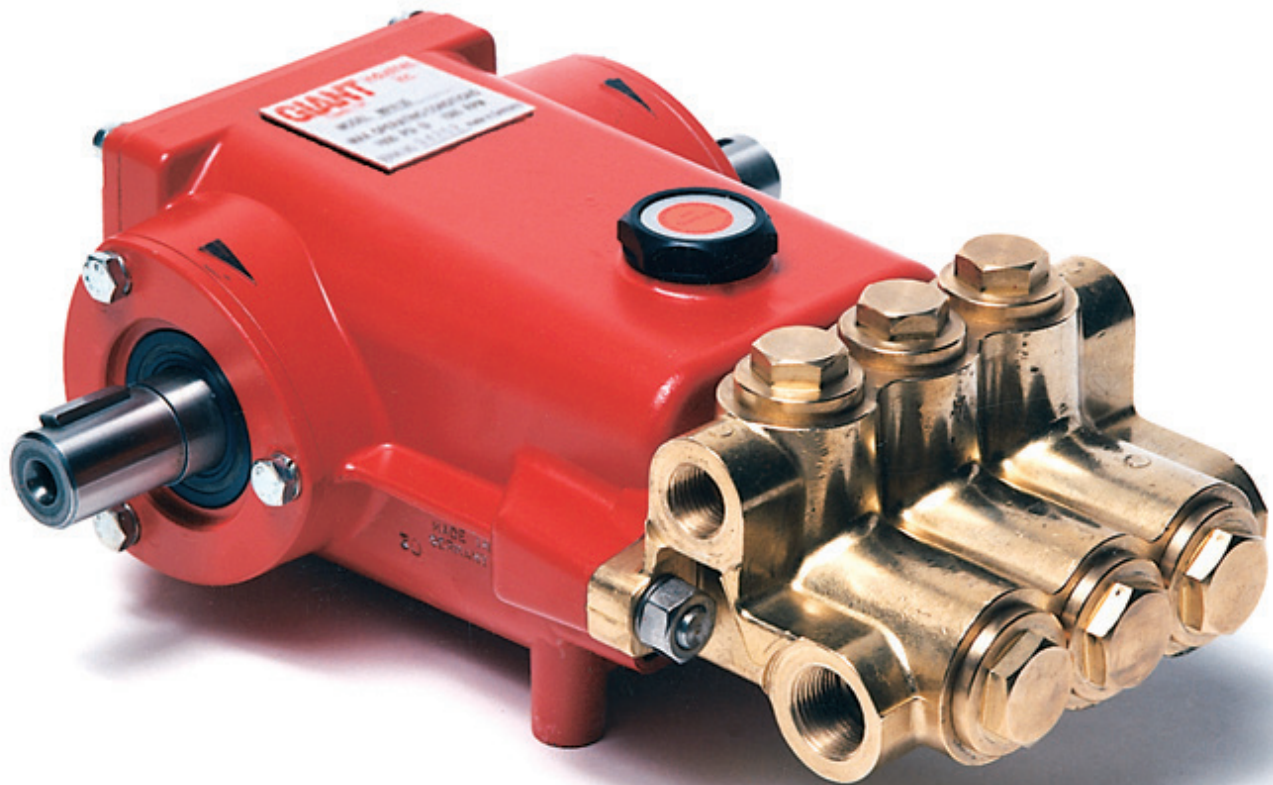


# Model BP100

Triplex Ceramic  
Plunger Pump  
Operating Instructions/  
Repair and Service  
Manual

## Bentonite Pump

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Updated 04/23

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# INSTALLATION INSTRUCTIONS

## Operation and Maintenance

Check oil level prior to starting and ensure trouble-free water supply. Oil: Use only 23.7 ounces (0.7 litres) of Giant oil (p/n 01154) ISO VG 220 (e.g. Aral Degol BG220) or SAE 90 gear oil.

Initial change after 50 operating hours and then every 1000 operating hours or after 1 year if used less.

**Caution!** When operating in damp places or with high temperature fluctuations. Should condensate (frothy oil) occur in the gear box, oil must be changed immediately.

**Maximum input pressure 145 PSI (10 bar).**

**Maximum suction head -4.35 PSI (-0.3 bar) (dependent on the viscosity of the medium).** Maximum input pressure 145 PSI (10 bar), maximum suction head -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 (17). The driven shaft side and coupling (or belt guard) should have a metal guard over all moving parts.

