

A RUTHMAN COMPANY

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# **7600 SERIES**

## **52 HEAVY DUTY, 53 HEAVY DUTY AND 54 HEAVY DUTY POWER FRAMES**

**MAINTENANCE • INSTALLATION • OPERATIONS**

**Instruction manual**

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## WARRANTY

Gusher Pumps, Inc. will replace or repair, within one year of shipment from our plant, any pump in our judgement that has failed due to defects in materials or workmanship, provided the pump has been properly installed and maintained and has not been subject to abuse. These pumps must return to Gusher Pumps, Inc. with complete history of service for inspection and warranty consideration. Gusher Pumps, Inc. does not accept the responsibility for transportation to and from our plant. Furthermore, we do not assume any responsibility for consequential damage or loss of production.

## RECEIVING AND INSPECTION

The utmost care has been taken at the factory to assure proper Coupling Alignment and Impeller Adjustment. However, due to circumstances beyond our control, YOU MUST inspect the pump upon receipt and follow the Installation Instructions completely before start-up.

### RECEIVING:

1. Rotate shaft by hand. If it does not rotate freely:
  - a. Check Impeller adjustment.
  - b. Check for bent Coupling Guard.
  - c. Check Slinger (#8).
  - d. Check for bent Shaft (#1).
2. Check for cracked or damaged parts. If upon receipt, you find the pump damaged, file a claim with the delivering carrier.

3. If drive motor has been supplied, check the R.P.M. and Horsepower to be sure it is correct as ordered.
4. Check the Pump Name Tag to be sure we have shipped correctly as ordered:
  - a. Model No.
  - b. Head in feet (Ft. Hd.)
  - c. Gallons per minute (G.P.M.)
  - d. Construction:
    1. All Iron.
    2. All Iron with Stainless Steel Shaft and Impeller.
    3. All Stainless Steel.
5. If there is anything that appears to be incorrect, call the factory immediately.

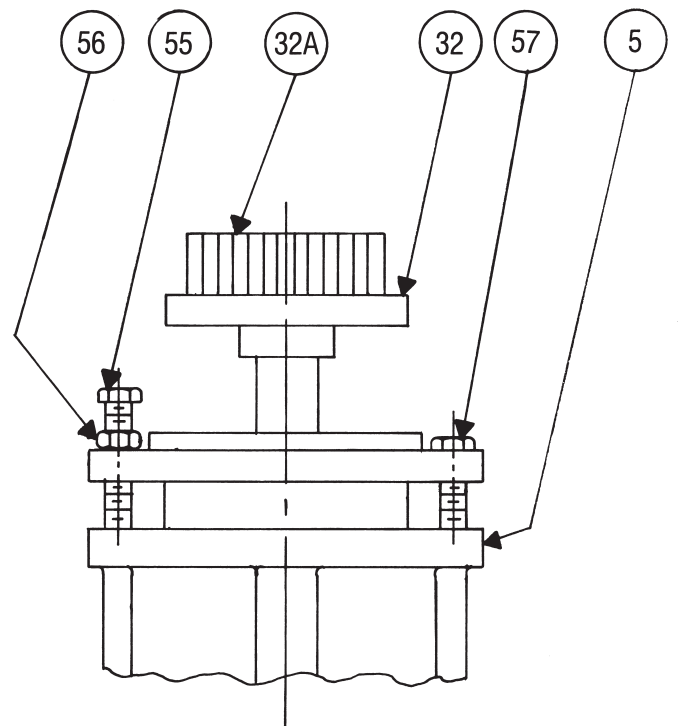
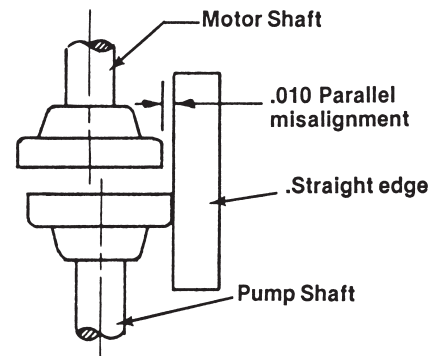
# INSTALLATION

After careful preliminary inspection, you may proceed with the installation of the pump into your system.

