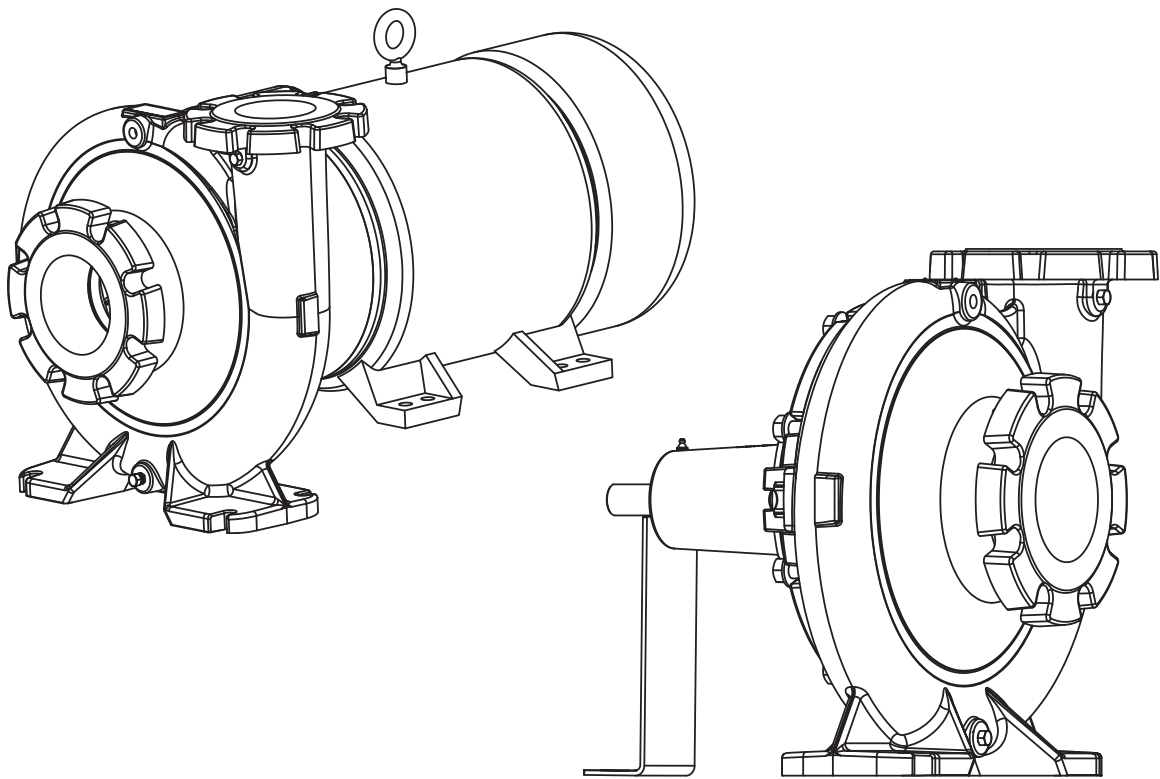


# WEINMAN<sup>®</sup>

## INSTALLATION AND OPERATION MANUAL CENTRIFUGAL PUMPS

### Series: End Suction Back Pull Out

Sections: 375 & 575



**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**<sup>®</sup>

A Crane Co. Company

### PUMPS & SYSTEMS

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

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Ontario, Canada L6T 2J6  
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Fax: (905) 457-2650

Form No. 134665-Rev. B

# 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.

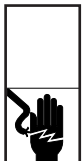


Rotating machinery Amputation or severe laceration can result.



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 with high quality components. Our years of pump building experience and systems controls allows us to produce a pump which will stand up to the toughest applications.

Product shall be installed in accordance with the Local Codes of Authority having Jurisdiction.

### 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 Weinman Service Center, check with your Weinman representative or Crane Pumps & Systems Service Department in Piqua, Ohio, telephone (937) 778-8947 or Crane Pumps & Systems Canada, Inc., Brampton, 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:

Position the unit on the foundation and level the pump base, using metal shims, so that the pump shaft is in vertical alignment and the pump suction and discharge flanges are level in both vertical and horizontal plane. Base may be grouted following alignment. Use a plumb line from floor above to establish centerline of pump and flexible drive shaft and bearings.

### COMMON BASE PLATE:

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.

