

DEMING®

INSTALLATION, OPERATION & MAINTENANCE MANUAL Frame Mounted End Suction Centrifugal Pumps

Series: 3021 / 3121



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

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

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

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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.

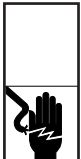


Rotating machinery Amputation or severe laceration can result.



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.



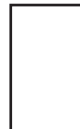
Make sure lifting handles are securely fastened each time before lifting. **DO NOT** operate pump without safety devices in place. Always replace safety devices that have been removed during service or repair. Secure the pump in its operating position so it can not tip over, fall or slide.



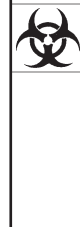
DO NOT exceed manufacturers recommendation for maximum performance, as this could cause the motor to overheat.



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

1. FOUNDATION

The pump foundation should be sufficiently substantial to form a level, rigid support for the combined weight of the pump and driver and maintain alignment of the installed unit. Foundation bolts, of the proper size, should be 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.

2. MOUNTING:

Pumps and drivers that are received from the factory with both machines mounted on a common base plate, were accurately aligned before shipment. All baseplates are flexible to some extent and, therefore, must not be relied upon to maintain the factory alignment. Preliminary alignment is necessary after the complete unit has been leveled on the foundation, and again, after the unit is piped, and rechecked periodically as outlined in the following paragraphs.

Position unit on foundation and level the base plate, using rectangular metal blocks and shims, or wedges having a small taper as shown in Figure 2. A gap of 3/4" to 1½" should be allowed between the base plate and foundation for grouting.

Adjust the metal supports or wedges until the shafts of the pump and driver are level. Check the coupling faces, as well as the suction and discharge flanges of the pump for horizontal or vertical position by means of a level. Correct the positions, if necessary, by adjusting the supports or wedges under the base plate, as required.

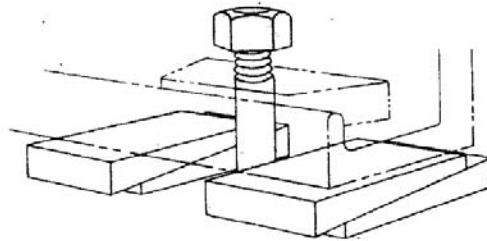


Figure 2. Adjusting Wedges for Mounting

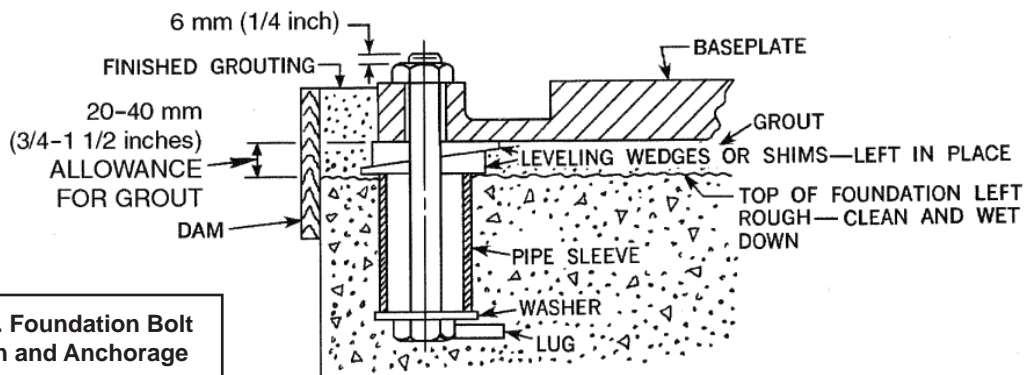


Figure 1. Foundation Bolt Location and Anchorage

NOTE: A flexible coupling should not be used to compensate for misalignment of the pump and driver shafts. The purpose of the flexible coupling is to compensate for temperature changes and to permit end movement of the shafts without interference with each other, while transmitting power from the driver to the pump.



CAUTION! - Remove and lock out power to driver.

3. FIELD ALIGNMENT

The faces of the coupling halves should be spaced far enough apart so that they cannot strike each other when the driver rotor is moved toward the pump. The necessary tools for checking the alignment of a flexible coupling are a straight edge and a taper gauge or a set of feeler gauges.

