Centrifugal Pumps

IMPORTANT! Read all instructions in this manual before operating pump.
DO NOT work on pump until you are sure pump and associated piping are totally depressurized,
pump and motor have cooled down, and electricity to the motor has been shut off and locked out.
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 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
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.
Rotating machinery Amputation or severe laceration can result.

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

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.
GENERAL INFORMATION

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

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

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

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

Service Centers:
For the location of the nearest Burks Service Center, check your Burks representative or Crane Pumps & Systems, Inc., in Piqua, Ohio, telephone (937) 778-8947.

To insure safety and a successful repair, if there is anything about the pump and motor you do not completely understand, contact your distributor or the factory for instructions.

WARNING ! - DO NOT start pump until it has been filled with water.

WIRING:
1. Motor wiring should conform to national, state and local electrical codes.
2. Use wire of adequate size to prevent voltage drop.
3. Pump should be on a branch or separate circuit, fused or circuit breaker, protected, with a manual disconnect.
4. Connect the electrical supply from the switch to the motor terminals, following the wiring diagram on the motor nameplate or terminal cover plate.

NOTE: Be sure that the connections to the motor terminals correspond with the voltage to be applied.

Check wiring and fuse charts before connecting wires to service line. Make sure the voltage and frequency of the electrical current supply agrees with that stamped on the motor nameplate. If in doubt, check with power company.

Some pumps are equipped with three phase motors. Three phase motors require magnetic starters, and can run in either direction, depending on how they are connected to the power supply.

ROTATION:
The rotation is indicated by an arrow on the casing, and the correct rotation of three phase motors should be established before assembling the coupling on base mounted units. The pump should not be operated backwards or in reverse rotation. If the motor operates in the wrong rotation, interchange any two of the lead wires and the correct rotation will result.

GROUNDING MOTOR:
Wiring to this pump must be installed and maintained in accordance with the National Electrical code or your State and local electrical code.

It is required that a permanent ground connection be made to the unit using a conductor of appropriate size from a metal underground water pipe or a grounded lead in the service panel. DO NOT connect to electric power supply until unit is permanently grounded. Connect the ground wire to the approved ground and then connect to the terminal provided.

IMPORTANT ! - Centrifugal pumps should never be started or run dry. Operating a pump dry will cause scoring of the mechanical seal, resulting in premature seal failure. To prevent the pump from being run dry, it should be primed before starting.

FLOODED SUCTION PRIMING:
This method of priming a pump is relatively simple. The liquid source is located above the pump and all that is necessary to prime the pump is to open the air vent valve or plug in the pump casing and to crack the gate valve in the suction line.
The suction line and pump should be filled slowly until a steady stream of liquid is observed flowing from the air vent. After the pump is operating, it is recommended that the air vent valve or plug be opened again to insure that all air has been expelled from the pump casing.

**SUCTION LIFT PRIMING:**
A foot valve should be used for priming on suction lift applications. The foot valve, located at the end or foot of the suction piping, functions as a check valve and allows flow in one direction only, toward the pump. Otherwise, all the liquid will drain from the pump and suction piping back into the sump after shutdown.

Initial priming is accomplished by completely filling the suction piping and pump casing with the liquid to be pumped. This can be done by removing the air vent valve or plug at the top of the pump casing, and inserting a pipe nipple in the orifice with an appropriate increaser to accommodate a hose connection. A priming line can also be inserted in the discharge piping between the check valve and the pump, or the priming can be done with a bucket and funnel. The important thing is to completely fill the suction pipe and pump casing with liquid.

When the pump is started, the vacuum created by pumping the priming fluid, combined with atmospheric pressure in the liquid well, forces liquid into the suction piping, thus opening the valve and keeping it open until the pump is shut down. When the pump is shut down, the liquid being pumped reverses its flow causing the valve to close. The liquid is now trapped in the suction piping and pump casing, thus maintaining a prime on the pump.

