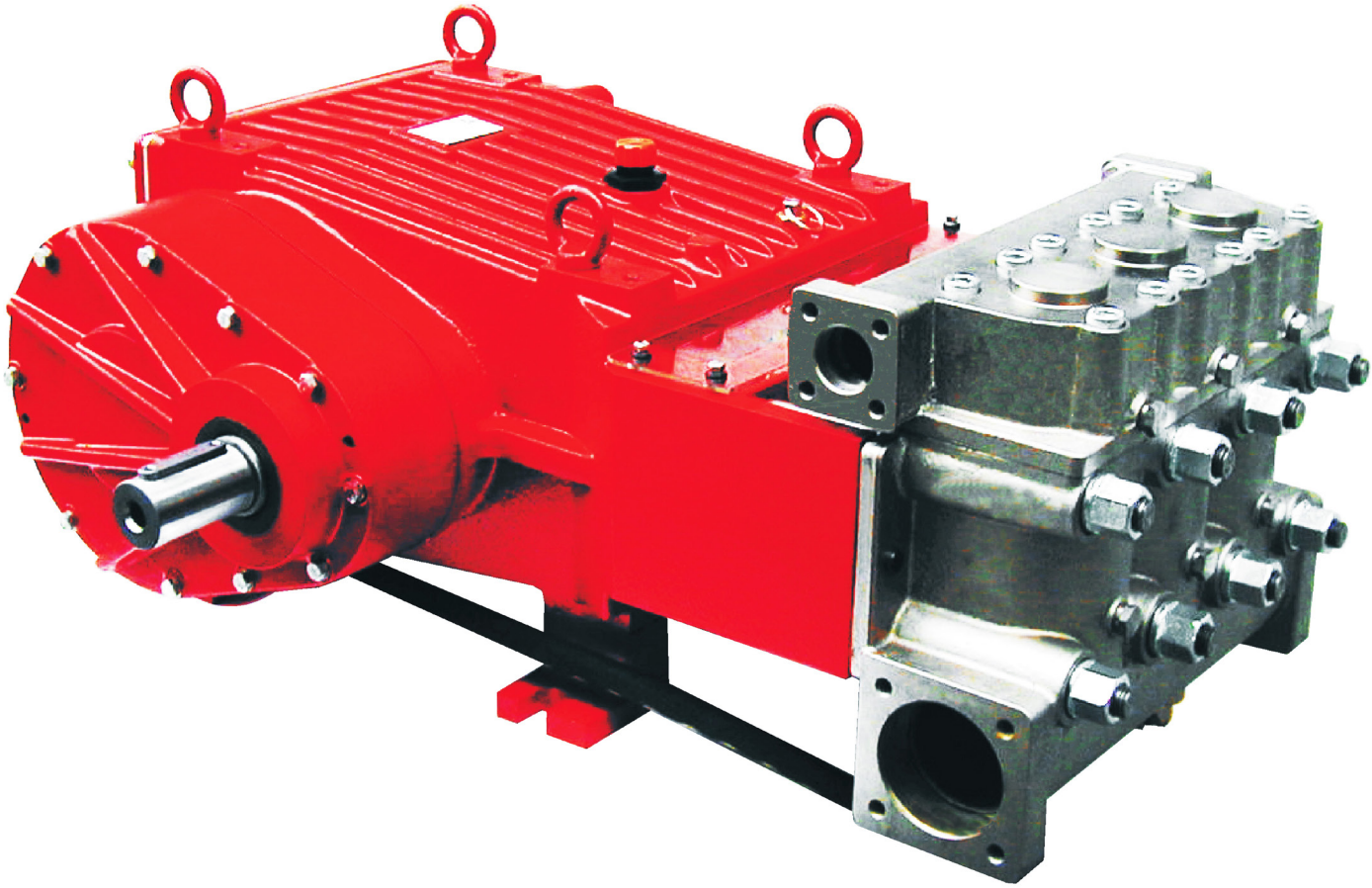
Models
GP8145 & GP8148

Triplex Ceramic
Plunger Pump
Operating Instructions
Repair and Service Manual



GIANT
Performance Under Pressure

Updated 02/24

Contents:

INSTALLATION INSTRUCTIONS

The stated figures are for maximum pressure and maximum speed (rpm) and apply for interval operation with cold water.
Required NPSH refers to water (specific weight 1kg/dm3, viscosity 1°E) at max. permissible pump revolutions.
Fluid medium: Clean water filtered with 100µm.
*higher temperatures possible with separate crankcase cooling system; the manufacturer is to be contacted in this case.

