

SureFire
Ag Systems

396-001710

Odyssey Tower Roller Pump

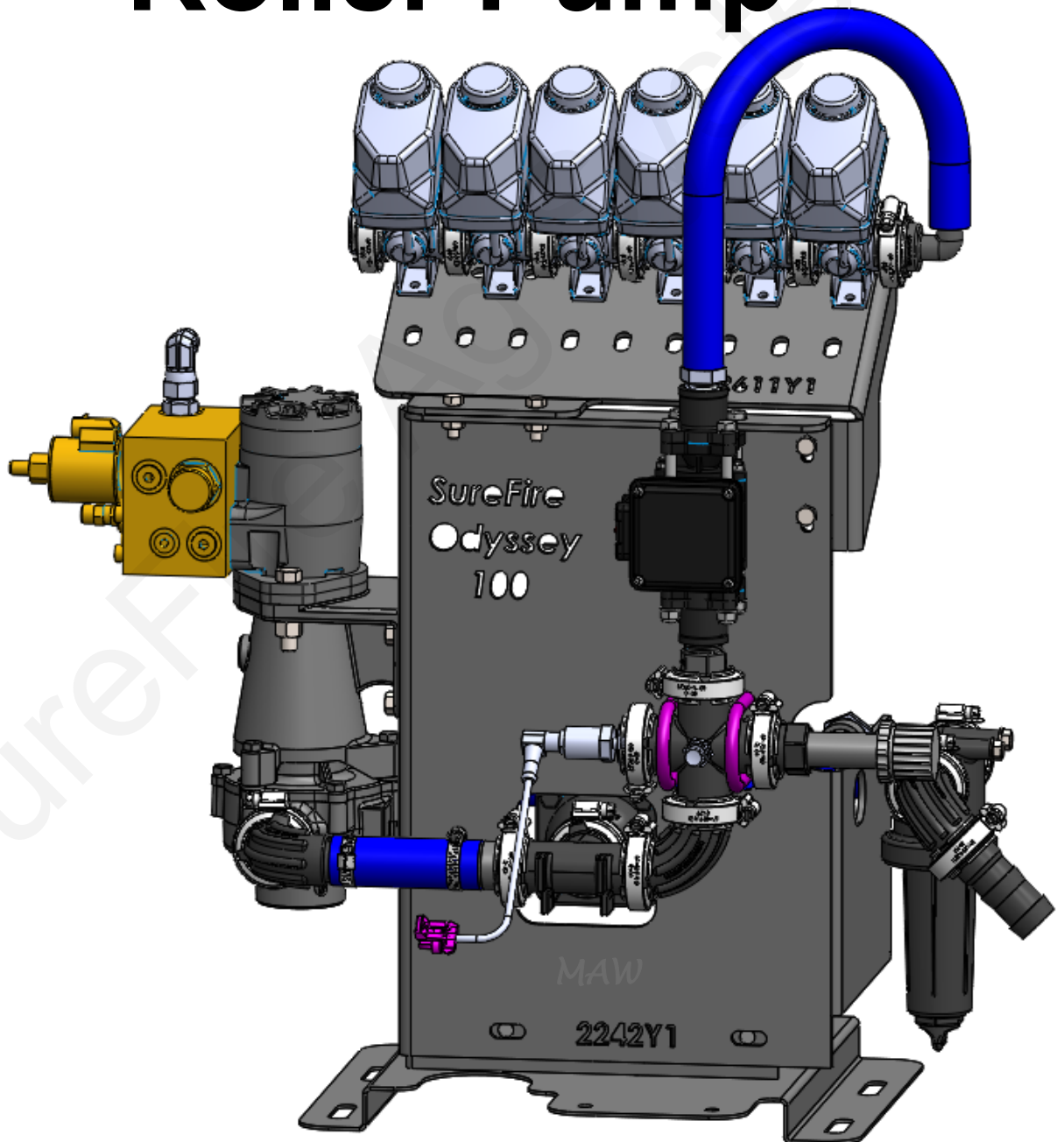


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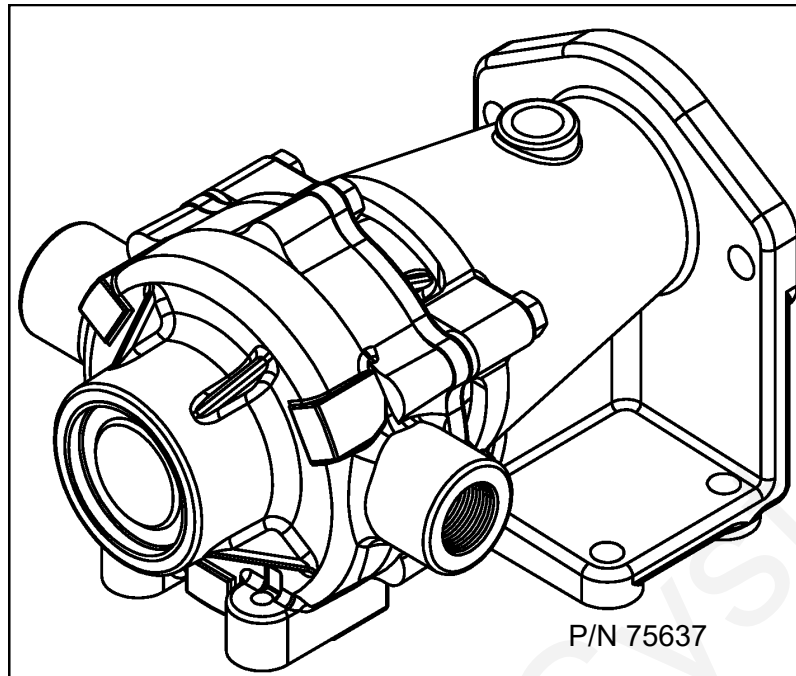
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B

Components Liquid



The heart of the Odyssey Tower system is the Odyssey Roller Pump. This specially-made pump is designed to handle the toughest agricultural chemicals. The pump comes standard with Teflon rollers and Teflon coated seals. For aggressive chemical applications, replace these items with Teflon service items. If the Teflon rollers show physical wear in regular fertilizer application, replace with the Super Roller repair kit, including Viton seals. (See parts list on next page.) Features of the Odyssey pump also include the new SilverCast™ body, 416 stainless steel shaft, and sealed factory-lubricated ball bearings.

Operating Tips:

Never run the pump dry.

To help prime the pump, keep the inlet line as short as possible with a minimum of bends, elbows, and kinks. Make sure all connections are tight and do not leak air. Make sure the line strainer is free of debris. If the pump does not self-prime, disconnect the suction hose, fill with water and reconnect to liquid source. Often a squirt of oil into the ports of the pump will seal clearances and help priming. (See more on page 4 about Pump Priming and the Air Bleed Valve.)

Flush the pump after each use.

The Odyssey pump is carefully machined to close tolerance. Proper care and maintenance will keep your pump wear at a minimum and will keep it running smoothly and trouble-free for a long time. One of the common causes of faulty pump performance is gumming or corrosion inside the pump. This prevents the rollers from moving freely in their rotor slots. Flush the pump with a solution that will neutralize the liquid pumped, mixed according to manufacturer's directions.