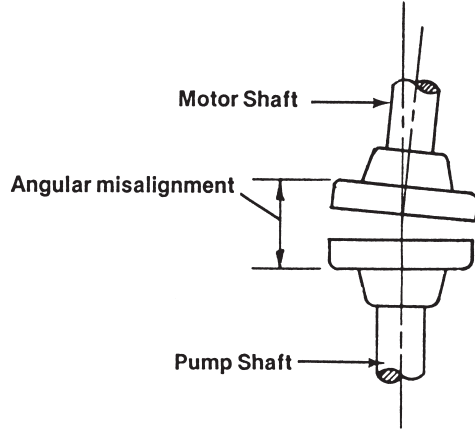
1. Lower the Pump into position.
2. Make sure Mounting Plate (#37) is setting firmly on support channels. (It may be necessary to use metal shims to level plate.)
3. Secure Mounting Plate (#37) by using hold-down screws in all four corners. Again, care must be taken to make sure plate is firm and level. DO NOT force bowed plate level. Use metal shims if necessary.
4. Make pipe connections:
  - a. Extreme care must be taken to support piping without causing any strain on the Pump.
  - b. Install pipe hangers on discharge pipe so all piping weight is supported by the hanger and not by the pump piping or casing.
  - c. Bolt holes must line-up without prying to insert bolts.
  - d. When tightening Flange Bolts, pipe flanges must not be forced together.
  - e. Check Valve should be placed in discharge line between Gate Valve and Pump discharge pipe to prevent liquid from running back through the Pump and causing reverse rotation. This is extremely important in applications with intermittent duty where the Pump may be rotating backwards when service is resumed. This will cause damage to the Pump and the Drive Motor.
  - f. Pressure gauge should be located at the Pump Discharge, as all performance data is taken at pump discharge.
  - g. If intake piping is used to pump the tank down, It must also be supported independently of the Pump.
5. Remove Coupling Guard and rotate Coupling by hand. Pump should rotate freely at this point. If it does not, check for:
  - a. Piping Strain: without exception, piping must not rest on Pump in any manner. (See Item #4 of INSTALLATION.)
  - b. Impeller Adjustment:
    1. Disconnect Coupling (#32) and remove Sleeve (#32a).
    2. Loosen three (3) Locking Screws (#57).
    3. Loosen three (3) Adjusting Screws (#55).
    4. Lightly tap Shaft (#1) until Impeller (#12) bottoms on Intake Flange (#13) or Impeller Housing (#11).
    5. Tighten three (3) Adjusting Screws by hand until they touch Ball Bearing Housing (#5).
    6. Tighten three (3) Adjusting Screws 1/4 turn (approximately .016") by alternating from one screw to the next, until all three screws have been turned 1/4 turn.
    7. Tighten Locking Screws (#57) and Jamb Nuts (#56).
    8. Rotate Coupling by hand to be sure Impeller (#12) does not rub Intake Flange (#13) or Impeller Housing (#11). If Impeller does rub, repeat steps #1 through #7.

9. Connect Coupling.

- c. Slinger Adjustment: Slinger (#8) is set at Plant and normally causes no problems, but should be checked when Unit is inspected upon arrival at your plant site and before Unit is lowered into position in your system.
- d. Coupling alignment -SEE ITEM #6 below:
6. Coupling Alignment: MUST BE CHECKED before and after system start-up.
  - a. Check parallel alignment by placing a straight-edge across the two coupling flanges and measuring the maximum offset at various points around the periphery of the coupling. DO NOT rotate the Coupling. If the maximum offset exceeds .010", realign the Coupling.

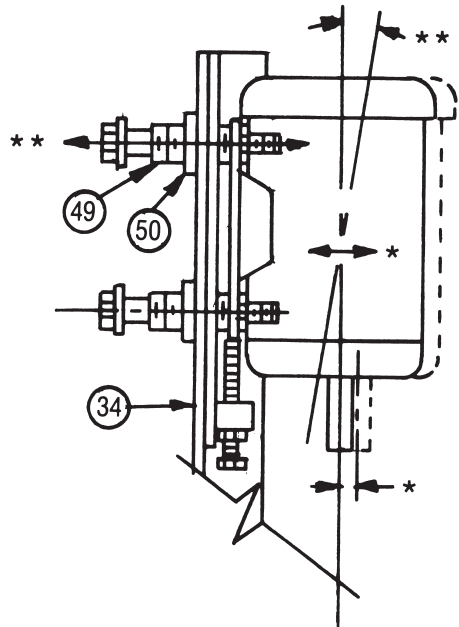


- b. Check angular alignment with a micrometer or caliper. Measure from the outside of the one flange to the outside of the other at intervals around the periphery of the Coupling. Determine the maximum and minimum dimensions. DO NOT rotate the Coupling. The difference between the maximum and minimum must not exceed .010". If a correction is necessary, be sure to recheck the parallel alignment.



