GIANT

Performance Under Pressure

17397 Pump Assembly

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Table of Contents

1) General Information

Giant Industries Packs are designed in accordance with customer specifications to suit a particular application. Therefore, this manual should only be used to reference the power pack specified on the cover page. The individual operating instructions apply for the operation, maintenance, and service of the pump, valves (relief valve, unloader valve, etc…), drive motor, and other accessories particular to this power pack.

2) Safety

This operating manual gives basic instructions, which are to be observed during installation, operation and maintenance of the Power Pack components. Qualified personnel should read this operation manual, prior to the assembly and operation of the power pack. A copy of this manual should be readily available and located near the installation site.

2.1) *Qualification and Training of Operation Personnel*

The personnel responsible for operation, maintenance, inspection, and assembly must be adequately qualified. If the staff does not have the appropriate knowledge to train they must be trained and instructed, which may be performed by the manufacturer or supplier on behalf of the plant manager. The plant manager must make sure that all participating personnel understand the contents of the operating manual.

2.2) *Hazards in the event of Non- Compliance*

Non-Compliance with the safety instructions may produce a risk to the personnel, as well as, to the environment and the machine and may result in a loss of warranty claim.
For example, noncompliance may involve the following hazards:

- Failure of important functions of the machine or plant
- Failure of specified maintenance and repair
- Exposure of people/environment to electrical, mechanical, and chemical hazards

2.3) *Safe Operation*

When operating the Power Pack, the safety instructions contained in this manual, safety instructions provided by sources outside of Giant Industries and the Occupations Safety & Health Administration (OSHA) should be observed.

2.4) *Safety Instructions for Operator*

If extreme hot or cold components promote hazards, they must be guarded against accidental contact. DO NOT remove guards from moving parts (couplings, belt assemblies, etc…) during operation. Any leakage of hazardous (toxic, hot fluids, etc…) fluids must be drained away to prevent any risks to persons or environment. Electrical hazards should be eliminated. It may be necessary to seek out qualified, professional support to eliminate any of the above hazards.

2.5) *Safety Instructions for Maintenance, Inspection, and Assembly Work*

It shall be the plant manager's (or equivalent qualified personnel) responsibility to ensure that all maintenance, inspection and assembly work is performed by authorized and qualified personnel who have adequately familiarized themselves with the subject matter by studying this manual in detail.
Any work on the machine shall only be performed when the Power Pack is at a standstill and all power has been disconnected.
Pumps and Power Packs, which convey hazardous media, must be decontaminated.
Upon completion of work, all safety and protective facilities must be reinstalled and made operative again.
Prior to restarting the unit, the instructions listed under "Operation" are to be observed.

2.6) *Unauthorized Alterations and Production of Spare Parts*

No modifications shall be made to this equipment without the manufacturer's knowledge or permission. In the interest of safety, only authorized parts, spare parts or accessories shall be utilized on this equipment. The use of unauthorized parts may exempt the manufacturer from liability and/or void any warranty.

2.7) *Unauthorized Modes of Operation*

The reliability of the delivered machine will only be guaranteed if it is used in the manner intended, in accordance with Clause 1 of this manual. The specified limit values in the data sheets provided must, under no circumstances, be exceeded.

3) Transport and Storage

The Power Pack should always be transported horizontally. Storage for any length of time in a humid place or where temperatures are below zero is to be avoided. The storage room much be well ventilated, as otherwise dampness could damage the motor, pump gear, or other major components.

4) Set-Up and Installation

The Power Pack is to be mounted onto a level and solid foundation (cement base). The location of the installation has to be chosen so that maintenance work can be carried out easily.

4.1) Pump

A flexible hose must be used for the connection of the suction and discharge line (See Picture) so that any forces coming from the pipeline cannot be transferred to the pump.

a) Suction Line

- According to the water temperature of the suction side, the static pressure must be arranged so that the NPSHA is always higher than the pump NPSHR. If necessary, a booster pump is to be built into the suction line (between the supply water and high-pressure pump) which guarantees the required inlet pressure, which is needed for a cavitation free environment.
- The nominal width of the suction line has to be at least the same size as that of the pump inlet, better still is one size larger. A filter or shut-off valve should not be installed directly in front of the inlet of the pump. The suction line must only be used to feed the pump and should not be branched off to other machines, etc.
- When installing more than one pump unit, each unit must be fed with its own separate suction line connected to the supply source. The suction line leading to the pump must fall steadily from the supply source and is to be installed without narrow elbow fittings and joints.
- If the pump is connected to the local water supply, the regulations of the local water works must be adhered to. A suction stabilizer is to be fitted in front of the plunger pump near the inlet to dampen suction pulsation.

b) Discharge Line

- A safety valve must be installed in the high-pressure line directly after the discharge outlet of the pump. Shut-off fittings are not to be put between the pump and safety valve. The bypass line can be either feed back to the supply source or placed in the open.
- Important! The bypass line is to be fitted in such a way that nobody can be injured or by the sudden emergence of hot corrosive medium. The by pass line must be free of any shut-off fittings.
- Make sure that air-turbulence does not occur when feeding back into the header tank.
- An air vent should be built into the discharge line as near as possible to the pump.
- The most optimal place for installing a pressure gauge is between the pump and safety valve. The second outlet on the pump casing can also be used for this purpose.
- The discharge line is to be mounted either horizontally or so that it rises steadily away from the pump.

4.2) Pulsation Dampener

The purpose of the pulsation dampener, if installed, is to dampen pulsation of the high-pressure pump and thus avoid vibrations in the discharge line. Gas in the pulsation dampener should be pressurized to 50% of the max system pressure. The gas pressure of the pulsation dampener must be checked regularly.

