

# Model SP100W/SP351W

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Triplex Ceramic  
Plunger Pump  
Operating Instructions/  
Repair and Service  
Manual



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**GIANT**

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# 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° F, it is important to insure a positive head to the pump to prevent cavitation.

NPSHR (FT-HEAD)

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 3-6.

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.

RPM

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 recommended 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 SP100W

	U.S.	(Metric)
Volume .....	11.2 GPM .....	(42 LPM)
Discharge Pressure .....	2000 PSI .....	(140 bar)
Maximum Speed of Crankshaft .....	1420 RPM .....	1420 RPM
Plunger Diameter .....	1.02" .....	(26mm)
Stroke .....	0.79" .....	(20mm)
Crankcase Oil Capacity .....	24 fl.oz. ....	(710 ml)
Temperature of Pumped Fluids .....	160 °F .....	(71° C)
Inlet Ports .....		(2) 3/4" NPT
Discharge Ports .....		(2) 3/8" NPT
Crankshaft Mounting .....		Either Side
Shaft Rotation .....	Top of Pulley Towards Fluid End	
Weight .....	41.9 lbs. ....	(19 kg)

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.

### PULLEY INFORMATION

Pulley selection and pump speed are based on a 1725 RPM motor and "B" section belts. When selecting desired GPM, allow for a ±5% tolerance on pumps output due to variations in pulleys, belts and motors among manufacturers.

1. Select GPM required, then select appropriate motor and pump pulley from the same line.
2. The desired pressure is achieved by selecting the correct nozzle size that corresponds with the pump GPM.

### HORSEPOWER INFORMATION

Horsepower ratings shown are the power requirements for the pump. Gas engine power outputs must be approximately twice the pump power requirements shown above.

We recommend that a 1.1 service factor be specified when selecting an electric motor as the power source. To compute specific pump horsepower requirements, use the following formula:

$$(GPM \times PSI) / 1460 = HP$$

<b>SP100W PULLEY SELECTION &amp; HORSEPOWER REQUIREMENTS</b>							
PUMP PULLEY	MOTOR PULLEY	RPM	GPM	1200 PSI	1500 PSI	1900 PSI	2000 PSI
9.75"	4.15"	700	5.5	4.5	5.7	7.2	7.5
9.75"	4.70"	800	6.3	5.2	6.5	8.2	8.6
9.75"	5.25"	900	7.1	5.8	7.3	9.2	9.7
9.75"	5.50"	950	7.5	6.1	7.7	9.7	10.2
9.75"	5.80"	1000	7.9	6.5	8.1	10.2	10.8
9.75"	6.90"	1200	9.4	7.7	9.7	12.3	12.9
9.75"	7.45"	1300	10.2	8.4	10.5	13.3	14.0
9.75"	8.10"	1420	11.2	9.2	11.5	14.5	

# Specifications Model SP351W

	U.S.	(Metric)
Volume .....	6.7 GPM .....	(25 LPM)
Discharge Pressure .....	3200 PSI .....	(220 bar)
Maximum Speed of Crankshaft .....	1420 RPM .....	1420 RPM
Plunger Diameter .....	0.79" .....	(20mm)
Stroke .....	0.79" .....	(20mm)
Crankcase Oil Capacity .....	24 fl.oz. ....	(710 ml)
Temperature of Pumped Fluids .....	160 °F .....	(71° C)
Inlet Ports .....		(2) 3/4" NPT
Discharge Ports .....		(2) 3/8" NPT
Crankshaft Mounting .....		Either Side
Shaft Rotation .....	Top of Pulley Towards Fluid End	
Weight .....	41.9 lbs. ....	(19 kg)

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.

### PULLEY INFORMATION

Pulley selection and pump speed are based on a 1725 RPM motor and "B" section belts. When selecting desired GPM, allow for a ±5% tolerance on pumps output due to variations in pulleys, belts and motors among manufacturers.

1. Select GPM required, then select appropriate motor and pump pulley from the same line.
2. The desired pressure is achieved by selecting the correct nozzle size that corresponds with the pump GPM.

### HORSEPOWER INFORMATION

Horsepower ratings shown are the power requirements for the pump. Gas engine power outputs must be approximately twice the pump power requirements shown above.

