Triplex Ceramic Plunger Pump Operating Instructions/ Manual

Models
GP5136-5100 & GP5145-5100

Contents:

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 140^0 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.

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. Required horsepower for system operation can be obtained from the charts on pages 3 and 6.

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 crankcase so that oil level is between the two lines on the oil dipstick. DO NOT OVERFILL. **SAE 80 or SAE 90 Industrial Gear (p/n 01154) oil may be used**. Crankcase oil should be changed after the first 50 hours of operation, then at regular intervals of 500 hours or less depending on operating conditions.

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.

NOTE: Contact Giant Industries for Service School Information. Phone: (419)-531-4600

Specifications
Model GP5136

Volume ..... Up to 35 GPM
Discharge Pressure ..... Up to 2200 PSI
Speed ..... Up to 945 RPM
Inlet Pressure ..... Up to 145 PSI
Plunger Diameter 36mm
Plunger Stroke 46mm
Crankshaft Diameter ..... 35mm x 10mm key
Crankshaft Mounting ..... Either side
Shaft Rotation ..... Top of pulley towards manifold
Temperature of Pumped Fluids ..... Up to 140 °F
Inlet Ports ..... (3) 1-1/2" BSP
Discharge Ports ..... (2) 1" BSP
Weight ..... 179 lbs.
Crankcase Oil Capacity ..... 1.2 Gal.
Fluid End Material ..... Cast Iron

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.

GP5136 HORSEPOWER REQUIREMENTS

RPM	GPM	1OOO PSI	15OO PSI	1800 PSI	2000 PSI	2200 PSI
700	26	18	27	33	36.3	39.4
750	28	19	29	35	39	42.5
800	30	21	31	37	41	45.5
850	32	22	33	40	44	48.6
945	35	24.1	36.2	43.4	48.2	53.1

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:

HP = (GPM X PSI) / 1450

SPECIAL NOTE:

FOR CONTINUAL OPERATION, THE SPEED OF THE PUMP MUST BE LIMITED TO 700 RPM, AND THE MAXIMUM PRESSURE OF THE PUMP MUST BE REDUCED BY 10%.

Specifications
Model GP5145

Volume ..... Up to 43.3 GPM
Discharge Pressure ..... Up to 1500 PSI
Speed ..... Up to 750 RPM
Inlet Pressure ..... Up to 145 PSI
Plunger Diameter 45mm
Plunger Stroke 46mm
Crankshaft Diameter ..... 35mm x 10mm key
Crankshaft Mounting ..... Either side
Shaft Rotation ..... Top of pulley towards manifold
Temperature of Pumped Fluids ..... Up to 140 °F
Inlet Ports ..... (3) 1-1/2" BSP
Discharge Ports ..... (2) 1" BSP
Weight ..... 179 lbs.
Crankcase Oil Capacity ..... 1.2 Gal.
Fluid End Material ..... Cast Iron

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.

GP5145 HORSEPOWER REQUIREMENTS

RPM	GPM	1OOO PSI	1100 PSI	1300 PSI	1500 PSI
550	31.9	22	24.2	28.6	33
600	34.9	24.1	26.5	31.3	36.1
650	37.8	26	28.7	33.9	39.1
700	40.6	28	30.8	36.4	42
750	43.3	29.9	32.8	38.8	44.8

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.