After cleaning the pump as above, flush it with a 50-50 solution of permanent-type automobile antifreeze (containing a rust inhibitor) and water. A rust inhibitor can also be squirted into the ports of the pump. Turn the shaft several times to draw protective liquid through pump and coat entire inner surface. Drain pump and plug ports to keep out air during storage.

Electromagnetic Flowmeter

The Odyssey 100 is available with either a 0.3 - 5.0 GPM or a 0.6 - 13.0 GPM Electromagnetic Flowmeter.

B

Components
Liquid



Electromagnetic flowmeters are superior to traditional turbine flowmeters in two basic ways. First, they have no moving parts. This translates into no wear items or potential for contaminants to jam a spinning turbine.

Second, electromagnetic flowmeters detect the flow by electrically measuring the velocity of the liquid, which makes them independent of viscosity or density of the fluid measured. They are extremely accurate using the standard calibration number. **SureFire still recommends you perform a catch test to verify the system is properly installed and configured.**

Flowmeter Model (meters have an orange label with blue lettering)	Pulses/Gal	Commander II Pulses/Gal	FPT Size	Hose Barb In kit
0.3 - 5.0 GPM	3000	6000	3/4"	3/4"
0.6 - 13 GPM	2000	4000	3/4"	1"
1.3 - 26 GPM*	2000	4000	1"	1"

* 1.3 - 26 GPM Flowmeter included in dual Odyssey Pump configuration only.

Turbine Flowmeter for Telone

B

Components
Liquid

The Odyssey 100 is available with a turbine flowmeter (204-02-2692Y1) for use with Telone, which cannot be read with an electromagnetic flowmeter.

Mount the flowmeter in a convenient location between the pump and the flow indicator manifold, so the flow is going up through the flowmeter.



