

P400HP Series - 22 and 25mm Versions

Triplex Ceramic
Plunger Pump
Operating Instructions/
Repair and Service Manual

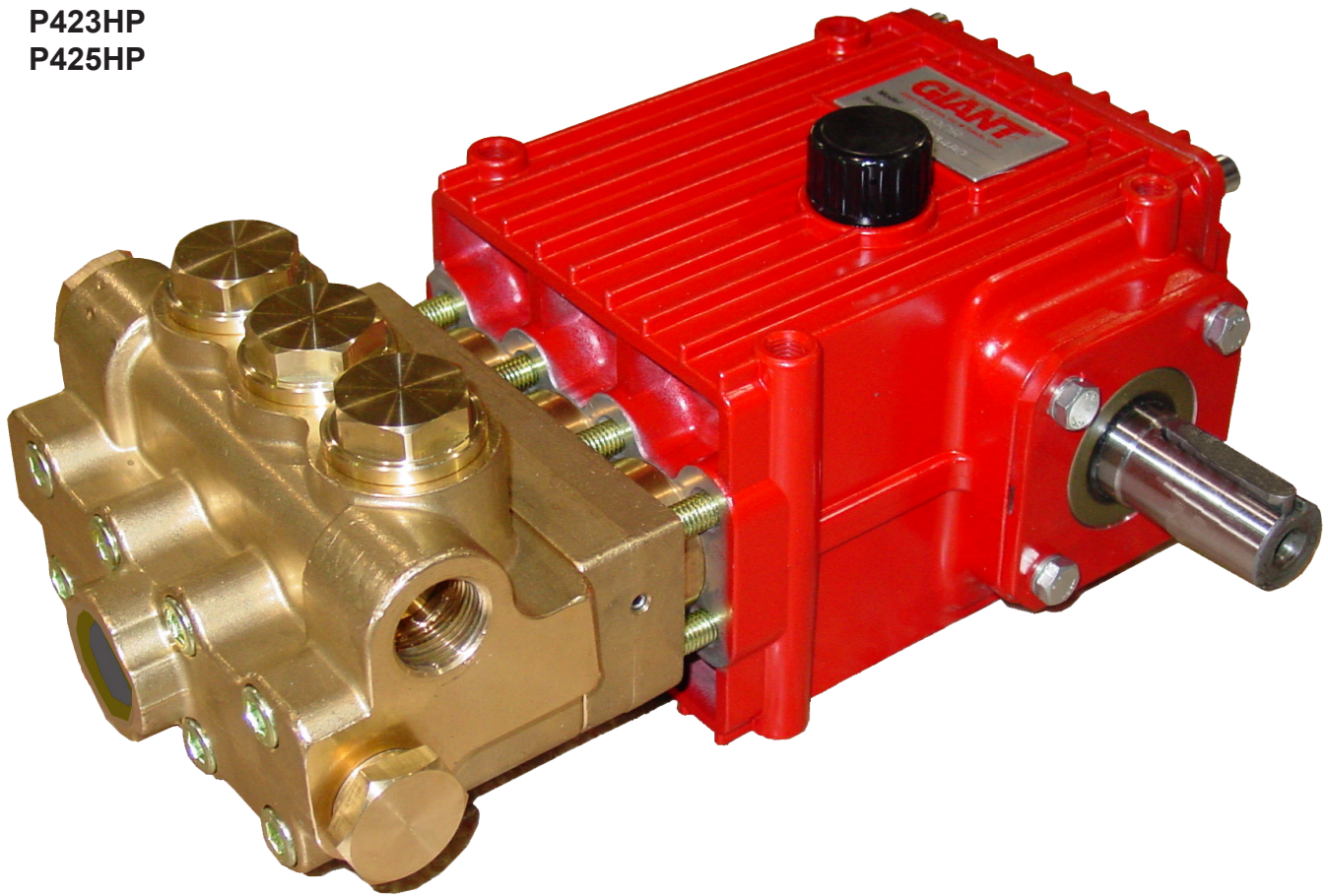
For Models:

P420HP

P422HP

P423HP

P425HP



GIANT
Performance Under Pressure

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Updated 03/22

INSTALLATION INSTRUCTIONS

Required NPSH refers to water (specific weight 1kg/dm³) 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 can 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 valve 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-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.

