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877.218.1981

AgXcel GX5 Hydraulic Fertilizer System
Guide for:
AgLeader, JD, & Trimble

AgXcel GX5 Hydraulic Pump Diaphragm Specifications				
PUMP MODEL	NUMBER OF DIAPHRAGMS	MAX FLOW RATE in GPM	MAX GPA ON 40' BAR AT 5MPH	MAX GPA ON 60' BAR AT 5MPH
GX5 D70	2	15	35	24
GX5 D115	3	25	55	40
GX5 D135	3	28	59	44
GX5 D160	4	35	70	58
GX5 D250	6	55		75

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NOTE: This is only a guide! Please consult your John Deere dealer for detailed instructions or troubleshooting!

GENERAL DESCRIPTION

(Read Instructions Completely before Beginning Installation)

BASIC INSTALLATION STEPS

Thank you for purchasing an AgXcel GX5 Hydraulic fertilizer system for your equipment. This system will be controlled by your OEM installed display and liquid rate control module. The rate controller will adjust the speed of the AgXcel GX5 hydraulic pump based on feedback from the flowmeter and vehicle speed. The system is capable of using the OEM swath control feature to minimize overlap areas with optional section valves.

Step #1: Have OEM Rate Controller mounted and wiring harnesses connected by your local Dealer.

Step #2: Open the packages and familiarize yourself with the components.

Step #3: Mount the GX5 pump in our preferred location ensuring that it will be secure given the environmental conditions. Make your hydraulic hose connections (Not provided by AgXcel).

Step #4: Plumb the tank to the GX5 inlet.

Step #5: Install the plumbing kit including section valves, flow indicator columns / manifolds, check valves, plumbing to each row unit delivery point.

Step #6: Attach the flow meter outlet to section valve or manifold inlet. Attach section valve outlets to flow indicator inlets.

Step #7: Attach harnesses

Step #8: Setup in cab controller to manage the AgXcel GX5 system

Step #9: Fill system with water, conduct initial operation and tests

Step #10: Winterize system with RV Antifreeze if freezing temperatures are expected.

GX5 GX5 MAG FLOW METER OPTIONS

(Read Instructions Completely before Beginning Installation)

AgXcel Part # 53615 - 0.6 - 13 GPM

AgXcel Part # 53636 - 1.3 - 26 GPM

AgXcel Part # 37613 - 2.6 - 53 GPM

Kits include flow meter, adapter harness, mounting bracket, hose barb fittings & hose clamps.

AGXCEL MAG FLOW METER

The AgXel Mag flow meter is a magnetic flow meter, also technically known as an electromagnetic flow meter. A magnetic field is applied to the metering tube, which results in a potential difference proportional to the flow velocity perpendicular to the flux lines. The physical principle at work is electromagnetic induction. The Mag meter is superior to other flow meters since there are no moving parts to replace or maintain just as when dirty or fertilizer with particles is present. Also given that the Mag meter detects the flow of ions in the liquid, it can therefore accommodate for viscosity or liquid density changes. Given the superior features of the Mag flow meter, a quick catch test is always recommended to ensure precision application.

GX5 OEM Calibration Numbers				
ARAG Flow Meter Model	Pulses / Gallon	AgLeader	Trimble	JD
0.6 - 13 GPM	4542	4542	4542	4542
1.3 - 26 GPM	2271	2271	2271	2271
2.6 - 53 GPM	1135	1135	1135	1135

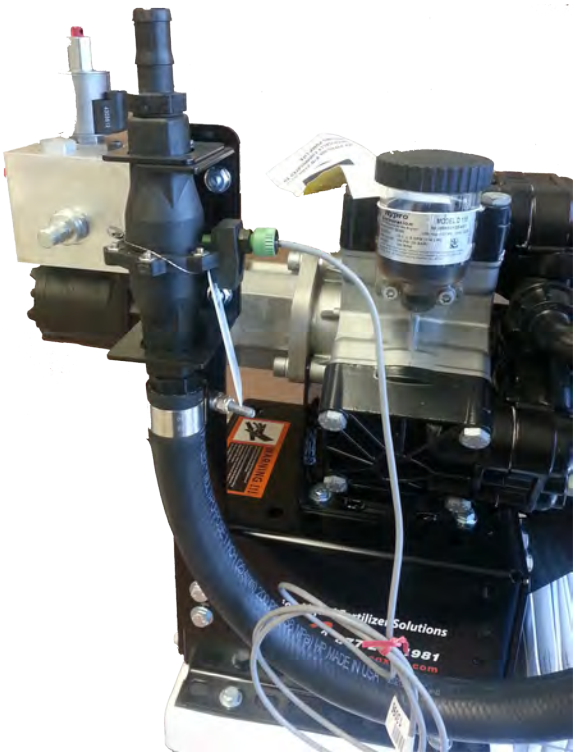
GX5 FM750 FLOW METER OPTION

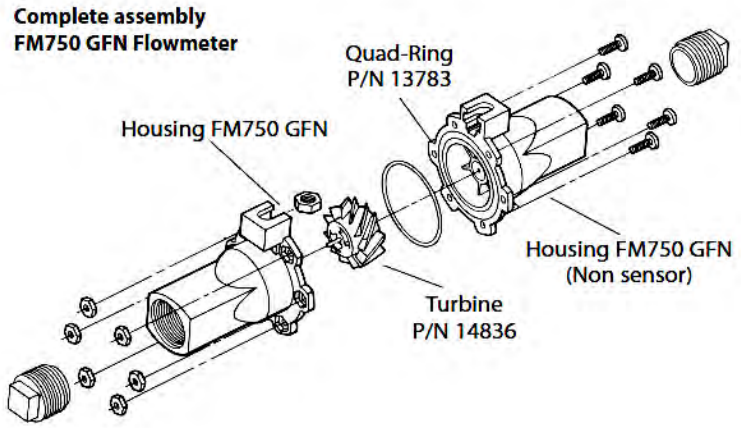
(Read Instructions Completely before Beginning Installation)

AgXcel Part # 38310 - 2.0 - 40 GPM

The FM750 turbine flowmeter is shown attached to the GX5 base. A min. of 24" of hose with a gentle curve should be used after the flowmeter outlet before any fittings. The FM750 works with flow in either direction. The FM750 Initial Calibration Number is stamped on a metal tag attached to the flowmeter. It will be between 134 & 154.

The FM750 may need disassembled for cleaning or to remove an obstruction. This diagram shows the components and proper location of each. If necessary use a mild detergent and brush to clean the flowmeter. The turbine should spin freely in the housing. After disassembly, re-calibration of the flowmeter is recommended as it's flow characteristics may change.





GX5 OEM Calibration Numbers				
FM750	Pulses / Gallon	AgLeader	Trimble	JD
2 - 40 GPM	134-154	TAG # ÷ 2 (67-77)	TAG # ÷ 2 (67-77)	TAG # ÷ 2 (67-77)

** The FM750LR (low rate) flowmeter is identical externally, however, its maximum flow is 12 GPM and it is not recommended with the GX5. it can be identified by: an orange Zip Tie and a Flowmeter Calibration number on metal tag between 400-550.

GX5 ACCESSORY - SECTION VALVES

(Read Instructions Completely before Beginning Installation)

SECTION VALVES - HOW THEY WORK

Section valves can be assembled into groups with a common inlet to control flow to each section. Common assemblies use up to 5-6 valves, however, more can be used where practical Many alternate fittings can be used to accommodate different hose sizes and configurations. The valves have a 3 pin weather pack electrical connector. This has a power, ground, and switched wire. The power measured to ground should have 12 volts when the controller is on. The switched wire will have 12 volts to turn the valve on, and 0 volts to turn the valve off.

Liquid inlet from flow meter or pump depending on system type

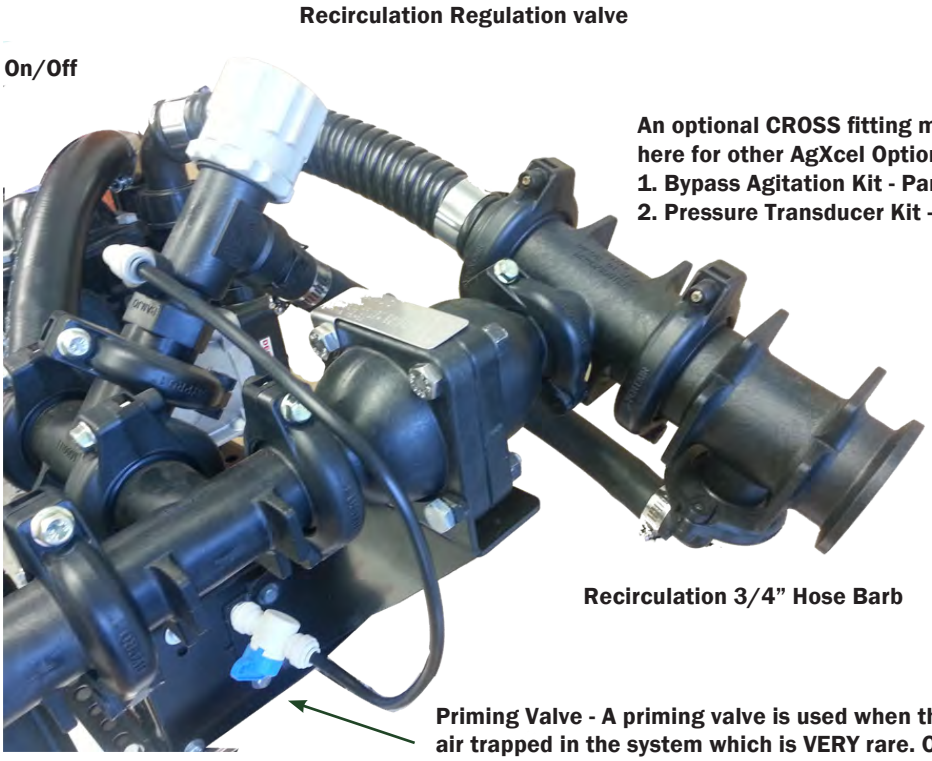
1/4” port for either a manual 4” pressure gauge or optional pressure transducer which allows for pressure to viewed from controller in cab

Liquid outlet to each section

GX5 ACCESSORY - RECIRCULATION KIT

(Read Instructions Completely before Beginning Installation)

D70 & D115



APPLICATIONS

1. Recirculation flow is required for product agitation.
2. IF a low flow rate is required, that would require pump to run less than 10-20% of maximum capacity. This kit will allow the pump to turn faster, while only applying a low rate of product. This makes the pump performance more stable under these circumstances. Make sure the flowmeter minimum flow is capable of metering the flow rate you wish to apply to the ground.

HOW IT WORKS

The recirculation valve diverts some pump flow before the flowmeter. The application rate is still measured by the flowmeter and everything that passes through the flowmeter is applied to the ground. Adjust the regulation valve to set the required recirculation.

USE OF THIS KIT LOWERS THE MAXIMUM RATE THAT CAN BE APPLIED

GX5 ACCESSORY - RECIRCULATION KIT - D160 & D250

Same function as above, slightly different attachment to pump.