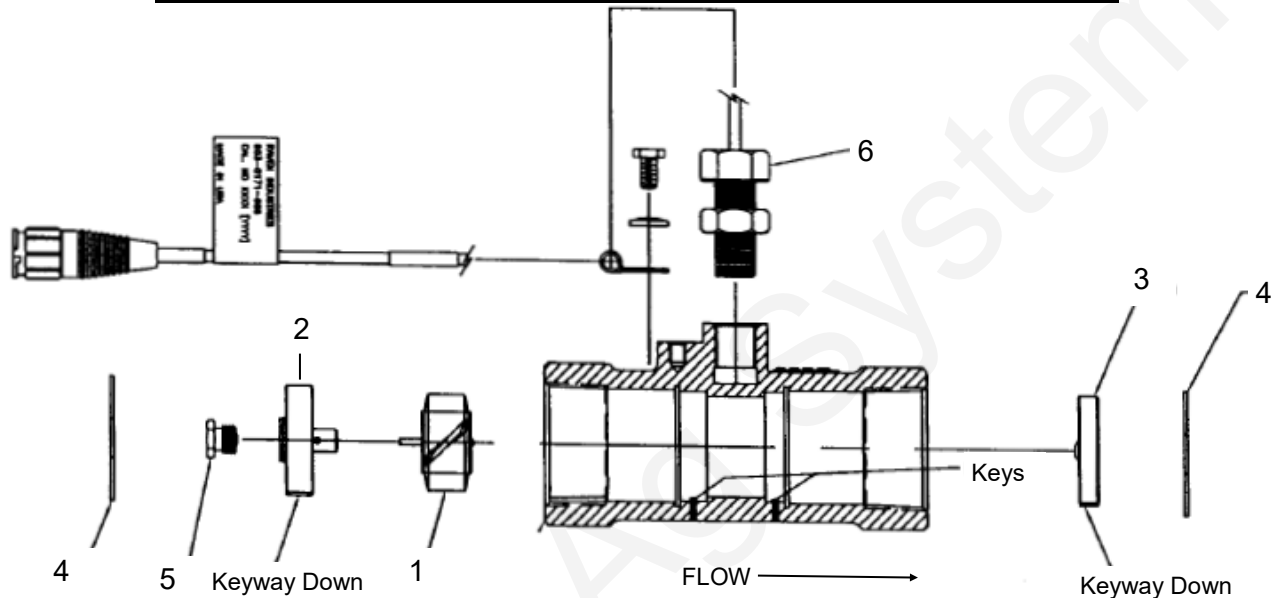
See the next page for flowmeter parts breakdown and flowmeter maintenance and adjustment procedure instructions.

RFM 60S Flowmeter

B

Components
Liquid

Item	Description	Raven Part #
1	Rotor / Magnet Assembly	063-0171-673
2	Hub / Bearing Assy, Upstream	063-0171-674
3	Hub Assembly, Downstream	063-0171-769
4	Ring, Retaining, Internal	335-0000-278
5	Stud Bearing	063-0173-062
6	Sensor Assembly	063-0171-669



RFM 60S Flowmeter Maintenance and Adjustment Procedure

1. Be sure it is safe to open flowmeter before starting maintenance.
2. Remove flowmeter, brush away any debris and flush with clean water.
3. Remove the retaining rings carefully. Remove the bearing hub, turbine hub, and turbine from inside flowmeter housing.
4. Clean the turbine and hubs of metal filings and any other foreign material. Use pressurized air to blow metal filings out of both hubs and turbine. Confirm that the turbine blades are not worn. Hold turbine and bearing hub in your hand and spin turbine. It should spin freely with very little drag.
5. If bearing hub stud is adjusted or replaced, verify the turbine fit before reassembling. Put turbine hub and retaining ring in place. Put bearing hub with turbine against turbine hub inside the flowmeter housing. (Stud keys inside flowmeter housing must be lined up in the groove on the hub.) Put the retaining ring into the groove to lock bearing hub in place. Spin turbine by blowing on it. Tighten bearing hub until turbine stalls. Loosen the stud 1/3 of a turn. The turbine should spin freely.
6. Use a low pressure (5 PSI) jet of air through flowmeter in the direction of flow and again in the opposite direction to verify the turbine spins freely. If there is drag, loosen the stud on the bearing hub 1/16 turn until the turbine spins freely.
7. If turbine spins freely and the cables have checked out, but the flowmeter is not totalizing properly, verify that the sensor assembly is threaded all the way into the flowmeter body, and the orientation groove on top of the sensor is parallel with flowmeter body. If flowmeter still does not totalize, replace Sensor Assembly.

Section Valves

B

Components
Liquid

105-100PLG (alternate
105-100PLG025 includes
1/4" pipe thread for
gauge)

117-211-0118
Liquid outlet to
each section

105-100075BRB90
Liquid inlet

Section Valve Bracket Kit
515-103300

Note: Ensure front-side port is
capped prior to use

Additional Parts:

1" Gasket	105-100G-V
1" Clamp	105-FC100

How it Works

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.

