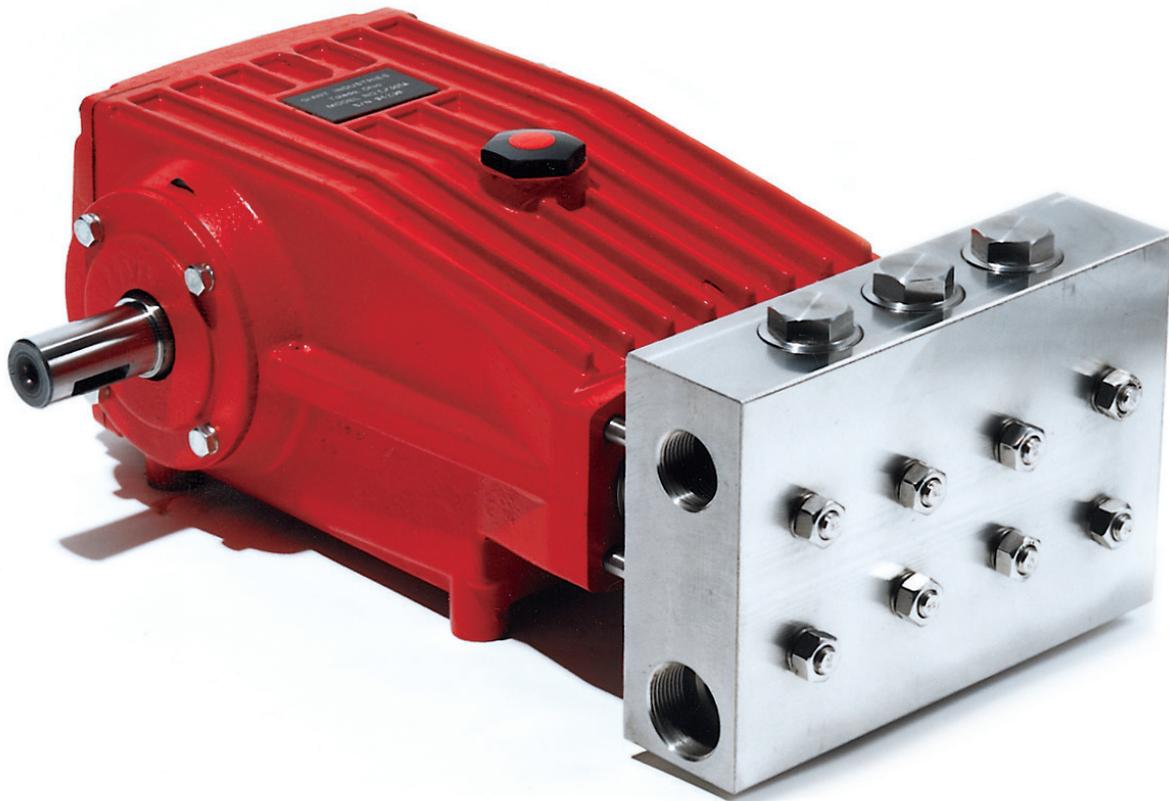


Model LP470

Triplex Ceramic
Plunger Pump
Operating Instructions/
Repair and Service
Manual



GIANT
Performance Under Pressure

Contents:

Installation Instructions:	page 2
Pump Specifications:	page 3
Exploded View:	page 4
Spare Parts List & Kits:	page 5
Troubleshooting Chart:	page 6
Preventative Maintenance & Recommended Spare Parts:	page 6
Repair Instructions:	page 7-10
Pump Mounting Selection Guide & Torque Specifications:	page 10
Dimensions:	page 11
Warranty Information:	back page

Updated 09/20

INSTALLATION INSTRUCTIONS

Required NPSH refers to water: Specific weight 1kg/dm³, viscosity 1°E at maximum permissible revolutions.

Operation and Maintenance

Check oil level prior to starting and ensure trouble free water supply.

IMPORTANT! If there is a **danger of frost**, the water in the pump and in the pump fittings (particularly the unloader valve) must be emptied. The second discharge port can also be used and the pump run “dry” for 1-2 minutes for this purpose.

