

A RUTHMAN COMPANY

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**GUSHER COOLANT PUMPS  
FLANGE MOUNTED-SEALED  
AND SEALLESS  
IMMERSED  
HORIZONTAL**

**MAINTENANCE • INSTALLATION • OPERATIONS**

**Instruction Manual**

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### General Information:

Although Gusher Pumps, Inc. have taken every precaution to prevent damage in shipment we recommend that you check the pump for visible damage such as cracks, holes, indentations, etc. upon arrival. Some damage isn't visible such as a bent shaft. This is checked by turning the rotating element of the pump by hand to assure free rotation (remove the motor fan cover if necessary). You should now check the name plate to be sure that you have received what you ordered. Here we provide a list of the things to check and record for future reference.

Keep this manual in a convenient location for quick reference.

Model .....

Motor frame size .....; Impeller Dia. ....

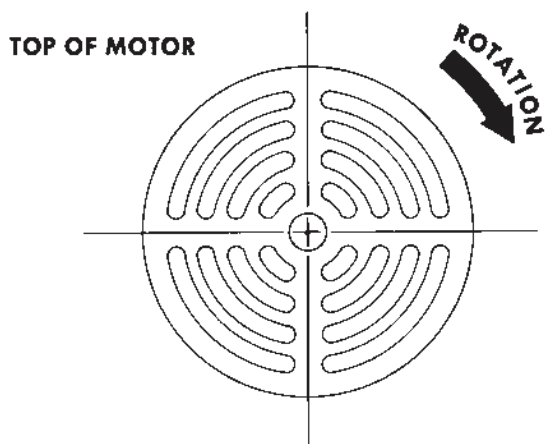
H.P. ....; Ph. ....; Cy. ....; RPM .....; Amps .....

Voltage .....; Serial No. ....

Performance G.P.M. .... @ T.D.H. .... in p.s.i.

## Installation Vertical Pump:

Gusher vertical end suction pumps with integral shaft is easily installed and put into service. With the one piece shaft design there is no couplings to align, no shims or no special adjustments to make. With the use of one of Gusher's clamp on brackets that fit around the stem's column the pump can be quickly set into position and bolted down. When piping your machine we recommend the use of as large a pipe as is practical from the pump to the point of delivery. It is advisable to install a pressure gauge in the discharge line as close to the pump as possible. It is also recommended to install a gate valve in the discharge line down stream from the pressure gauge. It is **IMPORTANT** to note that the machine piping should be self supporting and in no way supported by the pump impeller housing or discharge connection. After the pipe is installed we recommend the pump rotating element be turned by hand to check for bind-



ing. This is done by inserting a screw driver in the slots in the fan cover and turning the pump by hand. If there is a drag or if there is a tight spot you should check the piping system to be sure it is supported properly, if not, secure properly and recheck. When you are positive the pump is rotating free, wire the motor being sure to conform to all state and local electrical codes. Before putting the unit into operation, check the direction of rotation by jogging the motor starter on and off. The direction of rotation is clockwise when viewing from the top of the motor. If the pump is turning the wrong direction, reverse any two of the line wires at the motor in the conduit box or at the motor starter.

## Operation:

Before starting the pump the reservoir should be filled to the minimum level so as to completely submerge the pump impeller housing in the liquid which assures priming of the pump. Upon initial start-up we recommend that you check and maintain the minimum liquid level in your reservoir, it is also advisable to check your piping for leak at this time. We also recommend that you check and record (use space provided) the pump discharge pressure, line voltage, amperage being drawn by the motor and the operating temperature of the ball bearings.

