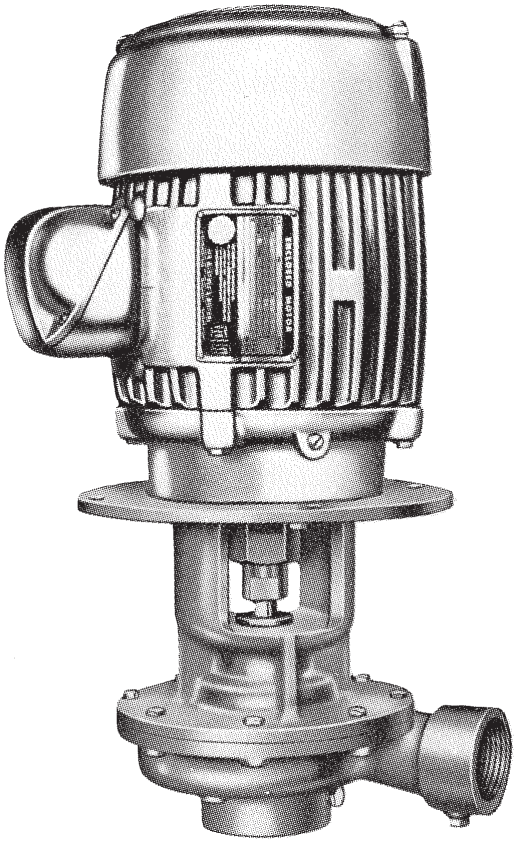
Manual Index

DEMING®

INSTALLATION, OPERATION & MAINTENANCE MANUAL
Vertical Process Pumps



Series:
4310 & 4311

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. 120007-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 orIndicates 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, burnes or death could result.


Extremely hot - Severe burnes 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.


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 ! 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

Standard pump are completely assembled and carefully adjusted at the factory before shipment.

1. Prior to installation of the unit remove the thread protectors from the suction and discharge nozzles, also check the following:
   a. Turn pump shaft (6) several revolutions by hand to be certain that it turns freely.
   b. Check and tighten coupling set screws (211) which may loosen during shipment.
2. Carefully lower the assembled unit into the tank or through the hole in the support plate.
3. Bolt support head (71) to tank cover or support plate.
4. Connect discharge piping to casing discharge nozzle. The weight of the discharge pipe and fittings must be supported independently of the pump to eliminate any strain on the pump casing (1).
5. Turn pump shaft (6) by hand to make sure that it rotates freely after installing pump and connecting the discharge pipe.
6. Make temporary electrical connections and jog motor to check rotation. Pump should rotate in a clockwise direction when looking down upon the top of the motor.
7. Pump should operate smoothly. If pump vibrates, there is a severe distortion of the pump as a result of excessive installation strain on pump support plate or discharge pipe.
8. Make permanent electrical connections.

C - LUBRICATION

1. Pump shaft bearing (171) is lubricated by the liquid being pumped.
2. Motor bearings have been greased at factory. Follow motor manufacturer's recommendations as to the type of grease and frequency of lubrication.

D - GENERAL REPAIRS

A. For inspection and repair of liquid end.
   1. Disconnect electric service to motor and remove wires from motor.
   2. Disconnect discharge piping from pump.
   3. Unscrew bolts from support head (71), then remove complete pumping unit with motor to a work bench.
   4. Unscrew cap screws (212) and remove casing (1) and casing gasket (73). Place gasket in a bucket of water to keep it pliable.
   5. Check for wear on casing face (1) where impeller might rub, also inspect impeller faces both front and back for wear.
   6. If impeller must be replaced, proceed as follows:
      a. On 1", 1½" or 2" pumps, unscrew impeller lock nut (24) then unscrew impeller (2) turning it counter-clockwise while holding shaft (6) with wrench.
      b. On 3" pumps, unscrew impeller lock nut (24) while holding shaft (6) with wrench, then remove impeller washer (270). Screw three 1/4" x 2" NC capscrews into tapped holes in impeller shroud to force impeller off of shaft. Remove key (32) from shaft.

B. For inspection and replacement of shaft bearing and seal.
   1. Dismantle liquid end as described in Section A.
   2. Remove cap screws (219) and tap support head (71) gently, knocking it loose from motor (228).
   3. If the inside of shaft bearing (171) is more than .025" larger than the shaft diameter (6), bearing should be replaced.
   4. Place support head (71) in an arbor press, and push out shaft bearing (171).
   5. Check seal (89) if worn, replace. The worn one will have to be pressed out and new one pressed in.

C. For shaft inspection.
1. Check shaft (6) for wear and out of roundness.
2. Check length of shaft extension beyond motor flange.
3. If shaft is worn, remove two set screws (211) and pull pump shaft (6) from motor shaft.
4. Inspect shaft slinger (40). Replace if it does not fit shaft snugly.

D. Installing a new shaft bearing.
1. Make sure bore is clean in support head (71).
2. Place a pilot plug with shoulder into shaft bearing (171). Press on pilot plug, pushing shaft bearing (171) into place. This is best done in an arbor press to make sure the bearing is moved in the correct plane.

