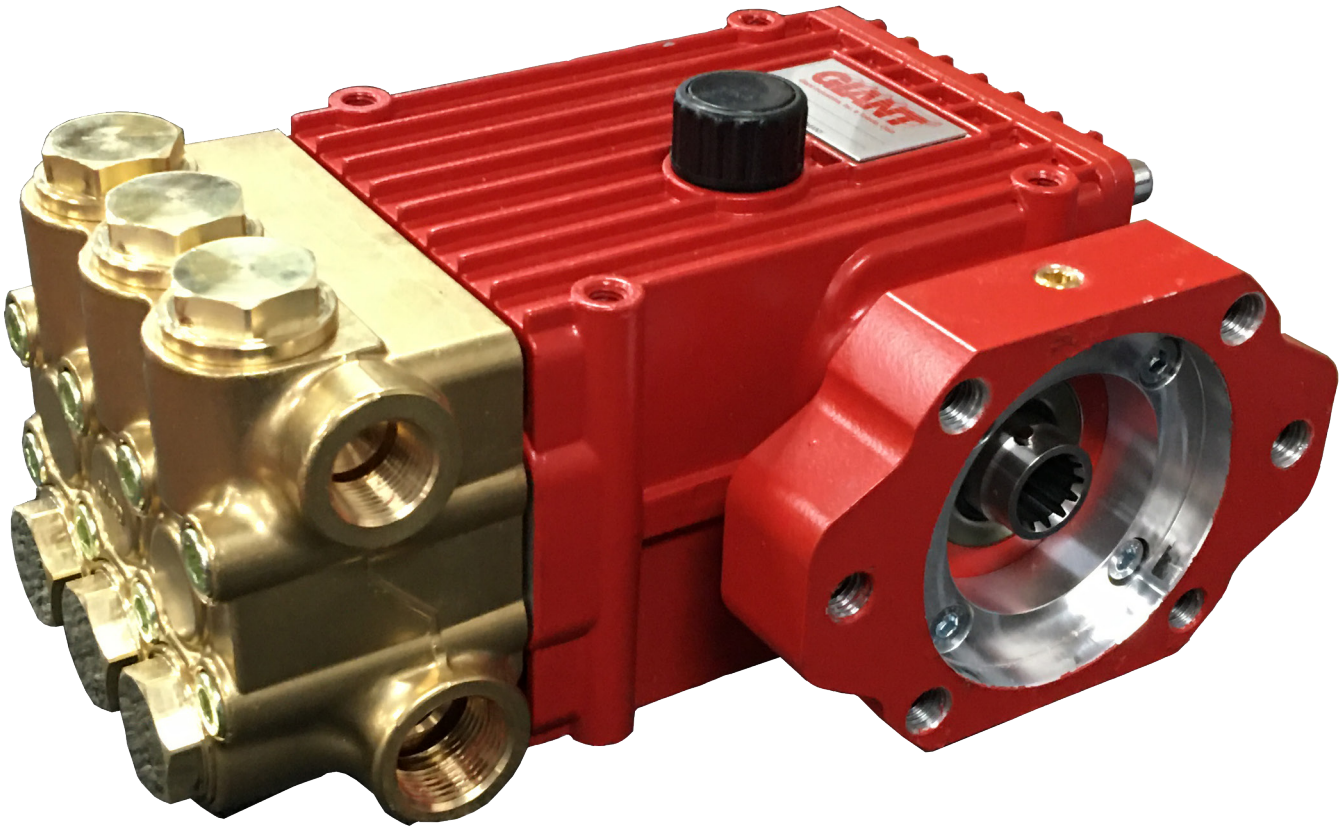
Models P420H and P422H

Triplex Ceramic Plunger Pump Operating Instructions/ Repair and Service Manual



GIANT
Performance Under Pressure

Contents:

INSTALLATION INSTRUCTIONS

Required NPSH refers to water (specific weight 1kg/dm^3) at maximum permissible pump revolutions.

Operation and Maintenance

Check oil level prior to starting to 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 cal also be used and the pump run “dry” for 1-2 minutes for this purpose.

