Series P200A

Triplex Ceramic Plunger Pump Operating Instructions/ Repair and Service Manual

THE EAGLE LINE.

For Models:
P217
P218
P219
P220
P221
P223

GIANT

Contents:

Updated 3/01

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 160^0 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 3-7 & page 10.

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

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.

Specifications
Model P217A

Volume	Up to 3.4 GPM
Discharge Pressure (Continuous)	Up to 2000 PSI
Discharge Pressure (Intermittent)	Up to 2320 PSI*
Inlet Pressure	14 to 140 PSI
RPM	Up to 3450 RPM
Plunger Diameter	18mm
Stroke	5.5mm
Temperature of Pumped Fluids	Up to 160°F
Inlet Ports	(2) 1/2" BSP
Discharge Ports	(2) 3/8" BSP
Shaft Rotation	Top of Pulley Towards Fluid End
Crankshaft Diameter	24mm
Key Width	8mm
Shaft Mounting	Right Side Facing Manifold
Weight	11 lbs. 11oz.
Crankcase Oil Capacity	7.5 fl.oz.
Extended Crankcase Oil Capacity	9.0 fl.oz.
Volumetric Efficiency @ 3450 RPM	0.88
Mechanical Efficiency @ 3450 RPM	0.86

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.

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.

P217A HORSEPOWER REQUIREMENTS

RPM	GPM	1000 PSI	1500 PSI	2000 PSI	2320 PSI*
1725	1.7	1.2	1.8	2.3	2.7
3000	3.0	2.1	3.1	4.2	4.8
3200	3.2	2.2	3.3	4.4	5.1
3450	3.4	2.3	3.5	4.7	5.4

*Intermittent duty only

SPECIAL NOTE:

The theoretical gallons per revolution (gal/rev) is 0.0009855.
To find specific outputs at various RPM, use the formula: GPM =0.0009855xRPM

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:

HP = (GPM X PSI) / 1450

Specifications
Model P218A

Volume	Up to 3.4 GPM
Discharge Pressure (Continuous)	Up to 2000 PSI
Discharge Pressure (Intermittent)	Up to 2320 PSI*
Inlet Pressure	- 4.35 to 140 PSI
RPM	Up to 1750 RPM
Plunger Diameter	18mm
Stroke	10.0mm
Temperature of Pumped Fluids	Up to 160°F
Inlet Ports	(2) 1/2" BSP
Discharge Ports	(2) 3/8" BSP
Shaft Rotation	Top of Pulley Towards Fluid End
Crankshaft Diameter	24mm
Key Width	8mm
Shaft Mounting	Right Side Facing Manifold
Weight	11 lbs. 11oz.
Crankcase Oil Capacity	7.5 fl.oz.
Extended Crankcase Oil Capacity	9.0 fl.oz.
Volumetric Efficiency @ 1750 RPM	0.96
Mechanical Efficiency @ 1750 RPM	0.85

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.

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.

P218A HORSEPOWER REQUIREMENTS

RPM	GPM	1000 PSI	1500 PSI	2000 PSI	2320 PSI*
1150	2.2	1.5	2.3	3.1	3.6
1450	2.8	1.9	2.9	3.9	4.5
1750	3.4	2.3	3.5	4.7	5.4

***Intermittent duty only**

SPECIAL NOTE:

The theoretical gallons per revolution (gal/rev) is 0.00193.

To find specific outputs at various RPM, use the formula: GPM = 0.00193 x 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:

HP = (GPM X PSI) / 1450

Specifications
Model P219A

Volume	Up to 4.2 GPM
Discharge Pressure (Continuous)	Up to 2000 PSI
Discharge Pressure (Intermittent)	Up to 2320 PSI*
Inlet Pressure	- 4.35 to 140 PSI
RPM	Up to 1750 RPM
Plunger Diameter	18mm
Stroke	12.4mm
Temperature of Pumped Fluids	Up to 160°F
Inlet Ports	(2) 1/2" BSP
Discharge Ports	(2) 3/8" BSP
Shaft Rotation	Top of Pulley Towards Fluid End
Crankshaft Diameter	24mm
Key Width	8mm
Shaft Mounting	Right Side of Manifold
Weight	11 lbs. 11oz.
Crankcase Oil Capacity	7.5 fl.oz.
Extended Crankcase Oil Capacity	9.0 fl.oz.
Volumetric Efficiency @ 1750 RPM	0.96
Mechanical Efficiency @ 1750 RPM	0.85

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.

