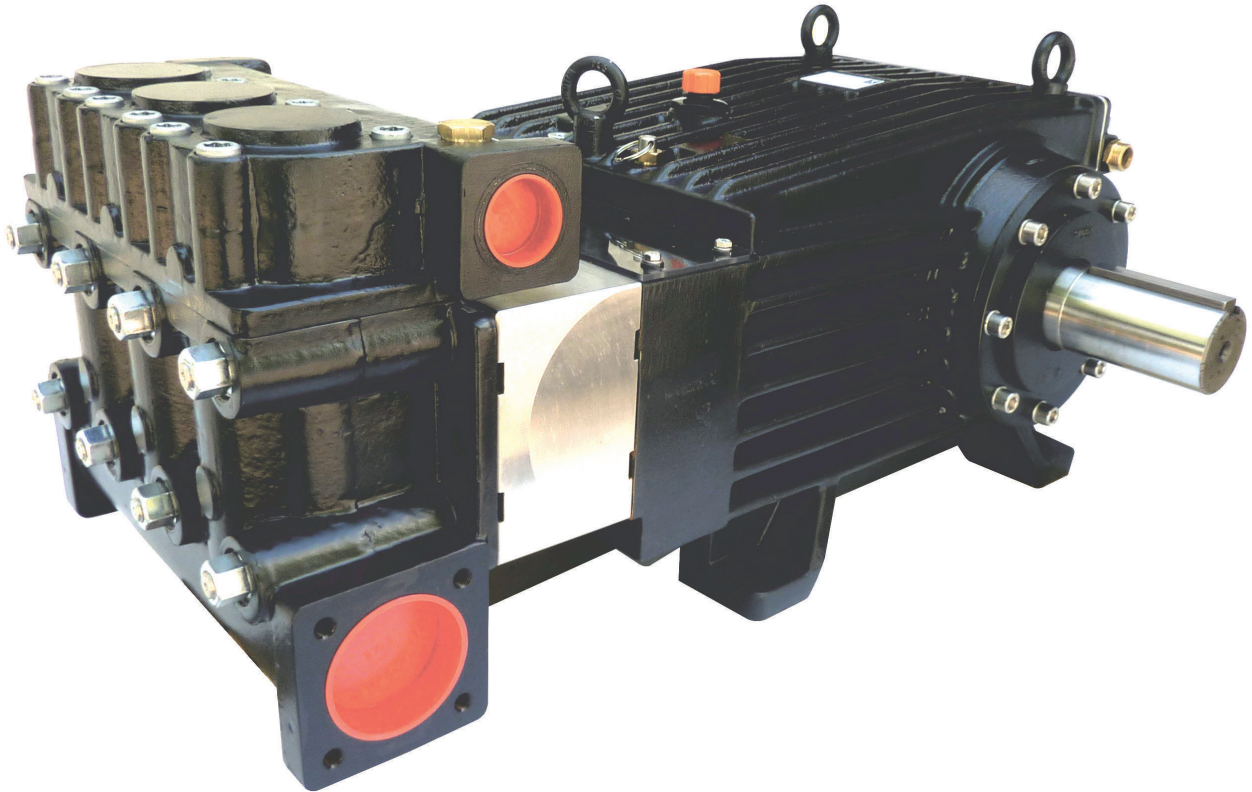


Model BP8085

Triplex Ceramic
Plunger Pump
Operating Instructions/
Repair and Service Manual



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INSTALLATION INSTRUCTIONS

Operation and Maintenance

Check oil level prior to starting and ensure trouble-free medium supply.

Oil: Use only 4.6 gallons (17.5 liters) of **ISO VG 220 GL4 (e.g. Aral Degol BG220)** or **SAE 90 GL4 gear oil** (Giant part number 01154).

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

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

Maximum input pressure 145 PSI (10 bar).
Maximum suction head -4.35 PSI (-0.3 bar)
(dependent on the viscosity of the medium).

Make sure that suction pulsation is sufficiently dampened – water column resonance must be avoided. When starting up for work, the pump must run first at zero pressure for approximately 1 minute.

Important! The pumps can be run without gear oil cooling in continuous operation **up to** a power rating of **107.2 hp (80 kW)** or with major intermittent operation at full performance (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 minute breaks in between or continuous full load operation for 20 minute followed by a 40 minute break).