Oil amount: 30.4 ounces (0.9 liters). Only use **ISO VG 220 industrial gear oil** (e.g. Aral Degol BG220) or **automobile gear oil SAE 90 GL4** (Giant p/n 01154).

Initial oil change after 50 operating hours and then every 500 hours, after 1 year if used less. Caution when operating in damp places or with high temperature fluctuations. Oil must be changed immediately should condensate (frothy oil) occur in the gear box.

NPSH values must be observed.

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.

Important! If the pump is not used for a long period of time, it is possible the seals (23/23B) could become hard or brittle thus causing the pump to leak when put into operation.

If this is the case, we recommend these seals be replaced every 4 years.

⚠ Safety Rules

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 vlave as well as any excess in temperature or speed limits automatically voids the warranty.

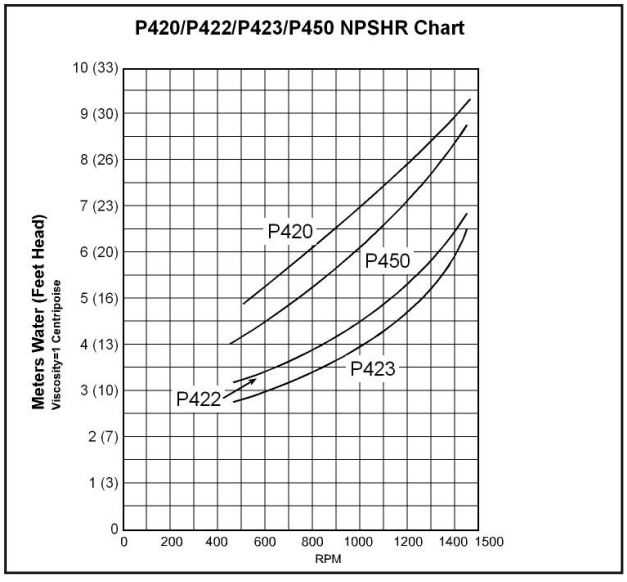
When the pump is in operation, the drive shaft end and the coupling must be enclosed by a protective cover or a coupling bell.

Pressure in the discharge line and pump must be at zero before any maintenance to the pump takes place. Shut off suction line. Disconnect fuses to ensure that the driving motor does not get switched on accidentally. Make sure that all parts on the pressure side of the unit are vented before starting the pump. In order to prevent air, or an air-water mixture being absorbed and to prevent cavitation occurring, the pump NPSHR (=suction head) and water temperature must be respected.

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 Plunger Pumps are suitable for pumping clean water and other non-agressive 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 ahered to.



P420H and P422H Specifications

U.S. Measurements

	Max. Flow	Max. Pressure Continuous/ Intermittent	Max. Speed	Power Required	Max. Temp	Plunger Diameter	Stroke	Weight
Model	**GPM**	**PSI**	**RPM**	**HP**	**F**	**in**	**in**	**lbs**
P422	9.9	2610/3000	1450	19.2	160	0.87	0.94	38.3
P420	12.8	2175	1450	17.7	160	0.98	0.94	38.3

Metric Measurements

	Max. Flow	Max. Pressure Continuous/ Intermittent	Max. Speed	Power Required	Max. Temp	Plunger Diameter	Stroke	Weight
Model	**L/min**	**Bar**	**RPM**	**kW**	**C**	**mm**	**mm**	**kg**
P422	37.3	180/200	1450	13.2	70	22	24	17.4
P420	48.4	150	1450	14.3	70	25	24	17.4

Common Specifications

Maximum Inlet Pressure .....-4.35 to 145 PSI .....-0.3 to 10 bar
Crankcase Oil Capacity.....30.4 fl.oz. ..... 0.9 Liters
Inlet Ports .....(1) x 1” NPT
Discharge Ports..... (2) 3/4” NPT
Crankshaft Bore .....SAE 2B or SAE 4B 13T 16/32 Spline**
Shaft Rotation ..... Towards fluid end
NPSHR.....30.5 feet of head ..... 9.3 meters of head

** Recommended for inlet connection.*

*** J498b 30° Class 5*

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.

