

# Model BP7170

Triplex Ceramic  
Plunger Pump  
Operating Instructions/  
Repair and Service Manual



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# INSTALLATION INSTRUCTIONS

**Installation of the Giant Industries, Inc., pump is not a complicated procedure, but there are some basic steps common to all pumps. The following information is to be considered as a general outline for installation. If you have unique requirements, please contact Giant Industries, Inc. or your local distributor for assistance.**

1. The pump should be installed flat on a base to a maximum of a 15 degree angle of inclination to ensure optimum lubrication.
2. The inlet to the pump should be sized for the flow rate of the pump with no unnecessary restrictions that can cause cavitation. Teflon tape should be used to seal all joints. If pumps are to be operated at temperatures in excess of 140° F, it is important to insure a positive head to the pump to prevent cavitation.
3. The discharge plumbing from the pump should be properly sized to the flow rate to prevent line pressure loss to the work area. It is essential to provide a safety bypass valve between the pump and the work area to protect the pump from pressure spikes in the event of a blockage or the use of a shut-off gun.
4. Use of a dampener is necessary to minimize pulsation at drive elements, plumbing, connections, and other system areas. The use of a dampener with Giant Industries, Inc. pumps is optional, although

recommended by Giant Industries, Inc. to further reduce system pulsation. Dampeners can also reduce the severity of pressure spikes that occur in systems using a shut-off gun. A dampener must be positioned downstream from the un-loader.

5. Crankshaft rotation on Giant Industries, Inc. pumps should be made in the direction designated by the arrows on the pump crankcase. Reverse rotation may be safely achieved by following a few guidelines available upon request from Giant Industries, Inc. Required horsepower for system operation can be obtained from the charts on page 3.
6. Before beginning operation of your pumping system, remember: Check that the crankcase and seal areas have been properly lubricated per recommended schedules. Do not run the pump dry for extended periods of time. Cavitation will result in severe damage. Always remember to check that all plumbing valves are open and that pumped media can flow freely to the inlet of the pump.

Finally, remember that high pressure operation in a pump system has many advantages. But, if it is used carelessly and without regard to its potential hazard, it can cause serious injury.

## **IMPORTANT OPERATING CONDITIONS** **Failure to comply with any of these conditions invalidates the warranty**

1. Prior to initial operation, add oil to crankcase so that oil level is between the two lines on the oil dipstick. **DO NOT OVERFILL. Use recommended Giant Oil.** Crankcase oil should be changed after the first 50 hours of operation, then at regular intervals of 500 hours or less depending on operating conditions.

2. Pump operation must not exceed rated pressure, volume, or RPM. A pressure relief device must be installed in the discharge of the system.

3. Acids, alkalines, or abrasive fluids cannot be pumped unless approval in writing is obtained before operation from Giant Industries, Inc.

4. Run the pump dry approximately 10 seconds to drain the water before exposure to freezing temperatures.

**NOTE: Contact Giant Industries for Service School Information. Phone: (419)-531-4600.**

# Specifications Model BP7170

|                                       |                                |
|---------------------------------------|--------------------------------|
| Volume .....                          | Up to 84.5 GPM (320 lm)        |
| Discharge Pressure .....              | Up to 1015 PSI (70bar)         |
| Speed .....                           | Up to 560 RPM                  |
| Inlet Pressure .....                  | Up to 140 PSI (10 bar)         |
| Plunger Diameter .....                | 70mm                           |
| Plunger Stroke .....                  | 52mm                           |
| Crankshaft Diameter .....             | 48mm                           |
| Key Width .....                       | 14mm                           |
| Crankshaft Mounting .....             | Either side                    |
| Shaft Rotation .....                  | Top of pulley towards manifold |
| Temperature of Pumped Fluids .....    | Up to 140 °F (60 °C)           |
| Inlet Ports .....                     | (2) 2-1/2" NPT                 |
| Discharge Ports .....                 | (2) 1-1/4" NPT                 |
| Weight .....                          | 423 lbs. (191 kg)              |
| Crankcase Oil Capacity .....          | 1.6 Gal. (6 Liters)            |
| Fluid End Material .....              | Cast Iron                      |
| Mechanical Efficiency @ 700 RPM ..... | 0.83                           |
| Volumetric Efficiency @ 700 RPM ..... | 0.95                           |

Consult the factory for special requirements that must be met if the pump is to operate beyond one or more of the limits specified above.

### PULLEY INFORMATION

Pulley selection and pump speed are based on a 1725 RPM motor and "B" section belts. When selecting desired GPM, allow for a ±5% tolerance on pumps output due to variations in pulleys, belts and motors among manufacturers.