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 4.2 gallons (16 litres) of ISO VG 220 GL4 (e.g. Aral Degol BG220) or SAE 90 GL4 gear oil (Giant’s p/n 01154). Initial change after 50 operating hours and then every 1000 operating hours after one year latest.

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

NPSH values must be observed.

Cooling the Gear Oil

IMPORTANT! When using the integrated system for cooling the gear oil (standard version), the water input pressure must not exceed 29 PSI (2 bar) .

If a ***separate*** cooling circuit maximum 29 PSI (maximum 2 bar) is installed, it is then possible to have an input pressure of up to maximum 145 PSI (maximum 10 bar) on the ***suction side*** of the pump.

Make sure that suction pulsation is sufficiently dampened – water column resonance must be avoided.

IMPORTANT! The pumps can be run without gear oil cooling in continuous operation **up to** a power rating of **93.9 HP (70 kW)** or with major intermittent operation at full performance.

If operational power **exceeds 93.9 HP (70 kW)** or if continuous operation is the case, the pump must be run with the integrated oil cooling system. The maximum temperature of the water being pumped, which is also fed through the cooling system, must not exceed 86 °F (30°C). The water amount which is fed into the cooling system depends on the pump speed and is approximately 1.8 GPM (7.0 l/min) at 580 pump rpm. The cooling water is sucked in by one of the pumping chambers and pumped away.

Definition of intermittent operation: operation at full performance for not more than altogether 20 minutes an hour, with the pump running without pressure or turned off in between. For example, this can be full load operation for 5 minutes four times an hour with 10 minutes breaks in between or continuous full load operation for 20 minutes followed by a 40 minutes break.

IMPORTANT! If higher medium temperatures or liquids other than water are involved or aggressive media such as seawater, demineralised water etc., the pump must be fitted with a separate cooling circuit. The separate cooler must have a cooling efficiency of 1700 watts. If there is a danger of frost, an appropriate amount of antifreeze must be mixed into the cooling circuit.

When starting up for work, the pump must run first at zero pressure for approximately 1 minute.

IMPORTANT! The GP8145/GP8148 pumps have a black arrow on the reduction gear which shows the preferred direction of rotation. The pumps can be delivered either with the gear on the left side or right side which eases the planning of assembling units with regard to rotational direction.

Pinion shaft rotation - towards the gear end of the pump

The preferred/optimal direction of rotation ensures the motion of the connecting rods correctly shovels the oil on to the crosshead guides – which is a particular advantage where continuous operation is involved.

The pump can also be run against the recommended direction of rotation if operated periodically or at reduced pressure. If so, the pump has to be run in in this direction to smoothen the bearing areas. This is done by a one-time operation at zero pressure for at least 30 minutes; thereafter the pressure must be slowly increased over the next hour to the desired maximum operating pressure; the pump is then run in. Check the oil temperature during this process.

IMPORTANT! The pump and cooling system must be emptied if there is a danger of frost. Travel wind can cause water in pumps fitted on open vehicles to freeze even if the outside temperature is above freezing point.

To empty the cooling circuit, remove the L-joints (K11) on the pump head (50). Blow out the circuit liquid at the joint connection (K11/K7) using compressed air.

The torque tenson on the valve casing nuts (49A) is to be checked after approximately 200 operating hours. Please see page 9 for the torque values.

When checking the torque tension, the pump must be at zero pressure.

IMPORTANT! The service life of the seals is maximized by allowing a minimal amount of leckage is to occur. A few drops of water can drip from each plunger every minute. Leakage has to be examined every day; the plunger seals must be changed should leckage become excessive (=constant dripping).

Safety Rules

The operating instructions must be read and adhered to before performing any work on the pump or complete assembled unit. No responsibility will be carried by us for damage to materials or persons caused by improper handling of our pumps.

Access to the pump is not allowed for unauthorized personnel. A safety valve is to be installed in accordance with the guidelines for liquid spraying units so that the admissible operating pressure cannot be exceeded by more than 10%. Pump operation without a safety valve as well as any excess in temperature or speed limits automatically voids the warranty.

When the pump is in operation, the driven shaft side and its coupling must be covered by a protective guard. The plunger area must also be covered by the protective plate (30).

Do not step onto the protective plate (30) nor put weight on it.