We recommend that a 1.1 service factor be specified when selecting an electric motor as the power source. To compute specific pump horsepower requirements, use the following formula:

$$(GPM \times PSI) / 1460 = HP$$

<b>SP351W PULLEY SELECTION &amp; HORSEPOWER REQUIREMENTS</b>							
PUMP PULLEY	MOTOR PULLEY	RPM	GPM	1000 PSI	2000 PSI	2500 PSI	3200 PSI
9.75"	4.15"	700	3.3	2.3	4.5	5.7	7.2
9.75"	4.70"	800	3.8	2.6	5.2	6.5	8.3
9.75"	5.25"	900	4.2	2.9	5.8	7.2	9.2
9.75"	5.50"	950	4.5	3.1	6.2	7.7	9.9
9.75"	5.80"	1000	4.7	3.2	6.4	8.0	10.3
9.75"	6.90"	1200	5.7	3.9	7.8	9.8	12.5
9.75"	7.45"	1300	6.1	4.2	8.4	10.4	13.4
9.75"	8.10"	1420	6.7	4.6	9.2	11.5	

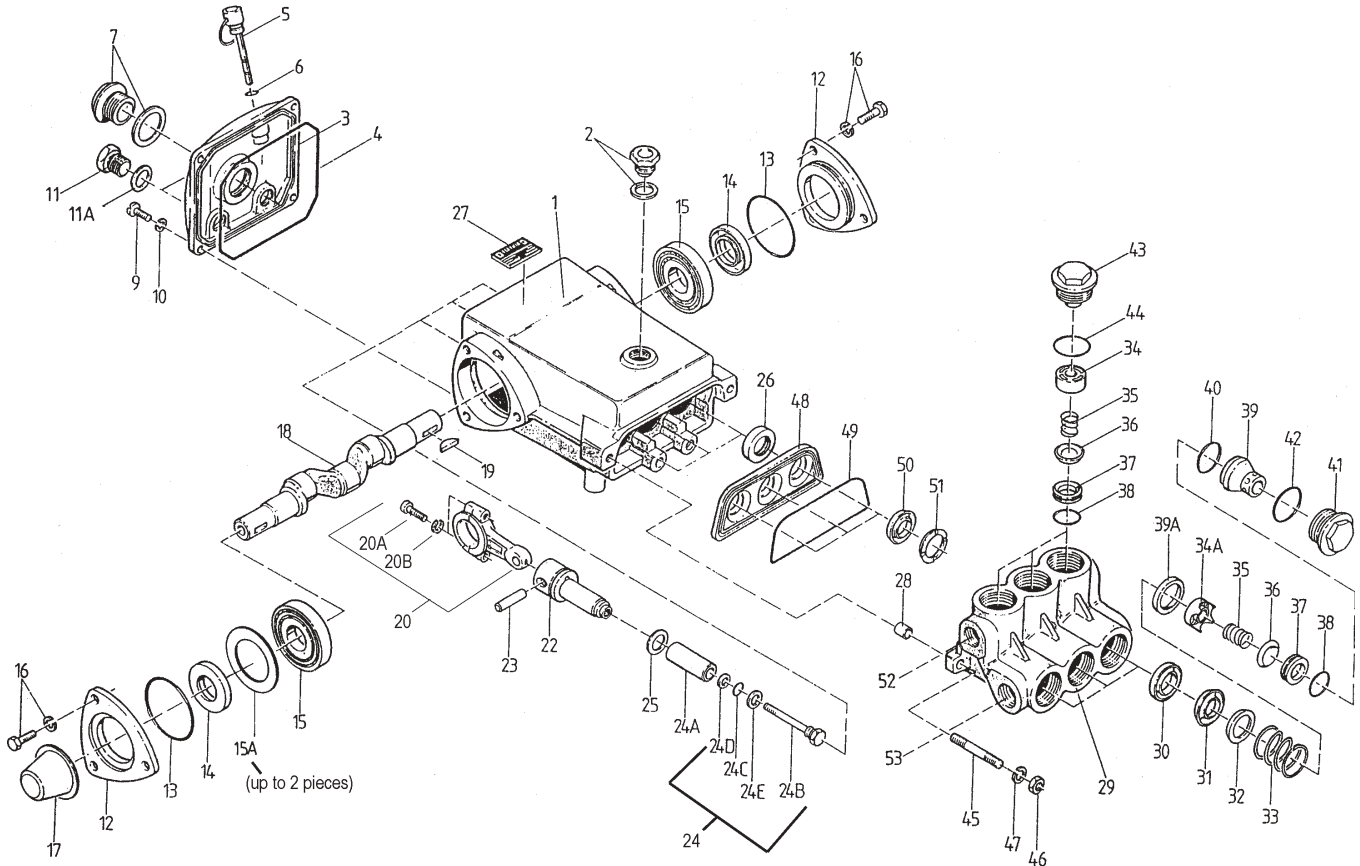
## SP100W/SP351W PARTS LIST

<u>ITEM</u>	<u>PART</u>	<u>DESCRIPTIONS</u>	<u>QTY</u>	<u>ITEM</u>	<u>PART</u>	<u>DESCRIPTIONS</u>	<u>QTY</u>
1	07294	Crankcase	1	29	07320	Manifold, SP100W	1
2	06968	Oil Filler Cap with Gasket	1	29	07321	Manifold, SP351W	1
3	07297	Cover, Crankcase	3	30	07335	Pressure Ring, SP100W	3
4	07298	O-Ring, Crankcase Cover	1	30	07268	Pressure Ring, SP351W	3
5	07299	Oil Dipstick	1	31	07336	V-Sleeve, SP100W	3
6	01009	O-Ring, Dip Stick	1	31	07322	V-Sleeve SP351W	3
7	07186	Oil Sight Glass	1	32	07337	Support Ring, SP100W	3
8	07187	Gasket, Oil Sight Glass	1	32	07270	Support Ring, SP351W	3
9	01010	Screw, Crankcase Cover	4	33	07338	Pressure Spring, SP100W	3
10	01011	Spring Washer, Cover Screw	4	33	07275	Pressure Spring, SP351W	3
11	07109	Oil Drain Plug	2	34	07325-0100	Spring Retainer, Discharge	3
11A	07182	Gasket for Oil Drain Plug	2	34A	07326-0100	Spring Retainer, Inlet	3
12	07302	Bearing Cover	2	35	06970	Valve Spring	6
13	07303	O-Ring, Bearing Cover	2	36	07327	Valve Plate	6