1. Select GPM required, then select appropriate motor and pump pulley from the same line.
2. The desired pressure is achieved by selecting the correct nozzle size that corresponds with the pump GPM.

### HORSEPOWER INFORMATION

Horsepower ratings shown are the power requirements for the pump. Gas engine power outputs must be approximately twice the pump power requirements shown above.

We recommend that a 1.1 service factor be specified when selecting an electric motor as the power source. To compute specific pump horsepower requirements, use the following formula:

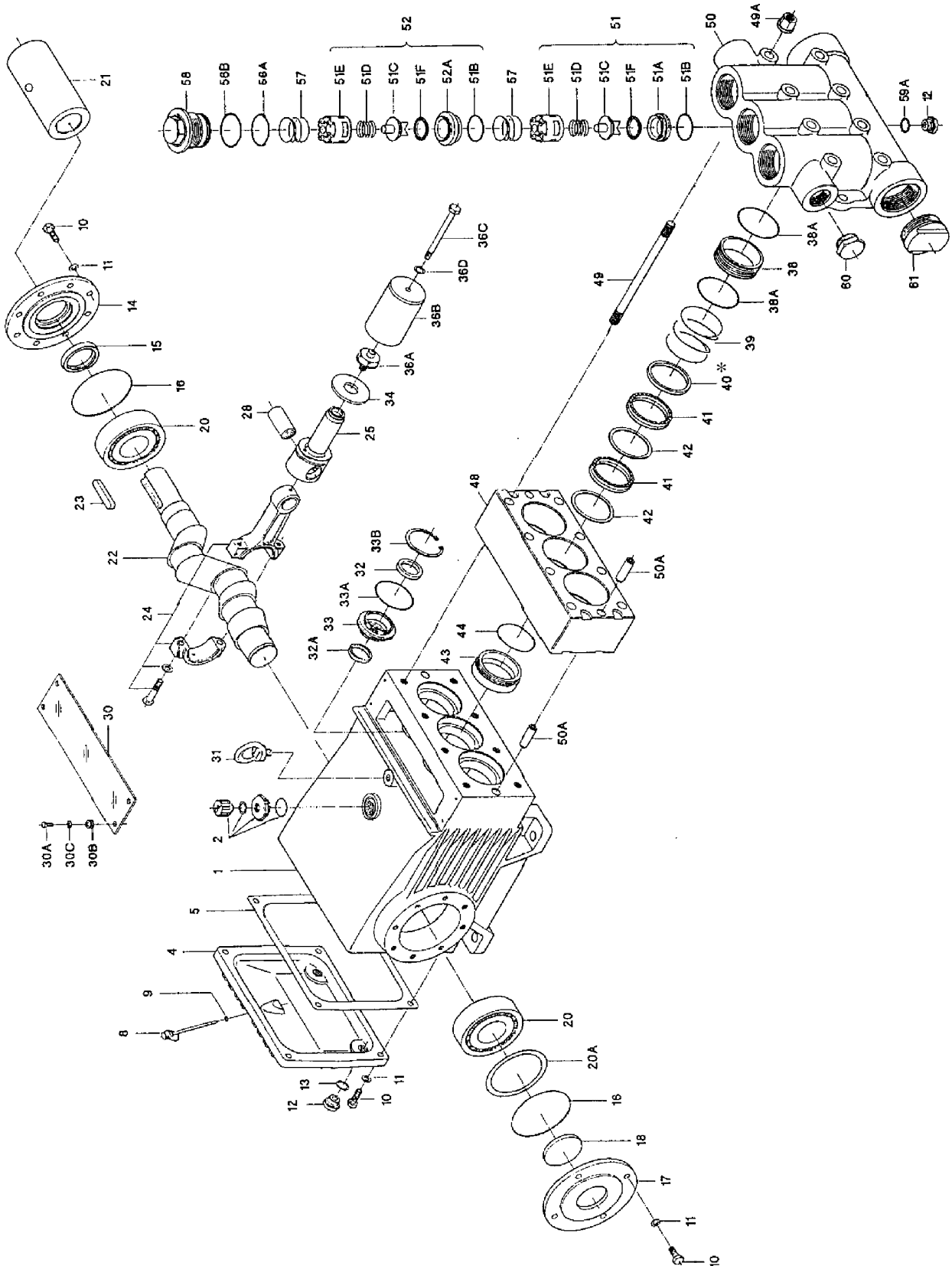
$$\frac{\text{GPM} \times \text{PSI}}{1400} = \text{hp}$$

