



Low Pressure Diaphragm Pumps

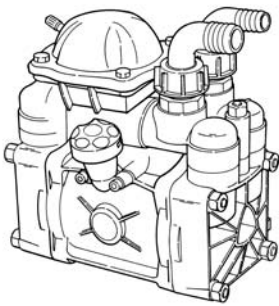
Form L-1381
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Installation, Operation, Repair and Parts Manual

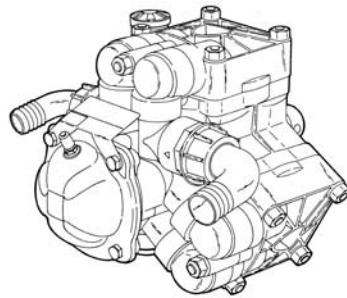
Description

Hypro low pressure diaphragm pumps are recommended for ground and low-level spraying of herbicides, pesticides, liquid fertilizers and many other hard-to-handle fluids. Low-cost maintenance and almost wear-free operation make these pumps ideal for a wide variety

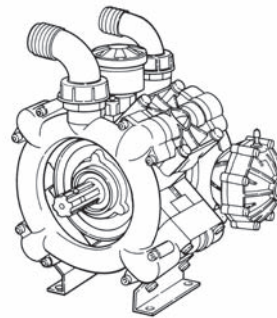
of spraying jobs. Pressure and output are designed for optimum performance of medium to large-sized sprayers. Hypro low pressure diaphragm pumps can be adapted for splined shaft, hollow shaft, and solid shaft drive options. Pumps include a pulsation dampener.



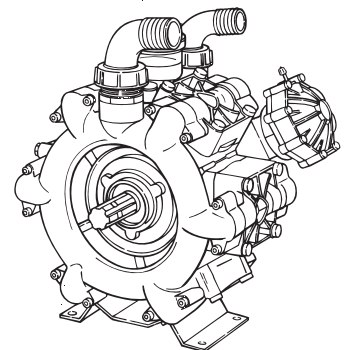
Model 9910-D70
Model 9910-D70GR
Max flow: 19 gpm
Max pressure: 290 psi
2 diaphragms



Model 9910-D115
Model 9910-D115GR34
Max flow: 30.1 gpm
Max pressure: 290 psi
3 diaphragms



Model 9910-D160
Max flow: 42.5 gpm
Max pressure: 290 psi
4 diaphragms



Model 9910-D250
Max flow: 66 gpm
Max pressure: 290 psi
6 diaphragms

Model 9910-D135
Max flow: 34.8 gpm
Max pressure: 290 psi
3 diaphragms

Drive Options

Order appropriate Shaft Adapter Kit for drive option requirements. Refer to adjoining chart for proper selection. For proper installation, refer to Page 5.

NOTE: Model 9910-D135 is supplied with a 1-3/8" male PTO splined shaft as standard. Models 9910-D160 and

9910-D250 are supplied with a splined thru shaft. These models can be adapted for belt and pulley drive with the use of a split taper bushing (Hypro part number 3115-0011). Use of this bushing allows a Browning Q2 sheave to be mounted on the bushing.



Pump Model	1-3/8" Male Splined PTO Shaft	1" Solid Shaft w/Keyway	1-3/8" Female Splined PTO Coupler	Hydraulic Motor Mounting Flange Kits
9910-D70	9910-KIT1710	9910-KIT1711	9910-KIT1708	9910-HYD2495
9910-D115	9910-KIT1710	9910-KIT1711	9910-KIT1708	9910-HYD2495
9910-D135	Std. 1-3/8" male-splined shaft	N/A	N/A	N/A
9910-D160	Std. thru shaft	N/A	N/A	9910-HYD1570
9910-D250	Std. thru shaft	N/A	N/A	9910-HYD1570

Control Units

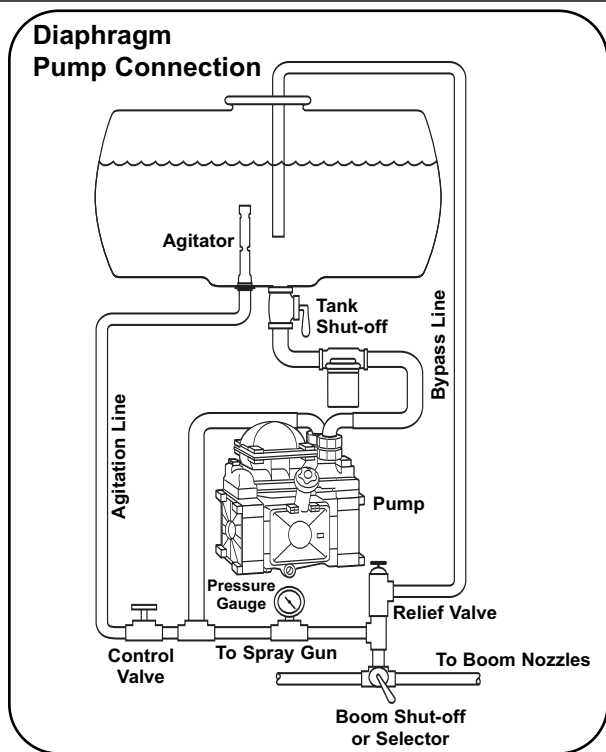
Control units are available for easy flow and pressure control of your spraying system. These units include a pressure relief valve to control pressure, an oil-filled pressure gauge to monitor pressure, and multiple outlet shut-off valves to control boom flow. Refer to the adjoining chart to select the proper control unit for your pump.

Control Unit Model	Max GPM	Max PSI	Type
3300-0082	66	290	D250
3300-0087	42.5	290	D70, D115, D135, D160
3300-0088	42.5	290	D70, D115, D135, D160

General Safety Information

1. Use of a pressure relief device on the discharge side of pump is required to prevent damage from pressure build up if the discharge is closed or blocked while the power source is still running.
2. **WARNING: DO NOT pump flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. DO NOT use in explosive atmospheres. The pump should be used only with liquids that are compatible with the pump component materials. DO NOT pump asphalt, asphalt sealer, roofing compounds, concrete sealers or any two-step curing products. Personal injury may result, and the warranty will be void. If there are any questions, call the Hypro Applications toll-free number: 800-445-8360.**
3. Do not operate pump above recommended rpm.
4. Do not pump at pressures higher than the maximum recommended pressures for the pump (see Specifications).
5. Operate pump between temperature range of 45° to 140° F.
6. Make certain that the power source conforms to the requirements of your equipment.
7. Provide adequate protection in guarding around the moving parts, such as the shaft and pulleys.
8. Disconnect power before servicing.
9. Release all pressure within the system before servicing any component.
10. Drain all liquids from the system before servicing.
11. Secure the discharge lines before starting the pump. An unsecured discharge line may whip, causing personal injury and/or property damage.
12. Check hoses for weak or worn condition before each use. Make certain that all connections are tight and secure.
13. Periodically inspect the pump and the system components. Perform routine maintenance as required (see Maintenance section).
14. When wiring an electrically-driven pump, follow all electrical and safety codes, as well as the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).
15. **WARNING: Because of the risk of electrical shock, all wiring should be done by a qualified electrician. WARNING: DO NOT handle a pump or pump motor with wet hands, when standing on a wet or damp surface, or while standing in water.**
16. Do not operate a gasoline engine in an enclosed area. Be sure the area is well ventilated.
17. Use only pipe, hose and fittings rated for maximum rated pressure of pump or pressure at which pressure relief valve is set at. Check with local supplier for proper pressure rating. Do not use used pipe!
18. Do not use these pumps for pumping water or other liquids for human or animal consumption.

Installation



1. Always mount the pump with oil sight tube in the upright position.
2. Proper selection of type and size of hose is vital to good performance:
 - a. Use suction line of spiral wire braid reinforced suction hose to prevent collapse. Diameter of inlet hose should be at least that of the pump inlet hose barb or greater.
 - b. Use only approved high pressure hose on discharge side of pump.
3. All ports are provided with hose barb connections. Use good quality hose clamps, and tighten securely.

