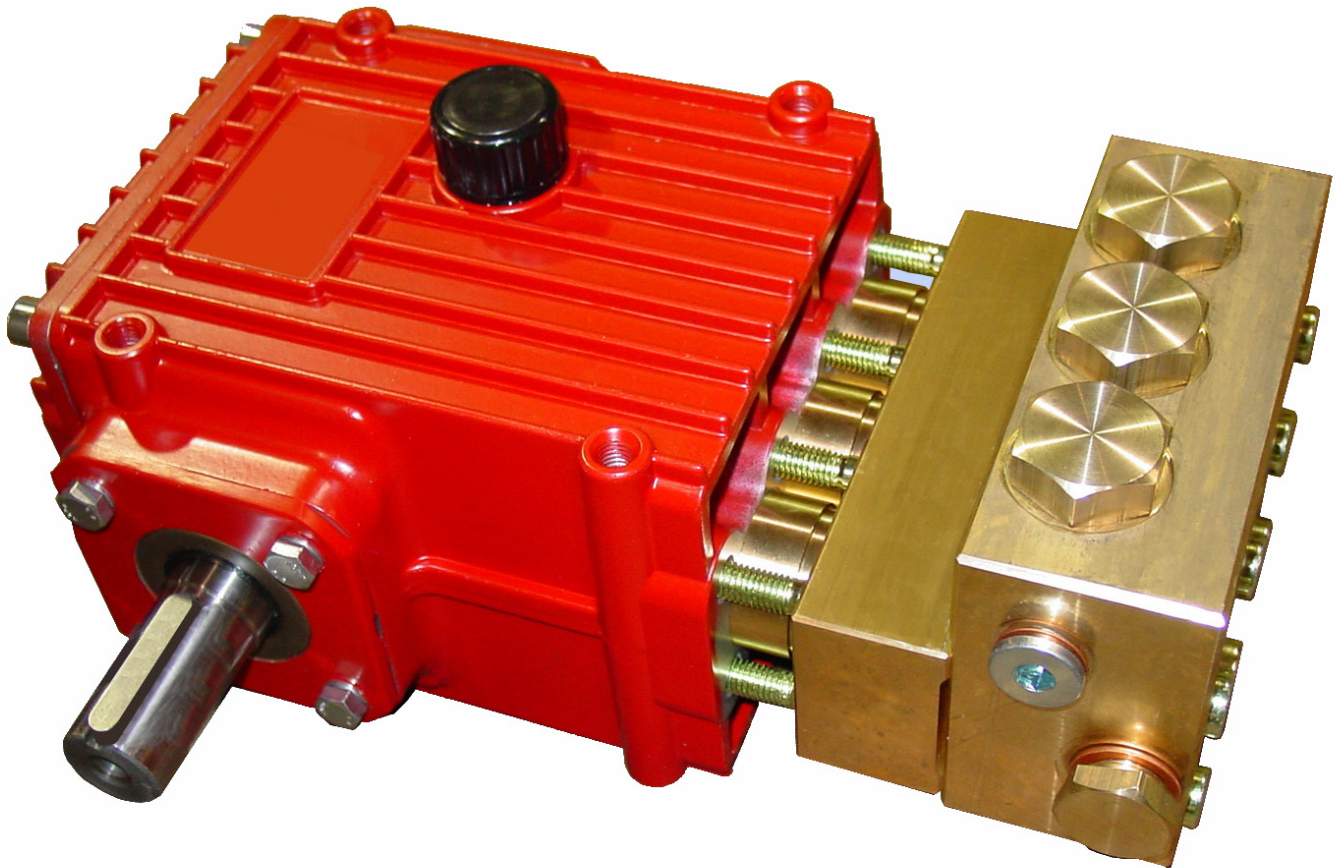


Pump Models P465 / P485

Triplex Ceramic
Plunger Pump
Operating Instructions/
Repair and Service Manual



Contents:

Installation / Operating Instructions:	page 2
Pump Specifications (P465):	page 3
Exploded View:	page 4
Parts List, Kits:	page 5
Torque Requirements:	page 5
Pump Specification (P485):	page 6
Maintenance Instructions:	page 7
Dimensions:	back page
Warranty Information	back page

Updated 07/12

INSTALLATION INSTRUCTIONS

Installation of the Giant Industries, Inc., pump is not a complicated procedure, but there are some basic steps common to all pumps. The following information is to be considered as a general outline for installation. If you have unique requirements, please contact Giant Industries, Inc. or your local distributor for assistance.

