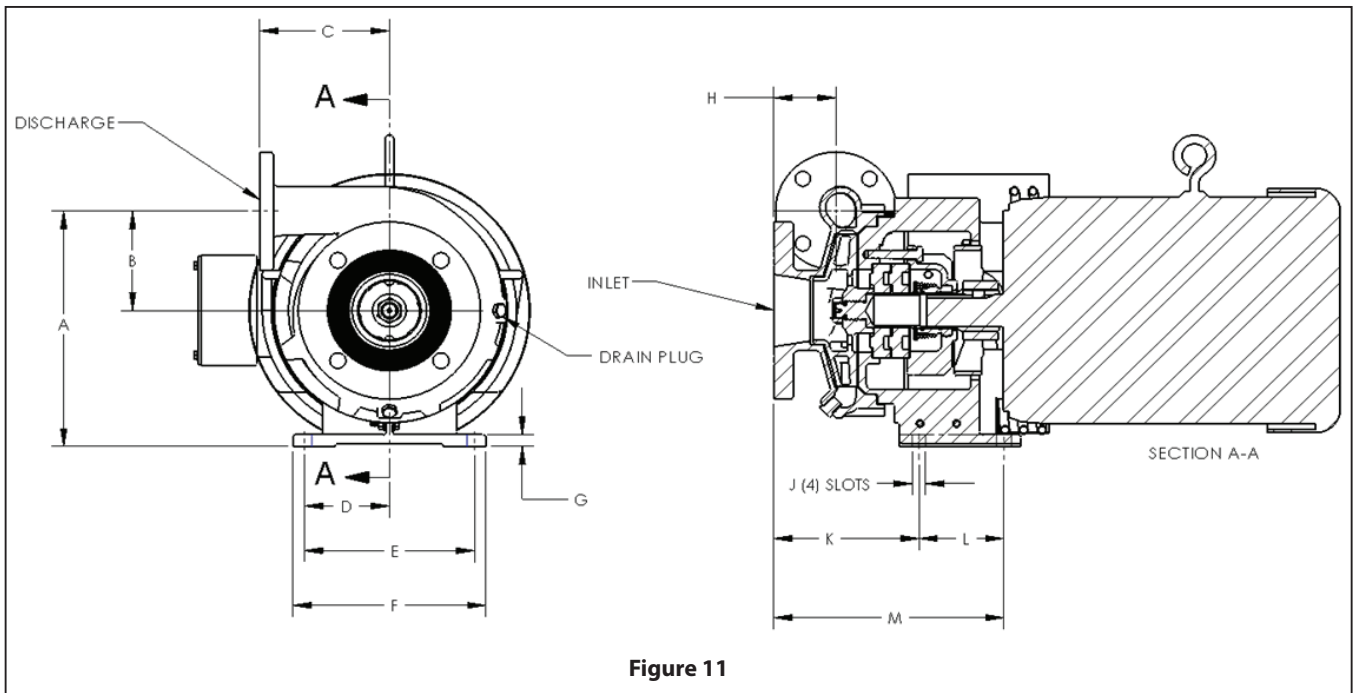


Figure 11

		INLET	DISCHARGE	A	B	C	D	E	F	G	H	J	K	L	M
NPT	HTW 80	1.5"	1.25"	8.65"	3.9"	3.3"	2.25"	4.5"	5.5"	0.4"	2.48"	0.44"	5.58"	2.02"	9.58"
FLANGE	HTW 80	1.5"	1.25"	8.65"	3.9"	4.25"	2.25"	4.5"	5.5"	0.4"	2.6"	0.44"	5.8"	2.02"	9.78"
NPT	HTW 120	2"	1.5"	8.75"	4"	3.1"	2.25"	4.5"	5.5"	0.4"	3.31"	0.44"	3.31"	2.02"	10.7"
FLANGE	HTW 120	2"	1.5"	8.75"	4"	5.24"	2.25"	4.5"	5.5"	0.4"	3.53"	0.44"	6.87"	2.02"	10.89"
FLANGE	HTW 180	3"	1.5"	9.96"	4.21"	5.34"	3.5"	7"	7.94"	0.5"	2.57"	0.56"	5.97"	3.5"	9.47"
FLANGE	HTW 300	3"	2.5"	10.59"	4.84"	6.25"	3.5"	7"	7.94"	0.5"	2.57"	0.56"	6.57"	3.5"	10.09"

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'

