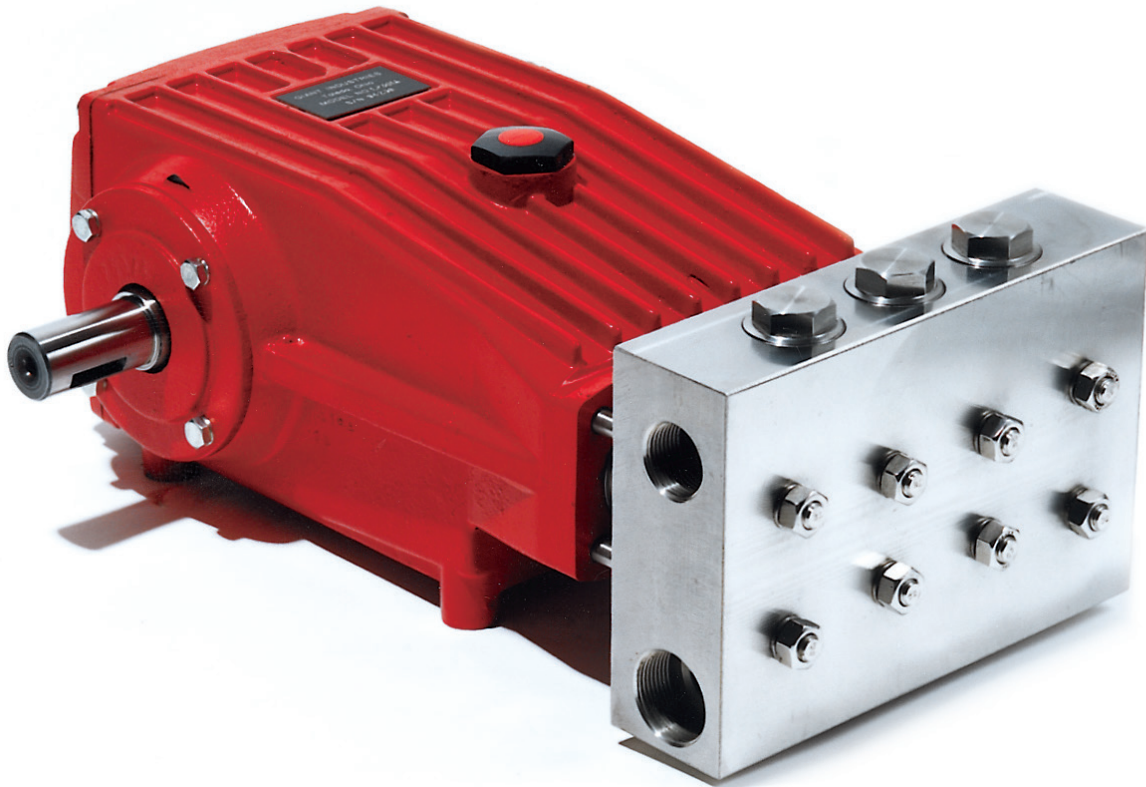


Models

LP301A-5100 / LP600-5100

Triplex Ceramic
Plunger Pump
Operating Instructions/Manual



Contents:

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

Updated 03/20

INSTALLATION INSTRUCTIONS

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 118 fluid ounces (3.5 L) of SAE 90 Industrial gear lube oil. (Giant's p/n 01154)

Initial change after 50 operating hours and then every 1000 operating hours, or after one year if used less.

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%.

When the pump is in operation, the open shaft end must be covered up by a shaft protector (21). For direct drive operations, the driven shaft side and coupling must have a guard over the connected area.

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-npsht, positive suction head and water temperature must be kept under control.

Required NPSH refers to water: Specific weight 0.0624 lb/ft³ (1kg/dm³), viscosity 1°E at maximum permissible revolutions.