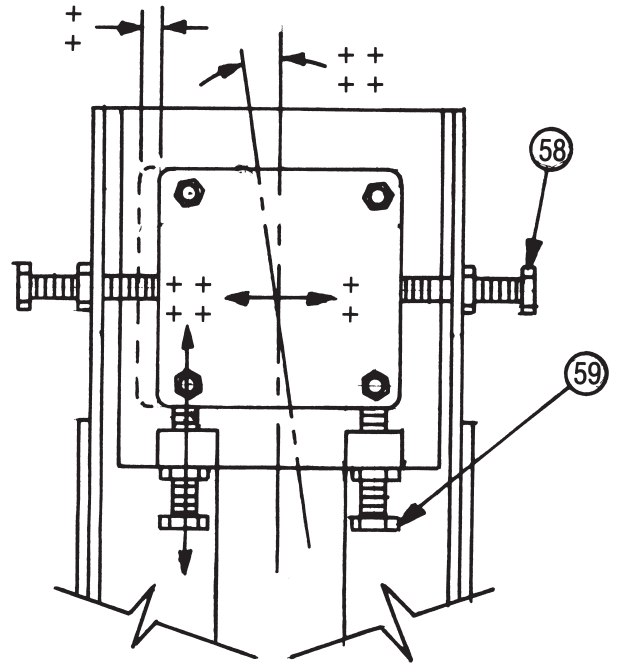
- c. If Coupling Alignment is out, adjustment can be made with the use of Gusher's unique Jack Screw design:

1. LATERAL PARALLEL MISALIGNMENT is adjusted by loosening four (4) Motor Screws, after which you loosen the Lateral Adjusting Screw (#58) on side of the Motor that has to be shifted and tighten the remaining Lateral Adjusting Screw until Lateral Parallel Alignment is achieved. (SEE Fig. #3). Tighten all screws and jamb nuts.



- \* HORIZ. PARALLEL MISALIGNMENT  
 \*\* HORIZ. ANGULAR MISALIGNMENT

Fig. 2



- + LATERAL PARALLEL MISALIGNMENT  
 ++ LATERAL ANGULAR MISALIGNMENT

Fig. 3

2. HORIZONTAL PARALLEL MISALIGNMENT is adjusted by loosening four (4) Jack Screw Jamb Nuts (#50) on back of Chair (SEE Fig. 2) and turning four (4) Jack Screws (#49) clockwise to move Motor away from Chair (#34) or counter-clockwise to bring Motor toward Chair. Turn all four (4) Jack Screws equally so as to maintain proper angular alignment. Tighten four (4) Jack Screw Jamb Nuts (#50).
3. LATERAL ANGULAR MISALIGNMENT is adjusted by loosening four (4) Motor Screws, after which you loosen the Angular Alignment Screw (#59) on side of Motor that has to be lowered and tighten the Angular Alignment Screw on side of Motor that has to be raised, until Angular Alignment is achieved. Tighten all Screw Jamb Nuts. (See Fig. 3).
4. HORIZONTAL ANGULAR MISALIGNMENT is adjusted by loosening four (4) Jack Screw Jamb Nuts (#50) on back of Chair (SEE Fig. #2) and turning two (2) Top Jack Screws clockwise if top of Motor has to be moved away from Chair or counter-clockwise if top of Motor has to be moved toward the Chair. Tighten Jamb Nuts. Adjustments can be made with two Bottom Jack Screws following the same procedure.

NOTES:

1. DO NOT LOOSEN FOUR MOTOR SCREWS TOO MUCH AS THIS WILL CAUSE DIFFICULTY WHEN TRYING TO ALIGN COUPLING. Motor Screws must be snug so a slight force must be applied to move Motor.

2. If an adjustment in either Parallel or Angular Alignment is required, you must check both after adjustment has been made.
3. Coupling alignment must be checked after system has been operating for 300 hours. Then as a Preventative Maintenance Procedure, it should be checked every 1200 hours of normal operation. More severe duty operation requires more frequent attention.
7. Make electrical connection to conform with State and Local Codes. (It is advisable to use approximate 4' length of flexible conduit to facilitate removal of Chair, if repair is required.)

Upon initial start-up, Pumps may seem to run tight and hot. This is caused by breaking-in of Oil Seals and Ball Bearings. Pump will operate normally after approximately 150 hours of service. Ball Bearings should not run over 225° F. When checking temperature use a pyrometer.