NOTE: Use only pipe, fittings, accessories, hose, etc. rated for the maximum pressure rating of the pump.

Troubleshooting

Symptom	Probable Cause(s)	Corrective Action
The pump does not draw water.	One or more valves are seating improperly. Suction line is plugged or collapsed. Clogged strainer.	Remove valve and check for debris. Examine suction line. Clean strainer.
The liquid flow is irregular.	The charge in the pulsation damper is incorrect. One or more valves are seating improperly.	Check pressure in pulsation dampener (20% working pressure). Remove valve and check for debris. Examine the valve seatings and clean them.
Output drops and the pump is noisy.	Oil level is too low.	Add oil to correct level (halfway up the sight tube).
Oil comes out of the discharge port or oil is a milky color.	One or more diaphragms split.	Remove manifold and heads. Drain oil and clean crankcase of water. Replace diaphragms, heads and manifold. Refill with Hypro Oil (Part No. 2160-0038) .



Hazardous Substance Alert

1. Always drain and flush pump before servicing or disassembling for any reason (see instructions).
2. Always drain and flush pumps prior to returning unit for repair.
3. Never store pumps containing hazardous chemicals.
4. Before returning pump for service/repair, drain out all liquids and flush unit with neutralizing liquid. Then, drain the pump. Attach tag or include written notice certifying that this has been done. Please note that it is illegal to ship or transport any hazardous chemicals without United States Environmental Protection Agency Licensing.

Maintenance Instructions for All Models

Maintenance

1. After use, flush the pump with clean water.
2. Hypro diaphragm pumps come with oil in the crankcase. **Hypro recommends changing oil after 40 hours of break-in operation and every three months or 500 hours, whichever comes first. Use Hypro Oil (Part Number 2160-0038).** Hypro Oil is a specially formulated, high-grade, nondetergent, SAE 30 weight oil designed to prolong pump life.

To drain oil from the pump, remove the oil drain plug, and rotate the shaft until the oil stops flowing out. To fill the pump with oil, slowly pour the oil into sight tube while turning the pump shaft. Turning the pump shaft purges all the air out of the crankcase. Always change oil when replacing diaphragms.

3. For winter storage or if a freezing condition will be encountered, flush pump with a 50/50 mixture of water and antifreeze.

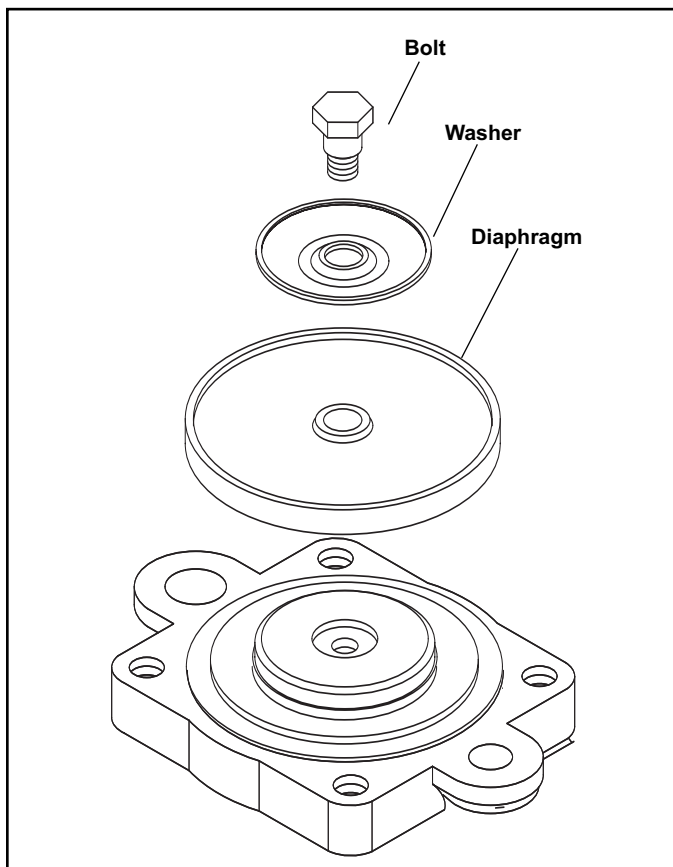


Figure 1. Diaphragm Replacement

Diaphragm and Valve Replacement

I. Valve and O-Ring Replacement

1. Occasionally debris can cause the valves to not seat properly or damage the o-rings. To check for this problem, follow these steps.
2. Remove the pump manifold. (See parts list for your model.) Use a 17 mm box wrench (or adjustable wrench) to remove manifold nuts. (Use a 13 mm for Models D160, D250.) With manifold removed, valves can readily be removed and checked for debris or wear. To replace valves or o-rings, refer to parts list for appropriate kits.

II. Diaphragm Replacement

Hypro recommends changing diaphragms every 500 hours or three months, whichever comes first.

1. Drain the oil from the pump by removing drain plug. Rotate the shaft to remove excess oil.
2. Remove the pump manifold according to Step 2 in Section I: Valve and O-ring Replacement.
3. Use a 19 mm box wrench (or adjustable wrench) to remove the diaphragm retaining bolt, support washer and diaphragm. To replace the diaphragms, order the appropriate repair kit. See the parts list.
4. Turn the crankshaft to bring the piston to its upstroke to replace the diaphragm. Use the downstroke to seat the new diaphragm into the sleeve groove. Install retaining washer and tighten nut.
5. Replace the pulsation dampener diaphragm by first bleeding the air from the dampener. (See parts list for your model.) Use a 13 mm box wrench to remove the bolts holding the dampener assembly together, then replace diaphragm. Recharge dampener to 20% of operation pressure.
6. Refill crankcase with Hypro Oil (Part No. 2160-0038). Rotate the shaft slowly forward and reverse to distribute oil, and fill to the proper level.

Parts List for 9910-KIT1708, 9910-KIT1710 and 9910-KIT1711

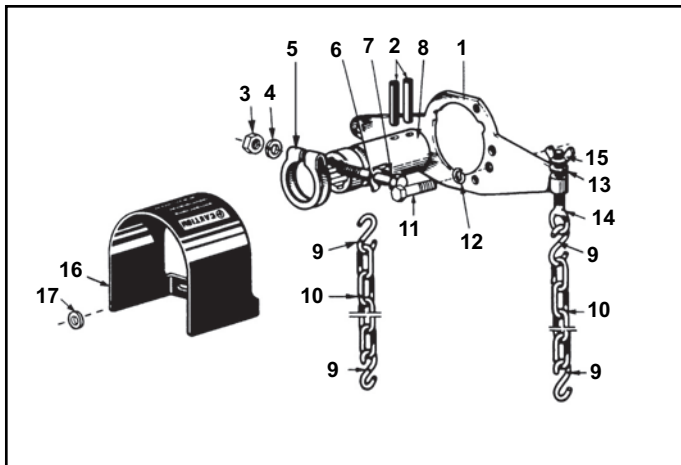


Figure 2. Coupler Kit 9910-KIT1708 Installation
9910-KIT1708: 1-3/8" Female PTO Adapter, Safety Shield, Torque Arm and Chains

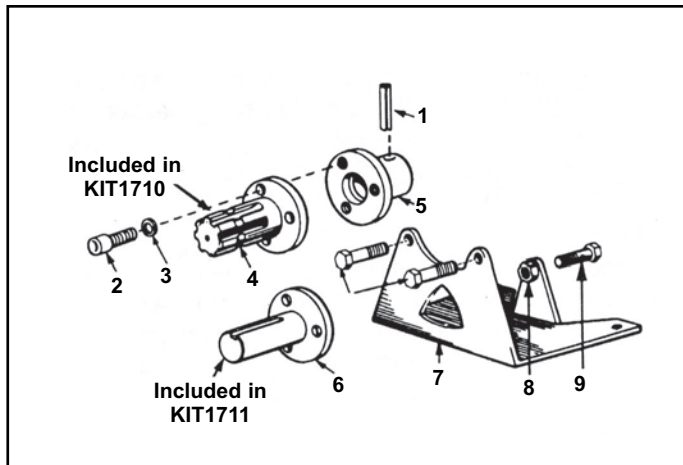


Figure 3. Coupler Kit 9910-KIT1710 Installation
9910-KIT1710: 1-3/8" Male PTO Shaft and Base Kit
9910-KIT1711: 1" Solid Shaft and Base Kit

