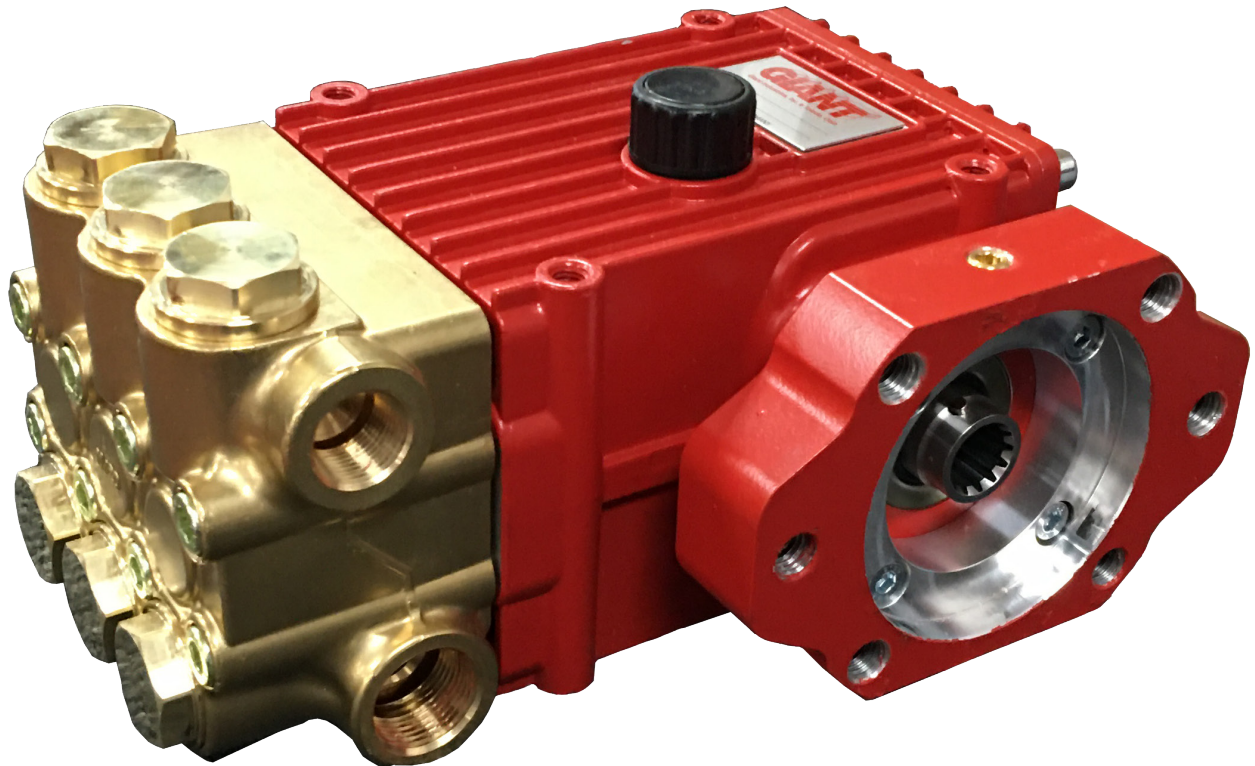


# Models P435H/P455BH

Triplex Ceramic  
Plunger Pump  
Operating Instructions/  
Repair and Service Manual



Updated 02/23

## Contents:

Installation Instructions:	page 2
Pump Specifications:	pages 3
Exploded View:	page 4
Parts List/Kits:	page 5
Torque Specifications:	page 5
Repair Instructions:	pages 6-7
Dimensions:	back page
Warranty Information	back page

# INSTALLATION INSTRUCTIONS

Required NPSH refers to water (specific weight 1kg/dm<sup>3</sup>) 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) 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.**

# PUMP SPECIFICATIONS - P435H/P455BH PUMP

## U.S. Measurements

	Max. Flow	Max. Pressure	Max. Speed	Power Required	Max. Temp	Plunger Diameter	Stroke	Weight
Model	GPM	PSI	RPM	HP	F	in	in	lbs
P455H	5.5	4350/5100 <sup>+</sup>	1450	16.5/19.2 <sup>+</sup>	160	0.71	0.79	38.3
P435H	6.6	3625	1450	16.5	160	0.71	0.94	38.3