## MAINTENANCE

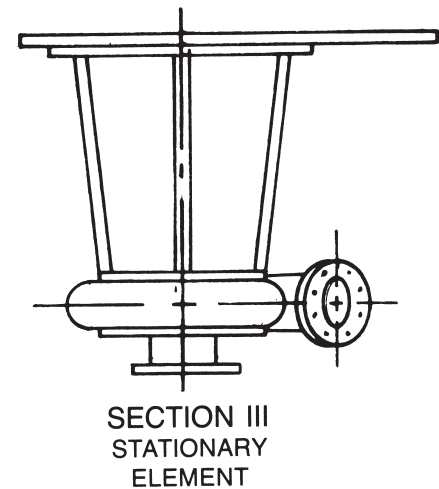
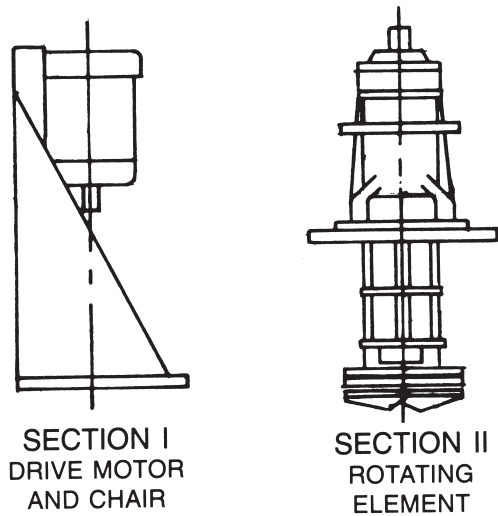
1. Lubrication-All Pumps are lubricated at the Gusher Plant and should not require additional lubrication for approximately 1200 hours of operation. A well planned maintenance schedule can only be devised after careful observation of the Pump for the first six months of operation and the lubrication that has been required. Each Pump installation is unique and requires a different lubrication schedule compatible with that specific operation. Use Chevron SRI #2 Ball Bearing Grease. DO NOT OVER-GREASE as it will cause ball bearing to run hot.

To Lubricate:

- a. Remove Pipe Plug from back of Ball Bearing Housing (#5).
  - b. Fill with grease until fresh grease flows from opening.
  - c. If automatic lubrication system is being used, reliefs must be placed in the tapped hole ( $\frac{1}{8}$ " N.P.T.).
2. Coupling Alignment: This must be checked before and after system start-up; after 300 hours of operation; and again after 1200 hours of operation. Follow procedure given in Item No. 6 of the INSTALLATION Section. Again, we recommend strongly that a routine preventative maintenance schedule be devised and followed to achieve optimum life from the Pump.

## REPAIRS

GUSHER 7600 SERIES TOP PULL-OUT PUMPS were designed with today's high cost of maintenance and repairs in mind. They are basically constructed in three (3) components: Chair or Barrel with Drive Motor, Stationary Element, and the Rotating Element. (We recommend that a spare Rotating Element be kept in your Maintenance Stock Room.)



## SECTION I CHAIR WITH DRIVE MOTOR: Removal and Replacement

1. Disconnect electrical leads. (During installation it is advisable to allow sufficient flexible conduit (approximately 4 feet) to allow removal without disconnection of electrical leads.)
2. Disconnect Coupling (#32).
3. Remove Nuts (#54) and Screws (#51). Not shown.
- 4A. Chair and Motor can be removed from service. Chair and Motor may be top-heavy. Therefore, care must be taken when rigging unit for lifting. (DO NOT use motor Eye Bolt for lifting.)
- 4B. Remove Screws that hold Barrel (#36) to Ball Bearing Housing (#5). Remove Barrel (#36) and Motor. Remove Secondary Plate (#63).
5. To reassemble, reverse the above procedure.
6. Check Coupling Alignment per item #6, 7600 Series Installation.
7. Rotate Coupling by hand to be sure Pump turns freely.

## **SECTION II - ROTATING**

### **ELEMENT:**

#### **Removal and Replacement**

1. Remove Chair with Motor by the procedure outlined in the preceding SECTION I, 7600 Series REPAIRS.
2. Screw Steel Eyebolt into Tapped Hold Provided on Shaft. 1.)  $\frac{1}{2}$  -13 on 52 HD; 2.)  $\frac{5}{8}$  -11 on 53 HD; 3.)  $\frac{3}{4}$  -10 on 54 HD.
3. Hook hoist through eyebolt and lift Rotating Element straight up.
4. Remove eyebolt and screw into stand-by unit.
  - a. If you do not have a stand-by unit and repair has to be made, proceed as follows:
    1. Get Serial No. of Unit.
    2. Call Gusher Pumps, Inc. direct or the Gusher Representative in your area with list of parts required to repair your unit. Many of the parts for the 7500 and 7600 Series are interchangeable, so parts are normally in stock. Allow approximately 1 week to 10 days for processing of order. For complete Parts List, see Pages 8 thru 10.
5. Lower replacement Unit straight down into position, taking care when lowering into opening to avoid all contact with Housing Support (#7a) so as not to damage "O"Ring (#15a).
6. Replace Chair with Motor as outlined in SECTION I, 7600 Series REPAIRS.