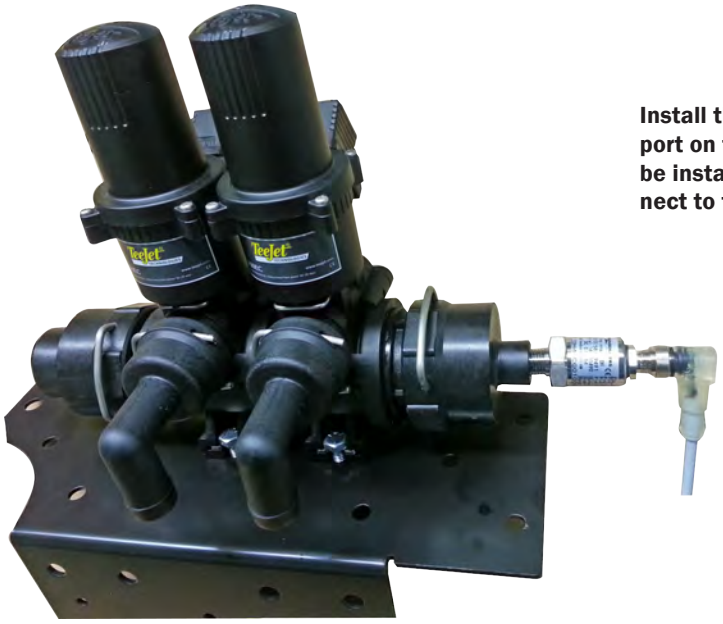
GX5 ACCESSORY - PRESSURE SENSOR AND GAUGE

(Read Instructions Completely before Beginning Installation)

MOUNT ON SECTION VALVES

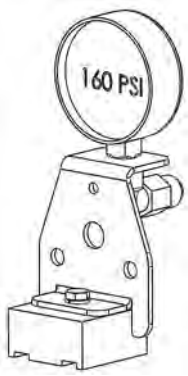
The AgXcel GX10 OEM integration harness is capable of implementing a pressure transducer into the system so that system pressure may be displayed on the console in the cab of the tractor. Now even though the in-cab pressure is for informational purposes only, it can be very useful for managing the system.

MOUNT ON GX5 OUTLET - D70 AND D115



Install the section valve with a 2" end cap and a 1/4" FPT port on the end. This is where the pressure transducer will be installed. The pressure transducer harness will connect to the AgXcel integration harness.

AgXcel has many different pressure guage mounts and most all AgXcel systems have a visual pressure gauge mounted on the GX5 system



MOUNT ON GX5 OUTLET - D160 AND D250

GX5 HYDRAULIC VALVE AND MOTOR

(Read Instructions Completely before Beginning Installation)

4.9 CID Motor with PWM Valve - HOW IT WORKS:

The AgXcel proprietary PWM valve has a solenoid that receives a variable signal from the OEM liquid rate controller. This signal is used to open the pressure compensating valve to allow the correct amount of hydraulic fluid through the valve to rotate the diaphragm pump appropriately to apply the correct GPM. When 0 volts are present then the valve closes and the motor stops.

With the bypass closed only the oil that passes through the PWM valve itself will flow to and from the valve. When the PWM valve is closed, no oil will flow. With the bypass open, the total oil flow from the tractor will always flow through the valve. The PWM valve will divert the oil it needs to rotate the motor at the proper speed.

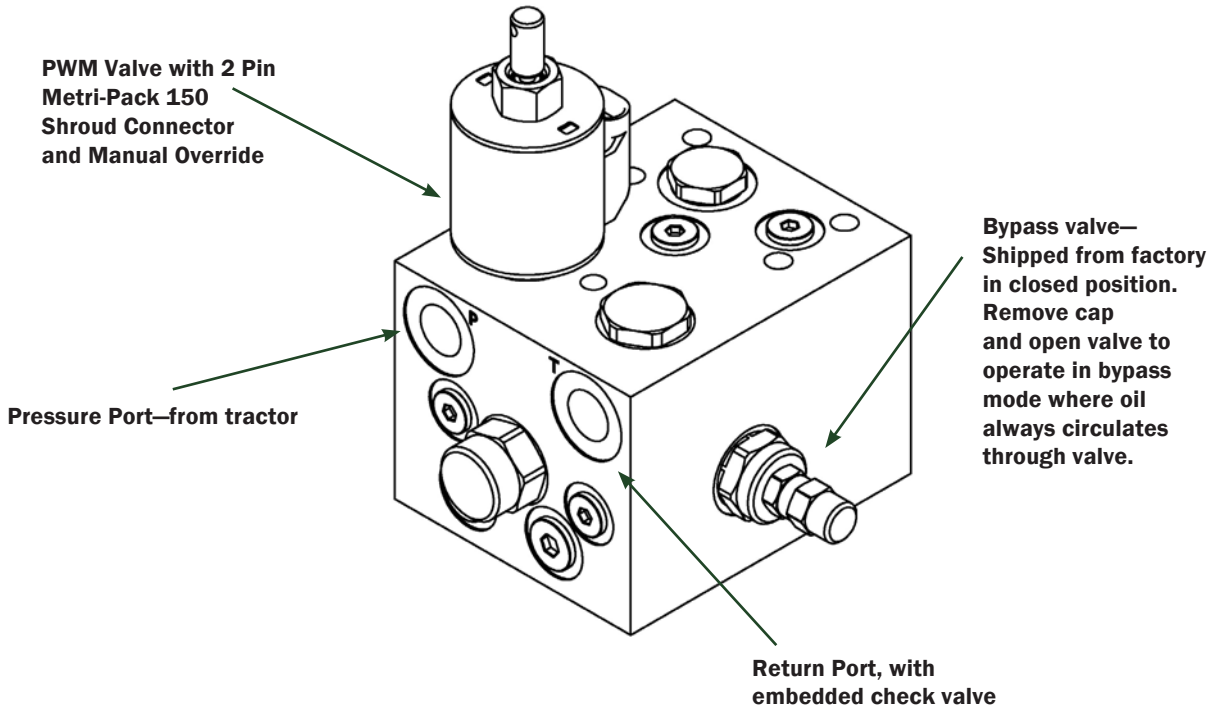
This valve can be used with Power Beyond hydraulics instead of using a standard tractor hydraulic valve. Uncap the LS port and plumb this back to the tractor load sense connector. The LS port has an internal check valve necessary in power beyond installations.

Port Sizes on valve: -8 SAE O-Ring (LS is –6 SAE O-Ring)

Hydraulic Hose Fittings: -8 JIC Female Swivel

Motor Mounting Hardware: Two 1/2” diameter bolts

Shaft Size: 1” with Woodruff Key



GX5 INSTALLATION

(Read Instructions Completely before Beginning Installation)

MOUNTING

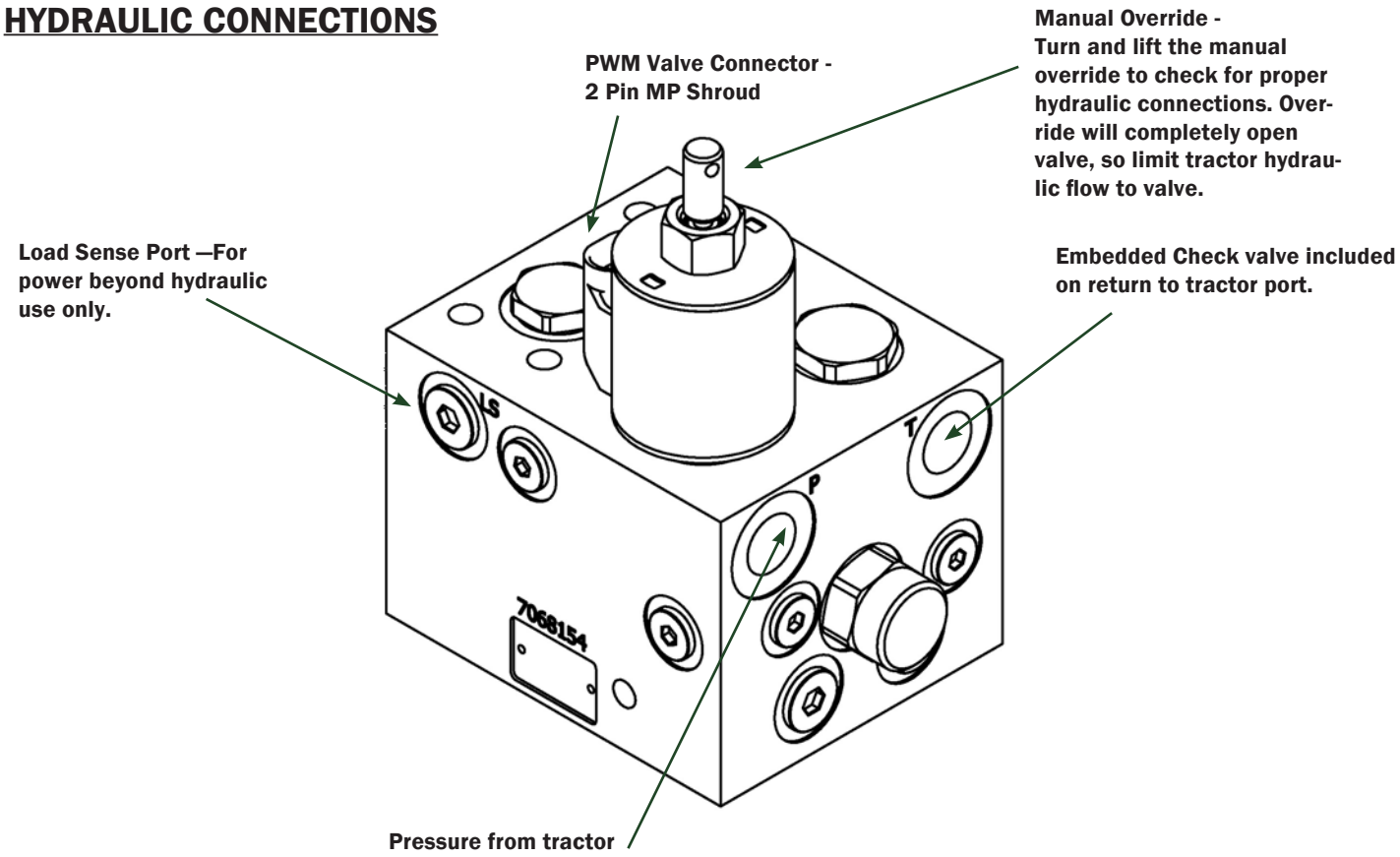
Shown below is the AgXcel GX5 D70 2 diaphragm pump system. AgXcel carries 5 different pump sizes to meet various rate requirements and will have a slightly different mounting setup. However, all functions of the AgXcel PWM valve remain the same despite the pump system or size.

1. Mount pump in your preferred location. The GX5 pump has excellent suction and priming ability, so it can be mounted away from or above fertilizer tanks.
2. For JD1770NT 12, 16 & 24 row planters, AgXcel offers an over the tire pump mount that fits all GX5 models. This mounts the pump over the center tires.
3. For JD1720 CCS planters, AgXcel offers a mounting bracket to the large circular plate on the CCS support arms.
4. AgXcel has U-bolts and universal mounting brackets that allow for the mounting of the GX5 system on various bar setups.

GX5 HYDRAULIC CONNECTIONS

(Read Instructions Completely before Beginning Installation)

HYDRAULIC CONNECTIONS



Pump Rotation Check Valve

A check valve is included on the outlet port of the hydraulic valve. This prevents the pump from running in the wrong direction. If ran in the wrong direction, liquid will be pumped, however the hydraulic valve will not be able to control the flow. The check valve can be identified by the Part Number 1108R stamped on it and a flow direction
arrow.

How it Works with Power Beyond Hydraulics

This valve is designed to work with power beyond hydraulics. This configuration will not require a standard tractor remote hydraulic valve. First, remove the load sense plug and install a #6 male boss x #6 JIC adapter fitting. Then run a 3/8" or 1/4" hydraulic hose back to the tractor. This hose will connect to the load sense port on the tractor. The bypass valve must be closed to use power beyond hydraulics. The load sense line will signal the tractor hydraulic system to supply the flow needed by the pump to meet your application rate. The AgXcel valve has an internal load sense check valve, which is required for power beyond hydraulics.