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.

P219A HORSEPOWER REQUIREMENTS

RPM	GPM	1000 PSI	1500 PSI	2000 PSI	2320 PSI*
1150	2.7	1.9	2.8	3.8	4.4
1450	3.5	2.4	3.6	4.8	5.5
1750	4.2	2.9	4.3	5.8	6.7

***Intermittent duty only**

SPECIAL NOTE:

The theoretical gallons per revolution (gal/rev) is 0.00239.

To find specific outputs at various RPM, use the formula: GPM = 0.00239 x 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:

HP = (GPM X PSI) / 1450

Specifications
Model P220A

Volume	Up to 4.7GPM
Discharge Pressure (Continuous)	Up to 2000 PSI
Discharge Pressure (Intermittent)	Up to 2320 PSI*
Inlet Pressure	14 to 140 PSI
RPM	Up to 1750 RPM
Plunger Diameter	18mm
Stroke	14.1mm
Temperature of Pumped Fluids	Up to 160°F
Inlet Ports	(2) 1/2" BSP
Discharge Ports	(2) 3/8" BSP
Shaft Rotation	Top of Pulley Towards Fluid End
Crankshaft Diameter	24mm
Key Width	8mm
Shaft Mounting	Right Side Facing Manifold
Weight	11 lbs. 11oz.
Crankcase Oil Capacity	7.5 fl.oz.
Extended Crankcase Oil Capacity	9.0 fl.oz.
Volumetric Efficiency @ 1750 RPM	0.95
Mechanical Efficiency @ 1750 RPM	0.86

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.

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.

P220A HORSEPOWER REQUIREMENTS

RPM	GPM	1000 PSI	1500 PSI	1700 PSI	2000 PSI*	2320 PSI*
1150	3.1	2.1	3.2	3.6	4.2	4.9
1450	3.9	2.7	4.0	4.5	5.3	6.2
1750	4.7	3.2	4.8	5.5	6.4	7.4

***Intermittent duty only**

SPECIAL NOTE:

The theoretical gallons per revolution (gal/rev) is 0.00266.

To find specific outputs at various RPM, use the formula: GPM = 0.00266 x 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:

HP = (GPM X PSI) / 1450

Specifications
Model P221A

Volume	Up to 2.21 GPM
Discharge Pressure (Continuous)	Up to 2000 PSI
Discharge Pressure (Intermittent)	Up to 2320 PSI*
Inlet Pressure	- 4.35 to 140 PSI
RPM	Up to 1750 RPM
Plunger Diameter	18mm
Stroke	7.0mm
Temperature of Pumped Fluids	Up to 160°F
Inlet Ports	(2) 1/2" BSP
Discharge Ports	(2) 3/8" BSP
Shaft Rotation	Top of Pulley Towards Fluid End
Crankshaft Diameter	24mm
Key Width	8mm
Shaft Mounting	Right Side Facing Manifold
Weight	11 lbs. 11oz.
Crankcase Oil Capacity	7.5 fl.oz.
Extended Crankcase Oil Capacity	9.0 fl.oz.
Volumetric Efficiency @ 1750 RPM	0.96
Mechanical Efficiency @ 1750 RPM	0.85

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.

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.