P420 HORSEPOWER REQUIREMENTS					
RPM	GPM	1000 PSI	1500 PSI	1700 PSI	2175 PSI
785	6.9	4.8	7.1	8.1	10.4
900	7.9	5.4	8.2	9.3	11.9
1010	8.9	6.1	9.2	10.4	13.4
1120	9.9	6.8	10.2	11.6	14.9
1240	10.9	7.5	11.3	12.8	16.4
1450	12.8	8.8	13.2	15.0	19.2

P422 HORSEPOWER REQUIREMENTS					
RPM	GPM	1000 PSI	1500 PSI	2610 PSI	3000 PSI*
900	6.1	4.2	6.3	11.0	12.6
1050	7.2	5.0	7.5	13.0	14.9
1160	7.9	5.4	8.2	14.2	16.3
1300	8.9	6.1	9.2	16.0	18.4
1450	9.9	6.8	10.2	17.8	20.5

*Intermittent duty only

NOTE:

In order to drive the pump from the side opposite the present shaft extension, simply remove the valve casing from the crankcase and rotate the pumps 180 degrees to the desired position. Be certain to rotate the seal case (item #20) as well, so that the weep holes are down at the six o’clock position. Exchange the oil fill and the oil drain plugs, also. Refer to the repair instructions as necessary for the proper assembly sequence.

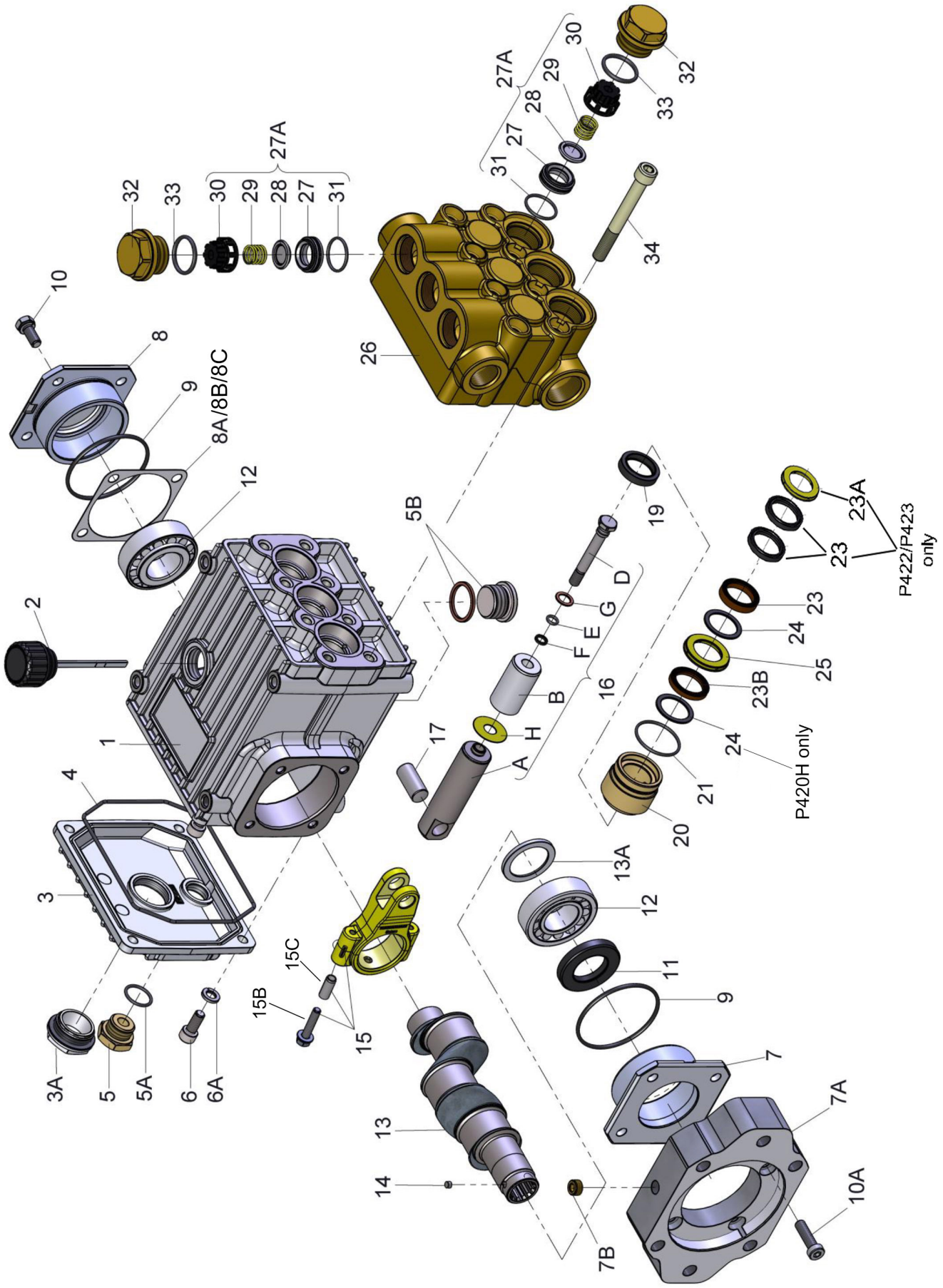
Horsepower Ratings:

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 X PSI) / 1450 = HP

For the Application of a Hydraulic Motor:

To Determine the Torque of a Hydraulic Motor -- (GPM x PSI x 36.77) / RPM = Torque (in-lbs)

EXPLODED VIEW - P420H and P422H PUMPS



P420H and P422H SPARE PARTS LIST

ITEM	PART	DESCRIPTION	QTY.
1	08377	Crankcase	1
2	08378	Oil Fill Plug with Gasket	1
3	06479	Crankcase cover	1
3A	07186	Oil Sight Glass w/ Gasket	1
4	08380	O-Ring	1
5	07109	Oil Drain Plug	1
5A	06015	Gasket for Oil Drain Plug	1
5B	08092	Plug with Gasket	1
6	01010	Screw	4
6A	01011-0400	Spring Washer	4
7	04739	Bearing Cover, Open	1
7A	03266	Motor Flange	1
7B	03267	Plug, M12 x 1	1
8	05291	Bearing Cover, Closed	1
8A	05292	Shim	1-3
8B	05293	Shim (May not be present)	1
8C	05964	Shim	1-2
9	01016	O-Ring	2
10	07114	Screw with Washer	8
10A	07774	Hexagon Socket Screw	4
11	07459	Radial Shaft Seal	1
12	05350	Taper Roller Bearing	2
13	03268	Crankshaft	1
13A	04742	Spacer Ring	1
14	03269	Magnet	1
15	08390	Connecting Rod Assembly	3
15B	05349	Connecting Rod Screw	6
15C	05348	Adapter Sleeve	6
16	05351	Plunger Assembly, P420H (16A-16H)	3
16	05353	Plunger Assembly, P422H (16A-16H)	3
16A	05352	Plunger Base	3
16B	08398	Plunger Pipe, 25mm (P420H)	3
16B	06247	Plunger Pipe, 22mm (P422H)	3
16D	08399	Tensioning Screw	3
16E	07023	O-Ring	3
16F	07203	Backup Ring	3
16G	07258	Copper Washer	3
16H	06431	Oil Scraper	3
17	06790	Crosshead Pin	3
19	05444	Oil Seal	3
20	05443	Seal Case (P420H)	3
20	05601	Seal Case (P422H)	3
21	07266	O-Ring	3
23	12254	V-Sleeve, 25mm (P420H)	3
23	06249	V-Sleeve with Support Ring, 22mm (P422H)	3
23A	06251	Spacer Ring (P422H)	3
23B	12255	Weep Seal (P420H)	3
23B	13390	Weep Seal (P422H)	3
24	08376	Pressure Ring (P420H)	6
24	06252	Pressure Ring (P422H)	3
25	08394	Weep Return Ring (P420H)	3
25	06254	Weep Return Ring (P422H)	3
26	08395	Manifold	1
27A	08408	Valve Assembly (27-31)	6
27	08370	Valve Seat	6
28	06791-0100	Valve Plate	6
29	06377-0100	Valve Spring	6
30	08372	Valve Spring Retainer	6
31	07212	O-Ring	6
32	08373	Plug	6
33	07214	O-Ring	6
34	08396	Cap Screw	8