Oil: Use only 101 fluid ounces (3.0 L) of SAE 90 Industrial gear lube oil. (Giant’s p/n 01154)

Initial change after 50 operating hours and then every 500 operating hours, or after 6 months in any case.

Caution! When operating in damp places or with high temperature fluctuations, condensate (frothy oil) might occur in the gear box. In this situation, change the oil immediately. **Keep NPSH under control.**

Maximum input pressure is 145 PSI (10 bar), the maximum suction head is -4.35 PSI (-0.3 bar). Make sure that suction pulsation is sufficiently dampened. Water column resonance must be avoided.



Safety Rules

Pump operation without safety valve as well as any excess in temperature or speed limits automatically voids the warranty. The safety valve must be regulated in accordance with the guidelines for liquid spraying units so that the admissible operating pressure can not be exceeded by more than 10%.

To cover the exposed crankshaft end with the shaft guard, position the guard directly over the grooved int the middle of the bearing cover and gently tap it into the groove using a plastic hammer.

Pressure in discharge line and in pump must be at zero before any maintenance to the pump takes place. Close the fluid supply to the inlet port(s). Disconnect fuses to ensure that the driving motor does not accidentally get switched on.

Make sure that all parts on the pressure side of the unit are vented and refilled, with pressure at zero, before starting the pump.

In order to prevent air, or air/water mixture being absorbed and to prevent cavitation occurring, the pump-npshr, positive suction head and water temperature must be kept under control.

Cavitation and/or compression of gases lead to uncontrollable pressure kicks which can ruin pump and unit parts and also be dangerous to the operator or anyone standing nearby.

Giant pumps are suitable for pumping clean water and other non-aggressive or abrasive media with a specific weight similar to water.

Before pumping other liquids - especially inflammable, explosive and toxic media - the pump manufacturer must under all circumstances be consulted with regard to the resistance of the pump material. It is the responsibility of the equipment manufacturer and/or operator to ensure that all pertinent safety regulations are adhered to.

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

Specifications

Model LP470

	<u>U.S.</u>	<u>Metric</u>
Volume.....	12.2 GPM.....	46.0 L/min
Discharge Pressure.....	4640 PSI.....	320 Bar
Power Consumption.....	40.3 BHP.....	30.1 kW
Maximum Crankshaft Speed.....		1000 RPM
Plunger Diameter.....	0.87”.....	22mm
Stroke.....	1.65”.....	42mm
Crankcase Oil Capacity.....	101 fl.oz.....	3.0 L
Temperature of Pumped Fluids.....	140° F.....	60° C
Inlet Port.....		2 x 1-1/4” BSP
Discharge Port.....		2 x 1” BSP
Shaft Mounting.....		Either side
Shaft Rotation.....		Top of pulley towards manifold
Weight.....	110 lbs.....	50 kg
Crankshaft Diameter.....		35mm
Manifold Material.....		Stainless Steel