Separate Gear Oil Cooling for Continuous Operation

The pump gear cover (K3) has 1/2" BSP female connections on both sides on the top and bottom through which cooling water can be run. The cooling water must be fed in on one side on the bottom of the gear cover and led out on the opposite top side. The cooling water amount should be at least 0.19 gallons (7 L/min) at maximum 104 °F (40°C) before entering the pump. The maximum pressure for the cooling system is 29 PSI (2 bar). Where a closed cooling circuit is involved, the cooling efficiency and circulation amount are to be adapted accordingly. If there is a danger of frost, either antifreeze must be added or the cooling system must be emptied.

Important! The BP8000 series has a black arrow on the crankcase which shows the preferred direction of rotation.

The preferred direction of rotation ensures the motion of the connecting rods correctly distributes the oil onto 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 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 after which the pump is then run in. The oil temperature is to be checked during this procedure.

Important! The pump must be emptied if there is a danger of frost. Note that travel wind, for example, can cause the medium in pumps fitted on open vehicles to freeze even if the outside temperature is above freezing point.

Expel the circuit liquid at the connecting branch (K10) using compressed air.

The torque tension on the valve casing nuts (49A) is to be checked after approximately 200 operating hours. Please see the torque specification chart on page 5.

The pump must be at zero pressure when checking the torque tension.

INSTALLATION INSTRUCTIONS

Important! The service life of the seals is maximized if a minimal amount of leakage is present. A few drops of medium should drip from each plunger every minute. If leakage increases, the spiral rings can be tightened by turning the pressure sleeve (46) with tool 04968 a short way clockwise. Leakage has to be examined every day. The plunger seals must be changed should leakage become excessive (=constant dripping).

Important! Only turn the sleeve past one or maximum two hole spaces. Otherwise friction will be too strong. Coat the sealing, for example, by putting silicone grease in the lubricating nipple (39B).

Important! To avoid any incrustation of the medium on the plungers (36B), screw off cover plate (30) after every operation and rinse the plunger area with clear non-pressurized water (e.g. using mains water, never under high pressure).

Important! If recycled bentonite is being pumped, the pump must be rinsed for 3 – 5 minutes with clear water after usage to flush out dirt particles (sand) from the bentonite. The service life of the seals, ceramic plungers and valves depends largely on how fine the recycled bentonite is filtered.



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 accidentally. 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/medium-mixture being absorbed and cavitation occurring, the pump-npshr (positive suction head required) and water temperature 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.

The BP8085 Giant pump is suitable for pumping clean water as well as water containing bentonite in a concentration of maximum 55 lbs. (25 kg) of bentonite diluted in 264 gallons (1m³) of water.

Specifications - Model BP8085

	U.S.	Metric
Volume	171.7 GPM	650 L/min
Discharge Pressure	1160 PSI.....	60 bar
Power Required	134 HP	100 kW
Speed		530 RPM
Inlet Pressure.....	-4.35 to 145 PSI*	-0.3 to 10 bar*
Plunger Diameter.....	3.3"	85 mm
Plunger Stroke	2.83"	72 mm
Crankshaft Diameter.....		70 mm
Key Width		B20 x 12 x 110 mm
Crankshaft Mounting.....		Either side
Shaft Rotation		Top of pulley towards manifold
Temperature of Pumped Fluids.....	Up to 104 °F	(40 °C)
Inlet Ports.....		(2) 3" BSP
Discharge Ports		(2) 1-1/2" BSP
Weight.....	785 lbs.....	(356 kg)
Crankcase Oil Capacity	4.6 Gal.....	(17.5 Liters)
Fluid End Material.....		Cast Iron

*See note on page 2

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:

$$\frac{\text{GPM} \times \text{PSI}}{1450} = \text{hp}$$

BP7170 Horsepower Requirements					
RPM	GPM	500 PSI	700 PSI	900 PSI	1160 PSI
300	97.2	33.5	46.9	60.3	77.8
400	129.6	44.7	62.6	80.4	103.7
500	162.0	55.9	78.2	100.6	129.6
530	171.7	59.2	82.9	106.6	137.2

SPECIAL NOTE:

The theoretical gallons per revolution (gal/rev) is 0.324.
To find specific outputs at various RPM, use the formula:

$$\text{GPM} = 0.324 \times \text{RPM}$$

Repair Kits - BP8085

Plunger Packing Kits - #09822

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
38A	05056	O-Ring	6
40	04939	Support Ring	3
41	04940	Guide Ring	6
42	04941	Spiral Ring	6

Valve Repair Kit - #09823

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
51	04949	Valve Assembly	6
56A	04955	O-Ring	3
56B	04966	O-Ring	3

Oil Seal Kit - #09584

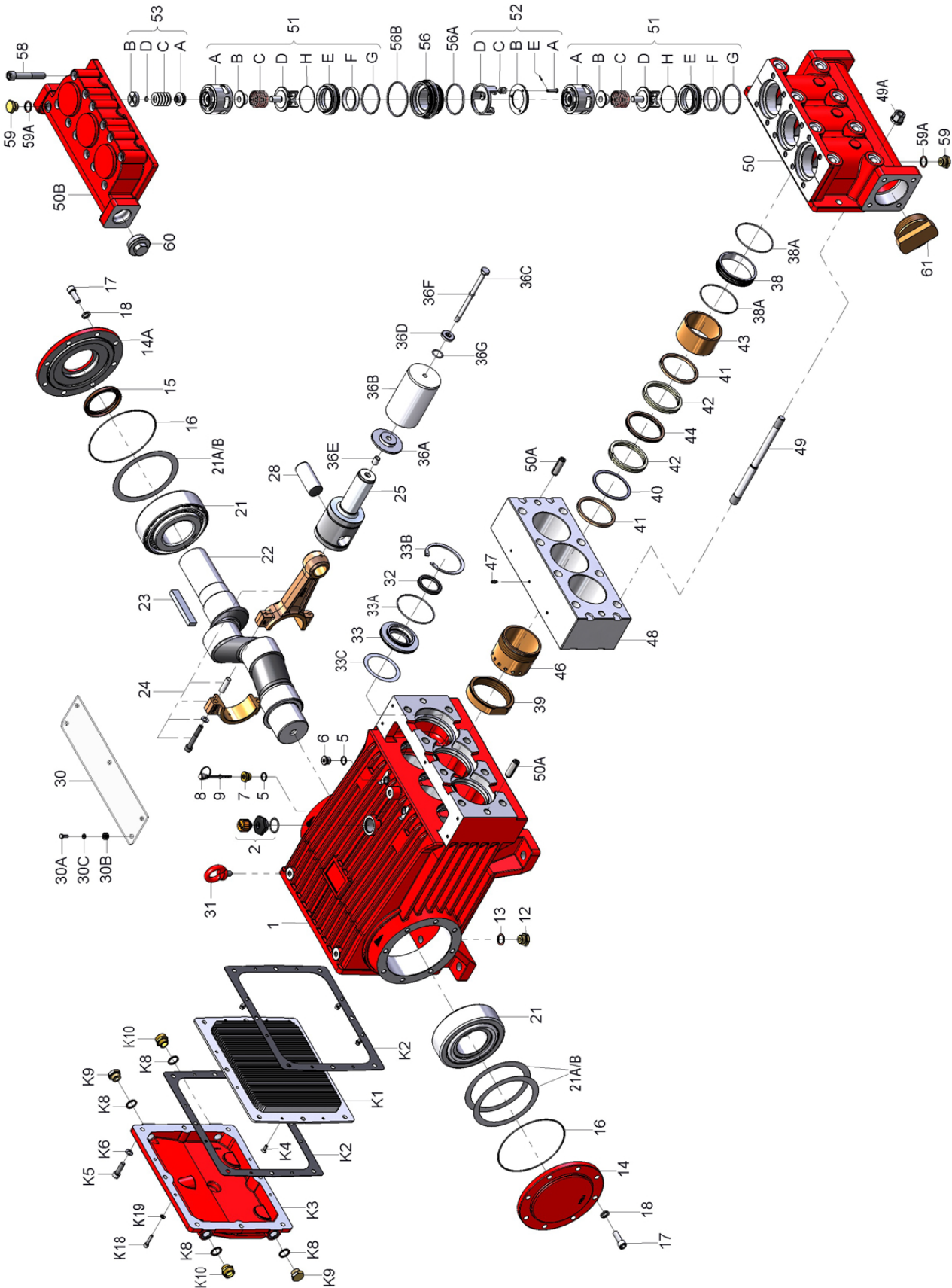
<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
32	05058	Radial Shaft Seal	3
33A	05056	O-Ring	3