GX5 HYDRAULIC CONNECTIONS

(Read Instructions Completely before Beginning Installation)

HYDRAULIC HOSE

Where is the best location for my GX5 to receive hydraulic fluid?

This question is often asked as many implements use up all the hydraulic connections on a tractor. AgXcel has some recommendations as to what works best. AgXcel does not supply the pump inlet and outlet hose and must be purchased by the end user. AgXcel recommends using 1/2" hydraulic hose with #8 female swivel fittings.

Best Option - Dedicated GX5 Circuit (AGXCEL GX5 PREFERRED METHOD)

If you have a tractor remote available, attach the tractor remote valve directly to the GX5 pressure and return ports. DO NOT try to avoid this method simply to save another set of hydraulic hoses running to the tractor. Operating the GX5 on it's own circuit is the simplest for installation and operation. It guarantees the GX5 won't negatively affect any other hydraulic components on your equipment.

Alternate Option - In Series with CCS Fan

If you do not have a tractor remote valve available, this may be your best method. You can plumb the GX5 after the CCS seed distribution fan. If using this method, the AgXcel PWM bypass valve must be open (see previous page for instruction & picture). If bypass is left closed, the AgXcel valve will limit the speed of the CCS fan. The CCS fan uses around 7 GPM of oil. This will limit the GX5 maximum flow (10 GPM oil necessary for maximum flow). See the charts on the next page for adjusted maximum pump flow. See flow charts to determine your necessary flow rate. If you absolutely need the maximum flow in this case, AgXcel has an alternate motor (smaller displacement) to increase pump speed at 7 GPM oil flow (see section C). DO NOT plumb the GX5 in series with a vacuum fan. The vacuum fan uses just a few GPM of oil. Also, problems will be caused by excessive pressure at the vacuum fan motor

Two GX5's

The preferred method is to plumb the two pumps in series. DO NOT plumb two pumps after the CCS fan. Excessive pressures may damage the CCS fan motor. Run the pressure line from tractor to first pump inlet. Plumb from the outlet of Pump 1 to the Inlet of Pump 2, then from Pump 2 outlet back to the tractor. Open the bypass needle valve on both pumps so each valve controls motor speed independently. Run the flow setting procedure on the next page to minimize the hydraulic flow based on the pump that requires more hydraulic motor flow.

GX5 HYDRAULIC OIL REQUIREMENTS

(Read Instructions Completely before Beginning Installation)

OIL FLOW FROM TRACTOR

GX5 pumps require a constant hydraulic oil flow from the tractor. The amount of oil needed varies with pump size and speed. The chart at right shows the necessary oil flow for each pump model at varying fertilizer flows.

Use this procedure to determine the correct setting on your tractor hydraulic flow.

1. Run the fertilizer system in the field at the maximum rate and ground speed.
2. Turn down the hydraulic flow slowly while watching the pump flow (Volume / Minute).
3. Observe when the Volume / Minute begins to drop.
4. Turn the hydraulic flow back up slightly

This setting will provide the GX5 pump just enough oil for your application rate. If running with the bypass open (not recommended in most cases) this process will minimize the oil circulated in the bypass loop, leaving more oil flow for other hydraulic functions.

AgXcel GX5 Hydraulic Oil / Sizing Chart

AgXcel GX5 Model D70 *

2 Diaphragm Pump Configuration

Liquid Fertilizer Flow (GPM)	Diaphragm Pump Speed (rpm)	Hydraulic Oil Requirements Flow (GPM)
5	160	3.5
10	320	7.0
15	470	10.5

* Rated at 19 GPM **OPENFLOW** / 290PSI / 550 RPM

AgXcel GX5 Model D115*

3 Diaphragm Pump Configuration

Liquid Fertilizer Flow (GPM)	Diaphragm Pump Speed (rpm)	Hydraulic Oil Requirements Flow (GPM)
5	95	2.1
10	190	4.2
15	283	6.3
20	377	8.4
25	472	10.5

* Rated at 30.1 GPM **OPENFLOW** / 290PSI / 550 RPM

AgXcel GX5 Model D135*

3 Diaphragms Pump Configuration

Liquid Fertilizer Flow (GPM)	Diaphragm Pump Speed (rpm)	Hydraulic Oil Requirements Flow (GPM)
5	79	1.8
10	159	3.5
15	238	5.3
20	317	7.1
25	397	8.9
30	476	10.6

* Rated at 34.8 GPM **OPENFLOW** / 290PSI / 550 RPM

AgXcel GX5 Model D160*

4 Diaphragms Pump Configuration

Fertilizer Flow (GPM)	Diaphragm Pump Speed (rpm)	Hydraulic Oil Requirements Flow (GPM)
10	135	3.0
20	270	6.0
30	405	9.1
35	473	10.6

* Rated at 42.5 GPM **OPENFLOW** / 290PSI / 550 RPM

AgXcel GX5 Model D250*

6 Diaphragms Pump Configuration

Fertilizer Flow (GPM)	Diaphragm Pump Speed (rpm)	Hydraulic Oil Requirements Flow (GPM)
20	175	3.8
30	258	5.7
40	343	7.7
50	429	9.6
55	472	10.5

* Rated at 66 GPM **OPENFLOW** / 290PSI / 550 RPM

GX5 LIQUID PLUMBING CONNECTIONS

(Read Instructions Completely before Beginning Installation)

PLUMBING CONNECTIONS

Inlet: The D70 & D115 are shipped with a 1 1/2" inlet hose barb. The D160 & D250 are shipped with 2" inlet hose barb. Attach this to the hose from your supply tank and strainer. 90 degree hose barbs are included and can be substituted.

Inlet Strainer: A 30 mesh strainer is included in the pump kit. The 2 inch manifold strainer includes two hose barbs so it can be mounted anywhere in the inlet line. If space allows, the strainer can be mounted directly to the inlet plumbing assembly as shown below.

Outlet: The outlet is plumbed directly to the flowmeter. As shown above, the flow meter may be mounted directly to the GX5 pump. The flowmeter outlet hose should be a minimum of 24" long with a gentle curve prior to any fittings for optimum flowmeter performance. The flowmeter outlet will attach to your manifold(s) or section valves. D70 & D115 have 3/4" flowmeter outlet. D160 & D250 have 1 1/4" or 1 1/2" flowmeter outlet.

Pressure Relief Valve (PRV): The PRV is a 100 psi relief. If there is a restriction that creates over 100 psi in the system, the PRV will open allowing the excess flow to pass back to the inlet side of the pump. This protects the pump and fertilizer system from damage. The PRV will sound like an impact wrench in use if it is activating. DO NOT operate the system with PRV continually activating. The vibrations will cause damage. Possibly switch to larger orifices to lower system pressure.

AGXCEL GX CHECK VALVE GUIDE

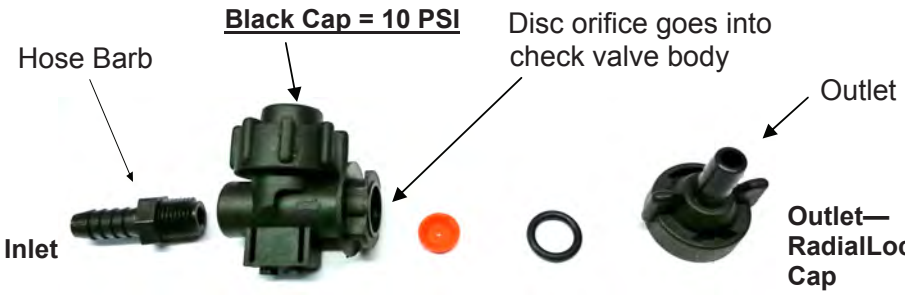
(Read Instructions Completely before Beginning Installation)

10 lb check valve with 3/8” hose barbs

PN - 313

Components
Liquid

The recommended check valve for most **AgX installations** is the 10 lb check with 3/8” hose barbs. This works with 3/8” rubber hose which AgXcel recommends for most applications over 10 GPA on 30” rows. The recommended minimum system operating pressure for this check is 20 psi, to ensure all checks open fully.

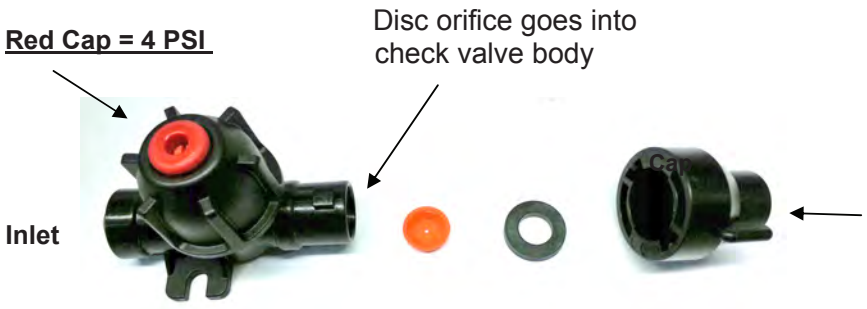


GX5

4 lb check valve with 1/4” quick connect fittings

PN - 310

4 lb check valves are typically used with **GX electric pump systems**. AgXcel recommends this valve for use with 1/4” tubing applying up to 10 GPA on 30” rows. The recommended minimum system operating pressure for this check is 10 psi, to ensure all checks open fully.



GX Electric
Pump Systems

GX5 TROUBLESHOOTING

(Read Instructions Completely before Beginning Installation)

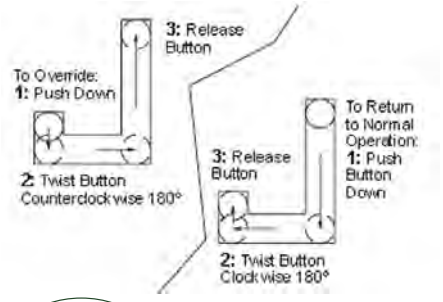
PUMP WILL NOT TURN

Turn hydraulics off, go to the AgXcel PWM valve and use the manual override on top of the electric coil to manually open the valve (Manual Override UP = valve fully open). Turn hydraulics on at a low flow only as the valve is 100% open. Try hydraulic lever in opposite direction. Does the pump turn? If it turns, your problem is electric / electronic. If the pump still does not turn, you have a hydraulic problem.

ELECTRIC / ELECTRONIC PROBLEM

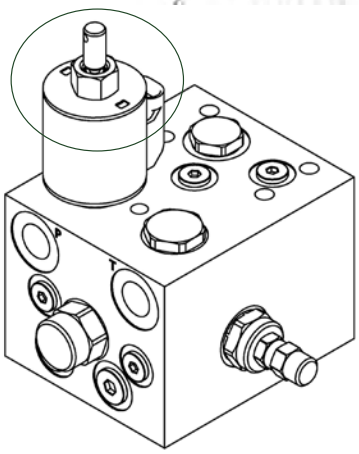
- Close manual override (lock down)
- Go to Diagnostics, Section Test to investigate this issue.
- Verify hydraulics are on.
- In Section Test, hold down "+" button for a few seconds. A single tap of this button produces a very small change in signal to the valve, so you must hold it.
- Take a metal object and hold it next to the coil. If the coil is working, you will feel the magnetic pull.
- If no magnetic force is felt, disconnect the PWM valve connector and check voltage. You will need 6-12 volts to get hydraulic valve to open.
- If 6-12 volts is not present, check harnesses and review control valve type setup.
- Go back to the 37 pin connector at the John Deere Rate Controller. Check voltage between pins 15 & 16, should be between 6-12 volts while in section test after holding "+" button.
- If you cannot get voltage at pins 15 & 16, contact your John Deere dealer for further assistance.

Hydraulic Manual Override
Down - Normal Operation
Up - Override, valve 100% open



HYDRAULICS PROBLEM

- Leave the manual override open on the valve.
- Check the hose routings. The "P" port on the valve should hook to pressure. The "T" port is the return that should flow back to the tractor.
- Try hoses in a different hydraulic remote. Inspect hydraulic connectors for damage or restrictions.



