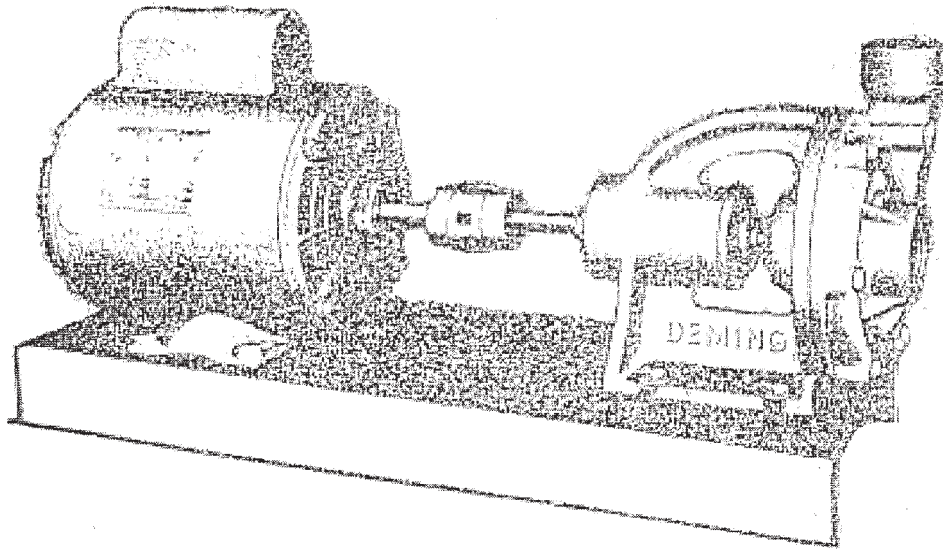


DEMING®

INSTALLATION, OPERATION & MAINTENANCE MANUAL End-suction Centrifugal Pumps

Series: 3904
3914



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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Form No. 119996-Rev. E

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 cause 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.

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.



WARNING! Do not wear loose clothing that may become entangled in moving parts.



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



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.



WARNING! To reduce risk of electrical shock, all wiring and junction connections should be made per the NEC or CEC and applicable state or province and local codes. Requirements may vary depending on usage and location.



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.



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.

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.

A - GENERAL INFORMATION

TO THE PURCHASER:

Congratulations! You are the owner of one of the finest pumps on the market today. These pumps are products engineered and manufactured of high quality components. With years of pump building experience along with a continuing quality assurance program combine to produce a pump which will stand up to the toughest applications.

Check local codes and requirements before installation. Servicing should be performed by knowledgeable pump service contractors or authorized service stations.

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.

STORAGE:

Short Term - 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. Pump should be stored in its original shipping container and before initial start up, rotate impeller by hand to assure seal and impeller rotate freely.

SERVICE CENTERS:

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

B - BEFORE YOU BEGIN

Motor driven pumps are carefully aligned on sub-base before shipment. However, after they are placed upon the foundation and sub-base is bolted down, the alignment must be rechecked and in MOST CASES it will be found necessary to carefully realign the unit. Quite often a noisy pump is due to pump and motor not being properly aligned. IN SUCH CASES WE DISCLAIM ALL RESPONSIBILITY FOR PROPER WORKING OF PUMP.

C - INSTALLATION

1. A good rigid foundation must be provided for pump base.
2. Place pumping unit on foundation with bolts, of the proper size, imbedded in the concrete. A pipe sleeve, about 2½" diameters larger than the bolt, should be used to allow for final positioning of the bolts. See Figure 1. Level sub-base, to give a space of about 3/4" for grouting, using rectangular metal blocks and shims, or wedges having a small taper as shown in Figure 2.

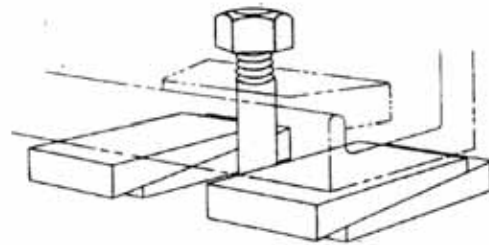


Figure 2. Adjusting Wedges for Mounting

3. Align the pump and motor shafts at the flexible coupling. Hold a straight edge on the top of the coupling so that it extends over both halves. Straight edge should rest evenly across both rims of the coupling halves when the straight edge is placed on the top, sides and bottom with no light showing between the straight edge and rim of the coupling. Also check vertical alignment of the coupling faces with a thickness gauge. Faces must be parallel and spaced about 1/8" apart when the motor rotor is at its extreme position towards the pump. This safe guards the pump shaft being crowded endwise by the motor shaft end play. By proper adjustment of metal shims under pump or motor, both halves of the flexible coupling can be brought into alignment See Figure 3.