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

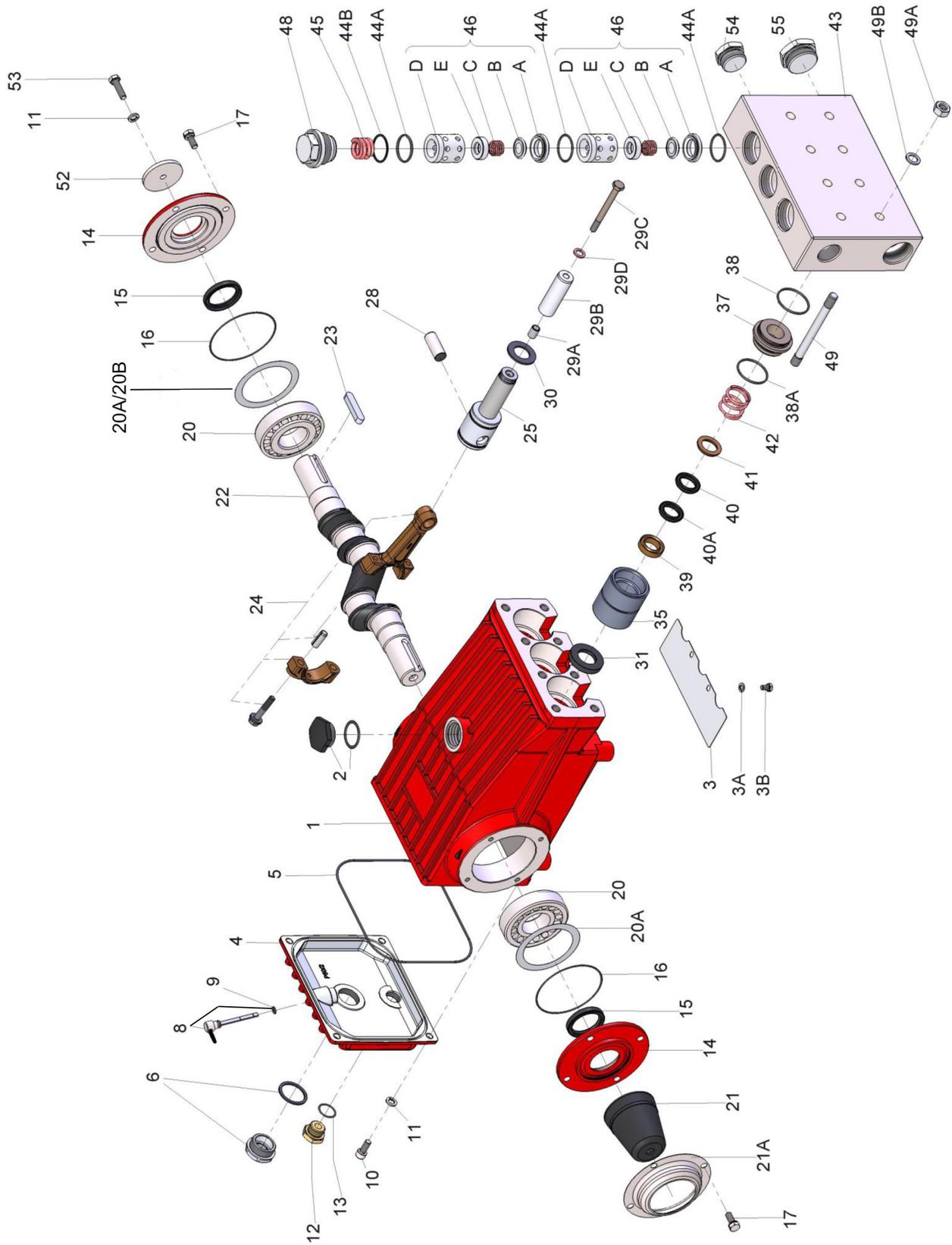
Horsepower ratings shown are the power requirements for the pump. Gas engine power outputs must be approximately twice the pump power requirements shown above.

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:

$$HP = (GPM \times PSI) / 1450$$

LP470 PULLEY SELECTION AND HORSEPOWER REQUIREMENTS					
RPM	GPM	1500 PSI	2500 PSI	3500 PSI	4640 PSI
300	3.7	3.8	6.3	8.8	11.7
500	6.1	6.3	10.5	14.7	19.5
700	8.5	8.8	14.7	20.6	27.3
900	11.0	11.4	18.9	26.5	35.1
1000	12.2	12.6	21.0	29.4	39.0