Preventative Maintenance Check-List & Recommended Spare Parts List						
Check	Daily	Weekly	50hrs	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 1154			X	X		
Seal Spare Parts (1 kit/pump) (This page for kit list)					X	
Oil Seal Kit (1 kit/pump) (This page for kit list)					X	
Valve Kit (1 kit/pump) (This page for kit list)						X

BP8085 Torque Specifications/Lubrication Information

<u>Position</u>	<u>Item#</u>	<u>Description</u>	<u>Lubrication</u>	<u>Torque Amount</u>
1	04293	Crankcase	Molycote Cu-Paste	
17	05038	Hexagon Socket Screw		64 ft.-lbs. (87 Nm)
24	05047	Connecting Rod Assembly		36.8 ft.-lbs. (50 Nm)
32	05058	Radial Shaft Seal	Loctite 403	
36C	04936	Tension Screw	Loctite 243	29.5 ft.-lbs. (40 Nm)
49	04946	Stud Bolt	Loctite 243	
49A	13160	Hexagon Nut		265 ft.-lbs. (360 Nm)
52B	04958	Tension Disc	Molycote Cu-Paste	
58	05087	Hexagon Socket Screw	Loctite 243/Molycote Cu-Paste	
K4	05029	Hexagon Head Countersunk Screw		132 in.-lbs.(15 Nm)
K5	07381	Hexagon Socket Screw		33 ft.-lbs. (45 Nm)
K9	07109	Plug, 1/2" BSP		59 ft.-lbs. (80 Nm)

Exploded View - B8085



Parts List - BP8085

<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	04293	Crankcase	1	48	04945	Intermediate Casing	1
2	06893	Oil Filler Plug Assy with Vent	1	49	04946	Stud Bolt	8
5	22929	Copper Washer	2	49A	13160	Hexagon Nut	8
6	12256	Plug	1	50	04947	Valve Casing	1
7	05381	Plug, 3/8" BSP	1	50A	13162	Centering Stud	4
8	01008	Oil Dipstick Assembly	1	50B	04948	Discharge Valve Casing	1
9	01009	O-Ring	1	51	04949	Valve Assembly	6
12	07109	Plug, 1/2" BSP	2	51A	04950	Spring Tension Cap	6
13	06272	Seal	2	51B	04951	Guide Sleeve	6
14	05036	Bearing Cover, Closed	1	51C	05080	Valve Spring	6
14A	04933	Bearing Cover, Open	1	51D	04952	Valve Plate	6
15	05112	Radial Shaft Seal	1	51E	04953	Valve Seat	6
16	05037	O-Ring	2	51F	04954	Guide Ring	6
17	05038	Hexagon Socket Screw	16	51G	04955	O-Ring	6
18	05039	Spring Ring	16	51H	07193	O-Ring	6
21	05044	Tapered Roller Bearing	2	52	04956	Suction Valve Tension Element	3
21A	05042	Fitting Disc	1-5	52A	04957	Cotter Bolt	9
21B	05043	Fitting Disc	1-5	52B	04958	Tension Disc	3
22	05299	Crankshaft	1	52C	07918	Pressure Spring	9
23	05104	Fitting Key	1	52D	04959	Spring Tension Element	3
24	05047	Connecting Rod Assembly	3	52E	04960	Cotter	9
25	05048	Crosshead c/w Plunger	3	53	04961	Discharge Valve Tension Element	3
28	05049	Crosshead Pin	3	53A	04962	Plate Spring Holder	3
30	05052	Cover Plate	1	53B	04963	Plate Spring Guide	3
30A	07225-0100	Hexagon Screw	5	53C	04698	Plate Spring	18
30B	13136	Grommet	5	53D	04964	O-Ring	3
30C	05053	Washer	5	56	04965	Discharge Valve Adaptor	3
31	07623	Eye Bolt	3	56A	04955	O-Ring	3
32	05058	Radial Shaft Seal	3	56B	04966	O-Ring	3
33	05055	Seal Retainer	3	58	05087	Hexagon Socket Screw	12
33A	05056	O-Ring	3	59	07109	Plug 1/2" BSP	3
33B	05054	Clip Ring	3	59A	06272	Copper Seal	3
33C	05059	Fitting Disc	3	60	13322	Plug 1-1/2" BSP	1
36A	04934	Plunger Pipe Cover	3	61	05088	Plug 3" BSP	1
36B	04935	Plunger Pipe	3	68	04967	Mounting Aid for Valve (not shown)	1
36C	04936	Tension Screw	3		04968	Readjustment Tool	1
36D	07665-0100	Seal Ring	3				
36E	06900	Centering Sleeve	3	78	04969	Oil Cooler Assembly	1
36F	22704	O-Ring	3	K1	05026	Cooling Vane Plate	1
36G	12092	O-Ring	3	K2	05027	Seal for Gear Cover	2
38	04937	Seal Case	3	K3	05028	Gear Cover	1
38A	05056	O-Ring	6	K4	05029	Hexagon Head Countersunk Screw	4
39	04938	Adjusting Ring	3				
40	04939	Support Ring	3	K5	07381	Hexagon Socket Screw	8
41	04940	Guide Ring	6	K6	08041	Washer	8
42	04941	Spiral Ring	6	K8	06272	Copper Seal	4
43	04942	Spacer	3	K9	07109	Plug, 1/2" BSP	2
44	04943	Lubrication Ring	3	K10	05031	Connecting Branch	2
46	04944	Pressure Sleeve	3	K18	04158	Hexagon Socket Screw	4
47	04374	Zerk Fitting	3	K19	05053	Washer	4