4.3) Motor

The motor is to be connected as per the information stated in the Operating Instructions and shown on the name-plate.

4.4) Filter/Strainer

Clean the filter insert regularly and check for any damage (based on the medium and operation period).

5) Operation

- Check the oil level in the pump, and if necessary fill up as described per operating instructions.
- Open all regulator valves and other shut-off fittings.
- Start the motor briefly to check the direction of rotation. Pay careful attention to the specified direction of rotation for the pump (arrows indicated on crankcase). To check the correct rotation, the pump must only be dry run for a short period (approximately 30 seconds).
- Install protective coverings.
- Open water feed line.
- Start pump. As there is a certain static pressure present in the suction line, the pump should be vented of air immediately and begin conveying water. Listen carefully for a smooth-running sound. If the pump begins to run irregularly or pulsate strongly, it can be that one of the three plungers is not vented. In this case, the pump should be started and stopped at quick intervals to ease venting. Venting is also made easier if the vent tap in the discharge line is opened.

Important! **Danger of scalding** when pumping hot water.

6) Maintenance and Repair

When carrying out maintenance or repair work on the pump, the respective points shown in the operating instructions must be observed. We recommend that a first inspection of the pump unit be made after 50 hours of operation.

a) Check V-belt for correct tensioning and excess wear.
b) Change pump oil as indicated in the operating instructions. This must normally be done at intervals of between 200-500/ hr, depending on the model. Oil checks are to be made weekly.

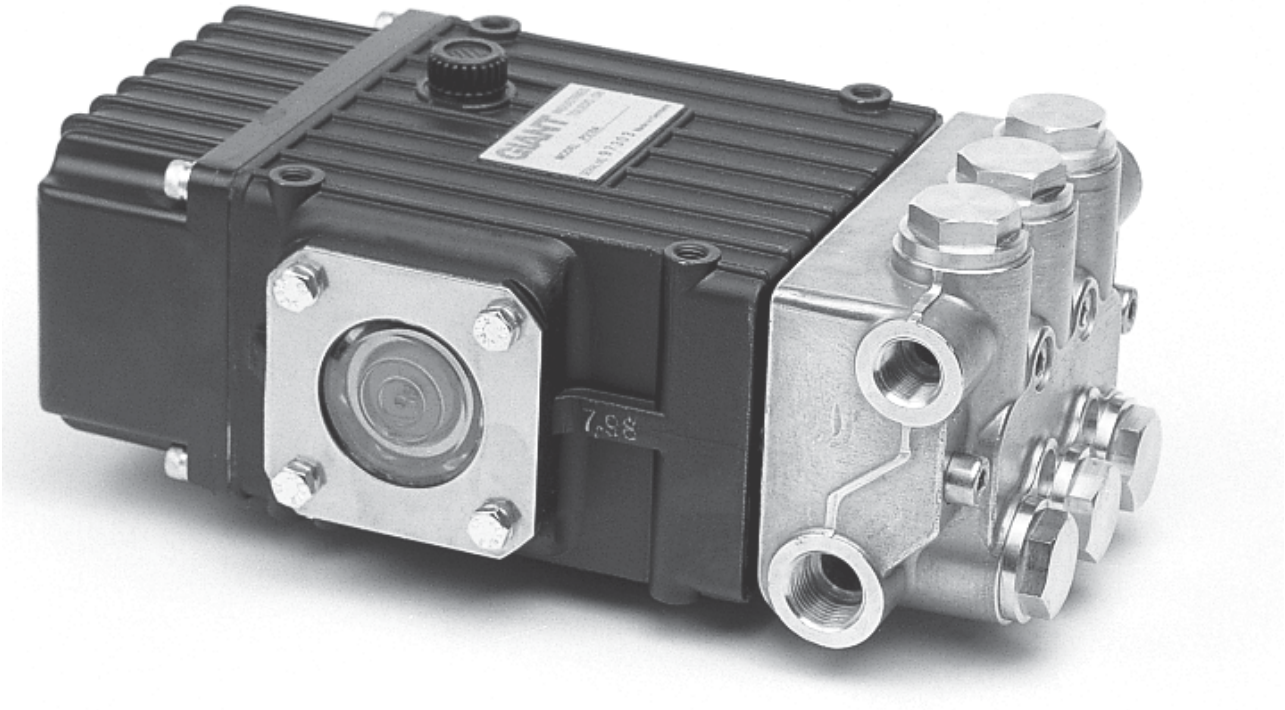
Important! Over tensioning of the V-belt can lead to permanent damage of associated parts in the gear end of the pump. Please see further instructions pertinent to V-belts tensioning provided in the Operation Instructions.

7) Operating Instructions

Individual operating instructions are available for important components provided by Giant Industries. Additional information for any product manufactured outside Giant Industries' facilities maybe obtained by contacting the manufacturer of the product. The plant manager and operating personnel should read and understand all operating instructions prior to installation and maintenance.

P319 Pump

Triplex Ceramic Plunger Pump Operating Instructions/ Repair and Service Manual



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. When viewed from the side of the pump, crankshaft rotation is clockwise on pumps with left handed shafts and counterclockwise on pumps with right handed shafts. 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 chart on page 8.