Before any maintenance to the pump takes place, the pressure in discharge line and in pump must be at zero. Close suction line. Disconnect fuses to ensure that the driving motor is not accidentally switched on.

Before starting the pump, make sure that all parts on the pressure side of the unit are vented and refilled (with pressure at zero).

In order to prevent air, or an air/water-mixture being absorbed and to prevent cavitation occurring, the pump-NPSHR, positive suction head and medium 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.**

The BP100 pump is suitable for pumping clean water as well as for water containing bentonite in a concentration of maximum 55 lbs. (25 kg) of bentonite diluted in 264 gallons (1 cubic meter) of water.

# Specifications

## Model BP100

	U.S.	(Metric)
Volume .....	5.9 GPM.....	(22.5 LPM)
Discharge Pressure .....	1885 PSI .....	(130 bar)
Maximum Crankshaft Speed .....		750 RPM
Power Required .....	8.0 HP .....	(6.0 kW)
Plunger Diameter .....	1.02" .....	(26mm)
Stroke .....	0.79" .....	(20mm)
Crankcase Oil Capacity .....	24 fl.oz. ....	(0.7 L)
Temperature of Pumped Fluids.....	194 °F .....	(90° C)
Inlet Ports.....		(2) 3/4" NPT
Discharge Ports .....		(2) 1/2" NPT
Crankshaft Mounting.....		Either Side
Shaft Rotation .....	Top of Pulley Towards Fluid End	
Weight.....	41.9 lbs. ....	(19 kg)

Consult the factory for special requirements that must be met if the pump is to operate beyond one or more of the limits specified above.

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

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

BP100 Horsepower Requirements					
RPM	GPM	500 PSI	1000 PSI	1500 PSI	1885 PSI
250	2.0	0.7	1.4	2.0	2.6
350	2.8	0.9	1.9	2.8	3.6
450	3.5	1.2	2.4	3.7	4.6
550	4.3	1.5	3.0	4.5	5.6
650	5.1	1.8	3.5	5.3	6.6
750	5.9	2.0	4.1	6.1	7.7

#### SPECIAL NOTE:

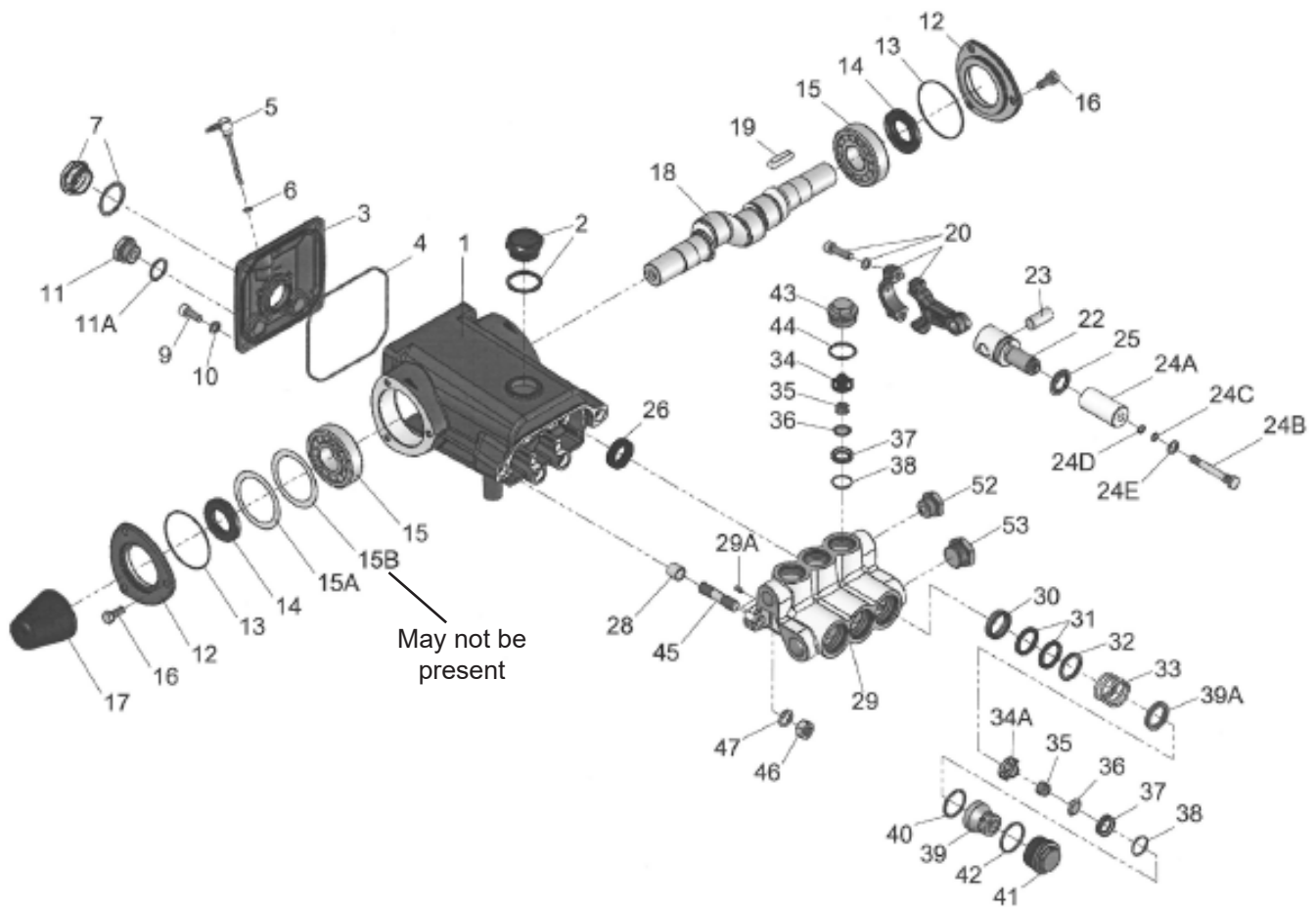
The theoretical gallons per revolution (gal/rev) is 0.0078667  
To find specific outputs at various RPM, use the formula:

$$GPM = 0.00787 \times RPM$$

## BP100 PARTS LIST

<u>ITEM</u>	<u>PART</u>	<u>DESCRIPTIONS</u>	<u>QTY</u>	<u>ITEM</u>	<u>PART</u>	<u>DESCRIPTIONS</u>	<u>QTY</u>
1	07294	Crankcase	1	24B	08399	Tension Screw	3
2	06968	Oil Filler Cap with Gasket	1	24C	07023	O-Ring, Bolt Assy. (Viton)	3
3	07297	Cover, Crankcase	3	24D	07203	Support Ring	3
4	07298	O-Ring, Crankcase Cover	1	24E	07258	Copper Seal Washer	3
5	07299	Oil Dipstick	1	25	05289	Flinger	3
6	01009	O-Ring, Dip Stick	1	26	07318	Radial Shaft Seal	3
7	07186	Oil Sight Glass Assembly	1	28	07319	Shim, Stud	2
9	01010	Screw, Crankcase Cover	4	29	07320	Manifold	1
10	01011-0400	Spring Washer, Cover Screw	4	29A	11502	Inner Hexagon Stud Bolt	2
11	07109	Oil Drain Plug	2	30	07335	Pressure Ring	3
11A	06015	O-Ring	2	31	11503	V-Sleeve	6
12	07302	Bearing Cover	2	32	07349	Support Ring	3
13	07303	O-Ring, Bearing Cover	2	33	07338	Pressure Spring	3
14	07459	Seal, Crankshaft	2	34	07325	Spring Retainer, Discharge	3
15	08388	Roller Bearing	2	34A	07326-0100	Spring Retainer, Inlet	3
15A	06962	Shim, 1.5mm	1-2	35	07312-0100	Valve Spring	6
16	07114	Screw & Washer, Bearing Cover	6	36	07327	Valve Plate	6
17	05312	Shaft Protector	1	37	06014	Valve Seat	6
18	07309	Crankshaft	1	38	06015	O-Ring, Valve Seat	6
19	13331	Fitting Key	1	39	07328	Valve Retainer, Inlet	3
20	07310	Connecting Rod Assy.	3	39A	07329	Spacer	3
20A	07311	Inner Hexagon Screw	3	40	12057	O-Ring, Inlet Valve Retainer	3
20B	07122	Spring Washer	3	41	07331	Plug, Inlet	3
22	07315	Crosshead with Plunger Base	3	42	07332	O-Ring, Inlet Plug	3
23	07314	Crosshead Pin	3	43	07213	Plug, Discharge	3
24	07360	Bolt Assembly		44	07214	O-Ring, Discharge Plug	3
		(Items 24B, 24C, 24D, 24E)	3	45	07333	Stud Bolt	4
24A	07346	Ceramic Plunger	3	46	07158	Hex Nut, Stud Bolt	4
				47	07159	Spring Washer, Stud Bolt	4