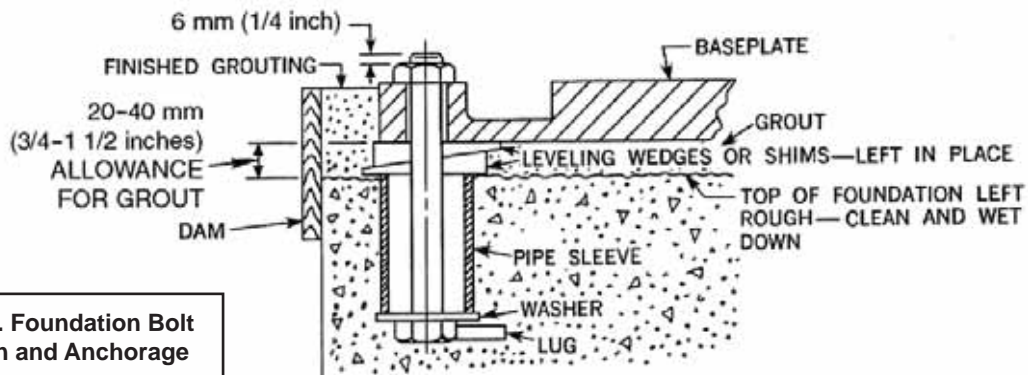


Figure 1. Foundation Bolt Location and Anchorage

4. Build a dam around sub-base at least 2" high for grouting in with thin cement and after cement has hardened, tighten anchor bolts.
5. Recheck alignment at drive coupling. Any misalignment now apparent should be corrected by metal shims under pump or motor. When properly aligned, pump shaft should turn freely by hand.
6. A foot valve and strainer must be installed on the lower end of the suction pipe to keep pump completely filled with liquid when the pump is used under suction lift conditions. Connect suction pipe to pump casing.

When a foot valve is used, it is **absolutely necessary to install a check valve** in the discharge line near the pump to prevent possible broken casing due to line shock or surge when the pump stops. A gate valve should also be installed in the discharge line. Connect discharge pipe to pump casing.

It is very important that the suction and discharge pipes "line up" naturally with the pump. DO NOT "pull" pipes into position with flange bolts. Support pipes independently of the pump to eliminate all strain on the pump casing. Select discharge pipe size so velocity is under 8 feet per second. Avoid sharp changes in pipe sizes.

7. After pipes have been connected to pump, check alignment at drive coupling. Correct any changes with metal shims as in section "C".
8. Check motor nameplate for electrical characteristics. Be sure they are the same as the rating of the electrical power available. Connect power lines to motor in accord with wiring diagram on the motor and test motor rotation, should turn in the direction indicated by arrow cast on pump casing.
9. Fill pump (and suction pipe) with water. Close discharge gate valve and start pump. When pump is up to speed, slowly open the discharge valve to obtain desired capacity and pressure.

D - LUBRICATION

The ball bearings (16) and (18) are double sealed and lifetime lubricated by the manufacture before shipment. Under normal operating conditions no further lubrication is required. Any motor lubrication should be in accord with motor manufacturer's recommendations.

