

DEMING[®]

INSTALLATION, OPERATION & MAINTENANCE MANUAL Vertical In-Line Centrifugal Pumps



Series: 3180

Section: 38
ANSI B73.2

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.***

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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.

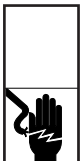


Rotating machinery Amputation or severe laceration can result.



Hazardous voltage can shock, burn or cause death.

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.



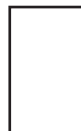
Make sure lifting handles are securely fastened each time before lifting. **DO NOT** operate pump without safety devices in place. Always replace safety devices that have been removed during service or repair. Secure the pump in its operating position so it can not tip over, fall or slide.



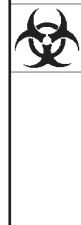
DO NOT exceed manufacturers recommendation for maximum performance, as this could cause the motor to overheat.



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.



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.



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.

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- INSTALLATION

Foundation

The In-Line pumps require no special foundation or piping. They may be installed on any solid support as shown in Figure 1, or with no under-support at all, if installed within rigidly supported piping as shown in Figure 2. As the illustration shown, they are frequently mounted in a pipeline like a valve.

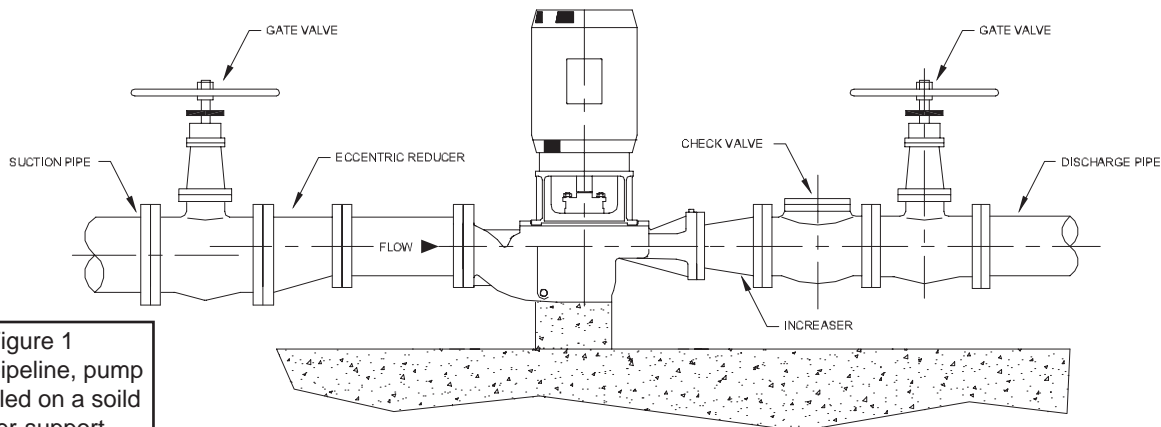


Figure 1
In this pipeline, pump is installed on a solid under-support

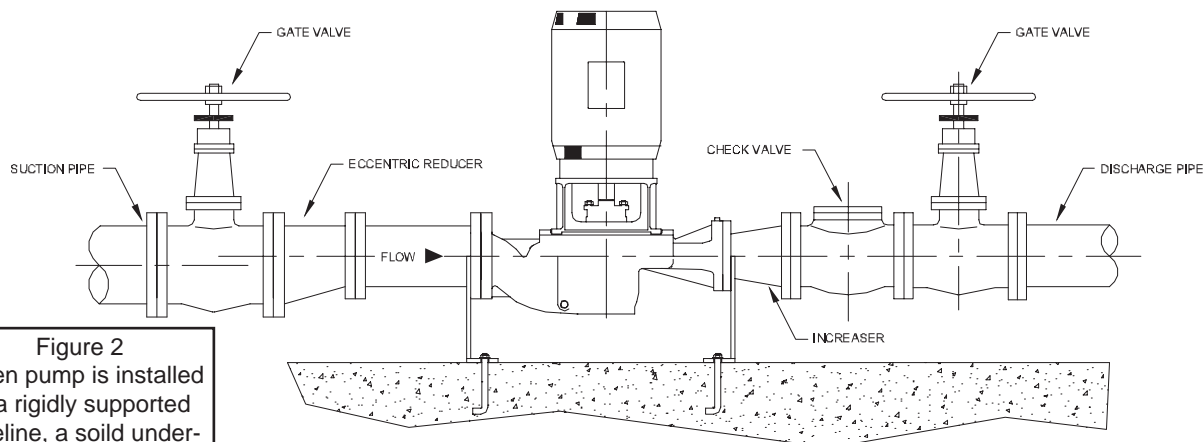


Figure 2
When pump is installed in a rigidly supported pipeline, a solid under-support is not required