| BP7170 PULLEY SELECTION & HORSEPOWER REQUIREMENTS |              |     |      |         |         |         |          |
|---|--------------|-----|------|---------|---------|---------|----------|
| PUMP PULLEY                                       | MOTOR PULLEY | RPM | GPM  | 500 PSI | 700 PSI | 900 PSI | 1015 PSI |
| 12.75   | 7.00         | 300 | 45.3 | 16.2    | 22.7    | 29.1    | 32.8     |
| 12.75   | 9.20         | 400 | 60.4 | 21.6    | 30.2    | 38.8    | 43.8     |
| 12.75   | 11.45        | 500 | 75.4 | 26.9    | 37.7    | 48.5    | 54.7     |
| 12.75   | 12.75        | 560 | 84.5 | 30.2    | 42.3    | 54.3    | 61.3     |

**SPECIAL NOTE:**  
 The theoretical gallons per revolution (gal/rev) is 0.151.  
 To find specific outputs at various RPM, use the formula:

GPM = 0.151 x RPM

# Exploded View - BP7170



## PARTS LIST - BP7170

| <u>ITEM</u> | <u>PART</u> | <u>DESCRIPTION</u>          | <u>QTY.</u> | <u>ITEM</u> | <u>PART</u> | <u>DESCRIPTION</u>              | <u>QTY.</u> |
|-------------|-------------|-----------------------------|-------------|-------------|-------------|---------------------------------|-------------|
| 1           | 06653       | Crankcase                   | 1           | 38A         | 13156       | O-Ring                          | 3           |
| 2           | 06654       | Oil Filler Plug Assembly    | 1           | 38B         | 07721       | O-Ring (GP7155A/GP7255A)        | 3           |
| 4           | 06655       | Crankcase Cover             | 1           | 38B         | 06258       | O-Ring (GP7150A)                | 3           |
| 5           | 07601       | Gasket, Crankcase Cover     | 1           | 38C         | 07635       | Support Ring (GP7150A Only)     | 3           |
| 8           | 07602       | Oil Dip Stick               | 1           | 39          | 13157       | Seal Sleeve (GP7155A/GP7255A)   | 3           |
| 9           | 07603       | O-Ring, Dip Stick           | 1           | 39          | 07795       | Seal Sleeve (GP7150A)           | 3           |
| 10          | 06225       | Hexagon Screw               | 12          | 39A         | 07723       | Compact Ring (GP7155A/GP7255A)  | 3           |
| 11          | 13133       | Spring Washer               | 12          | 39A         | 07796       | Compact Ring (GP7150A)          | 3           |
| 12          | 07109       | Drain Plug                  | 3           | 40*         | 07797       | Support Disc (GP7150A)          | 3           |
| 13          | 07182       | Gasket, Drain Plug          | 2           | 41          | 13158       | O-Ring (GP7155A/GP7255A)        | 3           |
| 14          |             | Bearing Cover               | 2           | 41          | 07636       | O-Ring                          | 3           |
| 15          | 07608       | Radial Shaft Seal           | 2           | 42          | 07711       | V-Sleeve (GP7155A/GP7255A)      | 6           |
| 16          | 07184       | O-Ring                      | 2           | 42          | 07638       | V-Sleeve                        | 6           |
| 20          | 07610       | Taper Roller Bearing        | 2           | 43          | 07712       | Pressure Ring (GP7155A/GP7255A) | 3           |
| 20A         | 07611       | Fitting Disc (Shim)         | 1-5         | 43          | 07639       | Pressure Ring                   | 3           |
| 21          | 07612       | Shaft Protector             | 1           | 44          | 07637       | Stud Bolt                       | 3           |
| 22          | 13405       | Crankshaft                  | 1           | 49          | 13159       | Stud Bolt                       | 8           |
| 23          | 07614       | Key                         | 1           | 49A         | 13160       | Hex Nut                         | 8           |
| 24          | 13182       | Connecting Rod Assy.        | 3           | 50          | 07790       | Valve Casing (GP7155A)          | 1           |
| 25          | 13183       | Crosshead Assy.             | 3           | 50          | 07791       | Valve Casing (GP7255A)          | 1           |
| 28          | 13184       | Crosshead Pin               | 3           | 50          | 06628       | Valve Casing (GP7150A)          | 1           |
| 30          | 07619       | Cover Plate                 | 1           | 50A         | 13162       | Cylinder Stud                   | 2           |
| 30A         | 07225-0100  | Hexagon Screw               | 8           | 51          | 13174       | Valve Assembly                  | 6           |
| 30B         | 13136       | Grommet                     | 4           | 51A         | 13163       | Valve Seat                      | 6           |
| 30C         | 07622       | Washer                      | 8           | 51B         | 07653       | O-Ring                          | 6           |
| 30D         | 13154       | Cover Plate                 | 1           | 51C         | 13164       | Valve Plate                     | 6           |
| 31          | 07623       | Eye Bolt                    | 1           | 51D         | 07732       | Valve Spring                    | 6           |
| 32          | 07624       | Radial Shaft Seal           | 3           | 51E         | 13165       | Spacer Pipe                     | 6           |
| 32A         | 07625       | Shaft Seal                  | 3           | 51F         | 13166       | Support Ring                    | 6           |
| 33          | 07626       | Seal Retainer               | 3           | 51G         | 07266       | O-Ring (GP7155A ONLY)           | 6           |
| 33A         | 07627       | O-Ring                      | 3           | 56          | 13167       | Valve Adaptor (GP7155A/GP7255A) | 3           |
| 33B         | 07628       | Circlip                     | 3           | 56          | 07744       | Valve Adaptor (GP7150A)         | 3           |
| 34          | 13137       | Oil Scraper                 | 3           | 56A         | 07658       | O-Ring                          | 6           |
| 36          | 07706       | Plunger Pipe Assy.          |             | 56B         | 07635       | Support Ring                    | 6           |
|             |             | (GP7155A/GP7255A) (36 A-D)  | 3           | 56C         | 13168       | Support Ring                    | 3           |
| 36          | 07630       | Plunger Pipe Assy. (36A-D)  | 3           | 56D         | 07653       | O-Ring                          | 3           |
| 36A         | 07667       | Plunger Connection          | 3           | 57          | 13173       | Tension Spring                  | 6           |
| 36B         | 07666       | Plunger Pipe                |             | 58          | 13170       | Plug M64 X 2                    | 3           |
|             |             | (GP7155A/GP7255A)           | 3           | 59A         | 07661       | Copper Ring                     | 1           |
| 36B         | 07793       | Plunger Pipe                | 3           | 66          | 13362       | Disc For Crankshaft             | 1           |
| 36C         | 07664       | Tension Screw               | 3           | 67          | 13358       | Hexagon Screw                   | 1           |
| 36D         | 07665       | Copper Ring                 | 3           |             |             |                                 |             |
| 38          | 13155       | Seal Case (GP7155A/GP7255A) | 3           |             |             |                                 |             |
| 38          | 07794       | Seal Case                   | 3           |             |             |                                 |             |

