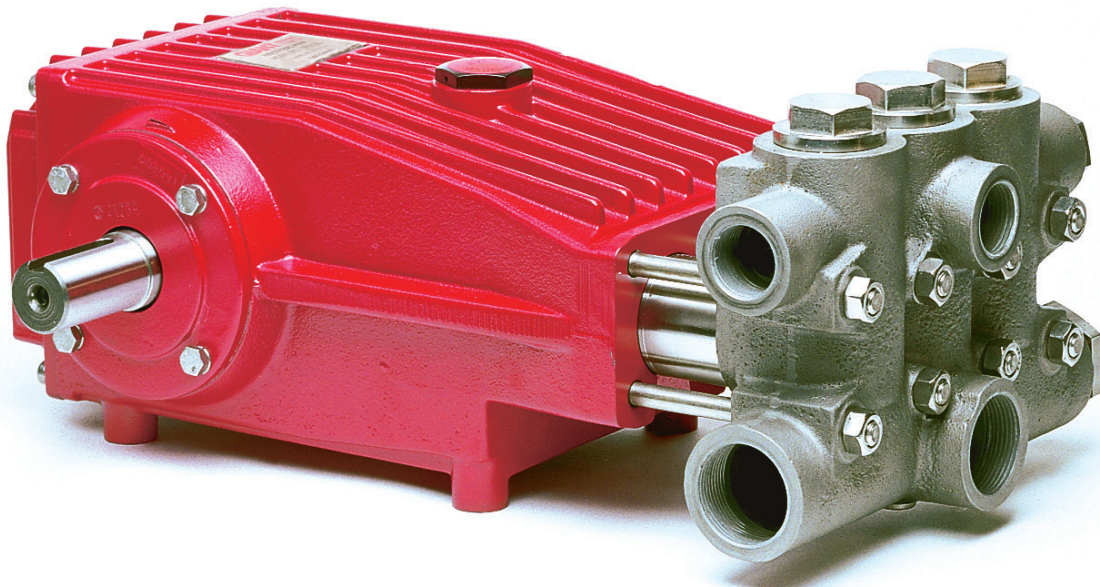


Triplex Ceramic
Plunger Pump
Operating Instructions/
Repair and Service
Manual

Models

LP121A-5100/LP200-5100/LP250-5100



GIANT
Performance Under Pressure

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updated 02/19

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

Model LP200-5100 Specifications

	<u>U.S</u>	<u>Metric</u>
Volume	19.1 GPM	72.2 LPM
Discharge Pressure	3000 PSI	200 Bar
Inlet Pressure	-4.35 to 87 PSI	-0.3 to 6.0 Bar
Speed		Up to 1000 RPM
Plunger Diameter	1.10"	28 mm
Stroke	1.65"	42 mm
Crankcase Oil Capacity	118 fl.oz	3.5 L
Temperature of Pumped Fluids @ 1000 RPM.....	140 °F	60 °C
Temperature of Pumped Fluids @ 500 RPM.....	160 °F	70 °C
Inlet Port		(3) x 1-1/2" BSP
Discharge Port		(3) x 1" BSP
Crankshaft Mounting		Either Side
Shaft Rotation.....		Top of Pulley Towards Fluid End
Weight	119 lbs.	54 kg
Crankshaft Diameter		35 mm

Model LP121A-5100 Specifications

	<u>U.S</u>	<u>Metric</u>
Volume	32.5 GPM	123.1 LPM
Discharge Pressure	1740 PSI	120 Bar
Inlet Pressure	-4.35 to 87 PSI	-0.3 to 6.0 Bar
Speed		Up to 1000 RPM
Plunger Diameter	1.42"	36 mm
Stroke	1.65"	42 mm
Crankcase Oil Capacity	118 fl.oz	3.5 L
Temperature of Pumped Fluids @ 1000 RPM.....	140 °F	60 °C
Temperature of Pumped Fluids @ 500 RPM.....	160 °F	70 °C
Inlet Port		(3) x 1-1/2" BSP
Discharge Port		(3) x 1" BSP
Crankshaft Mounting		Either Side
Shaft Rotation.....		Top of Pulley Towards Fluid End
Weight	119 lbs.	54 kg
Crankshaft Diameter		35 mm