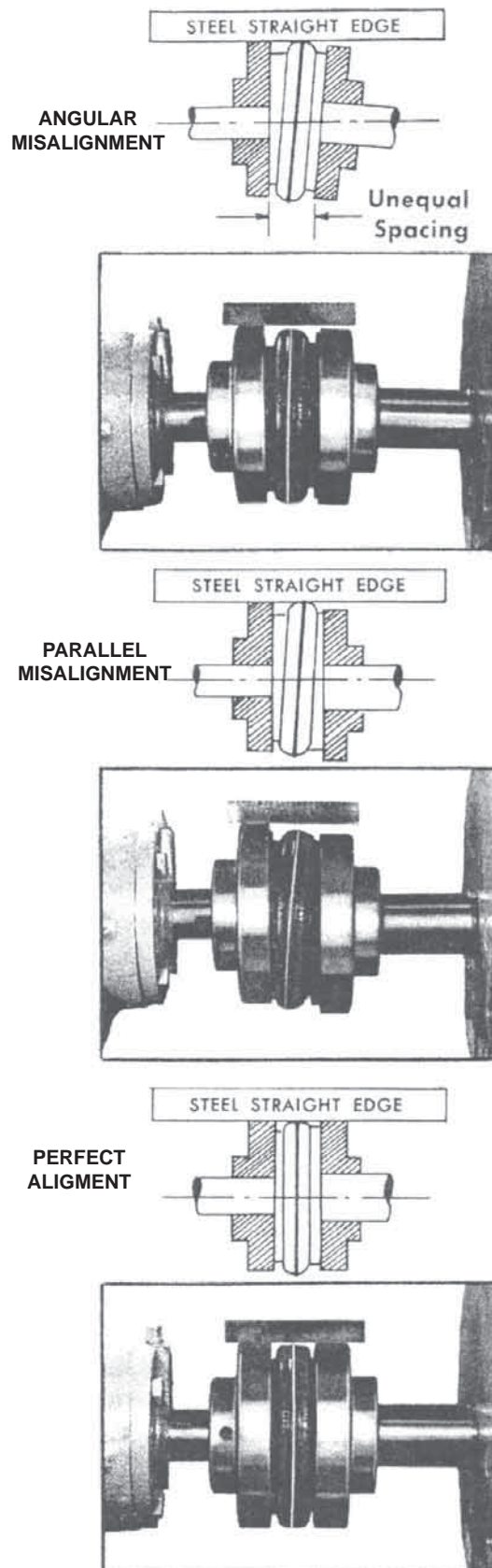


Figure 3

GENERAL MAINTENANCE AND REPAIR

E - PROPER ADJUSTMENT OF IMPELLER

To adjust the impeller, unscrew the two set screws in bearing collar (123). Push shaft forward until impeller vanes touch the casing wear faces, then back off the shaft slightly. Secure set screw on bearing collar. Rotate the shaft by hand to make certain the impeller does not rub on the casing wear face.

F - TO REMOVE OR REPLACE IMPELLER

Remove casing cap screws (212) and casing (1), also take off casing gasket (73) which must be kept moist while out of the pump. Remove impeller nut (24) and thread impeller (6) from shaft in counter-clockwise direction. To install new impeller, thread impeller (2) completely onto shaft and lock in position with nut (24). Replace casing and gasket.

DO NOT attempt to make impeller adjustment by threading impeller only partially onto shaft. Thread completely on. If impeller adjustment is necessary, follow procedure outlined in Section "E".

G - DISMANTLING

1. Drain pump, disconnect suction and discharge piping.
2. Remove casing cap screws (212) and casing (1). Also take off casing gasket (73) which must be kept moist while out of pump.
3. Unscrew impeller nut (24). Unscrew impeller (2) by turning counter-clockwise.
4. Remove mechanical seal (89) from shaft (6).
5. To remove shaft (6), remove machine screws (213), lock washers (229) and bearing cover (123). Brace support head and tap lightly with babbitt or plastic hammer on impeller end of shaft. Shaft (6) and bearings (16) and (18) should be removed as a unit.
6. If it is necessary to replace the ball bearings (16) and (18) mark the positions of the ball bearings on the shaft. Unscrew the set screw from bearing collars, then push the collars and bearings from the shaft.
7. To replace ball bearings, remove from bearing collars.
8. Extreme care should be taken in keeping parts clean. Special precaution should be taken to keep ball bearing dirt-free in or out of the pump. Any parts which are excessively worn or deteriorated should be replaced with new parts from the factory.

IF IT IS MORE CONVENIENT TO DISMANTLE THE PUMP WITHOUT DISCONNECTING THE SUCTION AND DISCHARGE LINE, IT IS POSSIBLE TO DO SO, AS FOLLOWS:

1. Drain Pump
2. Remove cap screws (212) from casing (1).
3. Pull the frame (19) carefully away from the casing (1). Remove casing gasket (73) which must be kept moist while out of pump.
4. Proceed with number 3 under Dismantling.

H - REASSEMBLING

1. If the ball bearings have been removed from the shaft, replace them on shaft (6) in the same position marked on the shaft before dismantling. Replace set screws in bearing collars and secure to the shaft.
2. Replace shaft (6) with ball bearings (16) and (18) as a unit through coupling end of frame (19) and slip the rubber slinger over the shaft before it enters the seal chamber. Replace bearing cover (123), lock washer (229), machine screws (213) and secure to support head.
3. Install seal as explained under "Mechanical Seals".
4. Install impeller (2) and locknut (24) as explained under "To Remove and Replace Impeller".
5. Replace casing gasket (73), casing (1) and secure to support head with cap screws (212).

On Figure 3914 "A" size pumps only, studs are used to secure casing (1) to frame (19). If these studs (216) are removed from casing (1), apply sealant or thread compound to threads before reinstalling in casing to prevent leakage around stud threads.

