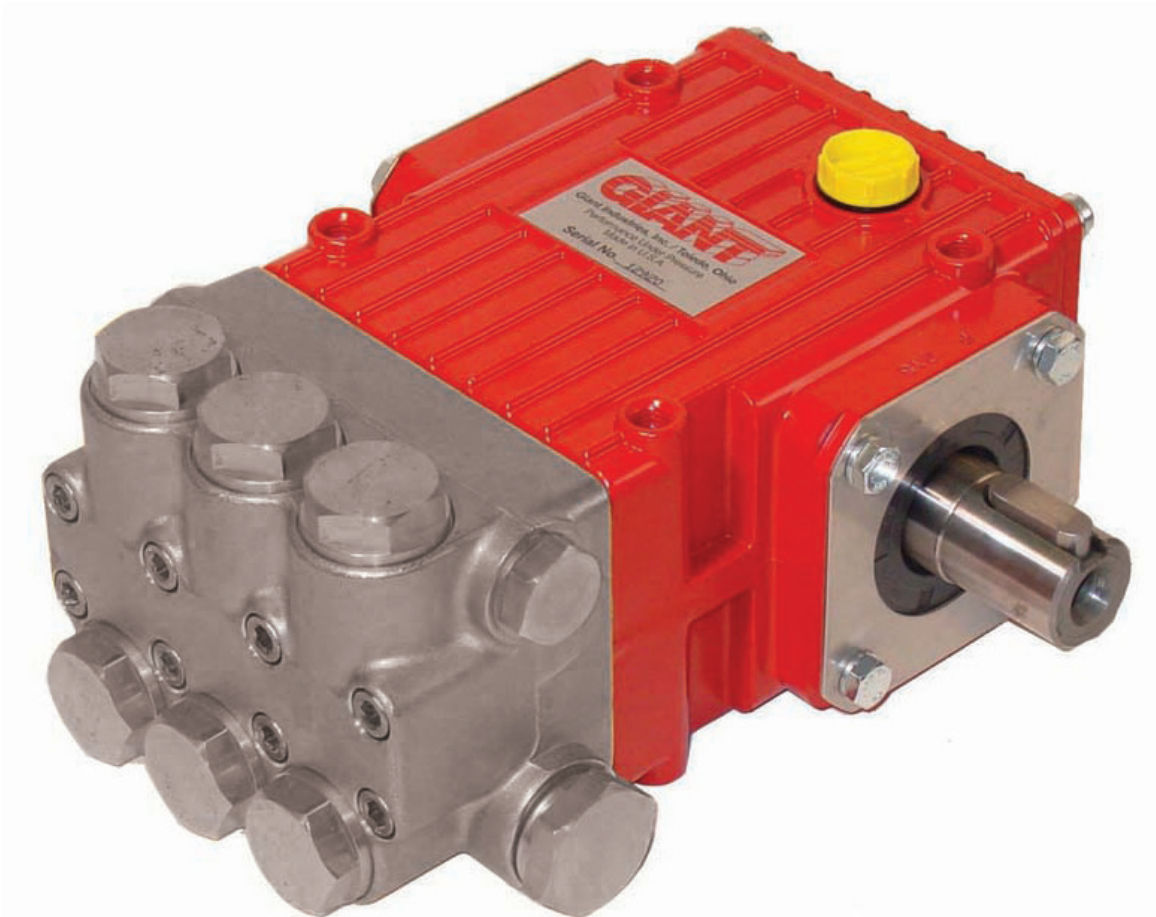


P200A-5100 SERIES PUMPS 18mm Versions

Triplex Ceramic
Plunger Pump
Operating Instructions/
Repair and Service Manual

Standard Versions:	P200-5100
Viton Versions:	P200-5111
Teflon Versions:	P200-5121
Teflon/EPDM Versions:	P200-5123
Teflon/Paraflour Versions:	P200-5125



GIANT
Performance Under Pressure

Contents:

Installation Instructions:	page 2
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Trouble Shooting Guide:	page 7
Repair Instructions:	pages 8-9
Torque Specifications:	page 10
Preventative Maintenance and Recommended Spare Parts List:	page 10
Pump mounting selection Guide:	page 10
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Warranty Information:	back page

Updated 08/18

INSTALLATION INSTRUCTIONS

Required NPSH refers to water: Specific weight 1kg/dm³, viscosity 1°E at maximum permissible revolutions .