LP470 Exploded View



LP470 Parts List

<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	07759	Crankcase	1	30	07779	Oil Scraper	3
2	13000	Oil Filler Plug Assembly	1	31	07133	Oil Seal	3
3	05940	Cover Plate	1	35	13392	Seal Sleeve	3
3A	07223-0100	Spring Ring	2	37	13393	Seal Case	3
3B	05051	Hexagon Screw	2	38	07140	O-Ring	3
4	06085	Crankcase Cover	1	38A	12055	O-Ring	3
5	07104	O-Ring, Crankcase Cover	1	39	04128	Pressure Ring	3
6	05943	Oil Sightglass with Gasket	1	40	04129	Sleeve, Front	3
8	06086	Oil Dipstick Assembly	1	40A	04130	V-Sleeve, Back	3
9	01009	O-Ring, Dipstick	1	41	04131	Support Ring	3
10	01010	Cylinder Screw	4	42	07338	Pressure Spring	3
11	01011-0400	Spring Ring	5	43	03007	Valve Casing	1
12	07109	Plug, 1/2" BSP	1	44A	07150	O-Ring	9
13	06015	O-Ring	1	44B	06266	Support Ring	3
14	07111	Bearing Cover	2	45	06078	Compression Spring	3
15	07112	Radial Shaft Seal	2	46	08286	Valve Assembly (46A-E)	6
16	07113	O-Ring	2	46A	07064-0100	Valve Seat	6
17	07114	Hexagon Screw	8	46B	13130	Valve Plate	6
20	07116	Taper Roller Bearing	2	46C	07062-0100	Valve Spring	6
20A	07117	Fitting Disc	1-3	46D	05472	Spacer Pipe	6
20B	13001	Fitting Disc	1-3	46E	05473	Valve Spring Guide	6
21	05376	Shaft Protector	1	48	06077	Plug	3
21A	05377	Shaft Guard Holder	1	49	07754	Stud bolt	8
22	13242	Crankshaft	1	49A	07158	Hexagon Nut	8
23	13243	Woodruff Key	1	49B	07159	Disc	8
24	13340	Connecting Rod Assembly	3	52	13020	Disc for Crankshaft	1
25	13244	Crosshead / Plunger Assy.	3	53	06607	Hexagon Screw	1
28	13232	Crosshead Pin	3	54	13044	Plug, 1" BSP	1
29A	07256	Centering Sleeve	3	55	13151	Plug, 1-1/4" BSP	1
29B	04127	Plunger Pipe	3		04165	Crankcase Assembly (1-29A/30/31/49/49A-B/52/53)	
29C	13007	Tensioning Screw	3				
29D	07258	Copper Ring	3		05437	Pumphead Assembly (43-48/50/50A)	

LP470 Repair Kits

Plunger Packing Kit - # 09741

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
38	07140	O-Ring	3
38A	12055	O-Ring	3
39	04128	Pressure Ring	3
40	04129	Sleeve, Front	3

Valve Assembly Kit - # 09742

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
44A	07150	O-Ring	9
44B	06266	Support Ring	3
46	08286	Valve Assembly	6

Oil Seal Kit - # 09577

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
31	07133	Oil Seal	3

PUMP SYSTEM MALFUNCTION

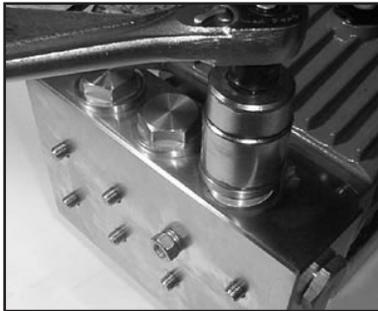
<u>MALFUNCTION</u>	<u>CAUSE</u>	<u>REMEDY</u>
The Pressure and/or the Delivery Drops	Worn packing seals Broken valve spring Belt slippage Worn or Damaged nozzle Fouled discharge valve Fouled inlet strainer Worn or Damaged hose Worn or Plugged relief valve on pump Cavitation Unloader	Replace packing seals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

Preventative Maintenance Check List & Recommended Spare Parts List						
Check	Daily	Weekly	50 Hrs.	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 01154			X	X		
Plunger Packing Kit (1 kit/pump) See page 5 for kit list					X	
Valve Assembly Kit (1 kit/pump) See page 5 for kit list						X
Oil Seal Kit (1 kit/pump) See page 5 for kit list					X	