14	07459	Seal, Crankshaft	2	37	06014	Valve Seat	6
15	08388	Roller Bearing	2	38	06015	O-Ring, Valve Seat	6
15A	06962	Shim, 1.5mm	2	39	07328	Valve Retainer, Inlet, SP100W	3
16	07114	Screw & Washer, Bearing Cover	6	39	07383	Valve Retainer, Inlet, SP351W	3
17	07308	Shaft Protector	1	39A	07329	Spacer	3
18	07309	Crankshaft	1	40	12057	O-Ring, Inlet Valve Retainer	3
19	07252	Woodruff Key	1	41	07331	Plug, Inlet	3
20	07310	Connecting Rod Assy.	3	42	07332	O-Ring, Inlet Plug	3
20A	07311	Inner Hexagon Screw	3	43	07213	Plug, Discharge, SP100W	3
20B	07122	Spring Washer	3	43	06820	Plug, Discharge, SP351W	3
22	07315	Crosshead with Plunger Base	3	44	07214	O-Ring, Discharge Plug, SP100W	3
23	07314	Crosshead Pin	3	44	07035	O-Ring, Discharge Plug, SP351W	3
24	07360	Bolt Assembly	3	45	07333	Stud Bolt	4
		(Items 24B, 24C, 24D, 24E)	3	46	07158	Hex Nut, Stud Bolt	4
24A	07346	Ceramic Plunger, SP100W	3	47	07159	Spring Washer, Stud Bolt	4
24A	07340	Ceramic Plunger, SP351W	3	48	07347	Weep Return Plate, SP100W	1
24B	07360-1	Tension Screw	3	48	07343	Weep Return Plate, SP351W	1
24C	07023	O-Ring, Bolt Assy. (Viton)	3	49	07344	O-Ring, Weep Plate	1
24D	07203	Support Ring	3	50	07336	Weep Return Seal, SP100W	3
24E	07258	Copper Seal Washer	3	50	06064	Weep Return Seal, SP351W	3
25	07317	Flinger	3	51	07349	Seal Support Ring, SP100W	3
26	08058	Radial Shaft Seal	3	51	07345	Seal Support Ring, SP351W	3
28	07289	Shim, Stud	2				

## SP100W/SP351W TORQUE SPECIFICATIONS

<u>Position</u>	<u>Part#</u>	<u>Description</u>	<u>Torque Amount</u>
20A	07311	Inner Hexagon Screw	310 in.-lbs.
24B	07360-1	Tension Screw	310 in.-lbs.
41	07331	Plug, Inlet	59 ft.-lbs.
42	07213/06820	Plug, Discharge	59 ft.-lbs.
45	07158	Nut, Stud Bolt	59 ft.-lbs.

