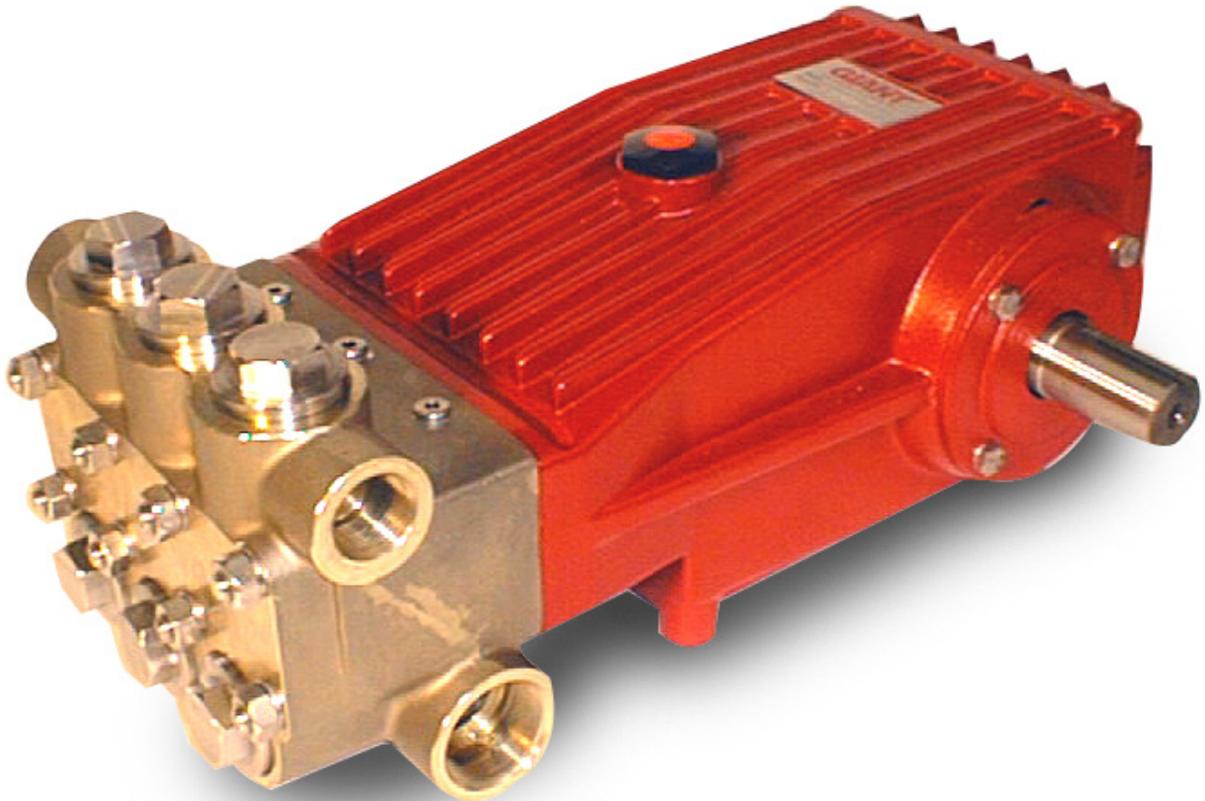


Models

Triplex Ceramic
Plunger Pump
Operating Instructions/
Repair and Service Manual

LP122A-3100 & LP250-3100



GIANT
Performance Under Pressure

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Updated 08/20

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 re-filled, 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.