Operation and Maintenance

Check oil level prior to starting and 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: Use only 8.1 ounces (0.24 litres) of Giant Oil (p/n 01154) ISO VG 220 GL4 (e.g. Aral Degol BG220) or SAE 90 GL4 gear oil.

Initial change after 50 operating hours and then every 500 operating hours. In either case change the oil once per year.

Caution! When operating in damp places or with high temperature fluctuations. Should condensate (frothy oil) occur in the gear box the oil must be changed immediately.

Keep NPSH under control.

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.



Safety Rules

Pump operation without safety valve as well as any excess in temperature or speed limits, automatically voids the warranty . The safety valve must be regulated in accordance with the guidelines for liquid spraying units so that the maximum admissible operating pressure can not be exceeded by more than 10 %.

When the pump is in operation, the drive shaft end and the coupling must be covered up by either a contact-protector or by a coupling bell.

Before any maintenance to the pump takes place the pressure in discharge line and in pump must be at zero. Close suction line. Disconnect fuses to ensure that the driving motor is not accidentally switched on.

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 kept under control.

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 abrasive media with a specific weight similar to water.

Before pumping other liquids - especially inflammable, explosive and toxic media - the pump manufacturer must under all circumstances be consulted with regard to the resistance of the pump material. It is the responsibility of the equipment manufacture and/or operator to ensure that all pertinent safety regulations are adhered to.

Pump Specifications

	Max. Flow	Max. Flow	Nominal/ Intermittent Pressure	Nominal/ Intermittent Pressure	Max. Speed	Plunger Diameter	Plunger Diameter	Stroke	Stroke	Power Req'd	Power Req'd
Model	GPM	l/min	PSI	bar	RPM	in	mm	in	mm	BHP	kW
P230	1.1	4.2	2200	150	1750	0.71	18	0.13	3.4	1.5	1.1
P217	1.85	7.0	2200	150	1750	0.71	18	0.22	5.5	2.5	1.9
P230	2.1	8.1	2200	150	3450*	0.71	18	0.13	3.4	2.9	2.2
P221	2.3	8.9	2200	150	1750	0.71	18	0.28	7.0	3.3	2.4
P217	3.6	13.8	2200	150	3450*	0.71	18	0.22	5.5	5.0	3.7
P218	3.4	12.8	2200	150	1750	0.71	18	0.39	10.0	4.7	3.5
P219	4.2	15.9	2200	150	1750	0.71	18	0.49	12.4	5.8	4.3
P221	4.6	17.6	2200	150	3450*	0.71	18	0.28	7.0	6.5	4.9
P220	4.7	17.6	2200	150	1750	0.71	18	0.56	14.1	6.5	4.9

* Positive inlet pressure required- Make sure that suction pulsation is sufficiently dampened-water column resonance must be avoided.

Common Specifications

	U.S.	Metric
Max. Temperature of Pumped Fluids.....	86 °F	30 °C
Inlet Pressure	90 PSI	6.2 bar
Inlet Ports		(2) 1/2" BSP
Discharge Ports		(2) 3/8" BSP
Shaft Rotation.....		Top of Pulley Towards Fluid End
Crankshaft Diameter.....	0.94"	24 mm
Key Width	0.31"	8 mm
Shaft Mounting		Either Side
Weight	13.25 lbs.	6.0 Kg
Crankcase Oil Capacity	8.1 fl.oz.	0.24 Liter

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.

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.