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

LP301A-5100 Specifications

	<u>U.S.</u>	<u>Metric</u>
Volume.....	14.2 GPM	53.6 LPM
Discharge Pressure.....	3900 PSI	270 Bar
Inlet Pressure.....	140 PSI	9.7 Bar
Speed.....		1000 RPM
Plunger Diameter.....	0.94"	24 mm
Stroke.....	1.65"	42 mm
Crankcase Oil Capacity.....	100 fl.oz.	3 liters
Temperature of Pumped Fluids.....	140° F	60 °C
Inlet Port.....		3 x 1-1/4" FBSP
Discharge Port.....		3 x 1" FBSP
Crankshaft Mounting.....		Either Side
Shaft Rotation.....		Top of Pulley Towards Fluid End
Weight.....	132 lbs.	60 kg
Crankshaft Diameter.....		35 mm

LP600-5100 Specifications

	<u>U.S.</u>	<u>Metric</u>
Volume.....	9.8 GPM	37 LPM
Discharge Pressure.....	5800 PSI	400 Bar
Inlet Pressure.....	140 PSI	9.7 Bar
Speed.....		1000 RPM
Plunger Diameter.....	0.79"	20 mm
Stroke.....	1.65"	42 mm
Crankcase Oil Capacity.....	100 fl.oz.	3 liters
Temperature of Pumped Fluids.....	140° F	60 °C
Inlet Port.....		3 x 1-1/4" FBSP
Discharge Port.....		3 x 1" FBSP
Crankshaft Mounting.....		Either Side
Shaft Rotation.....		Top of Pulley Towards Fluid End
Weight.....	132 lbs.	60 kg
Crankshaft Diameter.....		35 mm

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

We recommend that a 1.15 service factor be specified when selecting an electric motor as the power source. To compute specific pump horsepower requirements, use the following formula:

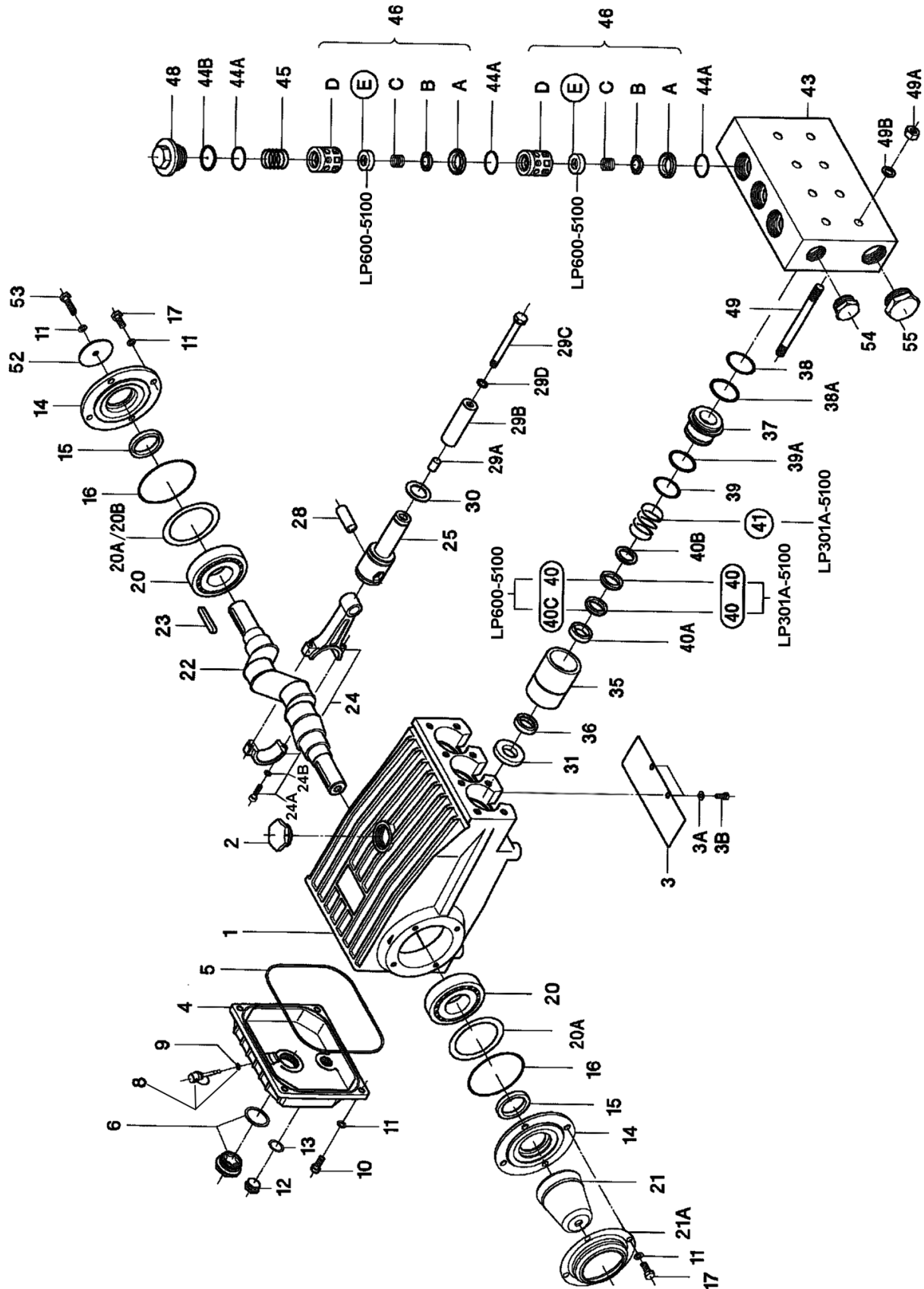
$$HP = (GPM \times PSI) / 1440$$

LP301A-5100 PULLEY SELECTION AND HORSEPOWER REQUIREMENTS					
RPM	GPM	2500 PSI	3000 PSI	3500 PSI	4000 PSI
500	7.1	12.2	14.7	17.1	19.6
640	9.0	15.6	18.8	21.9	25.1
750	10.6	18.4	22.0	25.7	29.4
805	11.4	19.7	23.6	27.6	31.5
865	12.2	21.2	25.4	29.6	33.9
940	13.3	23.0	27.6	32.2	36.8
1000	14.1	24.5	29.4	34.3	39.2

LP600-5100 PULLEY SELECTION AND HORSEPOWER REQUIREMENTS					
RPM	GPM	3000 PSI	4000 PSI	5000 PSI	5800 PSI
500	4.9	10.2	13.6	17.0	19.7
640	6.2	12.9	17.2	21.5	25.0
750	7.3	15.2	20.3	25.3	29.4
805	7.8	16.3	21.7	27.1	31.4
865	8.4	17.5	23.3	29.2	33.8
940	9.1	19.0	25.3	31.6	36.7
1000	9.8	20.4	27.2	34.0	39.5

LP301A-5100 / LP600-5100 Exploded View

Important! The stainless steel valve plugs (48) can seize when being screwed out of the casing. To release tension beforehand, strike the plugs 1-2 times with a steel hammer on the top before screwing them out. Coat threads with antiseize (e.g. Fel-Pro Nickel Anti-Seize 51119)