Torque Specifications - P420HP / P422HP / P423HP / P425HP

<u>Item #</u>	<u>Part #</u>	<u>Description</u>	<u>Lubrication</u>	<u>U.S. (Metric)</u>
3A	07186	Oil Sight Glass w/Gasket	Loctite 5910	106 in.-lbs. (12 Nm)
5	07109	Oil Drain Plug		59 ft.-lbs. (80 Nm)
5B	08092	Plug with Gasket		59 ft.-lbs. (80 Nm)
6	01010	Screw		110 in.-lbs. (12.5 Nm)
10	07114	Screw with Washer		133 in.-lbs. (15 Nm)
15	08390	Connecting Rod Assembly		97 in.-lbs. (11 Nm)
16D	08399	Tensioning Screw	Loctite 243	22 ft.-lbs. (30 Nm)
32	05971	Plug	Loctite 243	107 ft.-lbs. (145 Nm)
34	05973	Cap Screw	Lightly oil threads	30 ft.-lbs. (40 Nm)

Contact Giant Industries for service school information. Phone: (419) 531-4600

P400HP Pumps Specifications

U.S. Measurements

	Max. Flow	Nominal/ Intermittent Pressure	Max. Speed	Power Req'd	Max. Temp.	Plunger Diameter	Stroke	NPSHR
Model	GPM	PSI	RPM	BHP	°F	in	in	ft.-head
P423HP	8.2	4060	1450	22.9	160	0.87	0.79	N/A
P422HP	9.9	4060	1450	27.6	160	0.87	0.94	32.8
P425HP	10.7	3045	1450	22.5	160	0.98	0.79	N/A
P420HP	13.0	3045	1450	27.1	160	0.98	0.94	32.8

Metric Measurements

	Max. Flow	Nominal/ Intermittent Pressure	Max. Speed	Power Req'd	Max. Temp.	Plunger Diameter	Stroke	NPSHR
Model	L/min	Bar	RPM	kW	°C	mm	mm	mWs
P423HP	31.1	280	1450	17.1	70	22	20	N/A
P422HP	37.3	280	1450	20.6	70	22	24	10.0
P425HP	40.6	210	1450	16.8	70	25	20	N/A
P420HP	48.8	210	1450	20.2	70	25	24	10.0

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.

Horsepower Ratings:

We recommend a 1.15 service factor be specified when selecting an electric motor as the power source.

To compute electric motor horsepower required, use the following formula: $HP = (GPM \times PSI) / 1450$.

The formula to determine the horsepower required for a gas engine is: $HP = (GPM \times PSI) / 1150$.

The formula to determine the horsepower required for a diesel engine is: $HP = (GPM \times PSI) / 1250$.

For the Application of a Hydraulic Motor:

To Determine the Torque of a Hydraulic Motor -- $(GPM \times PSI \times 36.77) / RPM = \text{Torque (in-lbs)}$

Calculating RPM / GPM of Pump:

A pump must be connected to an electric motor or gas or diesel engine with the correct ratio of pulleys and belts to attain the required speed and GPM. The use of a Variable Frequency Drive (VFD) may also be used to control the RPM of a properly sized electric motor when variable flows are required.

$(\text{Max. Pump RPM} / \text{Rated Pump GPM}) \times \text{Required Pump GPM} = \text{Required Pump RPM}$

To calculate a pulley diameter one (1) pulley diameter and the required pump RPM must be known:

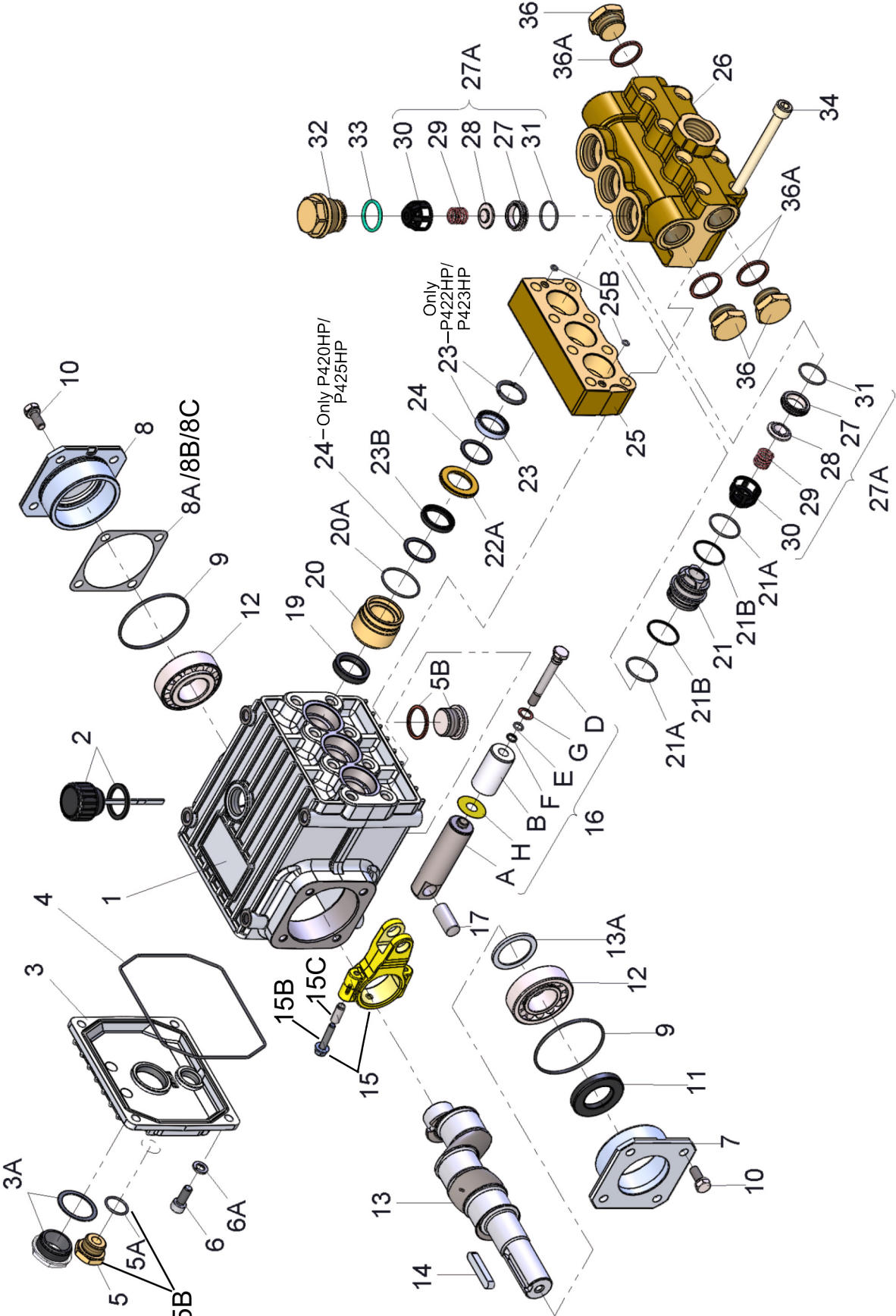
$(\text{Pump RPM} \times \text{Pump Pulley Diameter}) / \text{Motor RPM} = \text{Motor Pulley Diameter}$

$(\text{Motor RPM} \times \text{Motor Pulley Diameter}) / \text{Pump RPM} = \text{Pump Pulley Diameter}$

Common Specifications:

Inlet Pressure 145 PSI (10 Bar)
 Crankshaft Diameter.....(28 mm)
 Oil Capacity30.4 fl. oz. (0.9 L)
 Inlet Ports(1) 1" BSP, (2) 3/4" BSP
 Discharge Ports(2) 3/4" BSP
 Weight42 lbs (19 kg)
 Key Width8mm
 Shaft RotationTop of Pulley Towards Fluid End
 Shaft MountingEither Side