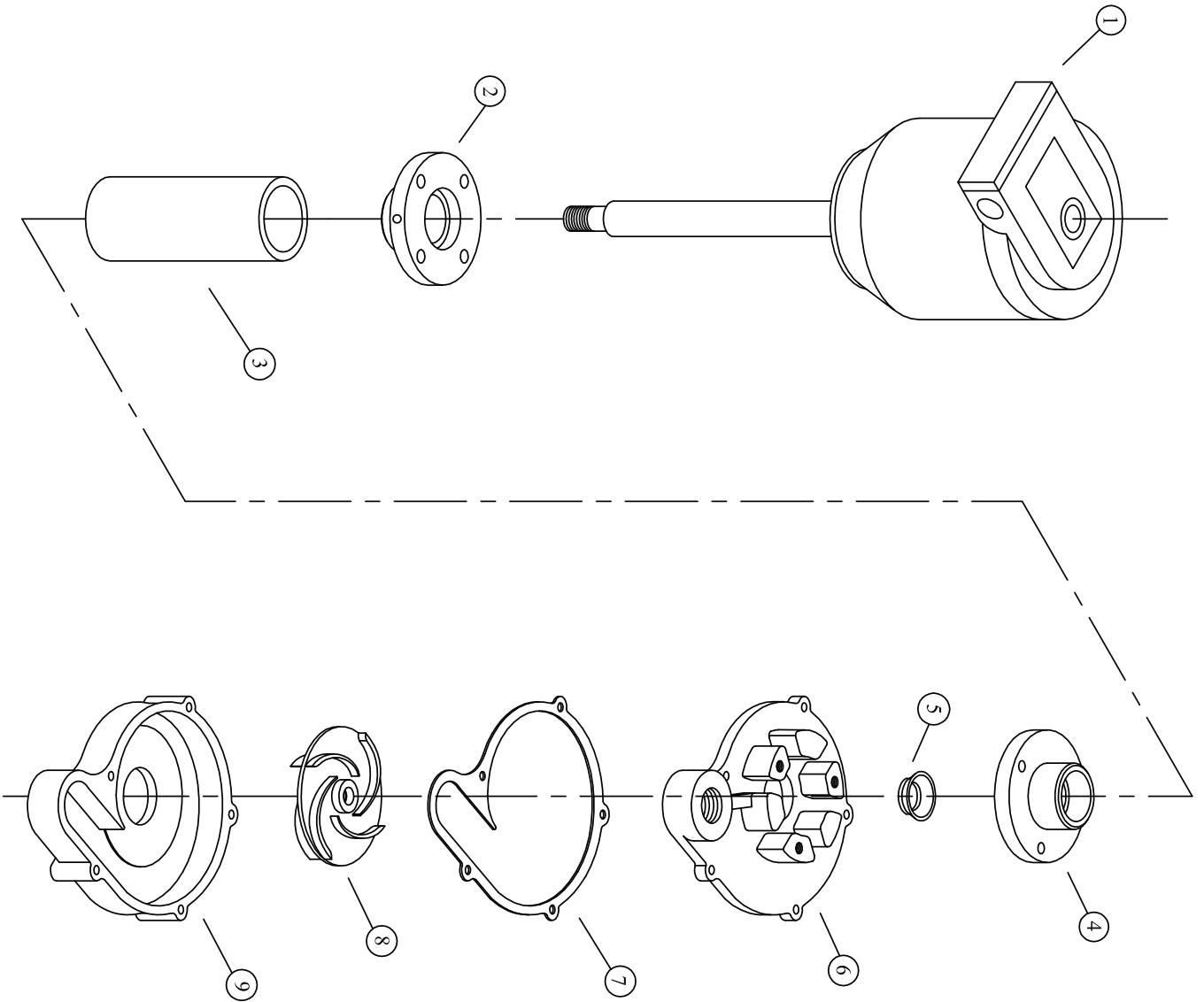
	At shut-off (valve in discharge line closed)	At operating condition
Pressure	.....	.....
Voltage	.....	.....
Amperage	.....	.....
Temperature	.....	.....

Temperature should be checked with a pyrometer, do not check by touch, temperatures that are hot to the touch are often well within the maximum operating temperature of 225°F.

If a problem develops check trouble shooting section on page 11. If you are unable to solve your problem using this section, contact Gusher Pumps, Inc. for assistance.