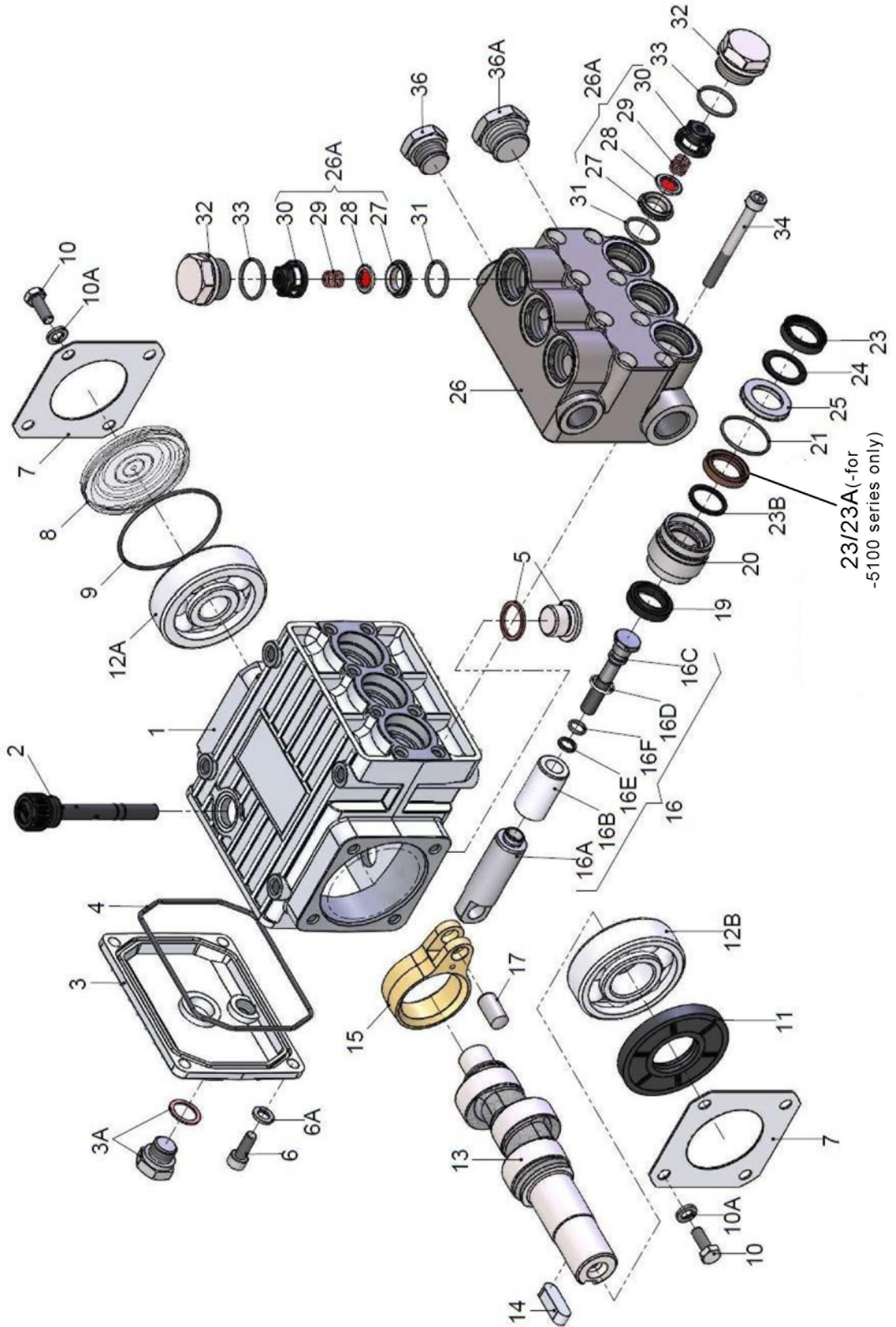
$$(\text{Max. Pump RPM} / \text{Rated Pump GPM}) \times \text{Required Pump GPM} = \text{Required Pump RPM}$$