P221A HORSEPOWER REQUIREMENTS

RPM	GPM	1000 PSI	1500 PSI	2000 PSI*	2320 PSI*
1150	1.4	1.0	1.5	2.0	2.3
1450	1.8	1.3	1.9	2.5	2.9
1750	2.2	1.5	2.3	3.0	3.5

***Intermittent duty only**

SPECIAL NOTE:

The theoretical gallons per revolution (gal/rev) is 0.00126.
To find specific outputs at various RPM, use the formula: GPM = 0.00126 x RPM

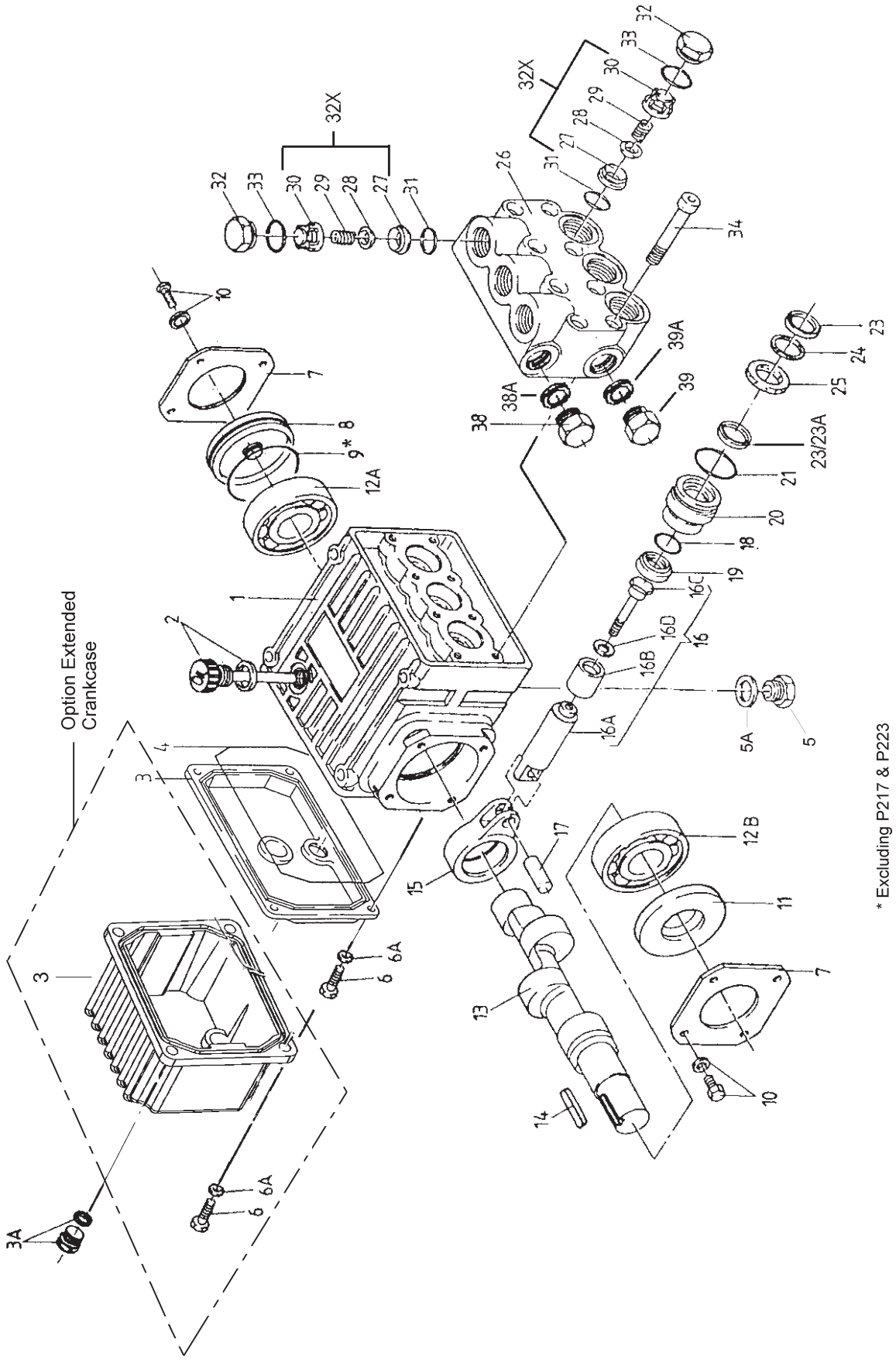
HORSEPOWER RATINGS:

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:

HP = (GPM X PSI) / 1450

Exploded View - P200A Series



P200A SERIES PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY.
1	08300	Crankcase	1
2	08301	Dipstick and Gasket, Black	
		(Except P217& P223)	1
2	08480	Dipstick and Gasket, Red	
		(P217& P223)	1
3	08302	Crankcase Cover, Short	1
3	08302-L	Crancase Cover, Long	1
3A	07190	Drain Plug & Gasket	1
4	08005	O-Ring	1
5	06273	Oil Drain Plug	1
5A	08192	Gasket	1
6	07188	Screw, Crankcase Cover	4
6A	01176-2	Spring Washer	4
7	08303	Bearing Cover I	2
8	08490	Sight Glass	
		(Excluding P217 & P223)	1
8	08439	Lid (P217 & P223 Only)	1
9	08492	O-Ring	
		(Excluding P217 & P223)	1
10	07225	Screw with Lock Washer	8
11	01166	Radial Shaft Seal	1
12A	08020	Ball Bearing	1
12B	01020	Ball Bearing	1
13	08465	Crankshaft **(P217A)**	1
13	08440	Crankshaft **(P218A)**	1
13	08466	Crankshaft **(P219A)**	1
13	08467	Crankshaft **(P220A)**	1
13	12258	Crankshaft **(P221)**	1
13	06547	Crankshaft **(P223)**	1
14	06207	Woodruff Key	1
15	08333	Connecting Rod	3
16	08469	Plunger, Complete, 18mm	
		(Excluding P223)	3
16	06561	Plunger Complete, 16mm	
		(P223 Only)	3
16A	08468	Plunger Base (Excluding P223)	3
16A	06562	Plunger Base (P223 Only)	3
16B	08455	Plunger Pipe (Excluding P223)	3
16B	07778	Plunger Pipe (P223 Only)	3
16C	08456	Tension Screw	3
16D	07676	Copper Gasket	3
17	08442	Wrist Pin	3
18	07770	O-Ring	3
19	08356-0010	Oil Seal	3
20	08444	Seal Case (Excluding P223)	3
20	06563	Seal Case (P223 Only)	3
21	08443	O-Ring	3
23	08477	V-Sleeve, Weep	
		(Excluding P223)	3
23	06315	V-Sleeve (P223 Only)	6
23A	08087	V-Sleeve, Brown	
		(Excluding P223)	3
24	07904	Pressure Ring (Excluding P223)	3
24	06290	Pressure Ring (P223 Only)	3
25	08445	Weep Return Ring	
		(Excluding P223)	3
25	06564	Weep Return Ring (P223 Only)	3
26	06582+	Valve Casing (Excluding P223)	
		1/2" Inlet Ports	1
26	06565	Valve Casing (P223 Only)	1
27	07849	Valve Seat	6
28	07491	Valve Plate	6
29	07906	Valve Spring	6
30	07907	Valve Spring Retainer	6
31	07853	O-Ring	6
32	07928	Valve Plug	6
32X	07946	Valve Assembly Complete	6
33	07913	O-Ring	6
34	08316	Hex Head Cap Screw	8
38	13338	Plug, 3/8" BSP	1
38A	08486	Copper Crush Washer, 3/8"	1
39	07109	Plug, 1/2" BSP	1
39A	07661	Seal	1