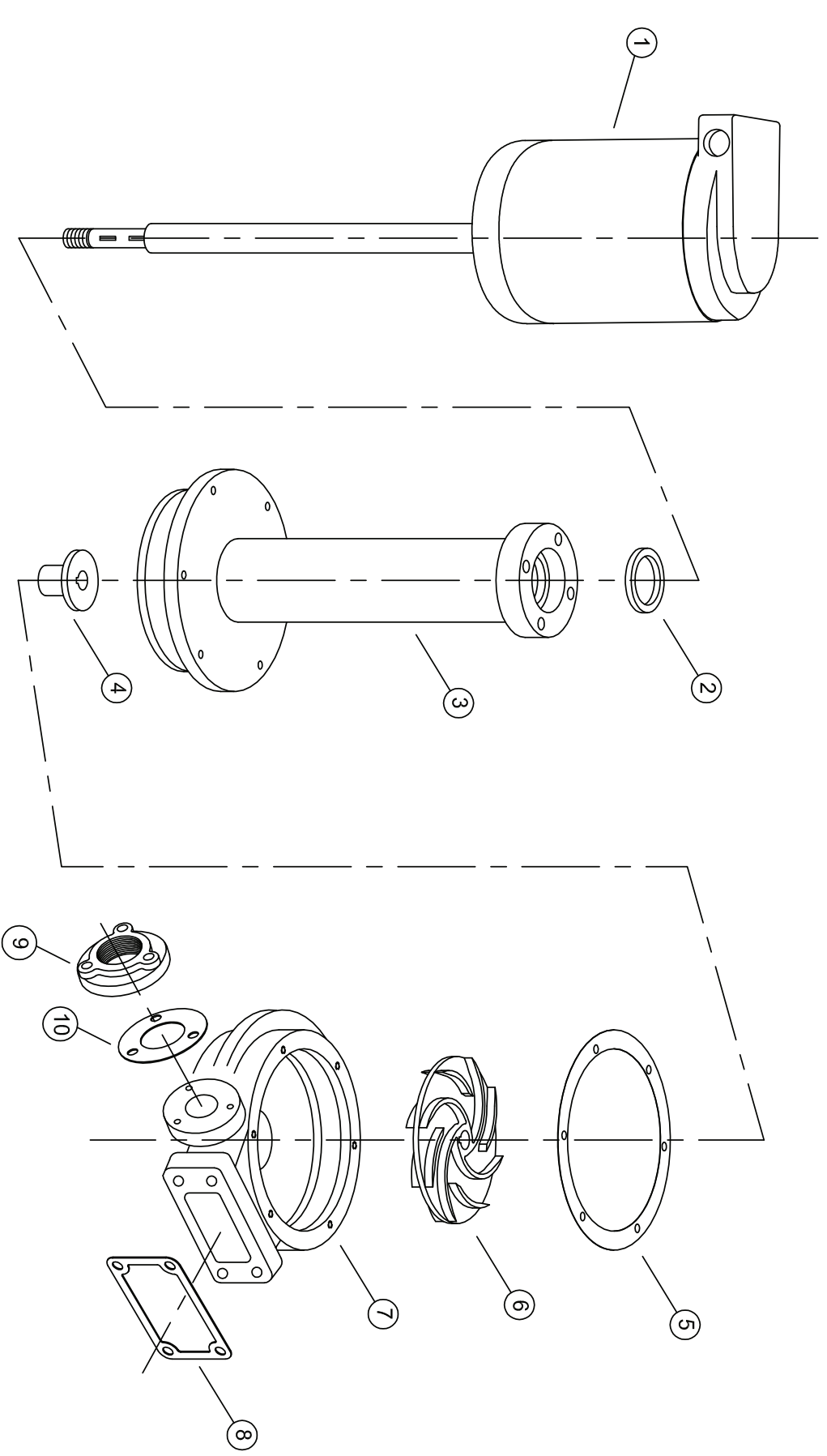
# Vertical Immersed



PART NO.	DESCRIPTION
1	MOTOR
2	PUMP FLANGE WITH LIP SEAL
3	COLD ROLLED STEEL TUBE
4	PUMP FLANGE
5	SLINGER
6	STEM PLATE
7	IMPELLER HOUSING GASKET
8	IMPELLER
9	IMPELLER HOUSING

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<b>GUSHNER PUMPS</b> DIVISION OF RUTIMAN PUMP AND ENGINEERING, INC. RUTIMAN BAYVIEW ROAD, KENTON, OHIO	
TITLE: EXPLODED VIEW OF RUTIMAN INTEGRAL SHAFT PUMP	
DESIGNER	BURKHEAD
DATE	7/11/96
SCALE	REV. 0.0
DRAWN	AK 960711-2

# Vertical Sealless



PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
1	MOTOR/SHAFT ASSEMBLY	6	IMPELLER
2	OIL SEAL	7	IMPELLER HOUSING
3	STEM	8	INTAKE FLANGE GASKET
4	BAFFLE	9	DISCHARGE FLANGE
5	IMPELLER HOUSING GASKET	10	DISCHARGE FLANGE GASKET