## SP100W/SP351W EXPLODED VIEW



## SP100W/SP351W REPAIR KITS

### Plunger Packing Repair #09077, SP100W

Item	Part #	Description	Qty.
31	07336	V-Sleeve	3

### Plunger Packing Repair #09076, SP351W

Item	Part #	Description	Qty.
31	07322	V-Sleeve	3

### Ceramic Plunger Kit #09079, SP100W

Item	Part #	Description	Qty.
24	07360	Bolt Assy. (24B-E)	3
24A	07346	Ceramic Plunger	3
25	07317	Flinger	3

### Ceramic Plunger Kit #09078, SP351W

Item	Part #	Description	Qty.
24	07360	Bolt Assy. (24B-E)	3
24A	07340	Ceramic Plunger	3
25	07317	Flinger	3

### Weep Repair Kit #09075, SP100W

Item	Part #	Description	Qty.
49	07344	O-Ring, Weep Return Plate	1
50	07336	Seal, Weep Return	3

### Weep Repair Kit #09074, SP351W

Item	Part #	Description	Qty.
49	07344	O-Ring, Weep Return Plate	1
50	06064	Seal, Weep Return	3

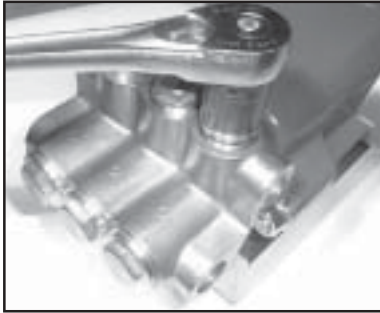
### Inlet Valve Kit #09069

Item	Part #	Description	Qty.
34A	07326-0100	Inlet Spring Retainer	3
35	06970	Valve Spring	3
36	07327	Valve Plate	3
37	06014	Valve Seat	3
38	06015	O-Ring, Valve Seat	3
40	12057	O-Ring, Inlet Valve Retainer	3
42	07332	O-Ring, Inlet Plug	3

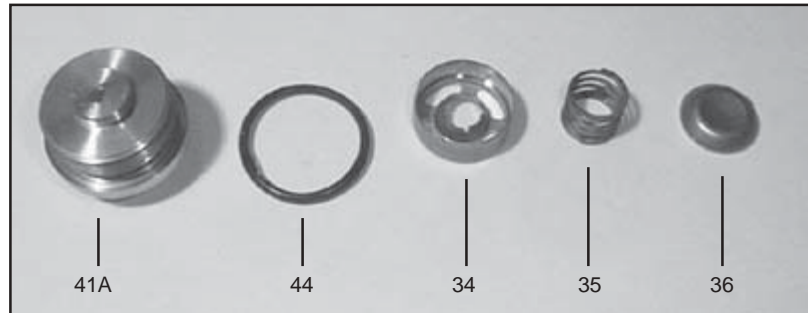
### Discharge Valve Kit #09068

Item	Part #	Description	Qty.
34	07325-0100	Spring Retainer, Discharge	3
35	06970	Valve Spring	3
36	07327	Valve Plate	3
37	06014	Valve Seat	3
38	06015	O-Ring, Valve Seat	3
44	07214	Discharge Plug O-Ring, SP100W	3
44	07035	Discharge Plug O-Ring, SP351W	3

## REPAIR INSTRUCTION - SP100W/SP351W SERIES



1. With a 22mm socket, remove the three discharge (43) and three inlet (41) manifold plugs.



2. Check o-ring (44) for wear and replace as necessary. Remove the discharge spring retainer (34), valve spring (35), and valve plate (36).



3. Use a small slide hammer to remove valve seats (37) from manifold (29). Inspect valve plate (36) and valve seats (37) for wear. If excessive pitting is seen, replace the worn parts. Check valve seat o-ring (38) for wear and replace as necessary.