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

LP122A-3100 Specifications

	<u>U.S.</u>	<u>Metric</u>
Volume.....	35.4 GPM	134.1 L/min
Discharge Pressure.....	1300 PSI	90 Bar
Power Consumption.....	31.9 BHP	23.8 kW
Inlet Pressure.....	87 PSI	6 Bar
Speed.....		Up to 800 RPM
Plunger Diameter.....	1.65"	42 mm
Stroke.....	1.65"	42 mm
Crankcase Oil Capacity.....	118 fl. oz.	35 liters
Temperature of Pumped Fluids (seawater).....	86 °F	30 °C
Temperature of Pumped Fluids (excluding seawater).....	140 °F	60 °C
Inlet Port.....		2 x 1-1/2" BSP
Discharge Port.....		2 x 1" BSP
Crankshaft Mounting.....		Either Side
Shaft Rotation.....		Top of Pulley Towards Fluid End
Weight.....	116 lbs.	52.6 kg
Crankshaft Diameter.....	1.38	35 mm
Valve Casing.....		Nickle Aluminum Bronze
NPSHR.....	25.6 ft. of head	7.8 mWs

LP250-3100 Specifications

	<u>U.S.</u>	<u>Metric</u>
Volume.....	25.7 GPM	97.3 L/min
Discharge Pressure.....	2030 PSI	140 Bar
Power Consumption.....	39.7 BHP	29.6 kW