LP301A-5100 / LP600-5100 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	39A	07693	Support Ring for 39 (LP301A-5100)	3
2	13000	Oil Filler Plug Assembly	1	40	07322	V-Sleeve (LP600-5100)	3
3	05940	Cover Plate	1	40	06083	V-Sleeve (LP301A-5100)	6
3A	07223-0100	Spring Ring	2	40A	07268-0100	Guide Ring (LP600-5100)	3
3B	05051-0100	Hexagon Screw	2	40A	13366-0100	Guide Ring (LP301A-5100)	3
4	06085	Crankcase Cover	1	40B	07270-0100	Support Ring for 40 (LP600-5100)	3
5	07104	O-ring, Crankcase Cover	1	40B	13438	Support Ring for 40 (LP301A-5100)	3
6	05943	Oil Sight Glass Assembly	1	40C	07322-0020	Sleeve (LP600-5100)	3
8	06086	Oil Dipstick Assembly	1	41	07338	Pressure Spring (LP301A-5100)	3
9	01009	O-Ring, (For Dipstick)	1	43	13040-5000	Valve Casing	1
10	01010-0100	Cylinder Screw	4	44A	07150	O-Ring	9
11	01011-0400	Spring Ring	13	44B	06266	Support Ring for O-Ring	3
12	07109-0400	Plug, 1/2" BSP	1	45	06078	Compression Spring	3
13	06015	O-Ring	1	46	08286	Valve Assembly, LP600-5100 (46A-E)	6
14	07111	Bearing Cover	2	46	07060-0100	Valve Assembly, LP301A-5100 (46A-E)	6
15	07112	Radial Shaft Seal	2	46A	07064-0100	Valve Seat	6
16	07113	O-Ring for Bearing Cover	2	46B	13130	Valve Plate (LP600-5100)	6
17	07114-0100	Hexagon Screw	8	46B	07063-0100	Valve Plate (LP301A-5100)	6
20	07116	Taper Roller Bearing	2	46C	07750-0100	Valve Spring	6
20A	07117	Fitting Disc	1-3	46D	05472	Spacer Pipe (LP600-5100)	6
20B	13001	Fitting Disc	1-3	46D	07066	Spacer Pipe (LP301A-5100)	6
21	05376	Shaft Protector	1	46E	05473	Valve Spring Guide (LP600-5100)	6
21A	05377	Shaft Guard Holder	1	48	06077-0100	Plug	3
22	13242	Crankshaft	1	49	07157	Stud Bolt	8
23	13243	Key	1	49A	07158	Hexagon Nut	8
24	13340	Connecting Rod Assembly	3	49B	07159	Disc	8
24A	13277	Inner Hex Screw	6	52	13020	Disc for Crankshaft	1
24B	13278	Spring Washer	6	53	04561	Hexagon Screw	1
25	13341	Crosshead Assy.	3	54	13044-0100*	Plug, G 1" BSP	1
28	13232	Crosshead Pin	3	55	13151-0100*	Plug, G 1-1/4" BSP	1
29A	07125	Centering Sleeve	3		05437-0100	Manifold Assembly, LP600-5100 (43-48/54/55)	
29B	07126	Plunger Pipe (LP600-5100)	3		04533-0100	Manifold Assembly, LP301A-5100 (43-48/54/55)	
29B	07127	Plunger Pipe (LP301A-5100)	3		05445-0100	Crankcase Assembly, (1-29A/30/31/49/49A-B/52/53)	
29C	07131-0100	Tensioning Screw	3		04868-0100	Plunger Conversion Assembly, LP600-5100, (29B-D/35-40B)	
29D	07161A-0100	Steel Ring	3		04869-0100	Plunger Conversion Assembly, LP301A-5100, (29B-D/35-40C)	
30	07779	Oil Scraper	3				
31	07133	Oil Seal	3				
35	13235-0100	Seal Sleeve (LP600-5100)	3				
35	13364-0100	Seal Sleeve (LP301A-5100)	3				
36	13237	Leakage Seal (LP600-5100)	3				
36	13238	Leakage Seal (LP301A-5100)	3				
37	13239-0100	Seal Case (LP600-5100)	3				
37	13240-0100	Seal Case (LP301A-5100)	3				
38	07140	O-Ring, Seal Case	3				
38A	13241	Support Ring for 38	3				
39	13012	O-Ring, Seal Case (LP600-5100)	3				
39	12055	O-Ring, Seal Case (LP301A-5100)	3				
39A	13036	Support Ring for 39 (LP600-5100)	3				

*BSP to NPT Adapters/Seals (sold separately)