GX5 TROUBLESHOOTING

(Read Instructions Completely before Beginning Installation)

SECTION VALVE(S) WILL NOT MOVE

1. Go to Diagnostics, Section Test to investigate this issue.
2. In Section Test, check and uncheck the boxes. With the box checked the
3. valve should turn on. The valve should be off with the box not checked.
4. Do you have a problem with 1 valve or all valves.
5. If working with the 7-12 section harness, identify if section 1-6 or section 7-12

ONE VALVE DOESN'T WORK

1. Check the harness connection to that valve. It is a 3 Pin Weather Pack connector. See wiring diagrams

Pin	Function
A	+ 12 V Constant
B	GND
C	+ 12 V Signal

2. Check voltage pin A to Pin B. Must be 12 volts, if not, go back to 16 pin & 37 pin connector and check voltage. See wiring diagrams.
3. If no voltage on 37 pin connector from OEM Rate Controller, contact your local dealer for assistance.
4. If voltage is present on pins A&B of 3 pin connection to valve, then check pin C to Pin B. This should be 12 volts when the valve is commanded on or open, this should be zero volts when valve is off or closed.
5. If signal voltage is not present to open valve, use diagrams to check at the 16 pin , then the 37 pin for voltage.
6. If constant voltage (Pins A&B) and switched voltage (Pins C&B) are present, inspect, repair or replace the valve.

ALL OR MULTIPLE VALVES DON'T WORK

1. Generally, follow the same steps as for a single valve. However, concentrate on checking for constant voltage on Pins A & B, then follow that back to the 16 pin and 37 pin connectors.
2. This problem could also be related to display configuration. Review Implement Setup to make sure sections are correct in controller.

GX5 TROUBLESHOOTING

(Read Instructions Completely before Beginning Installation)

APPLICATION RATE FLUCTUATES

First, you need to determine if the fluctuation is caused by the controller sending fluctuating signals to the valve.

1. Go to Section Test as shown in Initial Operation.
2. Turn the system on watch the flow in GPM on the 1,2,3 screen.
3. Is the flow steady within a very small range. For example a fluctuation from 12.3 to 12.6 GPM would be considered normal. A fluctuation from 11-14 GPM is a problem. If only a small normal fluctuation is seen in section test, skip steps 4-8 and proceed to "Application Rate Fluctuates in Field ..... " below.
4. If there is a large fluctuation, observe the system flow. Is the discharge a steady stream; are the flow indicator balls floating steady.
5. If visually the flow is steady, but the display reports a fluctuation in GPM, inspect the flowmeter. See section B for flowmeter information.
6. If visually the flow is unsteady, the flowmeter is working correctly reporting a flow problem. Is the pump turning steady or surging?
7. If the pump is turning steady, the hydraulic circuit is functioning correctly. Look for any type of obstruction in the pump inlet. Clean the strainer. If continually plugging the strainer investigate fertilizer quality and necessary strainer size.
8. If the pump speed is surging, there is a hydraulic problem.

APPLICATION RATE FLUCTUATES IN FIELD, BUT FLOW IN SECTION TEST

This problem indicates the valve calibration needs changed. The system is surging because the Rate Controller is moving the hydraulic valve too much.

1. Go to Setup - System - PWM Setup.
2. Change the Valve Calibration by reducing the valve speed (first two digits). For example reduce the number for 4012 to 3012, which changes valve speed from 40 to 30.

APPLICATION RATE IS SLOW TO GET TO THE TARGET RATE

3. You may need to increase the valve calibration. Go to Setup - System - PWM Setup.
4. Change the Valve Calibration by increasing the valve speed (first two digits). For example increase the number from 3012 to 4012, which changes valve speed from 30 to 40.

—— OR ——

5. You may need to increase the PWM Low Limit. When the rate has to increase from zero flow, the valve will begin at a higher point. The initial recommended setting is 60. If you increase this value too much the pump will not be able to reach the minimum flow necessary with only 1 section open or a slow field speed.

RECOMMENDED CARE AND MAINTENANCE

(Read Instructions Completely before Beginning Installation)

WINTERIZATION

AgXcel recommends flushing your fertilizer pump and complete system with adequate amounts of water first. Next, use RV antifreeze to winterize your system by pumping an adequate amount through all components. At the beginning

CHANGE PUMP OIL ANNUALLY

GX5 pumps use an internal oil lubricated crankshaft and connecting rod design. The oil is held in an external reservoir with level indicators. Hypro oil is recommended for the pump. This is a non-detergent SAE30 weight oil. If not available, hydraulic jack oils are a similar non-detergent formulation. Annual oil changes are recommended. To fill or drain the pump completely, the pump shaft must be turned slowly by hand. The hydraulic motor will have to be removed to do this. On some pump models, the pump will have to be removed from the mounting bracket and lifted slightly to allow access to the oil plug. When refilling the pump with oil, the shaft will again have to be rotated to fill the pump to its required oil volume.

DIAPHRAGM & VALVE REPLACEMENT

GX5 pumps are designed to allow very simple replacement of the two main pumping components; the diaphragms and the inlet & outlet valves. It is a good practice to replace these annually. It is a small job that helps ensure reliable operation during the busy season.

DIAPHRAGM PUMP VALVES & DIAPHRAGMS

(Read Instructions Completely before Beginning Installation)

WINTERIZATION

All GX5 models use the same diaphragm and valve parts.

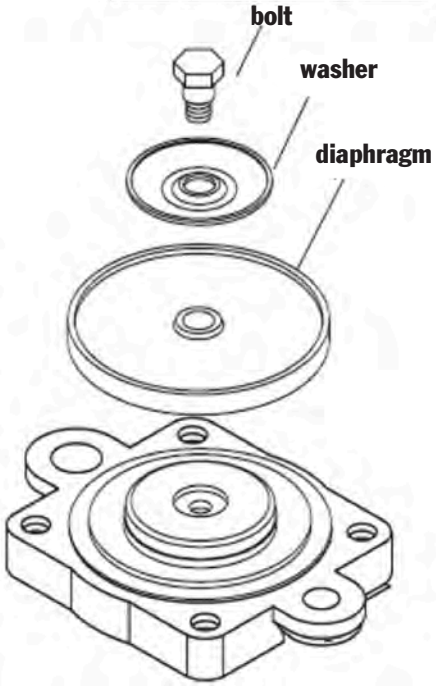
DIAPHRAGM PUMP SERVICE KIT

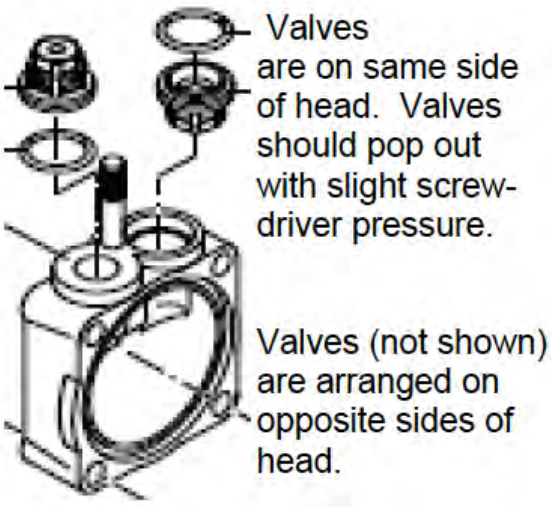
1 Kit contains 1 diaphragm and 2 valves to service a single pumping diaphragm. Order multiple kits to service all the diaphragms in your pump per chart at right.

DIAPHRAGM & VALVE SERVICE STEPS:

1. Drain oil from pump. Rotate pump shaft to remove all oil.
2. Remove pump manifold(s) using a 17mm or 13 mm wrench.
3. Remove and replace complete valve assembly.
4. Remove the pump head.
5. Remove the diaphragm bolt, support washer & diaphragm. Turn the pump shaft to up stroke to replace diaphragm.
6. Install new diaphragm, then replace washer and bolt.
7. Turn pump to downstroke to seat new diaphragm into the sleeve groove.
8. Replace pump head and manifold(s).
9. Refill crankcase with SAE30 non detergent oil (Hypro Oil or hydraulic jack oil).

	Number of Diaphragms
D70	2
D115	3
D160	4
D250	6





RECOMMENDED CARE AND MAINTENANCE

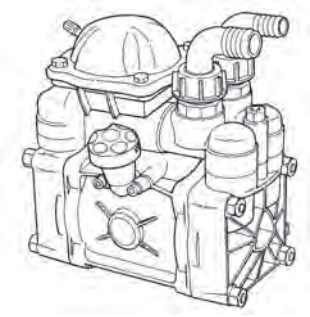
(Read Instructions Completely before Beginning Installation)

Low Pressure Diaphragm Pumps

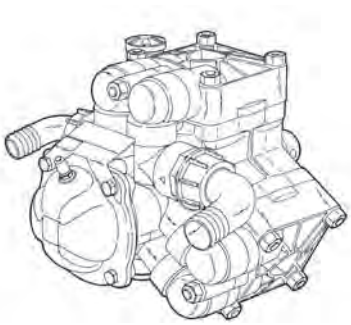
Installation, Operation, Repair and Parts Manual

Description

AgXcel 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. AgXcel low pressure diaphragm pumps can be adapted for splined shaft, hollow shaft, and solid shaft drive options. Pumps include a pulsation dampener.

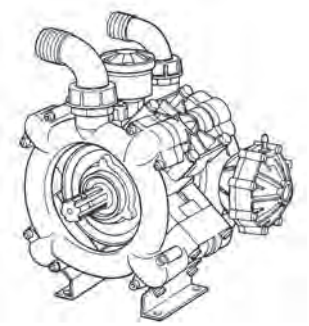


Model 9910-D70
Model 9910-D70GR
Max flow: 19 gpm
Max pressure: 290 psi
2 diaphragms

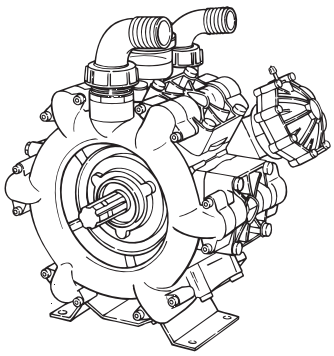


Model 9910-D115
Model 9910-D115GR34
Max flow: 30.1 gpm
Max pressure: 290 psi
3 diaphragms

Model 9910-D135
Max flow: 34.8 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

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 AgXcel 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.

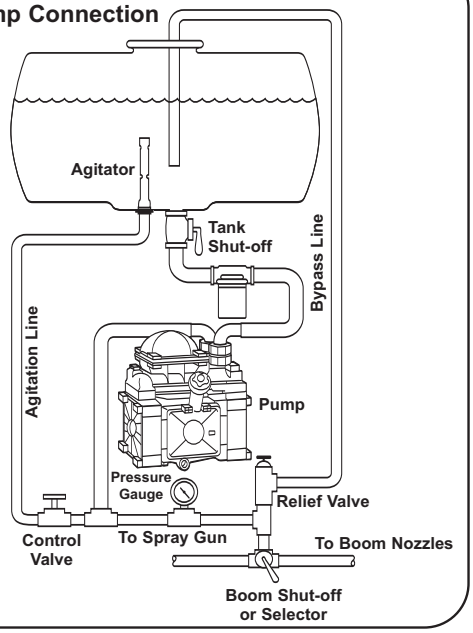
Control Unit Model	Max GPM	Max PSI	Type
3300-0082	66	290	D250
3300-0087	42.5	290	D70, D115, D135, D160
3300-0088	42.5	290	D70, D115, D135, D160

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 AgXcel Applications toll-free number: 877-218-1981.**
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

Diaphragm Pump Connection



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. AgXcel diaphragm pumps come with oil in the crankcase. **AgXcel 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.