Wiring Connector:

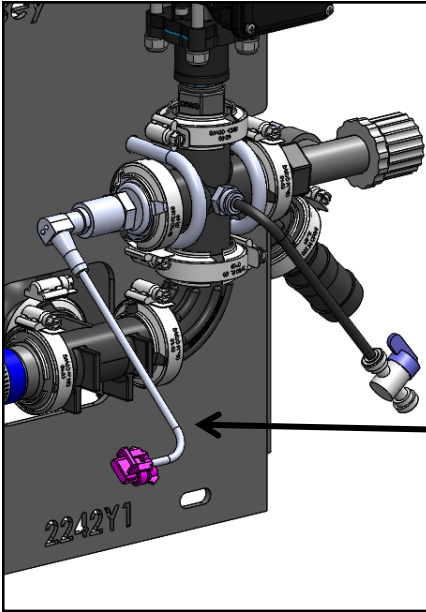
Pin A—Red, 12 Volts +
Pin B—Black, Ground -
Pin C—White, Signal
12V=on ; 0V=off

Pressure Sensor

B

Components
Liquid

The Odyssey 100 Tower comes equipped with a 100 psi pressure sensor to work with your display. This sensor is available with either a 2-wire or a 3-wire type sensor for compatibility with your display. The sensor has a 1/4" MPT fitting.



Your display will show the system pressure on the in-cab screen. *The pressure reading is only for informational purposes and is NOT used in the flow control process. Flow control uses the flowmeter feedback only.*

The pressure sensor is very helpful to optimize system performance and troubleshoot any issues.

The pressure transducer is factory calibrated and will display a very accurate pressure reading on your display. No manual gauge is required.

Pressure Sensor (2-wire or 3-wire type) with harness

Pressure
Calibration:
50 mv/psi

Pump Priming and Air Bleed Valve

An air bleed valve is included with each pump to aid in system priming. It is shipped in the pump accessories bag and must be installed during system installation.

Why use an air bleed valve:

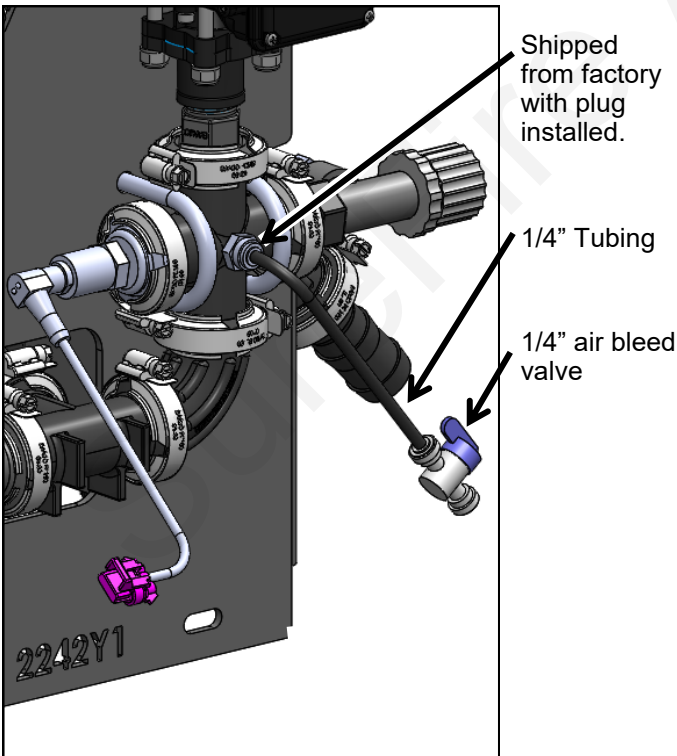
Most fertilizer systems are equipped with a 4 lb or 10 lb check valve on the end of each hose delivering fertilizer to the ground. These valves do not let air escape from the system, unless it is pressurized. Therefore, the pump can struggle to prime due to air trapped on the outlet side of the pump.

The air bleed valve is a small 1/4" valve that when opened lets air escape from the pump outlet at zero pressure. Open until liquid comes out and then close the valve.

How to install the air bleed valve:

Remove the 1/4" plug from the quick connect fitting on the T under the flowmeter (see picture). Next, insert the 1/4" tubing in the quick connect fitting. Run the 1/4" tubing to an easily accessible spot on your equipment. Next, cut the tubing and push the 1/4" valve onto the tubing. Finally, run the tubing to a low location where any fertilizer that escapes will run on the ground.

