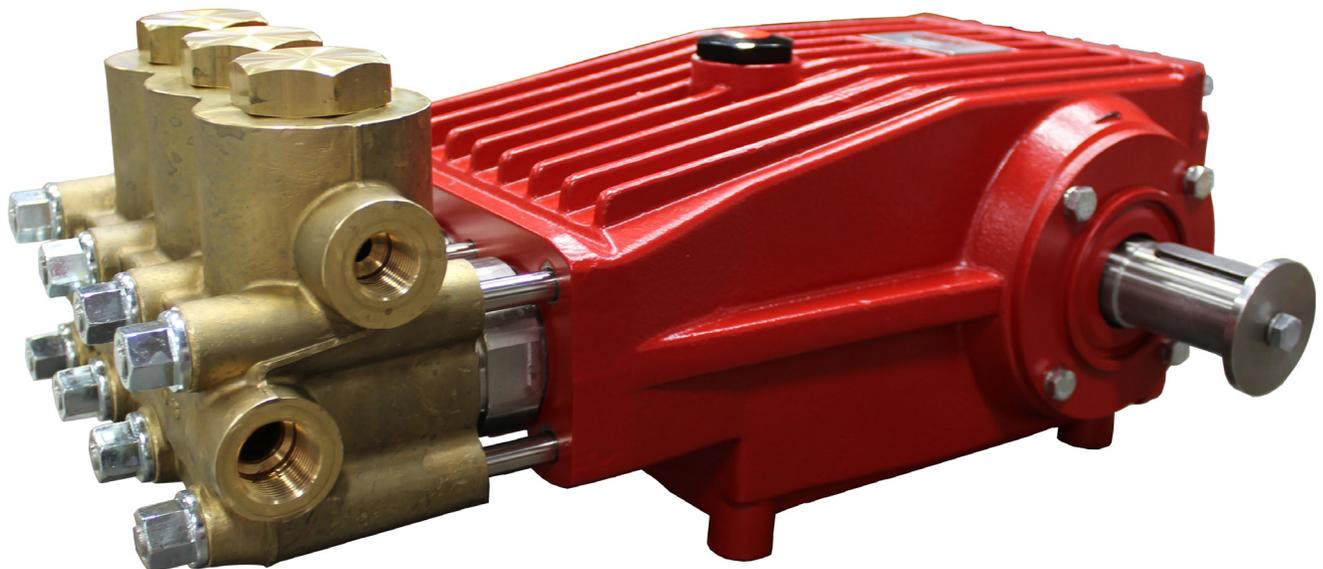


# Model LP650

---

Triplex Ceramic  
Plunger Pump  
Operating Instructions/  
Repair and Service  
Manual



---

**GIANT**  
Performance Under Pressure

Updated 09/21

**Contents:**

Installation Instructions:	page 2
Pump Specifications:	page 3
Exploded View:	page 4
Parts, Kits, Torque:	page 5
Repair Instructions:	page 6
Dimensions:	page 7
Warranty Information:	back page

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

Required NPSH refers to water: Specific weight 0.0624 lb/ft<sup>3</sup> (1kg/dm<sup>3</sup>), 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**

## SPECIFICATIONS MODEL LP650

	<u>U.S.</u>	<u>Metric</u>
Volume.....	10.6 GPM	40.0 L/min
Maximum Discharge Pressure .....	6000 PSI	400 Bar
Maximum Inlet Pressure.....	-4.35 to 87 PSI	-0.3 to 6 Bar
Power Consumption .....	42.2 BHP	31.5 kW
RPM.....	1080 RPM	1080 RPM
Plunger Diameter.....	0.79"	20 mm
Stroke .....	1.65"	42 mm
Crankcase Oil Capacity .....	101 fl. oz.	3 Liters
Temperature of Pumped Fluids .....	Up to 104 °F	40 °C
Inlet Port .....	2 x 3/4" BSP	
Discharge Ports .....	2 x 1/2" BSP	
Shaft Rotation.....	Top of Pulley Toward Manifold	
NPSHR.....	26.2 ft. of Head.	8 Meters of Water
Manifold Material .....	Forged Brass	

### 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.

<b>LP650 HORSEPOWER CHART</b>					
RPM	GPM	3000 PSI	4000 PSI	5000 PSI	6000 PSI
540	5.3	11.0	14.6	18.3	21.9
600	5.9	12.2	16.3	20.4	24.4
700	6.9	14.3	19.0	23.8	28.6
800	7.9	16.3	21.8	27.2	32.7
900	8.8	18.2	24.3	30.4	36.4
1080	10.6	21.9	29.2	36.6	43.9