\* This item may be removed to add a third v-sleeve.

## REPAIR KITS - BP7170

### Plunger Packing Kit

# 09558

| Item | Part # | Description  | Qty. |
|------|--------|--------------|------|
| 38A  | 06667  | O-Ring       | 6    |
| 41   | 06670  | Spiral Ring  | 6    |
| 42   | 06671  | Support Ring | 6    |
| 38A  | 06667  | O-Ring       | 3    |

### Oil Seal Kit

# 09557

| Item | Part # | Description       | Qty. |
|------|--------|-------------------|------|
| 32   | 07624  | Radial Shaft Seal | 3    |
| 32A  | 07625  | Compact-Ring      | 3    |
| 33A  | 13286  | O-Ring            | 3    |

### Valve Repair Kit

# 09559

| Item | Part # | Description    | Qty. |
|------|--------|----------------|------|
| 51A  | 06677  | Valve Seat     | 3    |
| 51B  | 07653  | O-Ring         | 6    |
| 51C  | 06678  | Valve Plate    | 6    |
| 51D  | 07732  | Valve Spring   | 6    |
| 51E  | 06679  | Spacer Pipe    | 6    |
| 51F  | 06680  | Ring for Valve | 6    |
| 56A  | 07658  | O-Ring         | 3    |
| 56B  | 07635  | Support Ring   | 3    |

### Preventative Maintenance Check-List & Recommended Spare Parts List

| Check   | Daily | Weekly | 50hrs | Every 500 hrs | Every 1500 hrs | Every 3000 hrs |
|---|-------|--------|-------|---------------|----------------|----------------|
| Oil Level/Quality   | X     |        |       |               |                |                |
| Oil Leaks   | X     |        |       |               |                |                |
| Water Leaks   | X     |        |       |               |                |                |
| Belts, Pulley   |       | X      |       |               |                |                |
| Plumbing  |       | X      |       |               |                |                |
| Recommended Spare Parts                                     |       |        |       |               |                |                |
| Oil Change p/n 1154   |       |        | X     | X             |                |                |
| Seal Spare Parts (1 kit/pump)<br>(See page 6 for kit list)  |       |        |       |               | X              |                |
| Oil Seal Kit (1 kit/pump)<br>(See page 6 for kit list)      |       |        |       |               | X              |                |
| Valve Spare Parts (1 kit/pump)<br>(See page 6 for kit list) |       |        |       |               |                | X              |

**Important:** Seal unit (40, 41, 42 see page 7) can only be installed after the intermediate casing (48) with guide rings (43) has been mounted to the drive. The seal unit is then mounted on to the plunger pipe and push it into the intermediate casing using a sleeve or tension spring.