## Metric Measurements

	Max. Flow	Max. Pressure	Max. Speed	Power Required	Max. Temp	Plunger Diameter	Stroke	Weight
Model	L/min	Bar	RPM	kW	C	mm	mm	kg
P455H	20.8	300/350 <sup>+</sup>	1450	12.3/14.3 <sup>+</sup>	70	18	20	17.4
P435H	25.0	250	1450	12.3	70	18	24	17.4

<sup>+</sup>Continuous/Intermittent duty

## Common Specifications

## U.S.

## Metric

Maximum Inlet Pressure ..... 145 PSI ..... 10 bar  
 Crankcase Oil Capacity ..... 30.4 fl.oz. .... 0.9 Liters  
 Temperature of Pumped Fluids ..... Up to 160 °F ..... 70 °C  
 Inlet Ports ..... (2) x 3/4" BSP  
 Discharge Ports ..... (2) 1/2" BSP  
 Crankshaft Bore ..... SAE 2B or SAE 4B 13T 16/32 Spline\*\*  
 Shaft Rotation ..... Towards fluid end  
 NPSHR ..... 32.8 feet of head ..... 10.0 meters of head

\*\* 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.

RPM	GPM	2000 PSI	2500 PSI	3000 PSI	3625 PSI
920	4.2	5.8	7.2	8.7	10.5
1050	4.8	6.6	8.3	9.9	12.0
1185	5.4	7.4	9.3	11.2	13.5
1315	6.0	8.3	10.3	12.4	15.0
1450	6.6	9.11	11.4	13.7	16.5

RPM	GPM	2000 PSI	3000 PSI	4350 PSI	5100 PSI
920	3.5	4.8	7.2	10.5	12.3
1050	4.0	5.5	8.3	12.0	14.1
1185	4.5	6.2	9.3	13.5	15.8
1315	5.0	6.9	10.3	15.0	17.6
1450	5.5	7.6	11.4	16.5	19.4

### 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.

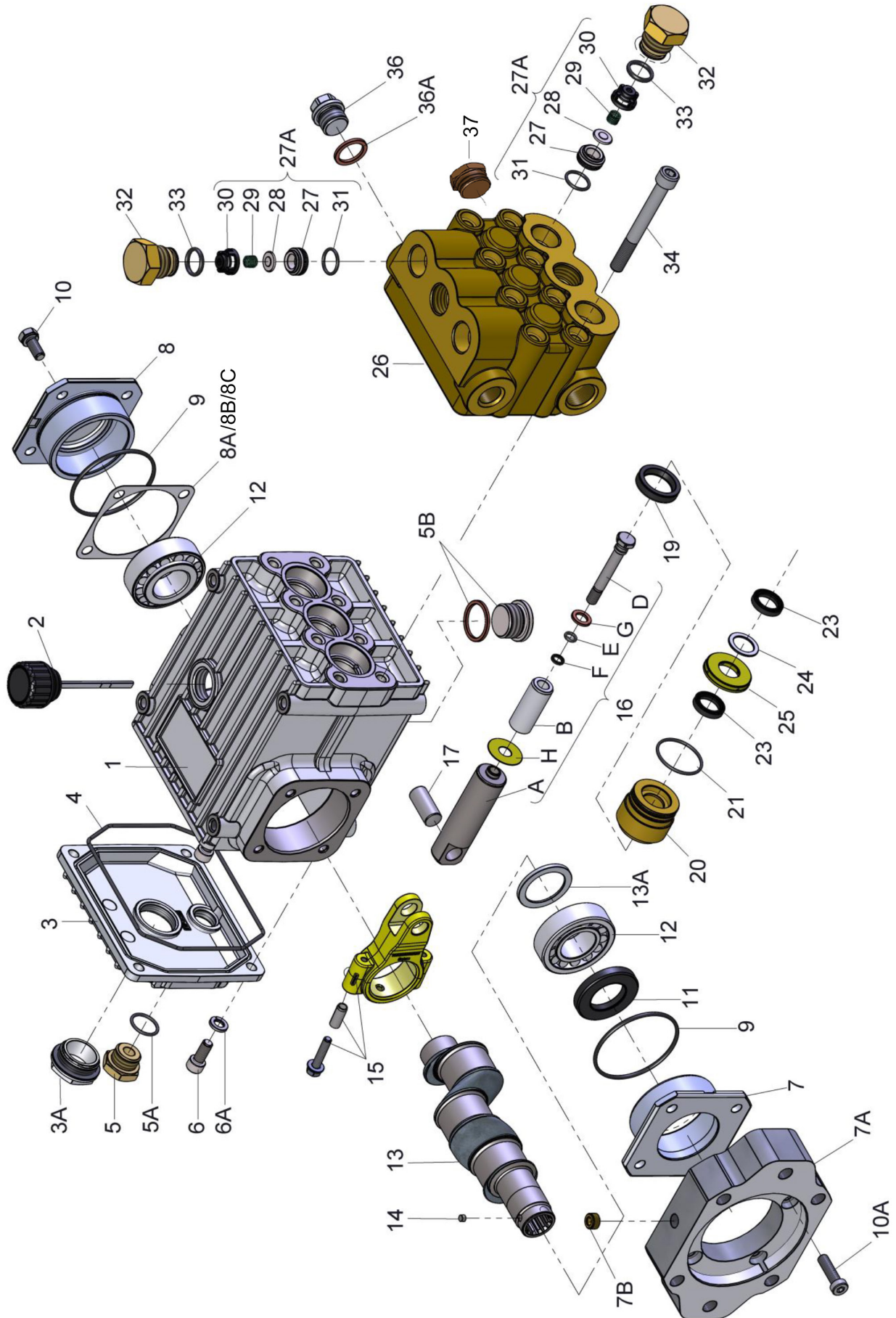
### Horsepower Ratings:

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 - P435H/P455BH



## P435H/P455BH SPARE PARTS LIST

ITEM	PART	DESCRIPTION	QTY.	ITEM	PART	DESCRIPTION	QTY.
1	08377	Crankcase	1	16A	05352	Plunger Base	3
2	08378	Oil Fill Plug with Gasket	1	16B	08397	Plunger Pipe	3
3	06479	Crankcase cover	1	16D	08399	Tension Screw	3
3A	07186	Oil Sight Glass w/ Gasket	1	16E	07023	O-Ring	3
4	08380	O-Ring	1	16F	07203	Backup Ring	3
5	07109	Oil Drain Plug	1	16G	07258	Copper Washer	3
5A	06015	O-Ring for Oil Drain Plug	1	16H	06431	Oil Scraper	3
5B	08092	Plug with Gasket	1	17	06790	Crosshead Pin	3
6	01010	Screw	4	19	05444	Oil Seal	3
6A	01011-0400	Spring Washer	4	20	05534	Seal Case	3
7	04739	Bearing Cover Open	1	21	07266	O-Ring	3
7A	03266	Motor Flange	1	23	08477	V-Sleeve, 18mm	6
7B	03267	Plug, M12 x 1	1	24	07929	Pressure Ring	3
8	05291	Bearing Cover Closed	1	25	08402	Weep Return Ring	3
8A	05292	Shim	1-3	26	05574	Manifold	1
8B	05293	Shim (May not be present)	1-2	27A	05543	Valve Assembly (Items 27-31)	6
8C	05964	Shim (May not be present)	1-2	27	05541	Valve Seat	6
9	01016	O-Ring	2	28	05542	Valve Plate	6
10	07114	Screw with Washer	4	29	07906	Valve Spring	6
10A	07774	Hexagon Socket Screw	4	30	07907	Valve Spring Retainer	6
11	07459	Radial Shaft Seal	1	31	07770	O-Ring	6
12	05350	Taper Roller Bearing	2	32	05544	Plug	6
13	03268	Crankshaft (P435H)	1	33	05545	O-Ring	6
13	03363	Crankshaft (P455H)	1	34	08484	Cap Screw	8
13A	04742	Spacer Ring	1	36	13434	Plug, 1/2" BSP	1
14	03295	Magnet	1	36A	06272	Copper Washer	1
15	08390	Connecting Rod Assembly	3	37	07703	Plug, 3/4" BSP	1
16	05484	Plunger Assy.(Items 16A-16H)	3				