**GUSHER PUMPS**

DIVISION OF RUTHMAN PUMP AND ENGINEERING, INC.  
RUTHMAN DRIVE-DRY RIDGE, KENTUCKY 41035

**TITLE**  
RUTHMAN SEALLESS FLANGED MOUNT PUMP

**DRAWN BY**  
J. HEEGER

**DATE**  
9-9-08

**AK 080909-201**



## Installation Horizontal Pump:

Before starting any centrifugal pump the suction line and impeller housing must be filled with liquid being pumped. If the pump is located below the liquid level in the reservoir the pump may be primed by removing the vent plug and allowing liquid to fill the suction line and impeller housing. To prime a pump operating under suction lift condition there must first be a foot valve installed in suction line. Liquid is then poured into the impeller housing through the vent plug or through the check valve in the discharge line until suction line and housing is filled with liquid being pumped. The unit will remain primed as long as the foot valve is operational.

**SUCTION PIPING...**The suction pipe must be kept free of air leaks. This is particularly important when the suction line is long or the static lift is high. The suction pipe should always slope gradually up toward the pump. Any high point in the pipe will become filled with air and prevent proper operation of the pump. A concentric reducer should not be used in a suction line, it forms air pockets in the top of the reducer and the pipe. Use an eccentric reducer instead (see illustrations). Small air pockets that may cause problems are often formed in the top of gate valves mounted vertically in suction line. We recommend gate valves in suction lines be laid so that the stem is in horizontal position.

**DISCHARGE PIPING...**We recommend the use of a check valve and a gate valve in the discharge line. The check valve should be placed between the pump and gate valve to prevent liquid from running back through the pump and possibly causing damage to the drive motor. The gate valve is used when starting and priming and when the pump is to be shut down. This valve should be closed when stopping the pump when a foot valve is used, this prevents water hammer. This is important when the pump is used against a high static lift. We recommend increasing the discharge pipe to the next size larger than the pump discharge size. This is done by placing a concentric reducer between the check valve and the pump. Both suction piping and discharge piping must be self supporting and in no way supported by the pump suction or discharge connection.

After the pipe is installed we recommend the pump rotating element be turned by hand to check for binding. This is done by inserting a screw driver in the slots in the fan cover and turning the pump by hand. If there is a drag or if there is a tight spot you should check the piping system to be sure it is supported properly, if not, secure properly and recheck.

