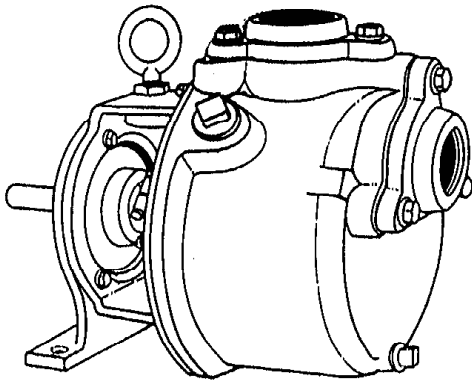
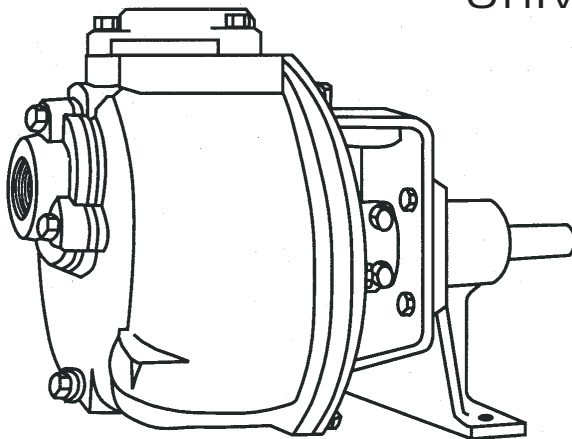


INSTALLATION and OPERATION MANUAL Self-Priming Centrifugal Pumps



Series: B4, B6, B9, B12,
B19*, B21*, SB4,
SB6, SB9, SB12,
SB19*, SB21*,
BH7, SBH7

Universal Drive



IMPORTANT!

Read all instructions in this manual before operating pump.

As a result of Crane Pumps & Systems, Inc., constant product improvement program, product changes may occur. As such Crane Pumps & Systems reserves the right to change product without prior written notification.

CRANE[®]

A Crane Co. Company

PUMPS & SYSTEMS

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Phone: (937) 778-8947
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Form No. 099811-Rev. H

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SAFETY FIRST!

Please Read This Before Installing Or Operating Pump.
This information is provided for **SAFETY and to PREVENT EQUIPMENT PROBLEMS**. To help recognize this information, observe the following symbols:



IMPORTANT! Warns about hazards that can result in personal injury or Indicates factors concerned with assembly, installation, operation, or maintenance which could result in damage to the machine or equipment if ignored.

CAUTION ! Warns about hazards that can or will cause minor personal injury or property damage if ignored. Used with symbols below.

WARNING ! Warns about hazards that can or will cause serious personal injury, death, or major property damage if ignored. Used with symbols below.



Hazardous fluids can cause fire or explosions, burns or death could result.



Extremely hot - Severe burns can occur on contact.



Biohazard can cause serious personal injury.



Hazardous fluids can Hazardous pressure, eruptions or explosions could cause personal injury or property damage.



Rotating machinery Amputation or severe laceration can result.



Hazardous voltage can shock, burn or cause death.



Toxic Fumes - Breathing can cause nausea, fainting or death



Eye protection required

Only qualified personnel should install, operate and repair pump. Any wiring of pumps should be performed by a qualified electrician.



WARNING ! - To reduce risk of electrical shock, pumps and control panels must be properly grounded in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances. Improper grounding voids warranty.

WARNING! - To reduce risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Lock out power and tag.



WARNING! Operation against a closed discharge valve will cause premature bearing and seal failure on any pump, and on end suction and self priming pump the heat build may cause the generation of steam with resulting dangerous pressures. It is recommended that a high case temperature switch or pressure relief valve be installed on the pump body.



CAUTION! Pumps build up heat and pressure during operation-allow time for pumps to cool before handling or servicing.



WARNING! - **DO NOT** pump hazardous materials (flammable, caustic, etc.) unless the pump is specifically designed and designated to handle them.



CAUTION! - Do not block or restrict discharge hose, as discharge hose may whip under pressure.



WARNING! - **DO NOT** wear loose clothing that may become entangled in the impeller or other moving parts. Always wear appropriate safety gear, such as safety glasses, when working on the pump or piping.



WARNING! - Keep clear of suction and discharge openings. **DO NOT** insert fingers in pump with power connected.



Always wear eye protection when working on pumps.

Make sure lifting handles are securely fastened each time before lifting. **DO NOT** operate pump without safety devices in place. Always replace safety devices that have been removed during service or repair. Secure the pump in its operating position so it can not tip over, fall or slide.

DO NOT exceed manufacturers recommendation for maximum performance, as this could cause the motor to overheat.



WARNING! If Engine driven, never operate in an enclosed building or area where exhaust gases can accumulate. Never operate near a building where exhaust gases can seep inside. Never operate in a pit or sump without making provisions for adequate ventilation.

WARNING! Do not breathe exhaust fumes when working in the area of the engine. (Exhaust gases are odorless and deadly poison.)



WARNING! Allow exhaust system to cool before touching.



Never add fuel to the tank while the engine is running. Stop engine and allow to cool. Do not smoke while refueling the engine Do not refuel near open flame



Carefully read instruction manuals supplied by engine manufacture before attempting to assemble, operate or service the engine or any part. The "WARNING" statements indicate potentially hazardous conditions for operator or equipment.



WARNING! Products Returned Must Be Cleaned, Sanitized, Or Decontaminated As Necessary Prior To Shipment, To Insure That Employees Will Not Be Exposed To Health Hazards In Handling Said Material. All Applicable Laws And Regulations Shall Apply.



Bronze/brass and bronze/brass fitted pumps may contain lead levels higher than considered safe for potable water systems. Lead is known to cause cancer and birth defects or other reproductive harm. Various government agencies have determined that leaded copper alloys should not be used in potable water applications. For non-leaded copper alloy materials of construction, please contact factory.



IMPORTANT! - Crane Pumps & Systems, Inc. is not responsible for losses, injury, or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

SECTION: A - PUMP SPECIFICATIONS: B4, B6, B9, SB4, SB6, SB9

SUCTION/DISCHARGE:

B4, SB4, B6, SB61½" x 1½" NPT, Female
 B9, SB92" X 2" NPT Female

LIQUID TEMPERATURE160°F (71°C) Continuous

VOLUTE/WEARPLATE..... **B**-Cast Iron ASTM A-48, Class 30
SB - 316 Stainless Steel,
 Replaceable

CASE.....**B**-Cast Iron ASTM A-48, Class 30
SB - 316 Stainless Steel

PEDESTAL.....Cast Iron ASTM A-48, Class 30

IMPELLER: Design:

B4 & SB4 Open Type, Passes 1/4" Solids

B6 & SB6 Open Type, Passes 3/8" Solids

B9 & SB9 Open Type, Passes 1/2" Solids

Material**B**-Cast Iron ASTM A-48, Class 30

SB - 316 Stainless Steel
 Dynamically Balanced, ISO G6.3

IMPELLER SHAFTStainless Steel

LOCKING COLLARStainless Steel. Serves as Shaft
 Slinger

SQUARE RINGS**B** - Buna-N

SB - Viton®

HARDWARE**B** - Corrosion Resistant Steel

SB - Stainless Steel

PAINT**B** - Air Dry Enamel

SB - Two Part Epoxy

SEAL:B

DesignSingle Mechanical

Lubrication.....Grease, with Self-Feeding Lubricator

Material.....Rotating Faces - Carbon

Stationary Faces - Ceramic

Elastomer - Buna-N

Hardware - 300 Series Stainless

SB

DesignSingle Mechanical

LubricationPumped Fluid

Material.....Rotating Faces - Carbon

Stationary Faces - Ceramic

Elastomer - Viton

Hardware - 300 Series Stainless

BEARING: B4, SB4, B6, SB6

Design.....Single Row, Ball

LubricationGrease

Load.....Radial & Thrust

BEARING: B9, SB9

Design.....Double Row, Ball

LubricationGrease

Load.....Radial & Thrust

CHECK VALVE:

Material**B** - Valve Flap-Neoprene

SB - Valve Flap - Viton

Weight-Cast Iron ASTM A-48,

Class 30

OPTIONAL EQUIPMENT....Seal Material, Case Heater,

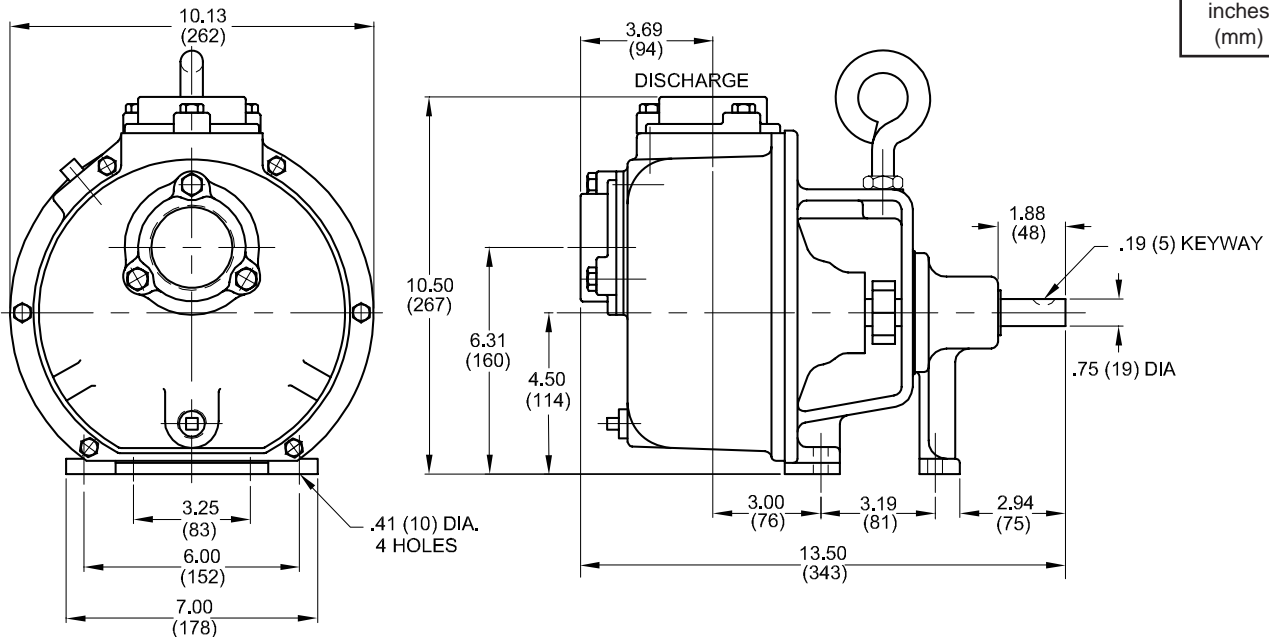
Stainless Hardware; High Temperature Control; Flex Coupled

Assy., with Base & OSHA Guard; Right Hand V-Belt Drive

Assy., Left Hand V-Belt Drive Assy., and In-Line Vertical V-

Belt Drive Assy., with Base, Motor Adjusting Base & OSHA

Guard.



IMPORTANT !

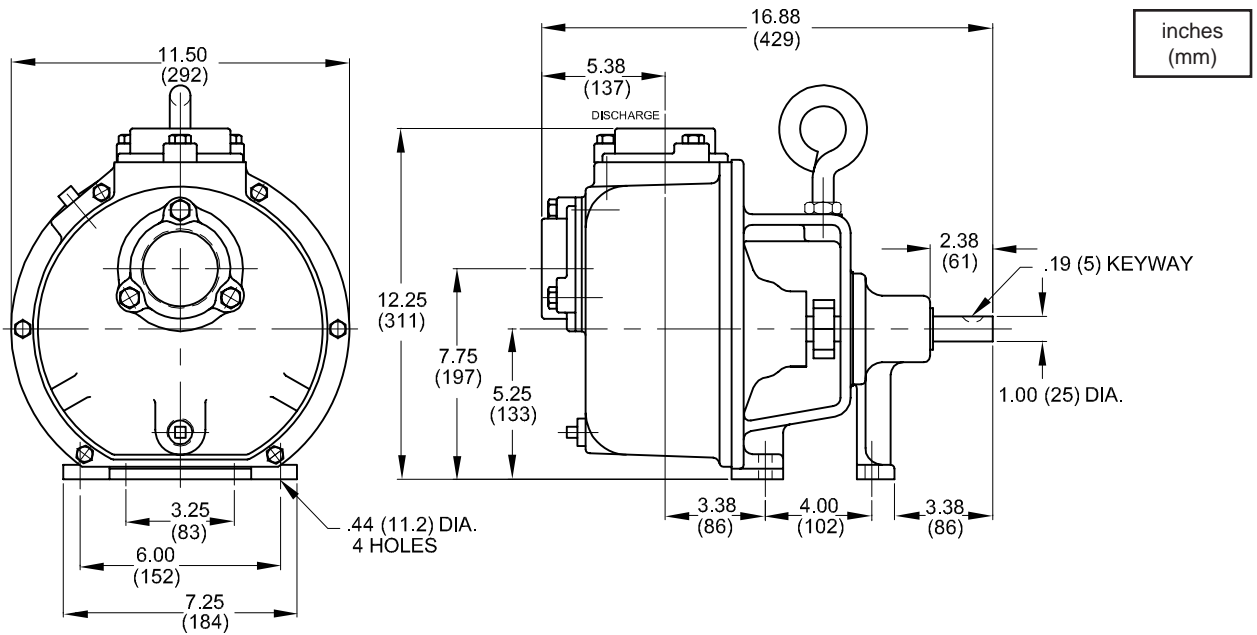
1.) DO NOT USE FOR PUMPING FLUIDS WITH A FLASH POINT OF LESS THAN 100°F.