Inlet Port
Adapter: 13377-0100
Seal: 13376-0100

Discharge Port
Adapter*: 13373-0100/
Seal: 13372-0100
**Rated up to 4000 PSI*

LP301A-5100 / LP600-5100 Repair Kits

Plunger Packing Kits

LP301A-5100 - # 09459-0100

For pumps manufactured on or after 4/96

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
36	13238	Leakage Seal	3
38	07140	O-Ring	3
38A	13241	Support Ring	3
39	12055	O-Ring	3
39A	07693	Support Ring	3
40	06083	V-Sleeve	6
40A	13366-0100	Pressure Ring	3

LP600-5100 - # 09197-0100

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
36	13237	Leakage Seal	3
38	07140	O-Ring	3
38A	13241	Support Ring	3
39	13012	O-Ring	3
39A	13036	Support Ring	3
40	07322	V-Sleeve	3
40A	07268-0100	Pressure Ring	3
40C	07322-0100	Sleeve	3

Oil Seal Kit

LP301A-5100 - # 09577

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

Valve Kits

LP301A-5100 - # 09196-0100

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
44A	07150	O-Ring	9
44B	06266	Support Ring	3
46A	07064-0100	Valve Seat	6
46B	07063-0100	Valve Plate	6
46C	07750-0100	Valve Spring	6

LP600-5100 - # 09195

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
44A	07150	O-Ring	9
44B	06266	Support Ring	3
46A	07064-0100	Valve Seat	6
46B	13130	Valve Plate	6
46C	07750-0100	Valve Spring	6

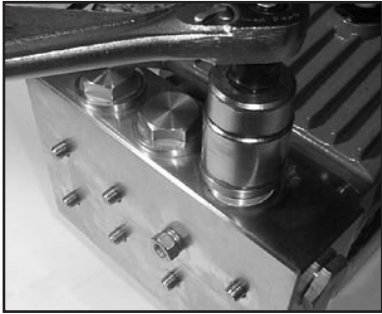
LP600-5100 - # 09721

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
44A	07150	O-Ring	9
44B	06266	Support Ring	3
46A	07064-0100	Valve Seat	6
46B	13130	Valve Plate	6
46C	07750-0100	Valve Spring	6
46D	05472	Spacer Pipe	6
46E	05473	Valve Spring Guide	6

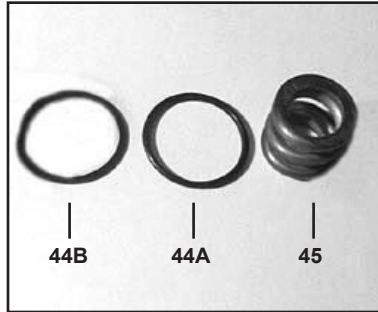
REPAIR INSTRUCTIONS

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



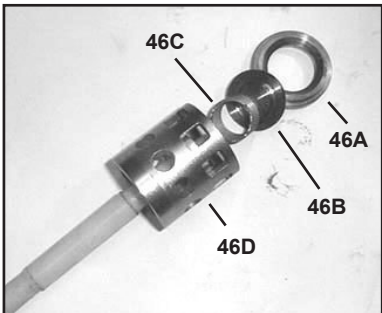
- 1) Loosen and remove tension plugs (48) with a 36mm socket wrench.



- 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.



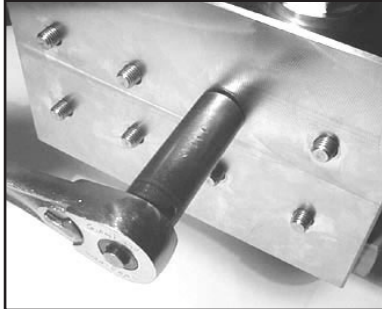
- 4) Loosen valve seats (46A) valve spring (46C), and valve spring guide (46E) from spacer pipe (46D) by lightly hitting the valve plate (46B) with a plastic stick. Check sealing surface and replace worn parts. Reassemble with new O-rings (44A) if possible and oil them before installing.