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 - P/N 01153
(20W-50)

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 P319

	U.S.	(Metric)
Volume	Up to 4.8 GPM	(18.2 LPM)
Discharge Pressure (Continuous)	Up to 2500 PSI	(175 bar)
Discharge Pressure (Intermittent)	Up to 3000 PSI	(200 bar)
Inlet Pressure	Positive Inlet Pressure Required	
Stroke	0.31"	8mm
RPM		Up to 3400 RPM
Plunger Diameter	0.71"	18mm
Temperature of Pumped Fluids	Up to 160 °F	(71 °F)
Inlet Ports		(2) 1/2" BSP
Discharge Ports		(2) 3/8" BSP
Shaft Rotation	Top of pulley towards manifold	
Crankshaft Diameter		24mm
Key Width		8mm
Shaft Mounting		Either side[1]
Weight	16 lbs.	(7.26 kg)
Crankcase Oil Capacity	14.2 fl.oz.	(0.42 liters)
Extended Crankcase Oil Capacity	17 fl. oz.	(0.5 liters)

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:

1 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.

P319 HORSEPOWER REQUIREMENTS					
RPM	GPM	1500 PSI	2000 PSI	2500 PSI	3000 PSI*
3000	4.2	4.3	5.8	7.2	8.7
3200	4.5	4.7	6.2	7.8	9.3
3450	4.8	5.0	6.6	8.3	9.9

* **Intermittent duty**

SPECIAL NOTE:

The theoretical gallons per revolution (gal/rev) is 0.0014.

To find specific outputs at various RPM, use the formula: GPM = 0.0014 x RPM

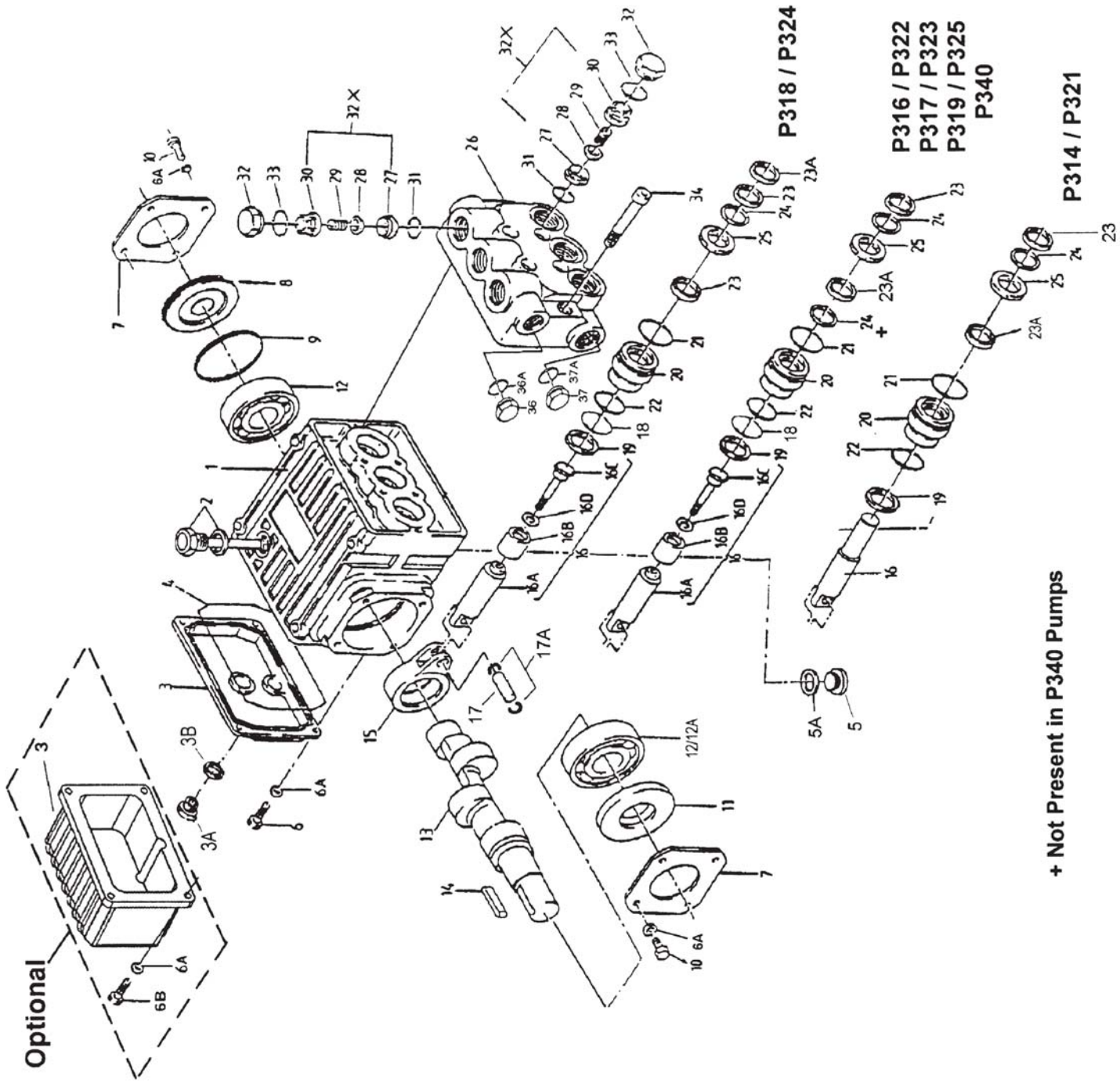
HORSEPOWER RATINGS:

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 - P319 Pump



P319 PUMP SPARE PARTS LIST AND REPAIR KITS

ITEM	PART NO.	DESCRIPTION	QTY.
1	08326	Crankcase	1
2	06773	Dipstick Assembly	1
3	08410B	Crankcase Cover, Short	1
3	08410-LG	Crankcase Cover, Extended	1
3A	07190	Oil Drain Plug	1
3B	13262A	Gasket for Plug	1
4	08328	O-Ring	1
5	06273	Oil Drain Plug	1
5A	08192	Gasket	1
6	07188	Screw, Short Cover	4
6A	01176-2	Spring Washer	12
6B	01196	Screw, Long Cover	4
7	08303	Bearing Cover I	2
8	08491	Sight Glass	1
9	07193	O-Ring	1
10	07225	Screw with Lock Washer	8
11	08331	Radial Shaft Seal	1
12	01086	Ball Bearing	1
12A	07760	Roller Bearing	1
13	06508	Crankshaft	1
14	06207	Straight Key	1
15	08333	Connecting Rod	3
16	08453	Plunger Assembly Complete,	3
16A	08367	Plunger Base	3
16B	08455	Plunger Pipe	3
16C	08456	Tension Screw	3
16D	07676	Copper Washer	3
17	06542	Wrist Pin	3
17A	22723	Clip Ring	6
18	07770	O-Ring (Except A,B)	3
19	08356-0010	Oil Seal	3
20	08458	Seal Case	3
21	07780	O-Ring	3
22	12027	O-Ring	3
23	08477	V-Sleeve	3
23A	08087	Grooved Seal, Brown	3
24	07904	Pressure Ring	6
25	08337	Weep Return Ring	3
26	06349*	Valve Casing	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	06350*	Valve Plug	6
32X	07946A	Valve Assembly, Complete	6
33	07913	O-Ring	6
34	08363	Hex Head Cap Screw	6
36	13338	Plug, 3/8" BSP	I
36A	08486	Copper Crush Washer, 3/8”	1
37	07109	Plug, 1/2" BSP	1
37A	07661	Seal	1

Plunger Packing Kits - # 09119

Item	Part #	Description	Qty.
23	08477	Grooved Seal, Black	3
23A	08087	Grooved Seal, Brown	3
24	07904	Pressure Ring, 18mm	6

Valve Assembly Kit - # 09116

Item	Part #	Description	Qty.
31	07853	O-Ring	6
32X	07946A	Valve Assy, Complete	6
33	07913	O-Ring	6

Oil Seal Kit - # 09144

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

Torque Specifications

Position	Item#	Description	Torque Amount
3B	07190	Oil Drain Plug w/ Gasket	222 in.-lbs.
6	07188	Screw	43 in.-lbs
10	07225	Screw with Lock Washer	85 in.-lbs.
16C	08456	Tension Screw, Plunger	220 in.-lbs.
34	08363	Hex Head Cap Screw, Valve Casing	222 in.-lbs.
32	06350	Plug	59 ft.-lbs.

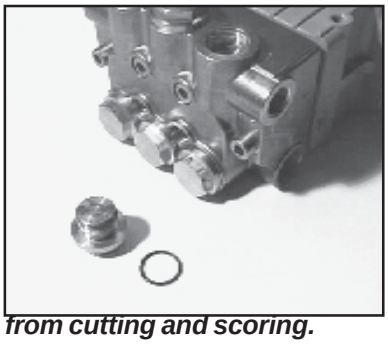
PUMP SYSTEM MALFUNCTIONS

MALFUNCTION	CAUSE	REMEDY
The Pressure and/ or the Delivery Drops	Worn packing seals	Replace packing seals
	Broken valve springs	Replace springs
	Belt slippage	Tighten or Replace belt
	Worn or Damaged nozzle	Replace nozzle
	Fouled discharge valve	Clean valve assembly
	Worn or Plugged relief valve on pump	Clean, Reset, and Replace
		worn parts
	Cavitations	Check suction lines on inlet
		of pump for restrictions
	Unloader	Check for proper operation
Water in Crankcase	High Humidity	Reduce oil change intervals
	Worn Seals	Replace seals
Noisy Operating	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

Preventative Maintenance Check List & Recommended Spare Parts List						
Check	**Daily**	**Weekly**	**50 Hrs.**	**Every 500 Hours**	**Every 1500 Hours**	**Every 3000 Hours**
Oil Level/Quality	X					
Oil Leaks	X					
Water Leaks	X					
Belts, Pulley		X				
Plumbing		X				
Recommended Spare Parts						
Oil Change (1 quart) p/n 01153			X	X		
Plunger Packing Kit (1 kit/pump) See page 11					X	
Oil Seal Kit (1 kit/pump) See page 11					X	
Valve Repair Kit (1 kit/pump) See page 11						X

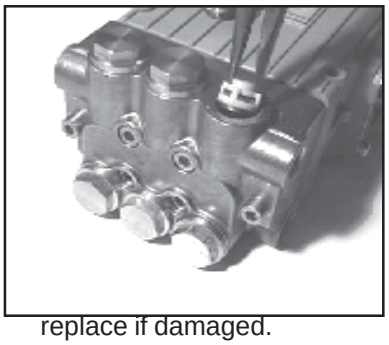
Repair Instructions- P319 Pump

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)



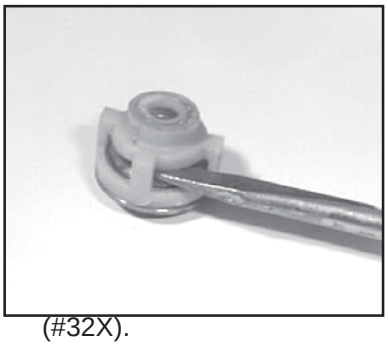
from cutting and scoring.