Piping

It is very important that suction and discharge pipes “line up” naturally with the pump. **DO NOT** “pull” pipes into position with flange bolts or fittings. Both suction and discharge pipes should be supported independently near the pump to avoid transmitting pipe strain to the pump when flange bolts are tightened. Turn the pump shaft by hand to see that it rotates freely. If the shaft binds, indicates excessive strain on the casing, correct before operating the pump.

If expansion joints are used, they must be of the limiting bolt type to contain hydraulic forces. The suction pipe must be kept free of air leaks, this is particularly true when static suction lift exists or when suction line pressure is below atmospheric pressure.

When the supply liquid is below the pump, a foot valve and strainer should be installed in the suction pipe to facilitate priming and a check valve should be installed next to the pump in the discharge line to prevent rupture of the casing from water hammer shock and/or reverse flow in the event of power failure. In addition, the discharge line should include a gate valve if priming is necessary. **DO NOT** throttle the pump by adjusting a valve on the suction side of the pump, this will result in pump cavitation.

If a reducer is used at the suction flange, it must be the eccentric type installed with its flat surface at the top. Suction piping should be installed so that it rises gradually toward the pump.

Wiring

Connect the power supply in conformance with local Codes. Line voltage and wire capacity must match ratings stamped on the motor name plate.



IMPORTANT! - Check rotation by momentarily starting motor. Rotation must be clockwise when viewing the pump from the motor end of the unit, See Figure 3.

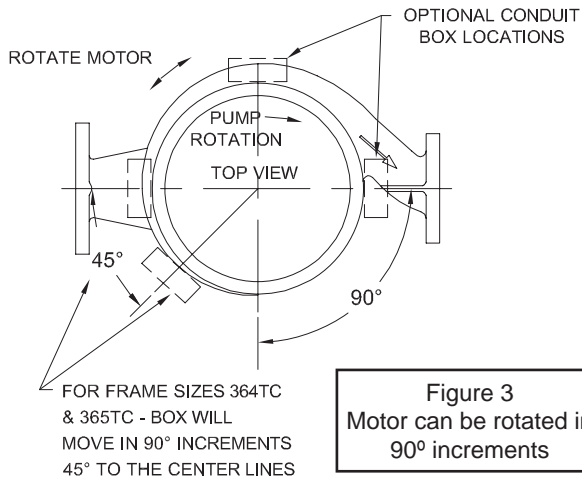


Figure 3
Motor can be rotated in 90° increments

If the unit is equipped with a mechanical seal, it must be lubricated to prevent damage to the seal faces.

Conduit box locations may be varied in increments of 90°. Simply remove the four cap screws holding the motor to the adapter, and rotate the motor until the conduit box is in the desired position.

Cooling

When pumping liquids exceeding 200° F, a water jacketed packing box is recommended, see Figure 4. Sufficient cooling water must be provided to reduce the seal or packing cavity temperature to 180° F, see Figure 5, cooling chart. All throttling must be done after water has passed through the water cavity of the jacketed packing box.