Pressure in the discharge line and pump must be at zero before carrying out any maintenance work to the pump or unit. Close off suction line. Disconnect fuses to ensure that the driving motor cannot get switched on accidently. Make sure that the pump, the cooling system and 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 an air/water-mixture being absorbed and cavitation occurring, the pump-npshr, positive suction head and water tem-perature must be respected.

Cavitation and/or compression of gases lead to uncontrollable pressure-kicks which can ruin the pump and unit parts and also be dangerous to the operator or anyone standing nearby.

Giant Industries Plunger Pumps are suitable for pumping clean water and other non-aggressive or non-abrasive media with a specific weight similar to water.

Before pumping other liquids - especially inflammable, explosive and toxic media - the pump manufacturer must 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.

Specifications
Model GP8145

	U.S.	Metric
Volume	49 GPM	185 LPM
Discharge Pressure	4350 PSI	300 bar
Crankshaft Speed		Up to 580 RPM*
Power Required	143 HP	107 kW
Inlet Pressure (with internal cooling)	29 PSI	2 Bar
Inlet Pressure (with external cooling)	145 PSI	10 Bar
Plunger Diameter	1.77”	45mm
Plunger Stroke	2.83”	72mm
Pinion Shaft Diameter	1.77”	45mm
Key Width	0.55”	14mm
Crankshaft Mounting		Either side
Shaft Rotation		Towards Gear End
Temperature of Pumped Fluids	Up to 86° F	30 °C
Inlet Ports		(2) 3” BSP
Discharge Ports		(2) 1-1/4” BSP
Weight	767 lbs.	348 kg
Crankcase Oil Capacity	4.2 Gal.	16.0 liters
Fluid End Material		Nickle plated Spheroidical Cast Iron

(The specifications above are based on maximum pressure and maximum RPM for intermittant duty using cold water.)

SPECIAL NOTE:
The theoretical gallons per revolution (gal/rev) is 0.084.

To find specific outputs at various RPM, use the formula:

GPM = 0.084 x RPM

Input Speed	Gear Ratio
1500	2.6
1800	3.1
2200	3.8
2600	4.5

GP8145 HORSEPOWER REQUIREMENTS

RPM	GPM	1000 PSI	2000 PSI	3000 PSI	4350 PSI
300	25.3	17.5	35.0	52.4	76.0
400	33.8	23.3	46.6	69.9	101.4
500	42.2	29.1	58.3	87.4	126.7
580	49	33.8	67.6	101.4	147.0

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:

$$\frac{\text{GPM X PSI}}{1450} = \text{HP}$$

Specifications
Model GP8148

	U.S.	Metric
Volume	56 GPM	213 LPM
Discharge Pressure	3770 PSI	260 bar
Crankshaft Speed		Up to 580 RPM*
Power Required	142 HP	106 kW
Inlet Pressure (with internal cooling)	29 PSI	2 Bar
Inlet Pressure (with external cooling)	145 PSI	10 Bar
Plunger Diameter	1.89”	48mm
Plunger Stroke	2.83”	72mm
Pinion Shaft Diameter	1.77”	45mm
Key Width	0.55”	14mm
Crankshaft Mounting		Either side
Shaft Rotation		Towards Gear End
Temperature of Pumped Fluids	Up to 86° F	30 °C
Inlet Ports		(2) 3” BSP
Discharge Ports		(2) 1-1/4” BSP
Weight	767 lbs.	348 kg
Crankcase Oil Capacity	4.2 Gal.	16.0 liters
Fluid End Material		Nickle plated Spheroidical Cast Iron

(The specifications above are based on maximum pressure and maximum RPM for intermittant duty using cold water.)

SPECIAL NOTE:
The theoretical gallons per revolution (gal/rev) is 0.097.