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

REPAIR INSTRUCTIONS

TO CHECK SEALS AND PLUNGER PIPE



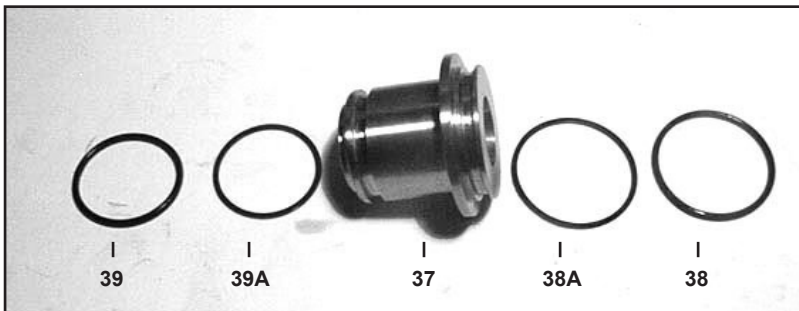
- 6) Loosen the 8 nuts (49A) with a 19mm socket and pull off valve casing (43) to the front.



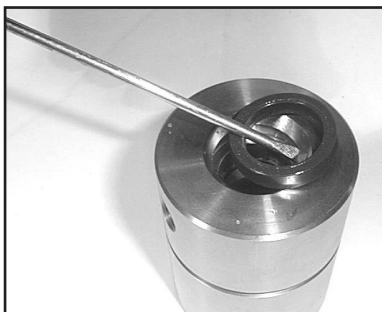
- 7) Remove the seal sleeve (35) from the manifold and /or crankcase.



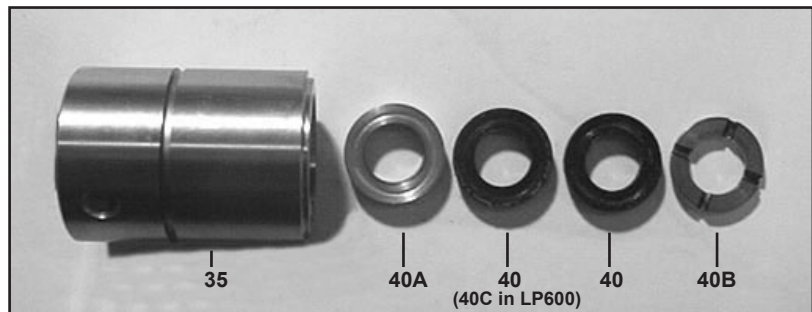
- 8) Remove seal case (37) from seal sleeve (35).



- 9) Check O-rings (39 & 38) and support rings (39A & 38A) on seal case (37).

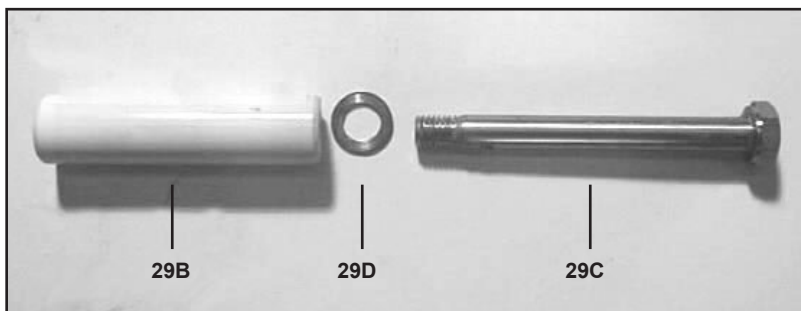


- 10) Remove leakage seal (36) from the seal sleeve. If worn or damaged replace with new seal.

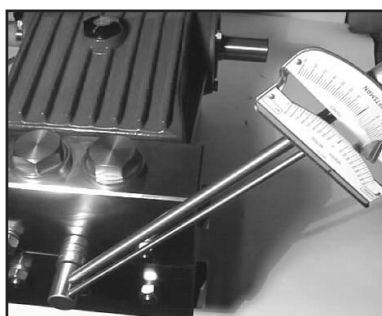


- 11) Remove the guide ring (40A), v-sleeves (40/40C), and support ring (40B), from the seal sleeve. Examine seals carefully and replace if worn. Clean surfaces of seal sleeves (35) which come in contact with the crankcase (1) and sealing surfaces of valve casing (43).