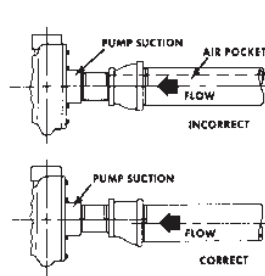


FIG. 1

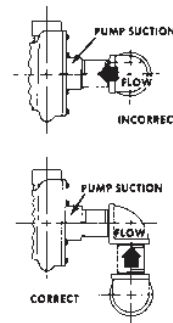


FIG. 2

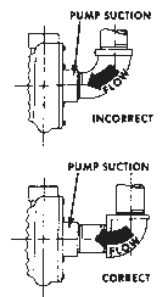


FIG. 3

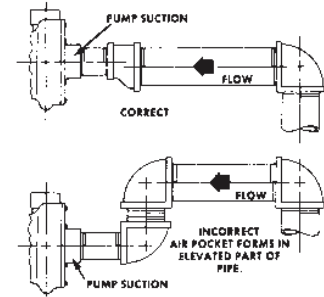
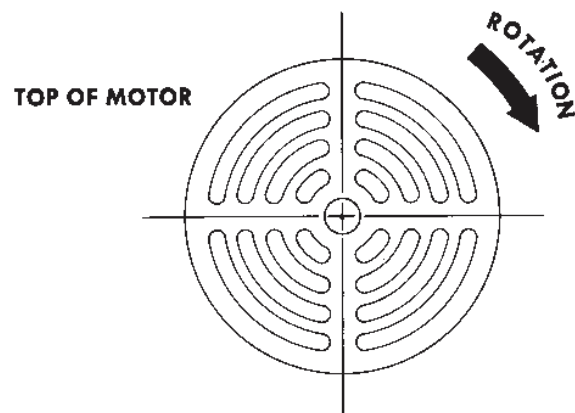
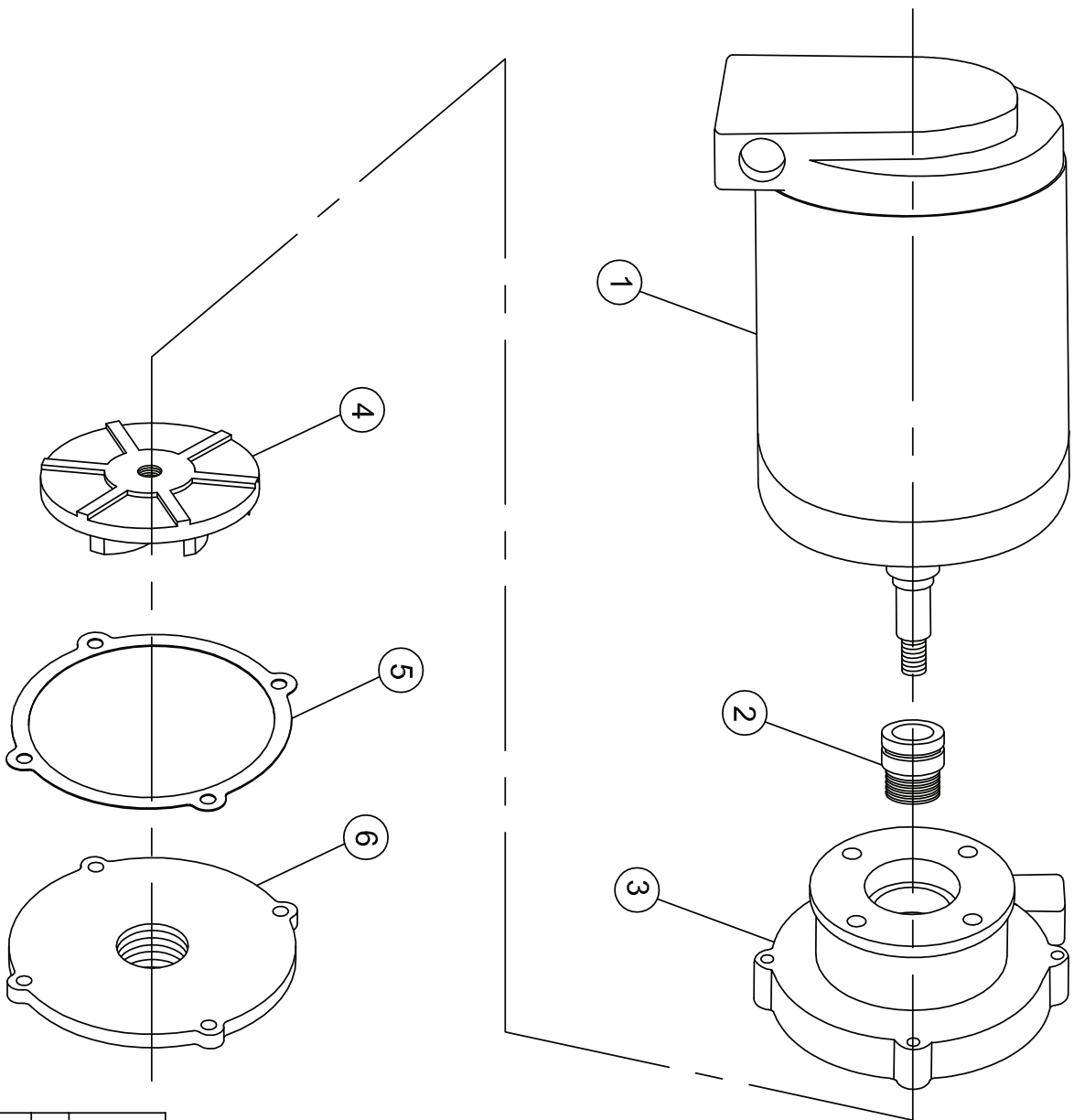


FIG. 4

When you are positive the pump is rotating free, wire the motor being sure to conform to all state and local electrical codes. Before putting the unit into operation, check the direction of rotation by jogging the motor starter on and off. The direction of rotation is clockwise when viewing from the top of the motor. If the pump is turning in the wrong direction, reverse any two of the line wires at the motor in the conduit box or at the motor starter.