LP200 HORSEPOWER REQUIREMENTS					
RPM	GPM	1000 PSI	1500 PSI	2000 PSI	3000 PSI
500	9.6	6.6	9.9	13.2	19.9
640	12.2	8.4	12.6	16.8	25.2
750	14.3	9.9	14.8	19.7	29.6
805	15.4	10.6	15.9	21.2	31.9
865	16.5	11.4	17.1	22.8	34.1
920	17.6	12.1	18.2	24.3	36.4
1000	19.1	13.2	19.8	26.3	39.5

LP121A HORSEPOWER REQUIREMENTS					
RPM	GPM	500 PSI	1000 PSI	1500 PSI	1740 PSI
500	16.3	5.6	11.2	16.9	19.6
640	20.8	7.2	14.4	21.5	25.0
750	24.4	8.4	16.8	25.2	29.3
805	26.2	9.0	18.1	27.1	31.4
865	28.1	9.7	19.4	29.1	33.7
920	29.9	10.3	20.6	30.9	35.9
1000	32.5	11.2	22.4	33.6	39.0

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.

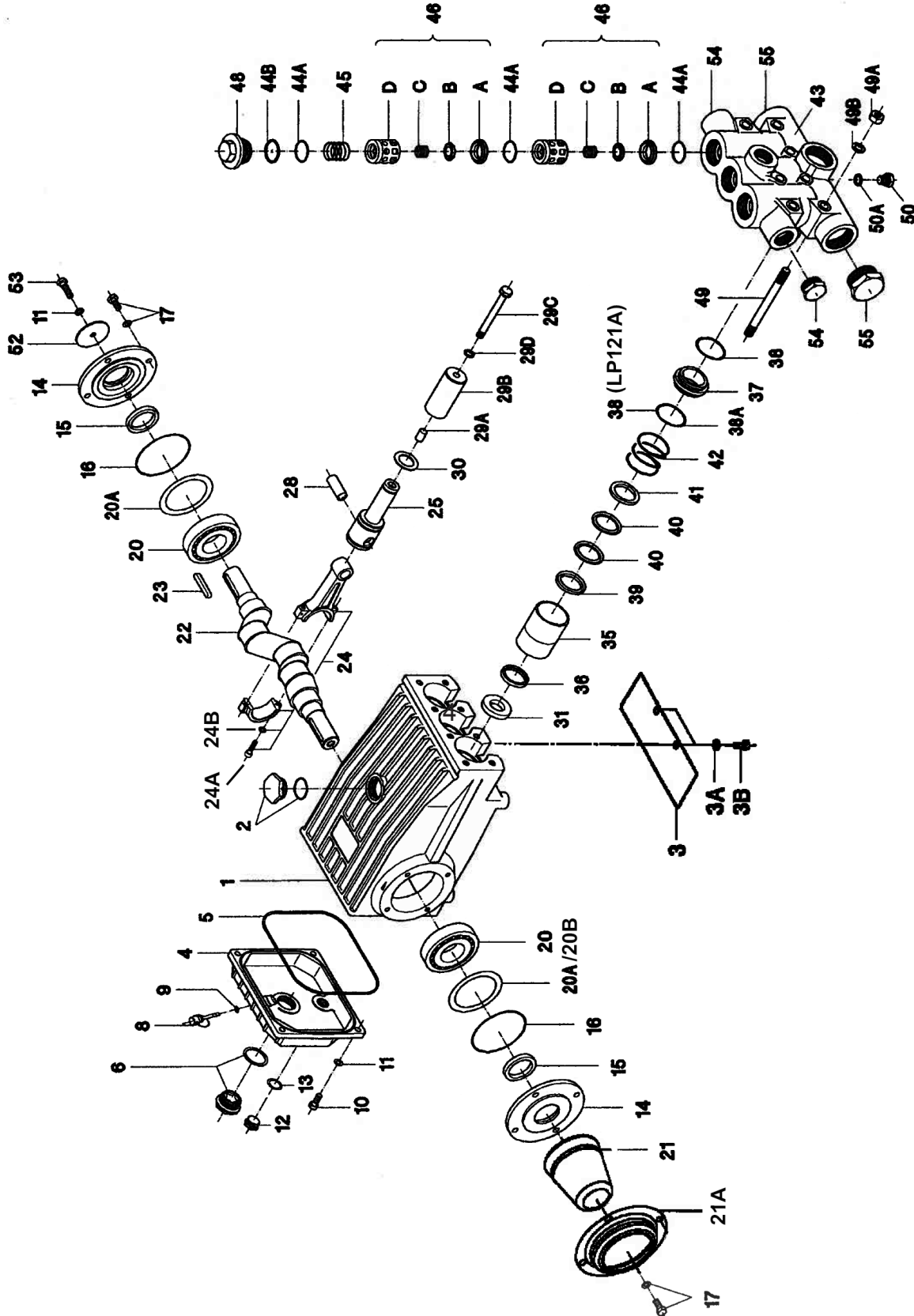
HORSEPOWER INFORMATION

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

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

Exploded View - LP121A-5100, LP200-5100, and LP250-5100

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)



LP121A-5100, LP200-5100, and LP250-5100 Parts List

ITEM	PART	DESCRIPTION	QTY	ITEM	PART	DESCRIPTION	QTY
1	07759	Crankcase	1	36	13228	Leakage Seal (LP200)	3
2	13000	Oil filler Plug Assembly	1	36	13360	Leakage Seal (LP250)	3
3	05940	Cover Plate	1	36	13291	Leakage Seal (LP121A)	3
3A	07223-0100	Spring Ring	2	37	07170-0100	Seal Case (LP200, LP250)	3
3B	05051-0100	Hexagon Screw	2	37	07139-0100	Seal Case (LP121A)	3
4	06085	Crankcase Cover	1	38	07140	O-Ring (LP200, LP250)	3
5	07104	O-ring, Crankcase Cover	1	38	07140	O-Ring (LP121A only)	6
6	05943	Oil Sight Glass Assembly	1	38A	12055	O-Ring (LP200, LP250)	3
8	06086	Oil Dipstick Assembly	1	39	13197-0100	Pressure Ring (LP200)	3
9	01009	O-Ring, Dipstick Assembly	1	39	13026-0100	Pressure Ring (LP250)	3