P400HP Series Exploded View



P400HP Series Spare Parts List

A = P423HP B = P422HP C = P425HP D = P420HP

<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	08377	Crankcase	1	16F	07203	Backup Ring	3
2	08378	Oil Fill Plug with Gasket	1	16G	07258	Copper Washer	3
3	06479	Crankcase Cover	1	16H	06431	Oil Scraper	3
3A	07186	Oil Sight Glass w/ Gasket	1	17	06790	Crosshead Pin	3
4	08380	O-Ring	1	19	05444	Oil Seal	3
5	07109	Oil Drain Plug	1	20	05601	Seal Case (A, B)	3
5A	06015	O-Ring	1	20	05443	Seal Case (C, D)	3
5B	08092	Plug with Gasket	1	20A	07266	O-Ring	3
6	01010	Screw	4	21	05965	Seal Sleeve (A, B)	3
6A	01011-0400	Spring Washer	4	21	05966	Seal Sleeve (C, D)	3
7	04739	Bearing Cover Open	1	21A	07281	O-Ring	6
8	05291	Bearing Cover Closed	1	21B	05967	Support Ring	6
8A	05292	Shim	1-3	22A	06254	Drip Return Ring (A, B)	3
8B	05293	Shim	1	22A	05968	Drip Return Ring (C, D)	3
8C	05964	Shim	2	23	06249	V-Sleeve with Support Ring (A, B)	3
9	01016	O-Ring	2	23	12254	V-Sleeve, 25mm (C, D)	3
10	07114	Screw with Washer	8	23B	13390	Weep Seal (A, B)	3
11	07459	Radial Shaft Seal	1	23B	12255	Weep Seal (C, D)	3
12	05350	Taper Roller Bearing	2	24	06252	Pressure Ring (A, B)	3
13	04740	Crankshaft (A, C)	1	24	08376	Pressure Ring (C, D)	6
13	04741	Crankshaft (B, D)	1	25	05969	Seal Casing	1
14	08091	Fitting Key	1	25B	02009	O-Ring	2
15	08390	Connecting Rod Assembly	3	26	05970	Manifold	1
15B	05349	Connecting Rod Screw	6	27A	06936	Valve Assembly	6
15C	05348	Adapter Sleeve	6	27	06937	Valve Seat	6
16	05351	Plunger Assy., 25mm, (C, D)	6	28	06938	Valve Plate	6
		for items 16A-16H	3	29	06377-0100	Valve Spring	6
16	05353	Plunger Assy., 22mm, (A, B)	6	30	06939	Valve Spring Retainer	6
		for items 16A-16H	3	31	07212	O-Ring	6
16A	05352	Plunger Base	3	32	05971	Plug	3
16B	06247	Plunger Pipe, 22mm (A, B)	3	33	05972	O-Ring	3
16B	08398	Plunger Pipe, 25mm (C, D)	3	34	05973	Cap Screw	8
16D	08399	Tensioning Screw	3	36	07703	Plug, 3/4" BSP	3
16E	07023	O-Ring	3	36A	04663	Seal Ring	3

P400HP Series Repair Kits

Plunger Packing Kits

P422HP, P423HP - # 09722

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty</u>
20A	07266	O-Ring	3
21A	07281	O-Ring	6
21B	05967	Support Ring	6
23	06249	V-Sleeve with Support Ring	3
23B	13390	Weep Seal	3
24	06252	Pressure Ring	3
25B	02009	O-Ring	2

Plunger Packing Kits

P420HP, P425HP - # 09723

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty</u>
20A	07266	O-Ring	3
21A	07281	O-Ring	6
21B	05967	Support Ring	6
23	12254	V-Sleeve	3
23B	12255	Weep Seal	3
24	08376	Pressure Ring	6
25B	02009	O-Ring	2

Valve Assembly Kit

P400HP Series - # 09724

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty.</u>
27A	06936	Valve Assembly, Complete	6
33	05972	O-Ring	6

Oil Seal Kit

P400HP Series - # 09641

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Qty</u>
19	05444	Oil Seal	3

P420HP / P422HP / P423HP / P425HP Repair Instructions

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.

Changing the Seals



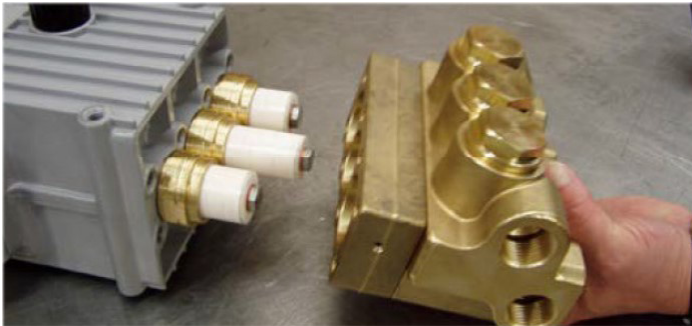
(Photo 1)

Remove the 8 socket screws (34) (photo 1) on the valve casing (26).



(Photo 2)

Using a plastic hammer, tap off the valve casing (photo 2).



(Photo 3)

The seal retainers (20) will remain either in the drive casing or in the seal casing (25) (photo 3).



Carefully lever the seal casing off the valve casing by placing two screw drivers in the seal casing side notches. Be careful not to damage casing surfaces (photo 4).