# Horizontal



PART NO.	DESCRIPTION
1	MOTOR/SHAFT ASSEMBLY
2	MECHANICAL SEAL STEM
3	IMPELLER
4	IMPELLER HOUSING GASKET
5	INTAKE PLATE
6	

## GUSHER PUMPS

DIVISION OF RUTHMAN PUMP AND ENGINEERING, INC.  
RUTHMAN DRIVE-DRY RIDGE, KENTUCKY 41035

TITLE HORIZONTAL COOLANT PUMP

DRAWN BY

J. HEEGER

DATE 8-25-08

AK 080825-200



## General Repair and Maintenance

### General Repair:

**DISASSEMBLY.** . .Shut off main power switch and disconnect the motor wiring. Close the inlet and outlet valves, disconnect the piping at the unions and remove from service. Remove the screws securing the impeller housing to the stem, remove the impeller housing. Take off the retaining screw and slide the impeller and throttle sleeve off the shaft. Take off the stem by removing four screws securing it to motor end bell and slide it off the shaft. Check for wear, replace worn parts where necessary and reassemble by reversing the procedure.

**BALL BEARING REPLACEMENT...**Follow the above steps to stem removal. Remove screws in fan cover & remove cover, loosen set screw in fan and remove fan, remove four screws securing upper end bell to stator and remove end bell, remove screws in bearing retainer, lay a block of wood or some other soft material on the floor and tap the shaft and ball bearing out of the stator and lower end bell using the weight of the stator as you drop the shaft on the block of wood lightly. (Fig. 1) Tap the old bearings off the shaft and install new ones by following the instructions on page 10. To reassemble, reverse procedure.

**SEAL REPLACEMENT...**Remove screws securing impeller housing to stem, remove impeller housing. Take impeller off by removing retaining nut or screw and slide impeller off the shaft, seal spring will be loose and may be taken out of seal cavity, slide shaft sleeve off shaft and remove rotating member of seal, inspect sleeve for wear, replace with new one if necessary. Remove screws securing stem to motor end bell and take stem off, remove stationary seal seat by tapping out with screw driver thru top of stem. Clean seal cavity in stem thoroughly, apply oil to rubber cup of stationary seat and insert into bore by hand, mount stem on motor. Clean shaft sleeve and oil thoroughly, slide rotating member of seal onto shaft sleeve by hand, install new shaft sleeve gasket and slide sleeve onto motor shaft so that the carbon ring of rotating member is facing stationary seat in stem, install impeller, and replace if worn, install impeller housing and put unit back into service.

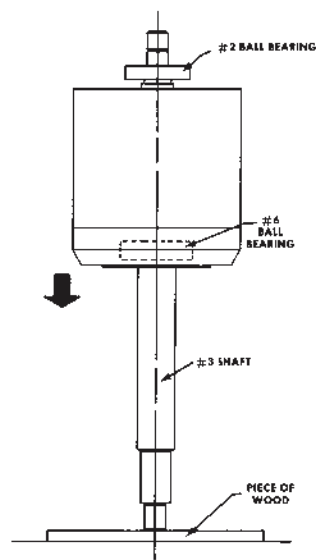


FIG. 1

## Maintenance:

Normally after proper installation and under normal operating conditions (8 hours daily duty in clean liquid with S.G. of 1) the pump requires very little attention.

Before shipment all Gusher pumps have been tested and greased at the plant, therefore lubrication is not necessary for approximately six to eight months. Remember, when lubricating ball bearings that too much grease will cause bearings to run hot, so grease bearings sparingly when it is necessary. We recommend the use of SRI #2 Chevron ball bearing grease.

Because of the vast range of operating conditions it is difficult to recommend one set schedule for periodic maintenance. The more severe the application the more attention the pump will require. When a pump operates in a high temperature application (over 150°F.) it is recommended to grease the ball bearings sparingly once a month (approx. one gram -no more). In applications where there is high abrasion, the pump may have to be inspected quarterly for wear

on impeller, impeller housing, throttle sleeve and wear ring. In applications requiring a high degree of solids, handling the bearings may require more frequent lubrication because of the abnormal radial load adherent to that type application.

On coupled motor type pumps it is recommended to check coupling alignment every six months. If misalignment recurs frequently, inspect the entire piping system. Unbolt the suction and discharge lines, if it springs away there is strain being exerted on the pump by the piping. System should be checked and piping supported properly.

At any rate, it is recommended that a routine maintenance schedule be set up and followed for the best service from the pump. A periodic comparison of existing operating conditions and data against data taken when pump was initially started (pressure, amps, voltage and temperature) may indicate a problem developing and allow for a planned maintenance check before a breakdown occurs.

## Bearing Installation:

Begin by cleaning your work area thoroughly, contaminants can cause bearing failures as fast as any other reason.

When a bearing is installed, the mounting force should be applied against the ring, and only the ring, which is being press-fitted. A bearing should never be forced onto a shaft by pressure or hammer blows applied to the outer ring, nor should the bearing be press-fitted into a housing by force applied to the inner ring.