P420H and P422H REPAIR KITS

Plunger Packing Kit
P420H - # 09140

Item	Part #	Description	Qty
21	07266	O-Ring	3
23	12254	V-Sleeve	3
23B	12255	Weep Seal	3
24	08376	Pressure Ring	6

Plunger Packing Kit
P422H - # 09295

Item	Part #	Description	Qty
21	07266	O-Ring	3
23	06249	V-Sleeve with Support Ring	3
23B	13390	Weep Seal	3
24	06252	Pressure Ring	3

Valve Assembly Kit
 # 09143

Item	Part #	Description	Qty.
27A	08408	Valve Assembly, Complete	6
33	07214	O-Ring	6

Oil Seal Kit
 # 09641

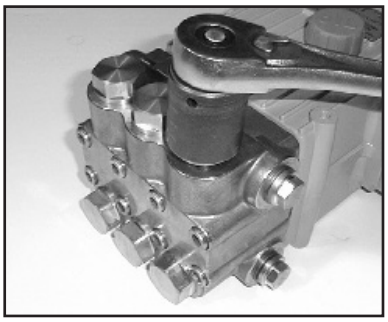
Item	Part #	Description	Qty
19	05444	Oil Seal	3

P420H and P422H Torque Specifications

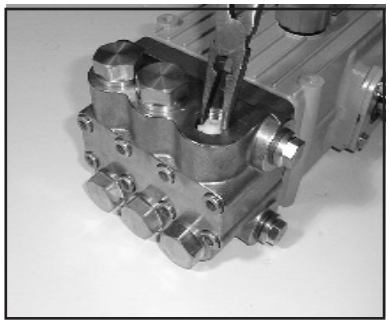
Item	Part #	Description	Lubrication Information	Torque Amount
3A	07186	Oil Sight Glass/Gasket	Loctite 5910	106 in.-lbs. (12 Nm)
5	07109	Plug		59 ft.-lbs. (80 Nm)
5B	08092	Plug w/Gasket		59 ft.-lbs. (80 Nm)
6	01010	Screw		110 in.-lbs. (12.5 Nm)
10	07114	Screw with Washer		132 in.-lbs. (15 Nm)
10A	07774	Hexagon Socket Screw		132 in.-lbs. (15 Nm)
15	08390	Connecting Rod Screw		97 in.-lbs. (11 Nm)
16D	08399	Tension Screw	Loctite 243	21 ft.-lbs. (28 Nm)
32	08373	Plug	Loctite 243	125 ft.-lbs. (170 Nm)
34	06494	Cap Screw	Lightly Oil Threads	30 ft.-lbs. (40 Nm)

Repair Instructions P420H and P422H

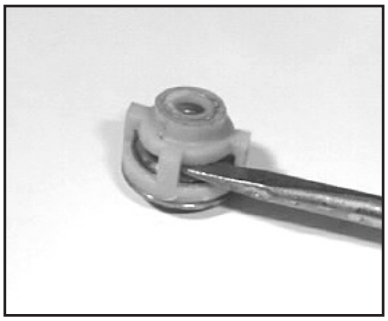
Note: Always take time to lubricate all metal and nonmetal parts with a light film of oil before reassembly. This step will ensure proper fit, at the same time protecting the pump nonmetal parts (i.e., the elastomers) from cutting and scoring.



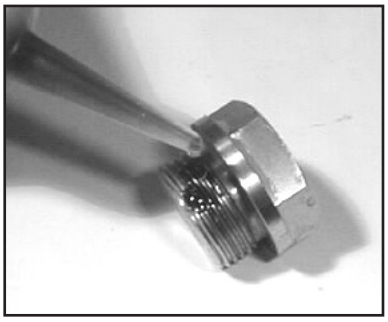
1) With a socket wrench, remove the three discharge valve plugs and three inlet valve plugs (32). Inspect the o-ring (33) for wear and replace if damaged.