10	01010-0100	Cylinder Screw	4	39	07142-0100	Pressure Ring (LP121A)	3
11	01011-0400	Spring Ring	5	40	13115	V-Sleeve (LP200)	6
12	07109-0400	Plug, 1/2" BSP	1	40	13027	V-Sleeve (LP250)	6
13	06015	O-Ring	1	40	07144	V-Sleeve (LP121A)	6
14	07111	Bearing Cover	2	41	13198-0100	Support Ring (LP200)	3
15	07112	Radial Shaft Seal	2	41	13028-0100	Support Ring (LP250)	3
16	07113	O-Ring	2	41	07146-0100	Support Ring (LP121A)	3
17	07114-0100	Hexagon Screw	8	42	07173	Tension Spring (LP200, LP250)	3
20	07116	Taper Roller Bearing	2	42	07147	Tension Spring (LP121A)	3
20A	07117	Fitting Disc	1-3	43	13018-5000	Valve Casing	1
20B	13001	Fitting Disc	1-3	44A	07150	O-Ring	9
21	05376	Shaft Protector	1	44B	06266	Support Ring for O-Ring	3
21A	05377	Shaft Guard Holder	1	45	06078	Compression Spring	3
22	13242	Crankshaft	1	46A	07064-0100	Valve Seat	6
23	13243	Fitting Key	1	46B	07063-0100	Valve Plate	6
24	13340	Connecting Rod Assembly	3	46C	07062-0100	Valve Spring	6
24A	13227	Hex Screw	3	46D	07066	Spacer Pipe	6
24B	13278	Spring Washer	3	48	06077-0100	Plug	3
25	13341	Crosshead / Plunger Assembly	3	49	07157	Stud Bolt	8
28	13232	Crosshead Pin	3	49A	07158	Hexagon Nut	8
29A	07125	Centering Sleeve	3	49B	07159	Disc	8
29B	13220	Plunger Pipe (LP200)	3	50	07423-0100	Plug	1
29B	13022	Plunger Pipe (LP250)	3	50A	07755-0100	Steel Ring	1
29B	07130	Plunger Pipe (LP121A)	3	52	13020	Disc for Crankshaft	1
29C	07131-0100	Tension Screw	3	53	04561	Hexagon Screw	1
29D	07161A-0100	Steel Ring	3	54	13044-0100	Plug, 1" BSP*	2
30	07779	Drip Shield	3	55	13322-0100	Plug 1-1/2" BSP*	2
31	07133	Radial Shaft Seal	3				
35	13228-0100	Seal Sleeve (LP200)	3				
35	13024-0100	Seal Sleeve (LP250)	3				
35	07135-0100	Seal Sleeve (LP121A)	3				