Parts List for 9910-KIT1708

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
1	9910-380271	Torque Arm	1
2	9910-550290	Roll Pin	2
3	9910-320130	Nut	1
4	9910-320131	Washer	1
5	9910-500160	Collar	1
6	9910-500171	Lock Retaining Washer	1
7	9910-320170	12MAx75 Bolt	1
8	9910-550250	Female Splined Shaft	1
9	9910-320650	Chain "S" Hook	4
10	9910-320640	Chain	2
11	9910-620472	M10 x 20 Bolt	2
12	9910-200231	Washer	5
13	N/A	Washer (7/16"; 10.5 mm)	1
14	N/A	Eye Bolt	1
15	9910-320610	Wing Nut	1
16	2840-0028	Safety Shield (with KIT1708)	1
17	2270-0004	Washer	4

Parts List for 9910-KIT1710 & 1711 Shaft Kit

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
1	9910-550290	Roll Pin	2
2	9910-620470	M10 x 20 Bolt	3
3	9910-200231	Washer	3
4	9910-620240	1-3/8" Male 6 Spline PTO Shaft	1
5	9910-550510	Adapter	1
6	9910-621600	1" Solid Shaft	1
7	9910-580080	Base	1
8	9910-180150	Nut	1
9	9910-540300	10MAx30 Bolt	1
10	9910-620472	M10 x 20 Bolt	2

Shaft Adapter Kit Installation

Order appropriate shaft kit according to chart on page 2.

Female Splined Coupler Kit 9910-KIT1708 (see Fig. 2).
 To install the 1-3/8" female splined shaft coupler:

- Place the torque bracket (Ref. 1) onto pump and secure with bolts (Ref. 11).
- Slide female coupler (Ref. 8) onto pump shaft. Align holes in coupler with holes in pump shaft and press in pins (Ref. 2).
- Make sure clamp (Ref. 5) is over groove in the coupler. Slide the pump onto the PTO shaft of power source and tighten clamp.
- Attach chains (Ref. 10) to tractor to prevent rotation of the pump.

Solid Shaft Kit 9910-KIT1711, Male Splined Shaft Kit 9910-KIT1710 (see Fig. 3).

To install the 1-3/8" male splined shaft coupler:

- Slide shaft adapter flange (Ref. 5) over pump shaft. Align adapter hole with hole on the pump shaft and press in pin (Ref. 1).
- Bolt shaft adapter (Ref. 4 or 6) onto flange with three bolts (Ref. 2) and washers (Ref. 3).
- Place base (Ref. 7) on pump, and secure with bolts and washers. Secure opposite side of base with bolt (Ref. 9) and nut (Ref. 8).

Control Units 3300-0082, 3300-0087 and 3300-0088

Description

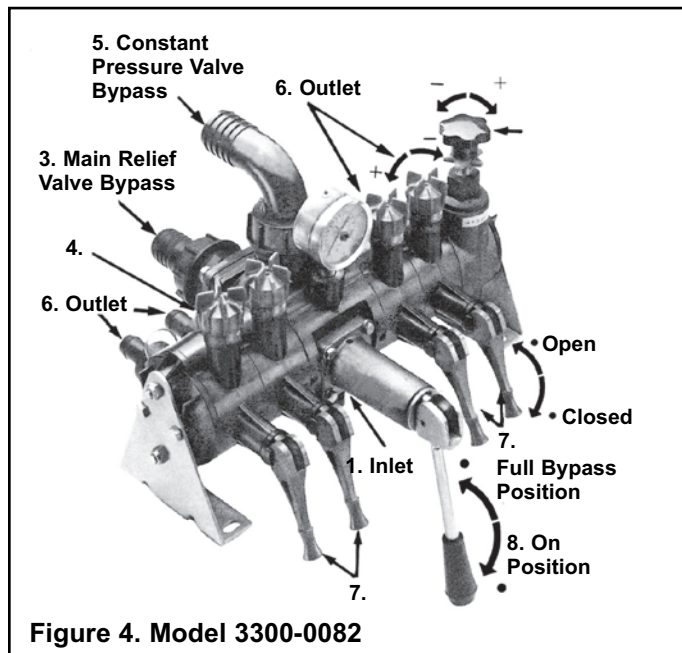
The 3300-0082 control unit is designed for proportional output and automatic pressure compensation of the outlet valves. When the outlet valves are turned on and off, the automatic compensation feature holds the pressure at constant value.

The 3300-0087 and 3300-0088 control units are designed for the control of pressure and output from 0 to 290 PSI. They are supplied with mounting brackets for

mounting separately from the pump. They consist of a main pressure regulating valve and 3 on-off outlet valves. For individual boom section control, model 3300-0088 includes a main on-off lever that can be put in the off position for complete bypass to the tank.

Safety Note: Main relief valve bypass must be connected to the tank directly without restrictions (such as ball valves).

Installation and Operation

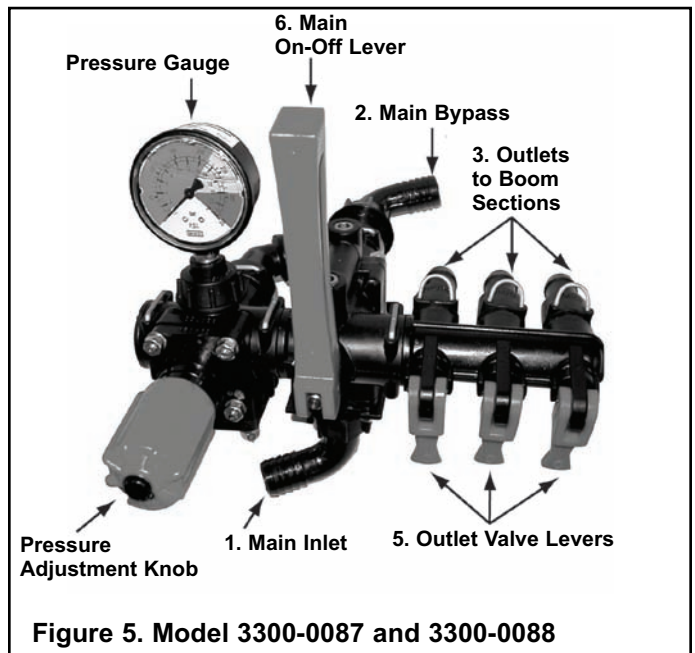


Model 3300-0082 Installation

The pressure line from the pump is connected to hose barb (1). The main relief valve (2) outlet is hose barb (3). The pressure compensation valve (4) outlet is hose barb (5). Both hose barb (3) and (5) should be connected directly back to the tank without restrictions. Boom sections are connected to hose barb (6).

Operation

1. Before starting pump, adjust relief valve for the lowest possible pressure by screwing adjustment knob (2) to its full up position.
2. Open all boom feed lines by lifting levers (7) to up position.
3. Turn all valve knobs (4) to number 10 on graduated scale.
4. Lift main on-off lever (8) to the full bypass (up) position.
5. Start pump and allow liquid to run through the control unit.
6. Lower main on-off lever to on position (down) and adjust to the desired spraying pressure by turning knob (2). Turning knob clockwise will increase pressure.
7. Adjust pressure in each boom feed line separately as follows:
 - a) Close on boom feed line (7). The pressure will drop. Adjust compensation valve (4) until pressure gauge reads required pressure. Reopen boom feed line.
 - b) Repeat for each boom feed valve.