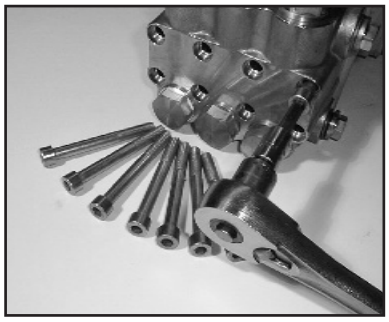
2) Using needle nose pliers, remove the inlet and discharge valve assemblies (27A). Note: It may become neccesary to remove the valve seat (27) from the valve casing using a slidehammer.



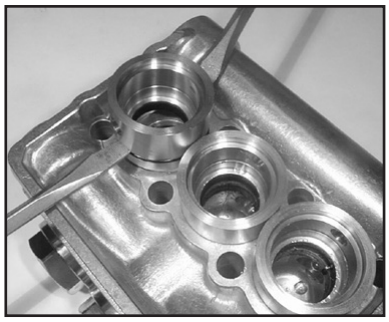
3) By inserting a small screw driver between the valve seat (27) and the valve spring retainer (30), the valve assembly can be separated.



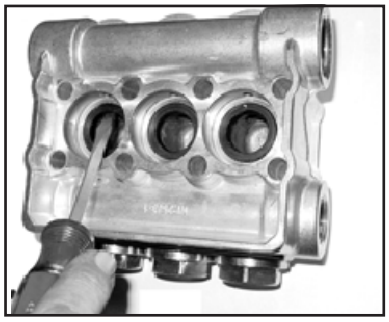
4) Remove the o-ring (31). Inspect all parts for wear and replace as necessary. Apply one drop of loctite 243 to the valve plugs (32) and tighten to 107 ft.-lbs. (145 NM).



5) Use a 8mm allen wrench to remove the 8 socket head cap screws (34). Carefully slide the valve casing (26) out over the plungers.



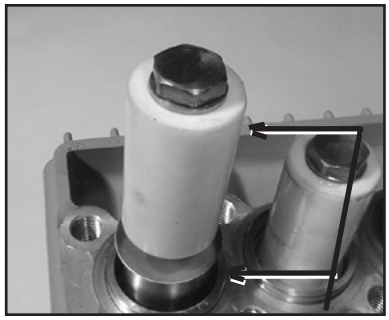
6) Remove seal case (20) and weep return rings (25) from the valve casing.



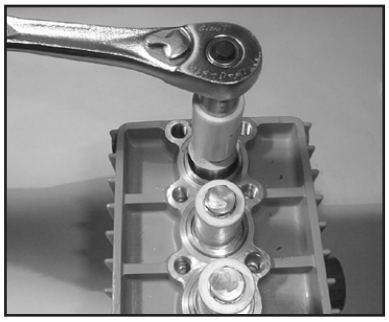
7) Remove the pressure rings (24) and v-sleeves (23 - Note: P422 & P423 pumps have a spacer ring) from the valve casing (26).

8) Remove the weep grooved seal (23 or 23B) together with pressure ring (24) P420 and P425 only) out of the seal case (20). Check O-rings (21).

IMPORTANT! The grooved seal (23) on the high-pressure side is to be fitted carefully into the valve casing (26) using a screwdriver. Under no circumstances must the seal surface in the valve casing or the seal lip be damaged.

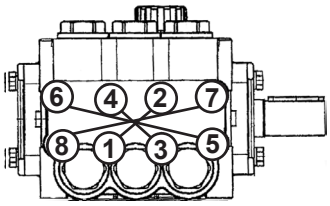


9) Check surfaces of plunger (16). Damaged surfaces cause accelerated seal wear. Deposits of all kinds must be removed from the plungers.



10) If the plunger pipe (16B), is damaged or worn, remove tension screw (16D) and plunger pipe (16B). Check and clean plunger surface (16A) and check flinger (16H). Cover thread of tension screw (16D) with a thin film of Loctite and tighten carefully to 20.7 ft.-lbs. (28 Nm).

IMPORTANT!
Plunger surfaces are not to be damaged. If there are lime deposits in the pump, care must be taken that the drip-return bore in parts (25) and (26) ensure trouble-free drip-return.