1. The pump should be installed flat on a base to a maximum of a 15 degree angle of inclination to ensure optimum lubrication.
2. The inlet to the pump should be sized for the flow rate of the pump with no unnecessary restrictions that can cause cavitation. Teflon tape should be used to seal all joints. If pumps are to be operated at temperatures in excess of 104° F, it is important to insure a positive head to the pump to prevent cavitation.
3. The discharge plumbing from the pump should be properly sized to the flow rate to prevent line pressure loss to the work area. It is essential to provide a safety bypass valve between the pump and the work area to protect the pump from pressure spikes in the event of a blockage or the use of a shut-off gun. Operating pressure should not be exceeded by more than 10%.
4. Use of a dampener is necessary to minimize pulsation at drive elements, plumbing, connections, and other system areas. The use of a dampener with Giant Industries, Inc. pumps is optional, although recommended by Giant Industries, Inc. to further reduce system pulsation. Dampeners can also reduce the severity of pressure spikes that occur in systems using a shut-off gun. A dampener must be positioned downstream from the unloader.
5. Crankshaft rotation on Giant Industries, Inc. pumps should be made in the direction designated by the arrows on the pump crankcase. Reverse rotation may be safely achieved by following a few guidelines available upon request from Giant Industries, Inc. The drive shaft and coupling must be covered by a protective cover. Required horsepower for system operation can be obtained from the charts on page 3.
6. Before beginning operation of your pumping system, remember: Check that the crankcase and seal areas have been properly lubricated per recommended schedules. Do not run the pump dry for extended periods of time. Cavitation will result in severe damage. Always remember to check that all plumbing valves are open and that pumped media can flow freely to the inlet of the pump.

Finally, remember that high pressure operation in a pump system has many advantages. But, if it is used carelessly and without regard to its potential hazard, it can cause serious injury.

IMPORTANT OPERATING CONDITIONS

Failure to comply with any of these conditions invalidates the warranty.

1. Prior to initial operation, add oil to the crankcase so that oil level is between the two lines on the oil dipstick. DO NOT OVERFILL.

Use Giant Oil # 01154 or the equivalent SAE 80W - 90 Industrial Gear oil .

Crankcase oil should be changed after the first 50 hours of operation, then at regular intervals of 200 hours or less depending on operating conditions. When operating in high humidity or extreme temperature fluctuations, frothy oil can occur. Oil must be changed immediately when encountered.
2. Pump operation must not exceed rated pressure, volume, or RPM. A pressure relief device must be installed in the discharge of the system.
3. Acids, alkalines, or abrasive fluids cannot be pumped unless approval in writing is obtained before operation from Giant Industries, Inc.
4. Run the pump dry approximately 10 seconds to drain the water before exposure to freezing temperatures.

Specifications Model P465

	<u>U.S.</u>	<u>Metric</u>
Maximum Flow	6.3 GPM	23.9 L/min
Maximum Discharge Pressure	5800 PSI	400 Bar
Inlet Pressure	-4.35 to 145 PSI	-0.3 to 10 Bar
Stroke	0.94"	24mm
RPM.....		Up to 1450 RPM
Plunger Diameter.....	0.71"	18mm
Maximum Temperature of Pumped Fluids.....	104 °F	40°C
Inlet Ports		(2) 1/2" BSP
Discharge Ports		(2) 3/8" BSP
Shaft Rotation.....		Top of pulley towards fluid end
Crankshaft Diameter.....		28mm
Key Width		8mm
Shaft Mounting		Either side ¹
Weight	37.5 lbs.	17kg
Manifold Material		Extruded Brass
Crankcase Capacity	27 fl.oz.	0.8 liters
Volumetric Efficiency @ 1450 RPM.....		0.90
Mechanical Efficiency @ 1450 RPM		0.80

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.

¹NOTES:

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.