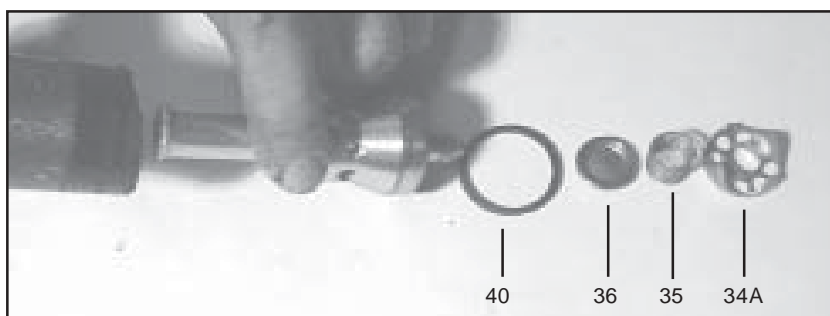
4. Drain the oil from the pump. Turn the pump over to remove the four manifold stud nuts (46) with a 19mm wrench.



5. Tap the back of the valve casing (29) with a rubber mallet.



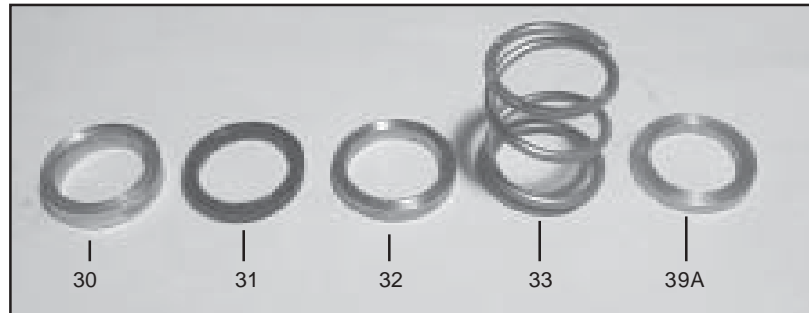
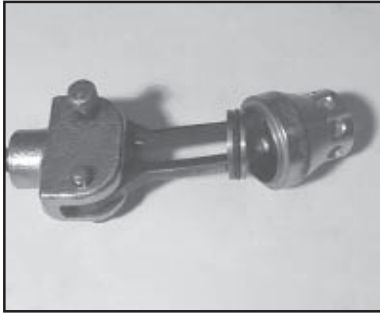
6. Remove the inlet valve retainer assembly (34A-39)



7. Remove the o-ring, (40), valve plate (36), valve spring (35), spring retainer (34A). Check valve retainer o-ring (40) for wear.

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

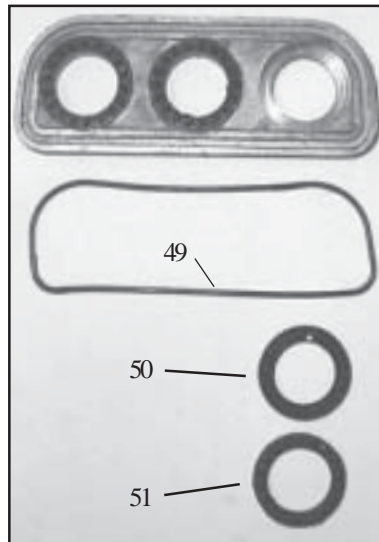
## REPAIR INSTRUCTION - SP100W/SP351W SERIES



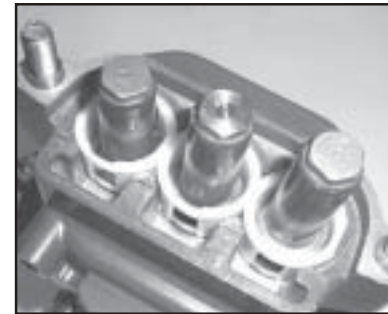
8. With a valve puller remove the valve seat (37) and o-ring (38) replace if worn. If excessive pitting is seen, replace the worn parts. Check valve seat o-ring (38) for wear and replace as necessary.
9. Remove the spacer (39A), pressure spring (33), support ring (32), v-sleeve (31), and pressure ring (30), from the manifold (29) and check for wear.