## BP100 EXPLODED VIEW



## BP100 REPAIR KITS

### Plunger Packing Repair - #09649

Item	Part #	Description	Qty.
31	11503	V-Sleeve	6
40	12057	O-Ring, Inlet Valve Retainer	3
42	07332	O-Ring, Inlet Plug	3

### Oil Seal Repair Kit - #09797

Item	Part #	Description	Qty.
26	07318	Radial Shaft Seal	3

### Inlet Valve Kit #09069

Item	Part #	Description	Qty.
34A	07326-0100	Inlet Spring Retainer	3
35	07312-0100	Valve Spring	6
36	07327	Valve Plate	3
37	06014	Valve Seat	3
38	06015	O-Ring, Valve Seat	3
40	12057	O-Ring, Inlet Valve Retainer	3
42	07332	O-Ring, Inlet Plug	3

### Discharge Valve Kit #09068

Item	Part #	Description	Qty.
34	07325	Discharge Spring Retainer	3
35	07312-0100	Valve Spring	3
36	07327	Valve Plate	3
37	06014	Valve Seat	3
38	06015	O-Ring, Valve Seat	3
44	07214	O-Ring, Discharge Plug (BP100)	3

Preventative Maintenance Check-List & Recommended Spare Parts List						
Check	Daily	Weekly	50hrs	Every 500hrs	Every 1500hrs	Every 3000hrs
Oil Level/Quality	X					
Oil Leaks	X					
Water Leaks	X					
Belts, Pulley		X				
Plumbing		X				
Recommended Spare Parts						
Oil Change p/n 1154			X	X		
Plunger Packing Kits (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

### Pump Mounting Selection Guide

<b>Bushings</b> <b>07175</b> - 28 mm Tapered H Bushing	<b>Rails</b> <b>07358</b> - Plated Steel Channel Rails (L=9.18" x W=1.88" x H=3.00")
<b>Pulley &amp; Sheaves</b> <b>01055</b> - 9.75" Cast Iron 2 gr. - AB Section <b>01062</b> - 7.75" Cast Iron - 2 gr. - AB Section	

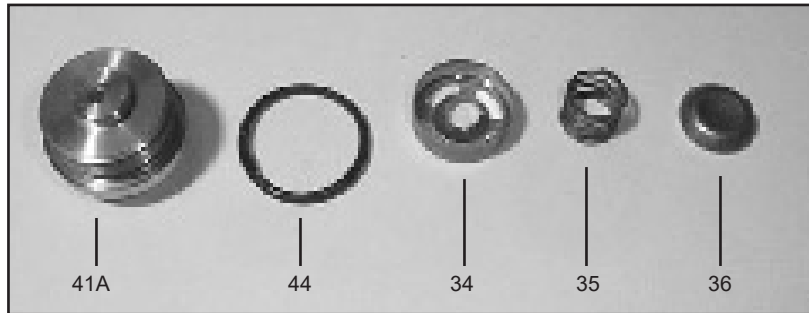
BP100 TORQUE SPECIFICATIONS				
Position	Part #	Description	Lubrication Info	Torque Amount
7	07186	Oil Sight Glass Assembly	Loctite 5910	106 in.-lbs. (12 Nm)
9	01010	Screw, Crankcase Cover		221 in.-lbs. (25 Nm)
11	07109	Oil Drain Plug		132 in.-lbs. (15 Nm)
16	07114	Screw Bearing Cover		
20A	07311	Inner Hexagon Screw		22 ft.-lbs. (30 Nm)
24B	08399	Tension Screw	Loctite 243	247 in.-lbs. (28 Nm)
26	07318	Radial Shaft Seal	Loctite 403	
41	07331	Plug, Inlet		51 ft.-lbs. (70 Nm)
43	07213	Plug, Discharge	Loctite 243	51 ft.-lbs. (70 Nm)
45	07333	Stud Bolt	Loctite 270	
46	07158	Nut, Stud Bolt		200 in.-lbs. (22.5 Nm)



## REPAIR INSTRUCTIONS - BP100 PUMP



1. With a 22mm socket, remove the three discharge (43) and three inlet (41) manifold plugs.



2. Check o-ring (44) for wear and replace as necessary. Remove the discharge spring retainer (34), valve spring (35), and valve plate (36).