**VACUUM PRIMING:**
Vacuum priming consists of removing air from the pump casing and suction piping and drawing liquid into them by means of a vacuum creating device. The types of vacuum equipment range from a simple hand pump to a complex central priming system. Your specific priming requirements will govern what type of vacuum primer you use.

**STARTING:**
For initial starting, the gate valve in the discharge line should be closed, and opened gradually as the motor approaches full speed, usually in five to ten seconds. After the pump has once been in operation so that the discharge line has been completely filled, it is then unnecessary to close the gate valve in starting.

**SEASONAL SERVICE:**
To take out of service:
1. Drain the liquid from the pump to prevent freezing and damage to the pump body. It is recommended that a good rust inhibitor be put into the liquid end to prevent excessive corrosion. Keep the motor dry and covered.
2. To drain, remove the drain plug which is located below the suction inlet of the pump. Drain the suction pipe to a point below the frost line. All other pipes, which may be exposed to freezing temperatures, should also be drained.
3. Remove the priming plug. This will help the pump body to drain by permitting air to enter the case.

**MAINTENANCE:**
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 on equipment supplied with grease points.

The following lubricant is recommended: Lubriplate 630-A or equal.

**STUFFING BOX - MECHANICAL SEAL:**
With the exercise of a few precautions a mechanical seal will furnish very satisfactory operation in pumps. Precautions which should be observed are:

1. Do not run the pump dry. The flat faces of the seal are lubricated by the liquid being pumped.
2. Vent the seal housing if it is the highest point in the pump.
3. Purge the system thoroughly to remove scale or dirt which may injure the seal prematurely due to the abrasive condition of the liquid.

**INSTALLING A NEW MECHANICAL SEAL**
**CAUTION:** This seal is a precision product and should be handled accordingly. Be especially careful not to scratch or chip the lapped sealing faces of the washer and floating seat. If reinstalling a used seal, both sealing faces should be relapped.

![Schematic Diagram](FIGURE 1)
INSTALLING STATIONARY ELEMENT
The seat must be seated securely in the seat ring with the lapped face out. The unlapped face is marked and correctly assembled when shipped. Oil the seat ring with light oil and seat it firmly and squarely. If this cannot be done with the fingers, use a sleeve as shown in Figure 1, inserting the cardboard shipping disc between the sleeve and the lapped face to prevent scratching sealing face.

INSTALLING ROTATING ELEMENT
Oil shaft with light oil. Shaft should be clean and polished smooth. Slide seal body on shaft (washer end first) and seat firmly. A sleeve as shown in Figure 2 will facilitate this operation and prevent the rubber driving ring from pulling out of place as the seal body is slid along the shaft. Assembly of impeller automatically sets seal in proper position.

Make sure at all times, and particularly before final assembly, that both sealing faces are absolutely clean. Sealing faces should be oiled with clean, light oil.

NOTE: DO NOT use petroleum based products to lubricate EPT or EPDM elastomers - use only water based lubricant.
<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE(S)</th>
</tr>
</thead>
</table>
| Little or no discharge and unit will not prime| 1. Casing not filled with water  
2. Total head too high  
3. Suction head higher than pump designed for  
4. Impeller partially or completely plugged  
5. Hole or leak in suction line  
6. Foot-valve too small  
7. Impeller damaged  
8. Foot-valve or suction line not submerged deep enough in water; pulling air  
9. Insufficient inlet pressure or suction head  
10. Suction piping too small  
11. Casing gasket leaking  
12. Suction or discharge line valves closed  
13. Piping is fouled or damaged  
14. Clogged strainer or foot-valve |
| Loss of suction after satisfactory operation  | 1. Air leak in suction line  
2. When unit was last turned off, water siphoned out of pump casing  
3. Suction head higher than pump designed for  
4. Insufficient inlet pressure or suction head  
5. Clogged foot-valve, strainer, or pump  
6. Defective wearplate(s) |
| Pump overloads driver                         | 1. Total head lower than pump rating, unit delivering too much water  
2. Specific gravity and viscosity of liquid being pumped different than the pump rating |
| Pump vibrates and/or makes excessive noise    | 1. Mounting plate or foundation not rigid enough  
2. Foreign material in pump causing unbalance  
3. Impeller bent  
4. Cavitation present  
5. Piping not supported to relieve any strain on pump assembly |
| Pump runs but no fluid                        | 1. Faulty suction piping (air leak)  
2. Pump located too far from fluid source  
3. Gate valve closed  
4. Clogged strainer  
5. Fouled foot-valve  
6. Discharge height too great  
7. Fouled impeller  
8. Faulty mechanical seal |
| Pump leaks at shaft                           | 1. Worn mechanical seal  
2. Replacement seal not installed properly |