10. With a flat headed screwdriver remove the weep return plate (48). Remove the o-ring (49) and check for wear.



11. Inspect seals (50), seal support ring (51) and O-ring (49) and replace as necessary.

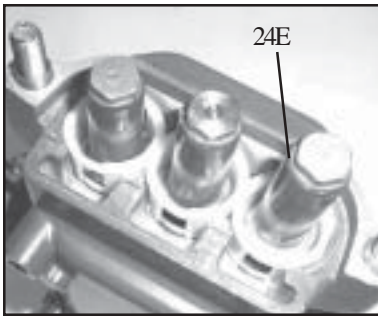


12. Inspect ceramic plunger (24A) tips for wear. If necessary, replacement of the ceramic plungers may be accomplished by removing the plunger bolt assemblies (24) with a 13mm wrench. Ceramic plungers should now slide off the stainless steel plunger base (22). Excessive resistance to plunger removal may be overcome by heating the stainless steel plunger base. This will melt any excess loc-tite beneath the ceramic plunger allowing easy removal.

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



## REPAIR INSTRUCTION - SP100W/SP351W SERIES



13. Replace copper ring (24E) onto plunger bolt (24B). Slide plunger bolt assembly (24) into ceramic plunger (24A). Apply a light film of loc-tite to plunger bolt threads and place plunger assembly onto stainless steel plunger base (22) and tighten to 310 in.-lbs.

14. To replace plunger oil seals (26), proceed to "Gear End Disassembly" section below. Otherwise, continue as described below.



15. Before replacing pump manifold (29), first rotate crankshaft (18) until two outside plungers (24A) extend evenly forward. Next lubricate v-sleeves (50) in the rear v-sleeve housing (48) and slide housing over plungers. Lubricate ceramic plungers with a light film of oil. Carefully and evenly slide manifold over plungers and press manifold firmly against crankcase (1). Replace manifold stud bolts (45), washers (47) and nut (46) and tighten to 59 ft.-lbs.

### Gear End Disassembly

16. Remove the crankcase cover screws (9). Inspect the crankcase cover o-ring (4) for wear. Replace if necessary.
17. Inspect the dipstick (5) vent hole for signs of clogging. Clean if necessary.
18. To remove the crankshaft (18), first remove the bearing cover plates (12). Remove the key (19).
19. With a 5 mm allen wrench remove the connecting rod screws (21) and rear portion of connecting rod assemblies (20). Push the connecting rod (20) and plunger rod (22) down as far as possible into the crankcase housing.
20. Hold the pump rear assembly with a wooden fixture, or other suitable device, in order to secure it while removing the crankshaft (18). Using a plastic mallet, tap the crankshaft from one side while turning it from the other side. The turning insures that during this sequence the crankshaft does not become wedged against the front portion of the connecting rods (20). The far side bearing (15) will remain in the crankcase (1). When free, the crankshaft can be removed by hand. The opposite side crankshaft seal (14) will be removed by this procedure. **It is important that you turn the crankshaft (18) constantly while tapping from the opposite end to avoid any binding. The crankshaft bearing (15) remains on the crankshaft as it is removed.** If necessary, use a bearing puller to remove the crankshaft bearing (15).
21. Remove the front portion of the connecting rods (20) and plunger base assembly (22) from the rear of the pump by pulling straight out of the crankcase crosshead guides. **Notice that the connecting rod (20) halves are numbered or colored. Connecting rods must be positioned with their numbers or colors on the upper left-hand side, in the same numerical sequence as when they were removed.**
22. Using a dowel and a rubber mallet, tap the oil seals (26) out from the rear of crankcase (1). The area onto which the oil seal rests should be clean and dry. Put a small drop of loc-tite on the oil seals and place into crankcase with lips facing the rear of the pump.
23. To remove the crosshead pin (23) from the crosshead (22), the assembly should be positioned on a wooden fixture to avoid damage to crosshead. Drive out the pin on opposite side of mark located on the crosshead. On those pumps without mark on crosshead, drive out pin by tapping on tapered side of pin.
24. To remove the bearing (15) remaining in the crankcase (1), insert small end of Giant bearing tool and tap with a rubber mallet until bearing and seal (14) are completely removed. **The bearing can only be removed from the inside by inserting the Giant Bearing Tool through the opposite side of the crankcase.** The crosshead guide in the crankcase should be inspected for possible damage.