**Important:** The seal unit (40, 41, 42 see page 7) is tensioned by a spring (39). To achieve long seal life, the unit is tensioned in such a way that a small amount of leakage can occur. This helps to lubricate and cool the seal. A seal change is only then necessary when leakage increases considerably, in turn causing flow and pressure to fall.

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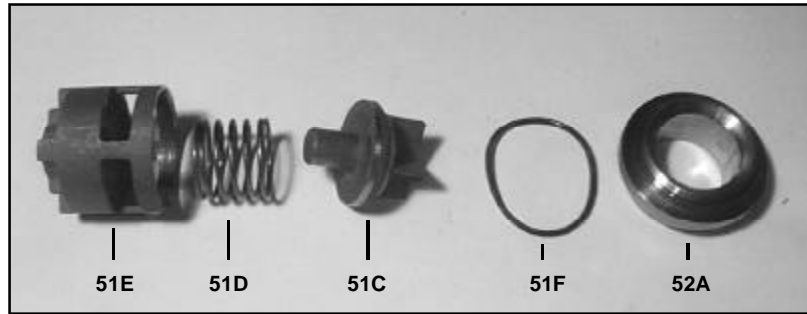
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## BP7170 REPAIR INSTRUCTIONS

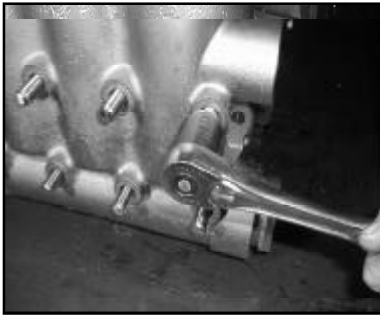
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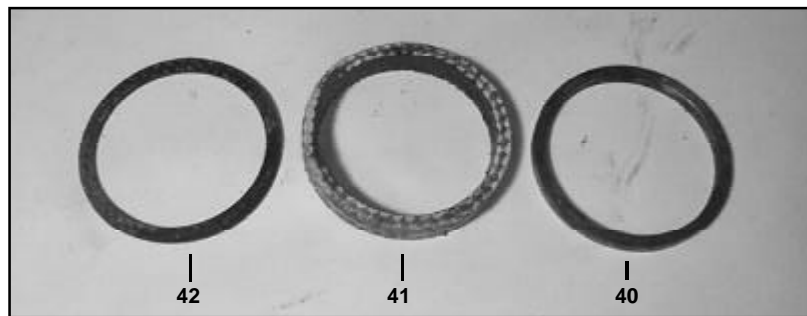
**NOTE:** Always take time to lubricate all metal and nonmetal parts with a light film of oil before reassembly. This step will ensure proper fit, at the same time protecting the pump nonmetal parts (i.e., the elastomers) from cutting and scoring.



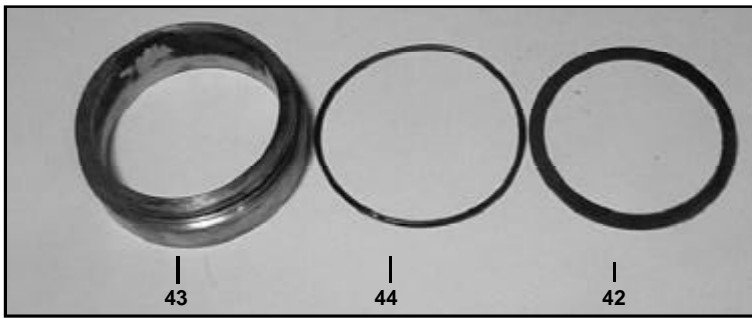
1. Remove plugs (58) and remove pressure springs (57).
2. Using either a pin spanner or pliers, take out complete discharge valve (52), tension spring (57) and suction valve (51). Dismantling valves: the spring tension cap (51 E) is screwed together with valve seat (51A or 52A). Remove spring tension cap, remove spring (51 D) and valve plate (51 C). The seal ring (51 F) is snapped on to the valve plate. Check sealing surfaces, o-rings (51B/56A) and support rings (56B). Replace worn parts.