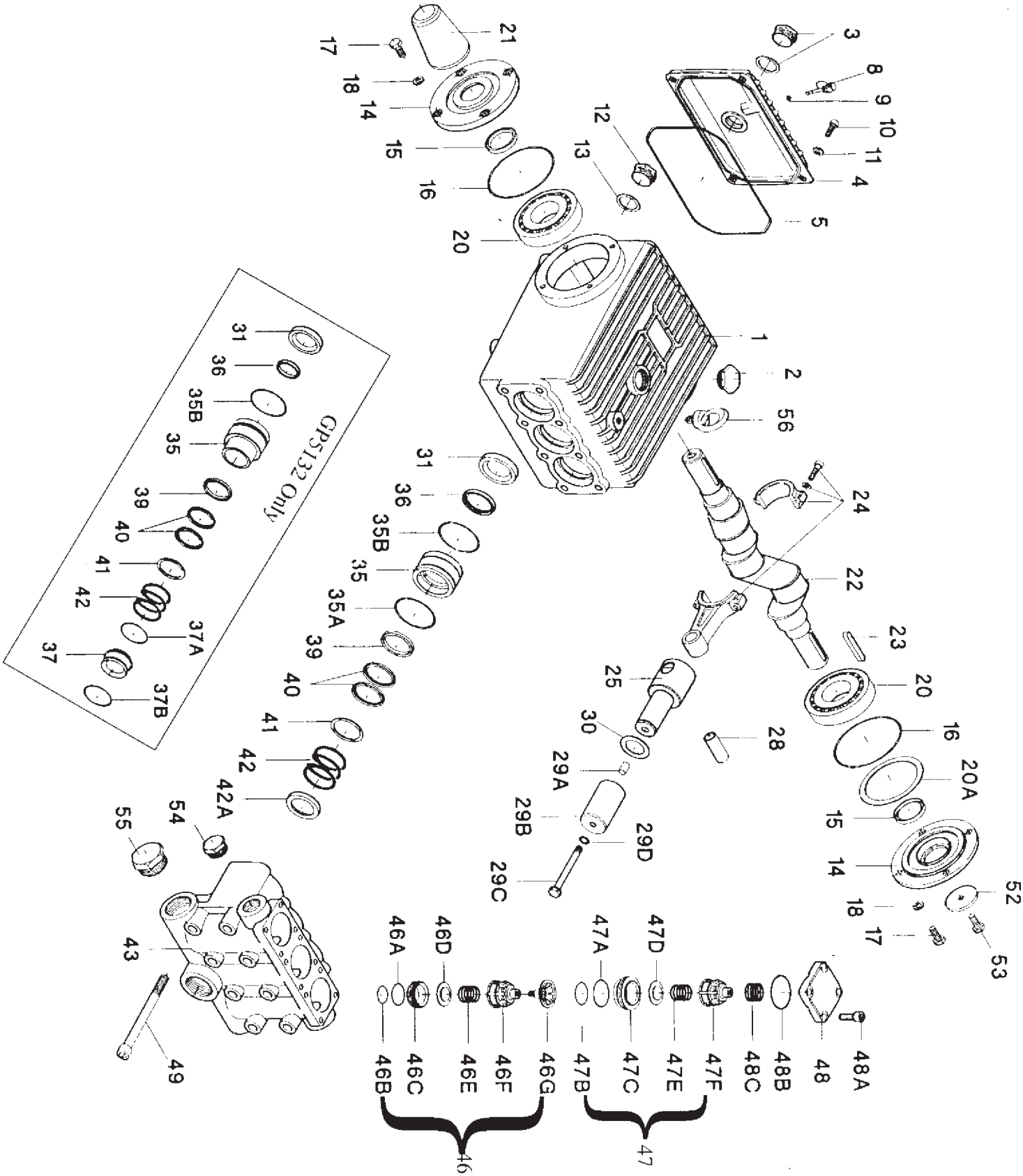
We recommend a 1.15 service factor be specified when selecting an electric motor as the power source. To compute specific pump horsepower requirements, use the following formula:

HP = (GPM X PSI) / 1450

SPECIAL NOTE:

FOR CONTINUAL OPERATION, THE SPEED OF THE PUMP MUST BE LIMITED TO 700 RPM, AND THE MAXIMUM PRESSURE OF THE PUMP MUST BE REDUCED BY 10%.