P465 HORSEPOWER REQUIREMENTS				
RPM	GPM	4000 PSI	5000 PSI	5800 PSI
1000	4.3	12.0	15.0	17.4
1100	4.8	13.2	16.4	19.1
1200	5.2	14.4	18.0	20.8
1300	5.6	15.6	19.4	22.6
1450	6.3	17.4	21.7	25.2

SPECIAL NOTE:

The theoretical gallons per revolution (gal/rev) is 0.00434. To find specific outputs at various RPM, use the formula:

$$\text{GPM} = 0.00434 \times \text{RPM}$$

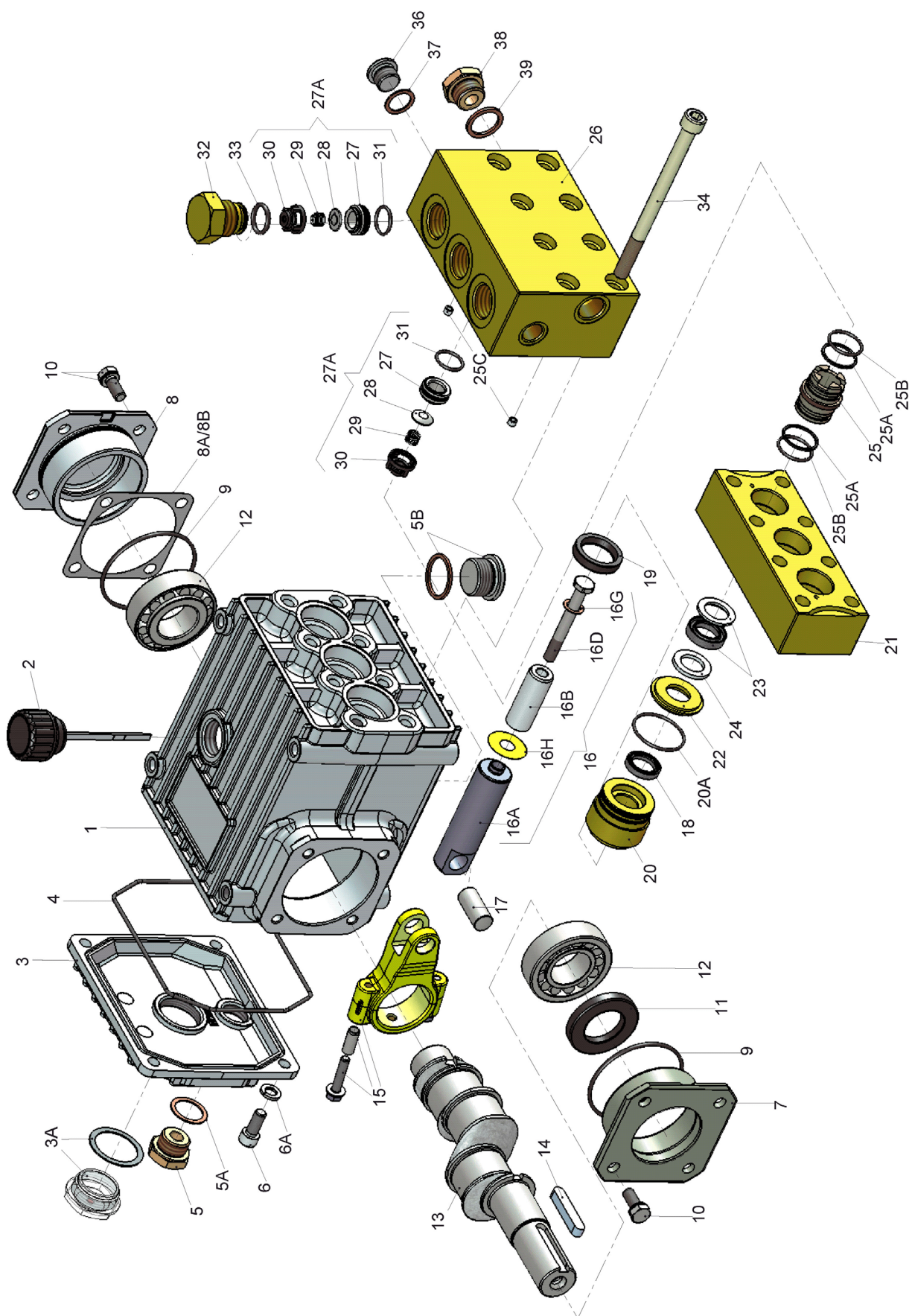
HORSEPOWER RATINGS:

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 horse power requirements, use the following formula:

$$\text{HP} = (\text{GPM} \times \text{PSI}) / 1450$$

Exploded View - P465 / P485



P465 / P485 PARTS LIST

<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	18	08477	Grooved Seal	3
2	08378	Oil Fill Plug with Gasket	1	19	05444	Oil Seal	3
3	06479	Crankcase Cover	1	20	05534	Seal Adapter	3
3A	07186	Oil Sight Glass w/Gasket	1	20A	07266	O-Ring	3
4	08380	O-Ring	1	21	05535	Seal Casing	1
5	07109	Oil Drain Plug	1	22	05536	Drip Return Ring	3
5A	07182	Gasket for Oil Drain Plug	1	23	05517	Grooved Seal Packing	3
5B	08092	Plug with Gasket	1	24	05537	Support Ring	3
6	01010	Screw	4	25	05547	Seal Case	3
6A	01011-4000	Spring Washer	4	25A	05538	Support Ring for O-Ring	6
7	05290	Bearing Cover Open	1	25B	07489	O-Ring	6
8	05291	Bearing Cover Closed	1	25C	05539	Border Seal Ring	2
8A	05292	Shim	1-3	26	05516	Valve Casing	1
8B	05293	Shim	1	27A	05540	Inlet Valve Assy.	3
9	01016	O-Ring	2	27B	05543	Discharge Valve Assy.	3
10	07114	Screw with Washer	8	27	05541	Valve Seat	6
11	07459	Radial Shaft Seal	1	28	05542	Valve Plate	6
12	05350	Bearing	2	29	07906	Valve Spring	6
13	08475	Crankshaft (P465)	1	30	07907	Valve Spring Retainer	3
13	08482	Crankshaft (P485)	1	30A	07492	Valve Spring Retainer	3
14	08091	Fitting Key	1	31	07770	O-Ring	6
15	08390	Connecting Rod Assy.	3	32	05544	Plug	3
16	05531	Plunger Assy.	3	33	05545	O-Ring	3
16A	05352	Plunger	3	34	05546	Cap Screw	8
16B	05532	Plunger Pipe	3	36	06273	Plug, 3/8" BSP	1
16D	05533	Tension Screw	3	37	08486	Copper Washer	1
16G	07676	Copper Gasket	3	38	07109	Plug, 1/2" BSP	1
16H	06431	Oil Scraper	3	39	06272	Copper Washer	1
17	06790	Crosshead Pin	3				

P465 / P485 REPAIR KITS

Plunger Packing Kits

Part # 09640

<u>Item</u>	<u>Qty.</u>	<u>Part #</u>	<u>Description</u>
18	3	08477	Grooved Seal
20A	3	07266	O-Ring
23	3	05517	Grooved Seal Packing
24	3	05537	Support Ring
25A	6	05538	Support Ring for O-ring
25B	6	07489	O-Ring
25C	2	05539	Border Seal Ring

Oil Seal Kit

Part # 09641

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

Valve Kits

Inlet Valves # 09648

<u>Item</u>	<u>Qty.</u>	<u>Part #</u>	<u>Description</u>
27	3	05541	Valve Seat
28	3	05542	Valve Plate
29	3	07906	Valve Spring
30A	3	07492	Valve Spring Retainer
31	3	07770	O-Ring

Discharge Valves # 09647

<u>Item</u>	<u>Qty.</u>	<u>Part #</u>	<u>Description</u>
27	3	05541	Valve Seat
28	3	05542	Valve Plate
29	3	07906	Valve Spring
30	3	07907	Valve Spring Retainer
31	3	07770	O-Ring
33	3	05545	O-Ring

P465 / P485 TORQUE SPECIFICATIONS

<u>Item</u>	<u>Part #</u>	<u>Description</u>	<u>Torque Amount</u>
16D	05533	Tension Screw	18.5 ft.-lbs.
32	05544	Plug	106 ft.-lbs.
34	05546	Cap Screw	30 ft.-lbs.

Model P485 Specifications

	<u>U.S.</u>	<u>Metric</u>
Maximum Flow	5.3 GPM	19.9 L/min
Maximum Discharge Pressure	7250 PSI	500 Bar
Inlet Pressure	-4.35 to 145 PSI	-0.3 to 10 Bar
Stroke	0.79"	20mm
RPM.....	Up to 1450 RPM	
Plunger Diameter.....	0.71"	18mm
Maximum Temperature of Pumped Fluids.....	104 °F	40° C
Inlet Ports	(2) 1/2" BSP	
Discharge Ports	(2) 3/8" BSP	
Shaft Rotation.....	Top of pulley towards fluid end	
Crankshaft Diameter.....	1.10"	28mm
Key Width	0.31"	8mm
Shaft Mounting	Either side ¹	
Weight	37.5lbs.	17kg
Manifold Material	Extruded Brass	
Crankcase Capacity	27 fl.oz.	0.8 liters
Volumetric Efficiency @ 1450 RPM.....	0.90	
Mechanical Efficiency @ 1450 RPM	0.80	

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.