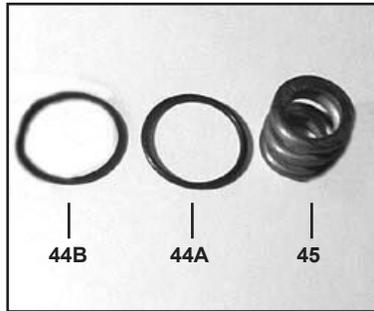
LP470 REPAIR INSTRUCTIONS

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

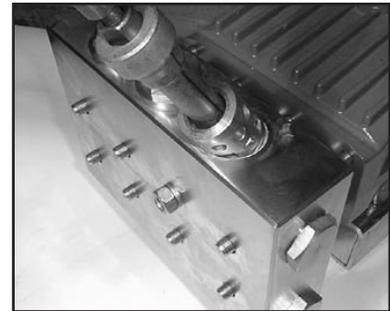
TO CHECK VALVES



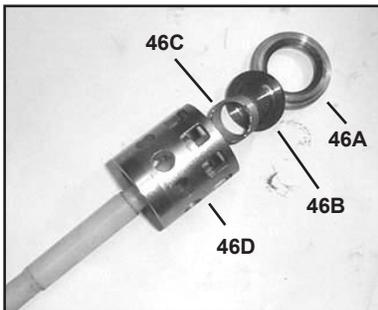
- 1) Loosen and remove tension plugs (48) with a 36mm socket wrench.



- 2) Remove the support ring (44B), O-ring (44A), and tension spring (45).



- 3) Take out discharge valve assemblies (46) by pulling them upwards out of the valve casing (43) with a snap-ring tongs or any other pull-off device. Then remove inlet valves in the same way.



- 4) Loosen valve seats (46A) and valve spring (46C) from spacer pipe (46D) by lightly hitting the valve plate (46B) with a plastic stick. Check sealing surface and replace worn parts. Reassemble with new O-rings (44A) if possible and oil them before installing.

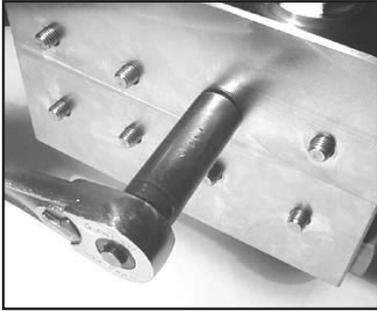


- 5) Tighten up tension plugs (48) to 107 ft.-lbs. (145 Nm).

LP470 REPAIR INSTRUCTIONS

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

TO CHECK SEALS AND PLUNGER PIPE



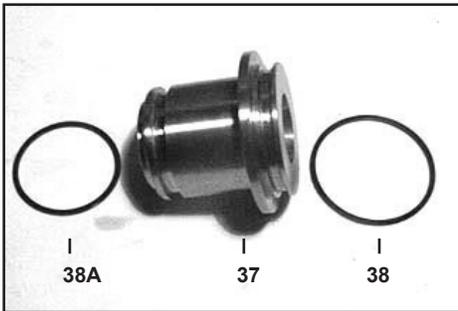
6) Loosen the 8 nuts (49A) with a 19mm socket and pull off valve casing (43) to the front.



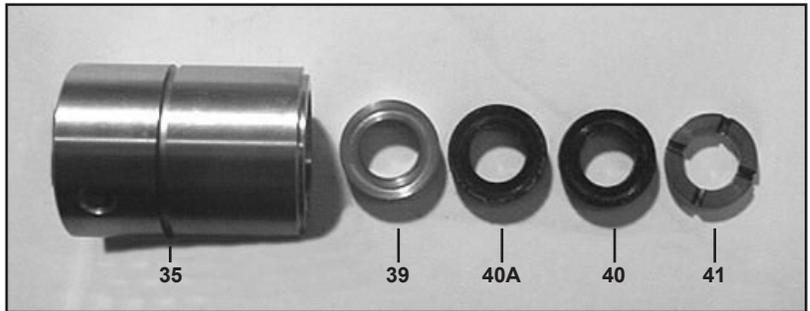
7) Remove the seal sleeve (35) from the manifold and/or crankcase.