(Photo 4)



The seal sleeves (21) will remain either in the seal casing (25) or in the valve casing (26) (photo 5).



(Photo 6)

Lever seal sleeves (21) out of the valve casing or respectively the seal casing (25) using two flat screwdrivers placed in the sleeve grooves (photos 6 and 7).



(Photo 7)

P420HP / P422HP / P423HP / P425HP Repair Instructions



(Photo 8)

Then lever seal retainers (20) out of the seal casing (25) with two flat screwdrivers if necessary (photo 8).

Examine o-rings (20A/21A/25B) and support rings (21B) and replace if necessary.

Cover new o-rings lightly with oil before fitting.



(Photo 9)

Remove drip return ring (22A) and support ring (24) from seal case (photo 9).



(Photo 10)

The high pressure seal (23) in the seal casing (25) can be pushed out carefully by hand (photo 10).



(Photo 11)

Drip return ring (23B) must be carefully levered out with a flat screwdriver (photo 11).



(Photo 16)

Next take support ring (24) out of seal retainer (applies only to P425HP and P420HP). Examine grooved rings (23 and 23B) and support rings (24) and replace if necessary (to fit see photo 16 and 17).



(Photo 17)

IMPORTANT! Pay careful attention not to damage the surfaces in the seal casing as these are sealing surfaces.

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

IMPORTANT! Plunger surfaces are not to be damaged. If there are lime deposits in the pump, care must be taken that the drip-return bores in parts (25 and 26) are clean and ensure trouble-free drip-return (photo 20).

P420HP / P422HP / P423HP / P425HP Repair Instructions



(Photo 13)

When fitting the drip-return seal, put in the support ring (42) first (only for P425HP and P420HP). Then make sure that the seal is fitted with its profile facing up (photo 13).



(Photo 14)

Then carefully press the greased seal into its recess in the seal retainer (20) (photo 14).



(Photo 15)

To fit the high pressure seal (23), put the seal sleeves (21) into the seal casing (25) (photo 15).



(Photo 16)



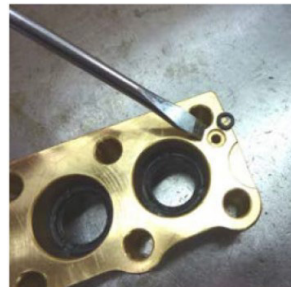
(Photo 17)

Place the seal casing onto the seal sleeves (21). Then put the greased seal (23) into the fitting sleeve with its **profile** facing **down** (photo 16) and press it into its recess in the seal casing (25) (photo 17).



(Photo 18)

Lever out the o-rings (25B) (photo 18) with a small screwdriver; examine them and replace if necessary (photo 19). Coat the o-rings with silicon grease and place them in their recesses in seal casing (25).



(Photo 19)



(Photo 20)

IMPORTANT! Make sure that the drip return bores in the seal casing and valve casing are free of lime and other deposits (photo 20).

P420HP / P422HP / P423HP / P425HP Repair Instructions



(Photo 21)

Carefully put the seal retainers (20) together with the greased drip return seal (22) and support ring (24) onto the plunger (photo 21).



(Photo 22)

Using a fitting sleeve, press the seal retainers (20) over the plunger and into their recess in the drive casing (photo 22 and 23). Then turn seal retainers (20) so that the Ø8 side bore faces down (photo 23).



(Photo 23)



(Photo 24)



(Photo 25)

Finally push drip return ring (22A) then support ring (24) onto the plungers (photo 24 and 25).

Checking the Valves



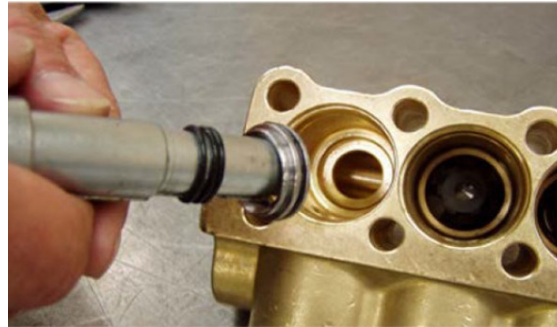
(Photo 26)

To check suction valves: The spring tension cap (30) of the suction valve can now be removed by carefully levering it off the valve seat (27) with a screwdriver (photo 26)

P420HP / P422HP / P423HP / P425HP Repair Instructions



(Photo 27)



(Photo 28)



(Photo 29)

Then pull out the exposed valve seat (27) (photo 27) using a size 4 (20-30mm) extractor tool (photo 28). Examine the individual suction valve parts (photo 27 and 28) and replace if necessary. Check o-rings (31) and replace if necessary.