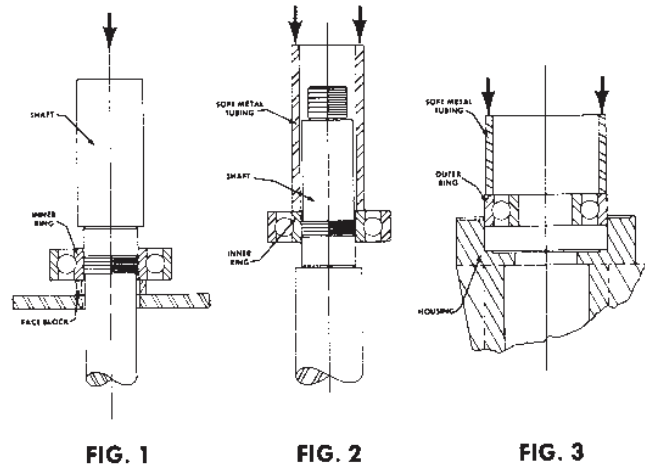
Using an arbor press, the bearing may be laid on a face block which contacts only the bearing inner ring and which has a hole diameter greater than the bearing bore, as shown in figure 1. The shaft is pressed through the bearing until it is seated firmly against the shaft shoulder.

If the shaft is not too long, it can be supported beneath the table of the arbor press and the bearing pressed onto it by ram pressure against a piece of soft metal tubing, as shown in figure 2. The tubing must be clean, inside and out, and the inside diameter of the tubing should be slightly greater than the bearing bore. The ends of the tubing should be square (with corners chamfered to avoid flaking) and should contact only the bearing inner ring. The shaft must be held in line with the ram of the arbor press to avoid cocking the bearing on the shaft seat.

When an arbor press is not available, the bearing can be driven onto the shaft seat by light hammer blows against the end of the soft metal tubing. These blows should be

made alternately against opposite sides of the tubing face, and great care must be taken to avoid cocking the bearing as it is driven onto the shaft seat.

When a ball bearing is installed into the housing it is normally a slip fit, however if force is necessary to install bearing the force should be exerted on the outer ring of the bearing as shown in fig. 3. Again the force must be applied evenly so as not to cock the bearing in the bore.



## **Trouble shooting:**

### **NO WATER DELIVERED.**

- (1) Pump not primed.
- (2) Speed too low.
- (3) Discharge head too high.
- (4) Suction lift higher than pump is designed for.
- (5) Impeller completely plugged up.
- (6) Wrong direction of rotation.

### **NOT ENOUGH WATER DELIVERED.**

- (1) Air leaks in suction or stuffing boxes.
- ‡ (2) Speed too low.
- (3) Discharge head higher than anticipated.
- (4) Suction lift too high. Check with gages.  
Check for clogged suction line or screen.
- (5) Impeller partially plugged up.
- (6) Not enough suction head for hot water.
- (7) Mechanical defects:
  - Wearing rings worn.
  - Impeller damaged.
  - Casing packing defective.
- (8) Foot valve too small.
- (9) Foot valve or suction opening not submerged deep enough.

### **NOT ENOUGH PRESSURE.**

- ‡ (1) Speed too low.
- (2) Air in water.
- (3) Mechanical defects:
  - Wearing rings worn.
  - Impeller damaged.
  - Casing packing defective.
- (4) Impeller diameter too small.

### **VIBRATION**

- (1) Impeller clogged.
- (2) Coupling alignment off.

### **PUMP WORKS FOR A WHILE AND THEN LOSES SUCTION.**

- (1) Leaky suction line.
- (2) Waterseal plugged.
- (3) Suction lift too high.
- (4) Air or gases in liquid.

### **PUMP TAKES TOO MUCH POWER.**

- (1) Speed too high.
- (2) Head lower than rating, pumps too much water.
- (3) Specific gravity or viscosity too high.
- (4) Mechanical defects:
  - Shaft bent.
  - Rotating element binds.
  - Stuffing boxes too tight.
  - Wearing rings worn.
  - Casing packing defective.

‡ When direct connected to electric motors, check up whether motor is across the line and receives full voltage.