8) Remove seal case (37) from seal sleeve (35).

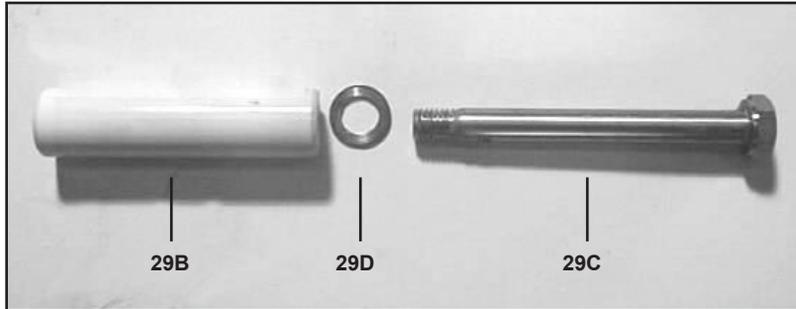


9) Check O-rings (38 & 38A) on seal case (37).



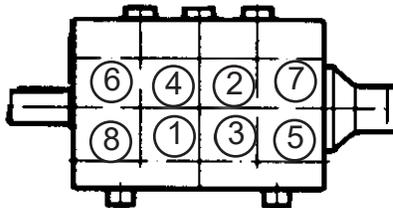
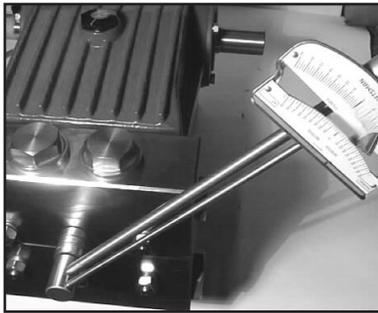
10) Remove the pressure ring (39), sleeves (40 & 40A), and support ring (41) from the seal sleeve. Remove the pressure spring (42). Examine seals carefully and replace if worn. Clean surfaces of seal sleeves (35) which come in contact with the crankcase (1) and sealing surfaces of valve casing (43).

LP470 REPAIR INSTRUCTIONS



11) Check plunger surface (29B). If plunger pipe is worn out, loosen tension screws (29C) with a 15mm socket and pull off plunger pipe to the front. Clean front surface of plunger (29B) thoroughly. Apply a small drop of locktite to tension screw. Put a **new** crush washer (29D) onto tension screw. Put a thin coat of glue (Loctite) on the ring (or ceramic plunger side) and tighten screw to 22 ft.-lbs. (30 NM).

12) Replace complete seal sleeve (35)/seal case (37) assembly into crankcase (1). Make sure that the weep hole points downward. **Note: To replace the oil seals (31), you will need to disassemble the gear end (see instructions on next page).**



13) Place entire manifold/seal sleeve assembly over the studs and push firmly until seated against the crankcase.

14) Tighten hex nuts (49A) in a crosswise pattern (shown above) to 59 ft.-lbs. (80 Nm).

LP470 REPAIR INSTRUCTIONS

TO DISMANTLE GEAR END

After removing valve casing (43) and plunger pipe (29B), drain the oil. Remove the gear cover (4) and both bearing covers (14). Loosen connecting rod screws (24A) and push the front of the connecting rod (24) forward as far as possible into the crosshead guide.

IMPORTANT! Connecting rods (24) are marked for identification. Do not twist connecting rod halves. Connecting rod is to be reinstalled in the same position on shaft journals.

Turning the crankshaft (22) slightly, hit it out carefully to the side with a rubber hammer.

IMPORTANT! Do not bend the connecting rod (24) shanks. Check crankshaft (22) and connecting rod (24) surfaces, radial shaft seals (15) and taper roller bearings (20).

To remove the oil seals (31) use a wooden rod and sharply hit down on the oil seals from the crankcase (1). Note: when replacing the oil seals, apply a small amount of locktight to the outside edges of each oil seal before re-inserting them into the crankcase.