## REPAIR INSTRUCTION - SP100W/SP351W SERIES

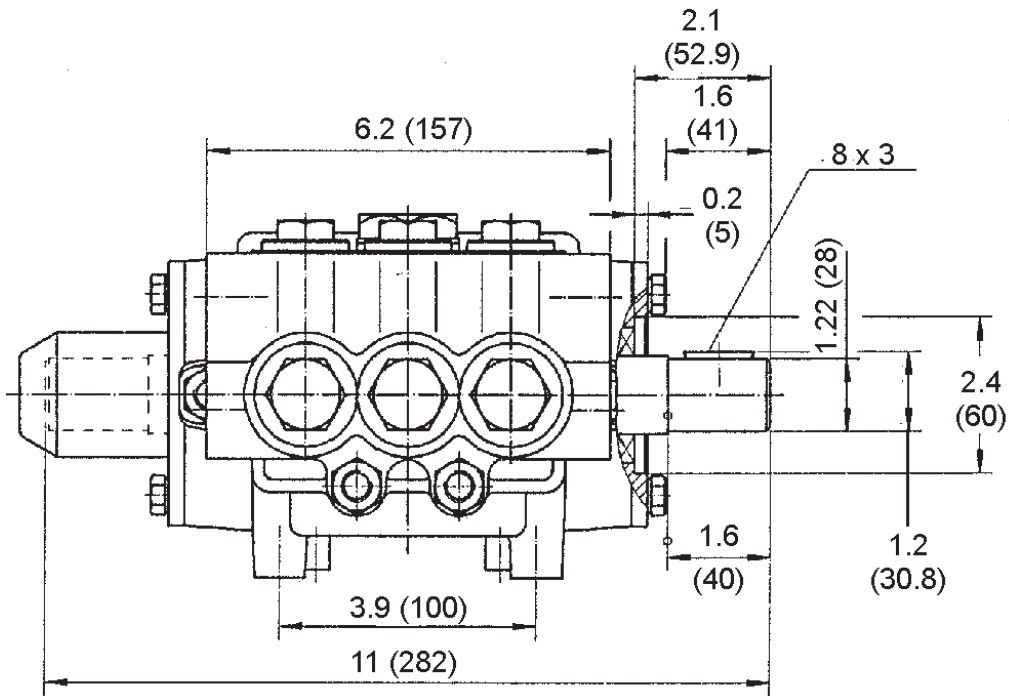
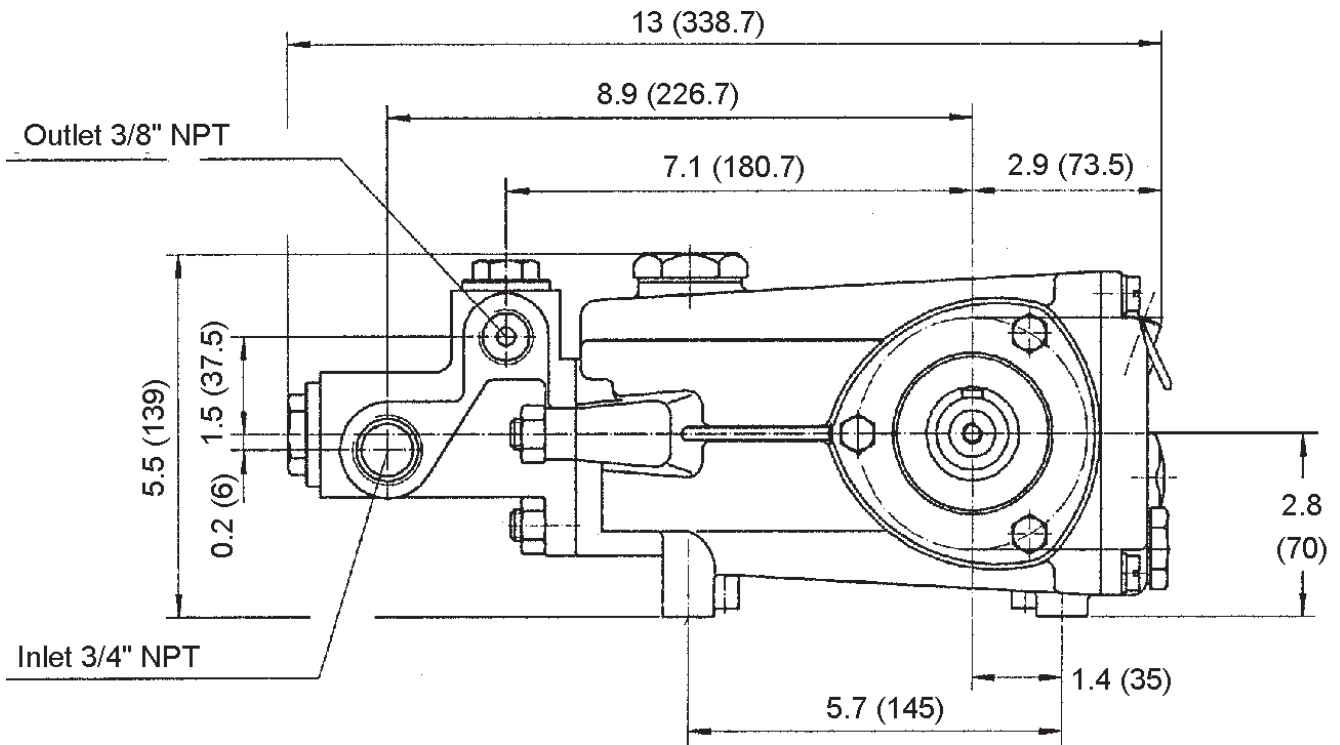
25. To reassemble, place the far bearing (15) in the crankcase (1) bearing housing and with the Giant Bearing tool as a driver, tap into the crankcase using a rubber mallet.
  26. Insert the far side crankshaft oil seal (14) with the Giant Bearing Tool making sure it is firmly seated and well oiled. Always make sure that the crankshaft seal lip does not show signs of wear and that the garter spring is firmly in place on the seal before reinserting into the pump. Replace the bearing cover (12) and o-ring (13) and tighten securely.
  27. Replace the front portion of the connecting rod (20) and plunger rod/ crosshead assembly (22) by press-fitting the crosshead pin (23). Make sure to insert the beveled edge of the crosshead pin into crosshead. If the crosshead has a mark, install pin from marked side. **The crosshead pin (23) should not extend beyond either side of the crosshead (22) in order to prevent damage to the crosshead bore of the crankcase (1).**
  28. Place each crosshead/ plunger assembly into the pump making sure that all of the parts are well oiled before insertion into the crankcase (1). **Notice that the connecting rod (20) halves are numbered or colored. Connecting rods must be positioned with their numbers or colors on the upper left-hand side, in the same numerical sequence as when they were removed.**
  29. Replace near side bearing (15) on crankshaft by using the Giant Bearing Tool and mallet to tap into place. Take the crankshaft (18) end with the bearing (15) and insert the other end through the bearing housing and tap with a rubber mallet until the bearing is seated.