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

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

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

Exploded View - P200A-5100 Series



P200A-5100 SERIES PARTS LIST

<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>	<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1	08300C	Crankcase	1	20	08444A-0100	Seal Retainer, 316 S.S.	3
2	08301	Dipstick, Except P217-5100	1	21	08443	O-Ring (-5100)	3
2	08480	Dipstick, P217-5100 Only	1	21	08443-0001	O-Ring, Viton (-5111/-5121)	3
3	08302	Crankcase Cover	1	21	06815	O-Ring, EPDM (-5123)	3
3A	07190-0100	Drain Plug & Gasket	1	21	08443-0005	O-Ring, ParafLOUR (-5125)	3
4	08005	O-Ring	1	23	06704	Grooved Seal (-5100)	3
5	08185-0100	Oil Drain Plug with seal	1	23	08087-0010	Grooved Seal, Viton (-5111)	6
6	07188-0100	Screw, 316 S.S.	4	23	08087-0020	Grooved Seal, Teflon (-5121/-5123/-5125)	6
6A	07223-0100	Spring Washer, 316 S.S.	4	23A	08087	Grooved Seal Ring, Brown (-5100)	3
7	08303	Bearing Cover	2	23B	06163	Drip Shield	3
8	08491	Sight Glass	1	24	07904	Pressure Ring	3
9	07193	O-Ring	1	25	08445-0100	Weep Return Ring, 316 S.S.	3
10	07225-0100	Screw	8	26	06582-5000	Valve Casing	1
10A	07223-0100	Spring Washer	8	26A	07946-0100	Valve Assembly (27-30) (except -5123)	6
11	08331	Radial Shaft Seal	1	26A	07946-5123	Valve Assembly (27-30) (-5123 only)	6
12A	04917	Ball Bearing	1	27	07849-0100	Valve Seat	6
12B	01086	Ball Bearing	1	28	06809	Valve Plate	6
13	03026	Crankshaft (P217A-5100)	1	29	07906-0100	Valve Spring	6
13	04920	Crankshaft (P218A-5100)	1	30	07907	Valve Spring Retainer	6
13	04921	Crankshaft (P219A-5100)	1	31	07853-0001	O-Ring (-5100/-5111/-5121)	6
13	04919	Crankshaft (P220A-5100)	1	31	06817	O-Ring (-5123)	6
13	04922	Crankshaft (P221A-5100)	1	31	07853-0005	O-Ring, ParafLOUR (-5125)	6
13	04918	Crankshaft (P230A-5100)	1	32	07928-0100	Plug	6
14	06207	Fitting Key	1	33	07913-0001	O-Ring (-5100/-5111/-5121)	6
15	08333	Connecting Rod	3	33	06818	O-Ring (-5123)	6
16	08469-0100	Plunger Assembly	3	33	07913-0005	O-Ring, ParafLOUR (-5125)	6
16A	08468-0100	Plunger Base, 316 S.S.	3	34	08316-0100	Hex Head Cap Screw	8
16B	08455	Plunger	3	36	12138	Plug, 3/8" BSP	1
16C	08456-0100	Tension Screw, 316 S.S.	3	36A	07109-0400	Plug, 1/2" BSP	1
16D	07204-0100	Crush Washer, 316 S.S.	3				
16E	07203	Support Ring	3				
16F	07023	O-Ring	3				
17	08442	Wrist Pin	3				
19	08356	Oil Seal	3				

P200A-5100 SERIES REPAIR KITS

Plunger Packing Kits

P200A-5100 - #09756

Item	Part#	Description	Qty
21	08443	O-Ring	3
23	06704	Grooved Seal	3
23A	08087	Grooved Seal Ring	3
23B	06163	Drip Shield	3
24	07904	Pressure Ring	3

P200A-5111 - #09602-0011

Item	Part#	Description	Qty
21	08443-0001	O-Ring	3
23	08087-0010	Grooved Seal, Viton	6
23B	06163	Drip Shield	3
24	07904	Pressure Ring	3

P200A-5121 - #09602-0021

Item	Part#	Description	Qty
21	08443-0001	O-Ring	3
23	08087-0020	Grooved Seal, Teflon	6
23B	06163	Drip Shield	3
24	07904	Pressure Ring	3

P200A-5123 - #09602-0023

Item	Part#	Description	Qty
21	06815	O-Ring	3
23	08087-0020	Grooved Seal, Teflon	3
23B	06163	Drip Shield	3
24	07904	Pressure Ring	3

P230A-5125 - #09602-0025

Item	Part#	Description	Qty
21	08443-0005	O-Ring	3
23	08087-0020	Grooved Seal, Teflon	3
23B	06163	Drip Shield	3
24	07904	Pressure Ring	3

Valve Assembly Kits

P200A-5100

P200A-5111

P200A-5121 - #09139-0011

Item	Part#	Description	Qty
27	07849-0100	Valve Seat	6
28	06809	Valve Plate	6
29	07906-0100	Valve Spring	6
30	07907	Valve Retainer	6
31	07853-0001	O-Ring	6
33	07913-0001	O-Ring	6

P200A-5123 - #09139-0023

Item	Part#	Description	Qty
27	07849-0100	Valve Seat	6
28	06809	Valve Plate	6
29	07906-0100	Valve Spring	6
30	07907	Valve Retainer	6
31	06817	O-Ring	6
33	06818	O-Ring	6

P230A-5125 - #09139-0025

Item	Part#	Description	Qty
27	07849-0100	Valve Seat	6
28	06809	Valve Plate	6
29	07906-0100	Valve Spring	6
30	07907	Valve Retainer	6
31	07853-0005	O-Ring	6
33	07913-0005	O-Ring	6