*BSP to NPT Adapters/Seals (sold separately)
 Inlet = 13375-0100 (Adapter) / 13374-0100 (Seal)
 Discharge = 13373-0100 (Adapter) / 13372-0100 (Seal)

LP121A-5100, LP200-5100, and LP250-5100 REPAIR KITS

Plunger Packing Kits							
LP200-5100 - #9307				LP250-5100 - #9308			
Item	Part#	Description	Qty.	Item	Part#	Description	Qty.
36	13228	Leakage Seal	3	36	13360	Grooved Ring	3
38	07140	O-Ring	3	38	07140	O-Ring	3
38A	12055	O-Ring	3	38A	12055	O-Ring	3
40	13115	V-Sleeve	6	40	13027	V-Sleeve	6

LP121A-5100 - #09720			
Item	Part#	Description	Qty.
36	13291	Leakage Seal	3
38	07140	O-Ring	6
40	07144	V-Sleeve	6

Valve Kit - #09196-0100			
Item	Part#	Description	Qty.
44A	07150	O-Ring	9
44B	06266	Support Ring	3
46A	07064-0100	Valve Seat	6
46B	07063-0100	Valve Plate	6
46C	07062-0100	Valve Spring	6

Oil Seal Kit - #09577			
Item	Part#	Description	Qty.
31	07133	Oil Seal Kit	3

Specifications

Model LP250-5100

	<u>U.S.</u>	<u>Metric</u>
Volume	26.0 GPM	98.3 LPM
Discharge Pressure	2200 PSI	150 Bar
Inlet Pressure	-4.35 to 87 PSI	-0.3 to 6.0 Bar
Speed		1000 RPM
Plunger Diameter	1.26"	32 mm
Stroke	1.65"	42 mm
Crankcase Oil Capacity	118 fl.oz.	3.5 L
Temperature of Pumped Fluids	140 °F	60 °C
Inlet Port		3 x 1-1/2" BSP
Discharge Port		3 x 1" BSP
Crankshaft Mounting		Either Side
Shaft Rotation		Top of Pulley Towards Fluid End
Weight	119 lbs.	54 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.

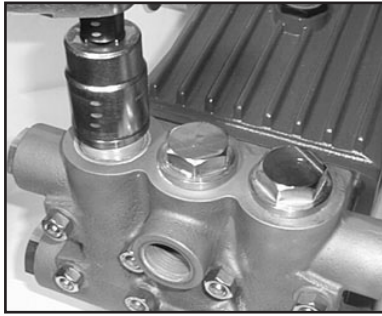
HORSEPOWER INFORMATION

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

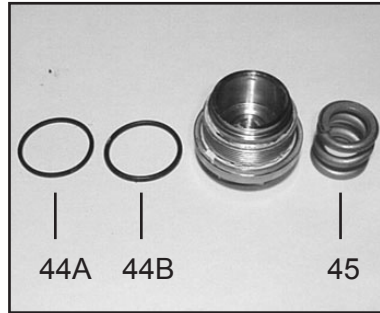
$$HP = (GPM \times PSI) / 1440$$

LP250 HORSEPOWER REQUIREMENTS					
RPM	GPM	1000 PSI	1500 PSI	2000 PSI	2200 PSI
500	13.0	9.0	13.5	18.0	19.8
640	16.6	11.5	17.3	23.1	25.4
750	19.5	13.5	20.3	27.1	29.8
805	20.9	14.5	21.8	29.0	31.9
865	22.5	15.6	23.4	31.2	34.3
920	23.9	16.6	24.9	33.2	36.5
1000	26.0	18.0	27.1	36.1	39.7