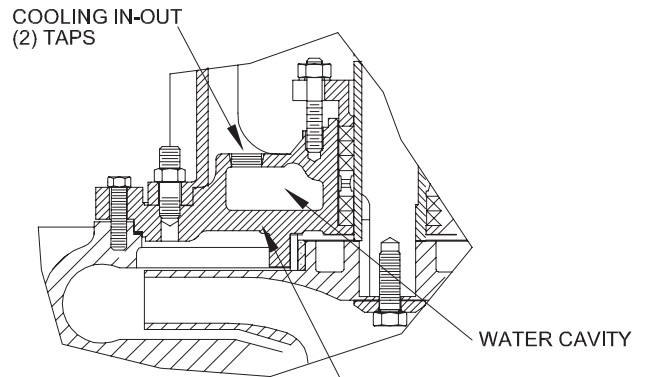


Figure 4
Jacketed Packing Box

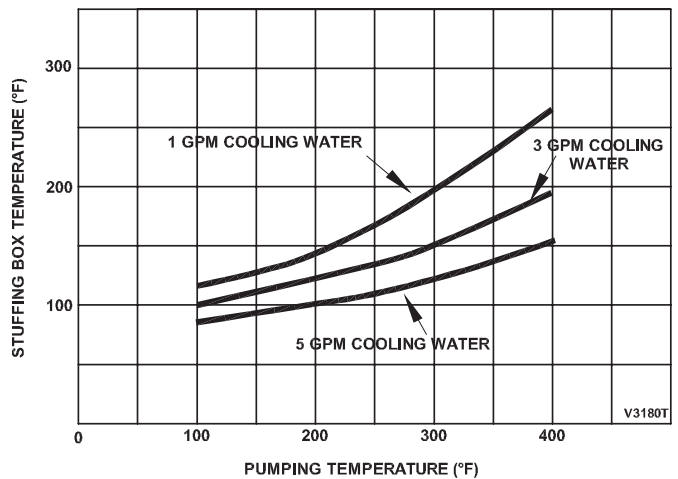


Figure 5 - COOLING CHART
Water Jacketed Stuffing Box Temperature (inlet water 72° F)

C - OPERATION

Priming

Make sure packing (for seal) is supplied with proper lubrication, see “Packing Box” in adjacent column. The pump casing and suction pipe must be completely filled with liquid before operating the pump. This may be accomplished by one of the following methods:

1. If adequate suction head is available, air can be relieved from the casing and packing box by one of two means:
 - a. For packed pumps, remove pipe plug (264) or recirculation line fitting from discharge flange. Replace when casing has been completely filled.
 - b. For pumps with mechanical seals, remove pipe plug (208) from stuffing box or seal gland if flexible-mounted. Do not replace the plug until all air has escaped.
2. In cases where there is suction lift and system liquid is not available, install a foot valve in the suction line. Prime by filling suction piping and casing completely through the tap in the discharge flange. Provide an air vent at the high point.

When the pump is fully primed, start the motor and slowly open the valve in the discharge line.

Initial Adjustments - Packed Pumps

After the pump has been started, packing box glands should be tightened to prevent excessive loss of liquid.

In cases where packed pumps are operating with a suction lift over 20 feet, the packing should be lubricated through the stuffing box tap from an external source. See "Packing Box" .

Packing should not be too tight, as this will result in burning the packing and scoring of the shaft sleeve. The best gland adjustment will allow liquid to drip slowly from the packing box gland. This will permit proper lubrication of the shaft and dissipate generated heat. The gland must **NEVER** be tightened to the point where leakage through the stuffing box is completely stopped.

Initial Adjustments - Pumps with Mechanical Seals

Mechanical seals are factory-adjusted at the time the pump is assembled and, normally, need no further adjustment in the field. The only prerequisite to operating an In-Line pump equipped with a mechanical seal is to make certain the seal chamber is filled with a compatible liquid before starting the pump.

NOTE: Numerals shown within parentheses after part names on this and pages following provide ready identification of such parts in the cross sectional drawings.

MAINTENANCE

D - Lubrication

Motor Bearings - See motor manufacturer's recommendations on motor name plate.

Packing Box - Packing must be continuously lubricated. Packed pump are normally furnished less an external recirculation line. When operating with suction lift and clean liquid, recirculation from the pump discharge to the packing box (or suitable grease) may be used, see "Initial Adjustments" . When lubrication is supplied from an outside source, it should be cool, clear water, light lithium base grease, or a compatible lubricating fluid.

Single Seal - Pumps with single seals are normally furnished with an external recirculation line. A portion of the liquid being pumped is recirculated from the casing through the seal chamber to serve as a lubricant and coolant. An alternate method is to supply a cool, compatible lubricating liquid from an outside source to the seal chamber at a pressure 15 to 25 psi higher than suction pressure.

Double Seal - On double seal applications, the seal chamber must be filled with lubricant or clear, compatible lubricating liquid under pressure. The liquid may be from an outside source or may be from the pump discharge passing through a filter and/or heat exchanger when necessary. Pressure on the box must be 15 to 25 psi higher than suction pressure. The liquid must circulate through the outlet and a restriction must be placed in the outlet to assure pressure on the seal chamber.