### HORSEPOWER RATINGS:

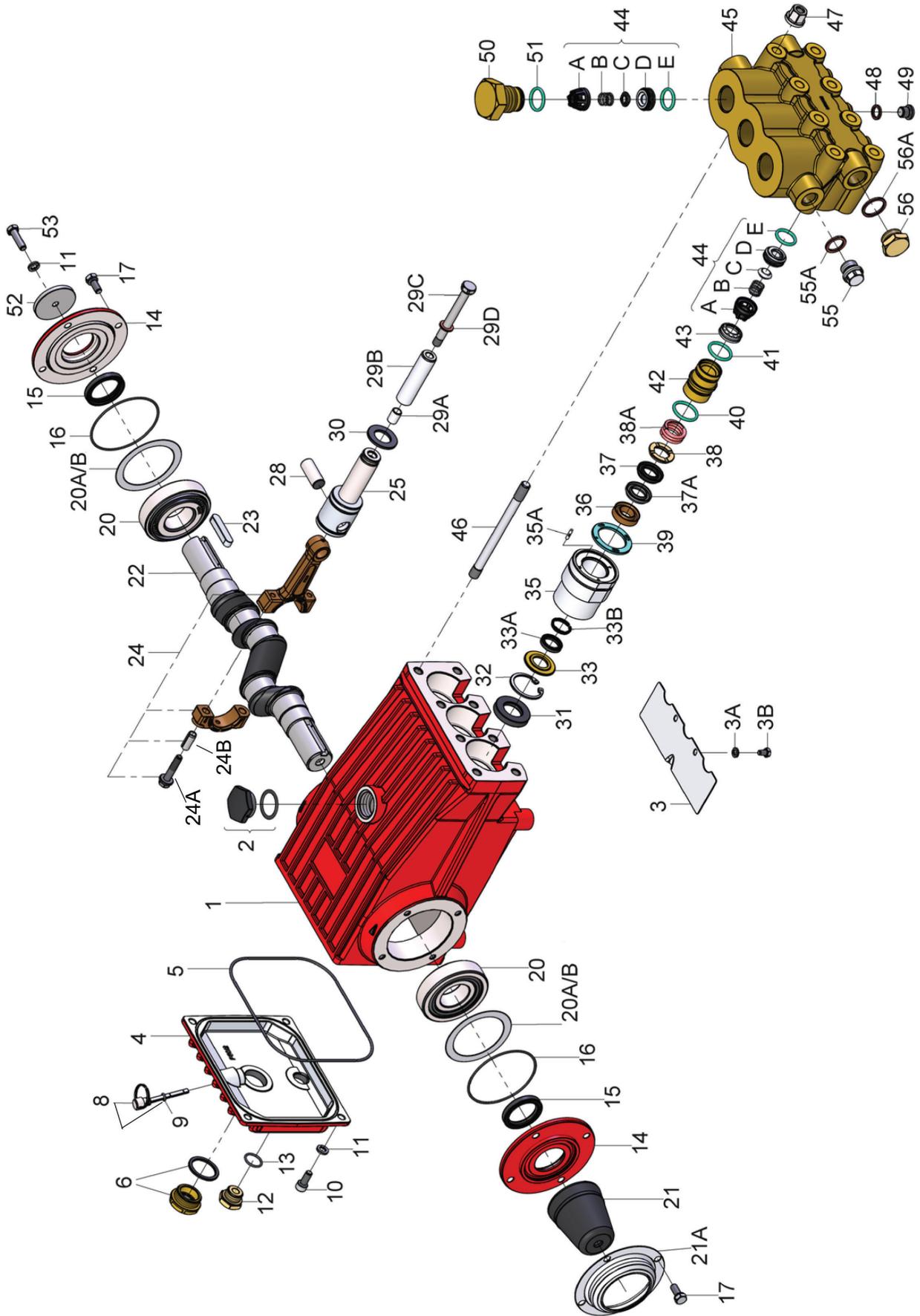
The rating shown are the power requirements for the pump. Gas engine power outputs must be approximately twice the pump power requirements shown above.