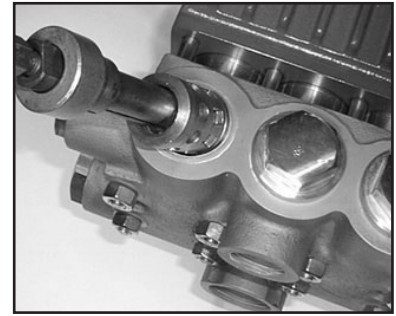
LP121A-5100, LP200-5100, and LP250-5100 - Repair Instructions



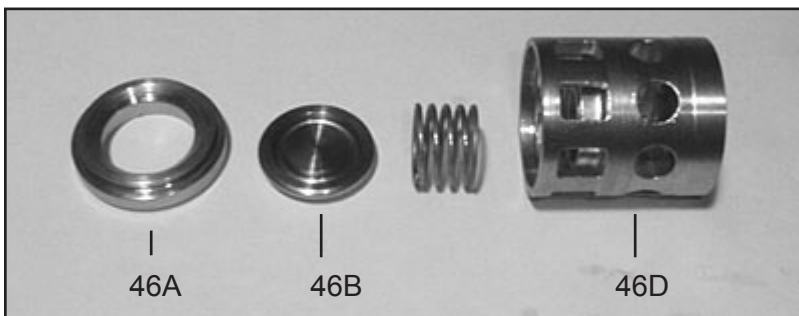
1. With a 30mm wrench, remove the 3 plugs (48).



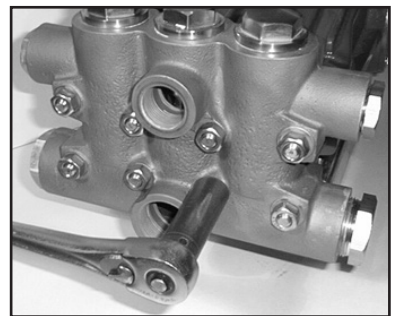
2. Remove the compression spring (45), O-rings and support rings (44A & 44B).



3. Remove the complete valve assembly (46A-46D) with valve pullers.



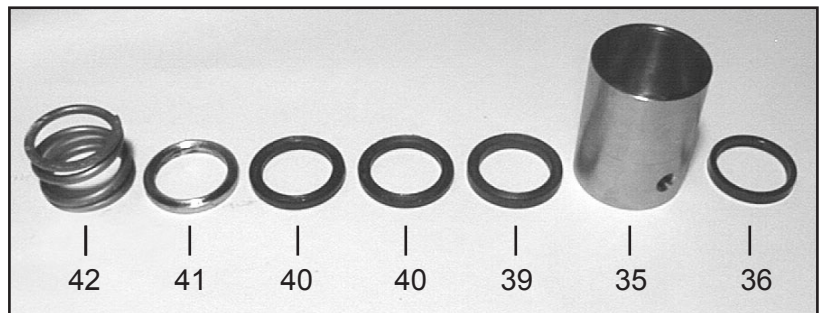
4. Loosen valve seats (46A) from spacer pipe (46D) by lightly hitting the valve plate (46B) with a plastic stick. Check sealing surface and replace worn parts. Reassemble with new O-rings (44A) and oil them before installing. Tighten up tension plugs (48) to 107 ft.-lbs. (145 NM).