+For pumps w/ 3/8" Inlet, order p/n 08446

Specifications
Model P223A

Volume	Up to 3.0 GPM
Discharge Pressure (Continuous)	Up to 2000 PSI
Discharge Pressure (Intermittent)	Up to 2320 PSI*
Inlet Pressure	14 to 140 PSI
RPM	Up to 3450 RPM
Plunger Diameter	16mm
Stroke	6.3mm
Temperature of Pumped Fluids	Up to 160°F
Inlet Ports	(2) 1/2" BSP
Discharge Ports	(2) 3/8" BSP
Shaft Rotation	Top of Pulley Towards Fluid End
Crankshaft Diameter	24mm
Key Width	8mm
Shaft Mounting	Right Side Facing Manifold
Weight	11 lbs. 11oz.
Crankcase Oil Capacity	7.5 fl.oz.
Extended Crankcase Oil Capacity	9.0 fl.oz.
Volumetric Efficiency @ 1750 RPM	0.96
Mechanical Efficiency @ 1750 RPM	0.85

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.

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.

P223A HORSEPOWER REQUIREMENTS

RPM	GPM	1000 PSI	2000 PSI	2320 PSI*
1750	1.5	1.0	2.1	2.4
3200	2.8	1.9	3.8	4.5
3450	3.0	2.1	4.1	4.8

***Intermittent duty only**

SPECIAL NOTE:

The theoretical gallons per revolution (gal/rev) is 0.000870

To find specific outputs at various RPM, use the formula: GPM = 0.000870 x 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:

HP = (GPM X PSI) / 1450

P200A SERIES REPAIR KITS

Plunger Packing Kit

Part # 09164 (Excluding P223)

Item #	Qty.	Part #	Description
23	3	08477	V-Sleeve, weep
23A	3	08087	V-Sleeve, brown
24	3	07904	Pressure Ring

Plunger Packing Kit

Part #09525 (P223 Only)

Item #	Qty.	Part #	Description
23	6	06315	V-Sleeve
24	3	06920	Pressure Ring

Teflon Plunger Packing Kit

Part # 09164-0020 (Excluding P223)

Item #	Qty.	Part #	Description
23	6	08087-0020	V-Sleeve
24	3	07904	Pressure Ring

Valve Assembly Kit

Part # 09116

Item #	Qty.	Part #	Description
32X	6	07946	Valve Assembly Complete
31	6	07853	O-Ring

Oil Seal Kit

Part # 09144

Item #	Qty.	Part #	Description
19	3	08356-0010	Oil Seal

P200A SERIES TORQUE SPECIFICATIONS

Position	Item#	Description	Torque Amount
16C	08456/07778	Tension Screw, Plunger	220 (in.-lbs.)
32	07928	Valve Plug	33 or 59* (ft.-lbs.)
34	08316	Hex Head Cap Screw, Valve Casing	105 (in.-lbs.)

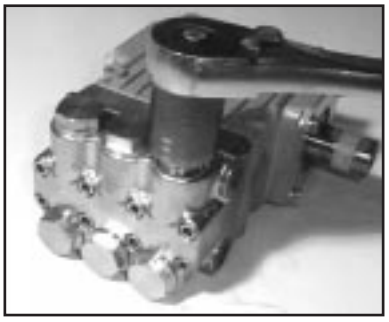
* For pumps manufactured prior to 5/97, tighten plugs to 33 ft.lbs. Otherwise, tighten to 59 ft.-lbs.

PUMP SYSTEM MALFUNCTION

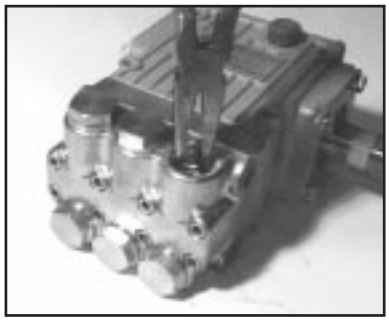
MALFUNCTION	CAUSE	REMEDY
The Pressure and/or the Delivery Drops	Worn packing seals	Replace packing seals
	Broken valve spring	Replace spring
	Belt slippage	Tighten or Replace belt
	Worn or Damaged nozzle	Replace nozzle
	Fouled discharge valve	Clean valve assembly
	Fouled inlet strainer	Clean strainer
	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
Pressure Drop at Gun	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 - P200A SERIES

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.