NOTE: In most cases where extreme accuracy is necessary, a dial indicator may be used to align coupling. Angular alignment check is made by inserting a taper gauge or feelers between the coupling faces at 90-degree intervals around the coupling. The unit will be in angular alignment when the coupling faces are exactly the same distance apart at all points. (See Figure 3).

Parallel alignment check is made by placing a straight edge across both coupling rims at the top, bottom and at both sides. The unit will be in parallel alignment when the straight edge rests evenly on the coupling rim at all positions. Allowance may be necessary for temperature changes and for coupling halves that are not of the same outside diameter. Care must be taken to have the straight edge parallel to the axis of the shafts. Correction for Angular and Parallel Misalignment is made by adjusting the shims under the driver. After each change, it is necessary to recheck the alignment of the coupling halves, as adjustment in one direction may disturb adjustments already made in another direction.

The permissible amount of coupling misalignment will vary with the type of pump and driver, but should be limited to approximately .002 inches per inch of shaft diameter when final adjustment is made. When the units are lined up cold, it is necessary to make allowance for the vertical rise of the driver caused by heating when in operation. When the preliminary alignment has been completed the foundation, bolts should be tightened evenly, but not too firmly.



WARNING - Coupling guards must be used to avoid serious injury to operating personnel.

4. GROUTING

Grouting compensates for unevenness in the foundation and prevents vibration and shifting after mounting is complete. Build a form around the base plate to contain the grout, and sprinkle area with water to obtain a good bond. The base should be completely filled with a good quality, non-shrinking grout. The usual mixture for grouting is one part Portland cement and two parts sand with sufficient water to flow freely. It is also desirable to grout the leveling pieces, shims or wedges in place. Foundation bolts should be fully tightened when grout has hardened, usually about 48 hours after pouring.

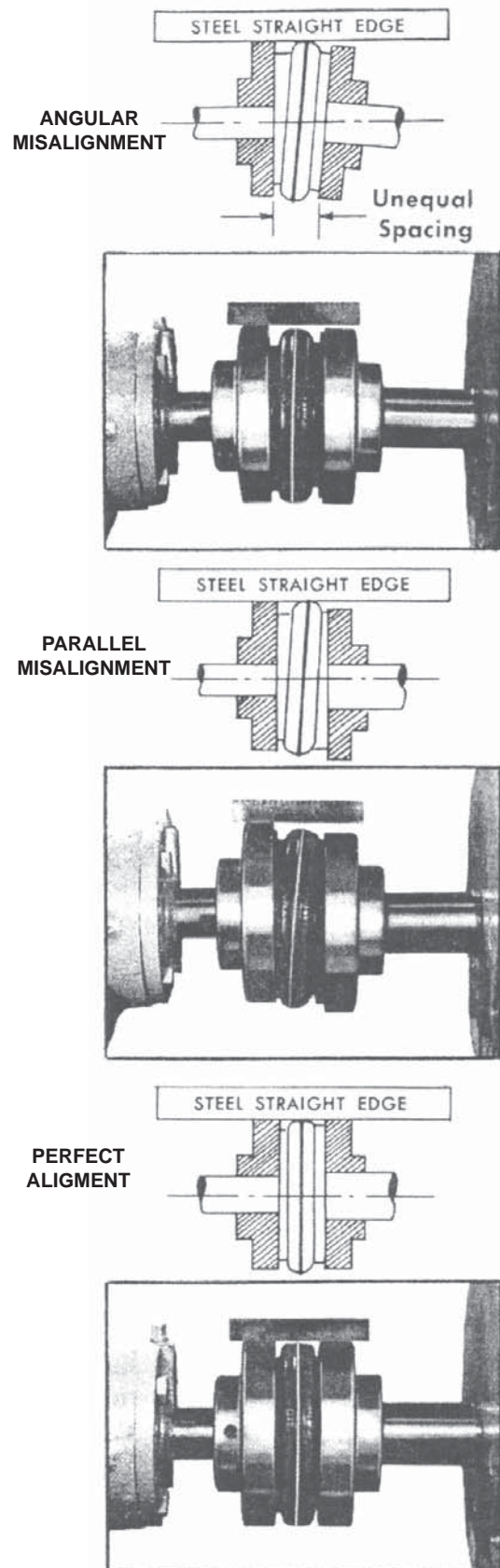


Figure 3

5. PIPING

The pump suction and discharge connections are not intended to indicate the required suction and discharge pipe sizes. The pipe diameter must be selected according to the requirements of the pumping system and recommended friction losses for the liquid being pumped.