Packing Box Care - Before installing new rings of packing, clean the packing box and inspect parts for wear. If the shaft sleeve is worn, replace it, new packing will not do an adequate job on a worn sleeve. Die molded packing rings are preferable. Insert two rings. Twist the rings sideways when installing, **DO NOT** pull the rings straight out over the shaft. Stagger the joints to minimize leakage.

Tamp each ring in place and then slip the lantern ring into the packing box behind them. Add three more rings behind the lantern ring. Replace the gland and bolts, rotate the shaft, and tighten gland securely. Be sure the lantern ring is positioned to receive lubrication through the orifice in the housing. Tighten nuts securely to seat the packing, rotate the shaft several turns, and then loosen the nuts to "finger-tightness" for starting.



IMPORTANT! - Liquid being pumped should drip slowly but constantly through the packing and gland. This will prevent overheating, high power consumption, and shaft sleeve damage.

If packing replacement becomes frequent:

- a. Check motor bearing for excessive wear causing shaft run-out.
- b. Check packing for proper grade. Also, check whether special packing is used, see pump data card.
- c. Check shaft sleeve for excessive wear or scoring
- d. Check for crystallization of solution and for embedded abrasives in the packing. Method of packing lubrication may not be satisfactory.
- e. Check recirculating line, if used, as well as relevant fittings for partial or full blockage.

E - DISASSEMBLY

The In-Line Pumps feature "pull-out maintenance" whereby the rotating assembly can be removed while the casing remains in the line. To facilitate disassembly, refer to Figure 6 thru 9 and to assembly drawings on page 10.

Steps 1 thru 6 that follow apply to all pumps.

1. Remove all cooling or lubrication lines, disconnect the power.
2. Remove cap screws (212) holding casing (1) to the adapter (71).
3. Tighten the jack screws (287) uniformly. This will raise the unit out of the casing and simultaneously lock the packing box cover (11) to the adapter. Draw the jack screws up snug, see Figure 6.

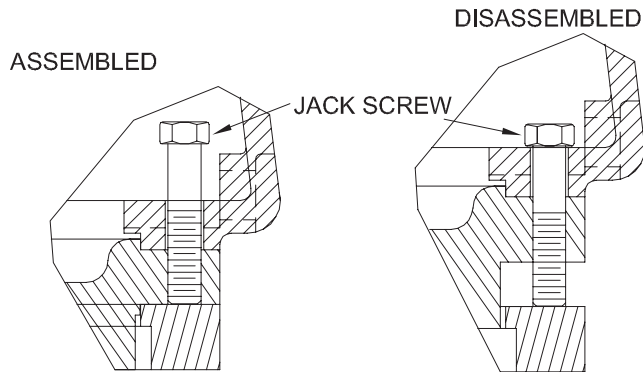


Figure 6

4. Remove the motor and rotating assembly.
5. Remove the impeller screw (26), washer (270), o-ring (272) and gasket (30), and pull the impeller (2) from the shaft. Remove the impeller key (32) and shaft gasket (38). If the wear rings on the impeller (optional) and in the casing are worn or scored, they should be replaced.

Steps 6 thru 9 for Packed Pumps ONLY.

6. Remove the split gland nuts (210), clips (206), and the gland (17).
7. Remove the jack screws and slide the packing box cover off. The shaft sleeve (14) may or may not come off. If it does, simply remove it from the packing box, if it clings to the shaft and is not scored, it may remain there.
8. Remove the packing (13) and lantern ring (29).
9. Remove the cap screws (219) holding the motor to the adapter. Remove the adapter from the motor.

Steps 10 and on apply only to pumps with mechanical seals as shown in Figures 9 to 11. For other seal constructions, see instructions furnished with pump.

10. Remove nuts (210) on seal gland studs (281).
11. Remove jack screws and, while holding shaft sleeve in place, slip the stuffing box cover off.
12. With seal assembly on shaft sleeve, remove sleeve and seal gland (251).

Steps 13 thru 15 for Single Seal Pumps ONLY.

13. Scribe a mark on sleeve at the spring retainer so that proper axial location will be maintained when the pump is reassembled.
14. Loosen set screws (K) in spring retainer (E) or seal collar. Remove seal from sleeve.

15. Remove stationary seat (A) and gasket (259) from gland (251). Remove adapter from motor.

Step 13a for Double Seal Pumps ONLY.