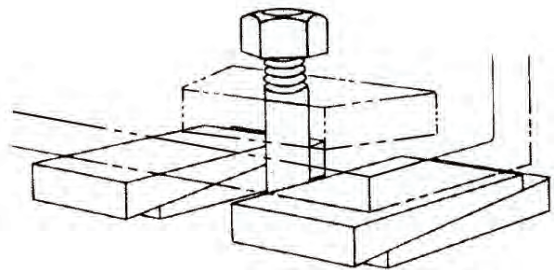


Figure 2. Adjusting Wedges for Mounting

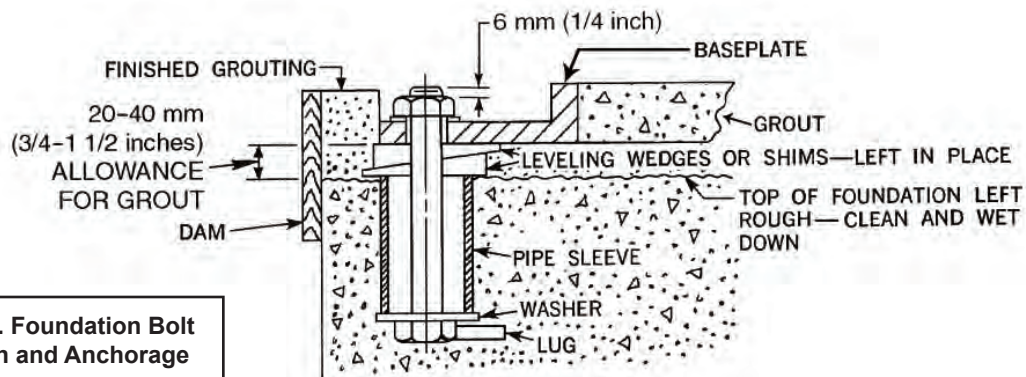


Figure 1. Foundation Bolt Location and Anchorage

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.

**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.

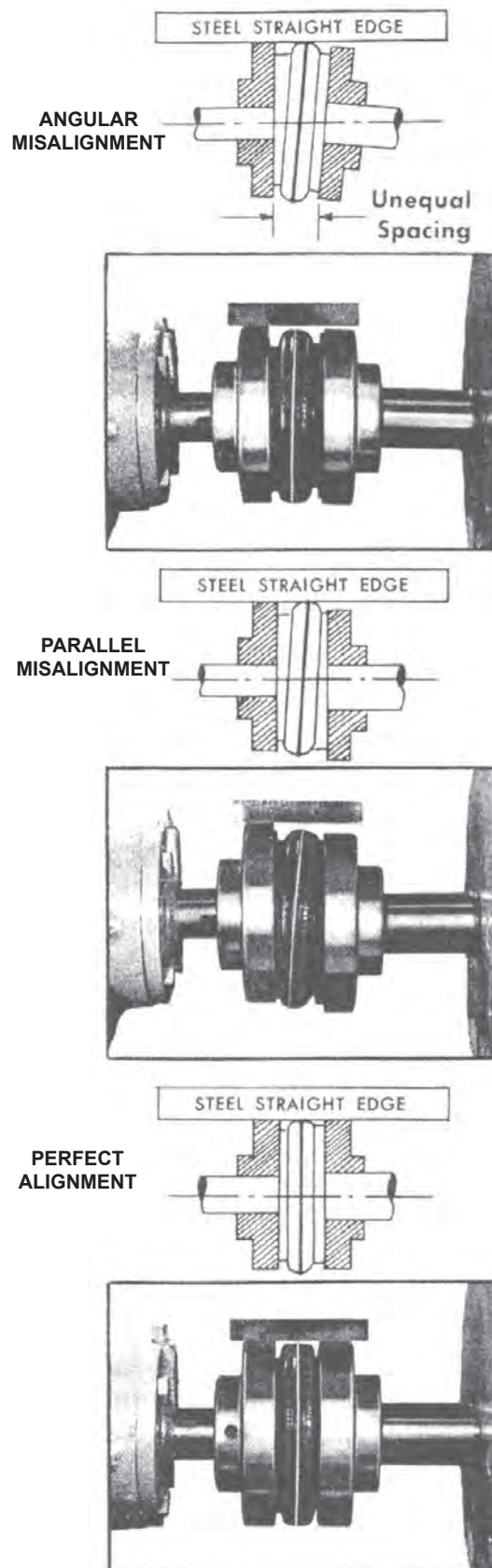


Figure 3



#### 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.

#### 5. PIPING

The piping practices you follow will directly affect the efficiency and power consumption of your pump. Pay particular attention to the seemingly insignificant details involved in piping for they make the difference between a good and bad installation. **BOTH THE SUCTION AND DISCHARGE PIPING SHOULD BE INDEPENDENTLY SUPPORTED NEAR THE PUMP. LIBERAL USE OF PIPE HANGERS AND SUPPORT BLOCKS WILL PREVENT EXCESSIVE STRAIN ON THE PUMP CASING AND ON THE PIPE JOINTS.**