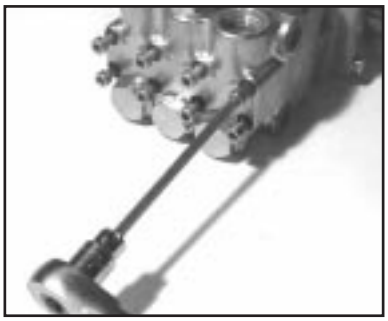
1. With a 22mm socket wrench, remove the (3) discharge valve plugs and (3) inlet valve plugs (32) Inspect the o-ring (33) for wear and replace if damaged.



2. Using a needle nose pliers, remove the inlet and discharge valve assemblies (32X).

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. For pumps manufactured prior to 5/97, tighten plugs (32) to 33 ft-lbs. otherwise, apply one drop of Loctite 243 to the valve plugs (32) and tighten to 59 ft.-lbs.



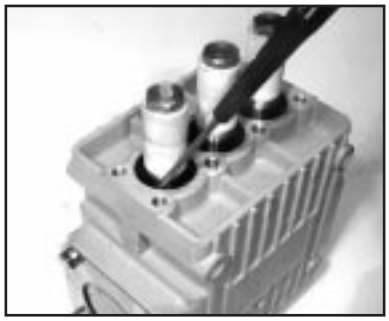
5. Next, use a 5mm allen wrench to remove the 8 socket head cap screws (34).

6. Carefully slide the valve casing (26) out over the plungers.

7. Remove the weep return ring (25), pressure ring (24), and v-sleeve (23) from the valve casing (26). Remove the v-sleeve (23) from the seal case (20).

Inspect all parts, including o-ring (21) for wear and replace as necessary

8. Check surfaces of plunger (16). A damaged surface will cause accelerated wear on the seals. Deposits of any kind must be carefully removed from the plunger surface. A damaged plunger must be replaced!



9. If the crankcase oil seals (19) are to be replaced, they can be removed by prying loose with a flat screwdriver. Take care not to make contact with the plunger.

9. If the ceramic plunger pipe (16B) is damaged, remove the plunger bolt (16C). Discard the old plunger pipe (16B) and copper gasket (16D), and clean the old locktite from the plunger bolt (16C) and plunger base (16A). Replace the plunger with the new one and locktite the plunger bolt and torque to 220 inch-pounds.

NOTE: If there are deposits of any kind (i.e., lime deposits) in the valve casing, be certain that the weep holes in the weep return ring (25) and valve casing (26) have not been plugged.

Reassembly sequence of the P200A series pump

1) If oil seals (19) were removed, replace with seal lip towards crankcase. Lubricate seals before replacing.

2) Replace seal case (20) with o-rings (21) over plungers. Generously lubricate o-rings and oil seal before reassembly. Replace v-sleeve (23) over plungers (16)..