Inlet Pressure.....	87 PSI	6 Bar
Speed.....		Up to 1000 RPM
Plunger Diameter.....	1.30"	32 mm
Stroke.....	1.65"	42 mm
Crankcase Oil Capacity.....	118 fl. oz.	3.5 liters
Temperature of Pumped Fluids (seawater).....	86 °F	30 °C
Temperature of Pumped Fluids (excluding seawater).....	140 °F	60 °C
Inlet Port.....		2 x 1-1/2" BSP
Discharge Port.....		1 x 1" BSP
Crankshaft Mounting.....		Either Side
Shaft Rotation.....		Top of Pulley Towards Fluid End
Weight.....	126 lbs.	57 kg
Crankshaft Diameter.....		35 mm
Valve Casing.....		Nickle Aluminum Bronze
NPSHR.....	25.6 ft. of Head	7.8 meters of Water

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.

Pump speeds of 640 RPM and above require a minimum inlet pressure of 12 psig.

HORSEPOWER INFORMATION

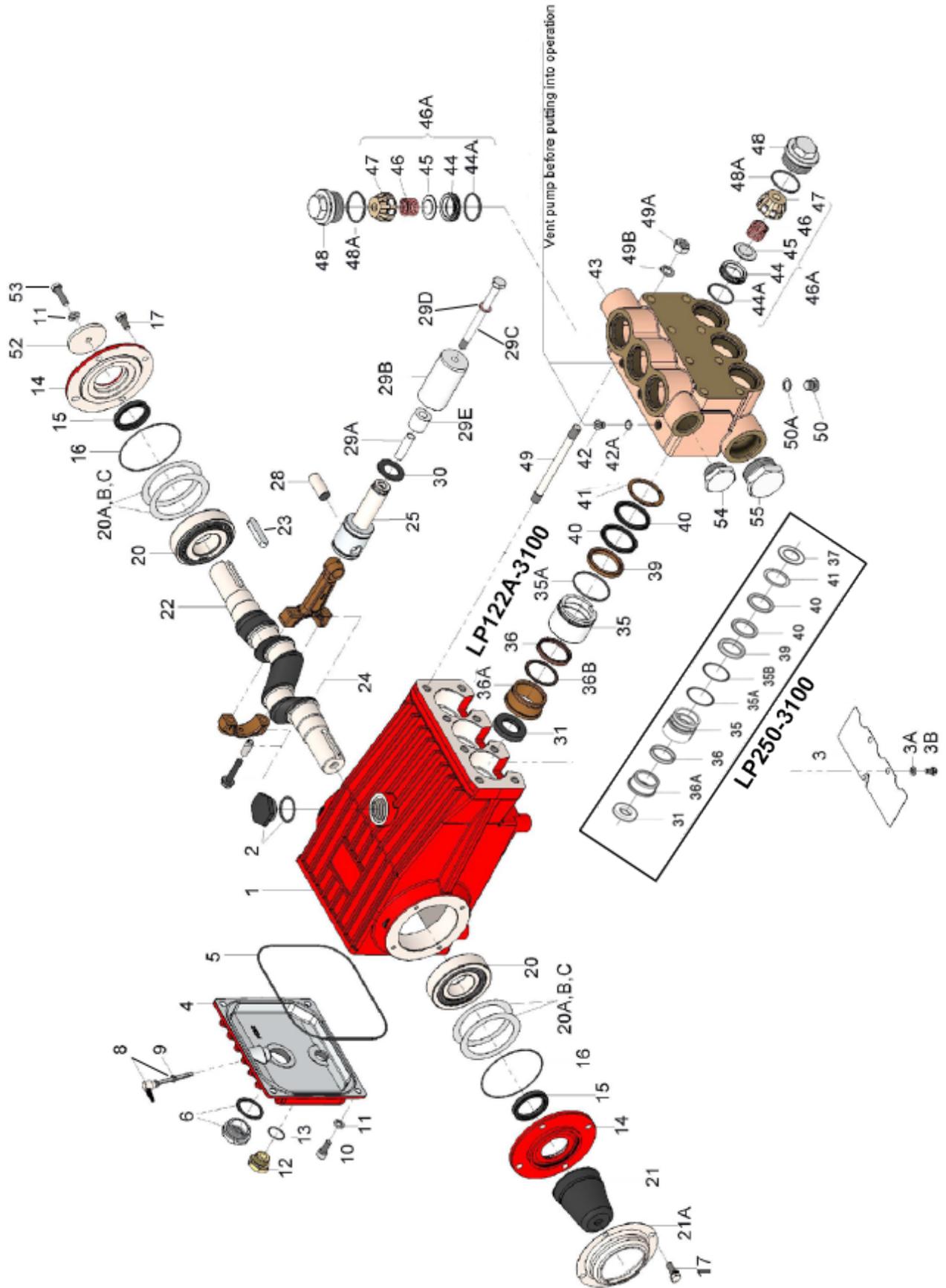
We recommend that a 1.1 service factor be specified when selecting an electric motor as the power source. To compute specific pump horsepower requirements, use the following formula:

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

LP250-3100 PULLEY SELECTION AND HORSEPOWER REQUIREMENTS						
RPM	GPM	600 PSI	800 PSI	1000 PSI	1600 PSI	2030 PSI
500	12.9	5.4	7.1	8.9	14.3	18.1
600	15.4	6.4	8.6	10.7	17.1	21.7
700	18	7.5	10.0	12.5	20.0	25.4
800	20.6	8.6	11.4	14.3	22.8	29.0
900	23.1	9.6	12.9	16.1	25.7	32.6
1000	25.7	10.7	14.3	17.8	28.6	36.2

LP122A-3100 PULLEY SELECTION AND HORSEPOWER REQUIREMENTS					
RPM	GPM	600 PSI	800 PSI	1000 PSI	1300 PSI
500	22.3	9.3	12.4	15.5	20.1
555	24.7	10.3	13.7	17.2	22.3
640	28.5	11.9	15.8	19.8	25.7
695	30.9	12.9	17.2	21.5	27.9
750	33.4	13.9	18.6	23.2	30.2
800	35.6	14.8	19.8	24.7	32.1

LP122A-3100 & LP250-3100 Exploded View



LP122A-3100 & LP250-3100 Spare 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	31	07133	Radial Shaft Seal	3
2	13000	Oil Filler Plug Assembly	1	35	13342-0100	Seal Sleeve (LP122A-3100)	3
3	05940	Cover Plate	1	35	04138	Seal Sleeve (LP250-3100)	3
3A	07223-0100	Spring Washer	2	35A	06619	O-Ring	3
3B	05051-0100	Hexagon Screw	2	35B	13141-0001	O-Ring (LP250-3100)	3
4	06085	Crankcase Cover	1	36	13415	Grooved Ring (LP122A-3100)	3
5	07104	O-Ring	1	36	13025	Grooved Ring (LP250-3100)	3
6	05943	Oil Sight Glass with Gasket	1	36A	13416A-0100	Pressure Ring (LP122A-3100)	3
8	06086	Oil Dipstick Assembly	1	36A	06700	Pressure Ring (LP250-3100)	3
9	01009	O-Ring	1	36B	06174	Drip Shield (LP122A-3100)	3
10	01010-0100	Screw	4	37	04124	Support Disc (LP250-3100)	3
11	01011-0400	Spring Washer	5	39	07744-0100	Pressure Ring (LP122A-3100)	3
12	07109-0400	Oil Drain Plug	1	39	13026-0100	Pressure Ring (LP250-3100)	3
13	06015	O-Ring	1	40	07745	Sleeve (LP122A-3100)	6
14	07111	Bearing Cover	2	40	13027	Sleeve (LP250-3100)	6
15	07112	Crankshaft Seal	2	41	07746-0100	Support Ring (LP122A-3100)	3
16	07113	O-Ring	2	41	06702	Support Ring (LP250-3100)	3
17	07114-0100	HexScrew	8	42	06589	Plug, 1/8" BSP	3
20	07116	Taper Roller Bearing	2	42A	07204-0100	Steel Ring	3
20A	07117	Fitting Disc, 0.1mm	1-3	43	13343-3000	Valve Casing	1
20B	13001	Fitting Disc, 0.15mm	1-3	44	07748-0500	Valve Seat	6
20C	04091	Fitting Disc, 0.2 mm (May not be present)	1-3	44A	07150-0001	O-Ring	6
21	05376	Shaft Protector	1	45	07749-0500	Valve Plate	6
21A	05377	Shaft Guard Holder	1	46	07750	Valve Spring	6
22	13242	Crankshaft	1	46A	07751-0100	Valve Assembly Complete	6
23	13243	Key	1	47	07752	Spring Tension Cap	6
24	13340	Connecting Rod Assembly	3	48	06089	Plug	6
25	13341	Crosshead Plunger Base Assembly	3	48A	06577	O-Ring	6
28	13232	Crosshead Pin	3	49	07157	Stud Bolt	8
29A	07735	Centering Sleeve	3	49A	07158	Nut	8
29B	07736	Plunger Pipe (LP122A-3100)	3	49B	07159	Washer	8
29B	13022	Plunger Pipe (LP250-3100)	3	50	07423-0100	Plug	1
29C	07737-0100	Plunger Bolt	3	50A	07755-0100	Gasket	1
29D	07161A-0100	Gasket for Bolt	3	52	13020	Disk for Crankshaft	1
29E	06618	Spacer Pipe	3	53	04561	Hexagon Screw (LP122A-3100)	1
30	07779	Flinger	3	53	06607	Hexagon Screw (LP250-3100)	1
				54	13044-0100	Plug 1" BSP	1
				55	13322-0100	Plug, 1" BSP	1

LP122A-3100 & LP250-3100 Repair Kits

Plunger Packing Kit LP122A-3100 # 09575

<u>Item</u>	<u>Part#</u>	<u>Description</u>	<u>Qty.</u>
35A	06619	O-Ring	3
36	13415	Grooved Ring	3
36B	06174	Drip Shield	3
39	07744-0100	Pressure Ring	3
40	07745	Sleeve	6

LP250-3100 # 09739

<u>Item</u>	<u>Part#</u>	<u>Description</u>	<u>Qty.</u>
35A	06619	O-Ring	3
35B	13141-0001	O-Ring	3
36	13025	Grooved Ring	3
39	13026-0100	Pressure Ring	3
40	13027	Sleeve	6

Valve Assembly Kit #09136-0100

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
46A	07751-0100	Valve Assembly	6
48A	06577	O-Ring	6