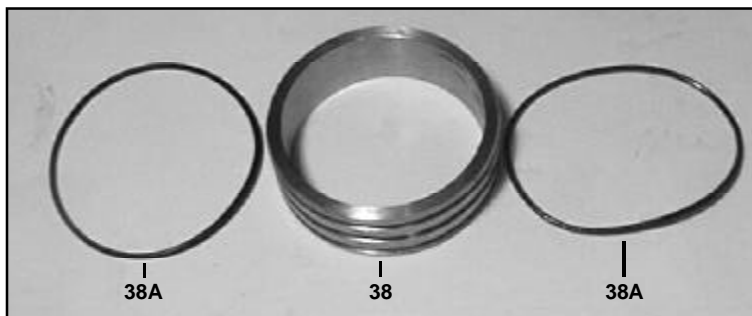
3. Remove inner hexagon screws (49A)
4. Remove pumphead together with seal case (38) from intermediate casing (48).
5. Take tension springs (39), out of intermediate casing (48).



6. Using two screwdrivers, pry off intermediate casing (48) from valve casing and remove by moving it past the plunger pipes.
7. Remove seal unit (40, 41, 42) by pressing it outwards past the plunger pipe. Examine spiral rings (41) and support rings (42).

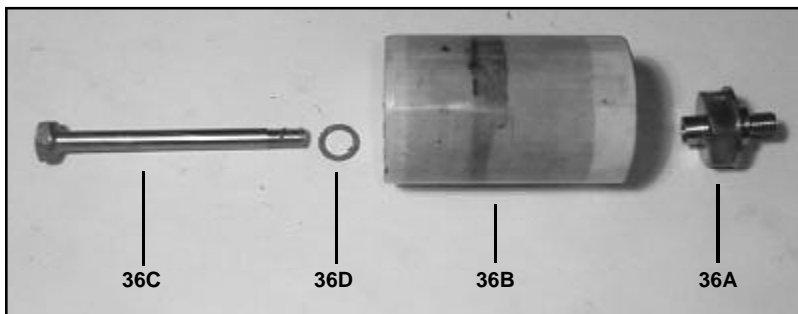


8. Pull guide ring (43) out of crankcase (1). Examine o-ring (44) and (42).



10. Remove seal cases (38) from valve casing (50) and check o-rings (38A). Replace worn parts. Apply silicon grease on seals and o-rings before installing again.

**Important:** Mounting surfaces of the crankcase and intermediate casing must be clean and free of damage. The components must line up exactly and evenly on one another. The same exactness applies for all centering positions within the crankcase, intermediate and valve casing.



11. If the plunger pipe (36B) is worn, tap the tension screw (36C) lightly with a plastic hammer beforehand to loosen the glue on the threads of the tension screw. Then remove tension screw (36C) and remove the plunger pipe from plunger connection (36A). Using the tension screw, put the new plunger pipe with a new copper ring (36D) on to the plunger connection. Cover the threads of the tension screw lightly with Locktight 243 and tighten at 30 ft-lbs.

**Important:** Care must be taken that locktight does not get between the plunger pipe (36B) and the plunger connection (36A).

Overtensioning of the plunger pipe by eccentric tightening of the tension screw and/or dirt or damage on the mounting surfaces can lead to plunger pipe breakage.



12. Check mounting and sealing surfaces of the crankcase (1), intermediate casing (48) and valve casing (50), and clean where neassary. Put seal cases (38) in the centring holes of the valve casing, then push valve casing carefully onto centring studs (50A). Tighten hexagon nuts (49) at 103 ft-lbs.

13. Take out plunger pipe and seal sleeves as described above. Drain oil. After removing the circlip ring (33B) pry out seal retainer (33) with a screwdriver. Check seals (32, 32A, 33A) and surfaces of crosshead. Remove crankcase cover (4). Loosen fitting screws on the connecting rods (24) and connecting rod halves as far into the crosshead guide as possible.

**Important:** Connecting rods are marked for identification. Do not twist connecting rod halves. Connecting rods are to be reinstalled in their exact original position on the shaft journals. Check surfaces of connecting rod (24) and crankshaft (22) Take out one bearing cover on one side and push out crankshaft making sure not to bend the connecting rods.

**Important:** Seal (32A) must always be installed so that the seal lip on the inside diameter faces the oil. Reassemble in reverse order: Regulate axial bearing clearance minimum 0.1 mm, maximum 0.1 5mm by means of fitting discs (20A). Shaft should turn easily with little clearance. Tighten fitting screws (24) at 30 ft-lbs.