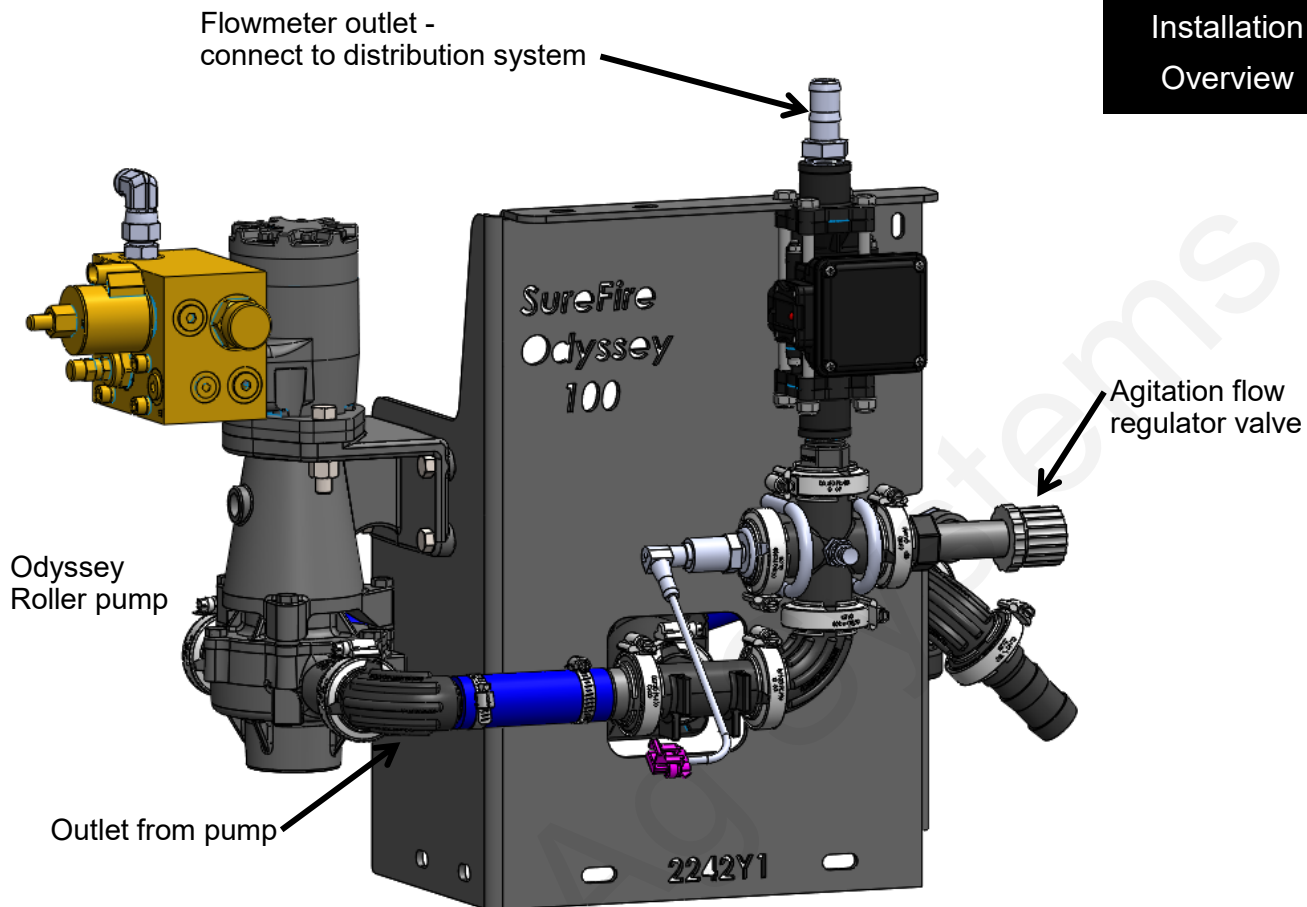
Be sure the air bleed tube is not plugged with dirt or it will not work.



Odyssey 100 Plumbing Overview

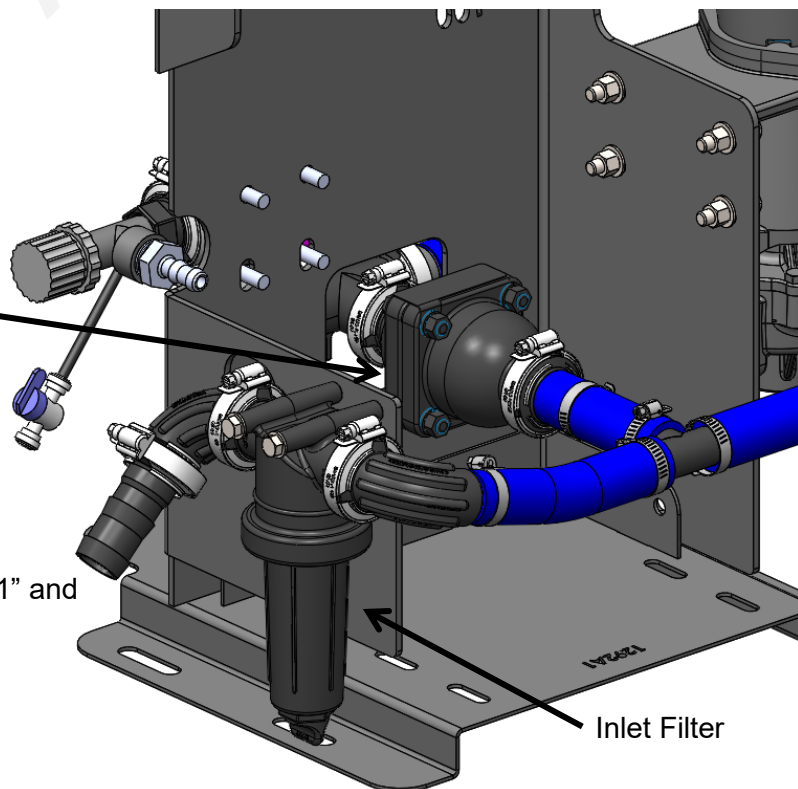
E

Installation
Overview



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.