- 13a. Remove rotating portion of seal from the sleeve, and stationary seats (A) and gasket (259) from the gland and packing box. Remove adapter from motor.

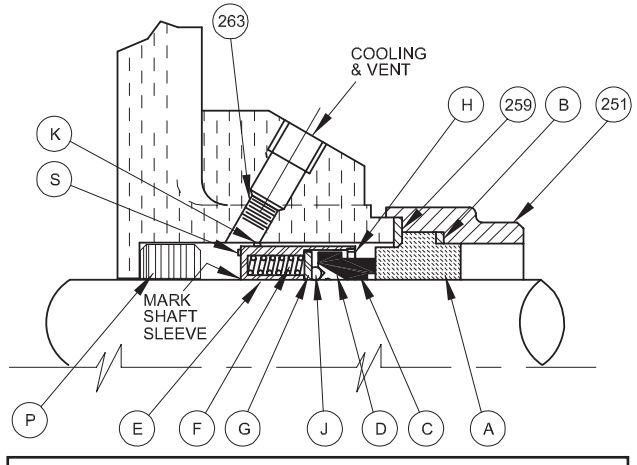


Figure 7 - Single Seal Clamped Seat

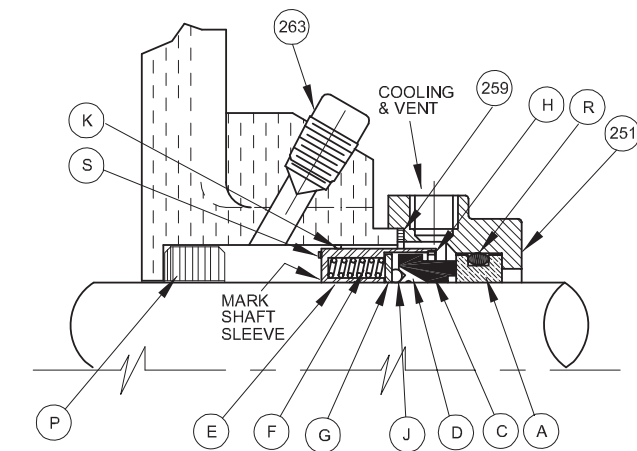


Figure 8 - Single Seal Flexible Mount

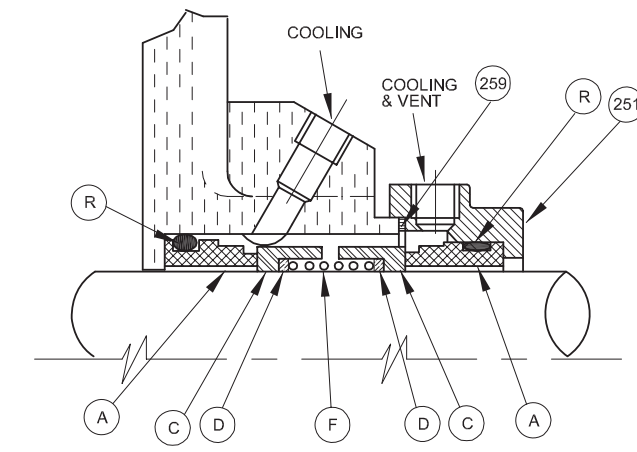


Figure 9 - Double Seal

PARTS IDENTIFICATION LISTING DFOR SEAL TYPES ILLUSTRATED IN FIGURES 9, 10 AND 11

Item	Name of part	Item	Name of part
A	Seat (insert)	J	Shaft Packing
B	Gasket (outboard)	K	Set Screw
C	Washer (seal ring)	P	Throttle Bushing (Optional)
D	Shaft Packing	R	O-ring
E	Spring Retainer	S	Holding Clips *(Types 9T, 9BT)
F	Spring	251	Seal Gland
G	Disc	259	Gasket (inboard)
H	Snap Ring	263	Pipe Plug

(*) Holding clips must be removed after seal is assembled on shaft; see instructions furnished with seal.

F - ASSEMBLY

Steps 1 through 3 apply to packed or sealed pumps.

1. If wearing rings need replacement, press the packing box cover wearing ring (27) into the recess of the packing box cover (11) making certain that it is properly seated. The casing wearing ring (7) should be pressed into the casing (1) until it is flush with the inside edge of the casing.
2. If impeller (2) was equipped with wearing rings, press the rear ring (8) onto the shoulder at the rear of the impeller until it is flush with the rear face. Press the front ring (8) onto the front shoulder of the impeller so that it is flush with the front face.