We recommend 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:

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

<b>TORQUE SPECIFICATIONS</b>				
Pos.	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		29 ft.-lbs (40 Nm)
17	07114	Hexagon Screw		221 in.-lbs. (25 Nm)
24	13340	Connecting Rod Assembly		22 ft.-lbs. (30 Nm)
29	06366	Plunger	Loctite 243	26 ft.-lbs. (35 Nm)
31	07133	Radial Shaft Seal	Loctite 403	
46	13429	Stud Bolt	Loctite 270	
47	13430	Hexagon Nut		59 ft.-lbs. (80 Nm)
50	04122	Plug		107 ft.-lbs. (145 Nm)

# LP650 EXPLODED VIEW



## LP650 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	32	06584	Clip Ring	3
2	13000	Oil Filler Plug Assembly	1	33	03281	Support Disc	3
3	05940	Cover Plate	1	33A	04615	Grooved Ring	3
3A	07223-0100	Spring Ring	2	33B	06240	Support Ring	3
3B	05051	Hexagon Screw	2	35	03282	Seal Sleeve	3
4	06085	Crankcase Cover	1	35A	22764	Lock Pin	3
5	07104	O-Ring	1	36	07268	Pressure Ring	3
6	05943	Oil Sight Glass Assembly	1	37	07322	Sleeve	3
8	06086	Oil Dipstick Assembly	1	37A	05963	Sleeve	3
9	01009	O-Ring	1	38	07270	Sleeve Support Ring	3
10	01010	Cylinder Screw	4	38A	13423	Spring	3
11	01011-0400	Spring Ring	5	39	13424	Leakage Seal	3
12	07109	Plug, 1/2" BSP	1	40	05523	O-Ring	3
13	06015	O-Ring	1	41	04118	O-Ring	3
14	07111	Bearing Cover	2	42	04146	Seal Case	3
15	07112	Radial Shaft Seal	2	43	13426	Valve Retainer	3
16	07113	O-Ring	2	44	04394	Valve Assembly (44A-44E)	6
17	07114	Hexagon Screw	8	44A	04395	Valve Retainer	6
20	07116	Taper Roller Bearing	2	44B	04396	Valve Spring	6
20A	07117	Fitting Disc	1-3	44C	04147	Valve Plate	6
20B	13001	Fitting Disc	1-3	44D	04121	Valve Seat	6
21	05376	Shaft Protector	1	44E	04123	O-Ring	6
21A	05377	Shaft Guard Mount	1	45	04560	Valve Casing	1
22	13242	Crankshaft	1	46	13429	Stud Bolt	8
23	13243	Fitting Key	1	47	13430	Hexagon Nut	8
24	13340	Connecting Rod Assembly	3	48	07161	Copper Washer	3
24A	13277	Hexagon Screw	6	49	07423	Plug, 1/4" BSP	3
24B	07122	Spring Washer	6	50	04122	Valve Plug	3
25	13341	Crosshead/Plunger Assembly	3	51	05972	O-Ring	3
28	13232	Crosshead Pin	3	52	13020	Disc for Crankshaft	1
29A	07125	Centering Sleeve	3	53	04561	Hexagon Screw	1
29B	07126	Plunger Pipe	3	55	13434	Plug, 1/2" BSP	1
29C	13031	Tensioning Screw	3	55A	06272	Copper Washer	1
29D	07755	Copper Ring	3	56	07703	Plug, 3/4" BSP	1
30	07779	Oil Scraper	3	56A	07704	Copper Washer	1
31	07133	Radial Shaft Seal	3				

## LP650 REPAIR KITS

### Plunger Packing Kit

#09837

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
33A	04615	Grooved Ring	3
33B	06240	Support Ring	3
36	07268	Pressure Ring	3
37	07322	Sleeve	3
38	07270	Sleeve Support Ring	3
39	13424	Leakage Seal	3

### Valve Assembly Kit

#09738

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
44	04394	Valve Assembly	6
51	05972	O-Ring	3

### Oil Seal Kit

#09577

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

## REPAIR INSTRUCTIONS - Model LP650

### VALVE REPLACEMENT

- 1) **Discharge Valves:** Screw out tension plugs (50). take the spring tension cap (44A) out of the exposed discharge valve with flat nose pliers. Remove the valve seat (44D), if necessary with an M12 screw (screwing it into the M12 thread).
  - 2) If the valve is extracted as a complete unit, position a screwdriver through the recess in the spring tension cap and press down on the valve plate to gently lever the valve apart.
  - 3) Check parts and replace if worn. Tighten plugs (50) at 107 ft.-lbs. (145 Nm).
  - 4) **Suction Valves:** Unscrew 8 nuts (47), remove valve casing (45) from seal sleeves (35). Using two screwdrivers, pry out seal case (42) from valve casing. Remove spring tension cap (44A) with flat nose pliers. Remove the valve seat (44D), if necessary with an M12 screw (screwing it into the M12 thread). Check parts, and replace if worn.
- NOTE:** The leakage seal (39) with its 3mm bores must be positioned on to the notched pins (35A) situated on the seal sleeve. Make sure the cutouts in the leakage seal are placed exactly over the bores of the seal sleeve (35) and that the drip return bores in the valve casing are also free, to ensure trouble-free drip return.
- 6) Secure valve casing by tightening nuts (47) evenly to 59 ft.-lbs. (80 Nm).