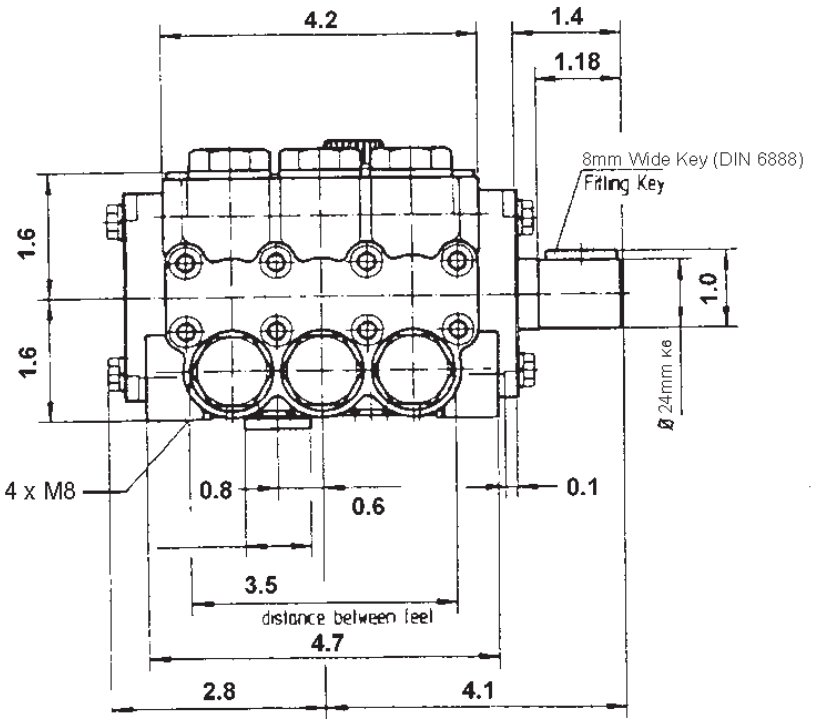
3) Generously lubricate v-sleeve (23). Assemble v-sleeves (22) into valve casing (#26). Assemble weep return ring (25) and pressure ring (24) over plungers (16). Slide valve casing over plungers and seat firmly. Replace the eight socket head cap screws (34) and tighten to 105 inch-pounds in a crossing pattern.

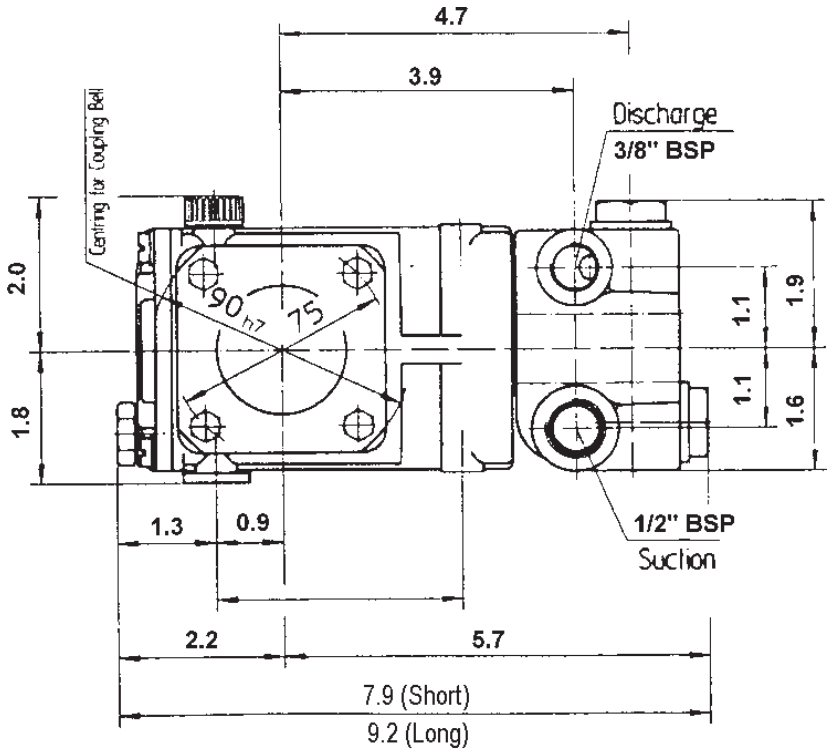
4) Replace the six o-rings (31) and the six valve assemblies (32X). Now replace the six valve plug o-rings (33). For pumps manufactured prior to 5/97, tighten plugs (32) to 33 ft-lbs. otherwise, apply one drop of Loctite 243 to the valve plugs (32) and tighten to 59 ft.-lbs.

For maintenance of the gear end of your pump contact Giant Industries or your local distributor. Phone: 419/531-4600

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

P200A DIMENSIONS (inches)





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-serve 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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