Before proceeding check wear ring tolerances. If clearances are not as shown in the table below, it is suggested that the impeller be machined to give the correct clearance.

WEARING RING CLEARANCES (DIAMETRICAL)

Sizes	
VAAE, VABE, VA10E	.011 - .016"
VA05E, VA50E, VA60E, VA70E	.013 - .018"
VA20E, VA30E, VA40E	.013 - .018"
VA80E	.017 - .022"
Galling type metals (316 - 347 - A20 Stainless) .017 - .022" All Size	

3. Reposition the adapter (71) on the motor and replace the cap screws (219). Slide the slinger (40) onto the shaft.
4. Insert the shaft sleeve into the bore of the packing box with the keyway towards the impeller. Insert packing (13) and lantern ring (29) as described under "Packing Box Care" .
5. Place the entire packing box assembly and shaft sleeve over the shaft and position the packing box cover on the adapter. Line up the keyway in the sleeve with the keyslot in the shaft and replace the impeller key (32).

6. Replace the jack screws (28) and draw down snug, see Figure 8.
7. Place the shaft gasket (38) over the end of the shaft. Place the impeller (2) over the end of the shaft with the keyway over the key. The impeller should be tapped into position with a babbitt or rawhide hammer. Replace the impeller gasket (30), impeller washer (270), o-ring (272), and impeller screw (26), and tighten. Proceed to Step 8.

Steps 4a thru 6b for Single Seal Pumps ONLY.

- 4a. Before installing new or used seals, inspect and clean all parts, remove all burrs, nicks etc., from shaft sleeve.
- 4b. Lightly oil the inside of the spring retainer or holder (E) and the outside of the sleeve. Slide the rotating portion of the seal over the sleeve.
- 4c. Line up the spring retainer to the premarked position (see Step 13 under E - Disassembly). Tighten the set screws.
- 5a. Replace the seal gland gaskets (A and 259). Oil the outer surface of the seal seat (A) and press into the seal gland (251).
- 5b. Carefully slide the seal gland and the gland gasket (259) over the motor shaft.
- 5c. Place the shaft sleeve on the shaft and line up the keyway in the sleeve with the keyslot in the shaft. Replace the impeller key (32).
- 6a. If supplied, replace the throttle bushing in the packing box.
- 6b. Place the packing box cover over the shaft and seal the assembly. Replace jack screws (28) and draw down snug (see Figure 8).

- 7a. Place the shaft gasket (38) over the end of the shaft. Place the impeller (2) over the end of the shaft also, with the keyway over the key. Tap impeller into position with a babbitt or rawhide hammer. Replace the impeller gasket (30), impeller washer (270), o-ring (272), and impeller screw (26) and tighten.
- 7b. Pull the seal gland into place, replace the gland fasteners and tighten securely. Proceed to Step 8.

Steps 4-1 thru 7-2 for Double Seal Pumps ONLY.

- 4-1. Before installing new or used seals, inspect and clean all parts, remove all burrs, nicks, etc, from shaft sleeve.
- 4-2. Oil outer surface of seal seats (A). Press one into the seal gland (251) and one into the packing box cover.
- 5-1. Slide the seal gland (251) and gland gasket (259) over the motor shaft.

5-2. Place the shaft sleeve on the shaft, lining up the keyway in the sleeve with the key slot in the shaft. Replace the impeller key (32).

6-1. Slide the rotating portion of the seal over the shaft sleeve.

6-2. Slide the packing box cover over the seal assembly and sleeve. Replace the jack screws (28) and draw down snug. See Figure 8.

7-1. Place the shaft gasket (38) over the end of the shaft. Place the impeller (2) over the end of the shaft also, with the keyway over the key. Tap impeller into position with a babbitt or rawhide hammer. Replace the impeller gasket (30), impeller washer (270), o-ring (272), and impeller screw (26), and tighten.

7-2. Pull the seal gland into place, replace the gland fasteners and tighten securely. Proceed to Step 8.

Steps 8 thru 11 for Packed or Sealed Pumps ONLY.