2.) MAKE CERTAIN THAT PUMP AND/OR MOTOR ASSEMBLY AND CONTROLS HAVE THE APPROPRIATE RATINGS FOR THE GIVEN APPLICATION AREA CLASSIFICATION. (ie DIVISION I, AGENCY LISTING ETC.)

SECTION: A - PUMP SPECIFICATIONS: B12, SB12, BH7, SBH7

SUCTION/DISCHARGE..... 2" X 2" NPT Female
LIQUID TEMPERATURE 160°F (71°C) Continuous
VOLUTE/WEARPLATE
B & BH Cast Iron ASTM A-48, Class 30
SB & SBH 316 Stainless Steel, Replaceable
CASE **B & BH** Cast Iron ASTM A-48, Class 30
SB & SBH 316 Stainless Steel
PEDESTAL Cast Iron ASTM A-48, Class 30
IMPELLER:
Design **B12 & SB12** ... Open Type, Passes 1/2" Solids
Design **BH7 & SBH7** ... Open Type, Passes 1/4" Solids
Material **B & BH** Cast Iron ASTM A-48, Class 30
SB & SBH..... 316 Stainless Steel
 Dynamically Balanced,
 ISO G6.3
IMPELLER SHAFT Stainless Steel
LOCKING COLLAR Stainless Steel. Serves as
 Shaft Slinger
SQUARE RINGS **B & BH** - Buna-N
SB & SBH - Viton®
HARDWARE
B & BH Corrosion Resistant Steel
SB & SBH Stainless Steel
PAINT **B & BH** Air Dry Enamel
SB & SBH Two Part Epoxy

SEAL:
B & BH *Design* Single Mechanical
Lubrication Grease, with Self-Feeding
 Lubricator
Material Rotating Faces - Carbon
 Stationary Faces - Ceramic
 Elastomer - Buna-N
 Hardware - 300 Series Stainless
SB & SBH
Design Single Mechanical
Lubrication Pumped Fluid
Material Rotating Faces - Carbon
 Stationary Faces - Ceramic
 Elastomer - Viton
 Hardware - 300 Series Stainless
BEARING:
Design Single Row, Ball
Lubrication Grease
Load Radial & Thrust
CHECK VALVE:
Material **B & BH** - Valve Flap
 Neoprene
SB & SBH - Valve Flap
 Viton
 Weight-Cast Iron ASTM A-48,
 Class 30
OPTIONAL EQUIPMENT Seal Material, Case Heater,
 Stainless Hardware; High Temperature Control; Flex Coupled
 Assy., with Base & OSHA Guard; Right Hand V-Belt Drive
 Assy., Left Hand V-Belt Drive Assy., and In-Line Vertical
 V-Belt Drive Assy., with Base, Motor Adjusting Base & OSHA
 Guard.



IMPORTANT !

- 1.) DO NOT USE FOR PUMPING FLUIDS WITH A FLASH POINT OF LESS THAN 100°F.
- 2.) MAKE CERTAIN THAT PUMP AND/OR MOTOR ASSEMBLY AND CONTROLS HAVE THE APPROPRIATE RATINGS FOR THE GIVEN APPLICATION AREA CLASSIFICATION. (ie DIVISION I, AGENCY LISTING ETC.)

SECTION: A - PUMP SPECIFICATIONS: B19, SB19, B21, SB21

SUCTION/DISCHARGE.....3" X 3" NPT Female
LIQUID TEMPERATURE 160°F (71°C) Continuous
VOLUTE/WEARPLATE
B Cast Iron ASTM A-48, Class 30
SB 316 Stainless Steel, Replaceable

CASE **B** Cast Iron ASTM A-48, Class 30
SB 316 Stainless Steel

PEDESTAL..... Cast Iron ASTM A-48, Class 30

IMPELLER: *Design* Open Type, Passes 3/4" Solids
Material
B Cast Iron ASTM A-48, Class 30
SB 316 Stainless Steel Dynamically Balanced, ISO G6.3

IMPELLER SHAFT Stainless Steel

LOCKING COLLAR Stainless Steel. Serves as Shaft Slinger

SQUARE RINGS **B** - Buna-N
SB - Viton®

HARDWARE **B** - Corrosion Resistant Steel
SB - Stainless Steel

PAINT **B** - Air Dry Enamel
SB - Two Part Epoxy

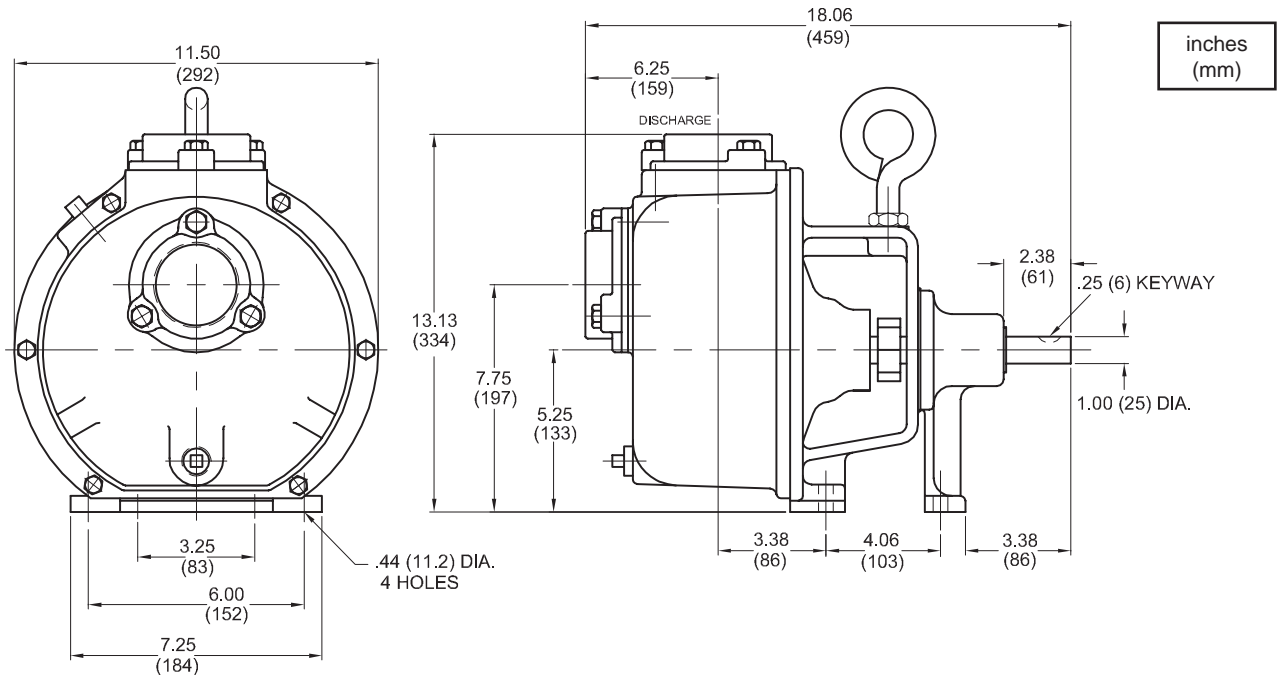
SEAL: B *Design* Single Mechanical
Lubrication Grease, with Self-Feeding Lubricator
Material..... Rotating Faces - Carbon
Stationary Faces - Ceramic
Elastomer - Buna-N
Hardware - 300 Series Stainless

SB *Design* Single Mechanical
Lubrication Pumped Fluid
Material..... Rotating Faces - Carbon
Stationary Faces - Ceramic
Elastomer - Viton
Hardware - 300 Series Stainless

BEARING:
B19 & SB19 *Design* Double Row, Ball
B21 & SB21 *Design* Single Row, Ball
Lubrication Grease
Load Radial & Thrust

CHECK VALVE:
Material **B** - Valve Flap-Neoprene
SB - Valve Flap - Viton
Weight-Cast Iron ASTM A-48, Class 30

OPTIONAL EQUIPMENT..... Seal Material, Case Heater, Stainless Hardware; High Temperature Control; Flex Coupled Assy., with Base & OSHA Guard; Right Hand V-Belt Drive Assy., Left Hand V-Belt Drive Assy., and In-Line Vertical V-Belt Drive Assy., with Base, Motor Adjusting Base & OSHA Guard.



IMPORTANT !

- DO NOT USE FOR PUMPING FLUIDS WITH A FLASH POINT OF LESS THAN 100°F.
- MAKE CERTAIN THAT PUMP AND/OR MOTOR ASSEMBLY AND CONTROLS HAVE THE APPROPRIATE RATINGS FOR THE GIVEN APPLICATION AREA CLASSIFICATION. (ie DIVISION I, AGENCY LISTING ETC.)

SECTION B: GENERAL INFORMATION

B-1) To the Purchaser:

Congratulations! You are the owner of one of the finest pumps on the market today. Crown® Pumps are products engineered and manufactured of high quality components. Over one hundred years of pump building experience along with a continuing quality assurance program combine to produce a pump which will stand up to the toughest pumping projects.

This pump manual will provide helpful information concerning installation, maintenance, and proper service guidelines.

B-2) Receiving:

Upon receiving the pump, it should be inspected for damage or shortages. If damage has occurred, file a claim immediately with the company that delivered the pump. If the manual is removed from the crating, do not lose or misplace.

B-3) Storage:

Short Term - Crown Pumps are manufactured for efficient performance following long inoperative periods in storage. For best results, pumps can be retained in storage, as factory assembled, in a dry atmosphere with constant temperatures for up to six (6) months.

Long Term - Any length of time exceeding six (6) months, but not more than twenty four (24) months. The units should be stored in a temperature controlled area, a roofed over walled enclosure that provides protection from the elements (rain, snow, wind blown dust, etc.), and whose temperature can be maintained between +40 deg. F and +120 deg. F. If extended high humidity is expected to be a problem, all exposed parts should be inspected before storage and all surfaces that have the paint scratched, damaged, or worn should be recoated with a water base, air dry enamel paint. All surfaces should then be sprayed with a rust-inhibiting oil.

B-4) Service Centers:

For the location of the nearest Crown Service Center, check your representative or Crane Pumps & Systems, Inc., in Piqua, Ohio, telephone (937) 778-8947 or Crane Pumps & Systems Canada, Bramton, Ontario, (905) 457-6223.

SECTION C: INSTALLATION RECOMMENDATIONS:

C-1) Location:

Locate the pump as close to the source of supply as possible. Although the pump will operate on suction lifts of 25 feet, it is desirable to keep the suction lift less than 15 feet, if possible. The closer the pump can be located to the source of supply, the faster the pump will prime and a greater capacity can be pumped.

All pump units rotate clockwise when looking from the motor end (driven end) of the pump. Also, rotation arrows are located on the pump. On three phase units with threaded suction/discharge connections the impellers are threaded on the shaft and it is necessary to slide one half of the flexible coupling back when checking rotation in order to eliminate the possibility of unscrewing the impeller and damaging the pump. **NOTE:** Where impellers thread on pump shaft, never check the direction of electric motor rotation without first disconnecting flexible coupling.

Locate the pump on a firm footing to make sure the pump will not move due to vibration. Flex coupled and V-belt driven units should be permanently grouted onto a cement foundation. The pumps should be level to provide favorable operating conditions. In addition, the flexible coupling should be realigned after grouting in order to eliminate excessive wear on the coupling.

Allow a minimum of 18 inches in front of the pump case cover or hatch cover to permit easy removal and access to the interior of the pump. On belt driven units, allow a minimum of 10 inches at the shaft end to permit easy removal of the pedestal or rotating cartridge.

C-2) Suction:

It is advisable to use a suction line of the same size as the pump port size. All horizontal suction lines should slope up to the pump to avoid trapped air pockets. An adjustable stand, pipe clamp or floor flange must be installed to support the weight of the suction line. On suction lifts less than 5 feet, it is sometimes possible to increase capacity slightly by oversizing the suction line, but oversized suction pipe on high suction lifts will create priming problems. Using a smaller suction line than the pump port size can cause internal damage to the pump.

The suction line must not have holes, even small holes. The smallest air leak in the suction line may prevent the pump from priming. Coat all threaded connections in the suction line with pipe thread compound to insure an air tight joint. In addition, suction flanges should be pulled up tight to prevent air leaks. Where fiber gaskets are used, coat them with grease.

Use a strainer on suction line to prevent the entrance of oversize solids. This strainer should be submerged deep enough to prevent air from being drawn into the suction line, thus reducing the pump's capacity and pressure.



CAUTION! - This pump should not be operated without a strainer on the end of the suction line to prevent sticks, stones, rags and other foreign matter from being drawn into the impeller. The strainer should be cleaned regularly to insure full flow.