To find specific outputs at various RPM, use the formula:

GPM = 0.097 x RPM

Input Speed	Gear Ratio
1500	2.6
1800	3.1
2200	3.8
2600	4.5

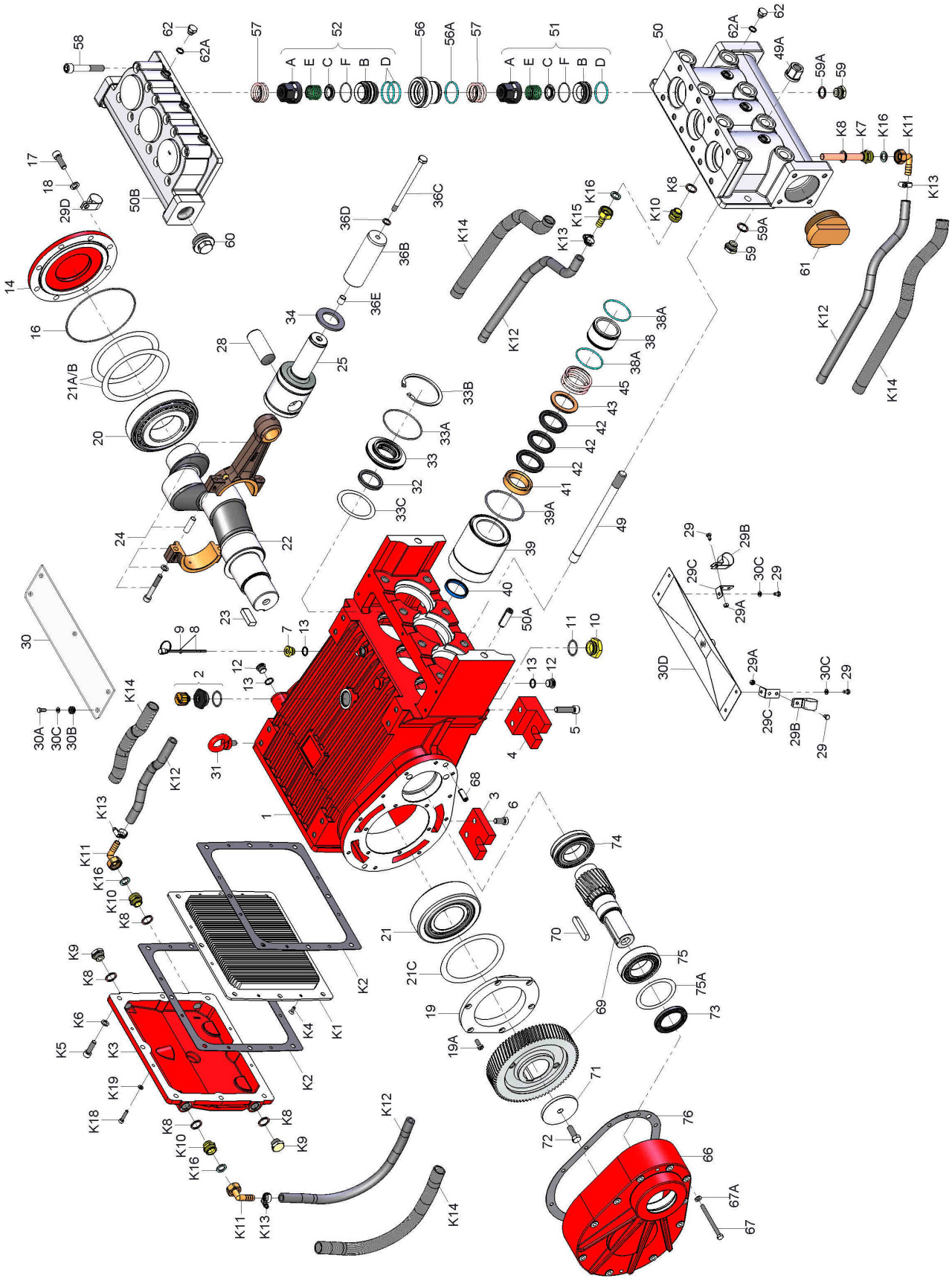
GP8148 HORSEPOWER REQUIREMENTS					
RPM	GPM	1000 PSI	2000 PSI	3000 PSI	3770 PSI
300	29	20.0	40.0	59.9	75.3
400	38.6	26.6	53.3	79.9	100.4
500	48.3	33.3	66.6	99.9	125.5
580	56	38.6	77.2	115.9	145.6