8. Replace the casing gasket (73)
9. Relocate the unit in the casing and replace cap screws (212) holding the adapter and cover the casing.
10. Loosen the jack screws (287) to permit the unit to slip into the casing. See Figure 8.
11. Tighten the cap screws replaced in Step 9 and snug up the jack screws to prevent them from working out.

G - SPARE PARTS

The assembly drawings and Parts List illustrate and identify parts for 3180 Series pumps having a water jacketed or air cooled stuffing box. Sealed pumps, except for having a mechanical seal construction instead of the packed stuffing box, are similar in design, see Figures 9, 10, and 11 and the table "Parts Identification Listing For Seal Types".

When ordering spare parts, include the following data:

- a. The serial number of the pump (on name plate)
- b. The part name
- c. The Item number
- d. The quantity of parts required

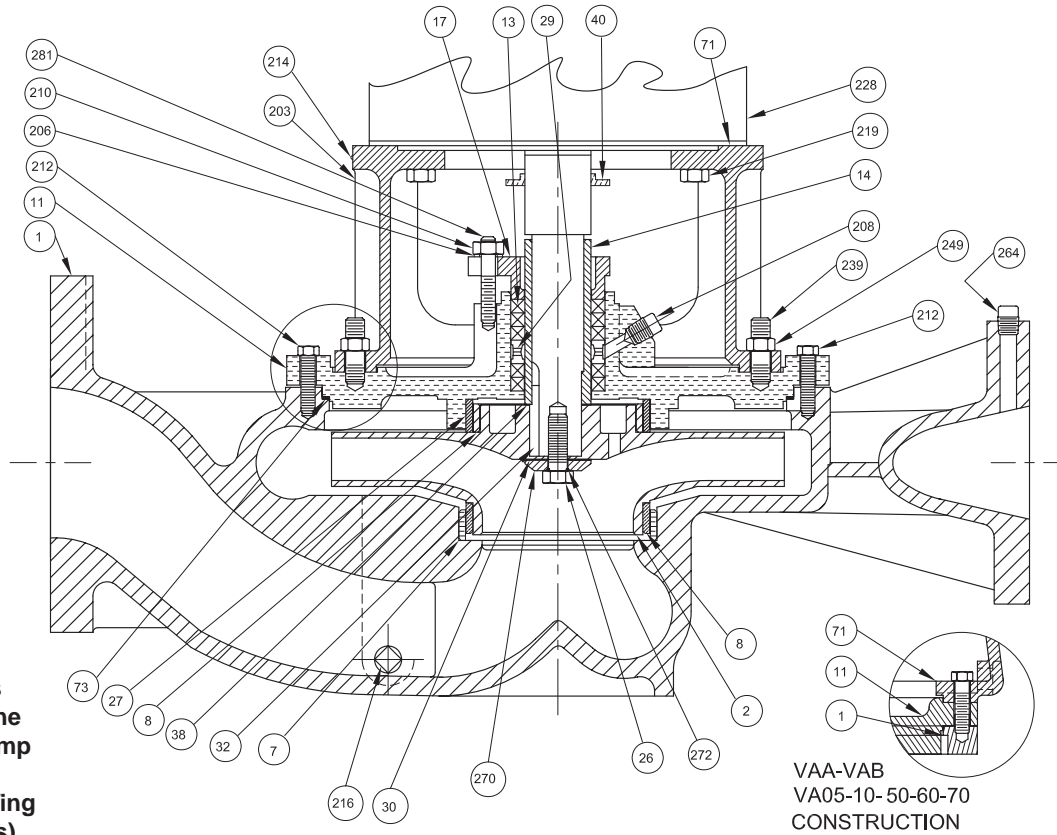
If an impeller is ordered, specify the diameter across the blade tips to be sure there is no further trim than that shown on factory records. If a motor or motor parts are ordered, specify the name of the driver manufacturer and all other data on the driver name plate.

Item No	Name of Parts
1	Casing
2	Impeller
*7	Casing Wear Ring
*8	Impeller Wear Rings (Optional)
11	Packing Box Cover
*13	Packing
*14	Shaft Sleeve
17	Split Guard
*26	Impeller Screw
*27	Packing Box Wear Ring
29	Lantern Ring
*30	Impeller Washer Gasket
32	Impeller Key
*38	Shaft Gasket
40	Deflector
71	Adapter
*73	Gasket (Casing)
203	Name Plate
206	Split Gland Clip
208	Pipe Plug
210	Hex Nut
212	Cap Screw
214	Drive Screw
216	Pipe Plug
219	Cap Screw
228	Motor
239	Stud
249	Hex Nut
264	Pipe Plug
270	Impeller Washer
*272	Impeller Screw o-ring
281	Gland Stud
287	Jack screw
297	Pipe Plug
298	Thread Protector

(*) Recommended spare parts.