Usually, it is advisable to increase the size of both the suction and discharge pipes at the pump nozzles to have minimum acceptable friction loss, suction pipe should never be smaller in diameter than the pump suction nozzle. When suction pipe is of larger diameter than the pump suction nozzle, an eccentric reducer is required to eliminate possible air or vapor pockets at the pump suction inlet.

Both suction and discharge pipes must be supported independently near the pump, so that when piping is connected to the pump, no strain will be transmitted to the pump. Piping should be arranged with as few bends as possible, and, preferably, with long radius elbow whenever possible.

SUCTION PIPING

A horizontal suction line must have a gradual rise to the pump. Any high point in the suction pipe can become filled with air and prevent proper operation of the pump and may cause loss of prime. The pipe and fittings must be free of all air leaks.

Any valves or fittings should be located at a distance equal to 5 to 10 times the diameter of the suction pipe from the pump suction nozzle. If an elbow must be installed at the pump suction, it should be installed in a vertical position to reduce unequal flow into the pump, which may cause cavitation in the pump.

NOTE: A gate valve in the suction piping should not be used as a throttling device, as this may cause the liquid to overheat during operation.

6. WIRING

For electric motor drives, connect power supply to conform with national and local codes. Line voltage and wire capacity must match the ratings stamped on the motor nameplate.

7. ROTATION

Before starting the pump, check the required direction of rotation of the pump. The proper direction is indicated by a direction arrow on the pump casing. Separate the coupling halves, then start motor to see that it rotates in the direction required by the pump. If it does not, reverse any two main leads of the 3-phase wiring to the motor. The coupling halves can be reconnected and the pump primed for starting.

C - OPERATION

1. PRIMING

CAUTION: Before starting the pump, the casing and suction line must be filled with liquid, and air-vented through the vent pipe plugs. The pump must not be run until it is completely filled with liquid, because of danger of injuring some of the parts of the pump which depend upon liquid for lubrication. The discharge gate valve should be closed during priming. Be sure the mechanical seal and power frame are supplied with the proper lubrication. See LUBRICATION.

PRIMING BY SUCTION PRESSURE

When operating with suction pressure (flooded suction), remove the pipe plug at the top of the casing and when pump is filled with liquid, replace plug.

PRIMING WITH FOOT VALVE AND STRAINER

A foot valve and strainer may be installed on the lower end of the suction pipe to keep pump filled with liquid. Incorporate filler pipe in discharge pipe between pump and check valve. Remove pipe plug at top of casing, then fill suction pipe and pump with liquid. When pump is full of liquid, replace plug and close filler pipe.

CAUTION: When a foot valve and strainer are installed on the suction pipe, a spring loaded type check valve **MUST** be installed next to the pump in the discharge piping to prevent pump rupture from water hammer shock.

Priming by means of primer pump or ejector, attached to the pump, will also remove air from suction pipe and pump casing. When pump is filled with liquid, start motor and slowly open discharge gate valve.

2. STARTING THE PUMP

On initial start up, the gate valve in the discharge piping should be closed and slowly opened after pump is up to speed and pressure developed. **DO NOT** operate pump for any appreciable length of time against a closed discharge valve, as this may heat trapped liquid excessively and damage the pump or seal.

The following important items should be checked as pump is started and placed in operation.

- a. Pump and driver securely bolted
- b. Coupling properly aligned
- c. Piping complete
- d. Correct pump rotation
- e. Pump shaft turns freely
- f. Discharge valve closed
- g. Suction valve open (if used)
- h. Coupling Guard installed
- i. Pump fully primed
- j. Pump and driver properly lubricated

Only after these items have been checked should the pump be started.

3. PUMP ADJUSTMENT

Open discharge valve as soon as operating speed has been reached. As soon as the pump and driver have reached the normal operating temperature, the unit should be shut down for final coupling alignment. If correction is necessary, it may be accomplished by the addition or removal of shims from under the motor mounting feet.

D. MAINTENANCE

1. LUBRICATION

Model 3021/3121 units are available with either grease or oil lubricated bearings.