**PROPER PIPING ALIGNMENT IS ESSENTIAL BEFORE CONNECTION IS MADE. PIPING ALIGNMENT SHOULD NEVER BE ACHIEVED BY FORCE, THIS COULD PRODUCE STRAIN ON THE PUMP CASING.**

#### SUCTION PIPING

The illustrations on page 8 are offered as a help in avoiding errors frequently made in suction piping, such as abrupt changes in pipe size, the use of concentric reducer, and the placing of an elbow in a horizontal plane next to the suction nozzle of a single suction type of pump, etc.

The following are of equal importance and should be carefully observed:

1. Never use pipe of a smaller size than the suction connection of the pump. Usually, it is necessary to use one pipe size larger, and sometimes several sizes larger in order to avoid excessive frictional loss with a resultant low NPSH available.

Select the size pipe necessary so that NPSHA exceeds NPSHR by at least 3-5 feet.

When centrifugal pumps are operated with insufficient NPSHA, cavitation will occur, resulting in noisy operation and damage to the pump.

2. The suction pipe, from the source of water supply, should be laid with a gradual incline, not on a level, toward the pump, with the highest point in the line at the pump suction connection. If the pipe is level and if there are any high points in the line which will form air pockets the pump will not operate properly.
3. If conditions require the use of a foot valve and strainer, the flow area of the foot valve should be

from 1-1/2 to 2 times the area of the suction pipe; and the strainer should have a free-opening area equal to 3 to 4 times the area of suction pipe. Otherwise excessive frictional loss will result.

4. If a gate valve is used on the suction line to a pump operating under a suction lift, the valve stem should be placed in a horizontal plane, or a vertical, downward position in order to avoid a possible air leak.
5. The end of the suction pipe should always be submerged a minimum of 18". If only limited submergence can be had, the end of pipe should be belled or flared. A board floating on the surface of water surrounding the suction pipe is helpful against the formation of a vortex permitting air to enter the suction pipe.
6. On pumps operating under high suction lift, the suction piping should be tested thoroughly for air leaks. A small volume of air will materially reduce the capacity of the pump, and a larger volume will frequently cause loss of prime.
7. Installations which will be subjected to considerable temperature variation should be provided with some means for compensating for expansion and contraction. A 50°F temperature change means an expansion or contraction of approximately 3/8" in a pipe line of 100ft. length. This will result in distortion and misalignment of the pump, and sometimes actual breakage.
8. The pipe should not be pulled into position by tightening the piping joints. The pipe should meet the pump and the pump should not be required to meet the pipe. All piping should be supported independently of the pump. Pumps are not designed for carrying loads imposed by piping and its contents.
9. When installing, guard against the possibility of foreign material such as nails, bolts or pieces of waste being left in the line, likely to lodge in the impeller and cause loss of capacity and mechanical damage.
10. When the suction supply is taken from a tank or sump, incoming water should never be allowed to fall into the water near the end of suction pipe. This will carry air down into the suction pipe.

#### SUCTION DIFFUSER FEATURES:

- Reduces both space and installation costs by replacing an extended entry pipe, a long radius elbow and a strainer.
- Disposable fine mesh start-up strainer provided on all models, guarantees a clean system.
- Steel stabilizing vanes ensure smooth flow into the pump.
- Drain/Purge plugs furnished to routinely remove

foreign particles and protect pump and other system components.

- Optional pressure tap allows monitoring of strainer condition.
- Blowdown tapping supplied to protect pump seals from damage by foreign particles.

#### **SUCTION DIFFUSER INSTALLATION:**

1. Provide for distance "L2" (see Suction Diffuser Catalog page for illustration and "L2" dimension). "L2" represents distance necessary for removal of strainer and stabilizing vanes.
2. Mount standard I.D. support leg and foot to pad cast-on body of suction diffuser.
3. After piping and initial circulation are complete, remove fine mesh start-up strainer.
4. A gauge may be connected to both the pump suction and the Suction Diffuser's schrader valve. An increase in pressure drop will indicate when the strainer may require cleaning.