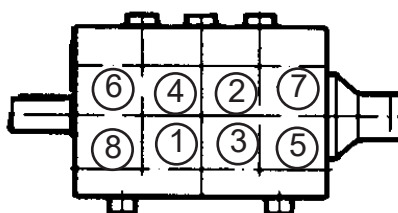
REPAIR INSTRUCTIONS



12) 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 26 ft.-lbs. (35 NM).



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



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



13) 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 below).

LP301-5100 / LP600-5100 Torque Specifications				
Position	Item #	Description	Lubrication Info	Torque Amount
1	07759	Crankcase	Molycote Cu-Paste	
6	05943	Oil Sight Glass	Loctite 572	29 ft.-lbs. (40 Nm)
10	01010	Cylinder Screw		221 in.-lbs. (25 Nm)
12	07109	Plug, 1/2" BSP		29 ft.-lbs. (40 Nm)
17	07114	Hexagon Screw		221 in.-lbs. (25 Nm)
24	13340	Inner Hex Screw, Connecting Rod		22 ft.-lbs. (30 Nm)
29C	13031	Tension Screw, Plunger	Loctite 243	26 ft.-lbs. (35 Nm)
29D	07161A-0100	Seal Sleeve	Loctite 577	
31	07133	Radial Shaft Seal	Loctite 403	
48	06077	Plug, Discharge		107 ft.-lbs. (145 Nm)
49	07157	Stud Bolt	Loctite 270	
49A	07158	Hexagon Nut, Stud Bolts		59 ft.-lbs (80 Nm)

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 (24A) to 22 ft.-lbs. (30 Nm). Re-assemble the fluid end (see instructions above).

Pump Mounting Selection Guide

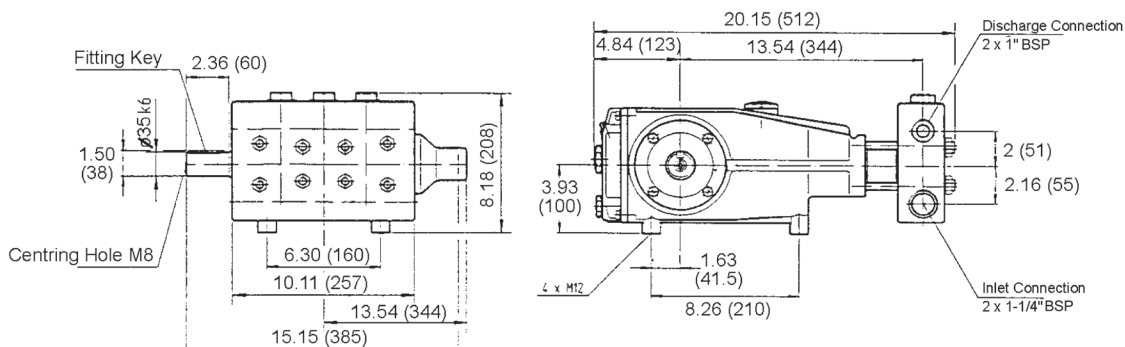
Bushings 06496 - 35 mm H Bushing
Pulley & Sheaves 07165 - 12.75" Cast Iron - 4 gr. AB Section
Rails 07357 - Plated Steel Channel Rails (L=11.75"x W=1.88"x H=3.00")

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 (1 Gallon) p/n 01154			X	X		
Oil Seal Kit (1 kit/pump) (see page 6 for kit list)					X	
Seal Spare Parts (1 kit/pump) (see page 6 for kit list)					X	
Valve Spare Parts (1 kit/pump) (see page 6 for kit list)						X

LP301A-5100 / LP600-5100 Dimensions - in (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.

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