Oil Seal Kit

#09144

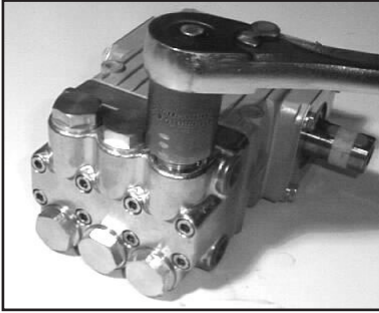
Item	Part#	Description	Qty
19	08356	Oil Seal	3

PUMP SYSTEM MALFUNCTION

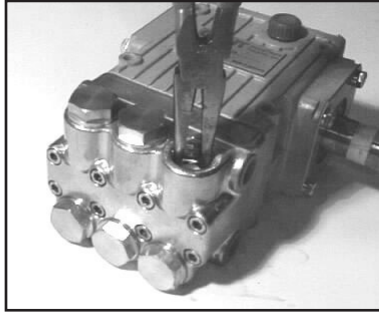
<u>MALFUNCTION</u>	<u>CAUSE</u>	<u>REMEDY</u>
The Pressure and/or the Delivery Drops	Worn packing seals Broken valve spring Belt slippage Worn or Damaged nozzle Fouled discharge valve Fouled inlet strainer Worn or Damaged hose Worn or Plugged relief valve on pump Cavitation Unloader	Replace packing seals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

REPAIR INSTRUCTION - P200A-5100 SERIES

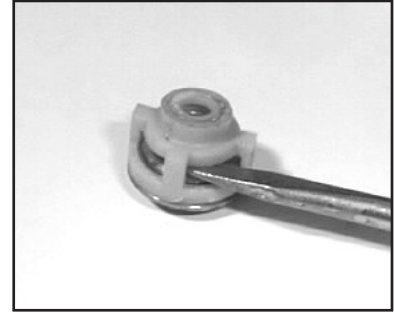
CAUTION EPDM o-rings must not come into contact with mineral oil or mineral grease. Use silicone grease only.



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.



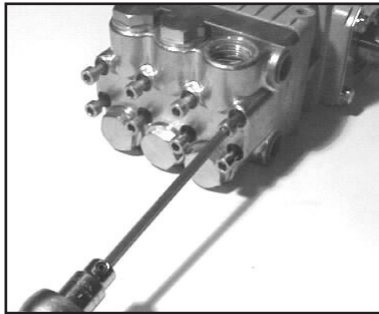
2. Using a needle nose pliers, remove the inlet and discharge valve assemblies (26A) and o-ring (31). Inspect all parts for wear and replace as necessary.



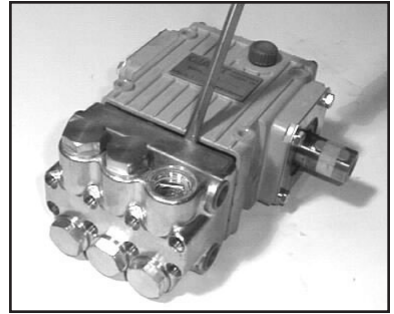
3. By inserting a small screw driver between the valve seat (27) and the valve spring retainer (30), the valve assembly can be separated.



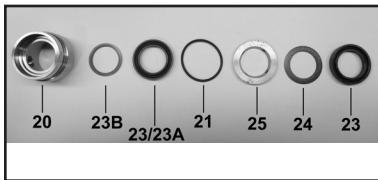
4. Apply one drop of Loctite 243 to the valve plugs (32) and tighten to 55 ft.-lbs. (75 Nm).



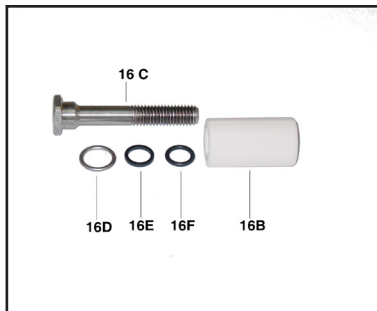
5. Next, use a 5mm allen wrench to remove the 8 socket head cap screws (34).



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 rear v-sleeve (23 or 23A) and drip shield (23B) from the seal case (20). Inspect all parts, including o-ring (21) for wear and replace as necessary.



8. Check surfaces of plunger pipe (16B). 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.

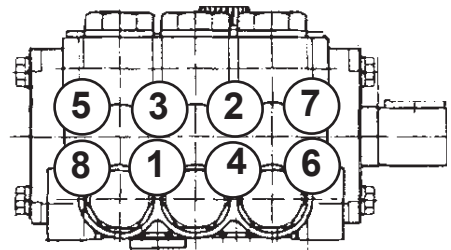
REPAIR INSTRUCTION - P200A-5100 SERIES

Disassembly sequence of the *back* end of the P200A-5100 series pump.