To Reassemble

Using a soft tool, press in the outer bearing ring until the outer edge lines up with the outer edge of the bearing hole. Remove bearing cover (14) together with radial shaft seal (15) and o-ring (16). Fit crankshaft (22) through bearing hole on the opposite side. Press in outer bearing and tighten it inwards with the bearing cover, keeping the crankshaft in vertical position and turning slowly so that the taper rollers of the bearings touch the edge of the outer bearing ring. Adjust axial bearing clearance to at least 0.1mm and maximum 0.15mm by placing fitting discs (20A and 20B) under the bearing cover.

IMPORTANT! After assembly has been completed, the crankshaft should turn easily with very little clearance. Tighten connecting rod screws (24) to 22 ft.-lbs. (30 Nm). Re-assemble the fluid end (see instructions on previous pages).

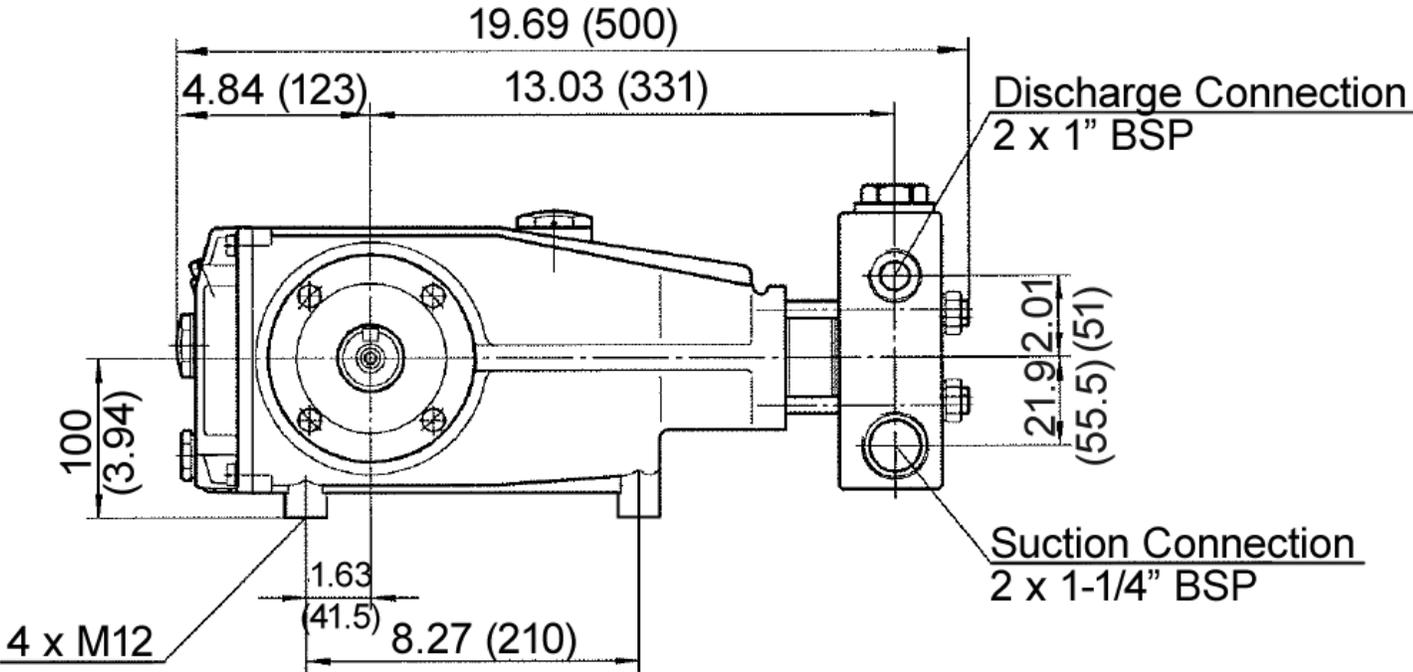
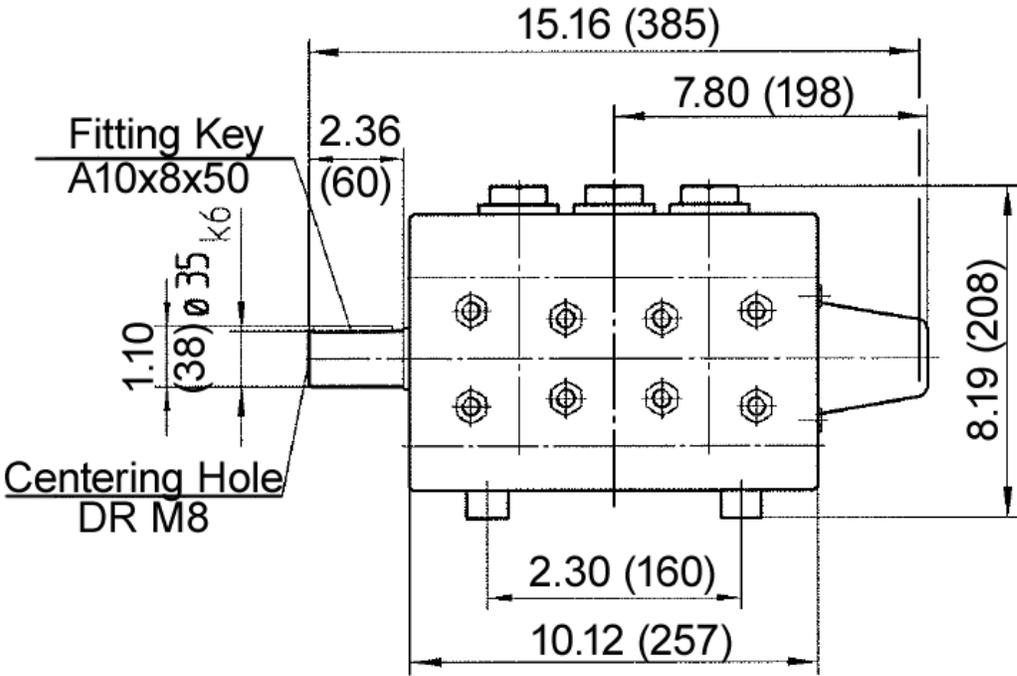
LP470 TORQUE SPECIFICATIONS