Exploded View - GP5100 Series



GP5100 Series PARTS LIST

ITEM	PART	DESCRIPTION	QTY.
1	13266	Crankcase	1
2	13000	Oil Filler Plug Assembly	1
3	07186	Oil Sight Glass Assy.	1
4	13267	Crankcase Cover	1
5	13268	O-Ring	1
8	07105	Oil Dip Stick	1
9	01009	O-Ring, Dip Stick	1
10	13270	Inner Hexagon Screw	4
11	13134	Spring Washer	4
12	07703	Drain Plug G 3/4"	1
13	13269	Gasket, Drain Plug	1
14	13271	Bearing Cover	2
15	13272	Radial Shaft Seal	2
16	08182	O-Ring	2
17	13358	Hexagon Screw	8
18	13134	Spring Washer	8
20	13206	Taper Roller Bearing	2
20A	13207	Fitting Disc (Shim)	5
21	13273	Shaft Protector	1
22	13274	Crankshaft	1
23	13275	Fitting Key	1
24	13276	Connecting Rod Assy.	3
25	13279	Crosshead Assy.	3
28	13281	Crosshead Pin	3
29A	07125	Centering Sleeve	3
29B	13022	Plunger Pipe (GP5132)	3
29B	07130	Plunger Pipe (GP5136)	3
29B	13283	Plunger Pipe (GP5145)	3
29C	07131	Tension Screw	3
29D	07755	Oil Scraper	3
30	13282	Copper Ring	3
31	13284	Radial Shaft Seal	3
35	13359	Seal Sleeve (GP5132)	3
35	13288	Seal Sleeve (GP5136)	3
35	13287	Seal Sleeve (GP5145)	3
35A	13289	O-Ring (GP5136)	3
35A	13286	O-Ring (GP5145)	3
35B	08183	O-Ring	3
36	13360	Grooved Ring (GP5132)	3
36	13291	Grooved Ring (GP5136)	3
36	13290	Grooved Ring (GP5145)	3
37	13361	Seal Case (GP5132)	3
37A	07700	O-Ring (GP5132)	3
37B	07653	O-Ring (GP5132)	3
39	13026	Pressure Ring (GP5132)	3
39	07142	Pressure Ring (GP5136)	3
39	13293	Pressure Ring (GP5145)	3
40	13027	V-Sleeve (GP5132)	6
40	07144	V-Sleeve (GP5136)	6
40	13294	V-Sleeve (GP5145)	6
41	13028	Sleeve Support Ring (GP5132)	3
41	07146	Sleeve Support Ring (GP5136)	3
41	13296	Sleeve Support Ring (GP5145)	3
42	07173	Tension Spring (GP5132)	3
42	07147	Tension Spring (GP5136)	3
42	13297	Tension Spring (GP5145)	3
42A	13298	Spring Guide (GP5136 only)	3
43	13300	Valve Casing	1
46	13302	Suction Valve Assy.	3
46A	12055	O-Ring	1*
46B	08059	O-Ring	1*
46C	13304	Suction Valve Seat	1*
46D	13306	Valve Plate	1*
46E	13307	Valve Spring	1*
46F	13308	Spring Tension Cap	1*
46G	13309	Spacer Pipe	1*
47	13311	Discharge Valve Assy.	3
47A	13289	O-Ring	1*
47B	07700	O-Ring	1*
47C	13314	Discharge Valve Seat	1*
47D	13306	Valve Plate	1*
47E	13307	Valve Spring	1*
47F	13308	Spring Tension Cap	1*
48	13316	Plug	3
48A	07008	Inner Hexagon Screw	12
48B	07740	O-Ring	3
48C	07232	Pressure Ring	3
49	13362	Inner Hexagon Screw	8
52	13363	Disc for Crankshaft	1
53	13358	Hexagon Screw	1
54	13321	Plug G 1"	1
55	13322	Plug G 1-1/2"	2

* Per Valve Assembly

GP5100 SERIES REPAIR KITS

Plunger Packing Kits

GP5132 #09290

Qty.	Part #	Description
3	08183	O-Ring
3	13360	Grooved Ring
6	13027	V-Sleeve

GP5136 #09229

Qty.	Part #	Description
3	13289	O-Ring
3	08183	O-Ring
3	13291	Grooved Ring
6	07144	V-Sleeve

GP5145 #09228

Qty.	Part #	Description
3	13286	O-Ring
3	08183	O-Ring
3	13290	Grooved Ring
6	13294	V-Sleeve

Valve Assembly Kits

Inlet Valve Kit, GP5100 Series, #09231

Qty.	Part #	Description
1	12055	O-Ring
1	08059	O-Ring
1	13304	Valve Seat
1	13306	Valve Plate
1	13307	Valve Spring

Discharge Valve Kit, GP5100 Series, # 09232

Qty.	Part #	Description
1	13289	O-Ring
1	07700	O-Ring
1	13314	Valve Seat
1	13306	Valve Plate
1	13307	Valve Spring

Oil Seal Kit

GP5100 Series, #09230

Qty.	Part #	Description
3	13284	Oil Seal

GP5100 SERIES TORQUE SPECIFICATIONS

Position	Item#	Description	Torque Amount (ft.-lbs)
24	13276	Connecting Rod Assy.	26
29C	07131	Tension Screw, Plunger	26
48A	07008	Inner Hexagon Screw, Plug	35
49	13362	Inner Hexagon Screw, Valve Casing	85