3. Use a small slide hammer to remove valve seats (37) from manifold (29). Inspect valve plate (36) and valve seats (37) for wear. If excessive pitting is seen, replace the worn parts. Check valve seat o-ring (38) for wear and replace as necessary.



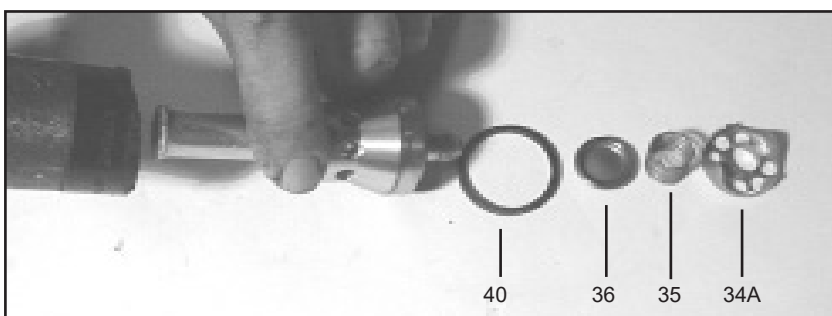
4. Drain the oil from the pump. Turn the pump over to remove the four manifold stud nuts (46) with a 19mm wrench.
5. Tap the back of the valve



casing (29) with a rubber mallet.



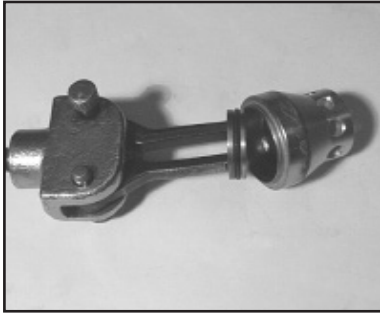
6. Remove the inlet valve retainer assembly (34A-39)



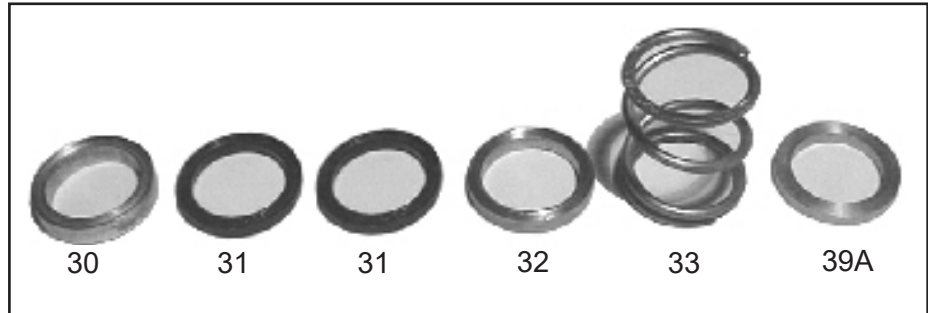
7. Remove the o-ring, (40), valve plate (36), valve spring (35), spring retainer (34A). Check valve retainer o-ring (40) for wear.
- 7A. Reassemble valve assemblies and install into manifold (29). Tighten plugs to 52 ft.-lbs. (70 Nm).

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

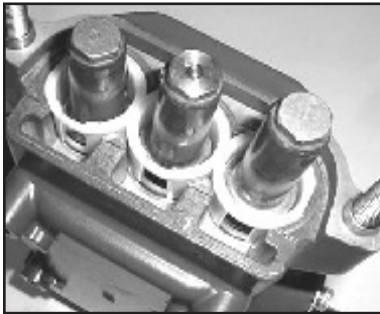
## REPAIR INSTRUCTIONS - BP100 PUMP



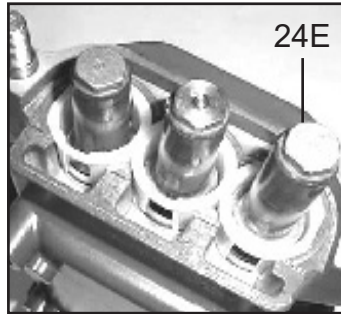
8. With a valve puller remove the valve seat (37) and o-ring (38). If excessive pitting is seen, replace the worn parts. Check valve seat o-ring (38) for wear and replace as necessary.