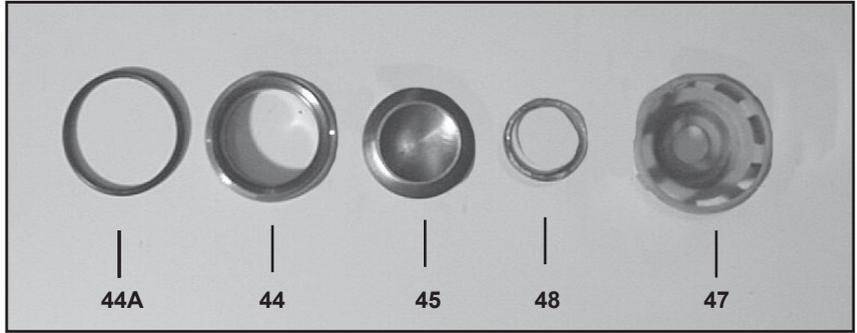
Oil Seal Kit # 09577

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

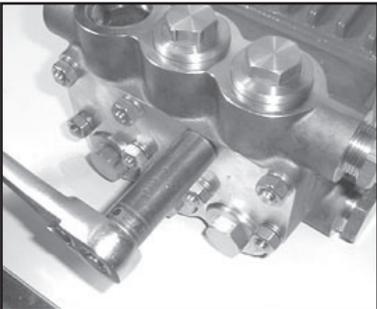
LP122A-3100 & LP250-3100 Repair Instructions



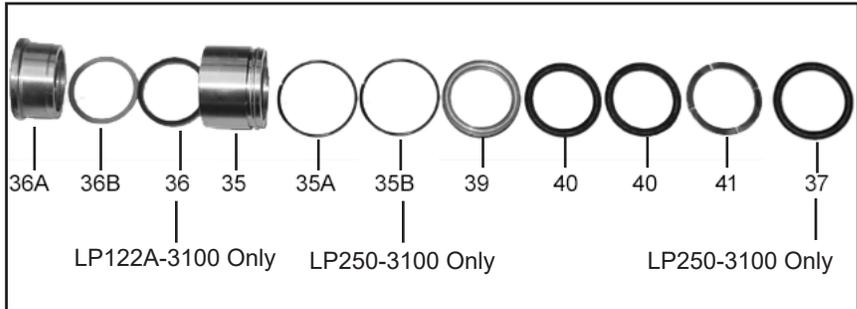
1. With a 30mm wrench, remove the six (6) plugs (48) from the valve casing (43). Inspect the o-rings (48A) and replace if necessary. With needle nose pliers, remove the complete valve assembly (46A).



2. To disassemble the valve assembly, insert a flat screwdriver between the valve plate (45) and valve seat (44) and gently twist. Examine all parts and replace if necessary. If the seat doesn't come out, use a valve puller to remove.



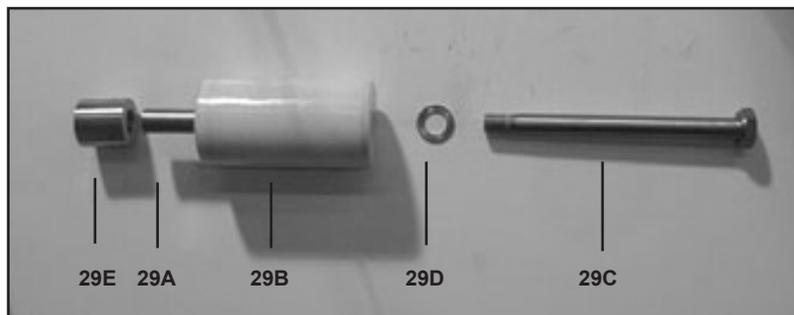
3. Remove the eight (8) hex nuts (49A) with a 19mm wrench. Tap the back of the manifold (43) with a rubber mallet to dislodge and slide off the studs.



4. Remove the seal sleeve (35) from the manifold (43) and/or crankcase (1). Remove the pressure rings (39 & 36A), drip shield for LP122A-3100 only (36B), v-sleeves (40 & 36), support ring (41) and o-rings (35A) from the manifold and seal sleeve, respectively. LP250-3100 pumps also have a support disc (37) and an O-ring (35B) for the seal sleeve. Examine seals carefully and replace if worn. Clean all parts.

LP122A-3100 & LP250-3100 - Repair Instructions

5. If there are signs of oil leaking through the plunger oil seals, then replacement is necessary. Remove the plunger pipe (29B) before inspecting oil seals. Disassemble the gear end and push out the seals from the back of the pump.