8. The 3300-0082 control unit is now ready for use. After use, flush with clean water.

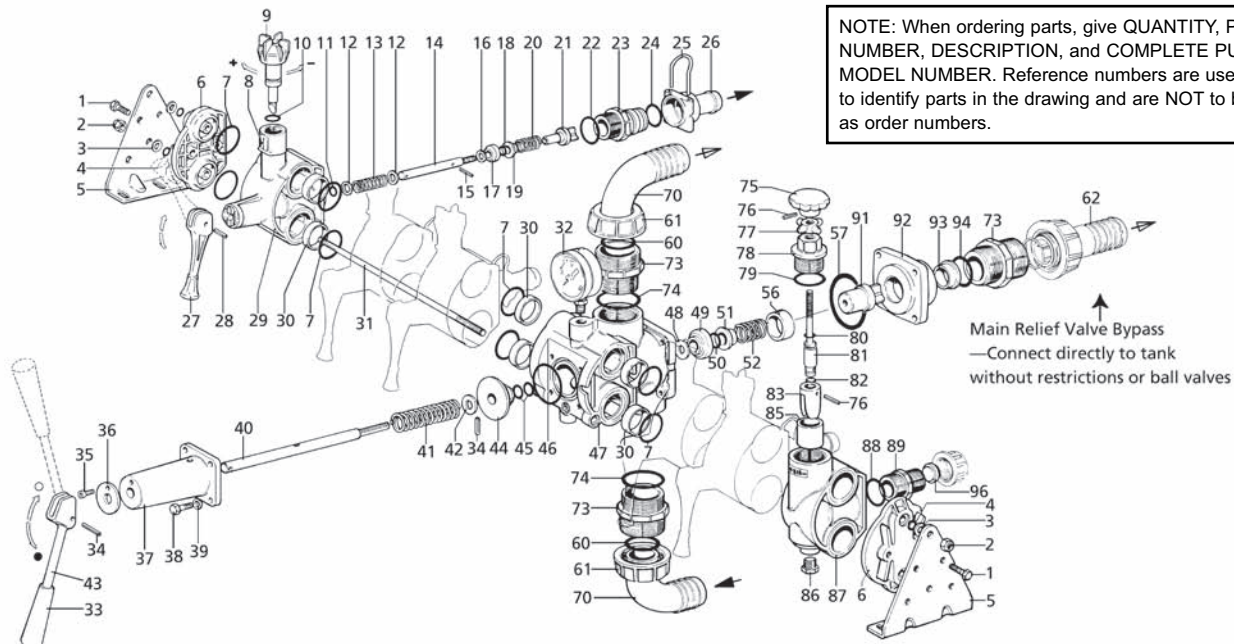
Model 3300-0087 and 3300-0088 Installation

Locate mounting bracket and secure in desired position. The pressure line from the pump is connected to main inlet hose barb (1). The return line is connected unrestricted to the main bypass hose barb (2). Boom sections are connected to the outlet boom hose barb (3).

Operation

1. Before starting pump, adjust relief valve for the lowest possible pressure by screwing the pressure adjustment knob (4) all the way counterclockwise.
2. On Model 3300-0088, turn the main on-off lever (6) to the full bypass (up) position.
3. Open all boom feed lines by lifting lever(s) to the up position.
4. Start pump and allow liquid to flow through the control unit.
5. Turn main on-off valve lever (6) to on position (down) and adjust to the desired spraying pressure by turning the pressure adjustment knob (4). Turning the knob clockwise will increase the pressure.
6. The 3300-0087 or 3300-0088 control unit is now ready for use. After each use, flush the unit with water. For extended or winter storage, drain the unit completely.

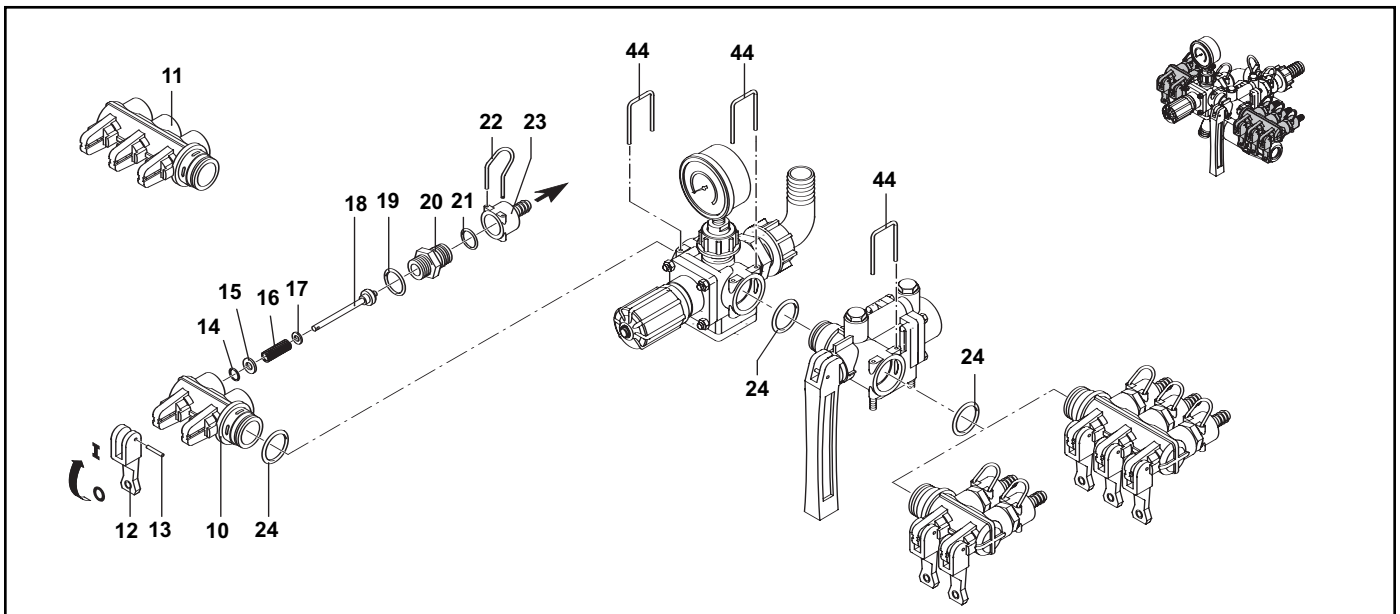
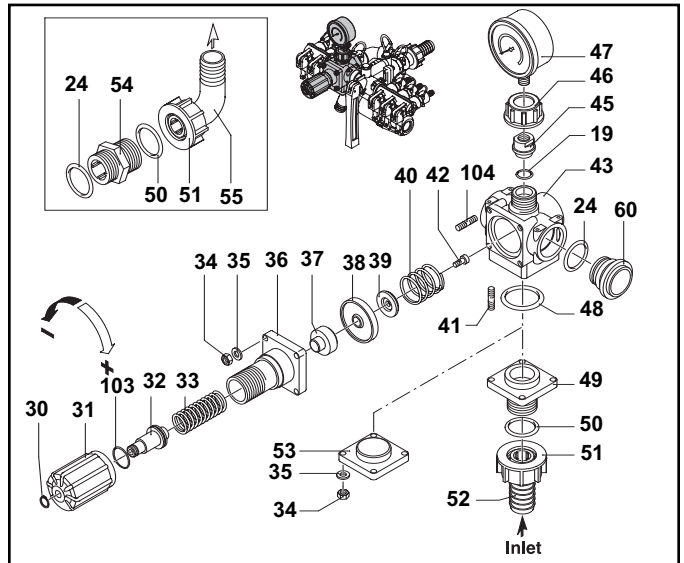
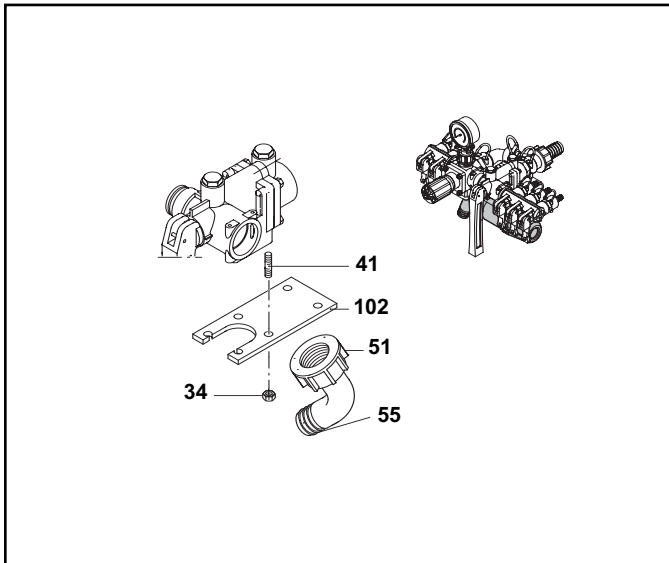
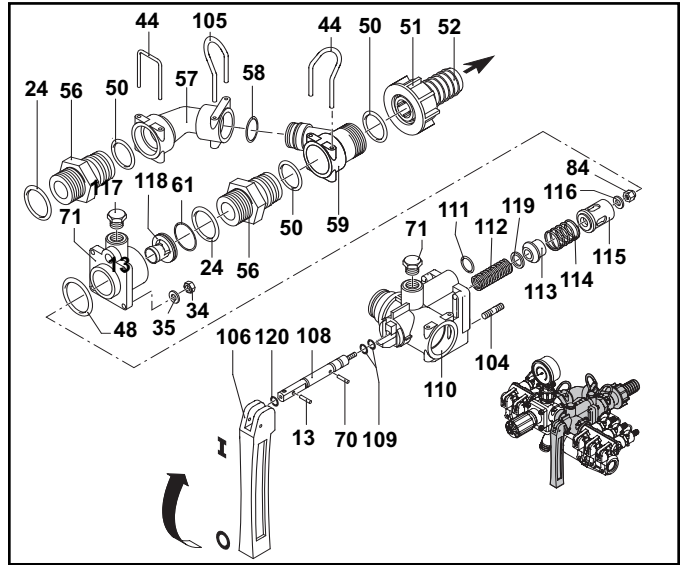
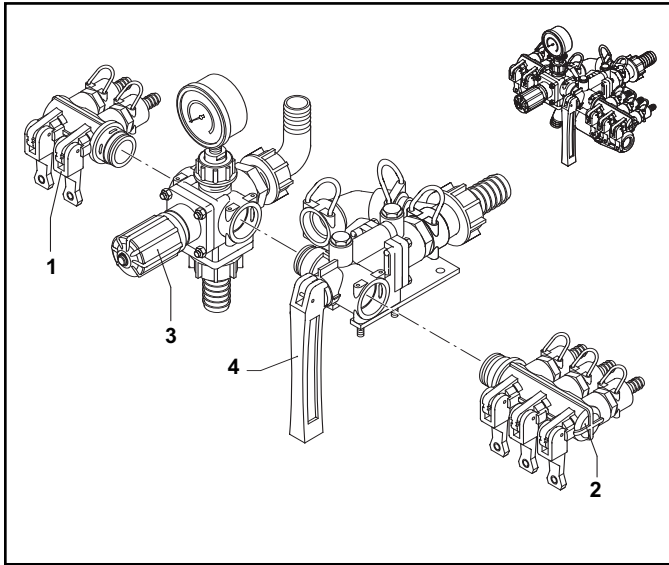
Parts Illustration and List for Model 3300-0082



REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
1	9910-180430	M8 x 20 Bolt	4
2	9910-160311	Nut	4
3	9910-390311	Washer	4
4	N/A	O-ring	4
5	N/A	Plate	2
6	9910-391940	Cap	2
7	9910-66017V	O-ring	2
8	9910-391960	Scale	1
9	9910-391710	Regulator valve	1
10	9910-64007V	O-ring	1
11	9910-650540	O-ring	1
12	N/A	Washer	2
13	9910-391680	Spring	1
14	9910-391650	Stem	1
15	9910-392120	Pin	1
16	9910-390312	Washer	1
17	9910-391660	Bypass valve	1
18	9910-39100V	O-ring	1
19	9910-391670	Seat	1
20	9910-391690	Spring	1
21	9910-391640	Plunger	1
22	9910-780050	O-ring	1
23	9910-391610	Seat	1
24	9910-550350	O-ring	1
25	9910-391700	Retaining pin	1
26	9910-391620	Hose barb 3/4"	1
27	9910-391720	Handle	1
28	9910-390330	Pin	1
29	9910-391600	Body	1
30	9910-391740	Ring	2
31	N/A	Threaded stud	2
32	9910-GG600	Gauge	1
33	9910-392180	Handle	1
34	9910-391500	Pin	2
35	9910-680560	M6 x 16 Bolt	1
36	N/A	Washer	1
37	9910-392390	Body	1
38	9910-1040370	M6 x 22 Bolt	4
39	9910-550331	Washer	4
40	N/A	Rod	1
41	9910-395060	Spring	1

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
42	N/A	Washer	1
43	9910-391800	Handle	1
44	N/A	Flange	1
45	9910-390080	O-ring	2
46	9910-392490	O-ring	1
47	N/A	Body	1
48	N/A	Washer	1
49	9910-391840	Seat	1
50	9910-640070	O-ring	1
51	N/A	Guide	1
52	N/A	Spring	1
56	9910-394010	Ring	1
57	9910-640030	O-ring	1
60	9910-250310	O-ring	3
61	9910-540540	Nut	3
62	N/A	Hose barb	1
63	9910-390311	Washer	4
64	9910-180370	M8 x 25 Bolt	4
70	9910-392130	Hose barb	2
73	9910-391920	Adapter	3
74	9910-540360	O-ring	3
75	9910-393860	Knob	1
76	9910-391190	Pin	2
77	9910-393870	Nut	1
78	9910-393880	Guide	1
79	9910-820490	O-ring	1
80	9910-77014V	O-ring	1
81	9910-393890	Stem	1
82	9910-660190	O-ring	1
83	N/A	Regulator valve	1
85	N/A	Seat	1
86	N/A	Plug	1
87	N/A	Body	1
88	9910-780050	O-ring	1
89	9910-393690	Adapter	1
91	N/A	Plunger	1
92	N/A	Flange	1
93	9910-391890	Seat	1
94	9910-320511	O-ring	1
96	N/A	Plug	1

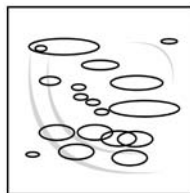
Parts Illustrations for Models 3300-0087 and 3300-0088



Parts List for Models 3300-0087 and 3300-0088

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
1	9910-1547	Left 2-way valve assy. (Optional)	1
2	9910-1571	Right 2-way valve assy. (Optional)	1
2	9910-1572	Right 3-way valve assy.	1
3	9910-1348	Compl.reg.valve (3300-0087)	1
3	9910-1349	Compl.reg.valve (3300-0088)	1
4	9910-1351	Bypass control assembly	1
10	9910-394850	Valve body 2 outlets	1
11	9910-394860	Valve body 3 outlets	1
12	9910-394690	Lever	4
13	9910-390330	Pin	5
14	9910-390341	O-ring	4
15	9910-390312	Lock washer	4
16	9910-390300	Spring	4
17	9910-390313	Lock washer	4
18	9910-390323	Complete valve rod	4
19	9910-180101	O-ring	5
20	9910-392600	Threaded adapter	4
21	9910-640070	O-ring	4
22	9910-392580	Clip	4
23	9910-392870	Hose barb 3/8"	4
23	9910-392590	Hose barb 1/2"	4
23	9910-392620	Hose barb 3/4"	4
24	9910-390291	O-ring	5
30	9910-480550	Retainer ring	1
31	9910-394790	Adjustment knob	1
32	9910-394770	Spring guide	1
33	9910-1040830	Spring	1
34	9910-390440	Nut	16
35	9910-550331	Washer	12
36	9910-394780	Adjustment body	1
37	9910-394750	Piston	1
38	9910-394740	Diaphragm-Desmopan	1
39	9910-394720	Valve	1
40	9910-394730	Spring	1
41	9910-394830	Stud	8
42	9910-680700	M6 x 20 Bolt	1
43	9910-394700	Regulating valve body	1
44	9910-395530	Clip	5
45	9910-394800	Gauge adapter	1
46	9910-550450	Ring nut	1
47	9910-GG400	Pressure gauge	1
48	N/A	O-ring	3
49	9910-394810	Threaded flange	1
50	9910-550350	O-ring	4
51	9910-550242	Hose barb nut	2
52	9910-550210	Hose barb inlet 1"	2
53	9910-394840	Cover	1
54	9910-550340	Threaded adapter	1
55	9910-550370	Elbow hose barb 1"	1
56	9910-395000	Adapter	2
57	9910-395520	Bypass manifold	1
58	9910-390060	O-ring	1
59	9910-395020	Bypass adapter	1
60	9910-394870	Plug	1
61	9910-770260	O-ring	1
70	9910-392120	Pin	1
71	9910-880581	Plug	2
84	N/A	Nut	1
102	9910-394820	Mounting bracket	1
103	9910-770130	O-ring	1
104	N/A	Stud	8
105	9910-850730	Clip	1
106	9910-1660560	Control lever	1
108	9910-1660020	Complete valve rod	1
109	9910-480561	O-ring, Viton	2
110	9910-1660010	Main valve body	1