9. Remove the spacer (39A), pressure spring (33), support ring (32), v-sleeves (31), and pressure ring (30), from the manifold (29) and check for wear.



10. Inspect ceramic plunger (24A) tips for wear. If necessary, replacement of the ceramic plungers may be accomplished by removing the plunger bolt assemblies (24) with a 13mm wrench. Ceramic plungers should now slide off the stainless steel plunger base (22). Excessive resistance to plunger removal may be overcome by heating the stainless steel plunger base. This will melt any excess loc-tite beneath the ceramic plunger allowing easy removal.



11. Replace copper ring (24E) onto plunger bolt (24B). Slide plunger bolt assembly (24) into ceramic plunger (24A). Apply a light film of loc-tite to plunger bolt threads and place plunger assembly onto stainless steel plunger base (22) and tighten to 310 in.-lbs. (35 Nm).

12. To replace plunger oil seals (26), proceed to "Gear End Disassembly" section below. Otherwise, continue as described below.



13. Before replacing pump manifold (29), first rotate crankshaft (18) until two outside plungers (24A) extend evenly forward. Lubricate ceramic plungers with a light film of oil. Carefully and evenly slide manifold over plungers and press manifold firmly against crankcase (1). Replace manifold stud bolts (45), washers (47) and nut (46) and tighten to 59 ft.-lbs. (80 Nm).