#### **SUCTION DIFFUSER MAINTENANCE:**

It is recommended that the stabilizing vanes be periodically inspected and the permanent strainer be periodically cleaned. This will ensure smooth flow into the pump and avoid damage to the pump components.

#### **DISCHARGE PIPING**

The discharge piping should never be of a smaller size than the discharge connection of the pump and, in most cases, should be one and sometimes two sizes larger in order to avoid excessive frictional loss. Avoid sudden or abrupt changes in pipe sizes which cause shock or frictional losses.

Use increasers of the concentric type. Eccentric increasers are not required for the discharge line.

Gate and check valves should be installed in the line with the check placed between pump and gate valve. A check valve, under most conditions of service, is required as a protection to the pump against excessive surge pressure when a foot valve is used on the suction, as well as for protection against reversed rotation if no foot valve is used.

In installations where noise is highly objectionable, such as hospitals, hotels and apartment buildings, the discharge pipe should not be attached to steel work or hollow walls without being insulated properly against vibration. In extreme cases, it is desirable that the discharge line be provided with a flexible connection.

#### **TDV DESIGN AND OPERATION:**

The principle of operation for the TDV valve is extremely simple. When in the open position, the clapper swings out of the flow. If the flow stops, the spring allows the clapper to close.

When closing the valve, a final "bumping" action with a wrench gives the final positive seal closure.

#### **TDV MAINTENANCE:**

The TDV valve requires no day-to-day maintenance or lubrication, but it is suggested that the valve be operated once a month to assure it is in operable condition.

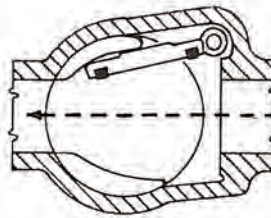
If at any time it is suspected that the valve is leaking, either in the plug position or as a check, it is possible that foreign particles are trapped between the mating faces of the seal and seat, and are preventing tight seal action. Cycling the valve from full open to close causes a jetting action that will wash away foreign particles that may be trapped. Also, cycling the valve will usually squeeze any build-up away from the seat mating faces and allow tight shut-off again.

It is not uncommon to discover that when a TDV valve has been reported leaking in the closed position, that the valve is actually not completely closed. The cam-based design of the TDV valve makes it almost impossible to over-close. The TDV is designed to close at an approximate ninety degree rotation of the plug stem. To close the valve, rotate the stem one quarter turn and tighten.

The TDV wrench is specially suited for the cam-based design of the valve to assure a positive closure. The most satisfactory closure is accomplished by turning the plug to a tight fit and then "bumping" the plug lightly using the TDV wrench. The use of cheater or a handwheel should not be necessary.

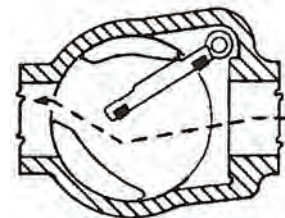
If these procedures have been completed and a tight seal is still not apparent, the valve should be disassembled and inspected for damage of the clapper seal and seat face, or for excessive wear of the clapper pin and pin hanger supports.

For balancing procedures, please refer to the TDV Catalog page.



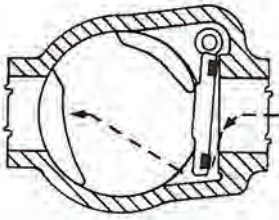
#### **Open Position**

With the plug in the open position, the clapper operates as an efficient check valve. The clapper being hinged at an angle provides 90% less dead weight to minimize clapper slam and chatter.



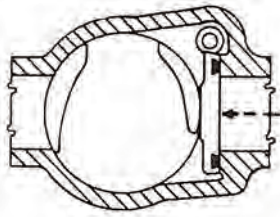
#### **Balancing**

The plug holds the clapper at the selected flow requirement for balancing.



**Closed Position**

As the plug is rotated toward the closed position, the downstream part closes first. This equalizes the pressure so the clapper closes with little resistance.

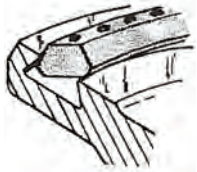


**Positive Seal Closure**

Final closing is accomplished by the plug camming against the back of the clapper.

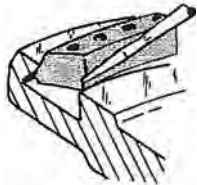
**REPAIR CLAPPER SEAL:**

HVAC TDV valves are equipped with Buna-N clapper seals. If the clapper seal is damaged, they can be replaced by removing the clapper and installing a new seal (see steps 1-3 below).