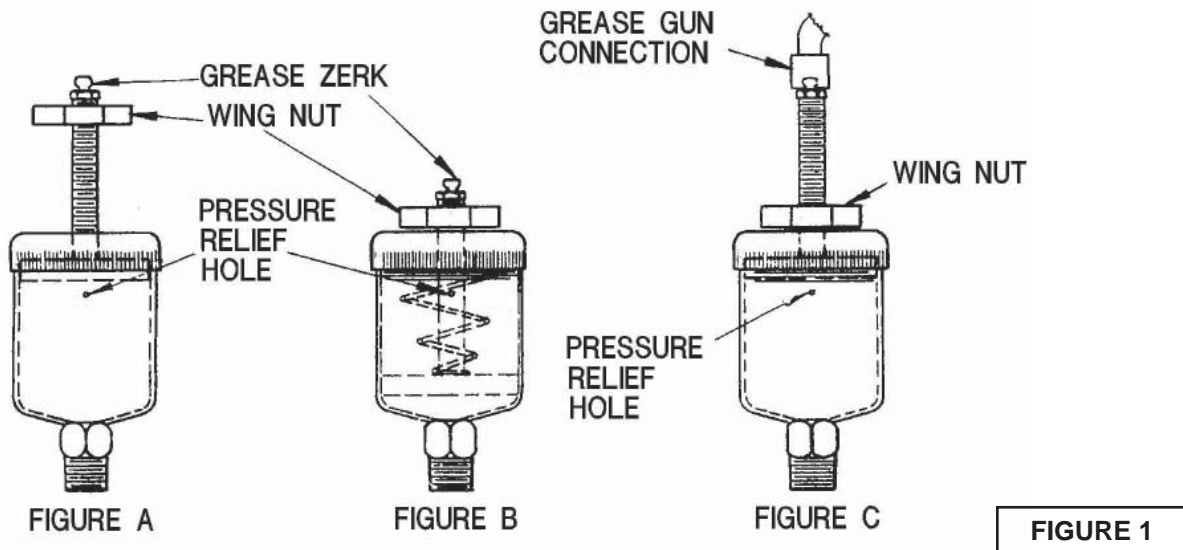
C-3) Discharge:

Connect discharge hose or pipe to discharge on pump. If Discharge hose is used, protect it from being driven over. Do not use quick closing check valves.

SECTION D: OPERATION RECOMMENDATIONS:

1. Fill the pump case with liquid prior to starting the pump. A self priming pump does require the case to be at least 2/3 full of liquid in order to self prime. Operate at sufficient speed to prime pump. Generally speaking, the pump will prime faster if it is operated at a fast speed.

2. Place the self-feeding grease lubricator in operation by turning the wing nut on the threaded plunger shaft counter clockwise as far as it will go. Do not force the plunger into the grease cup as this can cause a seal failure. See Maintenance Recommendations, Paragraphs 1 and 2 for instructions on filling the grease cup.



3. In cold weather operation, the pump will not freeze as long as it is running. However, it may freeze if it is not drained while standing idle. To drain the pump, remove the drain plug at the bottom of the pump case and rotate the impeller at least once to assure removal of all the water.

4. The discharge of a self priming centrifugal pump may be closed briefly without damaging the pump. However, the water will soon heat up and this can damage to the pump seal.

5. It is not desirable to run the pump without liquid in the pump case. If the pump must be run in order to check the operation of the engine or motor, fill the case with sufficient water to keep the rotating seal wet. This will eliminate damage to the seal and other pump parts.

6. If the pump has been idle for some time, the impeller may appear to be stuck or locked in place. This is usually caused by a film of rust or dirt between the impeller and volute. A little extra force on the crank may break it loose. If not, the pump must be dismantled.

SECTION E: MAINTENANCE RECOMMENDATIONS:

E-1) Seal Lubrication:

A self-feeding lubricator is provided to supply grease to the shaft seal of the pump. The grease cup is empty when the wing nut, positioned at the outer end of the threaded plunger shaft, recedes to the cap of the grease cup. To refill the grease cup, rotate the wing nut clockwise as far as it will go, attach a zerk gun to the zerk fitting, then fill until grease oozes from the relief hole on the side of the cup. For operation, return the wing nut to the end of the plunger. Never force the plunger into the grease cup as this can cause seal failures. (See Fig. 1)

A #1 grease is normally recommended. However, where high ambient temperatures are encountered, such as in direct sunlight, a #2 grease can be used. Use a water resistant, nonfibrous grease. Lithium base greases are excellent and molydisulphide is acceptable. Normally, the sodium soap base greases are the only non-water resistant types that are not acceptable for mechanical seal lubrication.

If the pump is inoperative for a long period of time, or appears not to use any grease, remove and clean the cup thoroughly. Caked grease in the cup can create a problem of non-lubrication to the seal. Under normal conditions, a grease cup full of grease will last three to four months. If a grease seal requires grease every day, and it is not leaking past the outer lip seal it indicates that the seal is wearing out. The internal pressure of the pump will often force the cup plunger out when the seal leaks badly.

E-2) Shaft Seal Replacement:

All parts of the pump are easily dismantled by simply removing nuts and screws. Rotating parts of the shaft seal grip the shaft by friction and may be frozen to the shaft through long usage.

If the mechanical shaft seal is not leaking and it is necessary to dismantle part of the pump for inspection or cleaning **DO NOT** disturb the shaft seal other than its spring if the impeller is removed. Once a shaft seal has been in operation it cannot be removed and replaced without leaking.



CAUTION ! - Handle parts with extreme care. Do not scratch or mar lapped surfaces.

It is recommended to remove the pump side from the support bracket. After the pump has been disassembled make sure that the shaft and seat areas in the pump side are as clean as possible. The shaft must not be sharp, but neatly rounded and polished to a 1/32" radius. This radius and the shaft, on which the rubber bellows grips, must be polished with 180 to 240 grit emery cloth. The seal will install relatively easy if the shaft is properly polished.

Install the seat assembly (1 and 2 or 1A and 2A, see Figure 2) in pump side adapter (12) using SAE# 10 oil on the rubber parts. They may install easier by first inserting the rubber part and then sliding the seat part into the rubber. All of this must be done with the fingers only.

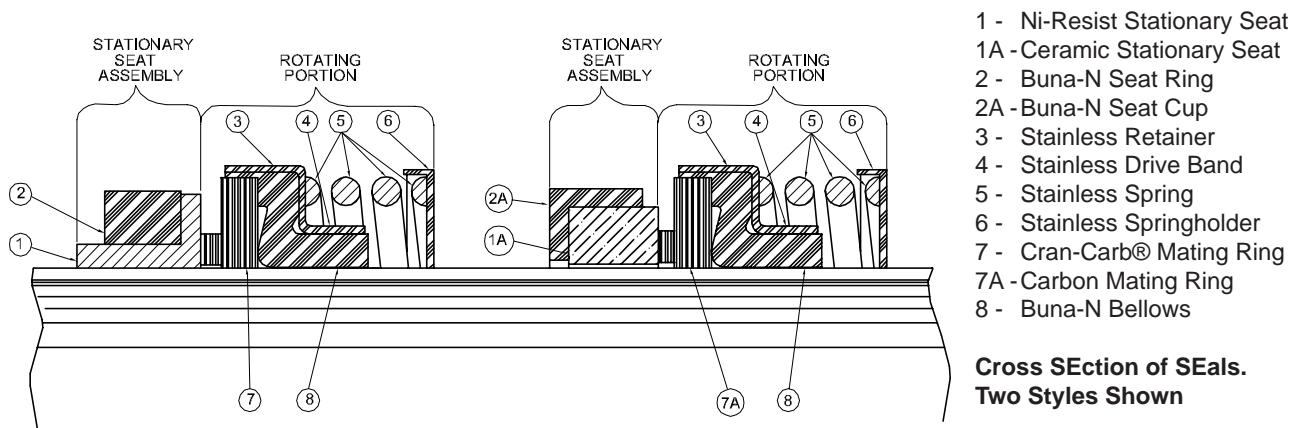


FIGURE 2

Now assemble the spring and rotating portion of the seal onto the impeller shaft (19). Lubricate the impeller shaft (19) and the inside of the bellows each with 2 or 3 drops of SAE# 10 oil. Install this assembly into adapter (12), this may take several minutes, therefore, oscillate the seal back and forth on the shaft to make sure it does not stick to the shaft until gage pin is in place and the clamp tightened.

If for any reason the gage pin does not give proper clearance, quickly adjust the impeller clearance before the rubber bellows seats on the shaft.

E-3) Impeller:

These pumps have their impellers threaded on with right hand threads.

The clearance between an open faced impeller and its wear surface in the volute is set at the factory at approximately .015 inches. This clearance is re-adjustable by relocating the shaft at the clamping arrangement. In cases where much sand is being pumped, close clearances may bind the impeller and volute and overload the motor. It may be necessary to provide extra clearance on these.

When reassembling a dismantled pump, clean all parts and especially areas where gaskets and o-rings are located. Grease all gaskets and o-rings and areas where o-rings must slide when assembling.

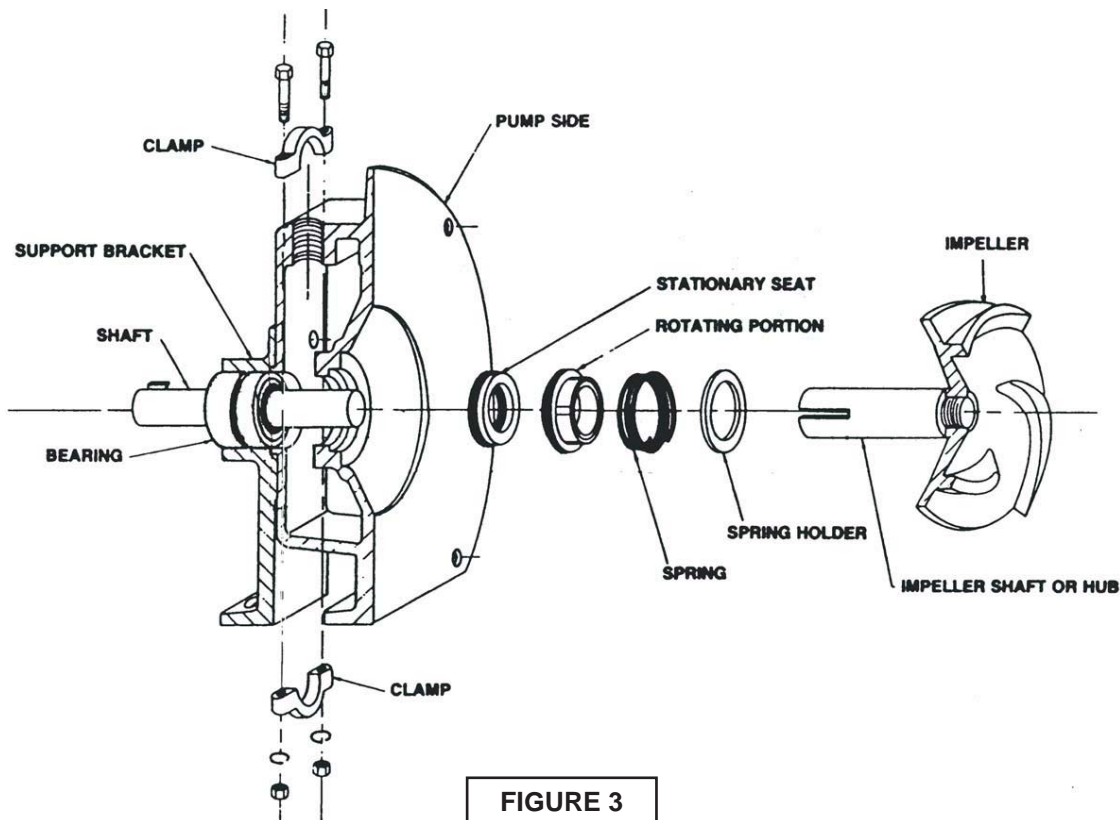


FIGURE 3

TROUBLE SHOOTING

CAUTION ! Always disconnect the pump from the electrical power source before handling.
If the system fails to operate properly, carefully read instructions and perform maintenance recommendations.

SYMPTOM	POSSIBLE CAUSE(S)	CHECK
A. Pump not primed - Vacuum gauge reading less than normal	1. Air leak in suction side of system.	a. Threaded joints in suction line for tight fit b. Gasket in suction line for tight fit c. O-rings in case cover for nicks or cuts d. Mechanical seal for air leaks e. Bottom drain plug for air leaks f. O-rings in pump side for nicks or cuts g. Vacuum gauge may be leaking internally
	2. Air bleed line blocked, or Air bleed valve closed.	a. Check line or valve
	3. Insufficient liquid in case	a. Pump case for water level b. Suction check valve for obstructions or deterioration
	4. Operating speed too low	a. Belts for proper tension b. Motor for low voltage
	5. Plugged pump	a. Impeller for lodge foreign material b. Vent line for stoppage
	6. Mechanical defects	a. Impeller - volute for proper clearance b. Impeller and volute for damage c. Pump for worn parts
B. Pump not priming - Vacuum gauge reads more than normal	1. Suction side of system clogged	a. End of suction line for obstructions b. Suction pipe for obstructions c. Suction check valve for obstructions
C. Pump primes - Vacuum gauge reads normal, discharge gauge reads lower than normal	1. Small air leak in suction side of system	a. For excessive air in discharge line b. Refer to A-1, a through g
	2. Pump speed too slow	a. Belts for proper tension b. Motor for low voltage
	3. Mechanical defects	a. Impeller - volute for proper clearance b. Impeller and volute for damage c. Pump for worn parts
D. Pump primes - Vacuum gauge reads near normal, Discharge gauge reads higher than normal	1. Plugged discharge	a. Discharge line for obstructions b. Discharge valves to insure proper operation
E. Pump loses prime when shut off - Vacuum gauge recedes to zero	1. Check valve leaking	a. Check valve for obstructions or deterioration b. Leak in suction pipe threads or flanges c. Water level bubbler control line too close to suction pipe d. The influent liquid for churning air into the sump and entering the suction pipe

TROUBLE SHOOTING

CAUTION ! Always disconnect the pump from the electrical power source before handling.
If the system fails to operate properly, carefully read instructions and perform maintenance recommendations.