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



## REPAIR INSTRUCTIONS - BP100 PUMP

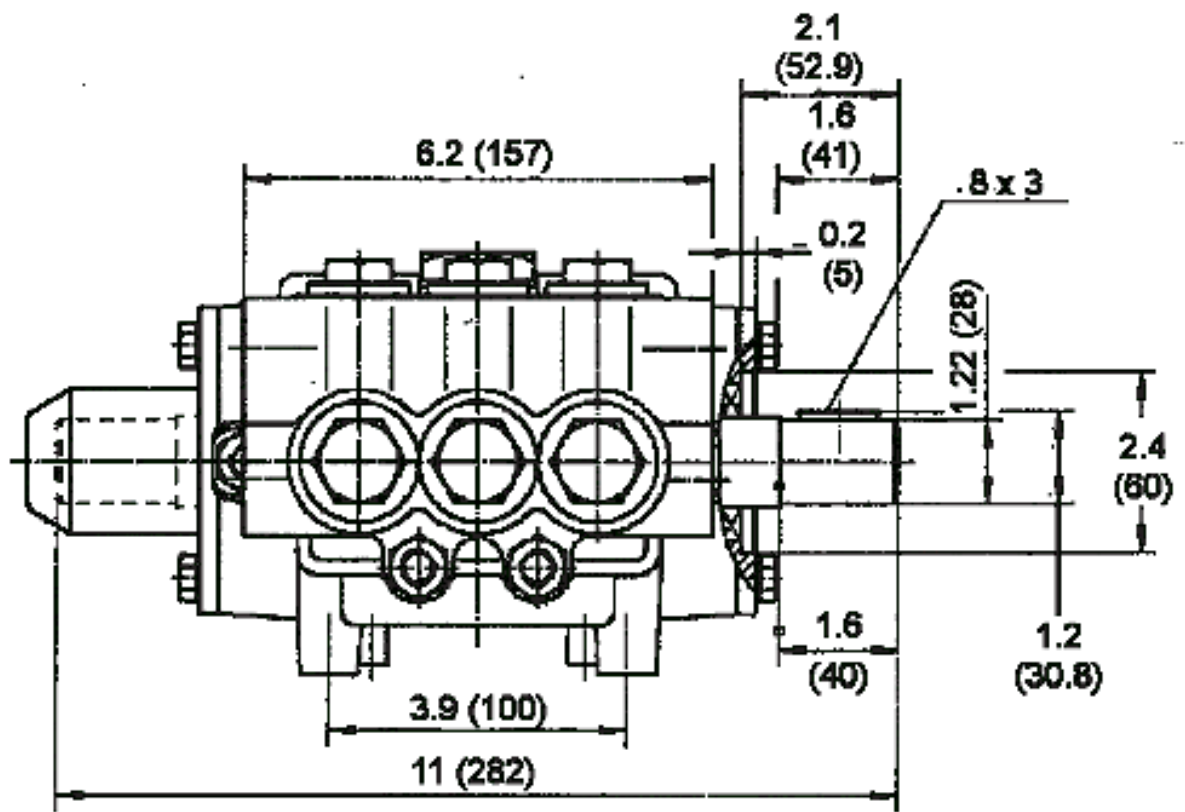
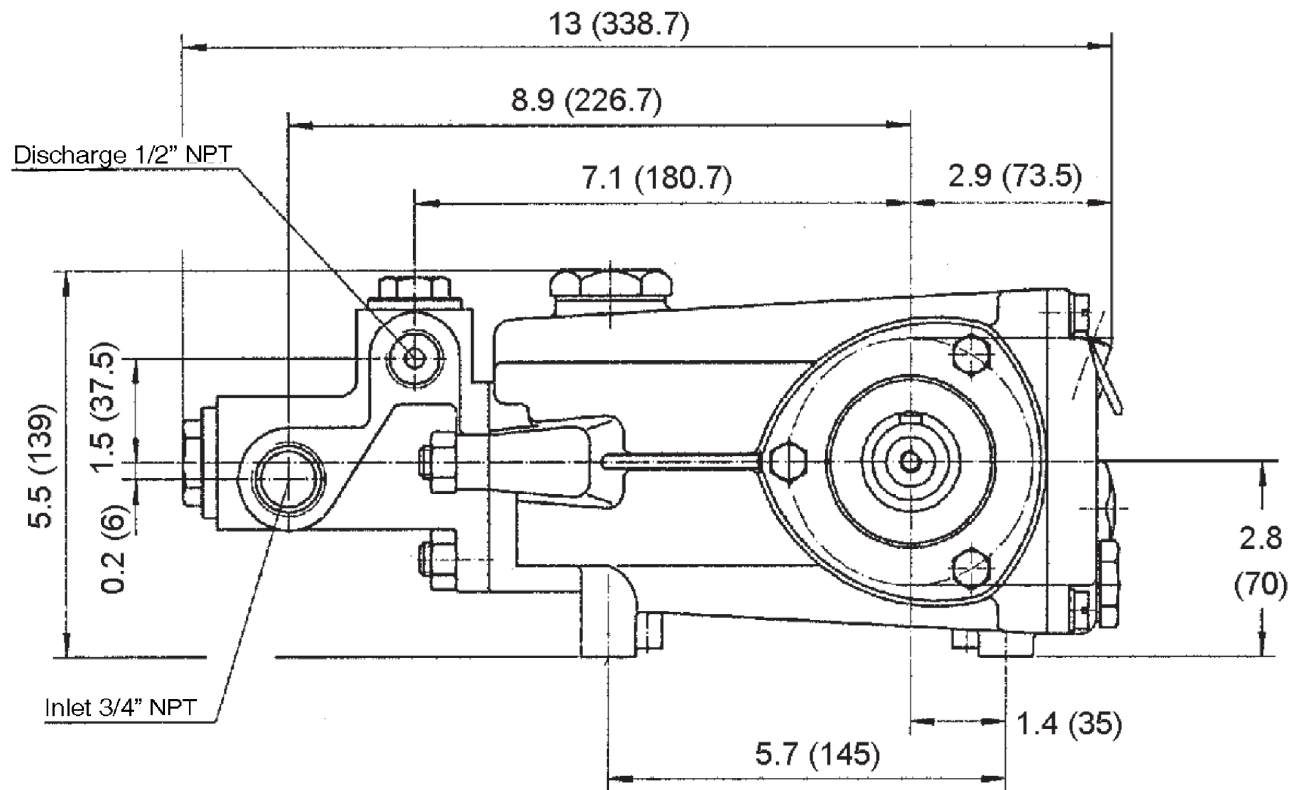
### Gear End Disassembly