### SEAL AND PLUNGER REPLACEMENT

- 7) Unscrew the 8 x nuts (47), remove valve casing (45) by pulling it out to the front. Remove seal sleeves (35) from the crankcase (1) guides. Remove seal case (42), tension spring (38A) and seal parts (36-38) from seal sleeve. Check plunger surface (29B) and seals (37/37A) and remove pressure ring (36). Replace worn parts.
  - 8) After removing clipring (32) and support ring (33), check weep seal and support ring (33A/33B); replace if necessary.
  - 9) If the surface of the plunger is worn, remove tension screw (29C) and pull out the plunger (29B). Carefully clean front surface of crosshead with plunger base (25).
  - 10) Working from the pump drive side, carefully place the new plunger pipe (29B) through lubricated seals in the seal sleeve (35). Using a properly sized tool, hold the seal sleeve in place.
  - 11) Then insert seal sleeve (35) with plunger pipe (29B) into crankcase (1) guide. Turn crankshaft (22) until plunger with crosshead (25) pushes against plunger (29B). Use new copper gasket (29D) and lightly coat threads of tension screw (29C); attach to plunger base (25) and tighten to 26 ft.-lbs. (35 Nm).
- IMPORTANT!** Glue must never come between the plunger pipe (29B) and the centring sleeve (29A). Deformation of the plunger pipe due to eccentric tightening of the tension screw or dirt or damage on the front surface can cause the plunger pipe to fracture.
- IMPORTANT!** The leakage seal (39) with its  $\varnothing$ 3mm bores must be positioned onto the notched pins (35A) situated on the seal sleeve (35). Make sure the cut-outs in the leakage seal are placed exactly over the bores of the seal sleeve (35) and that the drip return bores in the valve casing (45) are also free to thus ensure trouble-free drip return.
- 12) Evenly tighten nuts (47) evenly at 59 ft.-lbs. (80 Nm) to fix the valve casing (45).