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:

$$\frac{\text{GPM X PSI}}{1450} = \text{HP}$$

EXPLODED VIEW - GP8145 & GP8148



Parts List - GP8145 & GP8148

Item	Part	Description	Qty
1	03430	Crankcase	1
2	06893	Oil Filler Plug Assy with Vent	1
3	05652	Rear Foot for Crankcase	2
4	05653	Front Foot for Crankcase	2
5	05654	Hexagon Socket Screw	4
6	05655	Hexagon Socket Screw	4
7	05656	Plug 3/8” BSP for Oil Dipstick	1
8	05035	Oil Dipstick Assembly	1
9	01009	O-Ring	1
10	05657	Plug M33 X 1.5	1
11	07102	O-Ring	1
12	12256	Plug 3/8” BSP	3
13	22929	Copper Washer	4
14	05036	Bearing Cover Closed	1
16	05037	O-Ring	1
17	05038	Hexagon Socket Screw M12	8
18	05039	Spring Ring	8
19	05765	Flange	1
19A	05766	Hexagon Socket Screw	6
20	05658	Tapered Roller Bearing	1
21	05659	Tapered Roller Bearing	1
21A	05042	Fitting Disc	3
21B	05043	Fitting Disc	3
21C	05113	Fitting Disc	3
22	05741	Crankshaft For Turned Gear	1
23	05661	Fitting Key	1
24	05047	Connecting Rod Assembly	3
25	05048	Crosshead c/w Plunger	3
28	05049	Crosshead Pin	3
29	05051	Hexagon Screw	6
29A	07408	Hexagon Nut	2
29B	05383	Bracket 2 for Cooling Hose	2
29C	05662	Support Clamp	2
29D	05381	Bracket 1 for Cooling Hose	1
30	05052	Cover Plate	1
30A	07225-0100	Hexagon Screw	5
30B	13136	Grommet	5
30C	08280	Washer	9
30D	05050	Splash Cover	1
31	07623	Eye Bolt	4
32	05058	Radial Shaft Seal	3
33	05055	Seal Retainer	3
33A	05056	O-Ring	3
33B	05054	Clip Ring	3
33C	05059	Fitting Disc	3
34	05060	Oil Shield	3
36B	05385	Plunger Pipe, GP8145	3
36B	05384	Plunger Pipe, GP8148	3
36C	05062	Tension Screw	3
36D	07665	Copper Washer	3
36E	06900	Centering Sleeve	3
38	05386	Seal Case	3
38A	04840	O-Ring	6
39	05389	Seal Sleeve, GP8145	3
39	05388	Seal Sleeve, GP8148	3
39A	05066	O-Ring	3
40	13290	Seal Ring, GP8145	3
40	05390	Seal Ring, GP8148	3
41	05392	Pressure Ring, GP8145	3
41	05391	Pressure Ring, GP8148	3
42	05394	Sleeve, GP8145	9
42	05393	Sleeve, GP8148	9
43	05396	Sleeve Support Ring, GP8145	3
43	05395	Sleeve Support Ring, GP8148	3
45	07636	Seal Tension Spring, GP8145	3
45	05721	Seal Tension Spring, GP8148	3
49	05072	Stud Bolt	8
49A	05073	Hexagon Nut	8
50	05397	Valve Casing	1
50A	13162	Centering Stud	2
50B	05398	Discharge Casing	1
51	05976	Suction Valve Assembly	3
51A	05595	Spring Tension Cap	3
51B	05978	Suction Valve Seat	3
51C	05314	Valve Plate	3
51D	05408	O-Ring	3
51E	05450	Valve Spring	3
51F	05596	O-Ring	3
52	05977	Discharge Valve Assembly	3
52A	05595	Spring Tension Cap	3
52B	05979	Discharge Valve Seat	3
52C	05314	Valve Plate	3
52D	05408	O-Ring	6
52E	05450	Valve Spring	3
52F	05596	O-Ring	3
56	04090	Discharge Valve Adaptor	3
56A	05408	O-Ring	3
57	07173	Pressure Spring	6
58	05087	Hexagon Socket Screw	12
59	07109	Plug, 1/2” BSP	2
59A	06272	Copper Seal	2
60	06909	Plug, 1-1/4” BSP	1
61	05088	Plug, 3” BSP	1
62	05302	Plug, 1/4” BSP	6
62A	06934	Copper Gasket	6
66	03193	Gear Cover	1
67	08484	Hexagon Screw	11
67A	08041	Washer	11
68	03304	Cylinder Pin	2
69	04094	Gear Wheel Set (1500 RPM=2.6)	1
69	04093	Gear Wheel Set (1800 RPM=3.1)	1
69	05767	Gear Wheel Set (2200 RPM=3.8)	1
69	05666	Gear Wheel Set (2600 RPM=4.5)	1
70	07614	Fitting Key	1
71	04571	Fixing Disc	1
72	05667	Hexagon Screw	1
73	05428	Shaft Seal Ring for Gear	1
74	05668	Self-Aligning Roller Bearing	1
75	05669	Roller Bearing	1
75A	05670	Fitting Disc	1
76	03309	Gear Seal	1
78	05025	Oil Cooler (Items K1 - K16)	1
K1	05026	Cooling Vane Plate	1
K2	05027	Seal for Gear Cover	2
K3	05028	Gear Cover	1
K4	05029	Hexagon Head Countersunk Screw	8
K5	07381	Hexagon Socket Screw	8
K6	08041	Washer	8
K7	05030	Connection for Oil Cooler	1
K8	06272	Copper Seal	6
K9	07109	Plug, 1/2” BSP	2
K10	05031	Connecting Branch	3
K11	05032	U-Joint Connector c/w Nut	3
K12	05033	Tube for Cooler	2
K13	05402	Hose Clamp	4
K14	05403	Hose Guard	2
K15	05404	Hose Coupling Nut	1
K16	05405	Flat Gasket	4
K18	04158	Hexagon Socket Screw	4
K19	05053	Washer	4