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

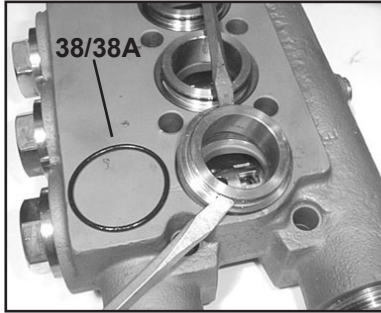


6. Pull seal sleeves (35) out of guides in crankcase (1).

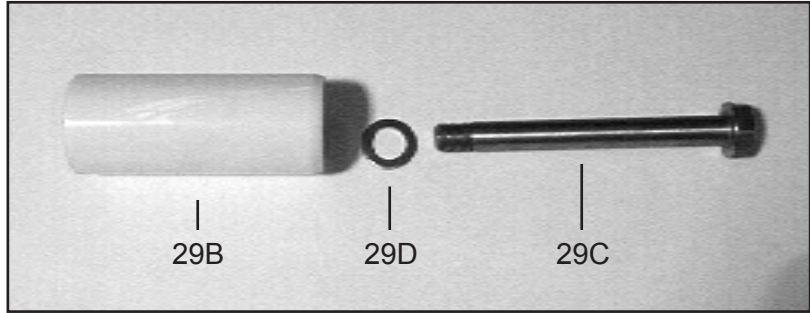


7. Remove the tension spring (42), support ring (41), v-sleeves (40), pressure ring (39), from the seal sleeve (35). Examine seals (36) carefully and replace if worn. Clean all parts.

LP121A-5100, LP200-5100, and LP250-5100 - Repair Instructions



8. Remove seal case (37) from valve casing (43) and inspect O-rings (38/38A).



9. Check plunger surface (29B). If plunger pipe is worn, loosen tension screws (29C) and pull off plunger pipe to the front. Clean front surface of plunger (25) thoroughly. Apply a thin coat of Loctite to the tension screw threads (29C). **Note: Care must be taken that no glue gets between the plunger pipe (29B) and the centering sleeve (29A).** Add new copper ring (29D).



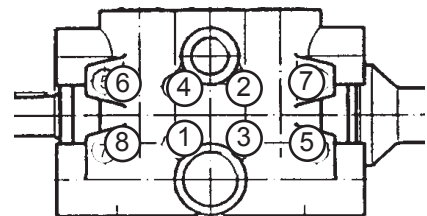
10. Place new plunger pipe (29B) carefully through the oiled seals and push seal sleeve (35) with plunger pipe into the crankcase guide. **Note: Make sure weep hole is facing down.**



11. Tighten the tension screws (29C) to 310 in.-lbs. (35NM). The plunger pipe (29B) should not be strained by over tightening of the tension screw (29C) or through damage to the front surface of the plunger; otherwise, it will probably break.



12. Place valve vasing (43) over studs and push firmly until seated against the crankcase (1). Tighten the hexagon nuts (49A) in a crosswise pattern (shown below) to 59 ft.-lbs. (80 NM)



LP121A-5100, LP200-5100, and LP250-5100 - Repair Instructions

To Dismantle Gear End

After removing valve casing (43) and plunger pipe (29B), drain oil. Remove crankcase cover (4) and bearing cover (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 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).

LP121A-5100, LP200-5100, and LP250-5100 Torque Specifications

Pos.	Item #	Description	Lubrication Info	Torque Amount
1	07759	Crankcase	Molycote Cu-Paste	
6	05943	Oil Sight Glass Assembly	Loctite 572	29 ft.-lbs. (40 Nm)
10	01010-0100	Cylinder Screw		221 in.-lbs. (25 Nm)
12	07109-0400	Plug		29 ft.-lbs. (40 Nm)
17	07114-0100	Hexagon Screw		221 in.-lbs. (25 Nm)
24A	13227	Hex Screw		22 ft.-lbs. (30 Nm)
29C	07131-0100	Tension Screw	Loctite 243	26 ft.-lbs. (35 Nm)
29D	07161A-0100	Steel Ring	Loctite 577	
31	07133	Radial Shaft Seal	Loctite 403	
48	06077-0100	Plug	Pro Pack 550	107 ft.-lbs. (145 Nm)
49A	07158	Hexagon Nut		59 ft.-lbs. (80 Nm)