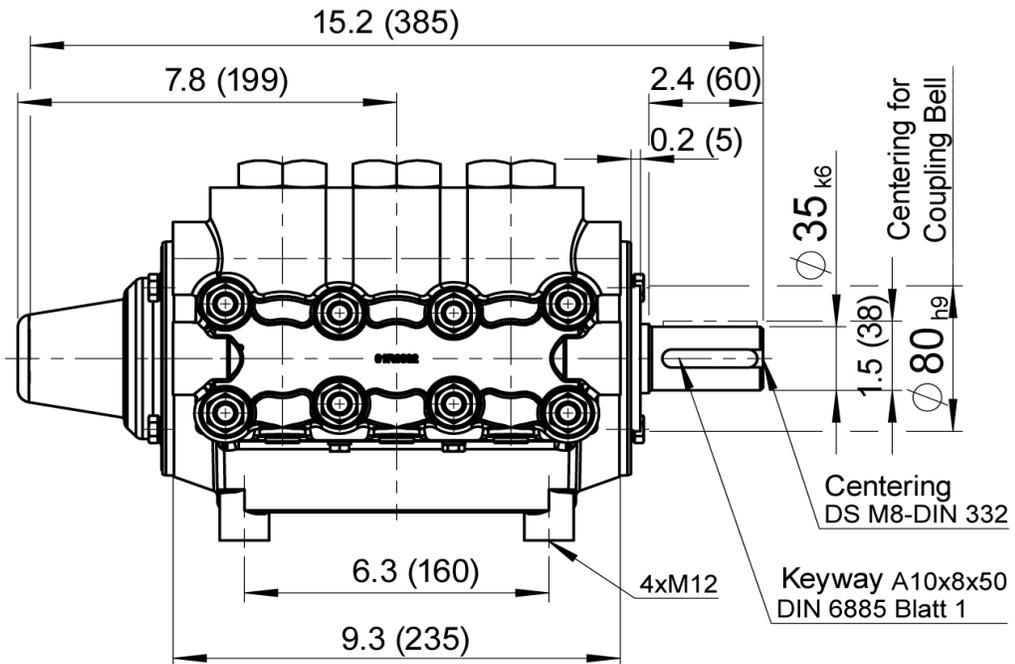
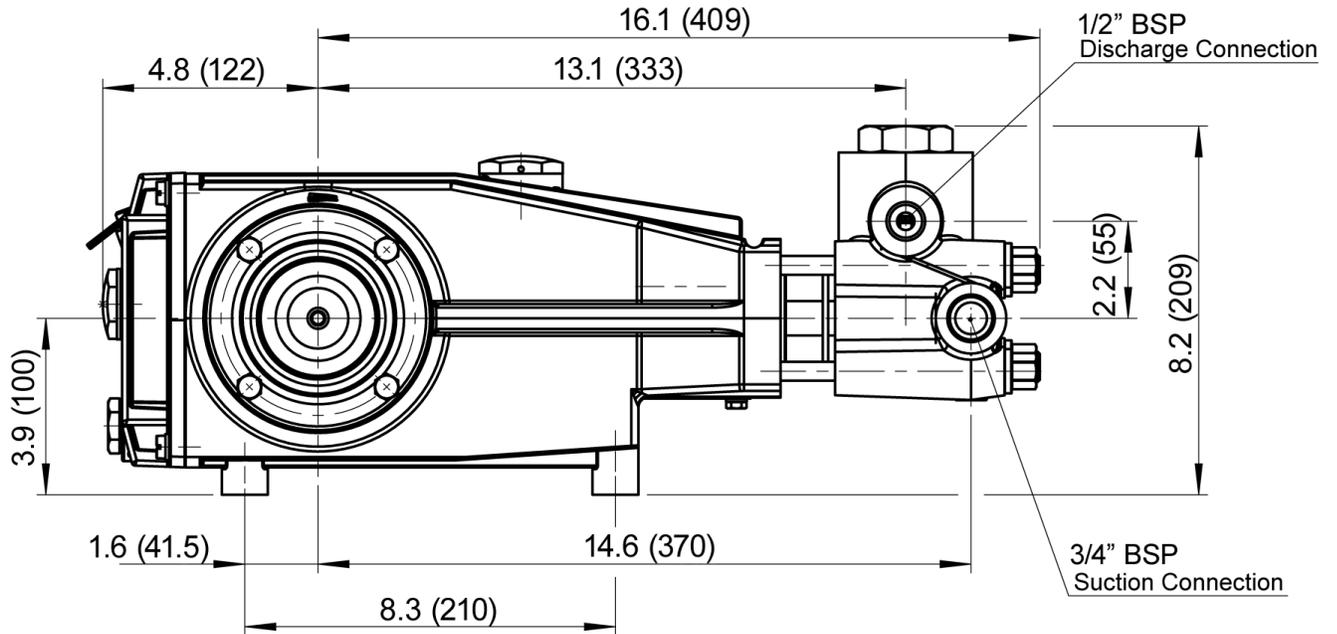
### DISASSEMBLY OF CRANKCASE

- 13) Remove valve casing (43) and plunger pipe (28B); drain oil.
  - 14) Remove gear cover (4) and bearing cover (14).
  - 15) Remove connecting rod screws (24A) and push the front of connecting rod forward as far as possible.
- IMPORTANT!** The connecting rods are marked for identification. Do not twist connecting rod halves. The connecting rods must be remounted on to the shaft journals in their exact original position.
- 16) Turning the crankshaft (22) slightly, carefully hit on side of crankshaft with a rubber mallet until crankshaft is loose.
- IMPORTANT!** Do not bend the connecting rod shanks. Check the crankshaft and connecting rod mounting surfaces as well as the shaft seal rings and roller bearings. Check crankshaft and bearing for damage, replace if needed.

### REASSEMBLY

- 17) Using a soft tool, press in the outer bearing ring (20) until the outer edge lines up with the outer edge of crankcase (1). Attach bearing cover (14) with shaft seal (15) and o-ring (16) in place. Fit crankshaft (22) through bearing hole on the opposite side. Press in bearing with bearing cover, keeping the shaft in a horizontal position and turning it slowly so that taper rollers touch the edge of outer bearing ring.
  - 18) Adjust axial bearing clearance to at least .004" (0.1mm) and maximum at .006" (0.15mm) by placing fitting discs (20A & 20B) under the bearing cover (14).
- IMPORTANT!** After assembly, the shaft should turn easily with very little clearance.
- 19) Bolt connecting rod (24) halves together making sure they are replaced in the same position from which they came from. Tighten connecting rod screws to 22 ft.-lbs. (30 Nm).

## Model LP650 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](http://www.P65Warnings.ca.gov)



**GIANT INDUSTRIES, INC.**, 900 N. Westwood Ave., Toledo, Ohio 43607  
PHONE (419) 531-4600 FAX (419) 531-6836 [www.giantpumps.com](http://www.giantpumps.com)  
© Copyright 2021 Giant Industries, Inc.