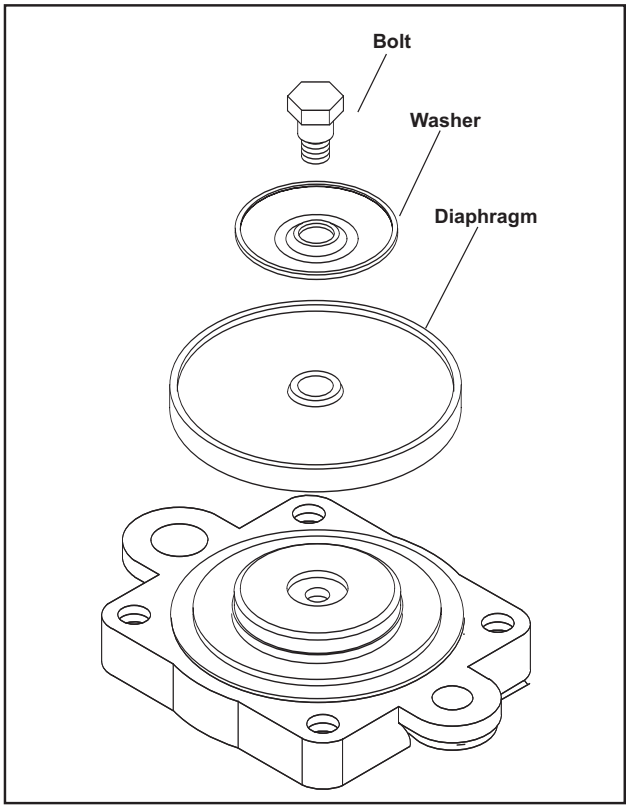


Figure 1. Diaphragm Replacement

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

AgXcel 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

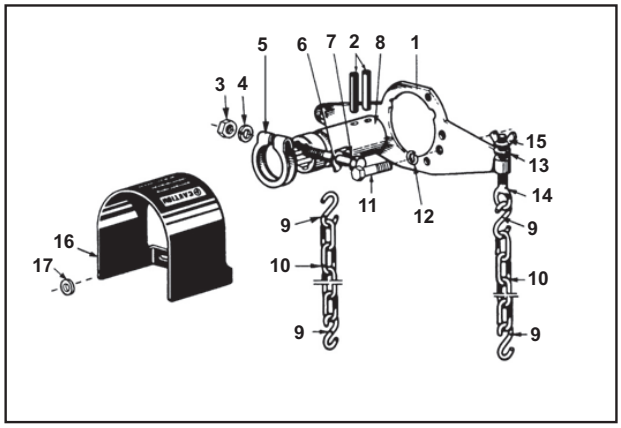


Figure 2. Coupler Kit 9910-KIT1708 Installation 9910-KIT1708: 1-3/8" Female PTO Adapter, Safety Shield, Torque Arm and Chains

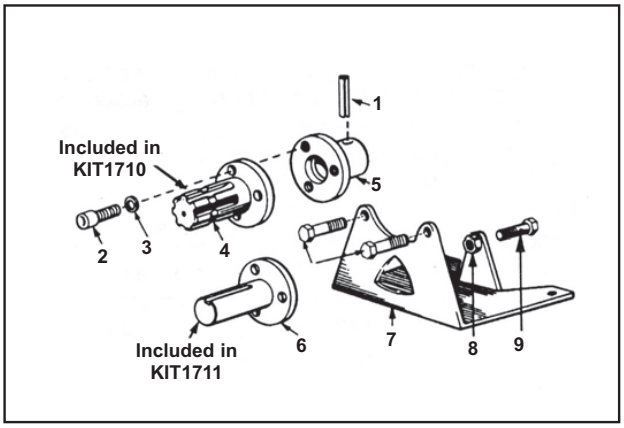


Figure 3. Coupler Kit 9910-KIT1710 Installation 9910-KIT1710: 1-3/8" Male PTO Shaft and Base Kit 9910-KIT1711: 1" Solid Shaft and Base Kit

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:

1. Place the torque bracket (Ref. 1) onto pump and secure with bolts (Ref. 11).

2. Slide female coupler (Ref. 8) onto pump shaft. Align holes in coupler with holes in pump shaft and press in pins (Ref. 2).

3. Make sure clamp (Ref. 5) is over groove in the coupler. Slide the pump onto the PTO shaft of power source and tighten clamp.

4. 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:

1. Slide shaft adapter flange (Ref. 5) over pump shaft. Align adapter hole with hole on the pump shaft and press in pin (Ref. 1).

2. Bolt shaft adapter (Ref. 4 or 6) onto flange with three bolts (Ref. 2) and washers (Ref. 3).

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

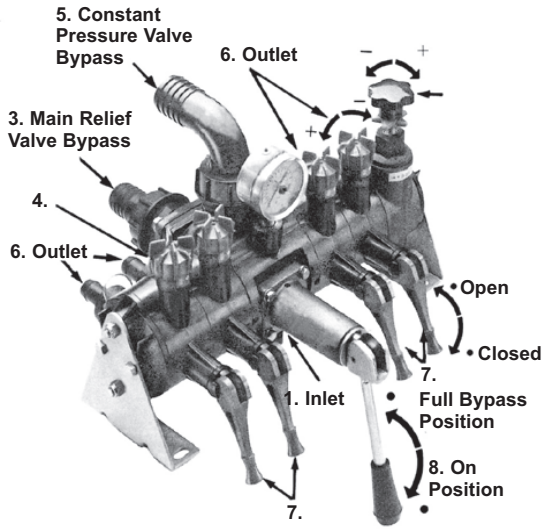


Figure 4. Model 3300-0082

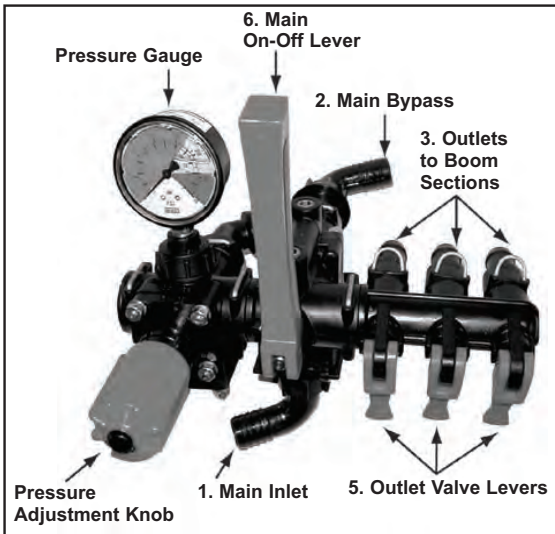


Figure 5. Model 3300-0087 and 3300-0088

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

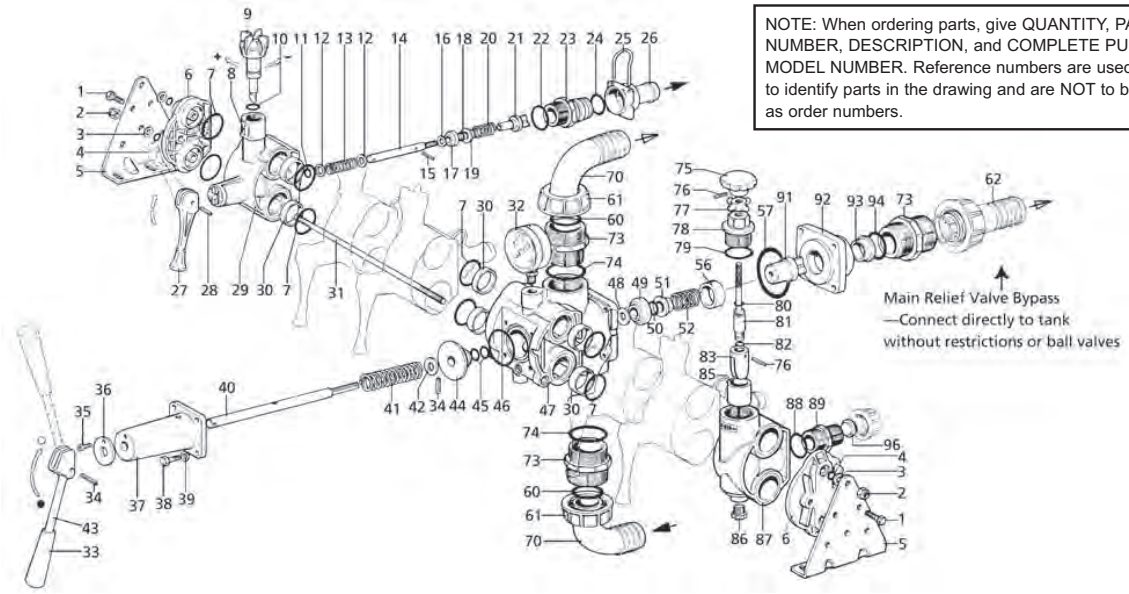
Locate mounting bracket and secure in desired position. The pressure line from the pump is connected to main inlet hose barb (1). The return line is connected unrestricted to the main bypass hose barb (2). Boom sections are connected to the outlet boom hose barb (3).

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

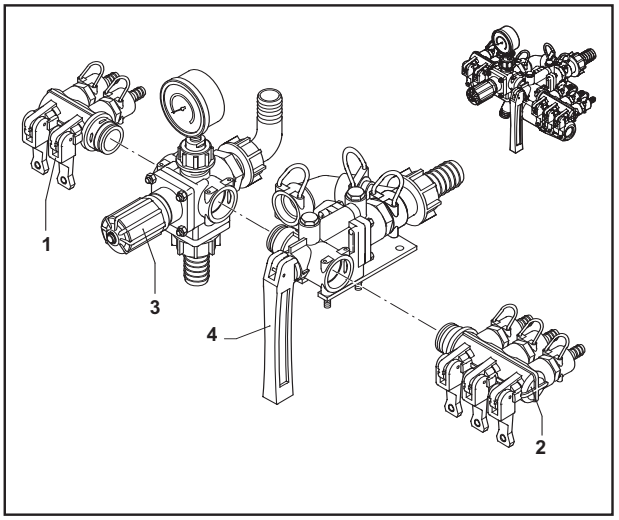
NOTE: When ordering parts, give QUANTITY, PART NUMBER, DESCRIPTION, and COMPLETE PUMP MODEL NUMBER. Reference numbers are used ONLY to identify parts in the drawing and are NOT to be used as order numbers.