## **SECTION III - STATIONARY**

### **ELEMENT**

#### **Removal and Replacement**

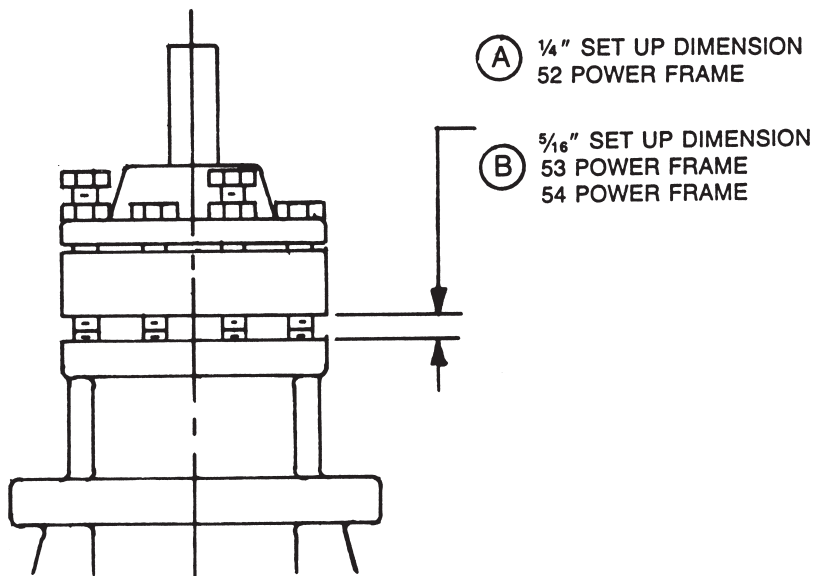
One of the most advantageous aspects of the 7600 Series is that this portion of the Unit rarely has to be replaced. However, in the event such exceptional replacement is necessary, the element is replaced as follows:

1. Remove Chair with Motor as outlined in SECTION I, 7600 Series REPAIR.
2. Remove Rotating Element as detailed in SECTION II, 7600 Series, REPAIR.
3. Remove four (4) Mounting Plate Hold-down Screws.
4. Disconnect discharge piping.
5. Secure rigging and lift straight up.
6. Make repairs. SEE Page No. 8 thru 10 for parts list.
7. Lower Stationary Element into position.
8. Make discharge pipe connections.
9. Replace Rotating Element. SEE SECTION II, 7600 Series REPAIRS.
10. Replace Chair with Motor. SEE SECTION I, 7600 Series REPAIRS.

## **SECTION IV - ROTATING**

### **ELEMENT: Repairs**

1. Remove Rotating Element by procedure outlined in SECTION II, 7600 Series REPAIRS.
2. Remove Impeller Retaining Hardware.
3. Slide Impeller (#12) off Shaft (#1).
  - a. It may be necessary to place pry bar between Impeller back shroud and Stem (#7).
4. Remove Impeller Drive Key (#19) and tape to hub of Impeller so it will not get lost.
5. Loosen Set Screws in Slinger (#8).
6. Remove Screws (#45) and slide Bearing Housing and Shaft Assembly out of Inner Stem (#7).
7. Remove Throttle Bushing (#10) from Stem (#7).
8. Remove Adjusting Screws (#55) and Locking Screw (#57).
9. Slide Ball Bearing Retainer (#2) off Shaft (#1).
10. Place the Ball Bearing Housing, Shaft Assembly in a vertical position with Shaft (#1) down. By lifting the Unit and dropping it on a block of wood, tap Shaft (#1) with Ball Bearings (#6) and (#4) out of Ball Bearing Housing (#5). Inspect Oil Seal (#22) and replace if worn or damaged.
11. Remove Lock Nut (#3). Tap Thrust Bearing (#6) off Shaft (#1). Slide telescoping Ball Bearing Housing (#5a) off Shaft (#1). Inspect Oil Seal (#21) and replace if worn or damaged. Tap Grease/Radial Bearing Retainer (#6) off Shaft (#1). Tap Radial Bearing (#4) off Shaft (#1).
12. To reassemble, reverse procedure.
  - a. Remember to replace Telescoping Ball Bearing Housing (#5a) on Shaft before installing Ball Bearing (#6).
13. Ball Bearing Installation:
  - a. Bearing installation should take place under conditions of cleanliness consistent with the precision of the product involved. All tables and tools must be clean and free from dirt or other foreign matter that could end up in the bearing.
  - b. When a bearing is installed, the mounting force should be applied against the race which is being press-fitted. A bearing should never be forced onto a shaft by pressure or hammer blows applied to outer ring, nor should the bearing be press-fitted into a housing by force applied to the inner ring.