1. With a 24mm socket wrench, remove the (3) discharge valve plugs and (3) inlet valve plugs (#32). Inspect the o-ring (#33) for wear and



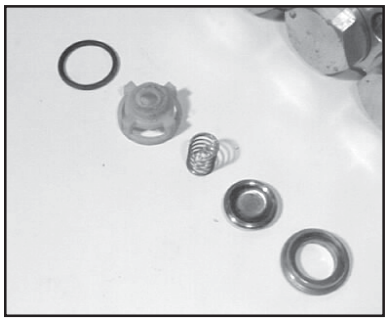
replace if damaged.

2. Using a needle nose pliers, remove the inlet and discharge valve assemblies

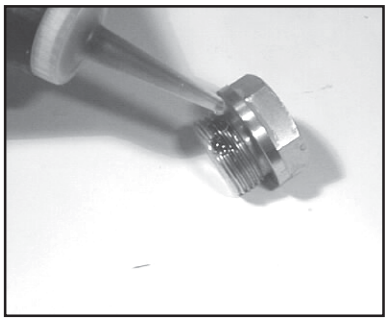


(#32X).

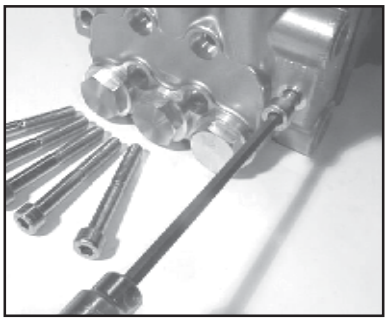
3. The valve assemblies can be separated by inserting a small screw driver between the valve seat (#27) and its valve spring retainer (#30).



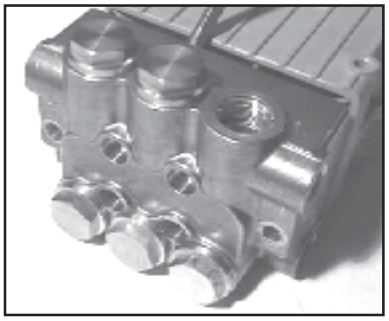
4. Remove each o-ring (#31). Inspect all parts for wear and replace as necessary. Reassemble valve assy's (32X) & place in valve casing (26)



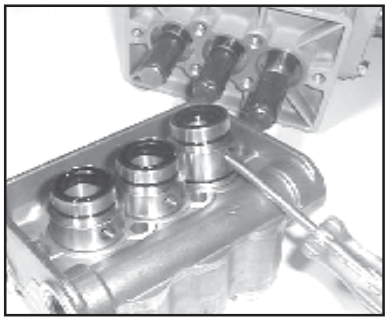
5. Apply one drop of Loctite 243 to valve plugs (32) and tighten to 59 ft.-lbs.



6. Next, use a 6mm allen wrench to remove the 6 hex head cap screws (#34).



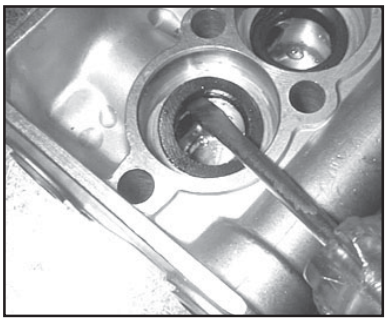
7. Carefully slide the valve casing (#26) out over the plungers with a screwdriver placed between the valve casing and crankcase.



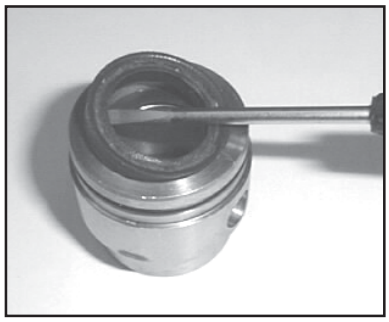
8. Remove weep return rings (#25) from the plungers (#16). Remove the seal case (#20) from either crankcases (#1) or manifold (#26) by using a screwdriver as shown above.

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

Repair Instructions- P319 Pump



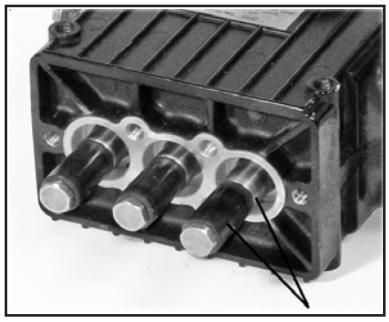
9. Remove the pressure rings (#24) and grooved seals (#23) from the valve casing (#26). Inspect parts for wear and replace if necessary.



10. Remove the weep grooved seals (23A) from the seal case (#20). Remove the pressure rings (#24).

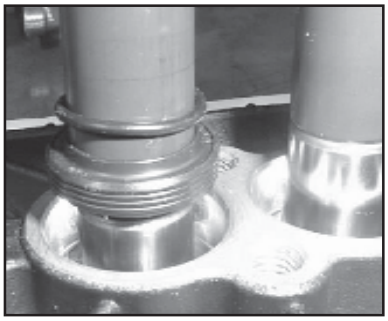
11. Inspect o-rings (#21 and 22) and replace as necessary.

12. Use a flat screw driver to pry the oil seals (#19) loose from the seal case (#20).

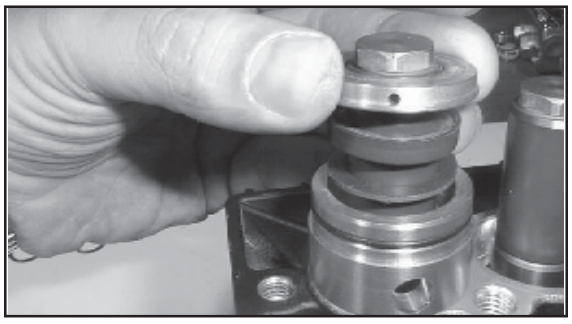


13. Check surfaces of the plunger bases and plunger pipes (#16B). A damaged surface will cause accelerated wear on the seals. Deposits of any kind must be carefully removed from the plunger surface. A damaged plunger must be replaced!