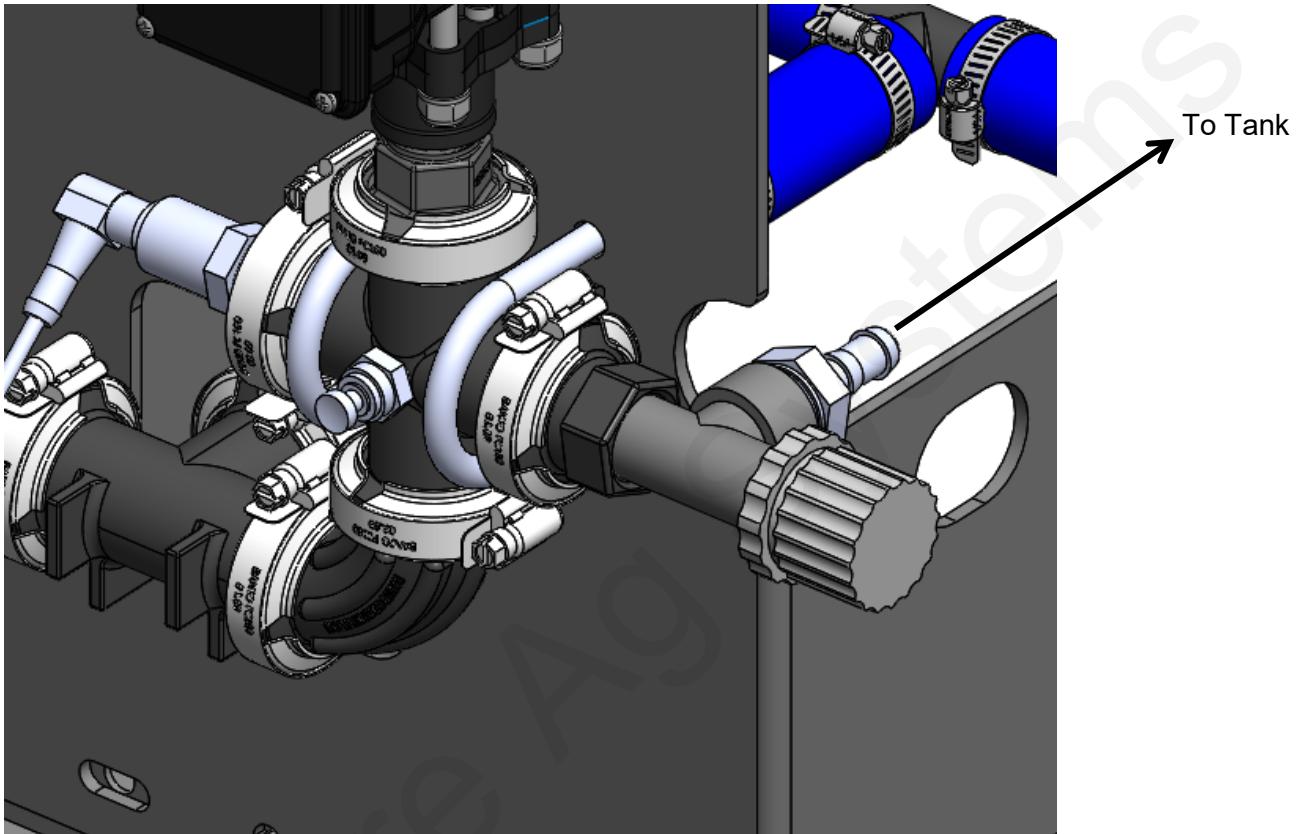
Pump Inlet - 3/4", 1" and 1-1/4" Hose Barbs provided



Odyssey 100 Valve Operation

E

Installation
Overview



Agitation Regulator Valve:

- This valve will allow tank agitation prior to application by leaving section valves and opening this valve (counterclockwise).
- This valve will shut off the agitation flow by threading the valve all the way in (clockwise)
- This valve adjusts how much flow returns to the tank while working in the field. Use the inner jam nut to lock the agitation setting.
- **This valve must be closed when rinsing the system with product still in the fertilizer tank. If not closed, the rinse water will be injected into the fertilizer tank through the agitation line.**

Odyssey Hydraulic Connections

E

Installation

PWM Valve

Load Sense Port—For power beyond hydraulic use only.