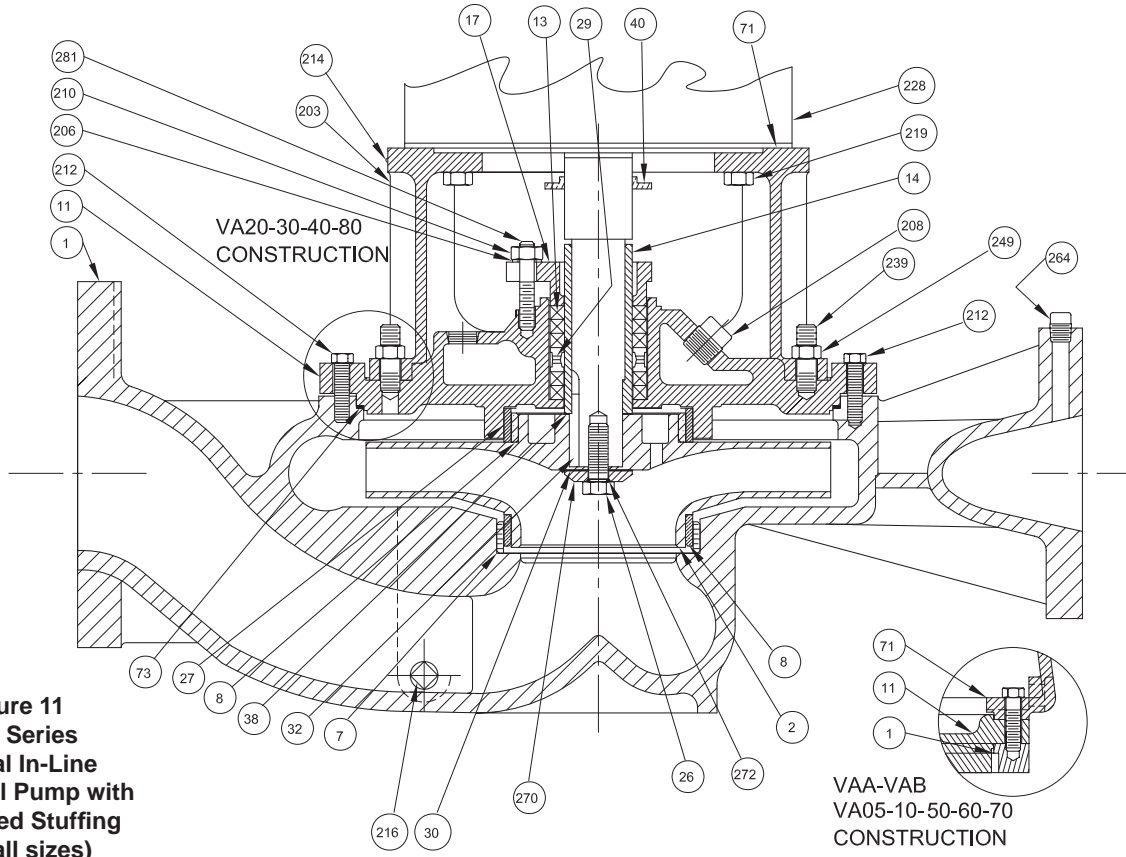
(**) For water jacketed model only.

Figure 10
3180 Series
Vertical In-Line
Centrifugal Pump
with Water
Jacketed Stuffing
Box (all sizes)



VAA-VAB
 VA05-10-50-60-70
 CONSTRUCTION

Figure 11
3180 Series
Vertical In-Line
Centrifugal Pump with
Air Cooled Stuffing
Box (all sizes)



VAA-VAB
 VA05-10-50-60-70
 CONSTRUCTION

BARNES®

BARNES®
PRESSURE **PS** SYSTEMS



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.



A Crane Co. Company

PUMPS & SYSTEMS

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Phone: (905) 457-6223
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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.**