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
111	9910-1660230	O-ring	1
112	9910-1660541	Spring	1
113	9910-1660050	Feed rod valve	1
114	9910-1660090	Spring	1
115	9910-1660080	Guide	1
116	9910-393790	Washer	1
117	9910-1660060	Flange	1
118	9910-1660120	Blue seat	1
119	9910-1660140	Washer	1
120	9910-1660551	O-ring, Viton	1



9910-KIT2346

O-Ring Kit

REF. NO.	QTY.
14	5
19	7
21	5
24	5
48	3
50	4
58	1
61	1
97	1
103	1
109	2
111	1
120	1

Parts Illustrations for Models 9910-D115, 9910-D115GR34 and 9910-D135

Figure 8. Parts Illustrations for Model 9910-D115 and 9910-D135

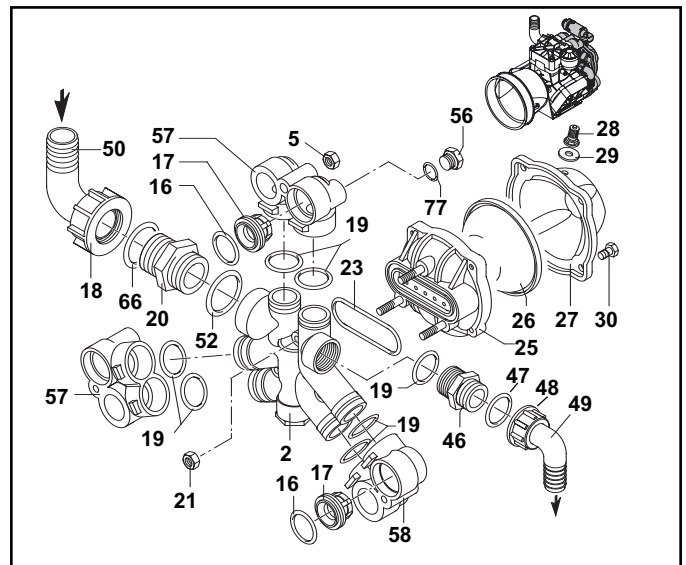
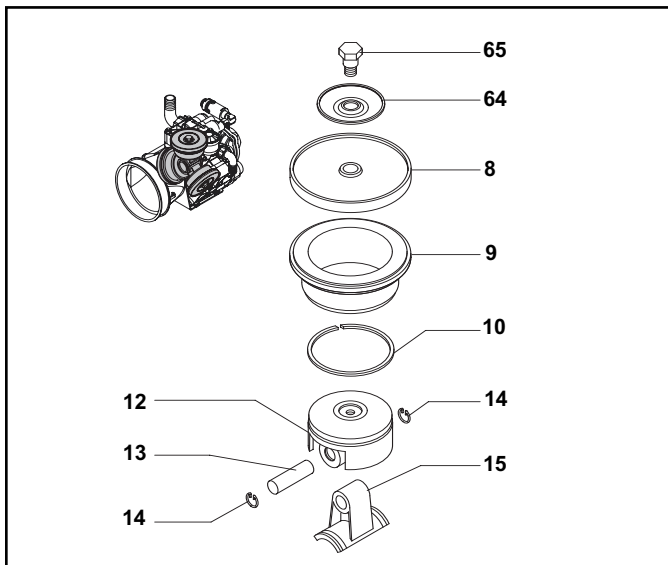
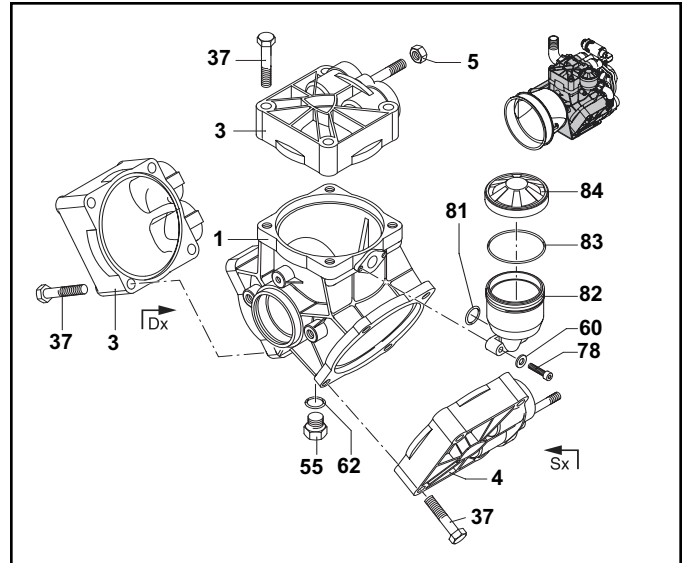
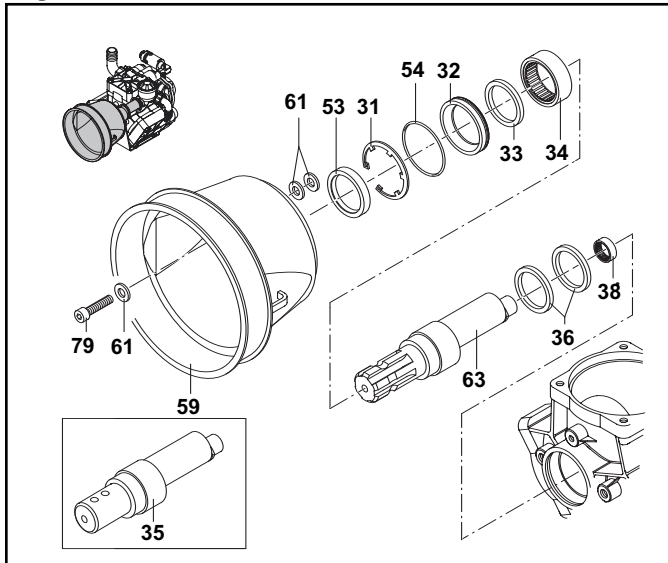
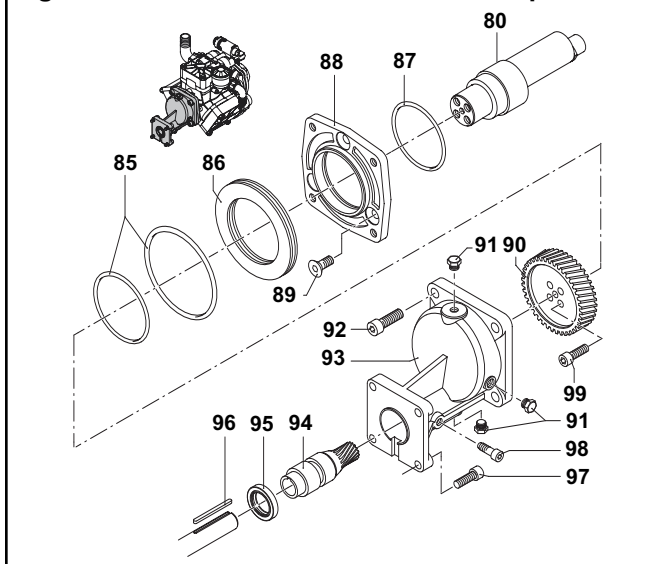