SYMPTOM	POSSIBLE CAUSE(S)	CHECK
F. Pump loose prime during operation - vacuum gauge recedes to zero	1. Drawdown too great	a. Automatic cut-off control for failure
	2. Pump taking air	a. Suction line for leak between cut-out and cut-off b. End of suction line for vortexing to suction pipe c. Water level bubbler control line too close to suction pipe d. The influent liquid for churning air into the sump and entering the suction pipe
G. Pump primed and pumping, but too noisy	1. Loose foundation	a. Foundation bolts for looseness b. Grouting c. For cracks
	2. Air leaks	a. Refer to A-1, a through g
	3. Cavitation	a. Drawdown too great b. Capacity too great c. Unit not operating in proper NPSH range d. If reducing capacity quiets pump, then (c) above is cause, close discharge valve partially
	4. Bearings	a. Balls for wear b. Oil reservoir for lubrication
	5. Misalignment	a. Coupling for proper alignment b. Check base, not properly bolted down
	6. Vibration	a. Impeller for partial obstruction b. Operating in cavitation range c. Misalignment of coupling
H. Motor running too hot	1. Low voltage	a. Voltage at motor terminals when loaded
	2. Overload	a. Amps at motor terminals when loaded b. Trash lodged in pump impeller c. Motor not large enough
I. Motor will not run	1. Overload relay kicked out	a. For one or more blown fuses b. Fuses for proper size c. For low voltage
	2. Three phase motor hums but will not rotate	a. For one of 3 blown fuses
	3. Automatic sump control failure	a. Float rod for corrosion b. Air bubbling pump not working c. Air line for stoppage

SECTION K: REPLACEMENT PARTS

K-1 ORDERING REPLACEMENT PARTS:

When ordering replacement parts, ALWAYS furnish the following information:

1. Pump serial number and date code.
2. Pump model number.
3. Pump part number.
4. Part description.
5. Item part number.
6. Quantity required.
7. Shipping instructions.
8. Billing Instructions.



SERIAL NO. ①

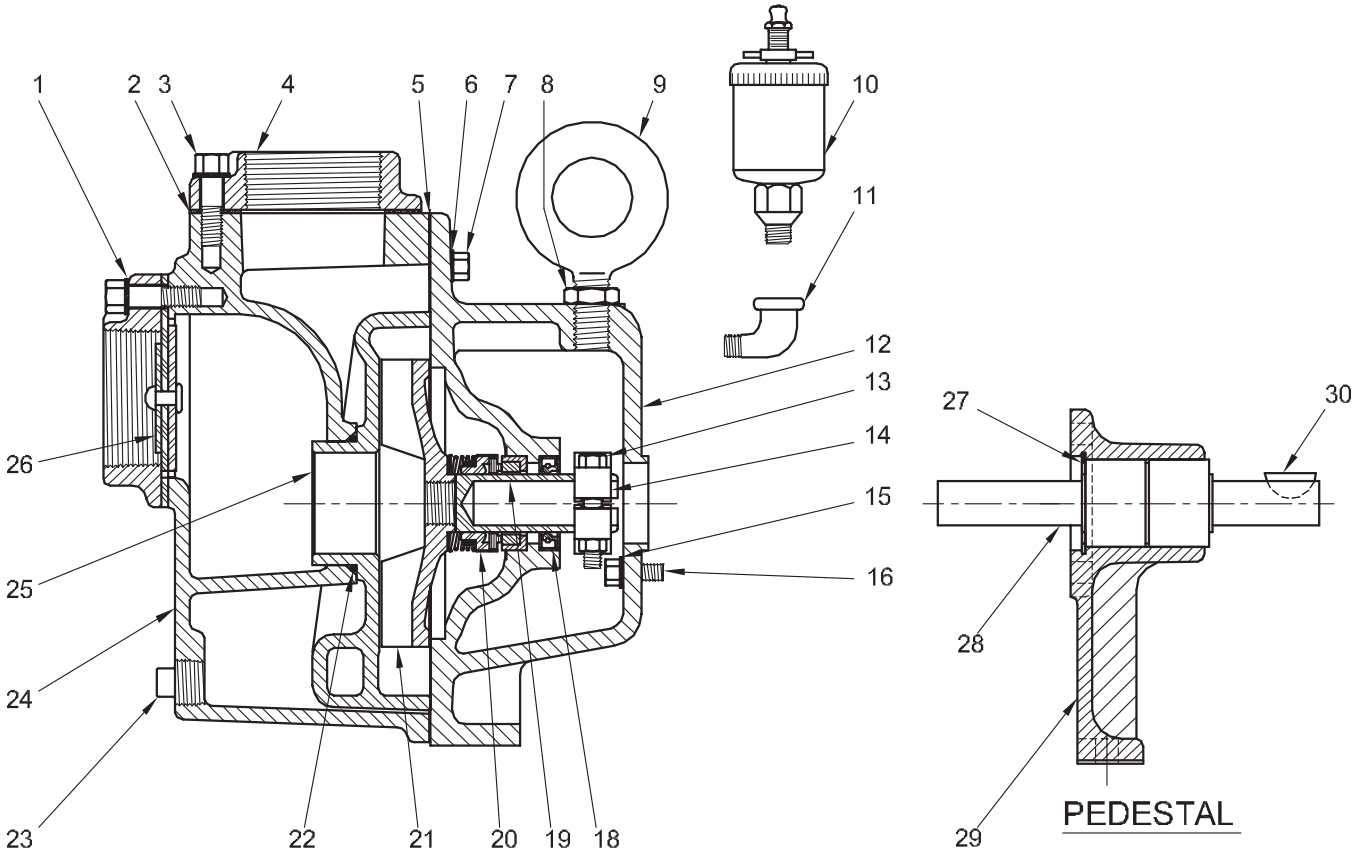
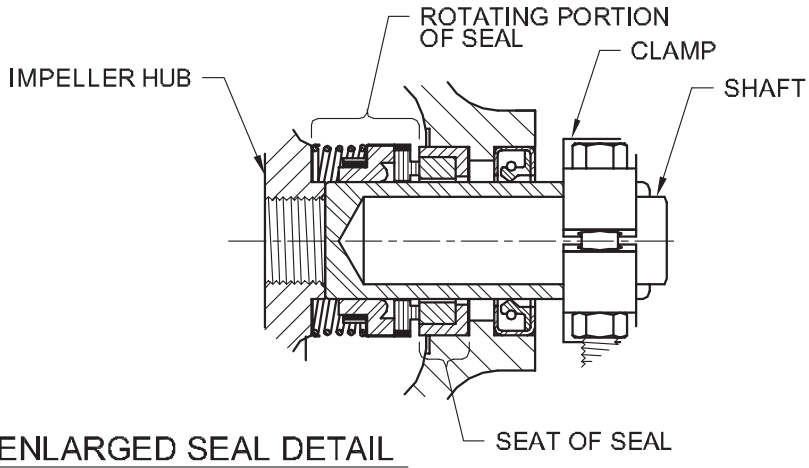
MODEL NO. ②

PART NO. ③

IMPELLER DIA.

IMPORTANT ! When Ordering Parts, ALWAYS Provide The Complete Part Number, Serial Number and Model Number. Information Subject To Change Without Notice.