# GENERAL INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS GUSHER COOLANT PUMPS

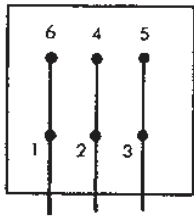
**INSTALLATION:** Lower pump into position and secure by use of mounting bracket. Connect piping, being sure that all pipes and fittings are supported independent of the pump. This precaution is taken to prevent strain on pump castings and to prevent binding of internal parts. The pump will be best utilized if all piping from pump to point of delivery is as large and straight as possible.

Small pipes result in undue friction loss.

**WIRING:** In connecting the motor to the power supply, be sure the current characteristics specified on the nameplate (A.C., D.C., voltage, phase, and cycle) are the same as the available current. If they are not the same as the available current, the motor should not be connected to the line.

## CONNECTION DIAGRAMS

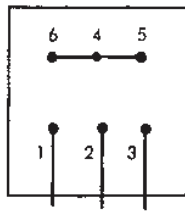
3 Phase 6 Leads



220 V.

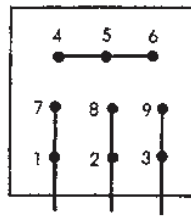
FIG. NO. 1

3 Phase 9 Leads

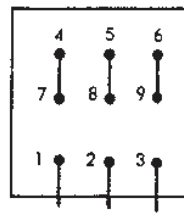


380V.

FIG. NO. 2

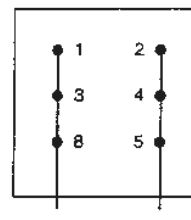


230V.

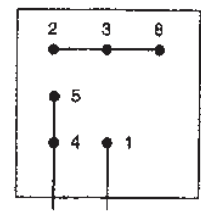


460 V.

1 Phase 6 Leads



Low Voltage



High Voltage

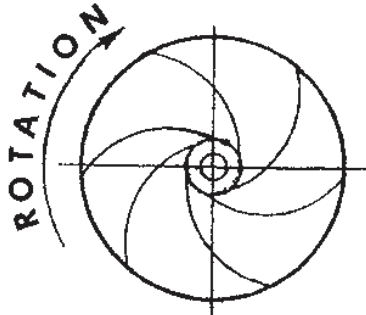
FIG NO. 3  
To Reverse Rotation for Fig. 3  
Switch 5 & 8

**FOR DUAL VOLTAGE MOTORS:** The motor leads should be paired and connected to power lines as shown in diagrams. Since the direction of rotation is important for proper functioning of the unit, an ARROW has been placed on the motor to indicate the direction it should rotate. On three phase motors, after connections are made, check to

see that the motor is turning in the direction indicated. If motor is turning in the wrong direction, interchange any two of the motor leads. On direct current and single phase A.C. (2 wire systems) the proper internal connections have been made at the factory for correct direction of rotation, and it is only necessary to connect the two line wires.

**CORRECT ASSEMBLY:** If for any reason the pump is disassembled, care should be taken to see that the impeller is placed on the shaft with the proper side up.

The curve of the blades should "flow" outwardly from the hub in the opposite direction to the arrow on the motor.



IMPELLER

After proper installation, the pump should operate smoothly. If vibration occurs, check to be sure piping is supported properly and not binding pump. Also check bearing temperature to assure against abnormal heat

(above 250 degree F.) Should bearings exceed this temperature, recheck piping. Also check bearings, they may have been overgreased.



A RUTHMAN COMPANY

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

**Ruthman Companies: A family-owned business supplying pumps for over 100 years**



Ruthman Companies was co-founded in 1912 by brothers Alois and Edward Ruthman as the "Ruthman Machinery Company." Based in Cincinnati, the company serviced the steamboats that traveled the Ohio River.

In 1924, Alois conceived the first sealless centrifugal pump, coining the term 'coolant pump.' The brothers named this new pump "Gusher," giving birth to what is now Ruthman Companies' flagship brand, Gusher Pumps.

Alois' son Thomas R. Ruthman joined the family business in 1949, growing the business globally through organic growth and the acquisition of complementary technologies. In the early 1990's, Alois' grandson, Thomas G. Ruthman, became the third generation of Ruthmans in the pump business. Over the years, Ruthman Companies has expanded its product line from the original centrifugal coolant pumps to include valves, vertical turbine pumps, positive displacement pumps, gear pumps, and other specialized pump equipment, while upholding its reputation as a leader in the custom engineering of pumps for the most challenging applications.

## GUSHER PUMPS LOCATIONS

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**RUTHMAN**  
Engineering Pump Solutions™