Figure 9. 9910-D115GR34 Gear Box Components



Parts List for 9910-D115GR34 Gear Box Components

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
80	9910-550175	Shaft	1
85	9910-620561	O-ring	2
86	9910-621440	O-ring retainer	1
87	9910-580230	O-ring	1
88	9910-550920	Flange	1
89	9910-550950	M10 x 25 Bolt	3
90	9910-550940	Gear	1
91	9910-620301	Plug	3
92	9910-160671	M10x 25 Bolt	4
93	9910-621810	Gear housing	1
94	9910-621820	Pinion shaft	1
95	9910-480820	Seal	1
96	9910-881090	Key	1
97	9910-651000	Bolt	4
98	9910-800800	M8 x 16 Bolt	1
99	9910-540290	M8 x 25 Bolt	4

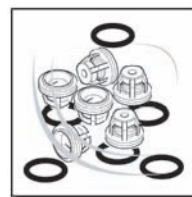
Parts List for Models 9910-D115, 9910-D115GR34 and 9910-D135

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
1	9910-580013	Pump body with bolts	1
2	9910-580150	Manifold	1
3	9910-550101	DX Right head	2
4	9910-550102	SX Left head	1
5	9910-180152	Nut	3
8	9910-550080	Diaphragm (Buna) Optional	3
8	9910-550085	Diaphragm (Desmopan) Standard	3
9	9910-580110	Sleeve (D115)	3
9	9910-580350	Sleeve (D135)	3
10	9910-500260	Piston ring	3
12	9910-580120	Piston	3
13	9910-380300	Pin	3
14	9910-380080	Pin ring	6
15	9910-580140	Connecting rod	3
16	9910-320030	O-ring	6
17	9910-759051	Complete valve	6
18	9910-540541	Ring nut	1
19	9910-390291	O-ring	7
20	9910-540530	Threaded adapter	1
21	9910-390271	Nut	3
23	9910-580050	Gasket	1
25	9910-580180	Accumulator manifold	1
26	9910-550190	Accumulator diaphragm	1
27	9910-559204	Accumulator head	1
28	9910-550300	Air valve	1
29	9910-650542	O-ring	1
30	9910-550680	M8 x 20 Bolt	4
31	9910-200391	Retainer ring	1
32	9910-550470	Gasket retainer	1
33	9910-550070	Spacer ring	1
34	9910-550060	Roller bearing	1
35	9910-550170	Shaft (D115)	1
36	9910-580470	Connecting rod ring	2
37	9910-551040	M10 x 55 Bolt	12
38	9910-550310	Roller bushing	1
46	9910-550340	Threaded adapter	1
47	9910-550350	O-ring	1
48	9910-550242	Ring nut	1
49	9910-550370	Elbow 1"	1
50	9910-540550	Elbow 1-1/2"	1
52	9910-250310	O-ring	1
53	9910-550491	Seal ring	1
54	9910-650920	O-ring	1
55	2406-0023	Oil drain plug	1
56	9910-330173	Plug	1
57	9910-589200	DX Right valve retainer w/plug/o-ring	2
58	9910-580072	SX Left valve retainer	1
59	9910-1500350	Shield	1
60	9910-550332	Washer	2
61	9910-320621	Washer	5
62	9910-740290	O-ring	1
63	9910-580330	Shaft (D135)	1
64	9910-580370	Plate	3
65	9910-580360	Diaphragm bolt	3
66	9910-250310	O-ring	1
69	9910-200233	Washer	2
77	9910-180101	O-ring	1
78	9910-850851	M6 x 30 Bolt	2
79	9910-620472	M10 x 20 Bolt	3
81	9910-390180	O-ring	1
82	9910-1040310	Oil sight glass	1
83	9910-650920	O-ring	1
84	9910-1040322	Black oil tank cap	1

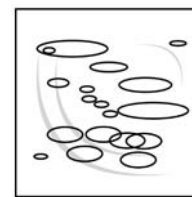
Ref. No.	Description	Tightening Torque	
		In. Lbs.	Nm
5	Nut	350.0	39.2
21	Nut	171.4	19.6
30	Bolt	171.4	19.6
37	Bolt	350.0	39.2
55	Plug	171.4	19.6
65	Diaphragm Bolt	262.5	29.4
78	Bolt	87.5	9.8
79	Bolt	350.0	39.2



9910-KIT1721 Diaphragm Kit Desmopan	
REF. NO.	QTY.
8	3
16	6
26	1



9910-KIT2370 Valve Kit	
REF. NO.	QTY.
16	6
17	6



9910-KIT2026 O-Ring Kit	
REF. NO.	QTY.
16	6
19	7
29	1
47	1
52	1
54	1
62	1
66	1
81	1
83	1

NOTE: When ordering parts, give QUANTITY, PART NUMBER, DESCRIPTION, and COMPLETE PUMP MODEL NUMBER. Reference numbers are used ONLY to identify parts in the drawing and are NOT to be used as order numbers.

Torques for D115GR3/4 Gearbox Components

Ref. No.	Description	Tightening Torque	
		In. Lbs.	Nm
89	Bolt	171.4	19.6
91	Plug	87.5	9.8
92	Bolt	218.7	24.5
97	Bolt	218.7	24.5
98	Bolt	87.5	9.8
99	Bolt	218.7	24.5

Pump Performance

English Standard

Series D70	350 RPM			400 RPM		450 RPM		500 RPM		550 RPM	
	PSI	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP
0	12.7	0.3	13.7	0.3	15.7	0.4	17.2	0.6	19.0	0.6	
145	10.7	1.2	11.0	1.4	13.5	1.6	14.9	1.8	16.0	1.9	
217	10.3	1.7	10.5	2.0	13.4	2.3	14.4	2.5	15.9	2.7	
290	10.0	2.2	10	2.5	13.0	2.8	14.1	3.1	15.8	3.4	

Metric

Series D70	350 RPM			400 RPM		450 RPM		500 RPM		550 RPM	
	BAR	L/M	HP	L/M	HP	L/M	HP	L/M	HP	L/M	HP
0	47.9	0.3	51.9	0.3	59.6	0.4	65.0	0.6	71.8	0.6	
10	40.4	1.2	41.6	1.4	51.2	1.6	56.4	1.8	60.4	1.9	
15	39.0	1.7	39.7	2.0	50.6	2.3	54.4	2.5	60.1	2.7	
20	37.8	2.2	37.9	2.5	49.2	2.8	53.2	3.1	59.7	3.4	

English Standard

Series D115	350 RPM			400 RPM		450 RPM		500 RPM		550 RPM	
	PSI	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP
0	19.3	0.3	22.1	0.3	24.8	0.4	27.1	0.7	30.1	0.8	
145	18.7	1.8	21.4	2.1	24.0	2.4	26.4	2.7	29.0	3.0	
217	18.6	2.7	21.2	3.1	23.9	3.5	26.2	3.9	28.8	4.3	
290	18.5	3.6	21.1	4.1	23.8	4.5	26.1	5.0	28.7	5.5	

Metric

Series D115	350 RPM			400 RPM		450 RPM		500 RPM		550 RPM	
	BAR	L/M	HP	L/M	HP	L/M	HP	L/M	HP	L/M	HP
0	73.1	0.3	83.6	0.3	94.0	0.4	102.7	0.7	113.8	0.8	
10	70.8	1.8	80.9	2.1	91.0	2.4	99.8	2.7	109.8	3.0	
15	70.3	2.7	80.4	3.1	90.5	3.5	99.1	3.9	109.0	4.3	
20	70.0	3.6	80.0	4.1	90.0	4.5	98.6	5.0	108.8	5.5	