Reassembly sequence of the P319 pump



14. If the oil seals (#19) were removed, replace them with the primary seal lip (grooved side) towards the crankcase and the dust lip (tapered end) towards the valve casing (#26). Lubricate the seal before replacing. Install the oil scraper (#18) over the plunger.

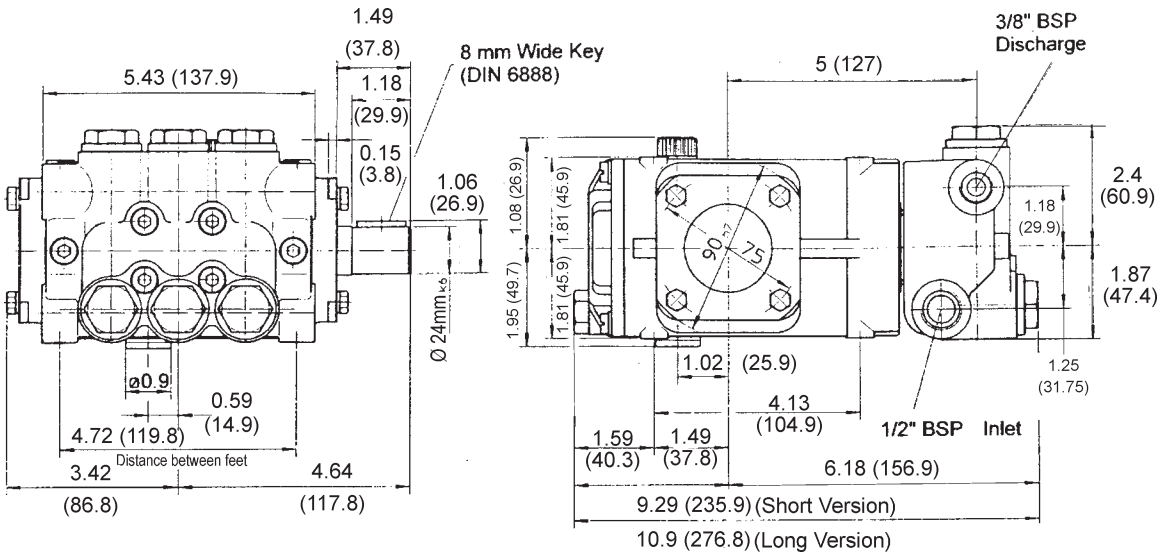


15. Place each seal case (#20) with o-rings (#21, 22) over the plungers (#16). Be certain the oil seal is centered with the seal case and tap firmly until the seal case is seated squarely on the crankcase (#1). Place pressure ring (#24) in seal case).

16. With the grooved side pointed toward the valve casing, place the weep grooved seals (23A) over each plunger and into each seal case (#20).

17. Generously lubricate the grooved seals (#23) and assemble these items into the valve casing. Place the weep return rings (#25) onto each plunger (#16). Place the pressure rings (#24) over the plungers. Slide the valve casing over the plungers and seat firmly. Replace the 6 hex head cap screws (#34) and tighten to 216 in.-lbs. in a crossing pattern.

P319 PUMP 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-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.

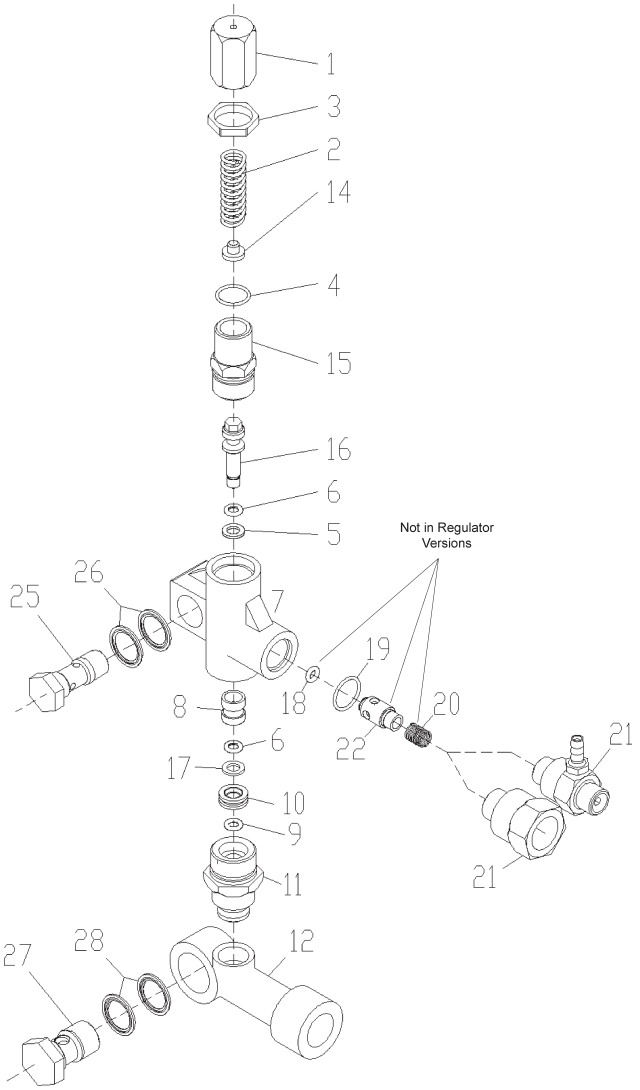
GIANT INDUSTRIES, INC., 900 N. Westwood Ave., P.O. Box 3187, Toledo, Ohio 43607
PHONE (419) 531-4600, FAX (419) 531-6836, www.giantpumps.com