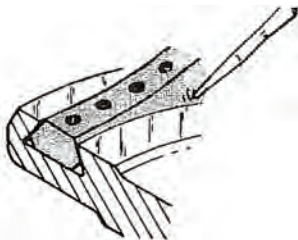
**Step 1**

Place the outer edge of the seal into the clapper groove as shown.



**Step 2**

Using a blunt screwdriver, force the inside lower edge of the seal into the clapper groove.

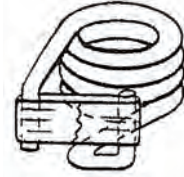


**Step 3**

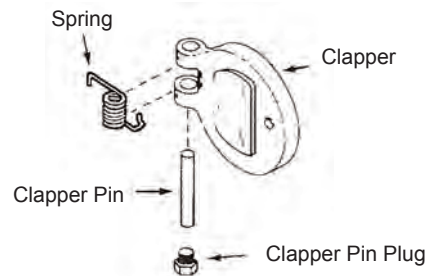
As you work the seal in, maintain force on the portion of the seal that has been installed. This will prevent elongation and excessive build-up of closing portion.

**REPLACEMENT PROCEDURE:**

1. Position clapper firmly against the seat face.
2. Pre-load spring and bind using filament tape (see Figure 4a)
3. Take the clapper pin with the extension screw and insert the pin into the spring and support hangers (see Figure 4b)
4. When holding the clapper firmly against the seat, the clapper pin must move freely into position.
5. Remove the extension screw, replace the clapper pin plug, and cut the filament tape to free the spring.
6. Check the clapper for free movement by opening and closing the clapper by hand.
7. If movement is free, complete the valve assembly.