BP8085 Repair Instructions

To Check Valves

Remove screws (58), lift discharge casing (50B) up and away. Take out discharge valve tension element (53). Pull out assembled valves (51), discharge valve adaptor (56) and suction valve tension element (52) with fitting tool (part number 04967).

Dismantling valves: the spring tension cap (51A) is screwed together with the valve seat (51E). Screw off spring tension cap, take out springs (51C) and valve plate (51D).

Examine o-rings and the sealing surfaces on the pressure rings and guide rings. Replace worn parts.

Coat threads of the valve seat with silicon grease or molycote anti-seize Cu-7439 when reassembling. Before refitting the valves and tension elements, clean the sealing surfaces in the casing and check for any damage. Tighten screws (58) at 132.7 ft.-lbs. (180 Nm).

Check torque tension after 8-10 operating hours.

To Check Seals and Plunger Pipe

Important! If necessary, support the pump head by resting it on wooden blocks or by using a pulley.

Screw off hexagon nuts (49A), remove pump head together with seal case (38) from intermediate casing (53). If necessary, carefully tap the valve casing (50) past the centring stud (50A) using a rubber hammer. Pull the seal case (38) out of the valve casing (50) (if necessary using two screwdrivers placed into the front o-ring groove). Examine o-rings (38A) and coat with silicon grease before fitting.

Remove tension screw (36C) and take the intermediate casing (53) together with all mounted parts out of the drive.

Pull plunger pipe out of seal assembly and check for any damage.

Clean parts from positions 38 to 44, examine them and replace if necessary. Coat new parts generously with silicone grease before fitting.

Insert the seal unit (40, 41, 42, 44) into the intermediate casing. Push the ceramic plunger carefully through the seals from the crankcase side. If necessary, the seals can be held on the other side of the seal sleeve using a suitable pipe support.

Coat the pressure sleeves (46) lightly with anti-corrosive grease (e.g. molycote no. Cu-7439) and screw it into the adjusting ring. Coat the step of the plunger pipe (36A) cover with silicon grease and put it onto the back end of the plunger pipe. Lightly coat the preassembled parts with silicon grease or molycote anti-seize Cu-7439 and insert it into the pressure sleeve.

Pay attention that the sealing surfaces on the intermediate casing, crankcase and valve casing are clean and without damage. The components must lie exactly and evenly on one another. The same exactness applies to all centering positions in the crankcase, pressure and valve casing. Fit o-rings (36F, G) into the seal ring (36D) and push these past the tension screw (36C). Lightly coat tension screw (36C) with screw glue and, together with seal ring (36D), place into the ceramic pipe. Turn the pump manually until the plunger (25) touches against the plunger pipe. Tighten tension screw at 29.5 ft.-lbs. (40 Nm).