English Standard

Series D135	350 RPM			400 RPM		450 RPM		500 RPM		550 RPM	
	PSI	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP
0	22.8	0.4	26.1	0.5	29.3	0.6	31.5	1.1	34.8	1.2	
145	22.1	2.3	25.3	2.6	28.4	2.9	30.5	3.4	33.6	3.8	
217	22.0	3.2	25.1	3.7	28.3	4.2	30.4	4.8	33.4	5.3	
290	21.7	4.3	24.8	4.9	27.9	5.5	30.3	6.1	33.3	6.7	

Metric

Series D135	350 RPM			400 RPM		450 RPM		500 RPM		550 RPM	
	BAR	L/M	HP	L/M	HP	L/M	HP	L/M	HP	L/M	HP
0	86.4	0.4	98.7	0.5	111.0	0.6	119.4	1.1	131.7	1.2	
10	83.6	2.3	95.6	2.6	107.5	2.9	115.4	3.4	127.0	3.8	
15	83.2	3.2	95.1	3.7	107.0	4.2	115.0	4.8	126.5	5.3	
20	82.1	4.3	93.8	4.9	105.5	5.5	114.5	6.1	126.0	6.7	

NOTE: "HP" is electrical horsepower. Consult your gas engine supplier for engine horsepower required.

Pump Performance

English Standard

Series D160	350 RPM			400 RPM		450 RPM		500 RPM		550 RPM	
	PSI	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP
0	27.7	0.7	31.7	0.8	35.7	0.9	38.4	1.3	42.5	1.4	
145	25.2	2.5	28.8	2.9	32.4	3.3	35.8	3.9	39.4	4.3	
217	24.7	3.7	28.2	4.2	31.7	4.7	35.2	5.3	38.7	5.8	
290	24.2	4.5	27.7	5.2	31.2	5.9	34.6	6.7	38.2	7.4	

Metric

Series D160	350 RPM			400 RPM		450 RPM		500 RPM		550 RPM	
	PSI	L/M	HP	L/M	HP	L/M	HP	L/M	HP	L/M	HP
0	105.0	0.7	120.0	0.8	135.0	0.9	145.4	1.3	160.9	1.4	
10	95.4	2.5	109.0	2.9	122.6	3.3	135.5	3.9	149.0	4.3	
15	93.4	3.7	106.7	4.2	120.0	4.7	133.2	5.3	146.5	5.8	
20	91.7	4.5	104.8	5.2	118.0	5.9	130.9	6.7	144.6	7.4	

English Standard

Series D250	350 RPM			400 RPM		450 RPM		500 RPM		550 RPM	
	PSI	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP
0	41.9	1.3	47.9	1.5	53.9	1.7	59.6	2.5	65.9	2.8	
145	39.7	3.8	45.3	4.4	51.0	4.9	56.7	5.6	62.4	6.2	
217	38.9	5.5	44.5	6.3	50.1	7.1	55.5	8.1	61.0	8.9	
290	38.4	7.2	43.9	8.3	49.4	9.3	55.0	10.4	60.7	11.5	

Metric

Series D250	350 RPM			400 RPM		450 RPM		500 RPM		550 RPM	
	PSI	L/M	HP	L/M	HP	L/M	HP	L/M	HP	L/M	HP
0	158.6	1.3	181.3	1.5	204.0	1.7	225.4	2.5	249.6	2.8	
10	150.1	3.8	171.5	4.4	193.0	4.9	214.5	5.6	236.0	6.2	
15	147.3	5.5	168.4	6.3	189.5	7.1	210.0	8.1	231.0	8.9	
20	145.2	7.2	166.0	8.3	186.8	9.3	208.2	10.4	229.7	11.5	

NOTE:

“HP” is electrical horsepower.
Consult your gas engine supplier for engine horsepower required.

Maintenance Schedule

REGULAR SERVICE PERIOD		First Use	Each Use	First month or 40 hours	Every 3 months or 500 hours	Every 6 months or 1000 hours
Performed at every indicated month or operating hour interval, whichever comes first.						
Item						
Crankcase Oil	Check Level	X	X			
	Replace			X	X	
Gearbox Oil	Check Level	X	X			
	Replace			X	X	
Pulsation Dampener Pressure (in models with dampeners)	Set to 20% of working PSI	X				
	Check			X	X	
Diaphragms	Replace				X	
Valves	Check				X	
	Replace					X
O-rings	Check				X	
	Replace					X

CRANKCASE OIL CAPACITIES

Model	Capacity	Model	Capacity
9910-D70	24 oz.	9910-D160	56 oz.
9910-D115	32 oz.	9910-D250	98 oz.
9910-D135	32 oz.		

⚠ CAUTION

Oil crankcase capacities are approximate. Fill oil to proper level in sight glass. Always make sure all the air is purged out of crankcase prior to operating.

Limited Warranty on Hypro/SHURflo Agricultural Pumps & Accessories

Hypro/SHURflo (hereafter, "Hypro") agricultural products are warranted to be free of defects in material and workmanship under normal use for the time periods listed below, with proof of purchase.

- Pumps: one (1) year from the date of manufacture, or one (1) year of use. This limited warranty will not exceed two (2) years, in any event.
- Accessories: ninety (90) days of use.

This limited warranty will not apply to products that were improperly installed, misapplied, damaged, altered, or incompatible with fluids or components not manufactured by Hypro. All warranty considerations are governed by Hypro's written return policy.

Hypro's obligation under this limited warranty policy is limited to the repair or replacement of the product. All returns will be tested per Hypro's factory criteria. Products found not defective (under the terms of this limited warranty) are subject to charges paid by the returnee for the testing and packaging of "tested good" non-warranty returns.

No credit or labor allowances will be given for products returned as defective. Warranty replacement will be shipped on a freight allowed basis. Hypro reserves the right to choose the method of transportation.

This limited warranty is in lieu of all other warranties, expressed or implied, and no other person is authorized to give any other warranty or assume obligation or liability on Hypro's behalf. Hypro shall not be liable for any labor, damage or other expense, nor shall Hypro be liable for any indirect, incidental or consequential damages of any kind incurred by the reason of the use or sale of any defective product. This limited warranty covers agricultural products distributed within the United States of America. Other world market areas should consult with the actual distributor for any deviation from this document.

Return Procedures

All products must be flushed of any chemical (ref. OSHA section 1910.1200 (d) (e) (f) (g) (h)) and hazardous chemicals must be labeled/tagged before being shipped* to Hypro for service or warranty consideration. Hypro reserves the right to request a Material Safety Data Sheet from the returnee for any pump/product it deems necessary. Hypro reserves the right to "disposition as scrap" products returned which contain unknown fluids. Hypro reserves the right to charge the returnee for any and all costs incurred for chemical testing, and proper disposal of components containing unknown fluids. Hypro requests this in order to protect the environment and personnel from the hazards of handling unknown fluids.

Be prepared to give Hypro full details of the problem, including the model number, date of purchase, and from whom you purchased your product. Hypro may request additional information, and may require a sketch to illustrate the problem.

Contact Hypro Service Department at 800-468-3428 to receive a Return Merchandise Authorization number (RMA#). Returns are to be shipped with the RMA number clearly marked on the outside of the package. Hypro shall not be liable for freight damage incurred during shipping. Please package all returns carefully. All products returned for warranty work should be sent **shipping charges prepaid** to:

HYPRO
Attention: Service Department
375 Fifth Avenue NW
New Brighton, MN 55112

For technical or application assistance, call the **Hypro Technical/Application number: 800-445-8360**. To obtain service or warranty assistance, call the **Hypro Service and Warranty number: 800-468-3428**; or send a fax to the **Hypro Service and Warranty FAX: 651-766-6618**.

*Carriers, including U.S.P.S., airlines, UPS, ground freight, etc., require specific identification of any hazardous material being shipped. Failure to do so may result in a substantial fine and/or prison term. Check with your shipping company for specific instructions.



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