## P435H/P455BH REPAIR KITS

### Plunger Packing Kit - # 09141

Item	Part#	Description	Qty
21	07266	O-Ring	3
23	08477	V-Sleeve	6
24	07929	Pressure Ring	3

### Valve Assembly Kits

#### P435/P455/P456 - # 09644

Item	Part #	Description	Qty
27A	05543	Valve Assembly, Complete	6
33	05545	O-Ring	6

### Oil Seal Kit - #09641

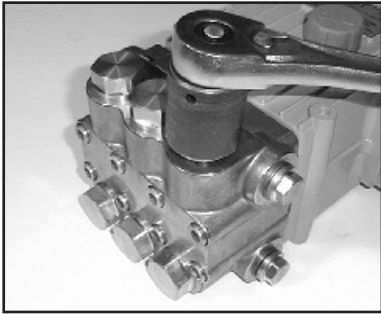
Item	Part #	Description	Qty
19	05444	Oil Seal	3

## TORQUE & LUBRICATION SPECIFICATIONS - P435H/P455BH

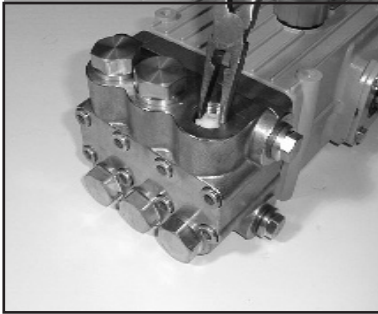
Item	Part #	Description	Lubrication Information	Torque Amount
3A	07186	Oil Sight Glass/Gasket	Loctite 5910	106 in.-lbs. (12 Nm)
5	07109	Plug		59 ft.-lbs. (80 Nm)
5B	08092	Plug w/Gasket		59 ft.-lbs. (80 Nm)
6	01010	Screw		110 in.-lbs. (12.5 Nm)
10	07114	Screw with Washer		132 in.-lbs. (15 Nm)
10A	07774	Hexagon Socket Screw		132 in.-lbs. (15 Nm)
15	08390	Connecting Rod Screw		97 in.-lbs. (11 Nm)
16D	08399	Tension Screw	Loctite 243	247 in.-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 P435H/P455BH

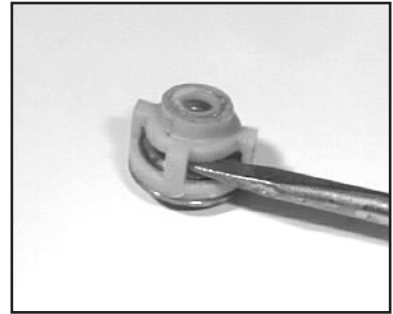
*Note: Always take time to lubricate all metal and nonmetal parts with a light film of oil before reassembly. This step will ensure proper fit, at the same time protecting the pump nonmetal parts (i.e., the elastomers) from cutting and scoring.*



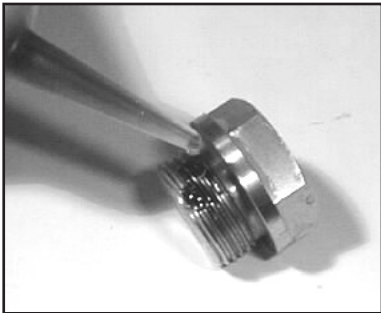
- 1) With a socket wrench, remove the three discharge valve plugs and three inlet valve plugs (32). Inspect the o-ring (33) for wear and replace if damaged.



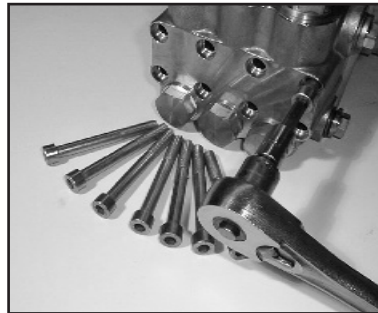
- 2) Using needle nose pliers, remove the inlet and discharge valve assemblies (27A). Note: It may become necessary to remove the valve seat (27) from the valve casing using a slidehammer.