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

## General Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Owner's Name</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Location of Installation</td>
<td></td>
</tr>
<tr>
<td>Contact Person</td>
<td></td>
</tr>
<tr>
<td>Phone</td>
<td></td>
</tr>
<tr>
<td>Purchased From</td>
<td></td>
</tr>
</tbody>
</table>

## Nameplate Data

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Model #</td>
<td></td>
</tr>
<tr>
<td>Serial #</td>
<td></td>
</tr>
<tr>
<td>Part #</td>
<td></td>
</tr>
<tr>
<td>Impeller Diameter</td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td></td>
</tr>
<tr>
<td>Hertz</td>
<td></td>
</tr>
<tr>
<td>Horsepower</td>
<td></td>
</tr>
<tr>
<td>Full Load Amps</td>
<td></td>
</tr>
<tr>
<td>Service Factor Amps</td>
<td></td>
</tr>
<tr>
<td>Motor Manufacturer</td>
<td></td>
</tr>
</tbody>
</table>

## Controls

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control panel manufacturer</td>
<td></td>
</tr>
<tr>
<td>Model/Part number</td>
<td></td>
</tr>
<tr>
<td>Number of pumps operated by control panel</td>
<td></td>
</tr>
<tr>
<td>Short circuit protection?</td>
<td>YES</td>
</tr>
<tr>
<td>Number and size of short circuit device(s)</td>
<td></td>
</tr>
<tr>
<td>Overload Type</td>
<td></td>
</tr>
<tr>
<td>Do protection devices comply with pump and motor Amp rating?</td>
<td>YES</td>
</tr>
<tr>
<td>Are all electrical and panel entry connections tight?</td>
<td>YES</td>
</tr>
<tr>
<td>Is the interior of the panel dry?</td>
<td>YES</td>
</tr>
<tr>
<td>Liquid level Control Brand and Model:</td>
<td></td>
</tr>
</tbody>
</table>

## Pre-Startup

**All Pumps**

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of equipment</td>
<td>NEW</td>
</tr>
<tr>
<td>Condition of equipment at Start-Up</td>
<td>DRY</td>
</tr>
<tr>
<td>Was Equipment Stored?</td>
<td>YES</td>
</tr>
<tr>
<td>Liquid being pumped:</td>
<td></td>
</tr>
<tr>
<td>Supply Voltage/Phase/Frequency matches nameplate?</td>
<td>YES</td>
</tr>
<tr>
<td>Shaft turns freely?</td>
<td>YES</td>
</tr>
<tr>
<td>Direction of rotation verified for 3Ø motors?</td>
<td>YES</td>
</tr>
<tr>
<td>Debris in piping or wet well?</td>
<td>YES</td>
</tr>
<tr>
<td>Debris removed in your presence?</td>
<td>YES</td>
</tr>
<tr>
<td>Pump case/wet well filled with liquid before startup?</td>
<td>YES</td>
</tr>
<tr>
<td>Is piping properly supported?</td>
<td>YES</td>
</tr>
</tbody>
</table>

**Non-Submersible Pumps**

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is base plate properly installed / grouted?</td>
<td>YES</td>
</tr>
<tr>
<td>Coupling Alignment Verified per I&amp;O Manual?</td>
<td>YES</td>
</tr>
<tr>
<td>Grease Cup/Oil Reservoir Level checked?</td>
<td>YES</td>
</tr>
</tbody>
</table>
**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: ___________________________

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