6. Inspect surface of plunger pipe (29B) carefully. Remove any chemical or mineral deposits taking care not to damage the surface of the plunger. If plunger pipe is worn, remove the plunger bolt (29C), plunger pipe (29B) and spacer (29E). Replace worn parts necessary. **Note: Always use a new copper gasket (29) when repairing the plunger assembly.**

To Dismantle Gear

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

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

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

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

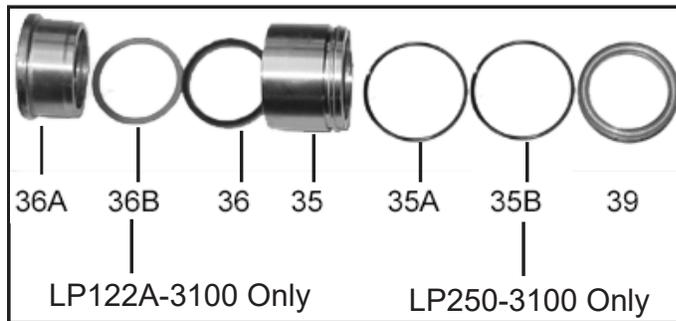
To Reassemble Gear

9. Using a soft tool, press in the outer bearing ring (20) until the outer edge lines up with the outer edge of the bearing hole.
10. Install bearing cover (14) together with shaft seal (15) and o-ring (16). Fit crankshaft (22) through bearing hole on the opposite side. Press in outer bearing (20) and tension it inwards with the bearing cover (14), 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, 20B, 20C) under the bearing cover.

Important! After assembly has been completed, the crankshaft should turn easily with very little clearance. Tighten connecting rod screws to 22.1 ft.-lbs. (30 Nm).

LP122A-3100 & LP250-3100 - Repair Instructions

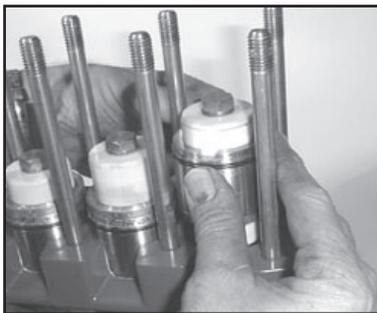
To Reassemble Fluid End



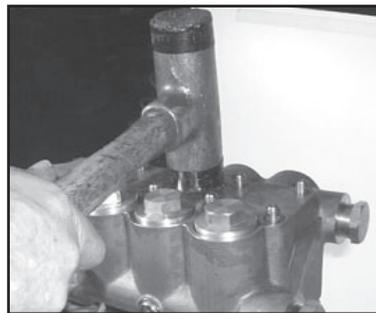
11. Lubricate seal (36). Place seal (36) and drip shield (36B for LP122A-3100 only), and pressure ring (36A) into the seal sleeve (35). Assemble the O-ring (35A) onto seal sleeve and lubricate. LP250-3100 has an additional O-ring (35B).



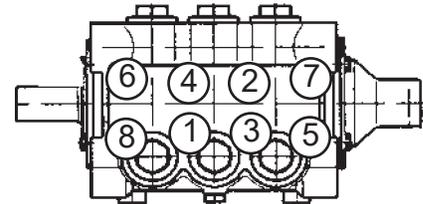
12. Place support ring (41) and v-sleeves (40) into valve casing. For LP250-3100, the support disc (37) is placed in the manifold (43) before the support ring.



13. Press seal sleeve assembly into the crankcase (1) and seat firmly.



14. Place entire manifold/seal sleeve assembly over the studs (49) and push firmly until seated against the crankcase.



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



16. Next, place valve assemblies (46A) into manifold after first lubricating the O-ring (44A). Seat firmly into manifold.



17. Replace plug with O-ring (48, & 48A) and tighten to 107 ft.-lbs. (145 Nm).

18. Fill crankcase with approximately 118 fluid ounces of Giant oil or equivalent SAE 80W/90 industrial gear oil and check oil level of the crankcase with the dipstick. Proper level is center of two lines. Reinstall your Giant LP pump into your system.