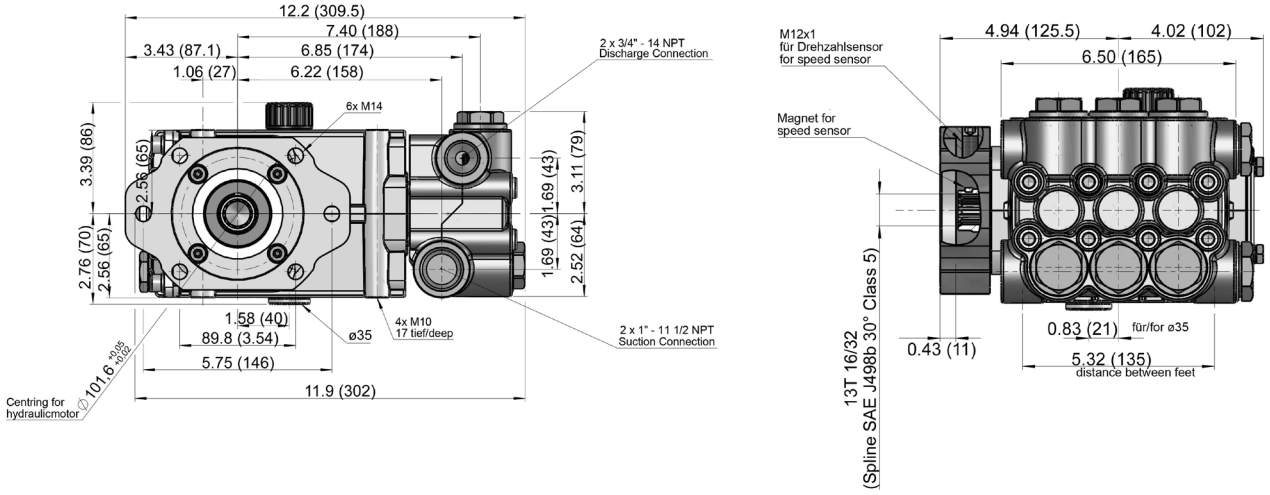
11) If oil leaks under under the plunger (16), the oil seals (19) need to be replaced. Remove oil plug (5) and drain oil. With the valve casing (26) and seal case (20) removed (ref. instructions #5 & 6), and plunger disassembled (ref. #10). Remove crankcase cover(3).

12) After installation of high pressure seals (23), place seal case (20) with weep seals & pressure ring installed, weep return ring (25) and high pressure weep return ring (24) over plungers. Slide valve casing over plungers and seat firmly. Replace the 8 socket head cap screws (34) and tighten to 30 ft.-lbs.(40 Nm) in a crossing pattern (as shown above right).

Gear End

13) Remove screws (15B) on connecting rods (15), separate the back connecting rod half from the crankshaft (13) and front connecting rod half by threading a screw into the center back bore on the connecting rod. **Be careful not to mix up the connecing rod halves.** Push connecting rod shaft as far as possible into the crosshead guide.
14) Remove screws (10) and remove bearing covers (7 & 8) with the help of a screwdriver.
15) Remove the crankshaft (13) by carefully threading it through the connecting rods (15); make sure not to bend the connecting rods. Remove and dismantle connecting rods and plungers (16); pay attention to avoid damaging the plunger bases (16A).
16) Remove the oil seal (19) using a screwdriver.
17) To reinstall, press the oil seal (19) into the crankcase (1). Make sure that the oil seal groove faces inward towards the oil.
NOTE: Be careful not to score the crankcase guides where the oil seal sits and where the plunger base (16A) moves through the crankcase (1).
18) Insert connecting rods (25) with plunger bases (16A). Install the crankshaft (13). Mount bearing covers (7 & 8) together with the roller bearing (12) and tighten with screws (10) to 132 in.-lbs (15 Nm) and adjust clearance by fitting shims (8A/8B/8C) under the bearing cover (8) to ensure the crankshaft (13) turns easily with very little play.
19) Fit the connecting rod halves and tighten screws (15) at 97 in.-lbs. (11 Nm). Install crankcase cover (3) together with o-ring (4).
20) Install fluid end components (ref. instruction #12). When refitting the valve casing assembly, tighten hexagon socket screws (34) at 30 ft.-lbs. (40 Nm).

Dimensions - P420H and P422H - 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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Performance Under Pressure