PUMP SYSTEM MALFUNCTION

MALFUNCTION	CAUSE	REMEDY
The Pressure and/ or the Delivery Drops	Worn packing seals	Replace packing seals
	Broken valve spring	Replace spring
	Belt slippage	Tighten or Replace belt
	Worn or Damaged nozzle	Replace nozzle
	Fouled discharge valve	Clean valve assembly
	Fouled inlet strainer	Clean strainer
	Worn or Damaged hose	Repair/Replace hose
	Worn or Plugged relief valve on pump	Clean, Reset, and Replace worn parts
	Cavitation	Check suction lines on inlet of pump for restrictions
	Unloader	Check for proper operation
Water in crankcase	High humidity	Reduce oil change interval
	Worn seals	Replace seals
Noisy Operation	Worn bearings	Replace bearings, Refill crankcase oil with recommended lubricant
	Cavitation	Check inlet lines for restrictions and/or proper sizing
Rough/Pulsating Operation with Pressure Drop	Worn packing	Replace packing
	Inlet restriction	Check system for stoppage, air leaks, correctly sized inlet plumbing to pump
	Accumulator pressure	Recharge/Replace accumulator
	Unloader	Check for proper operation
	Cavitation	Check inlet lines for restrictions and/or proper size
Pump Pressure as Drop at gun Rated, Pressure	Restricted discharge plumbing	Re-size discharge plumbing to flow rate of pump
Excessive Leakage	Worn plungers	Replace plungers
	Worn packing/seals	Adjust or Replace packing seals
	Excessive vacuum	Reduce suction vacuum
	Cracked plungers	Replace plungers
	Inlet pressure too high	Reduce inlet pressure
High Crankcase Temperature	Wrong Grade of oil	Giant oil is recommended
	Improper amount of oil in crankcase	Adjust oil level to proper amount

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's non-metal parts (i.e., the elastomers) from cutting and scoring.

To Check Valves

1. Screw-out inner hexagon screws (48A) with an allen wrench. Remove discharge plugs (48) with a screw driver. Check O-Rings (48B) on discharge plugs and replace as necessary.

2. Pull out Pressure Ring (48C). Remove the Spring Tension Cap (47F) from the discharge Valve Plate (47D) lying underneath by screwing in the 10mm screw. Take out the Valve Spring (47E) and Valve Plate (47D). Pull out the Discharge Valve Seat (47C) by means of slide hammer. Check sealing areas of the Valve Plate (47D) and the Valve Seat (47C) for damage and replace worn parts. Check O-Rings (47A and 47B) and replace as necessary.

3. Screw Spacer Pipe (46G) out of the Spring Tension Cap (46F) located in the suction valve lying underneath. Remove the Suction Valve Assembly (46) by screwing in a 10mm screw. Check O-Rings (46A and 46B) and replace as necessary. If the Suction Valve Seat (46C) remains in the Valve Casing (43), remove it with a slide hammer. Check the sealing areas of the Suction Valve Plate (46D) and the Suction Valve Seat (46C) for damage and replace worn parts.

4. After reassembling the above items, tighten the Inner Hexagon Screws (48A) to 35 ft.-lbs.

To Check Seals and Plunger Pipes

1. Loosen the eight Inner Hexagon Screws (49) and pull of the Valve Casing (43) to the front. Pull Seal Sleeves (35) out of the guides in the crankcase and over the plunger pipes (29B). Remove Sleeve Support Ring (41), Sleeves (40) and Grooved Rings (36). Replace worn parts as necessary.

2. If a Plunger Pipe (29B) is worn out, loosen the Tension Screw (29C) and pull off the Plunger Pipe to the front. Clean the contact surfaces of the Crosshead Assembly (25) thoroughly. Place the new plunger pipe carefully through oiled seals back into the seal case. Check O-Rings (35A and 35B) on the Seal Sleeves (35) and replace as necessary.

3. Push the Seal Sleeves (35) together with the Plunger Pipe (29B) back into the crankcase guide. Turn the crankshaft (22) carefully until the Crosshead Assembly (25) comes up against the Plunger Pipe. Put a new Oil Scraper (29D) onto the Tension Screw (29C). Cover the thread of the Tension Screw and the Oil Scraper and apply a liquid adhesive such as Lock-Tite. Tighten Tension Screw to 26 ft.-lbs..

Important!!

Do not get any adhesive between the Plunger Pipe (29B) and the Centering Sleeve (29A). The Plunger Pipe should not be strained by excessive force on the Tension Screw (29C) or through damage to the front surface of the Plunger. If these conditions are ignored, the Plunger Pipe will probably break.

4. Tighten the Inner Hexagon Screws (49) to the Valve Casing (43) to 85 ft.-lbs.

To Disassemble Gear End

1. Loosen Inner Hexagon Screws (49) for the Valve Casing (43) with an allen wrench. Carefully remove Valve Casing from the Crankcase (1).