Important! Thread glue must never come between the plunger pipe (36B) and centring sleeve (36E). Overtensioning of the plunger pipe by excessive tightening of the tension screw and/or dirt or damage on the mounting surfaces can cause the plunger pipe to fracture.

BP8085 Repair Instructions

Mounting the Valve Casing:

Put seal cases (38) in the centring holes of the valve casing. Then carefully push the valve casing onto the centring studs (50A).

Tighten hexagon screws (49A) evenly and crosswise at 132.8 ft.-lbs. (180 Nm).

Important! With no pressure in the pump, the torque tension on the screws (49A) must be checked after 8-10 operating hours. Thereafter the tension is to be checked every 200 operating hours.

To Dismantle Crankcase Gear

Take out the plungers, intermediate casing and seals as described above.

Drain the oil by removing plug (12).

After removing the clip ring (33B), lever out the seal retainer (33) with a screwdriver.

Screw off gear cover (K3) and remove the cooling vane plate (K1) by taking off the screws (K4). Then remove connecting rod screws (24).

Important! The connecting rods are marked 1 to 3 for identification. Do not twist the connecting rod halves or interchange them. When reassembling, the connecting rods must be fitted in their exact original position on the crankshaft journals.

Push connecting rod halves together with the crosshead as far as possible into the crosshead guides.

Take off the bearing cover (14/14A) and press out the crankshaft from the drive side.

Be careful not to bend the connecting rods.

Check running surfaces on the connecting rods (24), crankshaft (22) and crossheads (25).

Also check the surfaces of the crosshead bores in the crankcase for any unevenness.

Reassemble in reverse order.

Thread the long end of the crankshaft together with the inner bearing rings into the crankcase. Then mount the outer bearing ring (20) and spacer ring (22A).

Fit the connecting rod halves in their exact original position and tighten at 36.9 ft.-lbs. (50 Nm).

Important! A little clearance must be present to enable slight sideward movement of the connecting rods on their journals.

Fit bearing cover (14A) and tighten screws (17) at 64.2 ft.-lbs. (87 Nm).

Adjust axial play (clearance) on the crankshaft to minimum 0.1 mm / max. 0.15 mm using shims (21A/21B). The shaft should turn easily with little clearance. Connecting rods must sit exactly in the middle of each crank pin. Fit the bearing cover (14) and tighten the screws (17) at 64.2 ft.-lbs. (87 Nm).