**Figure 4a**



**Figure 4b**

PIPING

Right

Wrong

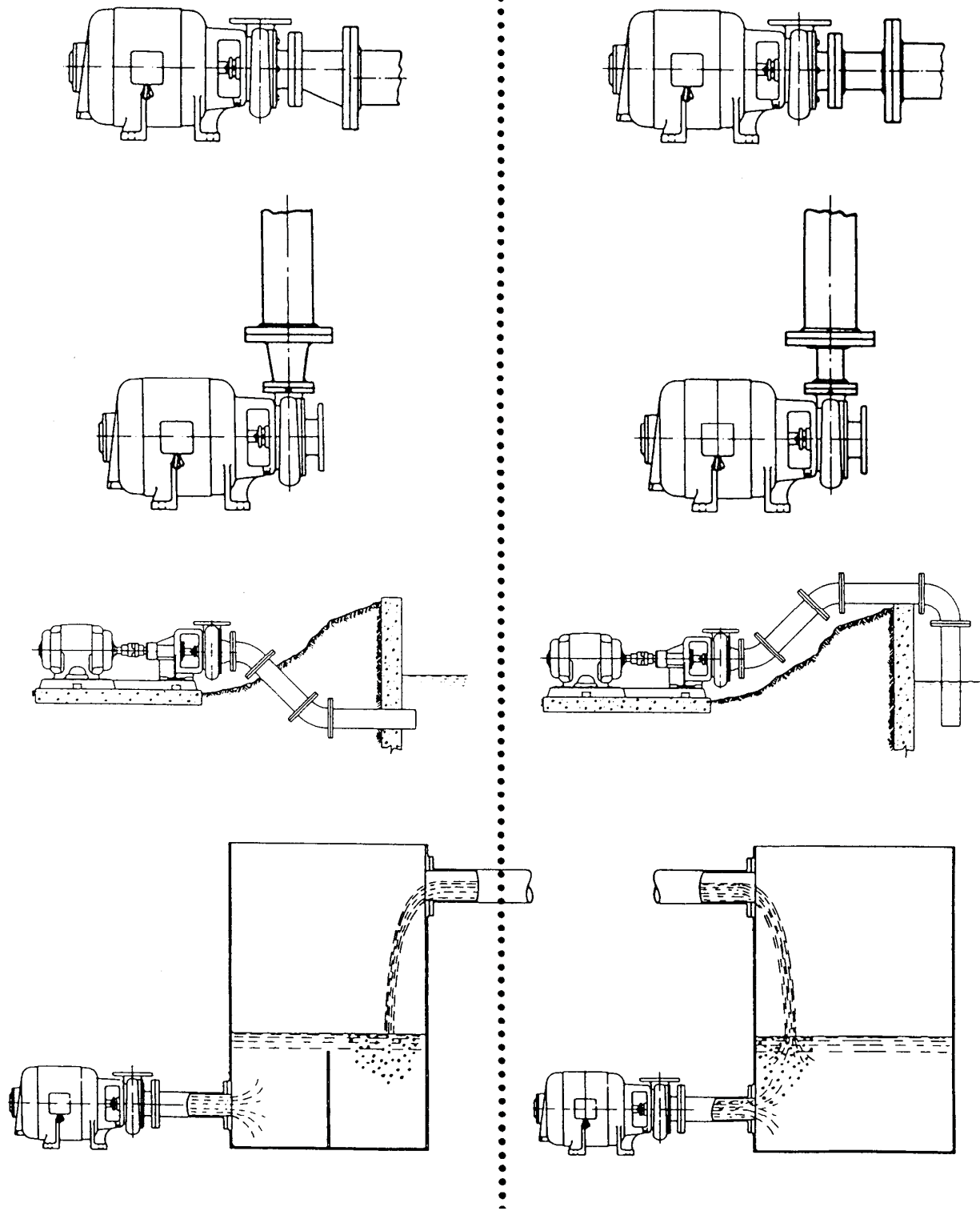


FIGURE 5



## 6. WIRING



**WARNING: DO NOT START PUMP UNTIL IT HAS BEEN FILLED WITH WATER.**

1. Motor wiring should conform to national 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. (See Chart)

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.

## 7. 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.

## 8. GROUNDING MOTOR



**WIRING TO THIS PUMP MUST BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE OR YOUR LOCAL ELECTRIC CODE. IF MORE INFORMATION IS NEEDED, CALL YOUR LOCAL LICENSED ELECTRICIAN OR YOUR POWER COMPANY.**

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** ground to a gas supply line. **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.



**NOTE: 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.**

## 9. FLOODED SUCTION PRIMING

The Weinman 375/575 pump models are designed to be self venting at startup and in operation. They do not require a casing high point vent, although one is provided to allow air to be vented to allow safe hydrostatic testing.

## 10. 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.

## 11. 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.

## 12. 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.

### 13. 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.

#### To Place Pump Back Into Service:

1. Replace all drain plugs previously removed, using pipe joint compound on all male threads.
2. If the suction line has been removed, be certain that it is re-connected.
3. Check to be certain that the pump shaft turns freely.
4. Prime and start.



**DO NOT START THE PUMP UNTIL IT IS FILLED WITH WATER.**

### 14. 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. Purge the system thoroughly to remove welding slag, scale, or dirt which may injure the seal prematurely due to the abrasive condition of liquid.

**WARNING: Do not work on this pump until you are sure the pump and associated piping are totally depressurized, and if pumping hot liquids that the temperature is safe to handle.**

Be sure that electricity to the motor is shut off and locked out, or if the motor is to be tested while running that it is conducted by a qualified person and safe electrical procedures are followed.

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.

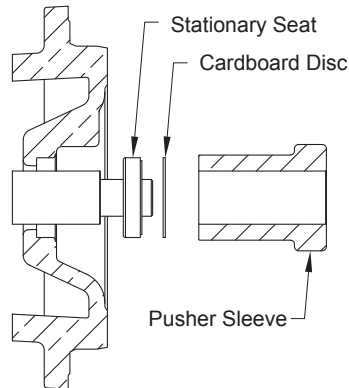


FIGURE 6

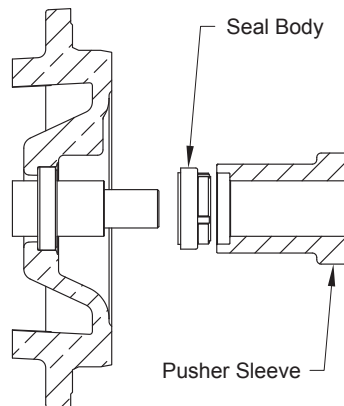


FIGURE 7

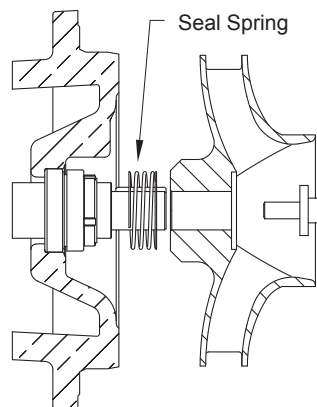


FIGURE 8

**15. 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.

**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. Lubricate the seat ring gasket and seat it firmly and squarely. **NOTE: DO NOT USE PETROLEUM BASED PRODUCTS TO LUBRICATE EPT OR EPDM ELASTOMERS - USE ONLY WATER BASED LUBRICANT.** If this cannot be done with the fingers, use a sleeve as shown in Fig.6, inserting

the cardboard shipping disc between the sleeve and the lapped face to prevent scratching sealing face.