Manual Override - Turn and lift the manual override to check for proper hydraulic connections. **Override will completely open valve, so limit tractor hydraulic flow to valve.**

PWM Valve Connector - 2-Pin MP Shroud

Pressure from Tractor

Return oil to Tank - Check valve included on return port

Bypass Valve—Remove the cap to access a bypass needle valve. This valve is shipped from the factory closed. **The only case when valve should be open is when running in series with other hydraulic motors.**

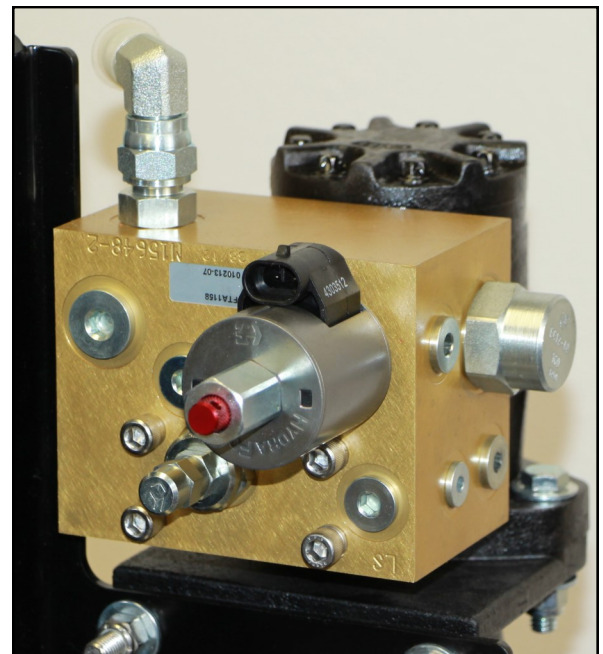
Depending on your tractor and exact hydraulic plumbing scenario your pump may turn very slowly when it should stop. To stop the pump completely, open the bypass valve slightly.

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. 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, SureFire PN 161-01-6MB-6MJ. 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 SureFire valve has an internal load sense check valve, which is required for power beyond hydraulics.



Odyssey Hydraulic Connections

E

Installation

Hydraulic Hose

SureFire recommends 1/2" hydraulic hose for both pump inlet and outlet. The hoses will need #8 JIC female swivel fittings.

Where do I get hydraulic flow for my Odyssey Pump?

This question is often asked as many implements use up all the hydraulic connections on a tractor. SureFire has some recommendations as to what works best.

Preferred

Best Option - Dedicated Odyssey Circuit

If you have a tractor remote available, attach the tractor remote valve directly to the Odyssey 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 Odyssey on it's own circuit is the simplest for installation and operation. It guarantees the Odyssey pump won't negatively affect any other hydraulic components on your equipment.

DO NOT plumb the Odyssey 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 Odyssey Pumps

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.

A Safety Tip from the Kansas Farm Bureau Safety Poster Program



Odyssey Pump Hydraulic Oil Flow Requirements



Odyssey pumps require a constant hydraulic oil flow from the tractor. The amount of oil needed varies with the speed of the pump. The chart at right shows the necessary oil flow for the Odyssey 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

Odyssey Pump Hydraulic Oil Flow Requirements (at 50 PSI)

Fertilizer Flow (GPM)	Pump Speed (RPM)	Hydraulic Oil Flow(GPM)
3	210	2.1
6	335	3.4
9	460	4.6
12	590	5.9
15	720	7.1

This setting will provide the Odyssey pump just enough oil for your application rate.