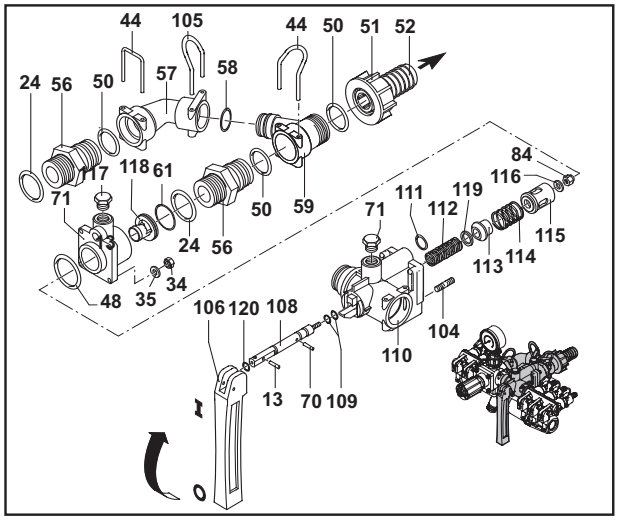


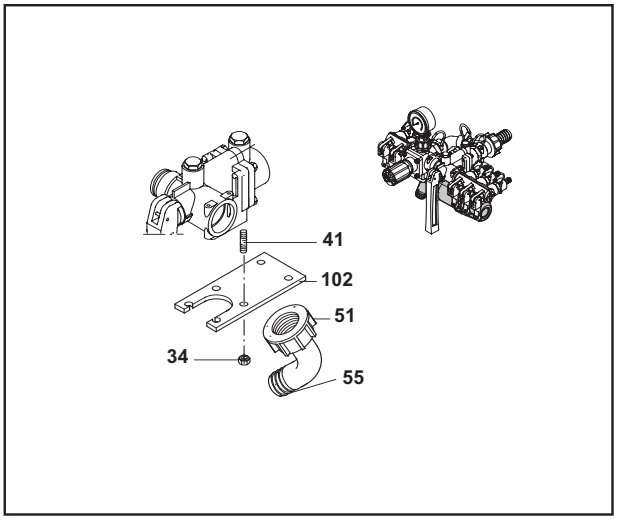
REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
1	9910-180430	M8 x 20 Bolt	4
2	9910-160311	Nut	4
3	9910-390311	Washer	4
4	N/A	O-ring	4
5	N/A	Plate	2
6	9910-391940	Cap	2
7	9910-66017V	O-ring	2
8	9910-391960	Scale	1
9	9910-391710	Regulator valve	1
10	9910-64007V	O-ring	1
11	9910-650540	O-ring	1
12	N/A	Washer	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

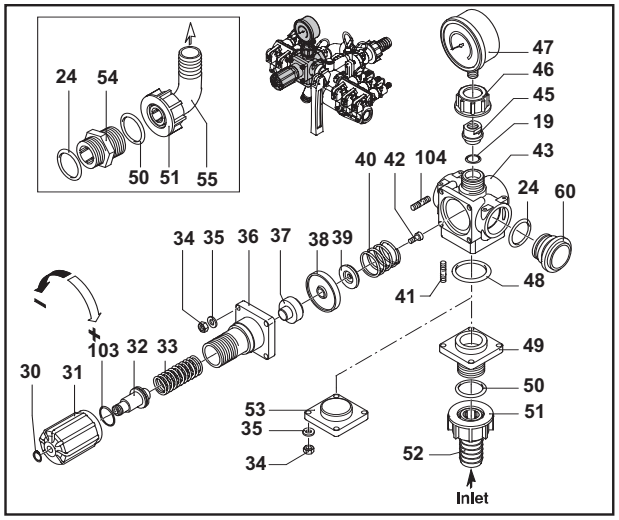
REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
42	N/A	Washer	1
43	9910-391800	Handle	1
44	N/A	Flange	1
45	9910-390080	O-ring	2
46	9910-392490	O-ring	1
47	N/A	Body	1
48	N/A	Washer	1
49	9910-391840	Seat	1
50	9910-640070	O-ring	1
51	N/A	Guide	1
52	N/A	Spring	1
56	9910-394010	Ring	1
57	9910-640030	O-ring	1
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

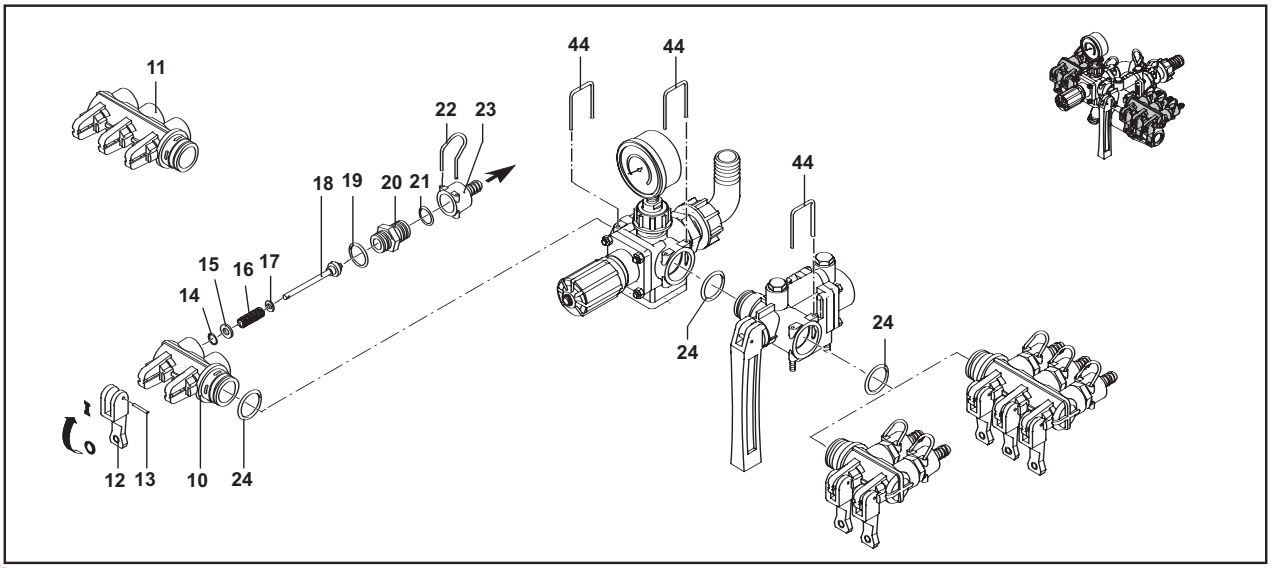
Parts Illustrations for Models 3300-0087 and 3300-0088











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
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-D70 and 9910-D70GR

Figure 6. Parts Illustrations for Model 9910-D70

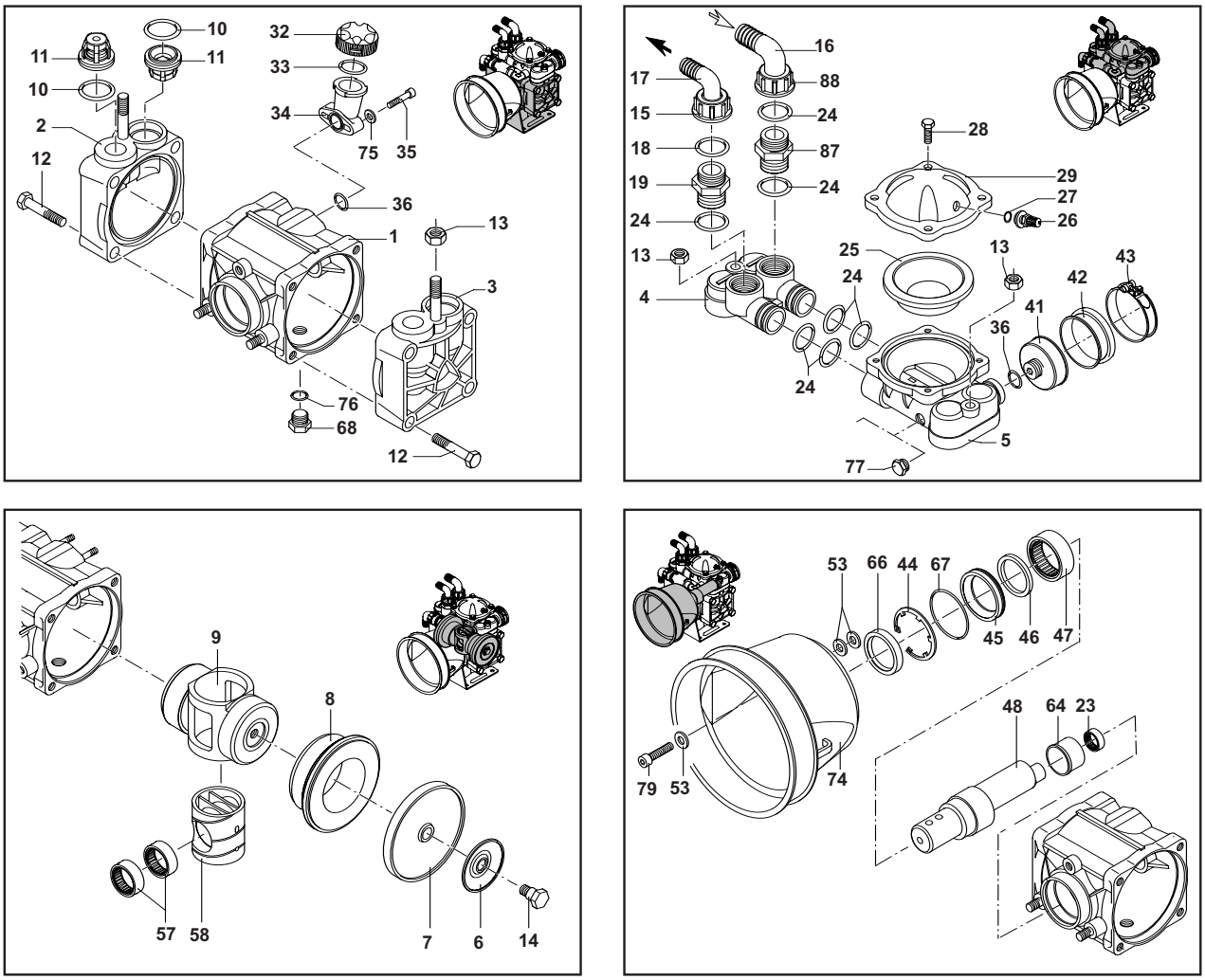
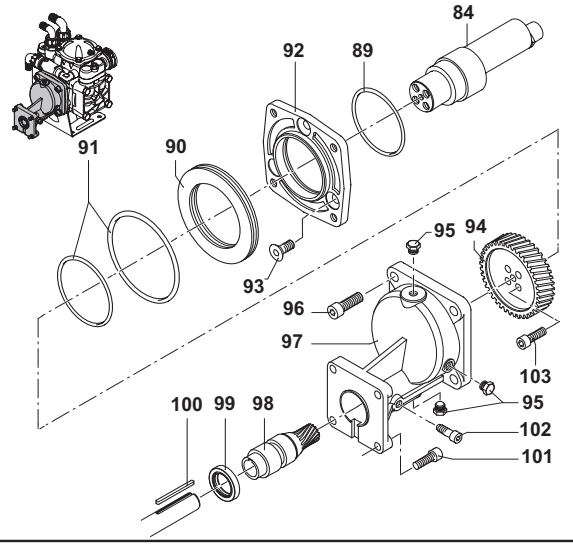


Figure 7. 9910-D70GR Gear Box Components



Parts List for 9910-D70GR Gear Box Components

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
84	9910-550175	Shaft	1
89	9910-580230	O-ring	1
90	9910-621440	O-ring retainer	1
91	9910-620561	O-ring	2
92	9910-550920	Flange	1
93	9910-550950	Bolt	3
94	9910-550940	Gear	1
95	9910-620301	Plug	3
96	9910-160671	M10 x 25 Bolt	4
97	9910-621810	Gear housing	1
98	9910-621820	Pinion shaft	1
99	9910-480820	Seal	1
100	9910-881090	Key	1
101	9910-651000	Bolt	4
102	9910-800800	M8 x 16 Bolt	1
103	9910-540290	M8 x 25 Bolt	4