Model 23280

Direct Mount Pressure Actuated Unloader with bypass connection

OPERATING CONDITIONS

Max Flow:	6.6 GPM	25 L/min
Pressure:	0-4000 PSI	0-275 Bar
Maximum Temp.:	194^0 F	90 ^{0} C
Weight:	2.0 lbs.	0.91 Kg
Inlet Port:		1/2" FNPT
Discharge Port (injector):		3/8" MNPT
Discharge Port (w/o injector):		3/8" FNPT
Bypass:		Internal



Item #	Part#	Description	Qty.
1	05137	Adjusting Spring Cap	1
2	08550	Pressure Spring	1
3	05134	Nut	1
4	07770*+	O-Ring	1
5	08553*+	Support Ring	1
6	07915*+	O-Ring, Piston	2
7	05131	Unloader Body	1
8	08691*	Piston	1
9	22659*+	O-Ring	1
10	08563*	Seat	1
11	05139	Bypass Fitting	1
12	05133	Inlet Tube	1
14	08549	Spring Retainer	1
15	08558	Guide Plug	1
16	08555	Piston Rod	1
17	08559*+	Support Ring	1
18	12326*+	O-Ring	1
19	07913*+	O-Ring	1
20	12328	Kick Back Valve Spring	1
21	12340	Kick back Valve Retainer	1
22	12325	Kick Back Valve Cone	1
23	08564*+	O-Ring	1
24	08566	O-Ring	1
25	13443	Discharge Banjo Bolt	1
26	08548	Seal Ring	2
27	13442	Inlet Banjo Bolt	1
28	08541	Seal Ring	2

*09321	Full Repair Kit (4-6,8-10, 17-19 & 23)
+09322	Seal Repair Kit (4-6, 9, 17-19 & 23)

Installation and Operation Instructions

1) The valve should be tension-free; therefore, loosen handwheel (3) as far as possible.
2) While the gun is open, turn the handwheel (3) in a clockwise motion until desired pressure is reached.

Important! If the nozzle orifice is too small to allow all the fluid to run through the hole after the required operating pressure is reacted, on no account is the valve to be adjusted higher than the maximum operating pressure of the pump.

Disassembly and Reassembly of the 23280 Unloader

1. Remove Adjusting Spring Cap (1) and remove Pressure Spring (2) and Spring Retainer (14).
2. Pull Inlet Tube (12) off Bypass Fitting (11) and unscrew Bypass Fitting(11) from Unloader Body (7).
3. Insert a small screwdriver or allen wrench in the bottom of the Bypass Fitting (11) and push the Seat (10) out of the Bypass Fitting. NOTE: Use caution to prevent scratching or nicking the chamfered area of the Seat.
4. Insert a 9/32" deep-well socket onto the top of the Piston Rod (16) and a ½" deep-well socket on to the Piston (8). Remove the Piston from the Piston Rod.
5. Unscrew the Guide Plug (15) from the top of the Unloader Body (7). Push the Piston Rod (16) out of the Guide Plug.
6. Loosen the Kick Back Valve Retainer (21) or Siphon Injector (21) and remove the Kick Back Valve Cone (22) and Kick Back Valve Spring (20).
7. Inspect all o-rings and mating parts. Replace with parts from the kit.
8. Reassemble in reverse order.

Note: Lightly grease all parts before reinstalling.

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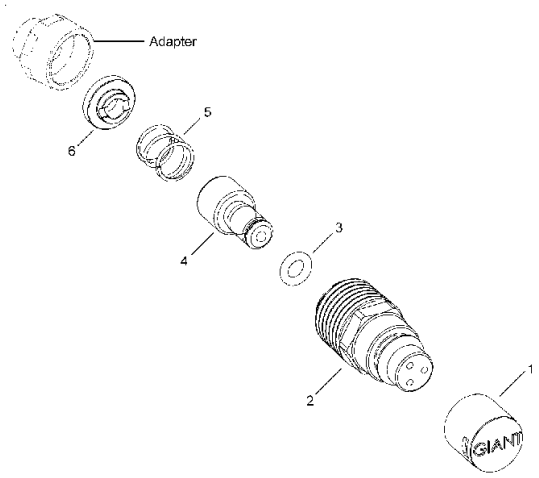
Model 23400 Series

Automatic Thermal Relief Valves

Item	Part #	Description	Qty.
1	06416	Deflector	1
2	06351*	Thermal Body, 1/2"	1
3	06355	O-Ring	1
4	23402	Power Pill	1
5	06356	Spring	1
6	06352	Spring Retainer	1



OPERATING CONDITIONS

Max Inlet Pressure:	**90 PSI**
Max System Flow:	**8 GPM**
Preset Temperature:	**140° F**
Inlet Port Size:	**23420B 1/4" NPT**
	23421B 3/8" NPT
	23422B 1/2" NPT
Outlet:	**7/8" Hose Barb (without deflector)**
Weight:	**3 Ounces**
Dimensions:	**7/8" X 1.8"**

* For 1/4" Thermals, an adapter (p/n 06399 is included)
* For 3/8" Thermals, an adapter (p/n 06400 is included)

Installation:
The Series 23400 Automatic Thermal Relief Valve is a must for any system utilizing a closed loop bypass line or internal bypass. The valve is designed to protect your pump and accessories against extreme heat when the pump is in bypass. When the temperature of the water in the bypass line reaches the preset temperature of the valve a small amount of hot water is released which is replaced by cooler supply water. This in turn lowers the temperature of the water in the bypass line thus signaling the valve to close. NOTE: The thermal relief valve works most effectively on pumping systems having positive inlet pressures.