14. Remove the crankcase cover screws (9). Inspect the crankcase cover o-ring (4) for wear. Replace if necessary.
15. Inspect the dipstick (5) vent hole for signs of clogging. Clean if necessary.
16. To remove the crankshaft (18), first remove the bearing cover plates (12). Remove the key (19).
17. With a 5 mm allen wrench remove the connecting rod screws (20A) and rear portion of connecting rod assemblies (20). Push the connecting rod (20) and plunger rod (22) down as far as possible into the crankcase housing.
18. Hold the pump rear assembly with a wooden fixture, or other suitable device, in order to secure it while removing the crankshaft (18). Using a plastic mallet, tap the crankshaft from one side while turning it from the other side. The turning insures that during this sequence the crankshaft does not become wedged against the front portion of the connecting rods (20). The far side bearing (15) will remain in the crankcase (1). When free, the crankshaft can be removed by hand. The opposite side crankshaft seal (14) will be removed by this procedure. **It is important that you turn the crankshaft (18) constantly while tapping from the opposite end to avoid any binding. The crankshaft bearing (15) remains on the crankshaft as it is removed.** If necessary, use a bearing puller to remove the crankshaft bearing (15).
19. Remove the front portion of the connecting rods (20) and plunger base assembly (22) from the rear of the pump by pulling straight out of the crankcase crosshead guides. **Notice that the connecting rod (20) halves are numbered or colored. Connecting rods must be positioned with their numbers or colors on the upper left-hand side, in the same numerical sequence as when they were removed.**
20. Using a dowel and a rubber mallet, tap the oil seals (26) out from the rear of crankcase (1). The area onto which the oil seal rests should be clean and dry. Put a small drop of loc-tite on the oil seals and place into crankcase with lips facing the rear of the pump.
21. To remove the crosshead pin (23) from the crosshead (22), the assembly should be positioned on a wooden fixture to avoid damage to crosshead. Drive out the pin on opposite side of mark located on the crosshead. On those pumps without mark on crosshead, drive out pin by tapping on tapered side of pin.
22. To remove the bearing (15) remaining in the crankcase (1), insert small end of Giant bearing tool and tap with a rubber mallet until bearing and seal (14) are completely removed. **The bearing can only be removed from the inside by inserting the Giant Bearing Tool through the opposite side of the crankcase.** The crosshead guide in the crankcase should be inspected for possible damage.

## REASSEMBLY INSTRUCTIONS - BP100 PUMP

23. To reassemble, place the far bearing (15) in the crankcase (1) bearing housing and with the Giant Bearing tool as a driver, tap into the crankcase using a rubber mallet.
24. Insert the far side crankshaft oil seal (14) with the Giant Bearing Tool making sure it is firmly seated and well oiled. Always make sure that the crankshaft seal lip does not show signs of wear and that the garter spring is firmly in place on the seal before reinserting into the pump. Replace the bearing cover (12) and o-ring (13) and tighten securely.
25. Replace the front portion of the connecting rod (20) and plunger rod/ crosshead assembly (22) by press-fitting the crosshead pin (23). Make sure to insert the beveled edge of the crosshead pin into crosshead. If the crosshead has a mark, install pin from marked side. **The crosshead pin (23) should not extend beyond either side of the crosshead (22) in order to prevent damage to the crosshead bore of the crankcase (1).**
26. Place each crosshead/ plunger assembly into the pump making sure that all of the parts are well oiled before insertion into the crankcase (1). **Notice that the connecting rod (20) halves are numbered or colored. Connecting rods must be positioned with their numbers or colors on the upper left-hand side, in the same numerical sequence as when they were removed.**
27. Replace near side bearing (15) on crankshaft by using the Giant Bearing Tool and mallet to tap into place. Take the crankshaft (18) end with the bearing (15) and insert the other end through the bearing housing and tap with a rubber mallet until the bearing is seated.
28. When reassembling the connecting rods (20), note that the connecting rod halves are numbered or colored and that the numbers or colors must be matched and aligned. Torque the connecting rod bolts to 310 in.-lbs.
29. Insert the near side crankshaft oil seal (14) with the Giant Bearing Tool making sure it is firmly seated and well oiled. Replace the bearing cover (12) and o-ring (13) and tighten securely.  
  
**See instructions above for re-installing fluid end onto the gear end.**
30. Fill the BP100 crankcase (1) with 23.7 oz. (0.7 liters) of Giant Industries' oil and check the oil level with the dipstick (5). Proper level is center of two lines. Reinstall the pump into your system.

## BP100 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**  
Performance Under Pressure

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