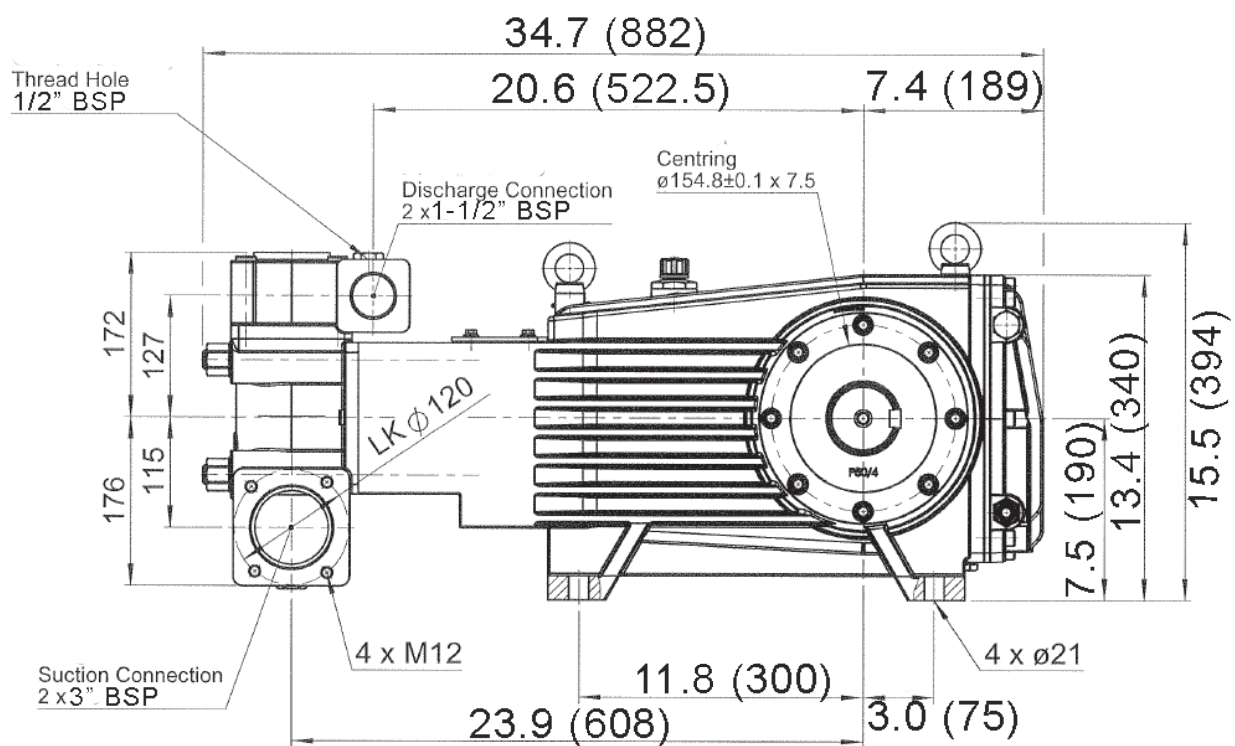
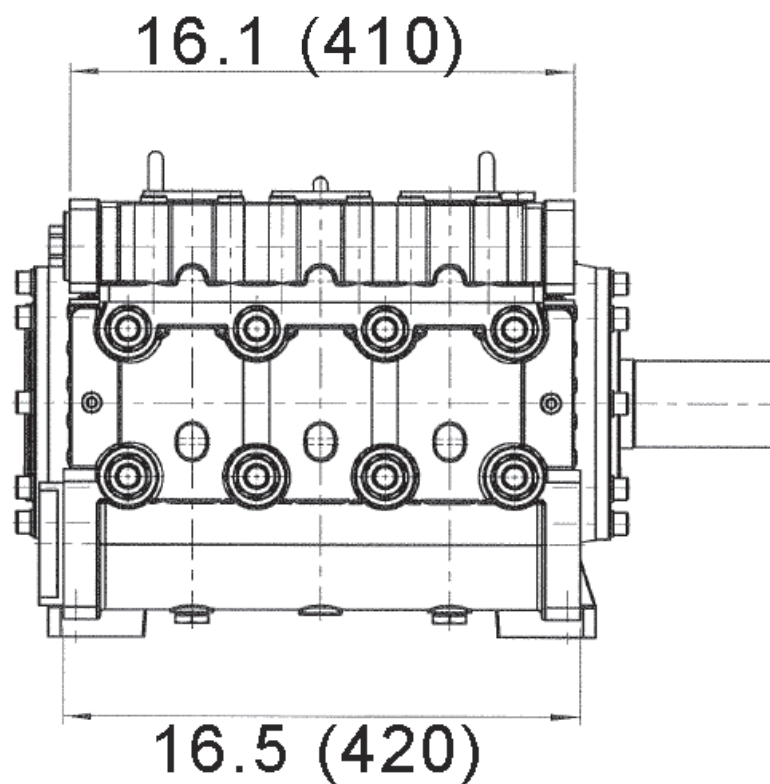
Possible axial float of the seal adaptor (33) is to be compensated with shims (33C).

Fit cooler plate (K1) and gear cover (K3) with their respective seals (K2).

GP8085 Troubleshooting

Problem	Cause	Solution
Pressure drops, medium leaks.	Spiral rings leak.	Replace spiral rings, examine surface of plunger.
Pressure drops, pump becomes loud.	Discharge or suction valve leaks.	Replace valve.
	Steam formation (cavitation).	Reduce suction height, reduce flow resistance in the suction line, clean suction filter, lower medium temperature.
Irregular pressure.	Worn valves.	Examine valves.
	O-Ring on the valves or suction valve adaptor leaks.	Examine O-ring, examine valve casing for unevenness on the sealing surfaces.
Oil leaks at visible part of plunger.	Gear sealing is leaky.	Examine seals and running surface of plunger.
Dirty milk-coloured frothy oil.	Oil has mixed with water.	Replace oil immediately, find and fix the cause.
Oil leakage on the crankshaft.	Shaft seal ring leaks.	Check seal and shaft.
Noise increases without loss of pressure.	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.

BP8085 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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