**Important:** Connecting rods must be able to move slightly sideways at the stroke journals

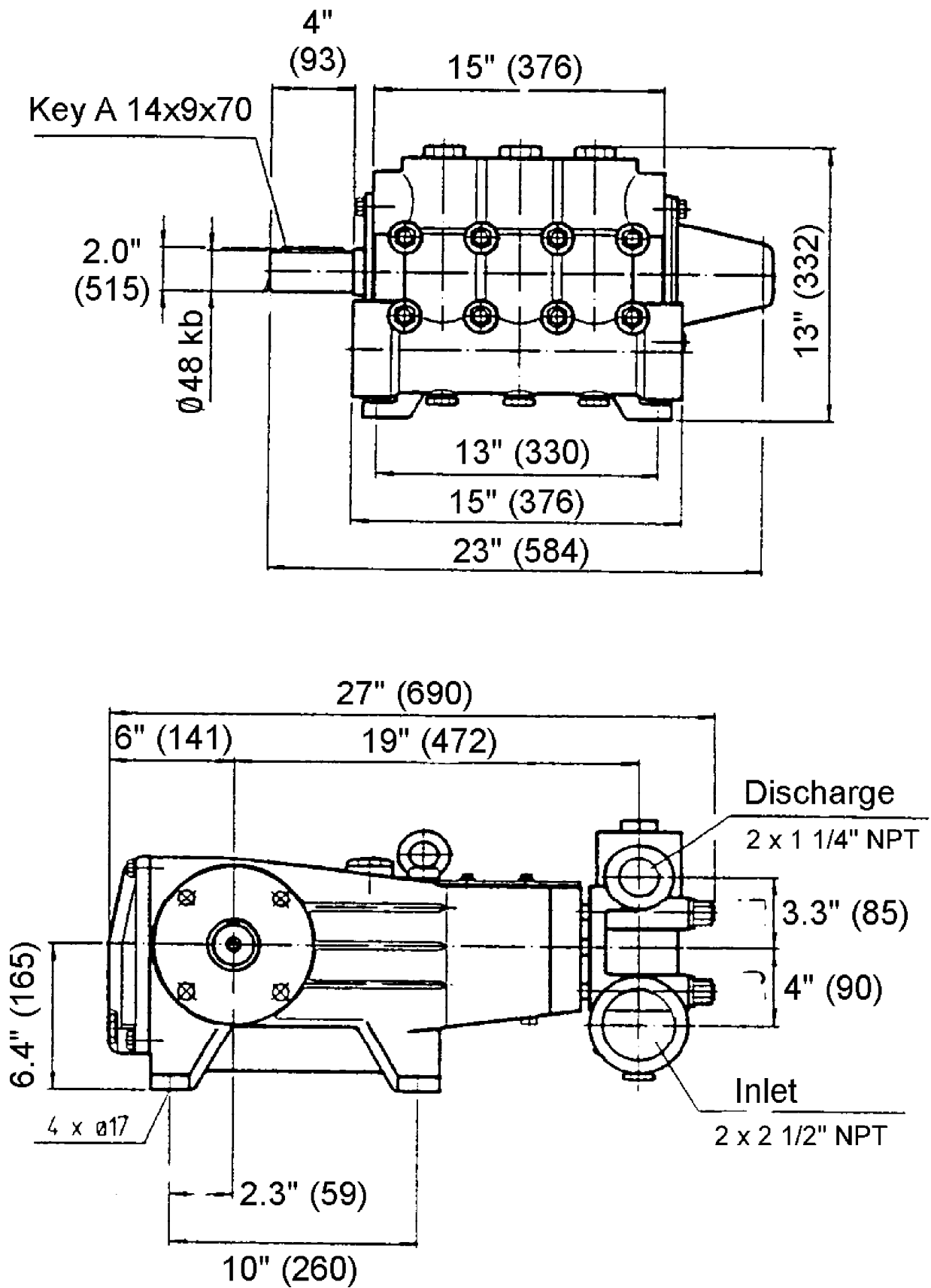
## Pump Mounting Selection Guide

|   |
|---|
| <p><b>Bushings</b><br/> <b>01074</b> - 24 mm Tapered H Bushing</p>  |
| <p><b>Pulley &amp; Sheaves</b><br/> <b>01061</b> - 7.75" Cast Iron 1 gr. - AB Section<br/> <b>01062</b> - 7.75" Cast Iron - 2 gr. - AB Section</p>                                  |
| <p><b>Rails</b><br/> <b>01160</b> - Plated Steel Channel Rails<br/> (L=5.75"x W=1.00"x h=2.50")<br/> <b>01161</b> - Plated Steel Channel Rails<br/> (L=5.75"x W=1.00"x H=2.50")</p> |