MODEL: B4, B6, B9

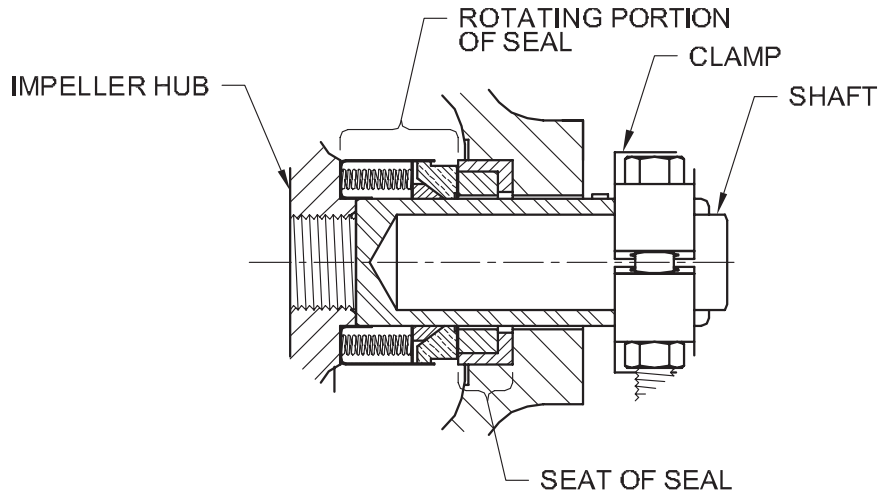


MODEL: B4, B6, B9

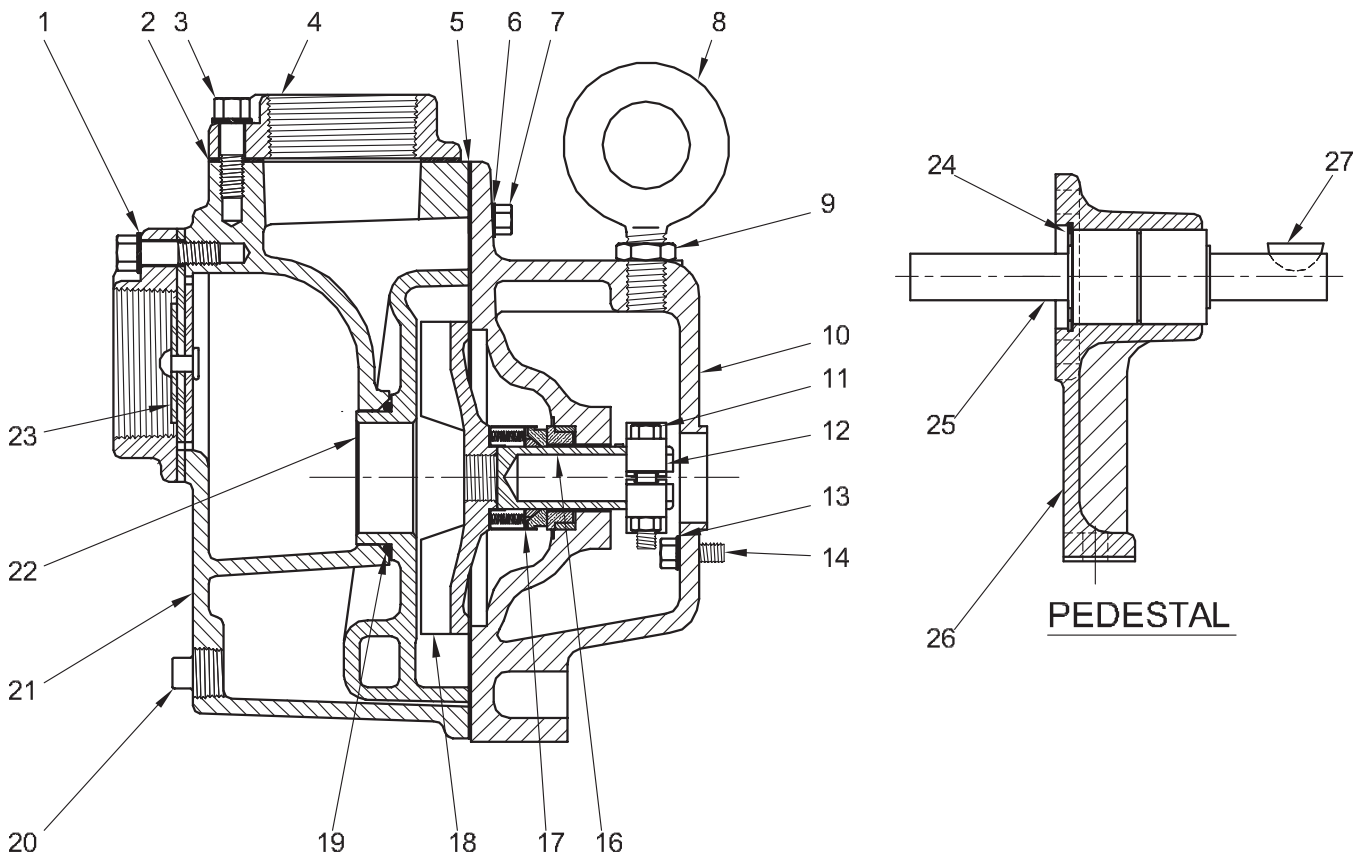
PARTS LIST

ITEM	QTY.	PART NO	DESCRIPTION	
1	6	20-14-1	Washer, Lock, Split,	3/8", Stainless
2	1	MT-8650	Gasket, Flange	
3	6	1-36-1	Screw, Hex Hd.	3/8-16 x 1.25"Lg, Stainless
4	2	FP-4487	Flange 1-1/2" (B4, B6)	
	2	FP-4488	Flange 2" (B9)	
5	1	T-28700	Gasket, Pump Case	
6	6	20-22-1	Washer, Lock, Split	5/16", Stainless
7	6	1-156-1	Screw, Hex Hd.	5/16-18 x 1.00"Lg, Stainless
8	1	15-22-6	Nut, Hex, Jam	5/8-11, Zinc Plated
9	1	M-5087	Bolt, Eye	5/8-11, Steel
10	1	M-3415	Cup, Grease	
11	1	625-01179	Elbow, Street	1/4", Galv.
12	1	FP-4446-A	Adapter, Side, Pump	
13	2	1-135-1	Screw, Hex Hd.	5/16-18 X 1.75", Stainless
	2	20-22-1	Washer, Lock, Split	5/16", Stainless
	2	15-19-1	Nut, Hex 5/16-18, Stainless	
14	2	PSS-4476	Clamp, Impeller	
15	4	20-22-6	Washer, Lock, Split	5/16", Zinc Plated
16	4	1-129-6	Screw, Hex Hd.	5/16-18 X .75", Zinc Plated
18	1	M-8759	Seal, Lip	
19	1	TS-29790	Hub, Impeller	Stainless
20	1	M-4292-F	Seal, Mechanical 1.00"	
21	1	FP-4300-A	Impeller (B4)	
	1	FP-4126-D	Impeller (B6, B9)	
22	1	M-5291	O-Ring	
23	1	525-00157	Plug, Pipe	1/2" NPT, Nylon
24	1	FP-4486	Case, Pump	
25	1	FP-4097	Volute (B4)	
	1	FP-4097-A	Volute (B6, B9)	
26	1	A-6064	Check Valve Assembly	
27	1	625-02840	Ring, Retaining	
28	1	T-29373	Shaft And Bearing Assembly	
29	1	FP-4417	Pedestal	
30	1	M-7313	Key, Woodruff	
	1	T-25856	Spacer, Pump Foot	(Not Shown)
	1	510-00234	Guard, Left,	(Not Shown)
	1	510-00235	Guard, Right,	(Not Shown)
	1	625-01652	Plug, Pipe	1" NPT, C.I. (Not Shown)

MODEL: SB4, SB6, SB9



ENLARGED SEAL DETAIL

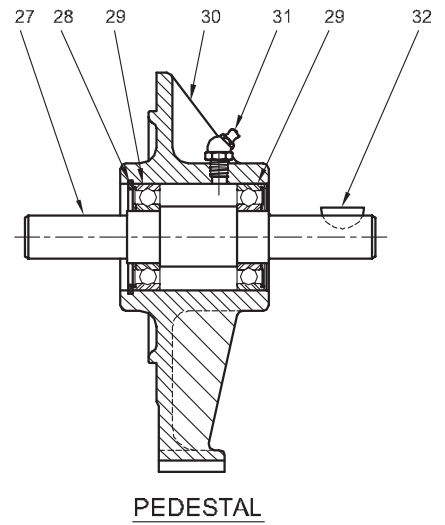
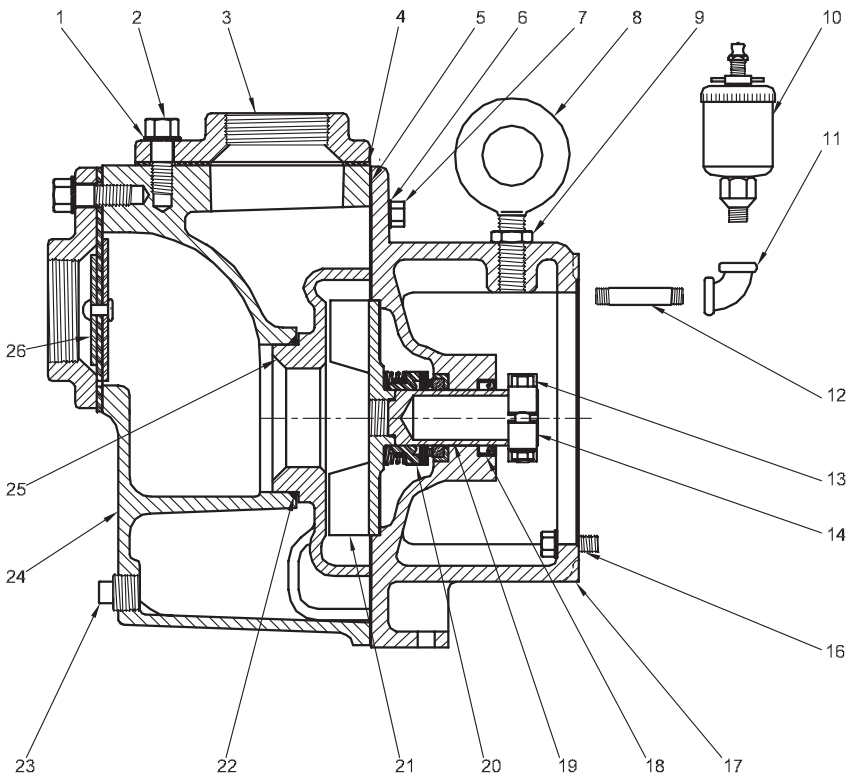
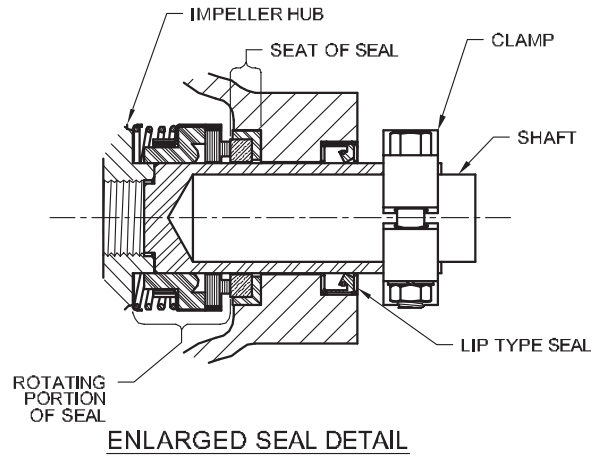


MODEL: SB4, SB6, SB9

PARTS LIST

ITEM	QTY.	PART NO	DESCRIPTION	
1	6	1-36-1	Screw, Hex Hd	3/8-16 x 1.25"Lg, Stainless
2	1	M-9597	Gasket, Flange	Viton
3	6	20-14-1	Washer, Lock, Split	3/8", Stainless
4	2	FSS-4487	Flange 1-1/2"	(SB4, SB6)
	2	FSS-4488	Flange 2", (SB9)	
5	1	M-9595	Gasket, Pump Case	Viton
6	6	1-156-1	Screw, Hex Hd.	5/16-18 x 1.00"Lg, Stainless
7	6	20-22-1	Washer, Lock, Split	5/16", Stainless
8	1	M-5087	Bolt, Eye	5/8-11, Steel
9	1	15-22-6	Nut, Hex	5/8-11, Zinc Plated
10	1	FSS-4446-B	Adapter, Side, Pump	
11	2	1-135-1	Screw, Hex Hd.	5/16-18 x 1.75", Stainless
	2	20-22-1	Washer, Lock, Split	5/16", Stainless
	2	15-19-1	Nut, Hex	5/16-18, Stainless
12	2	PSS-4476	Clamp, Impeller	
13	4	20-22-6	Washer, Lock, Split	5/16", Zinc Plated
14	4	1-129-6	Screw, Hex Hd.	5/16-18 x .75", Zinc Pltd.
16	1	TS-29790-A	Hub, Impeller	Stainless
17	1	525-00298-001	Seal, Mechanical 1.00"	
18	1	FSS-4300-A	Impeller (SB4)	
	1	FSS-4126-C	Impeller (SB6, SB9)	
19	1	M-9431	O-Ring Viton	
20	1	625-02786	Plug, Pipe	1/2" NPT, Stainless
21	1	FSS-4486	Case, Pump	
22	1	FSS-4097	Volute	
23	1	A-7913	Check Valve Assembly	
24	1	625-02840	Ring, Retaining	
25	1	T-29373	Shaft And Bearing Assembly	
26	1	FP-4417	Pedestal	
27	1	M-7313	Key, Woodruff	
	1	T-25856	Spacer, Pump Foot	(Not Shown)
	1	510-00234	Guard, Left	(Not Shown)
	1	510-00235	Guard, Right	(Not Shown)
	1	625-02787	Plug, Pipe	1.00" NPT, Stainless (Not Shown)

MODEL: B12

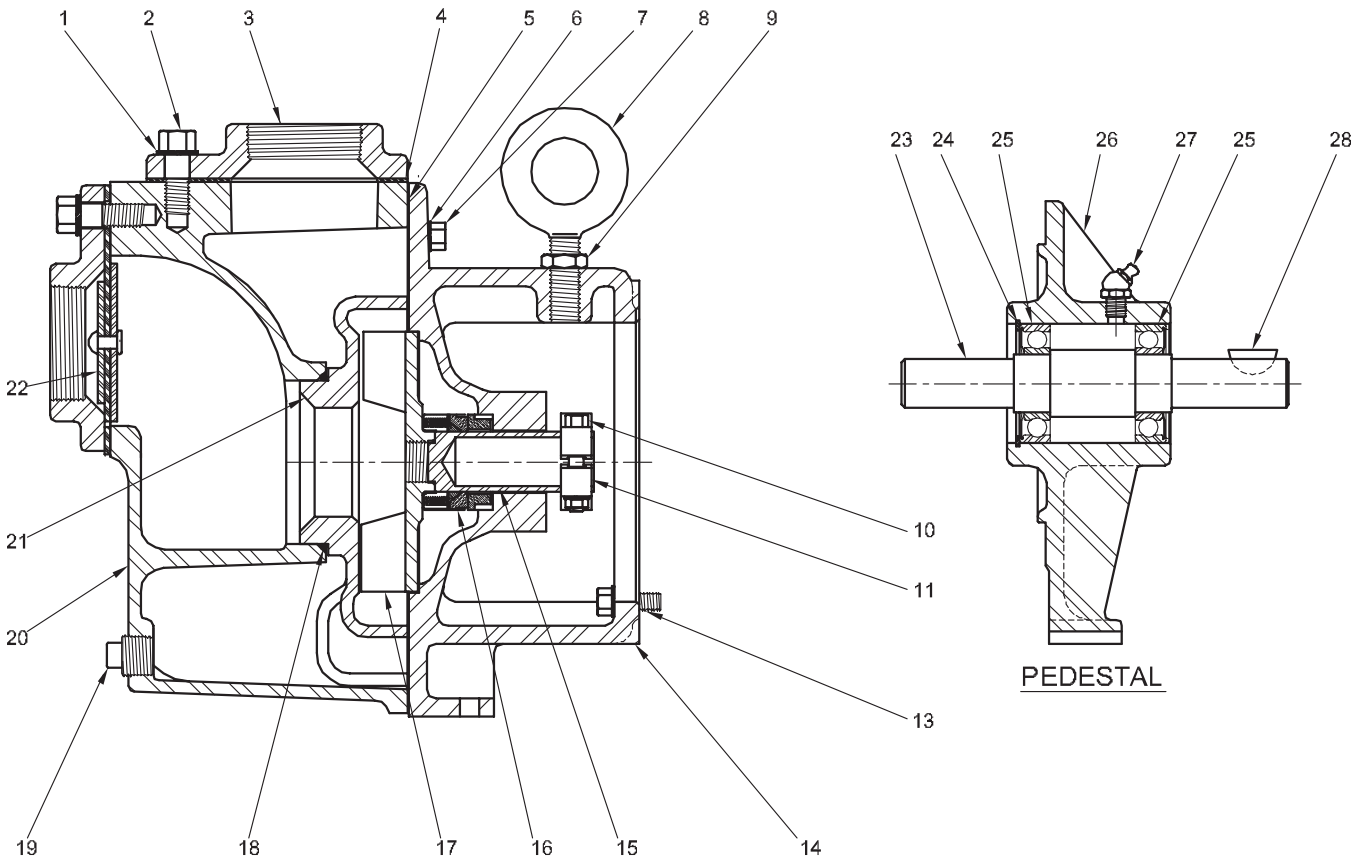
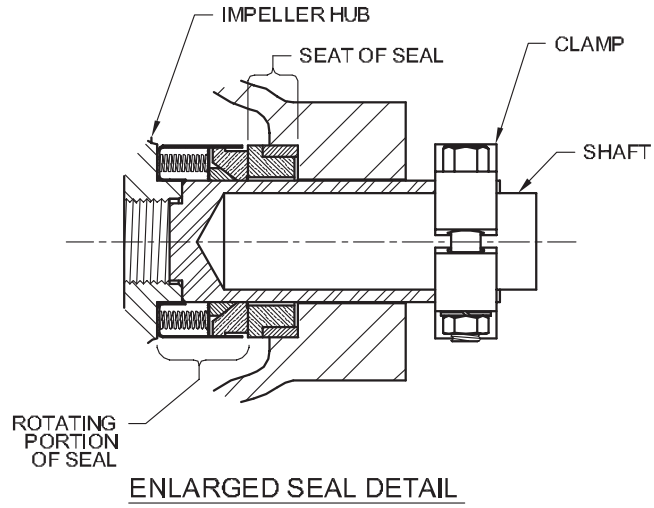