Pump Repair Kits - GP8145 & GP8148

Plunger Packing Kit - GP8145
09626

Item	Part #	Description	Qty.
38A	04840	O-Ring	6
39A	05066	O-Ring	3
40	13290	Seal Ring	3
42	05394	Sleeve	9

Plunger Packing Kit - GP8148
09627

Item	Part #	Description	Qty.
38A	04840	O-Ring	6
39A	05066	O-Ring	3
40	05390	Seal Ring	3
42	05393	Sleeve	9

Inlet Valve Kit
#09725

Item	Part #	Description	Qty.
51B	05978	Suction Valve Seat	3
51C	05314	Valve Plate	3
51D	05408	O-Ring	3
51E	05450	Valve Spring	3
51F	05596	O-Ring	3
52D	05408	O-Ring	3

Discharge Valve Kit*
#09726

Item	Part #	Description	Qty.
52B	05979	Discharge Valve Seat	3
52C	05314	Valve Plate	3
52D	05408	O-Ring	6
52E	05450	Valve Spring	3
52F	05596	O-Ring	3

*Since the discharge valve seat has two sides, you might be able to order the following kit (09726A) instead of the complete discharge kit (09726).

Discharge Valve Kit
#09726A

Item	Part #	Description	Qty.
52C	05314	Valve Plate	3
52D	05408	O-Ring	6
52E	05450	Valve Spring	3
52F	05596	Valve Spring Guide	3

Oil Seal Kit
#09584

Item	Part #	Description	Qty.
32	05058	Radial Shaft Seal	3
33A	05056	O-Ring	3

Torque Specifications and Troubleshooting GP8145 & GP8148		
Item	**Torque Ft-Lbs (Nm)**	**Tool Needed**
17	64 (87)	10 mm Allen Wrench
24	37 (50)	8mm Allen Wrench
33B	N/A	Industrial Snap Ring Pliers
36C	30 (40)	16mm Socket
49A	265 (360)	30mm Socket
51 & 52	N/A	Valve Puller (p/n) inlcuded w/pump
58	133 (180)	12mm Allen Wrench
67	18 (25)	13mm Socket
72	30 (40)	19mm Socket
K4	11 (15)	4mm Allen Wrench
K5	33 (45)	8mm Allen Wrench
K9	59 (80)	27mm Socket

TROUBLESHOOTING		
Problem	**Cause**	**Solution**
Pressure Drops, water leaks	V-sleeves leak	Replace V-sleeves, check surface of plunger
Pressure drops, pump gets loud	Discharge or suction valve leaks Steam formation (Cavitation)	Replace valve(s) Reduce suction height, reduce flow resistance in inlet line, clean inlet filter, lower water temperature.
Irregular pressure	Worn Valves	Examine valves
	O-ring on valves or inlet valve adapter leaks	Examine O-rings, check valve casing for unevenness on the sealing surfaces
Oil leaks at visible part of plunger	Gear sealing is leaking	Examine seals and running surface of plunger
Dirty, milk-colored or frothy oil	Water has mixed with oil	Replace oil immediately, find & fix the cause
Oil leakage on the crankshaft	Shaft seal ring leaks	Check seal and shaft
Noise increases without the loss	Worn bearing	Dismantle gear, examine all parts, replace worn parts, check oil level. If service life was too short, check for excess strain or whether lubrication intervals were too long. Only specified lubricants are to be used.