## 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 gauges. Check for clogged line or screen.
- (5) Impeller partially clogged.
- (6) Not enough suction head for hot water.
- (7) Mechanical defects:
  - a. Wearing Rings worn.
  - b. Impeller damaged.
  - c. 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:
  - a. Wearing Rings worn.
  - b. Impeller damaged.
  - c. Casing Packing defective.
- (4) Impeller diameter too small.

### VIBRATION:

- (1) Impeller clogged.
- (2) Coupling alignment off.
- (3) Bent shaft.
- (4) Pipe strain.

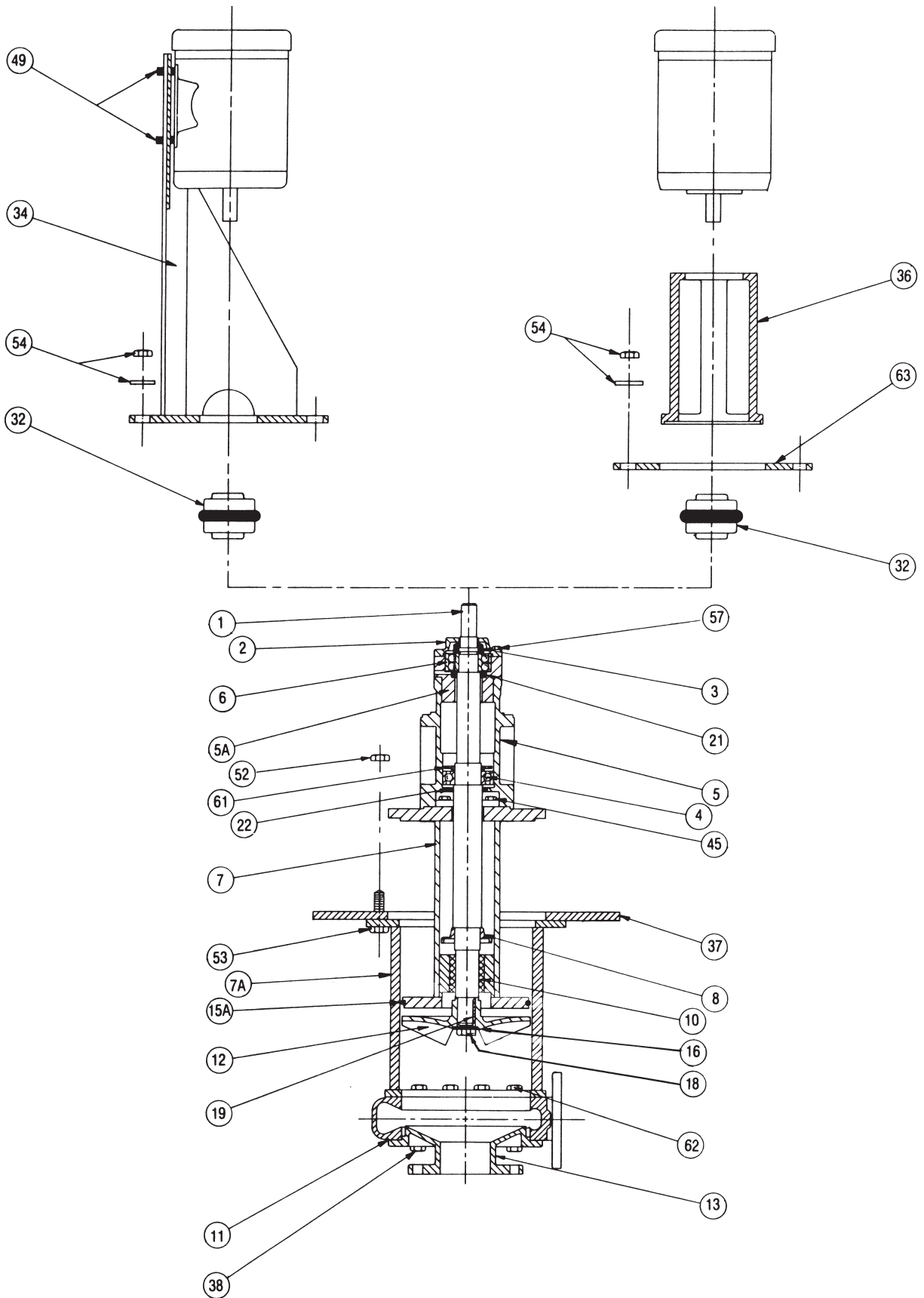
### PUMP WORKS FOR A WHILE AND THEN LOSES SUCTION:

- (1) Leaky suction line.
- (2) Water seal plugged.
- (3) Suction lift too high.
- (4) Air or gasses 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:
  - a. Shaft bent.
  - b. Rotating Element binds.
  - c. Stuffing boxes too tight.
  - d. Wearing Rings worn.
  - e. Casing Packing defective.