I - MECHANICAL SEAL

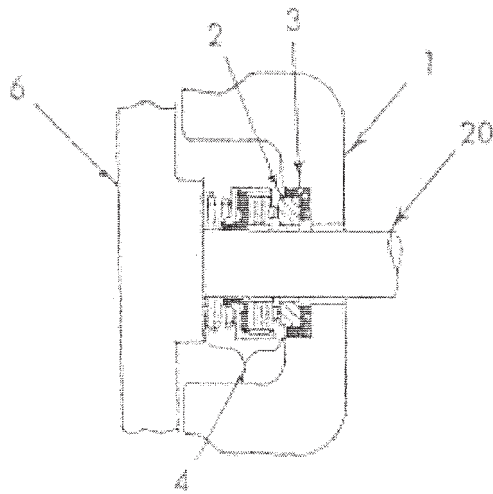
NOTE: ALL seal parts **MUST** be kept **CLEAN**. **DO NOT** drop seal face carbons, or floating seats, nor scratch the lapped faces of these parts. Seals are available as a complete assembly only.

Special precautions must be observed when handling a mechanical seal. To replace the seal, proceed as follows:

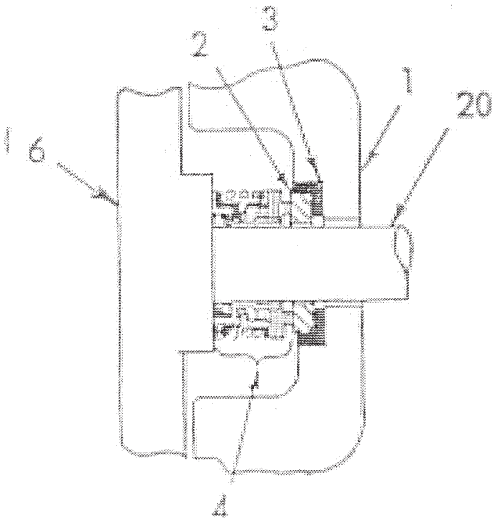
1. Follow steps 1 thru 5 under "Dismantling".
2. Reach through bearing openings and push ceramic seat (2) and seat rubber (3) out of support head.
3. Thoroughly clean seal seat position of frame (19)

and coat with light oil.