GP8145 & GP8148 PUMP REPAIR INSTRUCTIONS

To Check Valves

Loosen screws (58) and lift off the discharge casing (50B). Take out the pressure springs (57). Pull out the assembled valves (51 and 52) with the fitting tool.
Dismantling valves: the spring tension cap (51A, 52A) is screwed together with the valve seat (51B or 52B). Remove the spring tension cap, take out the springs (51E, 52E) and valve plate (51C, 52 C). check the sealing surfaces and O-rings (51D/F, 52D/F).
Replace the worn parts.
Coat the threads of the valve seat with silicon grease or molycote anti-seize Cu-7439 when reassembling. Before refitting the valves, clean the sealing surfaces in the casing and check for any damage. Tighten screws (58) at 133 ft-lbs (180 NM). Check the torque tension after 8-10 operating hours.

To Check Seals and Plunger Pipe

Remove the hexagon nuts (49A) and then remove the pump head and seal case (38) from the crankcase (1). If necessary, carefully tap the valve casing (50) past the centering stud (50A) using a rubber hammer.
IMPORTANT: if necessary, support the pump head by resting it on wooden blocks or using a pulley.
Remove the tension screws (36C) and take the seal sleeve (39) and all other mounted parts out of the drive.
Pull the plunger pipe out of the seal assembly and check for any damage. Lever seal rings (40) and sleeves (42) out of the seal sleeve with a screwdriver.
IMPORTANT: Be careful not to damage seal sleeves (39) and pressure ring (41). Check the inner diameter of the pressure ring for wear and if necessary replace together with seals (40 & 42). Clean all parts. New parts should be lightly coated with silicon grease before installation
Insert the seal unit (40, 41, 42, 43) into the sleeve. Push the ceramic plunger carefully through the seals from the crankcase side. If necessary, the seals can be held tightly using a suitable pipe support held on the other side of the seal sleeve.
Take out the seal case (38) from the valve casing (50) and check O-Rings (38A). If necessary, secure two screwdrivers in the front O-Ring groove to extract the seal casing from the valve casing. Coat seals with silicon grease before reinstalling.
IMPORTANT: Mounting surfaces of the crankcase and must be clean and free of damage. The components must lie exactly and evenly with one another. The same exactness applies for all centering positions in the crankcase, pressure, and valve casing.
Coat the seal sleeve lightly with anti-corrosive grease (e.g. molycote no. Cu-7439) in its fitted area towards the crankcase. Insert seal sleeves into their crankcase fittings. Coat the threads of the tension screw (36C) lightly with thread glue and insert it together with a new copper ring (36D) through the ceramic pipe. Turn the pump per hand until the plunger (25) rests against the plunger pipe. Tighten the tension screw at 30 ft-lbs (40 NM).
IMPORTANT: Thread glue must never come between the plunger pipe (36B) and centering sleeve (36E). Overtensioning of the plunger pipe by excessive tightening of the tension screw and/or dirt damage on the mounting surfaces can lead to plunger pipe breakage.
Insert the seal tension spring (45) and O-ring (39A) into the seal sleeve (39).
Mounting Valve Casing:
Put seal cases (38) in the centering holes of the valve casing, and then push the valve casing carefully on to the centering studs (50A).
Tighten the hexagon screws (49A) evenly in a crosswise pattern at 266 ft-lbs (360 NM).
IMPORTANT: The torque tension on the screws (49A) must be checked after 8-10 operating hours; the pump must be at zero pressure. After this, the tension should be checked at a regular interval of every 200 operating hours.

GP8145 & GP8148 PUMP REPAIR INSTRUCTIONS

To Dismantle Crankcase Gear

Take out plungers and seal sleeves as described above, and drain the oil by taking off the plug (12). After removing the clip ring (33B), lever out the seal retainer (33) with a screwdriver. Open the hose adaptor (K11).
Remove the gear cover (K3) and remove the cooling vane plate (K1) by unscrewing the screws (K4). Remove the conrod screws (24).
IMPORTANT: Connecting rods are marked for identification. Do not twist con rod halves or interchange them. When reassembling, the conrods must be fitted in their exact original position on the crankshaft journals.
Push conrod halves together with the crosshead as far as possible into the crosshead guide.
Remove the bearing cover (14) and remove the shims (21A/B).