The pump and its component parts that require lubrication have been lubricated at the factory. Subsequent lubrication depends on operating conditions. Periodic inspection of bearing lubrication is necessary and additional grease should be added as required.

CAUTION: DO NOT over grease bearings

The following lubricants are recommended:

Grease lubricated ball bearings: Shell Dolium R, Chevron SRI #2 or equivalent -40° thru 250°F.

Oil lubricated pump are shipped **WITHOUT** oil in the frame. Install the Trico Opto-Matic® oiler on the frame with its moveable oiler body 1/4" higher than its lowest level. Fill the plastic bottle with oil (0°F - 150°F, #10 Wt. Non-detergent, 150°F - 250°F, #20 Wt. Non-detergent) and screw it into the lower reservoir. Several fillings of the bottle will be required before the frame stops taking oil. Never fill the frame through the lower oil reservoir. For normal 8 hour duty change the oil approximately every 6 months, more or less frequently depending on the operating conditions.

Driver: See Manufacturers recommendations for proper lubrication.

E - REPAIR



WARNING - If pumping any fluid that could cause bodily injury (hot water, caustic, etc.), always use eye protection and wear protective clothing over all exposed body areas.

REMOVE AND LOCK-OUT POWER TO THE DRIVER WHILE PERFORMING THESE TASKS
Be sure that no one can accidentally restore power while the pump is being serviced.

1. IMPELLER ADJUSTMENT - To adjust the impeller, loosen the capscrew (337) and rotate the clip (204) clockwise until it disengages the bearing housing lugs. Turn the bearing housing (033) clockwise until the impeller just rubs on the casing. Turn the bearing housing counter-clockwise two notches for 3021 units and 1-1/2 revolutions for 3121 units.

2. DISASSEMBLY - These instructions apply to the series of pumps in general and may vary slightly on some units. If complete disassembly is not necessary, use only those steps which apply

Due to the "back pull out" construction of these pumps, the frame and rotating assembly may be removed from the unit without removing the casing from the piping, or the driver from the base plate providing a spacer coupling is employed.

- a. Close valves in discharge and suction piping
- b. Remove coupling guard and shaft coupling per manufacturer's instructions
- c. Remove cap screws from frame foot and casing cap screws (212)
- d. Remove frame assembly from casing.

3. DISASSEMBLY OF FRAME ASSEMBLY

- a. Remove cap screw (026), washer (270) and impeller (002) from the end of shaft.
- b. Remove seal assembly (089)
- c. Remove pump half coupling, key (046), and rotate the clip (204) out of the bearing housing notch.
- d. Rotate the shaft and bearings out of the frame counterclockwise. Remove the snap ring (202), nut (022), and washer (069).
- e. Using a bearing puller or arbor press, remove bearings (016) and (018) from the shaft (006)
- f. Gently press out lip seals (047) and (049), and remove o-ring (232)
- g. Clean and carefully inspect and replace as necessary any worn or damaged shafts, sleeves, bearings, lip seals, or gaskets. Replace mechanical shaft seal worn faces, hardened elastomers or springs with weak tension.

4. REASSEMBLY

- a. Press lip seals (047) and (049) into the frame and bearing housing, and replace o-ring (232)
- b. Press bearings onto the shaft using an arbor press to firmly seat the inner race of the bearing against the shaft shoulders.
- c. Place washer (069) and bearing locknut (022) onto the shaft. Slide bearing housing (033) over bearing (018) and attach with snap ring (202)
- d. Slide bearing and shaft assembly through the rear of the frame, threading bearing housing clockwise until the bottom of the lugs are flush with the frame

CAUTION - Use extreme care to prevent the shaft from hitting the seal stationary member. Damage can result