<u>Position</u>	<u>Item#</u>	<u>Description</u>	<u>Lubrication Info</u>	<u>Torque Amount</u>
1	07759	Crankcase	Molykote Cu-Paste	
6	05943	Oil Sightglass with Dipstick	Loctite 572	30 ft.-lbs. (40 Nm)
10	01010	Cylinder Screw		18 ft.-lbs. (25 Nm)
12	07109	Plug		30 ft.-lbs. (40 Nm)
17	07114	Hexagon Screw		18 ft.-lbs. (25 Nm)
24	13340	Inner Hex Screw, Connecting Rod		22 ft.-lbs. (30 Nm)
29C	13007	Tension Screw, Plunger	Loctite 243	22 ft.-lbs. (30 Nm)
31	07133	Oil Seal	Loctite 403	
48	06077	Plug, Discharge		107 ft.-lbs. (145 Nm)
49	07754	Stud Bolt	Loctite 648	
49A	07158	Hexagon Nut, Stud Bolts		59 ft.-lbs. (80 Nm)

Pump Mounting Selection Guide

<p>Bushings 06496 - 35 mm H Bushing</p>
<p>Pulley & Sheaves 07165 - 12.75" Cast Iron - 4 gr. AB Section</p>
<p>Rails 07357 - Plated Steel Channel Rails (L=11.75"x W=1.88"x H=3.00")</p>

LP470 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. Five (5) years from the date of shipment for all pumps used in portable pressure washers with NON-SALINE, clean water applications.
2. Two (2) years from the date of shipment for Giant pumps used in car wash applications.
3. One (1) year from the date of shipment for all other Giant industrial and consumer pumps.
4. Six (6) months from the date of shipment for all rebuilt pumps
5. 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.



WARNING: This product might contain a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm.
For more information go to www.P65Warnings.ca.gov

GIANT
Performance Under Pressure

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