MODEL: B12

PARTS LIST

ITEM	QTY.	PART NO	DESCRIPTION	
1	6	20-15-1	Washer, Lock, Split	1/2", Stainless
2	6	1-68-1	Screw, Hex Hd.	1/2-13 x 1.25"Lg, Stainless
3	2	FP-4498	Flange 2"	
4	1	MT-8655	Gasket, Flange	
5	1	T-28699	Gasket, Pump Case	
6	6	20-14-1	Washer, Lock, Split	3/8", Stainless
7	6	1-34-1	Screw, Hex Hd.	3/8-16 x 1.00"Lg, Stainless
8	1	M-5087	Bolt, Eye	5/8-11, Steel
9	1	15-22-6	Nut, Hex	5/8-11, Zinc Plated
10	1	M-3415	Cup, Grease	
11	1	625-01188	Elbow	1/4" NPT, 90 Deg., Galv.
12	1	625-02835	Nipple, Pipe	1/4" NPT x 2.00"Lg, Steel
13	2	1-135-1	Screw, Hex Hd.	5/16-18 x 1.75"Lg, Stainless
	2	20-22-1	Washer, Lock, Split	5/16", Stainless
	2	15-19-1	Nut, Hex	5/16-18, Stainless
14	2	PSS-4477	Clamp, Impeller	
16	4	1-34-6	Screw, Hex Hd.	3/8-16 x 1.00" Lg, Zinc Plated
	4	20-14-6	Washer, Lock, Split	3/8", Zinc Plated
17	1	FP-4113-A	Adapter, Side, Pump	
18	1	M-3649	Seal, Lip	
19	1	TS-24907	Hub, Impeller	Stainless
20	1	M-3957-F	Seal, Mechanical 1.25"	
21	1	FP-4127-A	Impeller	
22	1	M-5352	O-Ring	
23	1	525-00157	Plug, Pipe	1/2" NPT, Nylon
24	1	FP-4497	Case, Pump	
25	1	FP-4502	Volute	
26	1	A-6089	Check Valve Assembly	
27	1	510-00048	Shaft	
28	1	525-00011	Ring, Retaining	
29	2	525-00009	Bearing	
30	1	501-00003	Pedestal	
31	1	625-02816	Zerk Fitting, Grease	
32	1	625-02805	Key, Woodruff	
	1	510-00236	Guard, Left	(Not Shown)
	1	510-00237	Guard, Right	(Not Shown)
	1	625-01652	Plug, Pipe	1" NPT, C.I. (Not Shown)

MODEL: SB12

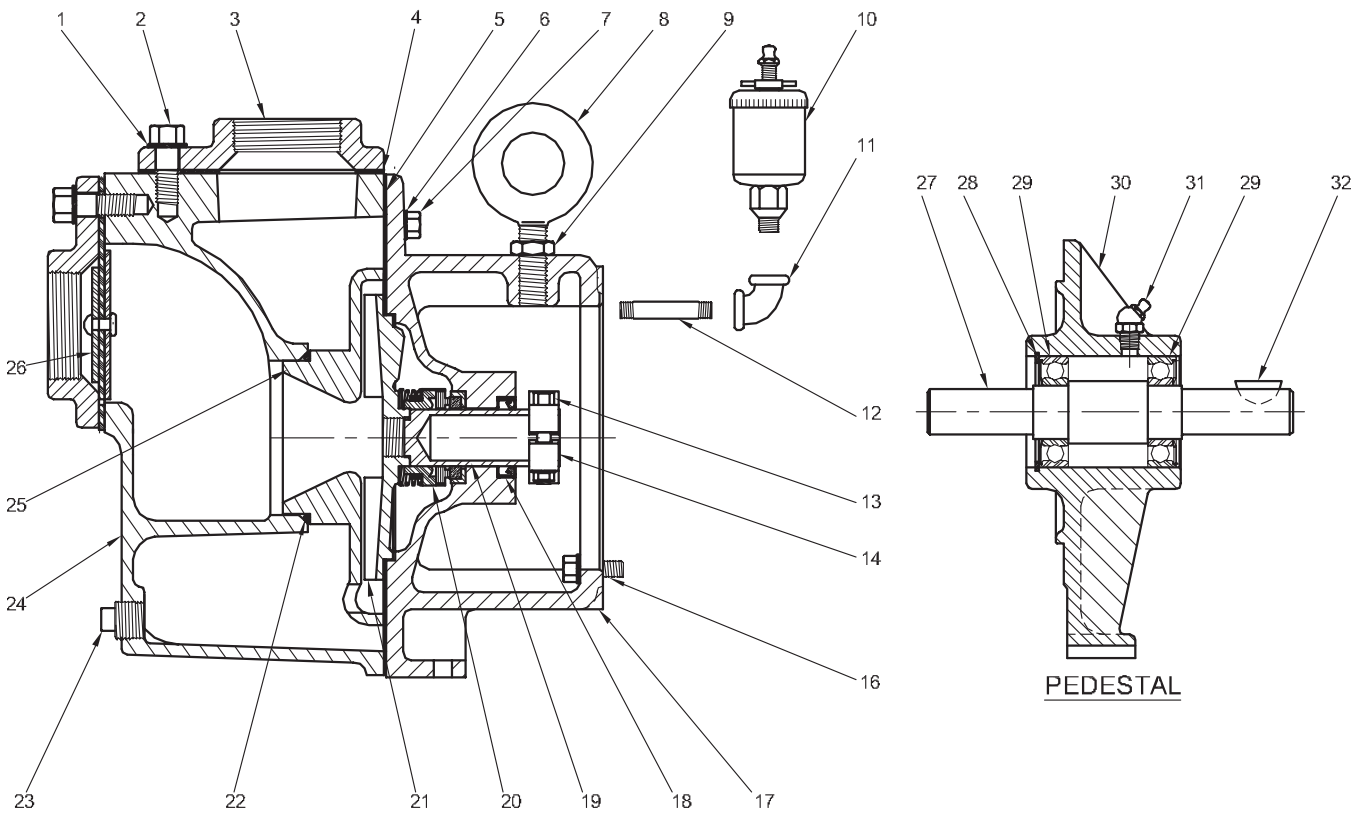
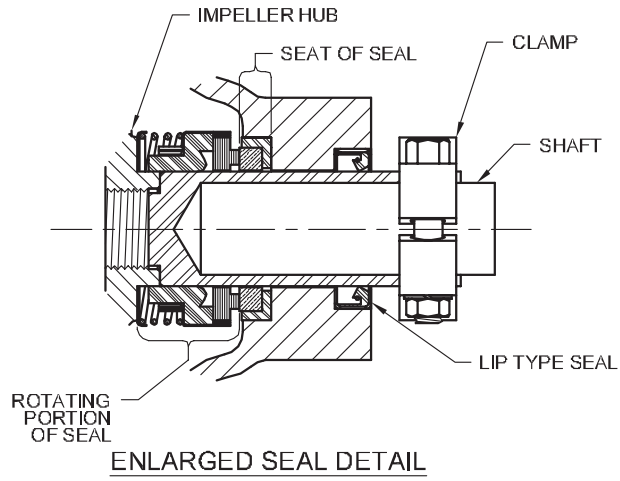


MODEL: SB12

PARTS LIST

ITEM	QTY.	PART NO	DESCRIPTION	
1	6	20-15-1	Washer, Lock, Split	1/2", Stainless
2	6	1-68-1	Screw, Hex Hd.	1/2-13 X 1.25"Lg, Stainless
3	2	FSS-4498	Flange 2"	
4	1	M-9596	Gasket, Flange	Viton
5	1	M-9594	Gasket, Pump Case	
6	6	20-14-1	Washer, Lock, Split	3/8", Stainless
7	6	1-34-1	Screw, Hex Hd.	3/8-16 x 1.00" Lg, Stainless
8	1	M-5087	Bolt, Eye	5/8-11, Steel
9	1	15-22-6	Nut, Hex	5/8-11, Zinc Plated
10	2	1-135-1	Screw, Hex Hd.	5/16-18 x 1.75" Lg, Stainless
	2	20-22-1	Washer, Lock, Split	5/16", Stainless
	2	15-19-1	Nut, Hex	5/16-18, Stainless
11	2	PSS-4477	Clamp, Impeller	
13	4	1-34-6	Screw, Hex Hd.	3/8-16 x 1.00" Lg, Zinc Plated
	4	20-14-6	Washer, Lock, Split	3/8", Zinc Plated
14	1	FSS-4113-B	Adapter, Side, Pump	
15	1	TS-24907-B	Hub, Impeller	Stainless
16	1	525-00299-001	Seal, Mechanical 1.25"	
17	1	FSS-4127-A	Impeller	
18	1	M-9430	O-Ring	Viton
19	1	625-02786	Plug, Pipe	1/2" NPT, Stainless
20	1	FSS-4497	Case, Pump	
21	1	FSS-4502	Volute	
22	1	A-7912	Check Valve Assembly	
23	1	510-00048	Shaft	
24	1	525-00011	Ring, Retaining	
25	2	525-00009	Bearing	
26	1	501-00003	Pedestal	
27	1	625-02816	Zerk, Fitting, Grease	
28	1	625-02805	Key, Woodruff	
	1	625-02787	Plug, Pipe	1.00" NPT, Stainless (Not Shown)
	1	510-00236	Guard, Left	(Not Shown)
	1	510-00237	Guard, Right	(Not Shown)

MODEL: BH7

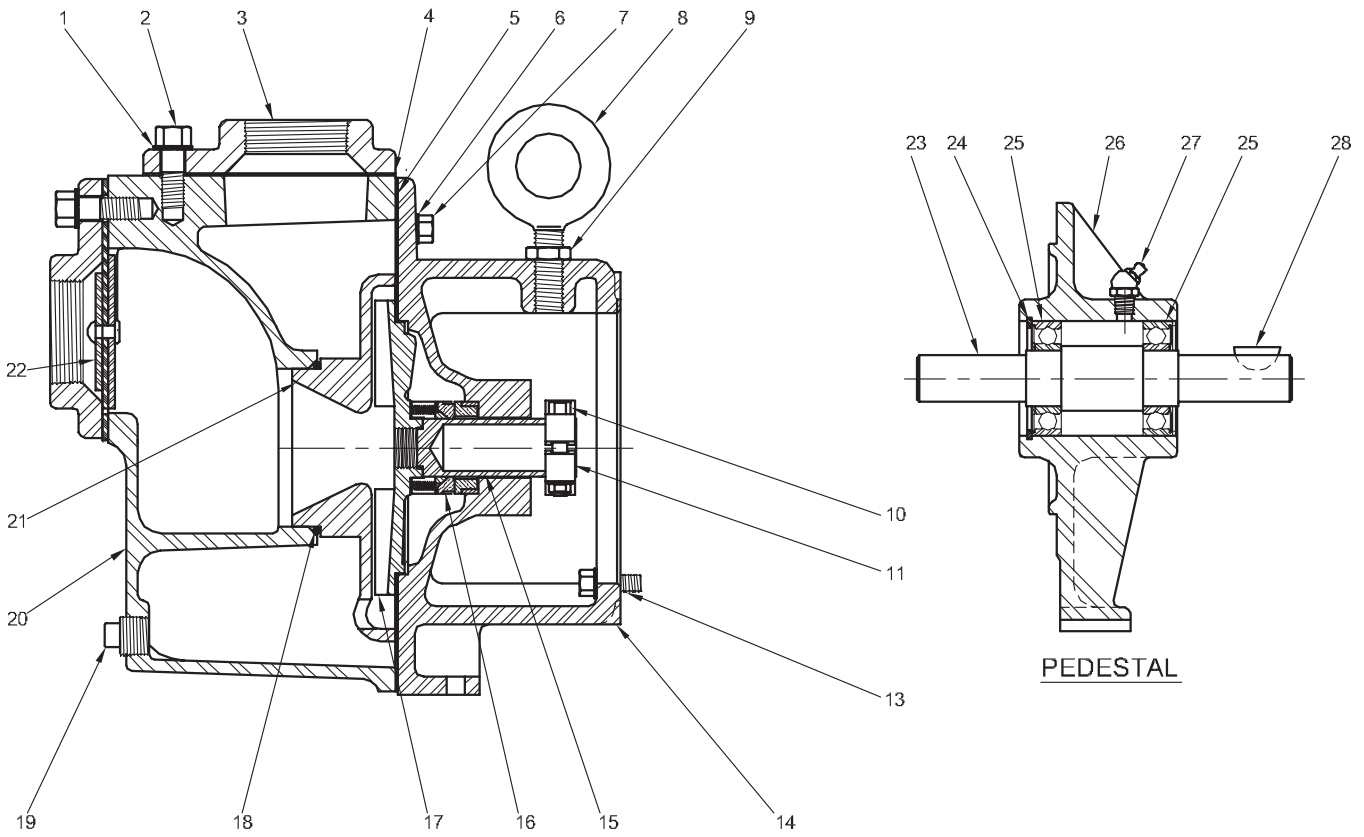
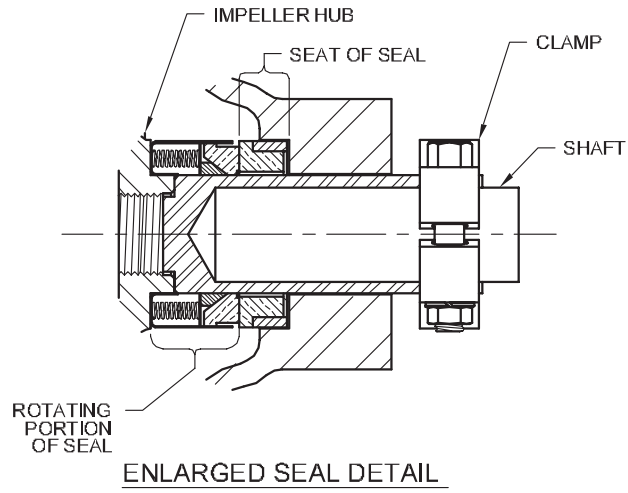