**INSTALLING ROTATING ELEMENT**

Lubricate shaft with International Products P-80® or rubbing alcohol. **NOTE: DO NOT USE PETROLEUM BASED PRODUCTS TO LUBRICATE EPT OR EPDM ELASTOMERS - USE ONLY WATER BASED LUBRICANT.** Shaft should be clean. Slide seal body on

shaft (rotating face end, first) and seat firmly. A sleeve as shown in Fig. 7 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. Torque the impeller bolt and all other fasteners per the bolt torque table.

**BEARING LUBRICATION:**

Standard pumps are supplied with sealed, greased for life bearings. If pump is equipped with optional regreaseable bearings a #2 grease is recommended. Use a water resistant, nonfibrous grease. Lithium based greases are excellent (standard factory lube) and Molybdenum Disulfide is acceptable. Approximately 1/2 ounce of grease, or a teaspoonful for bearings of small size, and a tablespoonful for larger sizes, is needed each time a bearing is relubricated.

**BOLT TORQUE TABLE**

APPLICATION	FASTENER SIZE	HEAD STYLE	TORQUE (ft. lb.)
Bearing Frame Cap/Bearing Frame	3/8-16x.875	Hex	31
	1/4-20x.625	Hex	8.4
Adapter/Motor-Bearing Frame	5/8-11x1.50	Hex	150
	1/2-13x1.25	Hex	75
	3/8-16x1.00	Hex	31
Impeller Bolt	3/4-10x1.50	Hex	266
	1/2-13x1.25	Socket	75
	3/8-16x1.00	Socket	31
Adapter/Case	5/8-11x1.50	Hex	150
	3/8-16x1.25	Hex	31
	3/8-16x1.00	Hex	31
Frame Foot/ Bearing Frame	3/8-16x.50	Hex	31
Drain Plug	1/4" NPT	Hex	18
Grease Fittings (Optional)	1/8" NPT	Hex	9
Pump Case/Base	1/2-13x1.25	Hex	57
Bearing Frame Foot/Base	3/8-16x1.00	Hex	23
Motor/Riser	1/2-13x2.00	Hex	57
	3/8-16x2.00		23
	5/16-18x1.25		13
Motor Riser/Base	3/8-16x1.00	Hex	23
Guard/Base	3/8-16x1.00	Hex	23

## TROUBLE SHOOTING GUIDE

TROUBLE AND CAUSE	REMEDY
<p>1. Failure to pump</p> <ul style="list-style-type: none"> <li>a. Pump not properly primed</li> <li>b. Suction lift too great</li> <li>c. Speed too slow</li> <li>d. Motor running in wrong direction</li> </ul>	<ul style="list-style-type: none"> <li>a. Be sure that pump case and suction line are full of water. See priming instructions.</li> <li>b. Locate the pump closer to the water source. Make sure that the suction piping diameter is large enough.</li> <li>c. Check the voltage at motor terminals and at the meter when the pump is operating. Check for loose connections. If voltage is low, contact your Power company. Be sure that wire size is adequate.</li> <li>d. Check the wiring diagram on the motor nameplate. If it is a 3-Phase motor, refer to the Wiring instructions.</li> </ul>
<p>2. Reduced Capacity and/or Head</p> <ul style="list-style-type: none"> <li>a. Clogged impeller</li> <li>b. Air pockets or leaks in suction line</li> <li>c. Strainer too small or clogged</li> <li>d. Insufficient submergence of suction pipe</li> <li>e. Excessive suction lift</li> <li>f. Excessively worn impeller</li> </ul>	<ul style="list-style-type: none"> <li>a. Remove and clean</li> <li>b. Check the line for air leaks or excessive lift.</li> <li>c. Check the end of the suction pipe or foot valve to see that it is not plugged or buried in mud or sediment. When installing in pond or lake, support the suction line so that it will be submerged in water, but not imbedded in mud or sediment. A strainer with greater screen area may be required.</li> <li>d. Add sufficient pipe to keep the submerged end well below the water surface.</li> <li>e. If caused by suction pipe friction, increase the size of the pipe; otherwise move the pump closer to the water level.</li> <li>f. Order replacement parts. See repair list.</li> </ul>
<p>3. Pump Losses Prime</p> <ul style="list-style-type: none"> <li>a. Air leaks in suction line</li> <li>b. Excessive suction lift and operating too near shut-off point</li> <li>c. Water level drops while pumping, exposing suction pipe or strainer</li> </ul>	<ul style="list-style-type: none"> <li>a. Check suction piping. Piping might have frozen, causing it to split.</li> <li>b. Move the pump closer to the water level.</li> <li>c. Check the water supply. Add a length of pipe to the suction line to keep the submerged end under water.</li> </ul>
<p>4. Motor Will Not Start</p> <ul style="list-style-type: none"> <li>a. Blown fuses</li> <li>b. No electric current at motor</li> <li>c. Motor hums but will not start</li> <li>d. Motor damaged by lightning or voltage surge</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace with new fuses.</li> <li>b. The power supply may be off, the connections may be loose or incorrect, or the wire may have been chewed by rodents.</li> <li>c. Turn power off. Check the rotating element of the pump to see that it turns freely.</li> <li>d. Take the motor to any authorized motor repair shop</li> </ul>