¹NOTES:

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.

P485 HORSEPOWER REQUIREMENTS					
RPM	GPM	4000 PSI	5000 PSI	6000 PSI	7250 PSI
1000	3.6	10.0	12.5	15.0	18.1
1100	4.0	11.0	13.7	16.5	19.9
1200	4.3	12.0	15.0	18.0	21.7
1300	4.7	13.0	16.2	19.4	23.5
1450	5.3	14.5	18.1	21.7	26.3

SPECIAL NOTE:

The theoretical gallons per revolution (gal/rev) is 0.00362. To find specific outputs at various RPM, use the formula:

$$\text{GPM} = 0.00362 \times \text{RPM}$$

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:

$$\text{HP} = (\text{GPM} \times \text{PSI}) / 1450$$

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

MAINTENANCE INSTRUCTIONS - P465 / P485

1. Inlet and Discharge Valves

Unscrew plugs (32) using a 32mm socket wrench. Using a pair of flat pliers, remove the discharge valve (27B). Disassemble valve. Unscrew (8) hexagon socket screws (34) and remove valve casing (26) by pulling off to the front. Remove inlet valves (27A) with flat pliers and disassemble. Examine spring tension caps (30,30A), valve springs (29), valve plates (28), valve seats (27) and o-rings (31,33). Replace worn parts. Take care to reassemble in the correct order. Coat the threads of plug (32) with *Loctite* and tighten to 106 ft.-lbs. (145 NM).

2. Seals

Remove the seal cases (25) from the seal casing (21) and examine o-rings (25A) and support rings (25B). The seal case (25) has an M30x1 thread and can be easily removed with fitting tool # 15.1010. Remove seal adapter (20) from the seal casing. Check o-rings (20A), grooved rings (18) and grooved seal pack (23) and the guide rings (24) for wear. Grease new seal rings and o-rings with a light coating of lubricant.

IMPORTANT Mounting tools are available for fitting the seals into the seal casing and seal adapters. If mounting tools are not available carefully insert the grooved seal pack (23) little by little into the bore of the seal casing by using the flat side of a screwdriver, making sure that the seal lip faces into the seal casing (21). Press grooved seal (18), flat side first, into the seal retainer. Under no circumstances must the seal surface in the valve casing or the seal lip of the grooved seal be damaged. Carefully check the surfaces of the plungers (16B). Damaged surfaces cause accelerated seal wear. Deposits of all kinds must be removed from the plungers. Plunger surfaces must not be damaged during this procedure. If there are lime deposits in the pump, care must be taken that the drip-return bores in parts (21) and (28) are open to ensure trouble-free drip return. If the plunger pipe (16B) is worn, loosen tension screw (16D) and remove together with plunger pipe. Check and clean plunger surface (16A), check oil scraper (16H) and replace with new plunger pipe and copper gasket (16G). Cover thread of tension screw (16D) with a thin film of *Loctite* and tighten carefully to 13.5 ft.-lbs. (25 NM).

IMPORTANT Glue / *Loctite* must never come between the plunger pipe (16B) and the centring support on the plunger (16A). Deformation of the plunger pipe due to improper tightening of the tension screw as well as dirt or damage on the front surface can fracture the plunger pipe. When remounting the valve casing, tighten the hexagon socket screws (34) to 30 ft.-lbs. (40 NM).

3. Gear End

If oil leaks where the plunger (16) extends from the crankcase (1), the oil seals (19) and plungers (16) must be examined and replaced if necessary. Remove oil plug (5) and drain oil; remove crankcase cover (3). Remove valve casing (26), seal casing (21) and seal adapters (20). Then remove plunger pipes (16B) and oil scrapers (16H) as described above.

IMPORTANT Before removing conn-rods be aware of their position on the crankshaft so as to return them to the same location when re-assembling.

Remove screws from connecting rods (15), separate the back conn-rod half from the crankshaft and the front conn-rod half by threading a screw into the center back bore of the conn-rod. The conn-rod halves must be kept as pairs - do not mix them up. Push conn-rod shaft as far as possible into the crosshead guide. Remove screws (10) and pry bearing covers (7,8) off gently with a screwdriver.