MODEL: BH7

PARTS LIST

ITEM	QTY.	PART NO	DESCRIPTION	
1	6	20-15-1	Washer, Lock, Split	1/2", Stainless
2	6	1-68-1	Screw, Hex Hd.	1/2-13 x 1.25" Lg, Stainless
3	2	FP-4498	Flange 2"	
4	1	MT-8655	Gasket, Flange	
5	1	T-28699	Gasket, Pump Case	
6	6	20-14-1	Washer, Lock, Split	3/8", Stainless
7	6	1-34-1	Screw, Hex Hd.	3/8-16 x 1.00" Lg, Stainless
8	1	M-5087	Bolt, Eye	5/8-11, Steel
9	1	15-22-6	Nut, Hex	5/8-11, Zinc Plated
10	1	M-3415	Cup, Grease	
11	1	625-01188	Elbow	1/4" NPT, 90 Deg., Galv.
12	1	625-02835	Nipple, Pipe	1/4" NPT x 2.00" Lg, Steel
13	2	1-135-1	Screw, Hex Hd.	5/16-18 x 1.75" Lg, Stainless
	2	20-22-1	Washer, Lock, Split	5/16", Stainless
	2	15-19-1	Nut, Hex	5/16-18, Stainless
14	2	PSS-4477	Clamp, Impeller	
16	4	1-34-6	Screw, Hex Hd.	3/8-16 x 1.00" Lg, Zinc Plated
	4	20-14-6	Washer, Lock, Split	3/8", Zinc Plated
17	1	FP-4113-A	Adapter, Side, Pump	
18	1	M-3649	Seal, Lip	
19	1	TS-24907	Hub, Impeller	Stainless
20	1	M-3957-F	Seal, Mechanical 1.25"	
21	1	FP-4268-A	Impeller	
22	1	M-5352	O-Ring	
23	1	525-00157	Plug, Pipe	1/2" NPT, Nylon
24	1	FP-4497	Case, Pump	
25	1	FP-4269-B	Volute	
26	1	A-6089	Check Valve Assembly	
27	1	510-00048	Shaft	
28	1	525-00011	Ring, Retaining	
29	2	525-00009	Bearing	
30	1	501-00003	Pedestal	
31	1	625-02816	Zerk Fitting, Grease	
32	1	625-02805	Key, Woodruff	
	1	510-00236	Guard, Left	(Not Shown)
	1	510-00237	Guard, Right	(Not Shown)
	1	625-01652	Plug, Pipe	1" NPT, C.I. (Not Shown)

MODEL: SBH7

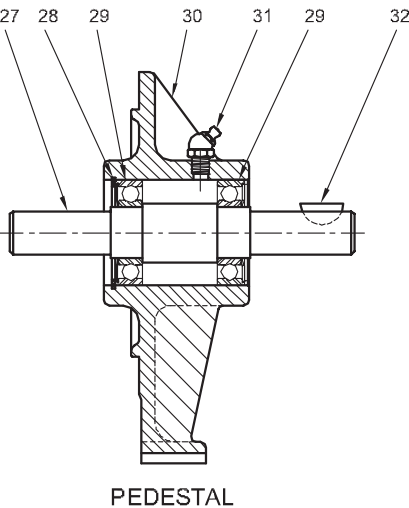
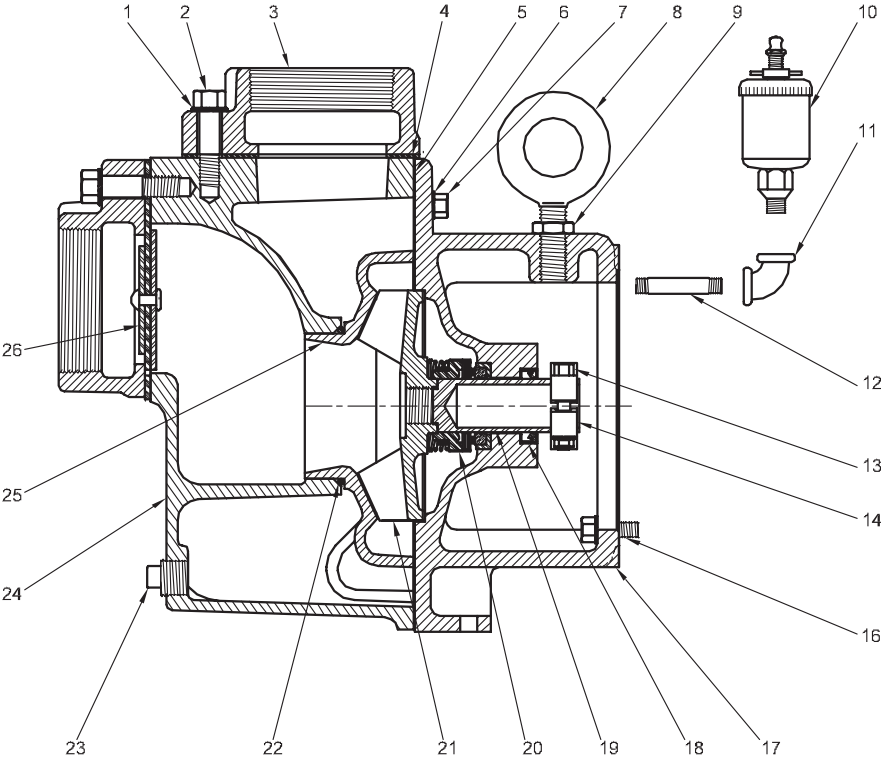
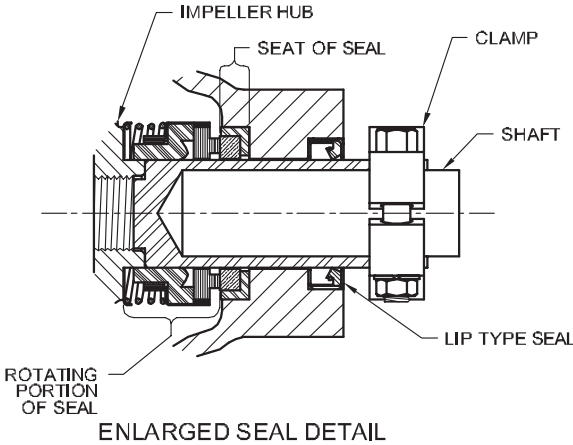


MODEL: SBH7

PARTS LIST

ITEM	QTY.	PART NO	DESCRIPTION	
1	6	20-15-1	Washer, Lock, Split	1/2", Stainless
2	6	1-68-1	Screw, Hex Hd.	1/2-13 X 1.25" Lg, Stainless
3	2	FSS-4498	Flange 2"	
4	1	MT-8655	Gasket, Flange	
5	1	T-28699	Gasket, Pump Case	
6	6	20-14-1	Washer, Lock, Split	3/8", Stainless
7	6	1-34-1	Screw, Hex Hd.	3/8-16 x 1.00" Lg, Stainless
8	1	M-5087	Bolt, Eye	5/8-11, Steel
9	1	15-22-6	Nut, Hex	5/8-11, Zinc Plated
10	2	1-135-1	Screw, Hex Hd.	5/16-18 x 1.75" Lg, Stainless
	2	20-22-1	Washer, Lock, Split	5/16", Stainless
	2	15-19-1	Nut, Hex	5/16-18, Stainless
11	2	PSS-4477	Clamp, Impeller	
13	4	1-34-6	Screw, Hex Hd.	3/8-16 x 1.00" Lg, Zinc Plated
	4	20-14-6	Washer, Lock, Split	3/8", Zinc Plated
14	1	FSS-4113-B	Adapter, Side, Pump	
15	1	TS-24907-B	Hub, Impeller	Stainless
16	1	525-00299-001	Seal, Mechanical 1.25"	
17	1	FSS-4268-A	Impeller	
18	1	M-9430	O-Ring Viton	
19	1	625-02786	Plug, Pipe	1/2" NPT, Stainless
20	1	FSS-4497	Case, Pump	
21	1	FSS-4269-B	Volute	
22	1	A-6089	Check Valve Assembly	
23	1	510-00048	Shaft	
24	1	525-00011	Ring, Retaining	
25	2	525-00009	Bearing	
26	1	501-00003	Pedestal	
27	1	625-02816	Zerk, Fitting, Grease	
28	1	625-02805	Key, Woodruff	
	1	625-02787	Plug, Pipe,	1.00" NPT, Stainless (Not Shown)
	1	510-00236	Guard, Left	(Not Shown)
	1	510-00237	Guard, Right	(Not Shown)

MODEL: B19, B21

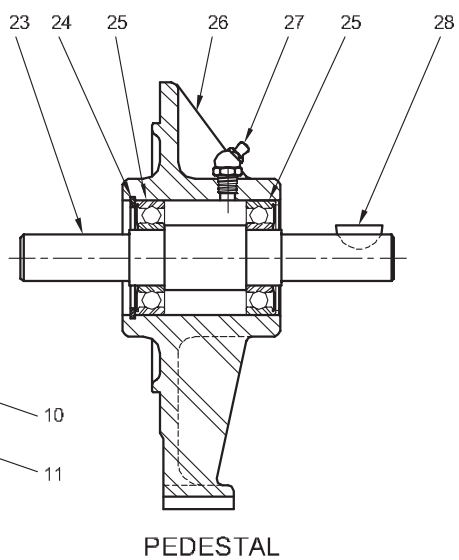
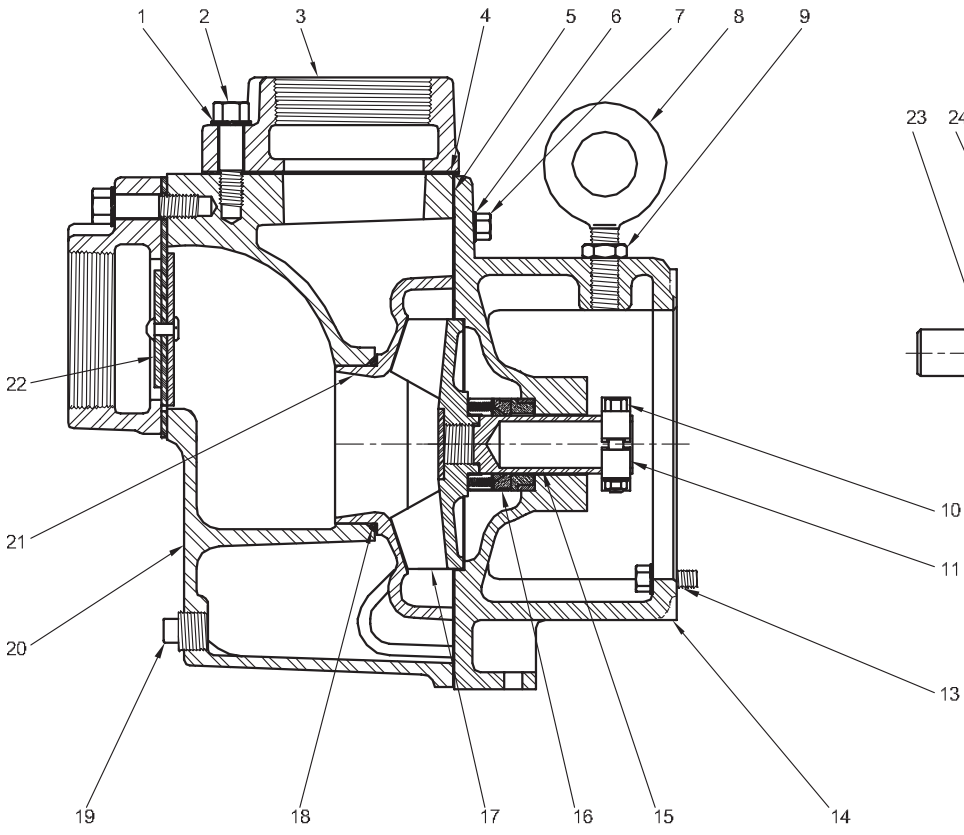
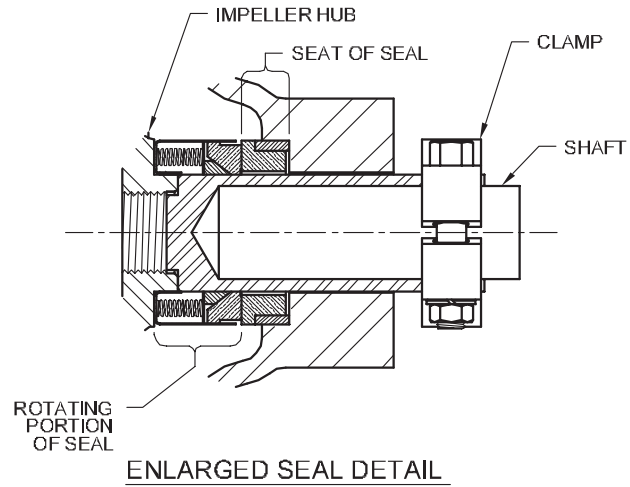