When refitting, place the valve plate (28) on the valve seat (27); put the valve spring (29) onto the centring neck of the valve plate (photo 29).



(Photo 30)

Then place the spring tension cap (30) on top and press it down with the thumb until it clicks into the valve seat (photo 30).



(Photo 31)

Place the suction valve onto its recess in the valve casing (26), and press it down with the thumb until it clicks into position (photo 31).



(Photo 32)

To check discharge valves: Screw off plugs (32) (tool size 32) (photo 32).



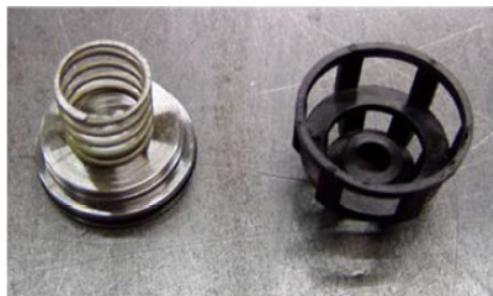
(Photo 33)

Using a screwdriver, lever out the spring tension cap (30) (photo 33).



(Photo 34)

Remove the valve parts and take out the valve seat using a size 4 (20-30 mm) extractor tool (photo 34).



(Photo 35)

if necessary. When refitting, place valve plate (28) on valve seat (27); put the valve spring (29) onto the centring neck of the valve plate (photo 35).



(Photo 36)

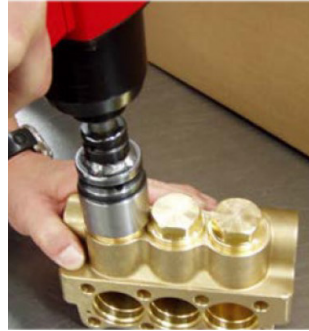
Then place spring tension cap (30) on top and press it down with the thumb until it clicks into the valve seat (photo 36).

P420HP / P422HP / P423HP / P425HP Repair Instructions



(Photo 37)

Place the discharge valve onto its recess in the valve casing (26) and press it down with the thumb until it clicks into position (photo 37).



(Photo 38)

Screw in plugs (32) and tighten at 107 ft.-lbs. (145 Nm) (photo 38).



(Photo 39)

Now put seal casing (25) together with the mounted seal sleeves (21) onto the valve casing (26) (photo 39).



(Photo 40)

Then using a plastic hammer, tap the seal casing until it lies evenly on the valve casing (photo 40).

IMPORTANT! When refitting the seal casing, make sure that the greased o-rings (25B) are fitted and do not fall out during positioning (photo 18 and 20).



(Photo 41)

Push the valve casing together with the seal casing over the plungers and onto the drive (photo 41 and 42).



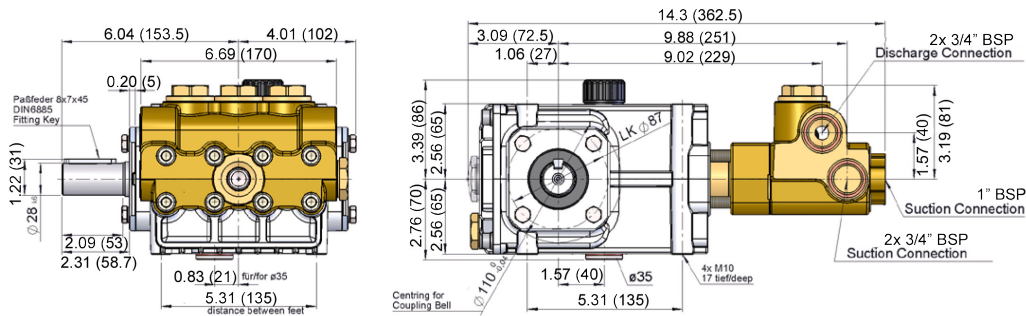
(Photo 42)



(Photo 43)

Screw in the hexagon socket screws (34) and tighten evenly and crosswise at 29.5 ft.-lbs. (40 Nm) (photo 43).

Dimensions - P420HP / P422HP / P423HP / P425HP - 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

GIANT
Performance Under Pressure

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