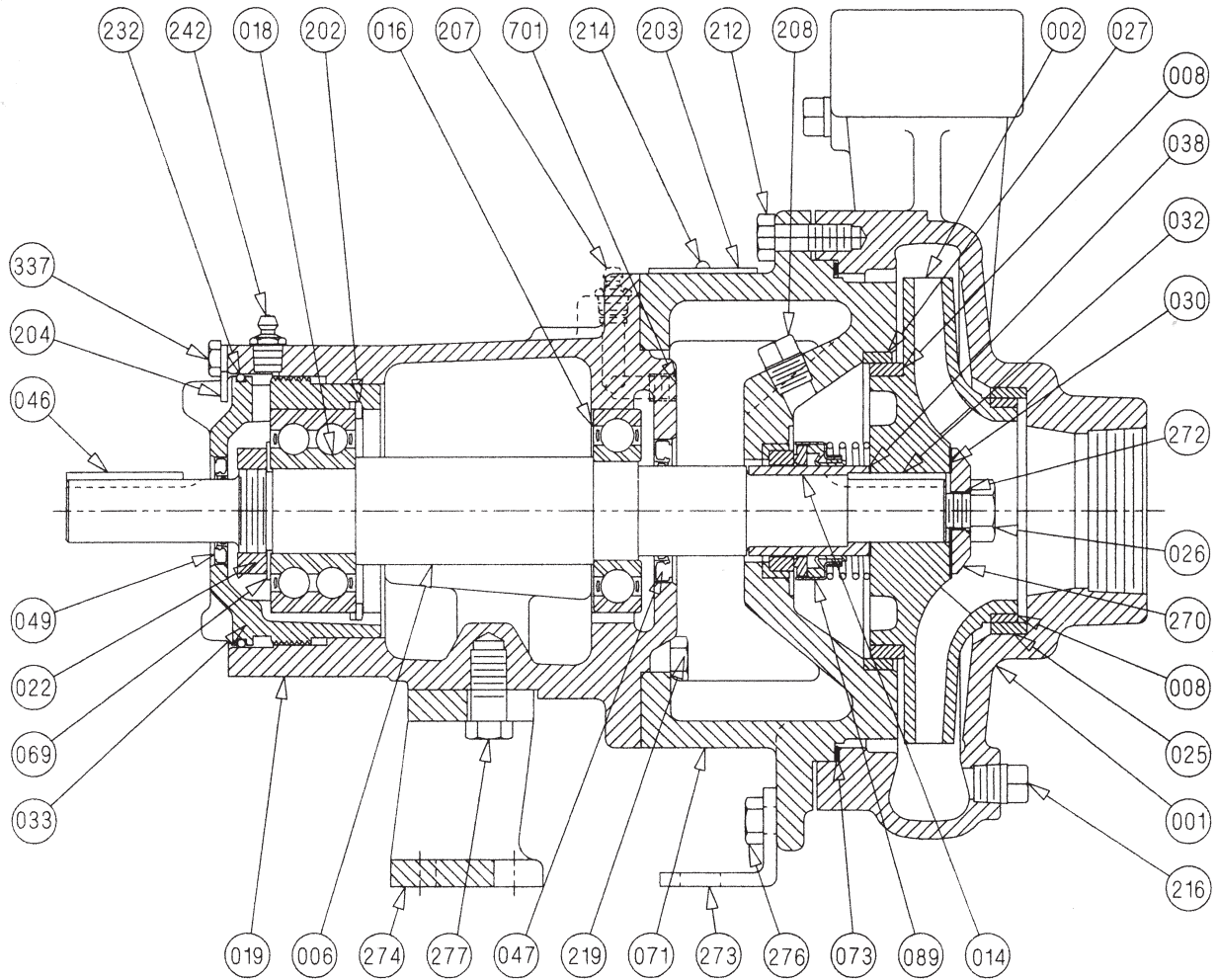
- e. Slide seal rotating member over shaft until lapped seal faces mate. (**Do Not** touch seal faces with hands or other objects).
- f. Slide key (032) and impeller (002) onto shaft and secure with washer (270) and cap screw (026)
- g. Replace wear rings (025) and (027)
- h. Mount the frame assembly to casing (001) using cap screws (212). Be sure the impeller turns freely.
- i. Adjust the impeller as indicated in Section 1.
- j. Align pump and motor according to Section A. Reassemble flexible shaft coupling.

NOTE: Model number, pump serial number and part item number are always required to secure correct replacement parts. Refer to the pump serial plate and illustrations in this booklet.