MODEL: B19, B21

PARTS LIST

ITEM	QTY.	PART NO	DESCRIPTION	
1	6	20-15-1	Washer, Lock, Split	1/2", Stainless
2	6	1-71-1	Screw, Hex Hd.	1/2-13 x 1.75" Lg, Stainless
3	2	FP-4499	Flange 3"	
4	1	MT-8655	Gasket, Flange	
5	1	T-28699	Gasket, Pump Case	
6	6	20-14-1	Washer, Lock, Split	3/8", Stainless
7	6	1-34-1	Screw, Hex Hd.	3/8-16 x 1.00" Lg, Stainless
8	1	M-5087	Bolt, Eye	5/8-11, Steel
9	1	15-22-6	Nut, Hex	5/8-11, Zinc Plated
10	1	M-3415	Cup, Grease	
11	1	625-01188	Elbow	1/4" NPT, 90 Deg., Galv.
12	1	625-02835	Nipple, Pipe,	1/4" NPT x 2.00", Steel
13	2	1-135-1	Screw, Hex Hd.	5/16-18 x 1.75" Lg, Stainless
	2	20-22-1	Washer, Lock, Split	5/16", Stainless
	2	15-19-1	Nut, Hex	5/16-18, Stainless
14	2	PSS-4477	Clamp, Impeller	
16	4	1-34-6	Screw, Hex Hd.	3/8-16 x 1.00" Lg, Zinc Plated
	4	20-14-6	Washer, Lock, Split	3/8", Zinc Plated
17	1	FP-4113-A	Adapter, Side, Pump	
18	1	M-3649	Seal, Lip	
19	1	TS-24907	Hub, Impeller	Stainless
20	1	M-3957-F	Seal, Mechanical 1.25"	
21	1	FP-4128-A	Impeller (B19)	
	1	FP-4169-D	Impeller (B21)	
22	1	M-5352	O-Ring	
23	1	525-00157	Plug, Pipe	1/2" NPT, Nylon
24	1	FP-4497	Case, Pump	
25	1	FP-4117	Volute (B19)	
	1	FP-4117-A	Volute (B21)	
26	1	A-6089	Check Valve Assembly	
27	1	510-00048	Shaft	
28	1	525-00011	Ring, Retaining	
29	2	525-00009	Bearing	
30	1	501-00003	Pedestal	
31	1	625-02816	Zerk Fitting, Grease	
32	1	625-02805	Key, Woodruff	
	1	510-00236	Guard, Left	(Not Shown)
	1	510-00237	Guard, Right	(Not Shown)
	1	625-01652	Plug, Pipe	1" NPT, C.I. (Not Shown)

MODEL: SB19, SB21



MODEL: SB19, SB21

PARTS LIST

ITEM	QTY.	PART NO	DESCRIPTION	
1	6	20-15-1	Washer, Lock, Split	1/2", Stainless
2	6	1-71-1	Screw, Hex Hd.	1/2-13 X 1.75" Lg, Stainless
3	2	FSS-4499	Flange 3"	
4	1	M-9596	Gasket, Flange	Viton
5	1	M-9594	Gasket, Pump Case	
6	6	20-14-1	Washer, Lock, Split	3/8", Stainless
7	6	1-34-1	Screw, Hex Hd.	3/8-16 x 1.00", Stainless
8	1	M-5087	Bolt, Eye	5/8-11, Steel
9	1	15-22-6	Nut, Hex	5/8-11, Zinc Plated
10	2	1-135-1	Screw, Hex Hd.	5/16-18 x 1.75" Lg, Stainless
	2	20-22-1	Washer, Lock, Split	5/16", Stainless
	2	15-19-1	Nut, Hex	5/16-18, Stainless
11	2	PSS-4477	Clamp, Impeller	
13	4	1-34-6	Screw, Hex Hd.	3/8-16 x 1.00" Lg, Zinc Plated
	4	20-14-6	Washer, Lock, Split	3/8", Zinc Plated
14	1	FSS-4113-B	Adapter, Side, Pump	
15	1	TS-24907-B	Hub, Impeller	Stainless
16	1	525-00299-001	Seal, Mechanical 1.25"	
17	1	N515-00211	Impeller (SB19)	
	1	N515-00212	Impeller (SB21)	
18	1	M-9430	O-Ring Viton	
19	1	625-02786	Plug, Pipe	1/2" NPT, Stainless
20	1	FSS-4497	Case, Pump	
21	1	FSS-4117	Volute (SB19)	
	1	FSS-4117-A	Volute (SB21)	
22	1	A-7912	Check Valve Assembly	
23	1	510-00048	Shaft	
24	1	525-00011	Ring, Retaining	
25	2	525-00009	Bearing	
26	1	501-00003	Pedestal	
27	1	625-02816	Zerk, Fitting, Grease	
28	1	625-02805	Key, Woodruff	
	1	625-02787	Plug, Pipe	1.00" NPT, Stainless (Not Shown)
	1	510-00236	Guard, Left	(Not Shown)
	1	510-00237	Guard, Right	(Not Shown)

BARNES®

BARNES®
PRESSURE **PS** SYSTEMS

CROWN

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WEINMAN®

DEMING®

PROSSER®

Limited 24 Month Warranty

Crane Pumps & Systems warrants that products of our manufacture will be free of defects in material and workmanship under normal use and service for twenty-four (24) months after manufacture date, when installed and maintained in accordance with our instructions. This warranty gives you specific legal rights, and there may also be other rights which vary from state to state. In the event the product is covered by the Federal Consumer Product Warranties Law (1) the duration of any implied warranties associated with the product by virtue of said law is limited to the same duration as stated herein, (2) this warranty is a LIMITED WARRANTY, and (3) no claims of any nature whatsoever shall be made against us, until the ultimate consumer, his successor, or assigns, notifies us in writing of the defect, and delivers the product and/or defective part(s) freight prepaid to our factory or nearest authorized service station. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply. **THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY AND ALL WARRANTIES WITH RESPECT TO ANY PRODUCT SHALL BE TO REPLACE OR REPAIR AT OUR ELECTION, F.O.B. POINT OF MANUFACTURE OR AUTHORIZED REPAIR STATION, SUCH PRODUCTS AND/OR PARTS AS PROVEN DEFECTIVE. THERE SHALL BE NO FURTHER LIABILITY, WHETHER BASED ON WARRANTY, NEGLIGENCE OR OTHERWISE.** Unless expressly stated otherwise, guarantees in the nature of performance specifications furnished in addition to the foregoing material and workmanship warranties on a product manufactured by us, if any, are subject to laboratory tests corrected for field performance. Any additional guarantees, in the nature of performance specifications must be in writing and such writing must be signed by our authorized representative. Due to inaccuracies in field testing if a conflict arises between the results of field testing conducted by or for user, and laboratory tests corrected for field performance, the latter shall control. **RECOMMENDATIONS FOR SPECIAL APPLICATIONS OR THOSE RESULTING FROM SYSTEMS ANALYSES AND EVALUATIONS WE CONDUCT WILL BE BASED ON OUR BEST AVAILABLE EXPERIENCE AND PUBLISHED INDUSTRY INFORMATION. SUCH RECOMMENDATIONS DO NOT CONSTITUTE A WARRANTY OF SATISFACTORY PERFORMANCE AND NO SUCH WARRANTY IS GIVEN.**

This warranty shall not apply when damage is caused by (a) improper installation, (b) improper voltage (c) lightning (d) excessive sand or other abrasive material (e) scale or corrosion build-up due to excessive chemical content. Any modification of the original equipment will also void the warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective parts. Neither will we accept charges incurred by others without our prior written approval.

This warranty is void if our inspection reveals the product was used in a manner inconsistent with normal industry practice and/or our specific recommendations. The purchaser is responsible for communication of all necessary information regarding the application and use of the product. **UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO TRAVEL EXPENSES, RENTED EQUIPMENT, OUTSIDE CONTRACTOR FEES, UNAUTHORIZED REPAIR SHOP EXPENSES, LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, WHICH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL AND/OR WORKMANSHIP AND/OR DAMAGE OR DELAYS IN SHIPMENT. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

No rights extended under this warranty shall be assigned to any other person, whether by operation of law or otherwise, without our prior written approval.



A Crane Co. Company

PUMPS & SYSTEMS

420 Third Street
Piqua, Ohio 45356
Phone: (937) 778-8947
Fax: (937) 773-7157
www.cranepumps.com

83 West Drive, Brampton
Ontario, Canada L6T 2J6
Phone: (905) 457-6223
Fax: (905) 457-2650

**IMPORTANT!
WARRANTY REGISTRATION**

Your product is covered by the enclosed Warranty.
To complete the Warranty Registration Form go to:

<http://www.cranepumps.com/ProductRegistration/>

If you have a claim under the provision of the warranty, contact your local
Crane Pumps & Systems, Inc. Distributor.

RETURNED GOODS

**RETURN OF MERCHANDISE REQUIRES A "RETURNED GOODS AUTHORIZATION".
CONTACT YOUR LOCAL CRANE PUMPS & SYSTEMS, INC. DISTRIBUTOR.**



**Products Returned Must Be Cleaned, Sanitized,
Or Decontaminated As Necessary Prior To Shipment,
To Insure That Employees Will Not Be Exposed To Health
Hazards In Handling Said Material. All Applicable Laws
And Regulations Shall Apply.**



A Crane Co. Company

PUMPS & SYSTEMS

START-UP REPORT

General Information

Pump Owner's Name: _____
 Address: _____
 Location of Installation: _____
 Contact Person: _____ Phone: _____
 Purchased From: _____

Nameplate Data

Pump Model #: _____ Serial #: _____
 Part #: _____ Impeller Diameter: _____
 Voltage: _____ Phase: _____ Ø Hertz: _____ Horsepower: _____
 Full Load Amps: _____ Service Factor Amps: _____
 Motor Manufacturer: _____

Controls

Control panel manufacturer: _____
 Model/Part number: _____
 Number of pumps operated by control panel: _____
 Short circuit protection? YES___ NO___ Type: _____
 Number and size of short circuit device(s): _____ Amp rating: _____
 Overload Type: _____ Size: _____ Amp rating: _____
 Do protection devices comply with pump and motor Amp rating? YES___ NO___
 Are all electrical and panel entry connections tight? YES___ NO___
 Is the interior of the panel dry? YES___ NO___
 Liquid level Control Brand and Model: _____

Pre-Startup

All Pumps

Type of equipment: NEW___ REBUILT___ USED___
 Condition of equipment at Start-Up: DRY___ WET___ MUDDY___
 Was Equipment Stored? YES___ NO___ Length of Storage: _____
 Liquid being pumped: _____ Liquid Temperature: _____
 Supply Voltage/Phase/Frequency matches nameplate? YES___ NO___
 Shaft turns freely? YES___ NO___
 Direction of rotation verified for 3Ø motors? YES___ NO___
 Debris in piping or wet well? YES___ NO___
 Debris removed in your presence? YES___ NO___
 Pump case/wet well filled with liquid before startup? YES___ NO___
 Is piping properly supported? YES___ NO___

Non-Submersible Pumps

Is base plate properly installed / grouted? YES___ NO___ N/A___
 Coupling Alignment Verified per I&O Manual? YES___ NO___ N/A___
 Grease Cup/Oil Reservoir Level checked? YES___ NO___ N/A___

Submersible Pumps

Resistance of cable and pump motor (measured at pump control):

Red-Black: _____ Ohms(Ω) Red-White: _____ Ohms(Ω) White-Black: _____ Ohms(Ω)

Resistance of Ground Circuit between Control Panel and outside of pump: _____ Ohms(Ω)

MEG Ohms check of insulation:

Red to Ground: _____ White to Ground: _____ Black to Ground: _____

Operational Checks

Is there noise or vibration present? YES___ NO___ Source of noise/vibration: _____

Does check valve operate properly? YES___ NO___ N/A___

Is system free of leaks? YES___ NO___ Leaks at: _____

Does system appear to operate at design flow rate? YES___ NO___

Nominal Voltage: _____ Phase: 1Ø 3Ø (select one)

Voltage Reading at panel connection, Pump OFF: L1, L2 _____ L2, L3 _____ L1, L3 _____

Voltage Reading at panel connection, Pump ON: L1, L2 _____ L2, L3 _____ L1, L3 _____

Amperage Draw, Pump ON: L1 _____ L2 _____ L3 _____

Submersible Pumps

Are BAF and guide rails level / plumb? YES___ NO___

Is pump seated on discharge properly? YES___ NO___

Are level controls installed away from turbulence? YES___ NO___

Is level control operating properly? YES___ NO___

Is pump fully submerged during operation? YES___ NO___

Follow up/Corrective Action Required

YES___ NO___

Additional Comments:

Startup performed by: _____ Date: _____

Present at Start-Up

() Engineer: _____ () Operator: _____

() Contactor: _____ () Other: _____

All parties should retain a copy of this report for future trouble shooting/reference



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