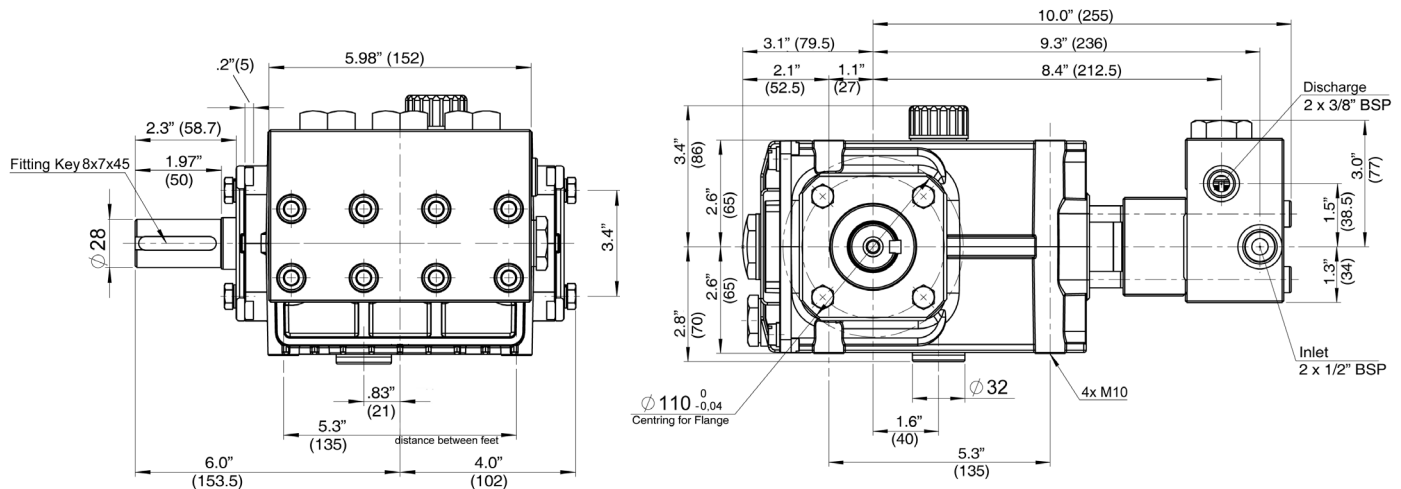
Carefully remove crankshaft (13) by threading it through the conn-rods (15), making sure not to bend the conn-rods. Remove and disassemble conn-rods and plungers (16) paying close attention not to damage the plungers. Pry out oil seal (19) using a screwdriver. Examine plunger surfaces (16A) and replace if necessary.

To re-assemble, first press the oil seal (19) into the crankcase. Then insert conn-rods with plungers remembering their original location. Thread in the crankshaft (13). Replace bearing cover (7) and o-ring (9) together with the radial shaft seal (11) and roller bearing (12) and fix in place with screws (10). Replace roller bearing (12), bearing cover (8) and o-ring (9). Adjust the clearance by fitting shims (8A,8B) under the bearing cover as required to ensure that the crankshaft (13) turns easily without play being felt. Finally, mount conn-rod halves on crankshaft matching them with other half and tighten screws (15) to 8 ft.-lbs. Replace crankcase cover (3) and o-ring (4). When remounting the valve casing (26), tighten hexagon socket screws (34) to 30 ft.-lbs. (40NM).

4. To Move Crankshaft to Opposite Side

Remove the valve casing (26) and seal casing (21) together with the seal adapters (20) then rotate the crankcase 180°. Interchange the oil plug ((5B) with oil dipstick (2). Rotate the crankcase cover (3) 180°. Remount the valve casing together with the seal casing and the seal adapters (20). Make sure that the seal adapters are rotated in order that the bores face downwards.

P465 / P485 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. For portable pressure washers and self-service car wash applications, the discharge manifolds will never fail, period. If they ever fail, we will replace them free of charge. Our other pump parts, used in portable pressure washers and in car wash applications, are warranted for five years from the date of shipment for all pumps used in NON-SALINE, clean water applications.
2. One (1) year from the date of shipment for all other Giant industrial and consumer pumps.
3. Six (6) months from the date of shipment for all rebuilt pumps.
4. 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.

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