Contact Giant Industries for service school information.

Phone: (419) 531-4600

Pump System Malfunction Troubleshooting

<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 sure Drop	Worn packing Inlet restriction Accumulator pressure Unloader Cavitation	Replace packing Check system for stoppage, air Pres- leaks, correctly sized inlet plumbing to pump Recharge/Replace accumulator Check for proper operation Check inlet lines for restrictions and/or proper size
Pump Pressure as Rated, 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		
Seal Spare Parts (1 kit/pump) (see page 5 for kit list)					X	
Oil Seal Kit (1 kit/pump) (see page 5 for kit list)					X	
Valve Spare Parts (1 kit/pump) (see page 5 for kit list)						X

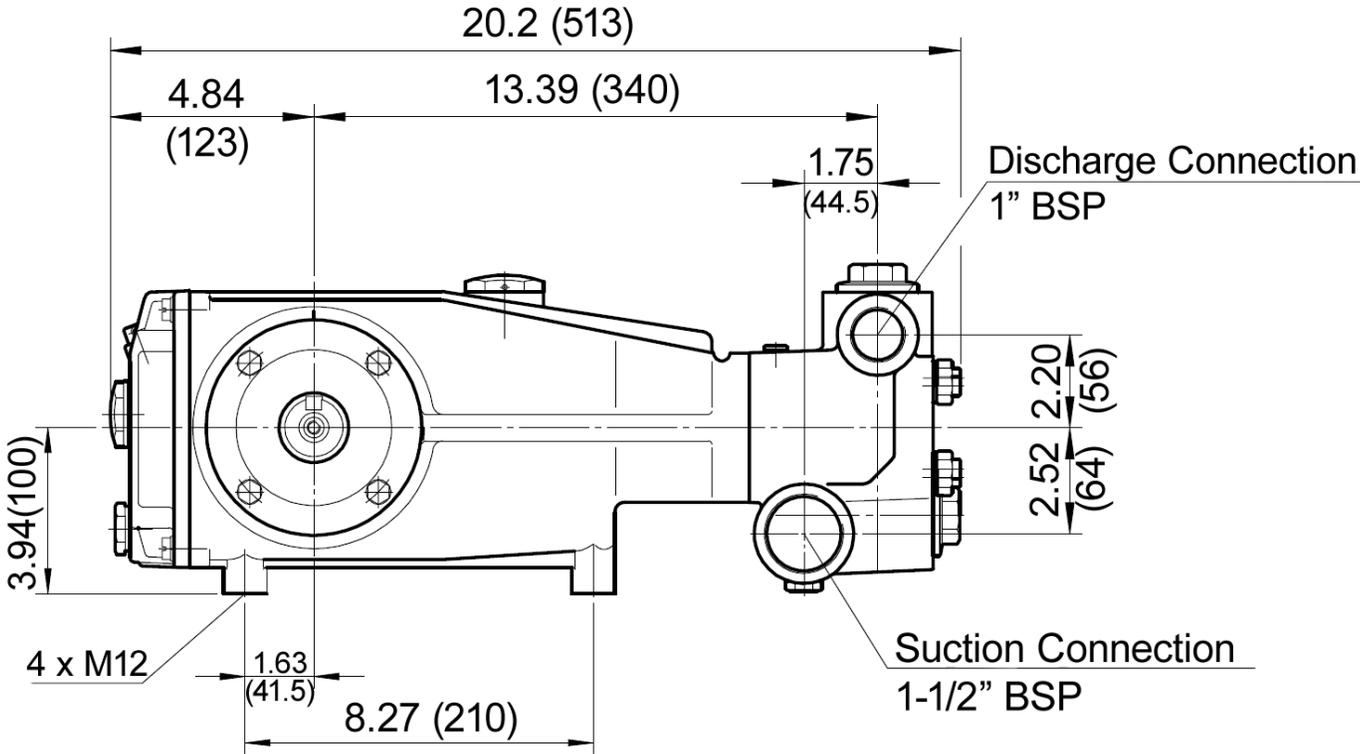
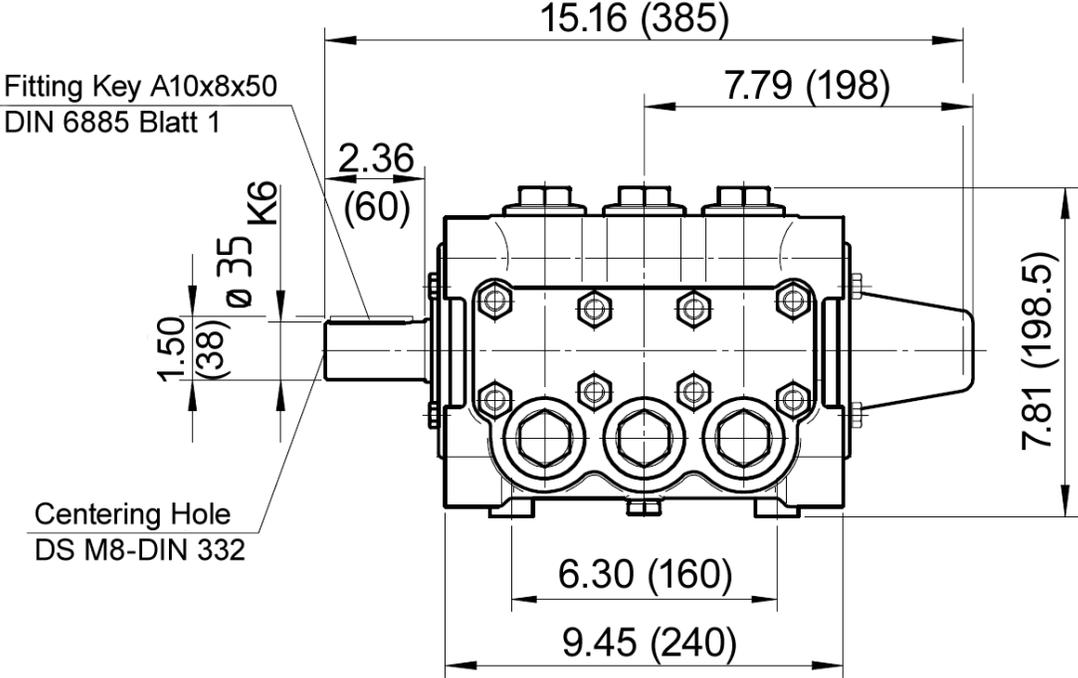
LP122A-3100 & LP250-3100 Torque Specifications

Position	Item #	Description	Lubrication Info	Torque Amount
1	07759	Crankcase	Molycote Cu-Paste	
6	05943	Oil Sight Glass w/Gasket	Loctite 572	29.5 ft.-lbs. (40 Nm)
10	01010-0100	Screw, Cover		18.5 ft.-lbs. (25 Nm)
12	07109-0400	Oil Drain Plug		29.5 ft.-lbs. (40 Nm)
17	07114-0100	Hex Screw, Bearing Cover		18.5 ft.-lbs. (25 Nm)
24	13277	Hex Screw, Connecting Rod		22.1 ft.-lbs. (30 Nm)
29C	07737-0100	Plunger Bolt	Loctite 243	25.8 ft.-lbs. (35 Nm)
31	07133	Radial Shaft Seal	Loctite 403	
44	07748-0500	Valve Seat	Hylomar	
48	06089	Plug, Valve	Loctite 243	107 ft.-lbs. (145 Nm)
49	07157	Stud Bolt	Loctite (270)	
49A	06577	Nut, Stud Bolt		59 ft.-lbs. (80 Nm)

Pump Mounting Selection Guide

<p>Bushings 06496 - 35mm 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"xW1.88"xH=3.00")</p>

LP122A-3100 & LP250-3100 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