+When directly connected to electric motors, check for full voltage across all electrical leads.



**7600 SERIES**  
**52 HD POWER FRAME**

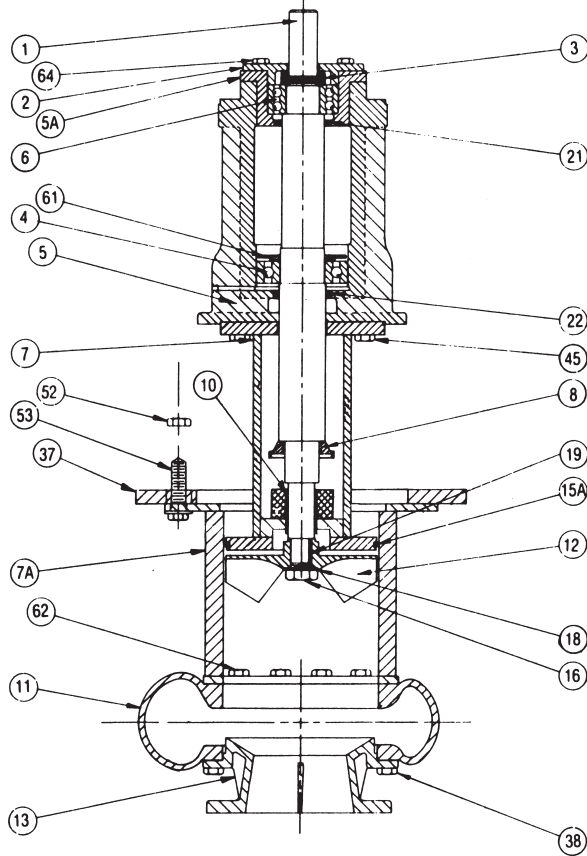
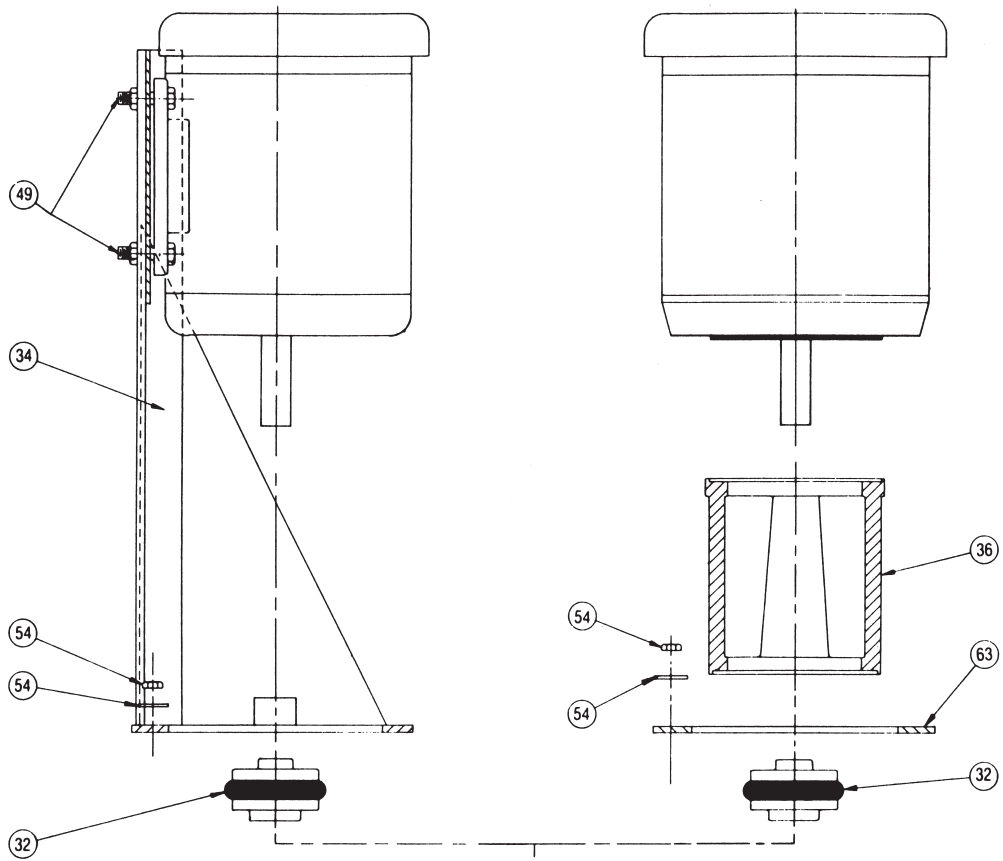