Parts List for Models 9910-D70 and 9910-D70GR

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
1	9910-550011	Pump Body with bolts	1
2	9910-550101	Right head DX	1
3	9910-550102	Left head SX	1
4	9910-550150	Manifold	1
5	9910-559200	Accumulator manifold	1
6	9910-580370	Plate	2
7	9910-550080	Diaphragm (Buna) Optional	2
7a	9910-550085	Diaphragm (Desmopan) Standard	2
8	9910-550110	Sleeve	2
9	9910-550120	Piston	1
10	9910-320030	O-ring	4
11	9910-759051	Complete valve assembly	4
12	9910-551040	M10 x 55 Bolt	8
13	9910-180152	Nut	4
14	9910-580360	Diaphragm bolt	2
15	9910-550880	Ring nut	1
16	9910-580040	Elbow 1-1/4"	1
17	9910-550370	Elbow 1"	1
18	9910-550350	O-ring	1
19	9910-550340	Threaded adapter	1
23	9910-550310	Roller bearing	1
24	9910-390290	O-ring	7
25	9910-550190	Accumulator diaphragm	1
26	9910-550300	Air valve	1
27	9910-650542	O-ring	1
28	9910-550680	Bolt	4
29	9910-559204	Upper air chamber	1
32	9910-550057	Sight glass cap	1
33	9910-550040	O-ring	1
34	9910-550030	Oil sight glass	2
36	9910-180101	O-ring	2
41	9910-650660	Diaphragm holder	1
42	9910-650670	Diaphragm	1
43	9910-650690	Clamp	1
44	9910-200391	Retainer ring	1
45	9910-550470	Seal ring	1
46	9910-550070	Spacer ring	1
47	9910-550060	Roller bushing	1
48	9910-550170	Shaft	1
52	9910-200233	Washer	2
53	9910-320621	Washer	5
57	9910-550280	Bearing	2
58	9910-550140	Cylinder	1
64	9910-550160	Spacer	1
66	9910-550491	Seal ring	1
67	9910-650920	O-ring	1
68	2406-0023	Oil drain plug	1
74	9910-1500350	Shield	1
75	9910-550332	Washer	2
76	9910-740290	O-ring	1
77	9910-330173	Plug	1
79	9910-620472	M10 x 20 Bolt	1
87	9910-450120	Threaded adapter	1
88	9910-550870	Ring nut	1

Ref. No.	Description	Tightening Torque	
		In. Lbs.	Nm
12	Bolt	350.0	39.2
13	Nut	350.0	39.2
14	Diaphragm Bolt	262.5	29.4
28	Bolt	171.4	19.6
35	Nut	87.5	9.8
77	Plug	171.4	19.6

9910-KIT1720 Diaphragm Kit Desmopan

REF. NO.	QTY.
7a	2
10	4
25	1

9910-KIT2364 Valve Kit

REF. NO.	QTY.
10	4
11	4

9910-KIT2365 O-Ring Kit

REF. NO.	QTY.
10	4
18	1
24	7
27	1
33	1
36	1
67	1
76	1

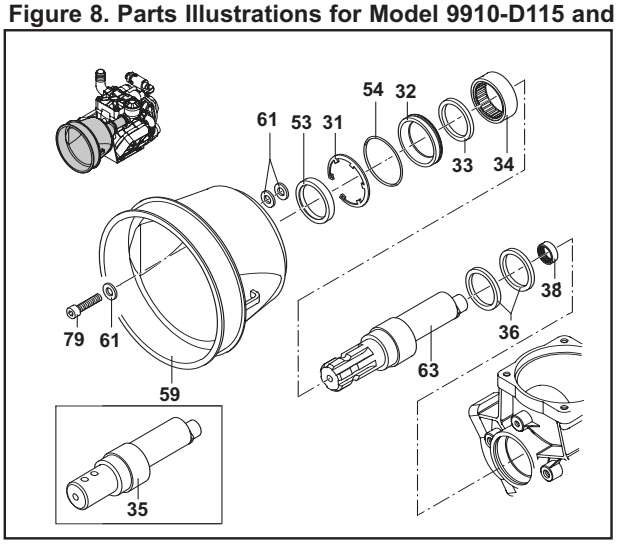
NOTE: When ordering parts, give QUANTITY, PART NUMBER, DESCRIPTION, and COMPLETE PUMP MODEL NUMBER. Reference numbers are used ONLY to identify parts in the drawing and are NOT to be used as order numbers.

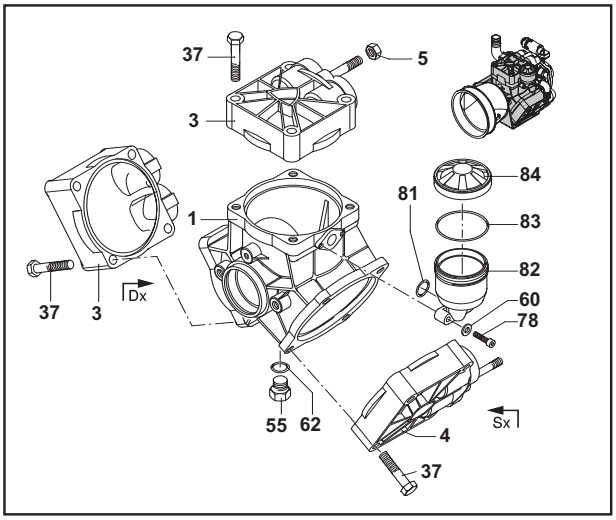
Torques for D70 Gearbox Components

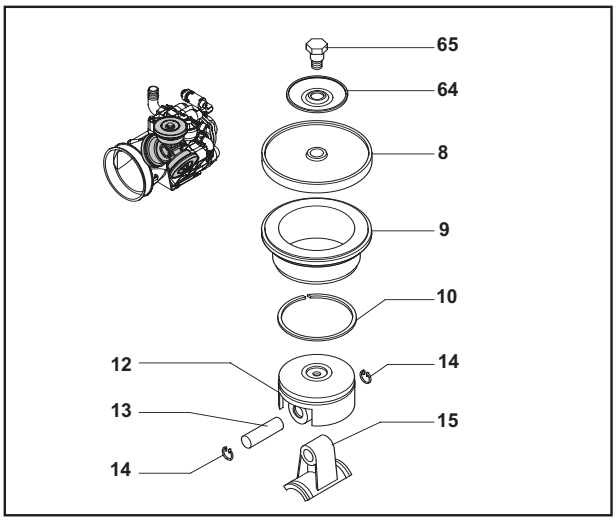
Ref. No.	Description	Tightening Torque	
		In. Lbs.	Nm
93	Bolt	171.4	19.6
95	Plug	87.5	9.8
96	Bolt	218.7	24.5
101	Bolt	218.7	24.5
102	Bolt	87.5	9.8
103	Bolt	218.7	24.5

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

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







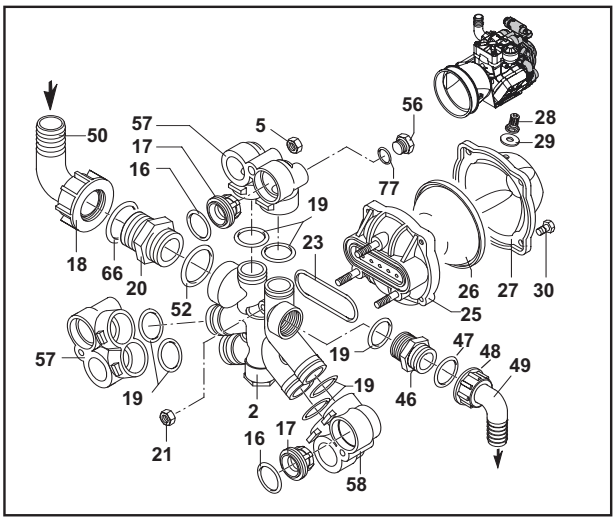
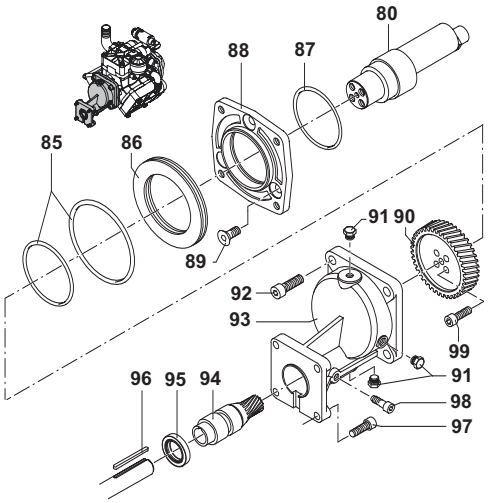