  30. When reassembling the connecting rods (20), note that the connecting rod halves are numbered or colored and that the numbers or colors must be matched and aligned. Torque the connecting rod bolts to 310 in.-lbs.
  31. Insert the near side crankshaft oil seal (14) with the Giant Bearing Tool making sure it is firmly seated and well oiled. Replace the bearing cover (12) and o-ring (13) and tighten securely.
- See instructions above for re-installing fluid end onto the gear end.**
32. Fill the SP100W/SP351W crankcase (1) with 24 oz. of Giant Industries' oil and check the oil level with the dipstick (5). Proper level is center of two lines. Reinstall the pump into your system.

<b>Preventative Maintenance Check-List &amp; Recommended Spare Parts List</b>						
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 p/n 1154			X	X		
Plunger Packing Kits (1 kit/pump) (See page 6 for kit list)					X	
Valve Assembly Kit (1 kit/pump) (See page 6 for kit list)					X	
Oil Seal Kit (1 kit/pump) (See page 6 for kit list)						X

### Pump Mounting Selection Guide

<p><b>Bushings</b> 07175 - 28 mm Tapered H Bushing</p>	<p><b>Rails</b> 07358 - Plated Steel Channel Rails (L=9.18" x W=1.88" x H=3.00")</p>
<p><b>Pulley &amp; Sheaves</b> 01055 - 9.75" Cast Iron 2 gr. - AB Section 01062 - 7.75" Cast Iron - 2 gr. - AB Section</p>	

**SP100W/SP351W 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. Five (5) years from the date of shipment for all pumps used in portable pressure washers with NON-SALINE, clean water applications.
2. Two (2) years from the date of shipment for Giant pumps used in car wash applications.
3. One (1) year from the date of shipment for all other Giant industrial and consumer pumps.
4. Six (6) months from the date of shipment for all rebuilt pumps
5. 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.

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