Closed Loop Bypass Line Systems:
For pumping systems whose bypass line is routed back to the pump inlet (closed loop), installation of the Giant thermal relief valve should be in this loop. By installing a "tee" in the bypass line the thermal relief valve can effectively be installed to detect heat build up during pump bypass. A 1/2" (I.D.) hose should be attached to the end of the valve to direct the hot discharge water to a safe location.

Internal Bypass Pumps:
On pumps equipped with an internal bypass system, (such as the Giant Series R51000) the thermal relief valve can be utilized by installing a "tee" at the inlet of the pump. The Giant thermal relief valve can be placed in a branch of the "tee" where it will sense the increased water temperature. A 1/2" (I.D.) hose should be attached to the end of the valve to direct the hot discharge water to a safe location.

Repair:
Because of it's unique construction the Giant Thermal Relief valve is not rebuildable. The design utilized will provide years of trouble free service.

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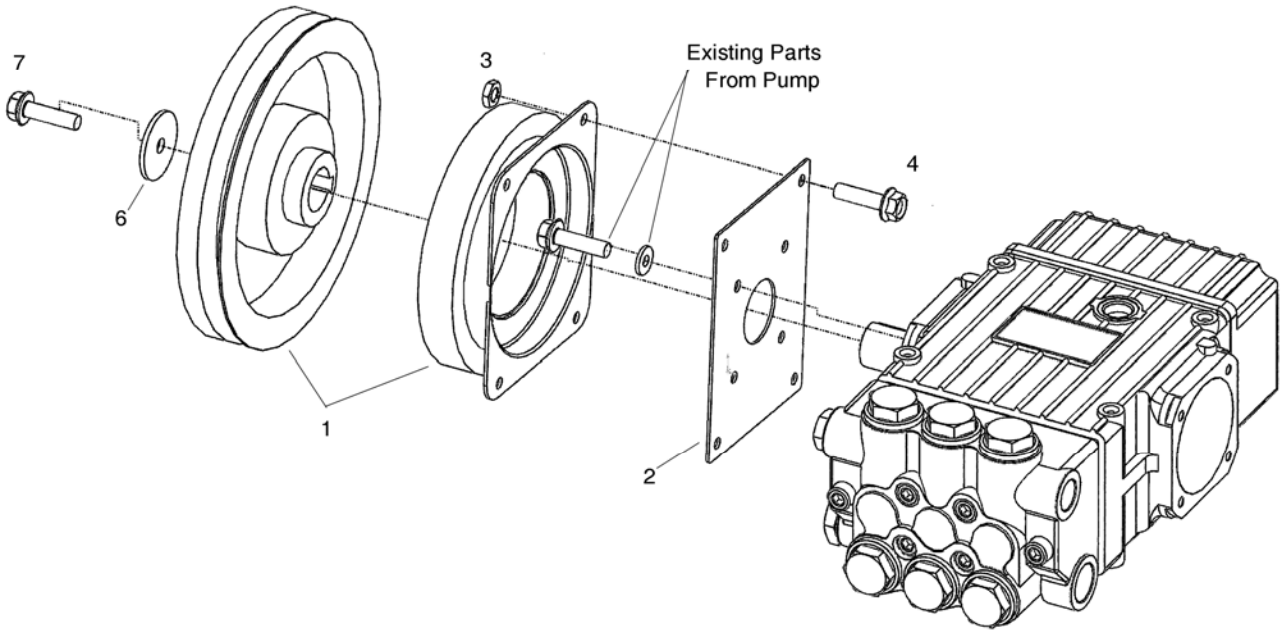
Instructions for 23910 clutch assembly (For P200 and P300 Series Pumps)

Parts List

Item #	Part #	Description	Qty
1	06429	24mm Clutch	1
2	06521	Mounting Flange	1
3	06522	1/4-20 Hex Nut	4
4	10440	Hex Head Screw	4
6	08198	Fender Washer	1
7	08198	M8-1.25 Screw	1



Assembly and Installation Instructions

1. Remove the bearing cover on the pump with a 10 mm hex wrench.
2. Place the mounting plate (2) over the crankshaft and secure with existing bearing cover screws.
3. Secure clutch (1) to mounting flange by sliding clutch over crankshaft and attaching with screws (4) and hex nuts (3). Secure set screw on pulley shaft.
4. Thread the M8-1.25 screw (7) and Fender Washer (6) over the hub of the clutch (1) into the crankshaft of the pump.
5. Attach lead wire to (+) or pressure flow / switch as desired.
6. Attach "A or AX section" belt of required length
7. Engage and disengage the clutch several times to ensure it is functioning properly. If full torque will be required from the pump immediately, the clutch should be properly burnished. (Burnishing involves cycling the clutch at a reduced speed not more than 4 times per minute so the surfaces can mate together. In most applications, 20-50 cycles are required for burnishing.)

NOTE: If an operation manual is needed for the above pump models, please consult your local distributor.

Performance Under Pressure

BILL OF MATERIALS

Part # 17397 (P319RUT Pump and Clutch Assembly)

COMPONENT#	DESCRIPTION	QTY
P319R	Pump	1
23280	Unloader	1
23422B	Thermal Relief Valve	1
23910	Clutch Assembly	1
25000-3600	Pressure Gauge	1

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Performance Under Pressure

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