- 1) Before you begin, drain the oil from the crankcase.
- 2) Remove the crankcase cover (3) and o-ring (4) from the crankcase (1). To remove the crankshaft (13), remove the bearing cover (7) and sight glass (8). Using a rubber mallet, remove the crankshaft axially through the connecting rods by tapping on the end of the shaft. Be careful not to bend or damage the connecting rods during crankshaft removal.
- 3) If the bearings (12A and 12B) and radial shaft seal (11) are still in the crankcase, remove them. Inspect both bearings and seal for wear and replace if necessary.
- 4) Remove the connecting rod (15) and plunger assembly(16). Remove the wrist pin (17) if necessary. Check the plunger bore in the crankcase for wear. Inspect parts and replace as necessary.
- 5) Should you find it necessary to service the plunger assembly (16) you can do so by removing the tension screw (16C). Replace crush washer (16D). **NOTE: Carefully flatten crush washer prior to replacing it. NOTE: Place side with line in the middle on the ceramic surface and use a hand press to cursh the washer prior to installing the tension screw.** Inspect all parts and replace as necessary.

Reassembly sequence of the P200A-5100 series pump

- 1) Reassemble plunger assembly (16) (apply a drop of Loctite to the tension screw (16C) threads) and the connecting rod (15) with wrist pin (17). Place assemblies in crankcase (1). Install crankshaft through connecting rods again being careful not to bend or otherwise damage the connecting rods.
- 2) Replace left and right side bearings (12A and 12B) if they were removed from the crankshaft. Be certain the bearings are pressed all the way onto the shaft and completely into the crankcase. Replace radial shaft seal (11), bearing cover (7), sight glass (8), and crankcase cover (3) with its o-ring (4).
- 3) If oil seals (19) were removed, replace with seal lip towards crankcase. Lubricate* seal before replacing.
- 4) Replace seal case (20) with o-rings (21) over plungers. Generously lubricate* o-rings and oil seal before reassembly. Replace drip shield (23B) and v-sleeve (23A) over plungers (16)..
- 5) Generously lubricate* v-sleeve (23) and assemble 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 106 inch-pounds (12 Nm) in a crossing pattern (see below).
- 6) Re-install the six o-rings (31) and the six valve assemblies (27-30). Now replace the six valve plugs with o-rings (32 and 33) and tighten securely with a 22mm socket wrench to 55 foot-pounds (75 Nm).
- 7) Fill crankcase with 8.1 ounces (0.24 L) of oil.



*For pumps with EPDM o-rings, use silicone grease only.