Pump Mounting Selection Guide

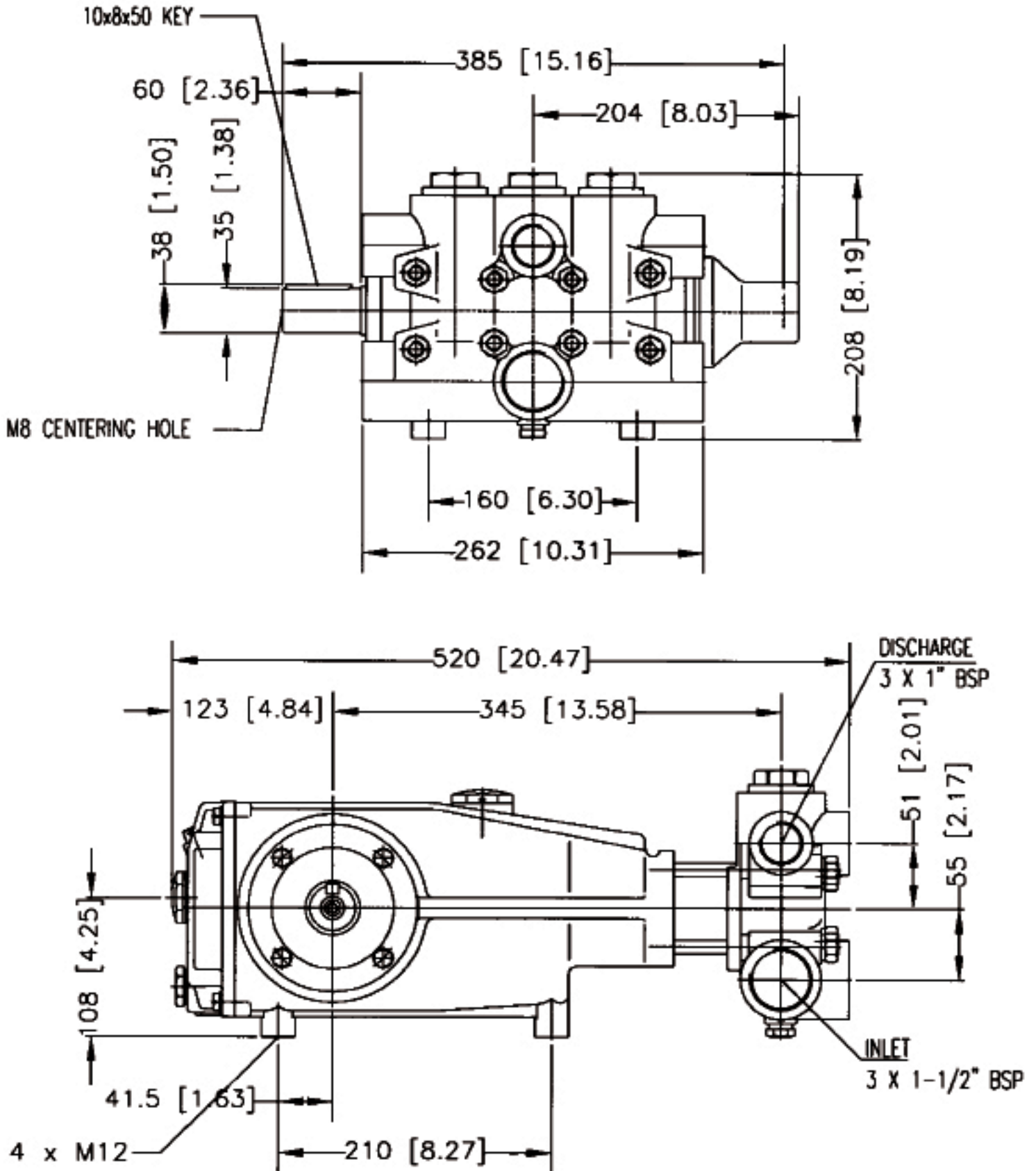
<p>Bushings 06496 - 35mm H Bushing</p>
<p>Pulley & Sheaves 07165 - 12.75" Cast Iron - 4 gr. - AB Section</p>
<p>Rails 07357 - Plated Steel Channel Rails (L=11.75" x W=1.88" x H=3.00")</p>

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 Quart) p/n 01153			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

LP121A-5100, LP200-5100, and LP250-5100 Dimensions - mm (in)



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 are guaranteed for the life of the pump. 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.



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