BARNES®



burks®

WEINMAN®

DEMING®

PROSSER®

## Limited 24 Month Warranty

Crane Pumps & Systems warrants that products of our manufacture will be free of defects in material and workmanship under normal use and service for twenty-four (24) months after manufacture date, when installed and maintained in accordance with our instructions. This warranty gives you specific legal rights, and there may also be other rights which vary from state to state. In the event the product is covered by the Federal Consumer Product Warranties Law (1) the duration of any implied warranties associated with the product by virtue of said law is limited to the same duration as stated herein, (2) this warranty is a LIMITED WARRANTY, and (3) no claims of any nature whatsoever shall be made against us, until the ultimate consumer, his successor, or assigns, notifies us in writing of the defect, and delivers the product and/or defective part(s) freight prepaid to our factory or nearest authorized service station. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply. **THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY AND ALL WARRANTIES WITH RESPECT TO ANY PRODUCT SHALL BE TO REPLACE OR REPAIR AT OUR ELECTION, F.O.B. POINT OF MANUFACTURE OR AUTHORIZED REPAIR STATION, SUCH PRODUCTS AND/OR PARTS AS PROVEN DEFECTIVE. THERE SHALL BE NO FURTHER LIABILITY, WHETHER BASED ON WARRANTY, NEGLIGENCE OR OTHERWISE.** Unless expressly stated otherwise, guarantees in the nature of performance specifications furnished in addition to the foregoing material and workmanship warranties on a product manufactured by us, if any, are subject to laboratory tests corrected for field performance. Any additional guarantees, in the nature of performance specifications must be in writing and such writing must be signed by our authorized representative. Due to inaccuracies in field testing if a conflict arises between the results of field testing conducted by or for user, and laboratory tests corrected for field performance, the latter shall control. **RECOMMENDATIONS FOR SPECIAL APPLICATIONS OR THOSE RESULTING FROM SYSTEMS ANALYSES AND EVALUATIONS WE CONDUCT WILL BE BASED ON OUR BEST AVAILABLE EXPERIENCE AND PUBLISHED INDUSTRY INFORMATION. SUCH RECOMMENDATIONS DO NOT CONSTITUTE A WARRANTY OF SATISFACTORY PERFORMANCE AND NO SUCH WARRANTY IS GIVEN.**

This warranty shall not apply when damage is caused by (a) improper installation, (b) improper voltage (c) lightning (d) excessive sand or other abrasive material (e) scale or corrosion build-up due to excessive chemical content. Any modification of the original equipment will also void the warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective parts. Neither will we accept charges incurred by others without our prior written approval.

This warranty is void if our inspection reveals the product was used in a manner inconsistent with normal industry practice and/or our specific recommendations. The purchaser is responsible for communication of all necessary information regarding the application and use of the product. **UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO TRAVEL EXPENSES, RENTED EQUIPMENT, OUTSIDE CONTRACTOR FEES, UNAUTHORIZED REPAIR SHOP EXPENSES, LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, WHICH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL AND/OR WORKMANSHIP AND/OR DAMAGE OR DELAYS IN SHIPMENT. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

No rights extended under this warranty shall be assigned to any other person, whether by operation of law or otherwise, without our prior written approval.

**CRANE**

PUMPS & SYSTEMS

A Crane Co. Company

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[www.cranepumps.com](http://www.cranepumps.com)

83 West Drive  
Brampton, Ont. Canada L6T 2J6  
(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**



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