P200A-5100 SERIES TORQUE SPECIFICATIONS

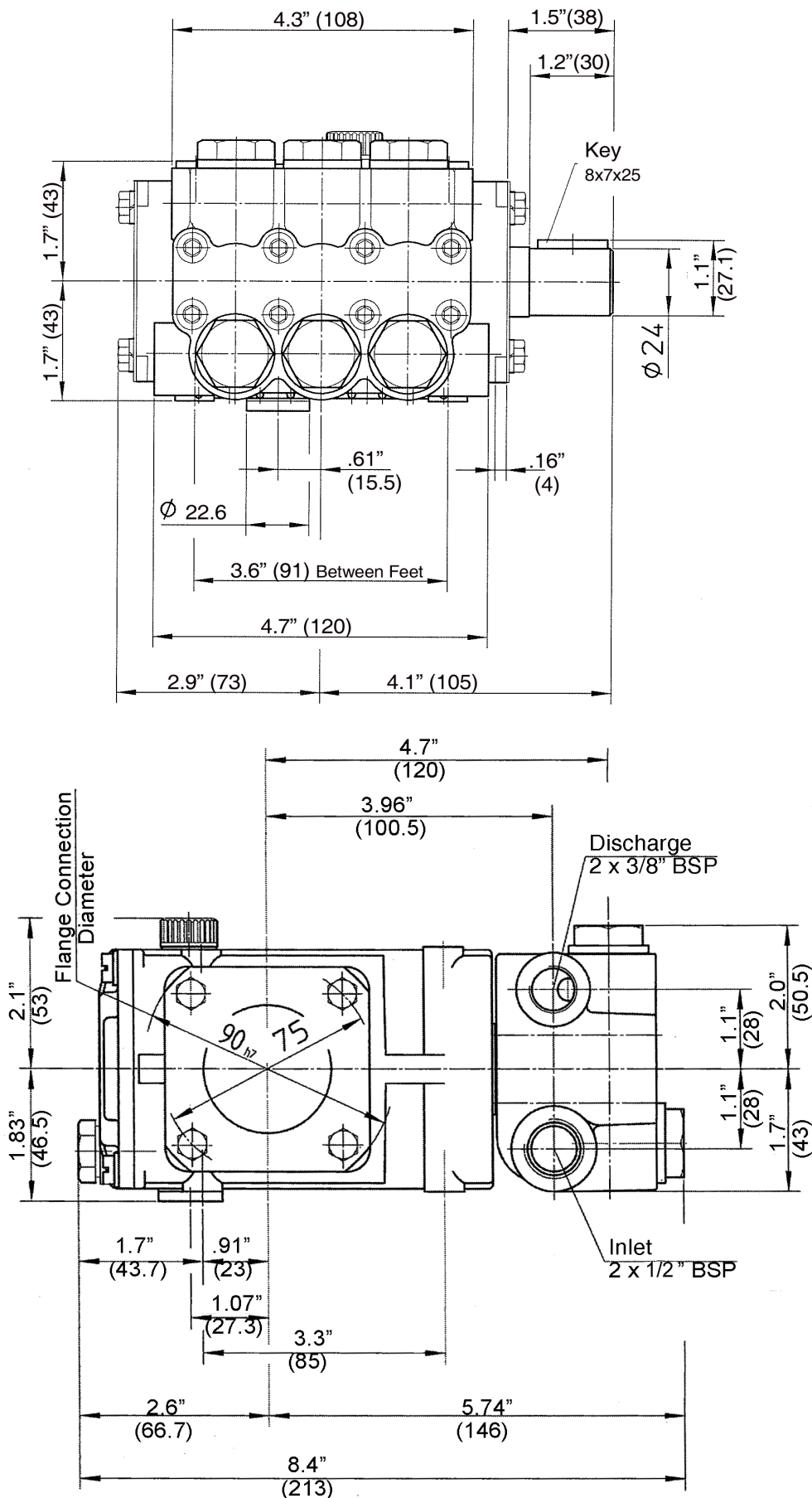
<u>Position</u>	<u>Item#</u>	<u>Description</u>	<u>Lubrication</u>	<u>Torque Amount</u>
3A	07190-0100	Drain Plug & Gasket		22 ft.-lbs. (30 Nm)
5	08185-0100	Oil Drain Plug with Seal		22 ft.-lbs. (30 Nm)
6	07188-0100	Screw, 316 S.S.		88 in.-lbs. (10 Nm)
10	07225-0100	Screw		88 in.-lbs. (10 Nm)
16C	08456-0100	Tension Screw, Plunger	Loctite 243	200 in.-lbs. (22.5 Nm)
16D	07204-0100	Crush Washer	Loctite 577	
32	07928-0100	Valve Plug	Pro Pack 550	55 ft.-lbs. (75 Nm)
34	08316-0100	Hex Head Cap Screw		106 in.-lbs. (12 Nm)

Preventative Maintenance Check-List & Recommended Spare Parts List						
Check	Daily	Weekly	50hrs	Every 500 hrs	Every 1500 hrs	Every 3000 hrs
Oil Level/Quality	X					
Oil Leaks	X					
Water Leaks	X					
Belts, Pulley		X				
Plumbing		X				
Recommended Spare Parts						
Oil Change			X	X		
Seal Spare Parts (1 kit/pump) (See page 6 for kit list)					X	
Oil Seal Kit (1 kit/pump) (See page 6 for kit list)					X	
Valve Spare Parts (1 kit/pump) (See page 6 for kit list)						X

Pump Mounting Selection Guide

Bushings 07174 - 24 mm Tapered H Bushing
Pulley & Sheaves 01061 - 7.75" Cast Iron - 1 gr. - AB Section 01062 - 7.75" Cast Iron - 2 gr. - AB Section
Rails 01160 - Plated Steel Channel Rails (L=5.75"x W-1.0"XH=1.812") 01161 - Plated Steel Channel Rails (L=5.75"x W-1.0"XH=2.50")

P200A-5100 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 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.