## PARTS LIST

No.	Part Description	No.	Part Description
1	Shaft	32A	Coupling Insert
2	Thrust Bearing Retainer	34	Chair
3	Lock Nut	36	Barrel
4	Radial Ball Bearing	37	Mounting Plate
5	Ball Bearing Housing	38	Hex Head Cap Screw
5A	Telescoping Ball Bearing Housing	45	Hex Head Cap Screw
6	Thrust Ball Bearing	49	Jack Screw
7	Inner Stem	50	Jam Nut
7A	Impeller Housing Support Bracket	51	Hex Head Cap Screw
8	Slinger	52	Hex Nut
10	Throttle Bushing	53	Hex Head Cap Screw
11	Impeller Housing	54	Hex Nut & Washer
12	Impeller	55	Adjusting Screw
13	Intake Flange	56	Jam Nut
15A	O-Ring	57	Locking Screw
16	Impeller Retaining Screw/Nut	58	Hex Head Cap Screw
18	Impeller Retaining Washer	59	Hex Head Cap Screw
19	Drive Key	61	Grease/Radial Bearing Retainer
21	Tel. B. Brg. Hous. Oil Seal	62	Hex Head Cap Screw
22	B. Brg. Hous. Oil Seal	63	Secondary Plate
32	Coupling	64	Hex Head Cap Screw

When ordering parts the following information should be provided. This will enable the factory to give precise information and part numbers for the pump in question.

- A.) Serial Number
- B.) Complete Model Number
- C.) Discharge Size
- D.) Horsepower & Current Characteristics
- E.) Material of Construction



**7600 SERIES**  
**53 HD & 54 HD POWER FRAME**

# MAINTENANCE HISTORY

SERIAL NO. \_\_\_\_\_  
 MODEL NO. \_\_\_\_\_ IMP. DIA. \_\_\_\_\_  
 OPERATING COND. \_\_\_\_\_ GPM@ \_\_\_\_\_ FT. THD \_\_\_\_\_  
 HP. \_\_\_\_\_ SPEED/RPM \_\_\_\_\_  
 Start-Up Date \_\_\_\_\_ Amps at Start-Up \_\_\_\_\_  
 Pressure at Start-Up \_\_\_\_\_

## ENGINEERING DATA

	(1750 RPM)		
<b>POWER FRAME</b>	<b>52HD</b>	<b>53HD</b>	<b>54 HD</b>
1. RADIAL BRG.	41211	41316	41319
2. THRUST BRG.	41308-DR	41312-DR	41314-DR
3. BALL BRG. SPAN	9.032	12.750	12.750
4. SHAFT DIA'S.			
@ RADIAL BRG.	2.1655	3.1497	3.7403
@ THRUST BRG.	1.5750	2.3623	2.7560
@ THROTTLE SLV.	1.735	1.875*	2.500
@ IMPELLER	1.375	1.500	1.750
BET. BALL BRG'S.	1.937	3.125	3.625
BET. RADIAL BRG. & THROTTLE SLV.	2.250	3.250	4.250
		<b>*2.010 (6X6-14)</b>	

### GREASE LUBRICATION

DATE	GREASED	DATE	GREASED	DATE	GREASED

TYPE GREASE USED \_\_\_\_\_

### COUPLING ALIGNMENT

Parallel Alignment

Angular Alignment

Parallel Alignment				Angular Alignment			
Date Checked	Amt. Out	Date Checked	Amt. Out	Date Checked	Amt. Out	Date Checked	Amt. Out

NOTES: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



A RUTHMAN COMPANY

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## GUSHER PUMPS LOCATIONS

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## 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.

## RUTHMAN COMPANIES MANUFACTURING DIVISIONS

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Blanchester, OH 45107

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**Email:** [Sales@PSI4Pumps.com](mailto:Sales@PSI4Pumps.com)

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### RAE Pumps

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Cincinnati, OH 45223

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### Ruthman Pumps & Service

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