2. Loosen Inner Hexagon Screws (10) for the Crankcase Cover (4) with an allen wrench and remove Crankcase Cover.

3. Loosen Hexagon Screws (17) for the Bearing Covers (14) with a wrench and remove Bearing Cover.

4. Drain oil from the Crankcase (1) by removing Drain Plug (12) with a 3/4" wrench.

5. Loosen Connecting Rod Screws (24) with an allen wrench. Push the stems of the connecting rods as far as possible into the crosshead guides. Carefully push out the Radial Shaft Seals(31).

Important!!

Connecting Rods (24) are marked for identification. Do not twist Connecting Rod halves. Connecting Rods must be reinstalled in the same position on the Crankshaft (22) journals.

6. While slightly turning the Crankshaft (22), hit it out carefully to one side with a rubber hammer.

Important!!

Do not bend Connecting Rod (24) shank.

7. Check the surfaces of the Crankshaft (22), Connecting Rods (24), Crosshead Assemblies (25) as well as the Radial Shaft Seals (15 and 31) and Taper Roller Bearings (20).

To Reassemble Gear End

1. Using a soft tool, such as brass or wooden dowel, press in the outer bearing ring until it lines up with the outer edge of the bearing hole. Assemble the Bearing Cover (14) together with the Shaft Seal (15) and O-Ring (16).

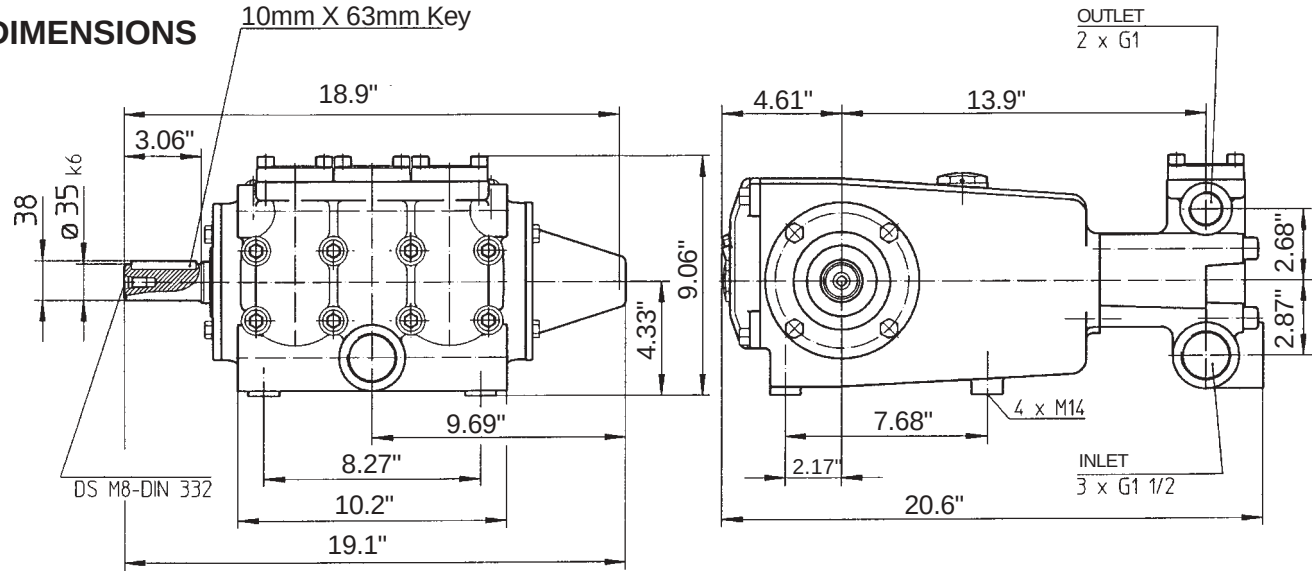
2. Fit the Crankshaft (22) with pressed-on bearing parts through the bearing hole on the opposite side. Press in outer bearing ring and push it inwards with the Bearing Cover (14) while keeping the Crankshaft in the vertical position and turning it slowly so that the taper rollers of the bearings touch the edge of the outer bearing ring.

3. Adjust axial bearing clearance with Fitting Discs (20A) which are 0.1mm each. The Crankshaft (22) should turn easily with very little clearance. Tighten Inner Hexagon Screws on the Connecting Rods (24) to 26 ft.-lbs..

Important!!

There should be enough clearance for the Connecting Rods (24) to move sideways a little on the journals.

DIMENSIONS



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 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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