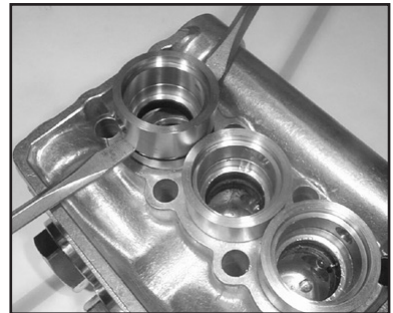
- 3) By inserting a small screw driver between the valve seat (27) and the valve spring retainer (30), the valve assembly can be separated.



- 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.



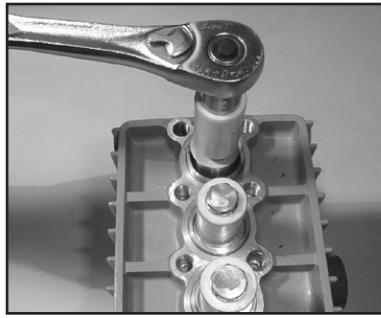
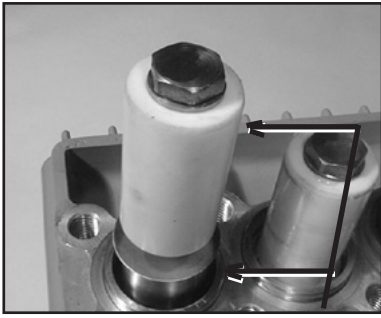
- 7) Remove the pressure rings (24) and v-sleeves (23 - Note: P422 & P423 pumps have a spacer ring) from the valve casing (26).



- 8) Remove the weep grooved seal (23) 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.

## Repair Instructions P435H/P455BH

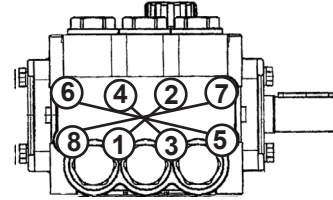


### IMPORTANT!

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.

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).



11) If oil leaks 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).

### 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 connecting 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. Remove magnet (14).

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).

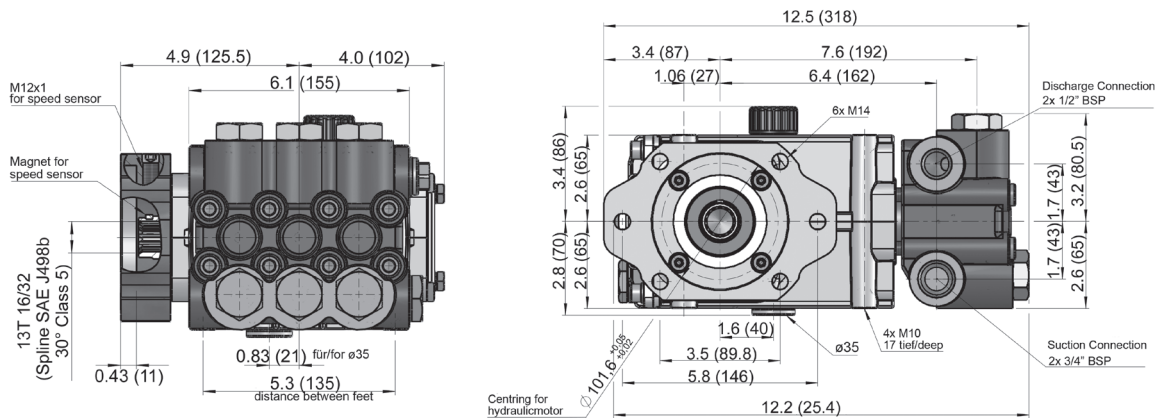
18) Insert connecting rods (25) with plunger bases (16A). Install the crankshaft (13). Mount bearing covers (7 & 8) together with the roller bearing (12) and tighten with screws (10) to 132 in.-lbs (15 Nm) and adjust clearance by fitting shims (8A/8B/8C) under the bearing cover (8) to ensure the crankshaft (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).

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

## P435H/P455BH Dimensions - in (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

**GIANT INDUSTRIES, INC.**

900 N. Westwood Ave., Toledo, Ohio 43607  
 PHONE (419) 531-4600 FAX (419) 531-6836  
[www.giantpumps.com](http://www.giantpumps.com)

© Copyright 2023 Giant Industries, Inc.