F - LOCATING TROUBLE

1. No Liquid Delivered
 - a. Pump not primed - See Priming
 - b. Speed too low - Check motor speed and nameplate
 - c. Discharge head too high
 - d. Impeller completely plugged
 - e. Wrong direction of rotation - Check wiring
 - f. NPSHA may be too low, pump cavitates - Check total NPSHR
 - g. Suction or discharge valves closed
2. Not Enough Liquid Delivered
 - a. Air leaks in suction piping
 - b. Speed too low - Check motor speed
 - c. Discharge head higher than anticipated. Check discharge valve/system requirements
 - d. Impeller partially plugged
 - e. Wrong direction of rotation
 - f. NPSHA may be too low, pump cavitates
 - g. Air entrainment
 - h. Flow meter improperly calibrated
3. Not Enough Pressure
 - a. Speed too low - Check motor speed
 - b. Air or gas in liquid
 - c. Incorrect impeller diameter - Check system requirements
 - d. Obstruction in pump or piping
 - e. Specific gravity lower than specified - May require larger pump impeller
 - f. Defective pressure gauge
4. Pump Works For A While Then Quits
 - a. Obstruction in pump or piping
 - b. Air or gas in liquid
 - c. Incomplete priming - See Priming
 - d. Air leak through seal when operating with high vacuum or high suction lift.
5. Pump Takes Too Much Power
 - a. Speed too high - Compare Pump and motor nameplates
 - b. Head lower than rating - pumps too much liquid. Check system requirements
 - c. Liquid specific gravity or viscosity greater than expected. Requires large motor.
 - d. Pump and driver misalignment - Check casing for pipe strain. Support piping and realign unit
 - e. Wrong direction of rotation
 - f. Electrical defects - Check power supply and motor
 - g. Impeller oversized for system requirements
6. Excessive Pump Vibration
 - a. Cavitation at pump suction due to insufficient NPSHA. Alter installation to reduce NPSHR
 - b. Impeller out of balance - Check mechanical (static) balance
 - c. Pump and motor misalignment
 - d. Obstruction in pump impeller
 - e. Pump shaft bent
 - f. Worn pump bearings
 - g. Impeller imbalance due to wear or corrosion
 - h. Motor imbalance
 - i. Base plate loose on foundation or insufficient strength to support the load
7. Pump and/or Motor Noise
 - a. Pump and motor misalignment
 - b. Pump cavitation
 - c. Base plate loose or not grouted
 - d. Pump bearings worn
 - e. Motor bearings worn or fan rubs housing