## PUMP SYSTEM MALFUNCTION

| <u>MALFUNCTION</u>                                 | <u>CAUSE</u>   | <u>REMEDY</u>  |
|--|--|--|
| The Pressure and/<br>or the Delivery<br>Drops      | Worn packing seals<br>Broken valve spring<br>Belt slippage<br>Worn or Damaged nozzle<br>Fouled discharge valve<br>Fouled inlet strainer<br>Worn or Damaged hose<br>Worn or Plugged relief valve on pump<br>Cavitation<br>pump for restrictions<br>Unloader | Replace packing seals<br>Replace spring<br>Tighten or Replace belt<br>Replace nozzle<br>Clean valve assembly<br>Clean strainer<br>Repair/Replace hose<br>Clean, Reset, and Replace worn parts<br>Check suction lines on inlet of<br><br>Check for proper operation |
| Water in crankcase                                 | High humidity<br>Worn seals  | Reduce oil change interval<br>Replace seals  |
| Noisy Operation                                    | Worn bearings<br>oil with<br>Cavitation  | Replace bearings, Refill crankcase<br>recommended lubricant<br>Check inlet lines for restrictions<br>and/or proper sizing  |
| Rough/Pulsating<br>Operation with<br>Pressure Drop | Worn packing<br>Inlet restriction<br><br>Accumulator pressure<br>Unloader<br>Cavitation  | Replace packing<br>Check system for stoppage, air<br>leaks, correctly sized inlet<br>plumbing to pump<br>Recharge/Replace accumulator<br>Check for proper operation<br>Check inlet lines for restrictions<br>and/or proper size                                    |
| Pump Pressure as<br>Rated, Pressure<br>Drop at gun | Restricted discharge plumbing  | Re-size discharge plumbing to<br>flow rate of pump   |
| Excessive<br>Leakage                               | Worn plungers<br>Worn packing/seals<br>Excessive vacuum<br>Cracked plungers<br>Inlet pressure too high   | Replace plungers<br>Adjust or Replace packing seals<br>Reduce suction vacuum<br>Replace plungers<br>Reduce inlet pressure  |
| High Crankcase<br>Temperature                      | Wrong Grade of oil<br>Improper amount of oil in crankcase  | Giant oil is recommended<br>Adjust oil level to proper amount  |

BP7170 DIMENSIONS - INCHES (mm)



## GIANT INDUSTRIES LIMITED WARRANTY

Giant Industries, Inc. pumps and accessories are warranted by the manufacturer to be free from defects in workmanship and material as follows:

1. For portable pressure washers and self-service car wash applications, the discharge manifolds will never fail, period. If they ever fail, we will replace them free of charge. Our other pump parts, used in portable pressure washers and in car wash applications, are warranted for five years from the date of shipment for all pumps used in NON-SALINE, clean water applications.
2. One (1) year from the date of shipment for all other Giant industrial and consumer pumps.
3. Six (6) months from the date of shipment for all rebuilt pumps.
4. Ninety (90) days from the date of shipment for all Giant accessories.

This warranty is limited to repair or replacement of pumps and accessories of which the manufacturer's evaluation shows were defective at the time of shipment by the manufacturer. The following items are NOT covered or will void the warranty:

1. Defects caused by negligence or fault of the buyer or third party.
2. Normal wear and tear to standard wear parts.
3. Use of repair parts other than those manufactured or authorized by Giant.
4. Improper use of the product as a component part.
5. Changes or modifications made by the customer or third party.
6. The operation of pumps and or accessories exceeding the specifications set forth in the Operations Manuals provided by Giant Industries, Inc.

Liability under this warranty is on all non-wear parts and limited to the replacement or repair of those products returned freight prepaid to Giant Industries which are deemed to be defective due to workmanship or failure of material. A Returned Goods Authorization (R.G.A.) number and completed warranty evaluation form is required prior to the return to Giant Industries of all products under warranty consideration. Call (419)-531-4600 or fax (419)-531-6836 to obtain an R.G.A. number.

Repair or replacement of defective products as provided is the sole and exclusive remedy provided hereunder and the MANUFACTURER SHALL NOT BE LIABLE FOR FURTHER LOSS, DAMAGES, OR EXPENSES, INCLUDING INCIDENTAL AND CONSEQUENTIAL DAMAGES DIRECTLY OR INDIRECTLY ARISING FROM THE SALE OR USE OF THIS PRODUCT.

THE LIMITED WARRANTY SET FORTH HEREIN IS IN LIEU OF ALL OTHER WARRANTIES OR REPRESENTATION, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND ALL SUCH WARRANTIES ARE HEREBY DISCLAIMED AND EXCLUDED BY THE MANUFACTURER.