- Oil new seat rubber (3) with light oil and position ceramic



seat (2) in rubber firmly and squarely.
Mechanical Seal for Fig. 3904



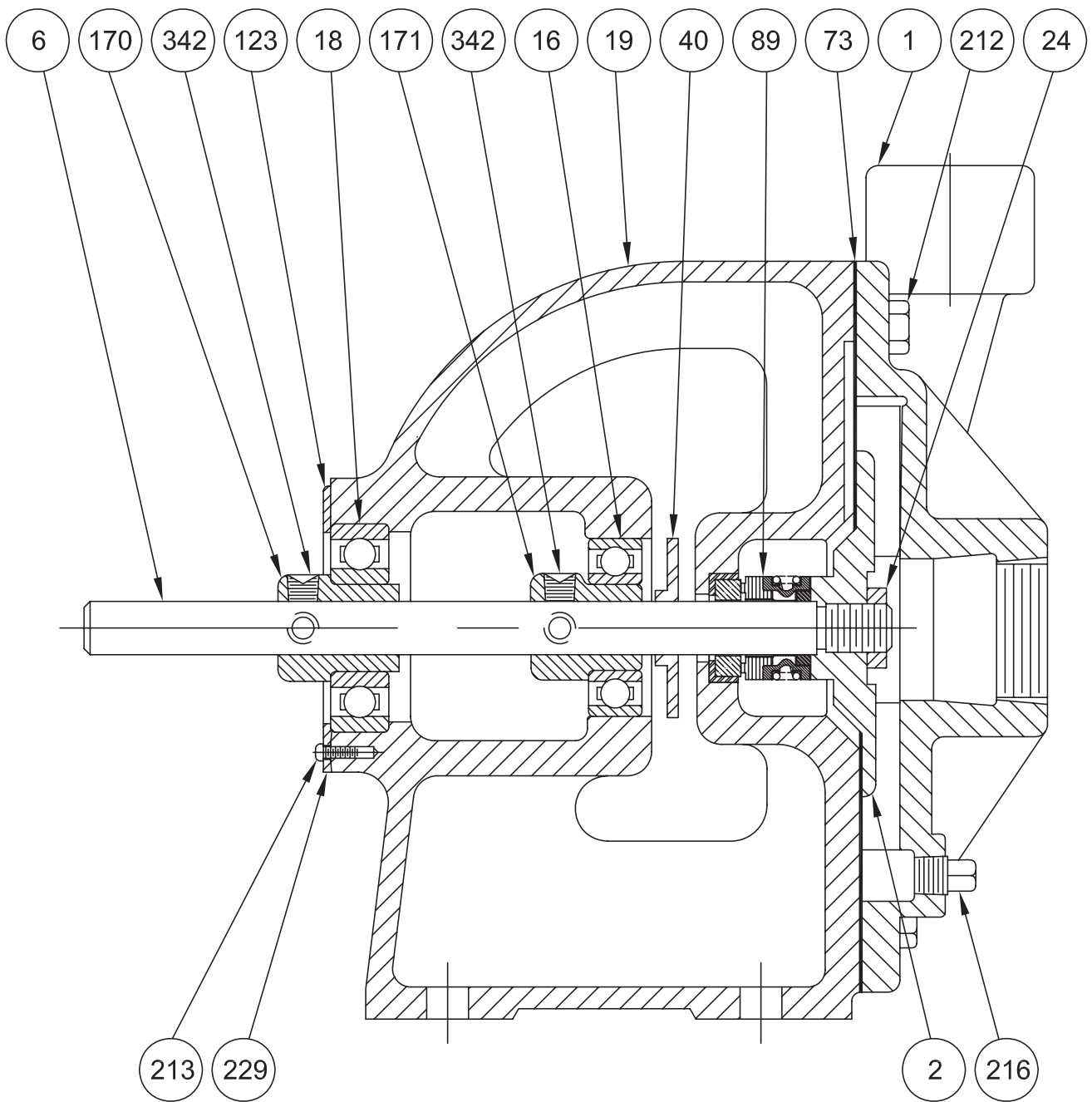
Mechanical Seal for Fig. 3914

- Push seat assembly (2) and (3) into position in the frame (19) using a close fitting sleeve with end square with bore. Protect the ceramic seat face (2) from damage by placing a paper ring between the sleeve and seat. **DO NOT** hammer the seat as it is easily broken. Be sure to remove the paper after installing the seat.
- See Step 2 under "Reassembly".
- Oil shaft (6) and inside of the seal assembly (4) and slide seal (4) onto the shaft (6).
- Proceed with Steps 4 and 5 under "Reassembly".

J - LOCATING TROUBLE

- No Liquid Delivered
 - Wrong direction of rotation
 - Speed too low - Check with revolution counter
 - Discharge head is too high
 - Impeller or pipe lines plugged
 - Pump not primed
 - Suction lift too high, over 15 feet (check with vacuum gauge)
- Not Enough Liquid Delivered
 - Discharge head higher than anticipated
 - Speed too low (check with revolution counter)
 - Air leaks in suction pipe or stuffing box.
 - Suction lift too high, over 15 feet (check with vacuum gauge)
 - Impeller partially plugged
 - Not enough suction head for hot water
 - Mechanical defects
 - Impeller worn or damaged
 - Casing worn
 - Foot valve too small
 - Foot valve not immersed deep enough
 - Wrong direction rotation
- Not Enough Pressure
 - Air in water
 - Mechanical defects
 - Impeller diameter too small
 - Speed too low
- Pump Works for a while, then Quits
 - Leaky suction line
 - Suction plugged
 - Suction lift too high, over 15 feet (check with vacuum gauge)
 - Air or gas in liquid
- Pump Takes Too Much Power
 - Speed too high
 - Liquid either viscous or heavier than water, or both.
 - Strain on casing caused by piping misalignment
 - Head lower than rating
 - Mechanical defects
 - Shaft bent
 - Impeller binds in casing
 - Stuffing box packing too tightly adjusted

When ordering repairs, refer to drawing and give information stamped on nameplate which is:
Figure Number, Pump Size and Serial Number. Unless we have this information, we cannot identify pump and guarantee the repairs to fit.



ITEM No.	DESCRIPTION
1	Casing
2	Impeller
6	Shaft
16	Ball Bearing - Inboard
18	Ball Bearing - Outboard
19	Frame
24	Impeller Nut
40	Deflector
73	Gasket

ITEM No.	DESCRIPTION
89	Seal
123	Bearing Cover
170	Adapter
171	Adapter
212	Cap Screws
213	Machine Screws
216	Pipe Plug
229	Shakeproof Washer
342	Set Screws

BARNES®



burks®

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.

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**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.**