E. Replacing pump shaft.
1. Slide coupling end of pump shaft over motor shaft and key (40) to the position or dimension obtained from Section C-2.
2. Place indicator at impeller end of shaft (6) and rotate shaft by hand. Maximum indicator reading should be less than .004".
3. After shaft is in alignment, tighten set screws (211) and re-check alignment.
4. Place shaft slinger (40) into place with the smaller diameter of the slinger away from the motor.

F. Reassembly of complete liquid end.
1. Position support head (71) over pump shaft.
2. Reconnect support head to motor with capscrews (219).
3. On 1", 1½" and 2" pumps, hold pump shaft (6) and screw impeller (2) onto shaft until the impeller butts against shaft shoulder. At this point check clearance between back of impeller and support head. It should be about .004". It shouldn't quite touch. Lock impeller by tightening impeller lock nut (24) in place.
4. On the 3" pump, place the impeller key (32) into its correct position in the shaft. Place impeller (2) onto tapered shaft and tap slightly to insure a good fit. Place impeller washer (270) over threaded portion of shaft, and lock impeller to shaft with impeller lock nut (24).
5. Position casing gasket (73) onto support head (71). Place casing (1) into correct position and tighten cap screws (212).
6. Check to see that the shaft will rotate freely. If it doesn't, refer to Section E. The shaft can be adjusted so that the impeller faces will just clear the casings face and not rub.

F - LOCATING TROUBLE

1. No Liquid Delivered
   a. Wrong direction of rotation
   b. Speed too low - Check with revolution counter
   c. Relief holes in support head plugged
   d. Discharge head is too high
   e. Impeller or pipe lines plugged
   f. Pump shaft loose from motor shaft
   g. No water in tank, or not enough water

2. Not Enough Liquid Delivered
   a. Discharge head higher than anticipated
   b. Improper impeller adjustment
   c. Impeller is worn
   d. Casing is worn
   e. Wrong direction of rotation
   f. Water is too hot
   g. Speed too slow

3. Not Enough Pressure
   a. Air in water
   b. Mechanical defects
   c. Impeller diameter too small
   d. Wrong direction of rotation

4. Pump Takes Too Much Power
   a. Impeller is rubbing
   b. Speed too high
   c. Liquid either viscous or heavier than water, or both.
   d. Impeller too large in diameter
   e. Motor windings going bad
   f. Bearings too tight
   g. Shaft is bent
   h. Strain on casing caused by piping misalignment
   i. Head lower than rating

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.

Fig. 4310
Size: 1”, 1½ and 2”