MODEL 3121

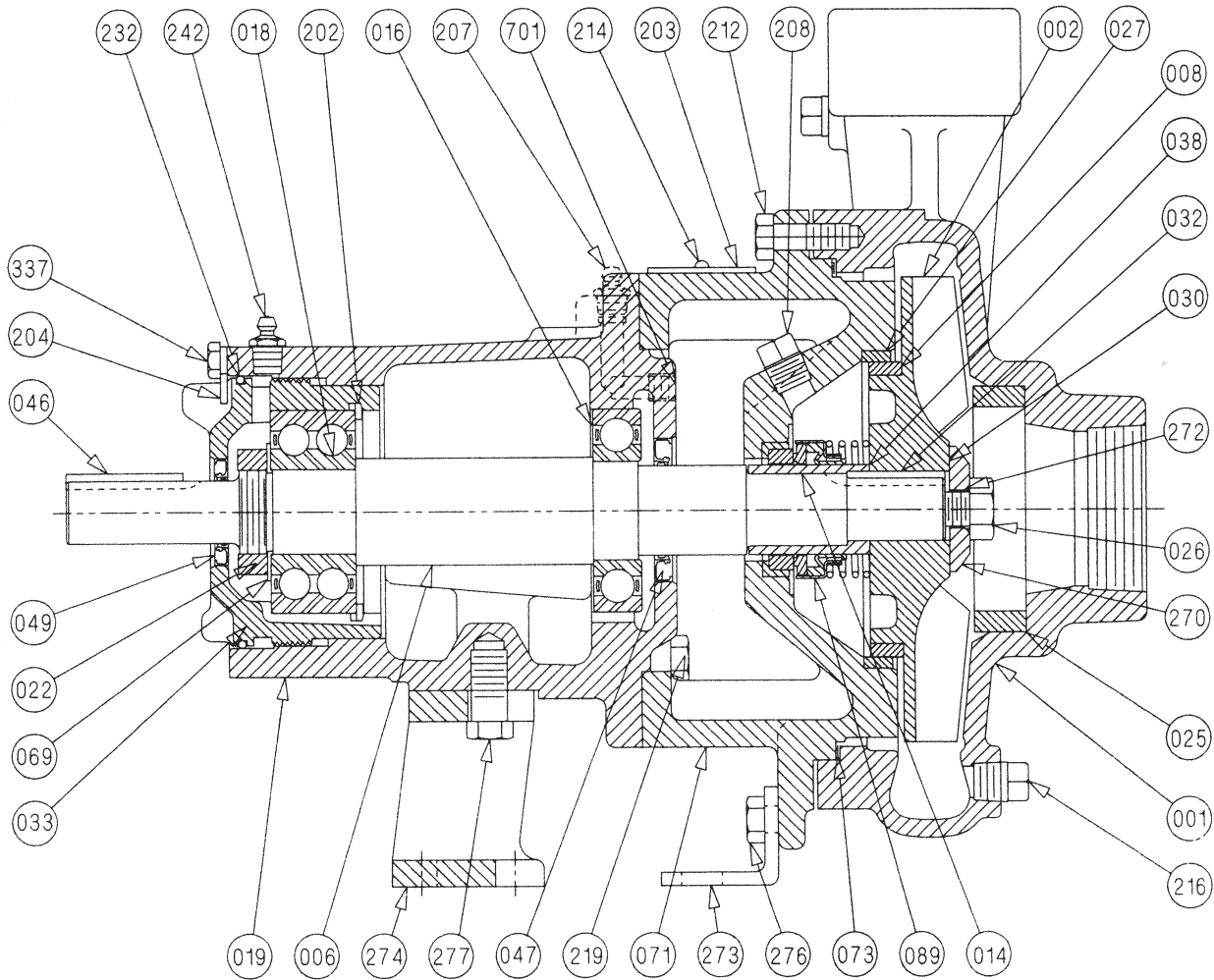


ITEM No.	DESCRIPTION
001	Casing
002	Impeller
006	Shaft
008	Ring, Impeller (Optional)
*014	Shaft Sleeve
*016	Bearing (inboard)
*018	Bearing (outboard)
019	Frame
022	Nut, Bearing Lock
025	Wear ring, Casing
*026	Impeller capscrew
027	Ring, Cover
*030	Impeller washer gasket
032	Impeller Key
033	Housing, Bearing
*038	Sleeve gasket
046	Coupling key
047	Seal, Lip I.B.
049	Seal, Lip O.B.
071	Adapter
*073	Casing gasket

ITEM No.	DESCRIPTION
*089	Mechanical Seal
202	Snap ring (Frame)
203	Name Plate (Not shown)
204	Clip, Bearing Housing
207	Grease Fitting
208	Pipe Plug
212	Cap screw
214	Drive screw
216	Pipe Plug (Casing)
219	Cap screw
232	O-ring
242	Grease Fitting
*270	Impeller Washer
*272	O-ring, Impeller Washer
273	Foot (Adapter)
274	Frame Foot
277	Cap screw
337	Cap Screw
701	Set screw

(*) Recommended Spare Parts

MODEL 3021



ITEM No.	DESCRIPTION
001	Casing
002	Impeller
006	Shaft
008	Ring, Impeller (Optional)
*014	Shaft Sleeve
*016	Bearing (inboard)
*018	Bearing (outboard)
019	Frame
022	Nut, Bearing Lock
*026	Impeller capscrew
027	Ring, Cover
*030	Impeller washer gasket
032	Impeller Key
033	Housing, Bearing
*038	Sleeve gasket
046	Coupling key
047	Seal, Lip I.B.
049	Seal, Lip O.B.
069	Lockwasher, Bearing
071	Adapter
*073	Casing gasket

ITEM No.	DESCRIPTION
*089	Mechanical Seal
202	Snap ring (Frame)
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212	Cap screw
214	Drive screw
216	Pipe Plug (Casing)
219	Cap screw
232	O-ring
242	Grease Fitting
*270	Impeller Washer
*272	O-ring, Impeller Washer
273	Foot (Adapter)
274	Frame Foot
276	Cap screw
277	Cap screw
337	Cap Screw
701	Set screw

(*) Recommended Spare Parts

BARNES®

BARNES®
PRESSURE **PS** 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.

CRANE[®]

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



PUMPS & SYSTEMS

A Crane Co. Company

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