Figure 9. 9910-D115GR34 Gear Box Components



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

Parts Illustrations for Model 9910-D160

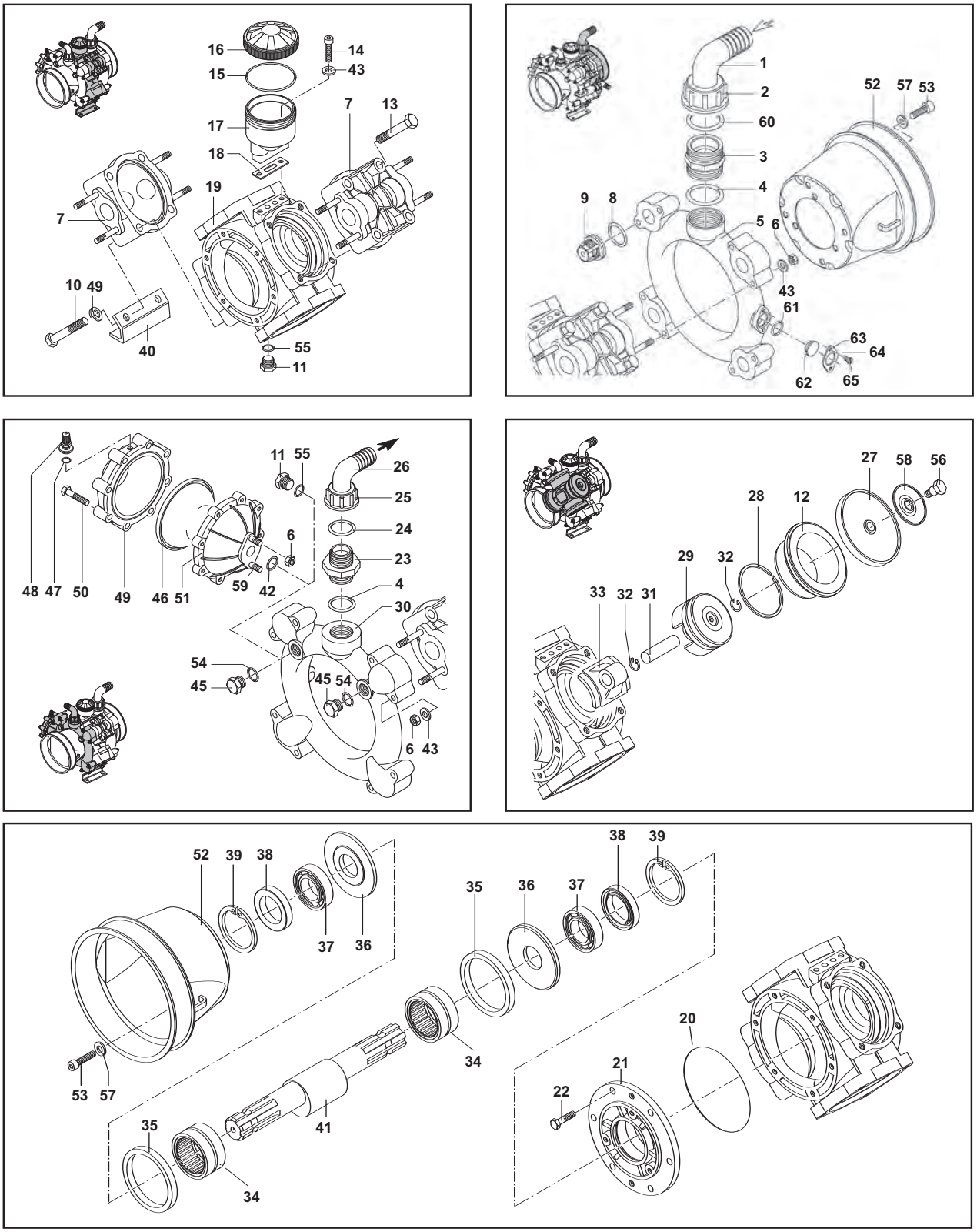


Figure 10. Parts Illustrations for Model 9910-D160

Parts List for Model 9910-D160

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
1	9910-760020	Elbow 2"	1
2	9910-760040	Ring nut	1
3	9910-760030	Threaded adapter	1
4	9910-250310	O-ring	1
5	9910-760220	Suction manifold	1
6	9910-380242	Nut	18
7	9910-750100	Head	4
8	9910-680070	O-ring	8
9	9910-759051	Complete valve	8
10	9910-750071	Bolt	4
11	2406-0023	Oil drain plug	2
12	9910-750110	Sleeve	4
13	9910-750061	M12 x 65 Bolt	12
14	9910-680350	M8 x 35 Bolt	2
15	9910-1040060	O-ring	1
16	9910-750057	Black oil tank cap	1
17	9910-750030	Oil sight glass	1
18	9910-750040	Gasket	1
19	9910-760010	Pump body	1
20	9910-851360	O-ring	1
21	9910-680020	Bearing support housing	1
22	9910-160672	M10 x 25Bolt	6
23	9910-540530	Threaded adapter	1
24	9910-250310	O-ring	1
25	9910-540540	Ring nut	1
26	9910-540550	Elbow 1-1/2"	1
27	9910-550085	Diaphragm (Desmopan) Standard	4
27a	9910-550080	Diaphragm (Buna) Optional	4
28	9910-500260	Piston ring	4
29	9910-750122	Piston	4
30	9910-760070	Manifold	1
31	9910-160700	Pin	4
32	9910-160691	Pin ring	8
33	9910-760140	Connecting rod	4
34	9910-750090	Roller bearing	2
35	9910-750130	Connecting rod ring	2
36	9910-540040	Spacer washer	2
37	9910-230350	Bearing	2
38	9910-160740	Seal ring	2
39	9910-200390	Retainer ring	2
40	9910-760201	Base	2
41	9910-750170	Crankshaft	1
42	9910-390290	O-ring	1
43	9910-380243	Washer	18
44	9910-250143	Washer	4
45	9910-330173	Plug	2
46	9910-550190	Accumulator diaphragm	1
47	9910-650542	O-ring	1
48	9910-180020	Air valve	1
49	9910-620232	Accumulator head	1
50	9910-621781	M8 x 40 Bolt	8
51	9910-680180	Accumulatorbody	1
52	9910-1500350	Shield	2
53	9910-850251	M8 x 12 Bolt	6
54	9910-180101	O-ring	2
55	9910-740290	O-ring	2
56	9910-580360	Diaphragm bolt	4
57	9910-390314	Washer	6
58	9910-580370	Retaining washer	4
59	9910-390670	Accumulator stud	1

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
60	9910-620210	Oring	1
61	9910-480440	Oring	1
62	9910-2420120	Flange Plug	1
63	9910-2420110	Flange	1
64	9910-2420290	Washer	2
65	9910-2420280	Bolt	2

Ref. No.	Description	Tightening Torque	
		In. Lbs.	Nm
6	Nut	171.4	19.6
10	Bolt	435.5	49.0
11	Plug	171.4	19.6
13	Bolt	435.5	49.0
14	Bolt	87.5	9.8
22	Bolt	304.8	34.3
45	Plug	350.0	39.2
50	Bolt	171.4	19.6
53	Bolt	87.5	9.8
56	Diaphragm Bolt	262.5	29.4

9910-KIT1730 Diaphragm Kit Desmopan

REF. NO.	QTY.
8	8
27	4
46	1

9910-KIT2374 Valve Kit

REF. NO.	QTY.
8	8
9	8

9910-KIT1908 O-Ring Kit

REF. NO.	QTY.
4	3
8	8
15	1
24	1
42	2
47	1
54	2
55	2

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.

Parts Illustrations for Model 9910-D250

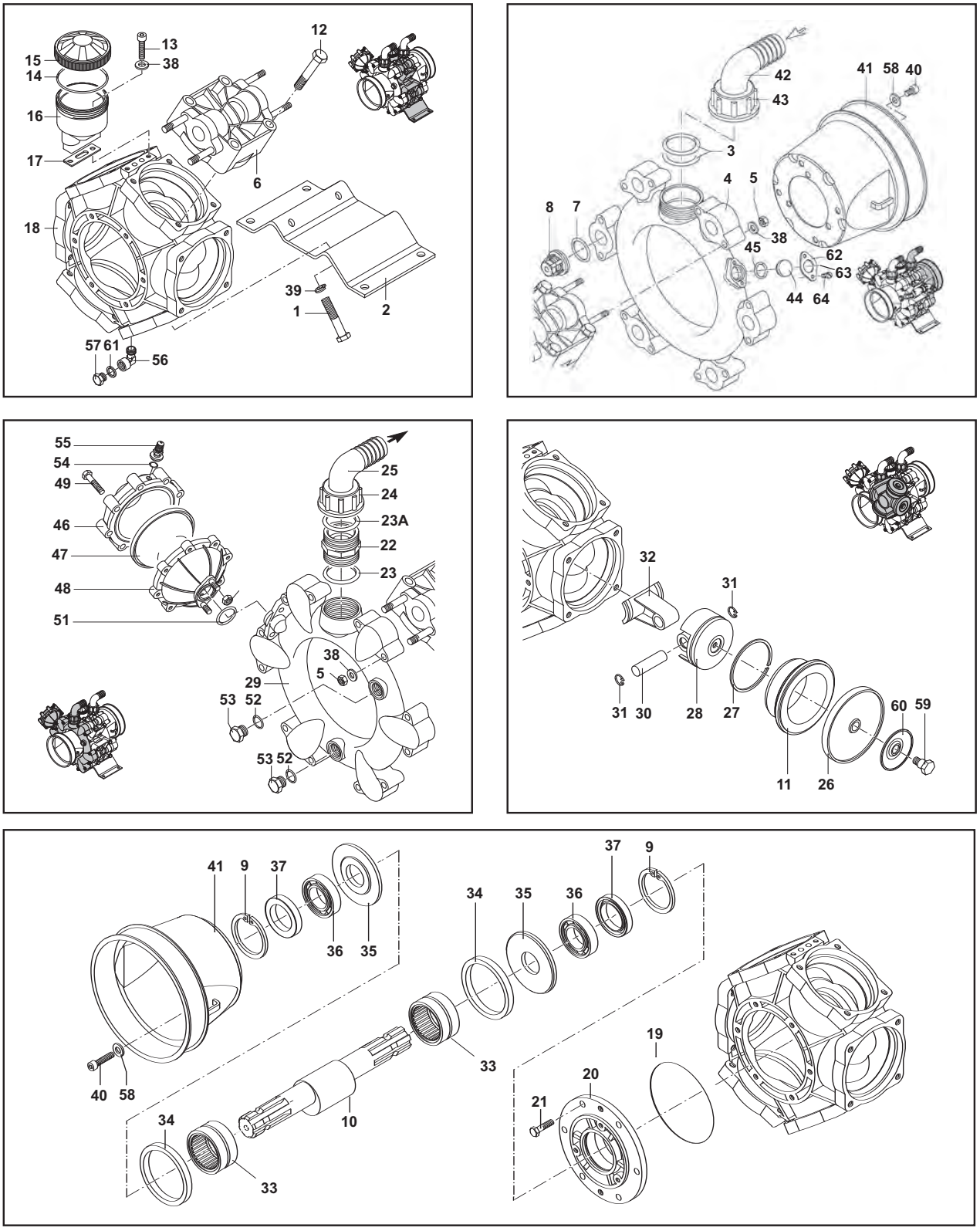


Figure 11. Parts Illustration for Model 9910-D250

Parts List for Model 9910-D250

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
1	9910-750071	Bolt	4
2	9910-750200	Base	1
3	9910-750740	O-ring	2
4	9910-KIT2486	Suction Manifold Kit (Includes Ref. 3, 42, 43, 44, 45 and 62)	1
5	9910-380242	Nut	26
6	9910-750100	Head	6
7	9910-680070	O-ring	12
8	9910-759051	Complete valve	12
9	9910-200390	Retainer ring	2
10	9910-750170	Crankshaft	1
11	9910-750110	Sleeve	6
12	9910-750061	M12 x 65 Bolt	20
13	9910-680350	M8 x 35 Bolt	2
14	9910-1040060	O-ring	1
15	9910-750057	Black oil tank cap	1
16	9910-750030	Oil sight glass	1
17	9910-750040	Gasket	1
18	9910-750010	Pump body	1
19	9910-851360	O-ring	1
20	9910-680020	Shaft support	1
21	9910-160672	M10 x 25Bolt	6
22	9910-751130	Threaded adapter	1
23	9910-751140	O-ring	1
23A	9910-390290	O-ring	1
24	9910-750670	Ring nut	1
25	9910-3040160	Elbow 1-1/2"	1
26	9910-550085	Diaphragm (Desmopan) Standard	6
26A	9910-550080	Diaphragm (Buna) Optional	6
27	9910-500260	Piston ring	6
28	9910-750122	Piston	6
29	9910-751080	Manifold	1
30	9910-160700	Pin	6
31	9910-160691	Pin ring	2
32	9910-750140	Connecting rod	6
33	9910-750090	Roller bearing	2
34	9910-750130	Connecting rod ring	2
35	9910-540040	Spacer washer	2
36	9910-230350	Bearing	2
37	9910-160740	Seal ring	2
38	9910-380243	Washer	26
39	9910-250143	Washer	4
40	9910-850251	M8 x 12 Bolt	6
41	9910-1500350	Shield	2
42	9910-750850	Elbow 2"	1
43	9910-750710	Ring nut	1
44	9910-2420120	Plug	1
45	9910-480440	O-ring	1
46	9910-620232	Accumulator head	1
47	9910-550190	Accumulator diaphragm	1
48	9910-680180	Accumulator body	
49	9910-621781	M8 x 40 Bolt	8
51	9910-390290	O-ring	1
52	9910-180101	O-ring	2
53	9910-330173	Plug	2
54	9910-650542	Gasket	1
55	9910-180020	Air valve	1
56	9910-750370	Elbow	1
57	9910-880581	Oil drain plug	1
58	9910-390314	Washer	6
59	9910-580360	Diaphragm bolt	6

REF. NO.	PART NUMBER	DESCRIPTION	QTY. REQ'D
60	9910-580370	Retainer washer	6
61	9910-880820	Washer	1
62	9910-2420110	Flange	1
63	9910-2420290	Washer	2
64	9910-2420280	Bolt	2

Ref. No.	Description	Tightening Torque	
		In. Lbs.	Nm
1	Bolt	435.5	49.0
5	Nut	171.4	19.6
12	Bolt	435.5	49.0
13	Bolt	87.5	9.8
21	Bolt	304.8	34.3
40	Bolt	87.5	9.8
49	Bolt	171.4	19.6
53	Plug	350.0	39.2
57	Plug	171.4	19.6
59	Diaphragm Bolt	262.5	29.4

9910-KIT1722 Diaphragm Kit Desmopan

REF. NO.	QTY.
7	12
26	6
47	1

9910-KIT2114 Valve Kit

REF. NO.	QTY.
7	12
8	12

9910-KIT1904 O-Ring Kit

REF. NO.	QTY.
3	1
7	12
14	1
23	2
45	1
51	1
52	1
54	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.

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 Performed at every indicated month or operating hour interval, whichever comes first. Item		First Use	Each Use	First month or 40 hours	Every 3 months or 500 hours	Every 6 months or 1000 hours
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 AgXcel Agricultural Pumps & Accessories

AgXcel 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.

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