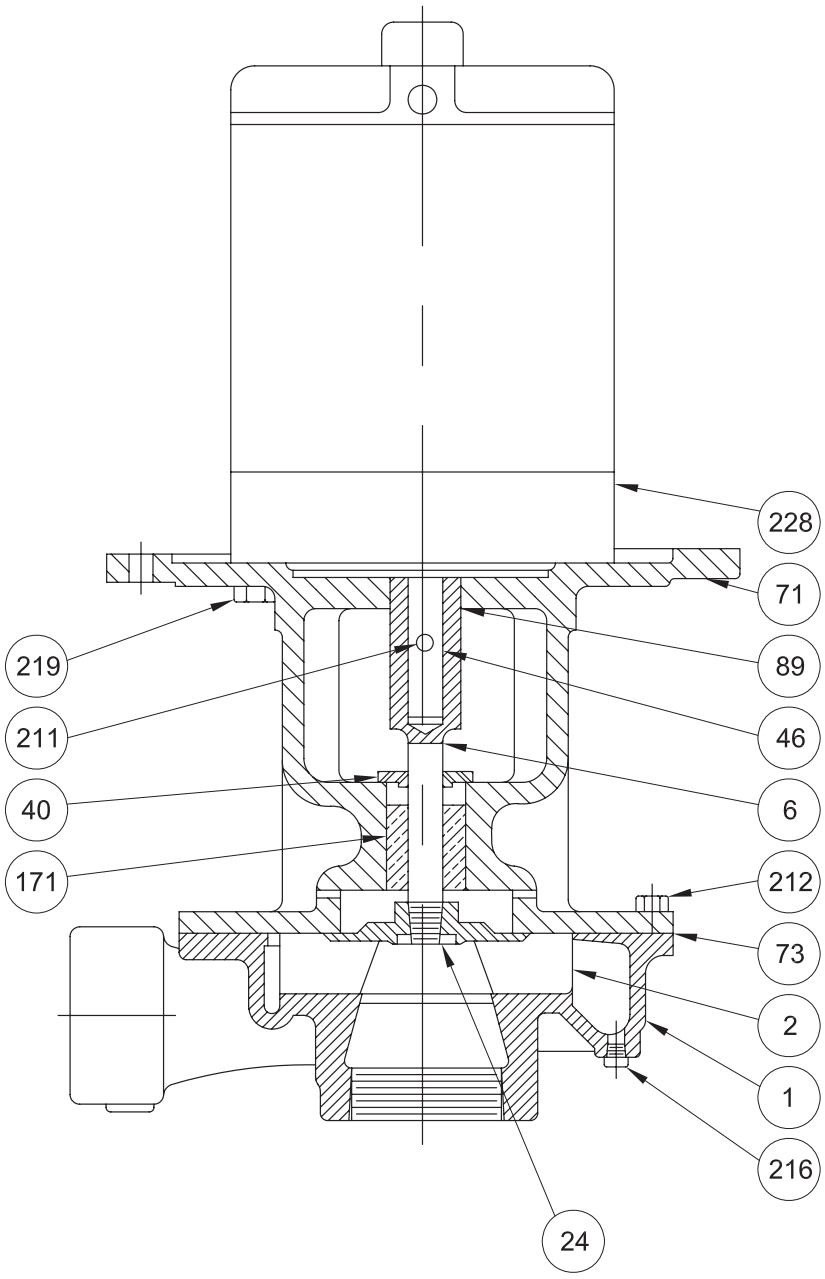

FIG. 4310-11 1" - 1-1/2" - 2"

ITEM No.	DESCRIPTION
1	Casing
2	Impeller
6	Shaft
24	Impeller Nut
40	Deflector
46	Shaft Key
71	Adapter
73	Casing Gasket

ITEM No.	DESCRIPTION
89	Seal
171	Shaft Bearing
211	Set Screws
212	Cap Screws
216	Pipe Plug
219	Cap Screws
228	Motor

Fig. 4310
Size: 3”

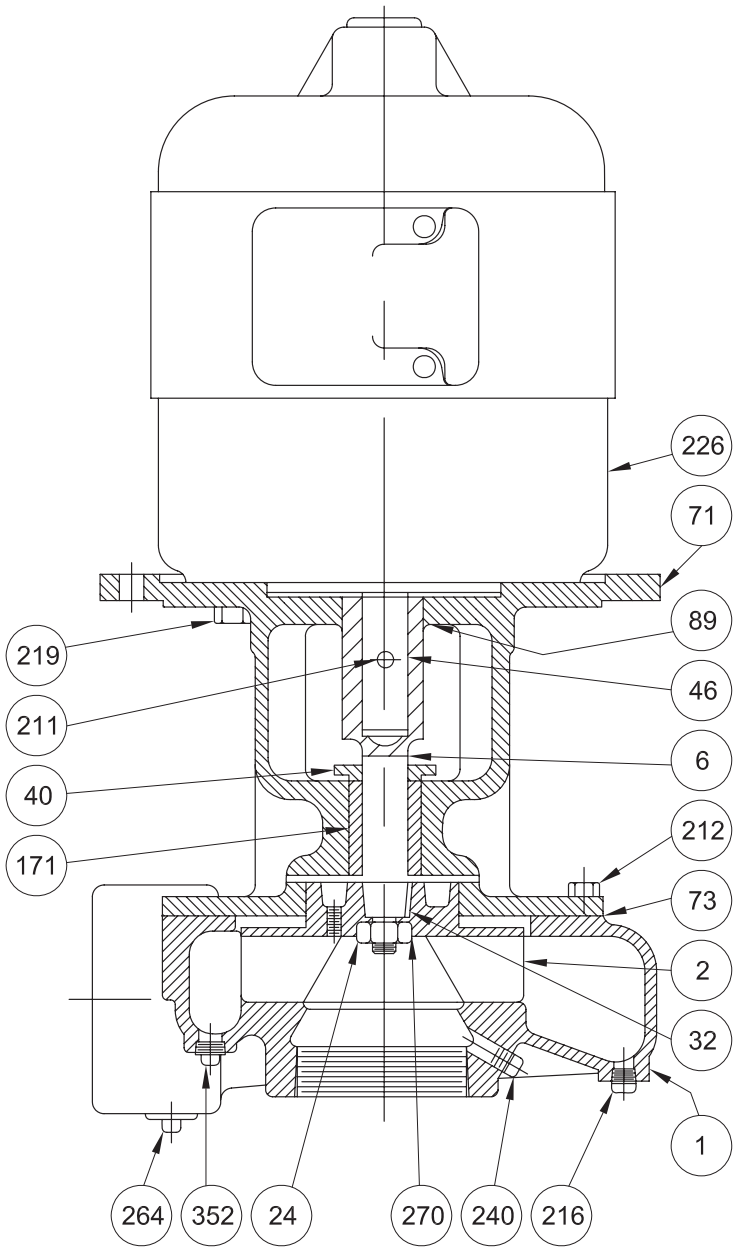

FIG. 4310-11 3"

ITEM No.	DESCRIPTION
1	Casing
2	Impeller
6	Shaft
24	Impeller Nut
32	Impeller Key (Woodruff)
40	Deflector
46	Shaft Key
71	Adapter
73	Casing Gasket

ITEM No.	DESCRIPTION
89	Seal
171	Shaft Bearing
211	Set Screws
212	Cap Screws
216	Pipe Plug
219	Cap Screws
228	Motor
270	Impeller Washer
352	Pipe Plug

BARNES® BARNES PRESSURE SYSTEMS CROWN

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.