To Dismantle Reduction Gear

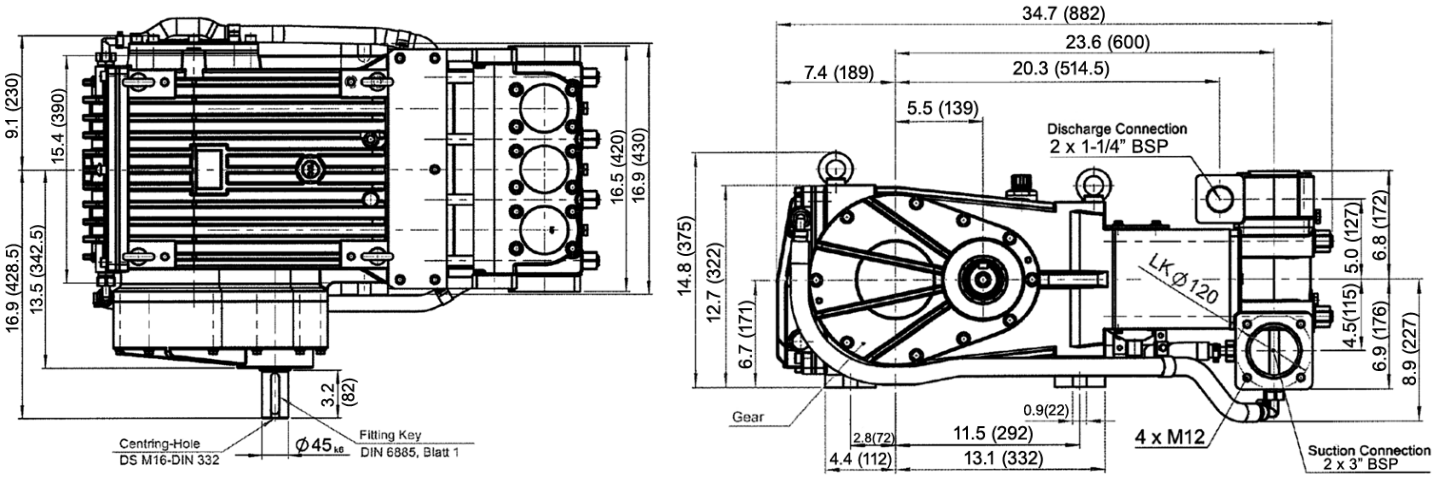
Remove screws (67). Press off gear cover (66) by screwing two screws into both thread bores. Remove screw (72) and take off fitting disc (69). Remove the cogwheel from the shaft with a removal tool. Using a rubber hammer, tap out the crankshaft towards bearing cover (14).
Check surfaces on the conrods (24), crankshaft (22), and crossheads (25). Check the surfaces of the crosshead guides in the crankcase for any unevenness.
Reassemble in reverse order. Thread the crankshaft in from the bearing cover side until the bearing rests cleanly in the outer ring on flange (19).
Press the outer ring from bearing (20) and using shims (21A/B), adjust the bearing to be free of play. To achieve this, add shims, screw on cover (14), and turn the crankshaft until it can no longer be turned by hand.

Then remove the shim and try to turn the crankshaft. A crankshaft that can be too easily turned may cause damage later to the bearing and conrods due to wobble movements in the conical bearing shells.
Mount conrod halves in their exact position and tighten at 37 ft-lbs (50 NM).
IMPORTANT: Connecting rods must be able to move slightly sideways on the stroke journals.

To Mount Reduction Gear

Heat ball bearings (75 and 74) before pressing them on to the pinion. Press the cogwheel slightly on to the crankshaft so that the pinion (69) together with the bearing (74) can still be inserted. Move the pinion (69) against the cogwheel and make them mate perfectly when mounting. Then carefully tap the cogwheel and the pinion simultaneously on to the crankshaft and into the bearing seat.
Fit the fitting disc (69) and secure the screw (72) with Loctite.
Fit the seal (76) on to the cylindrical pins (68).
Push the gear cover 966) carefully on to the bearing (75). Make sure that the radial shaft seal (73) does not get damaged during fitting on to the pinion.
Mount the cooling plate (K1) and gear cover (K3) with their respective seals (K2). When assembling the cooling circuit line, make sure that the oil cooler connection (K7) is always joined to the upper connection (K3) of the gear cover.
IMPORTANT: Before operating again, turn the reduction gear shaft by hand at least four full turns to make sure the gear is correctly aligned.

GP8145 & GP8148 Pump 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

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