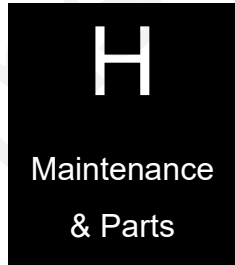
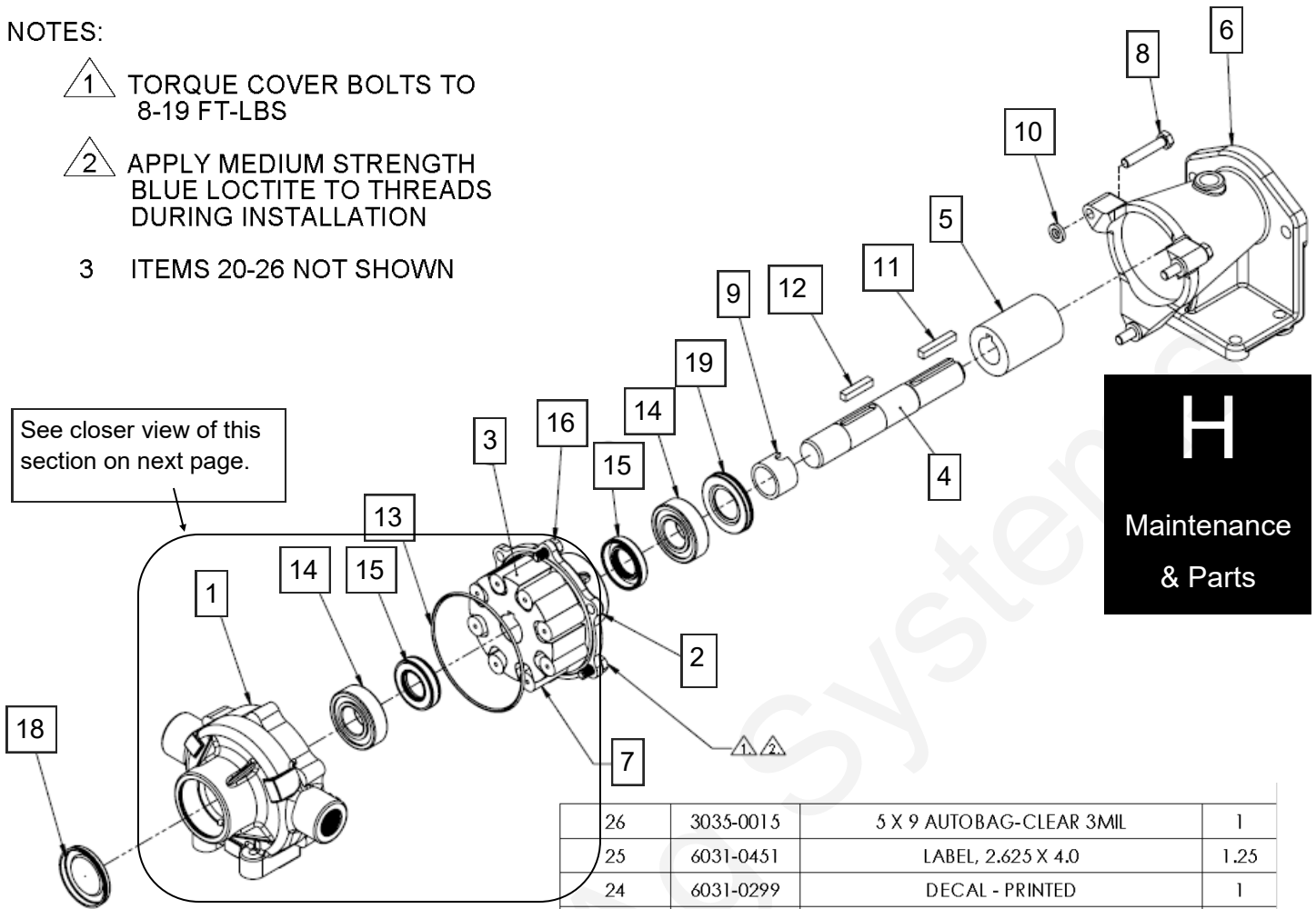
If running with the bypass open (only recommended when 2 motors are operated in series) this process will minimize the oil circulated in the bypass loop, leaving more oil flow for other hydraulic functions.

Troubleshooting		
Symptom	Probable Cause(s)	Corrective Action
Pump does not prime	Leak in suction line.	Check hose and fittings for leaks, and correct.
	Obstruction in suction line.	Inspect hose for obstruction such as debris or loose inner liner.
	Suction hose sucked to bottom or side of tank.	Cut a notch or "V" in end of suction hose.
	Rollers stuck in pump.	Disassemble pump and inspect rollers.
	Pump seals leaking air.	Replace seals.
	Pump turning in wrong direction.	Correct rotation of pump. (See Reversing
Loss of pressure	Clogged suction strainer.	Check strainer and clean it regularly.
	Kinked or blocked suction hose.	Inspect suction hose and repair as necessary.
	Air leak in inlet side plumbing.	Check hose and connections for leaks. Use pipe joint sealant and retighten connections.
	Relief valve setting too low or weakened spring.	Check relief valve and correct setting or replace weakened spring.
	Faulty gauge.	Replace gauge.
	Pump seals leak air.	Replace seals.
	Nozzle orifices worn.	Replace nozzles.
	Pump worn.	Repair pump. (See Repair Instructions).
Pump will not turn	Corrosion, rust, scale, or residue.	Loosen end plate bolts. Squirt oil into ports to help free rotor. Retighten bolts.
	Solid object lodged in pump.	Disassemble pump and remove objects.
Hydraulic system overheating.	Improper hydraulic hose size.	Check hydraulic hose size. Hose should be at least 1/2". For large open-center systems, 3/4".

NOTES:

- 1 TORQUE COVER BOLTS TO 8-19 FT-LBS
- 2 APPLY MEDIUM STRENGTH BLUE LOCTITE TO THREADS DURING INSTALLATION
- 3 ITEMS 20-26 NOT SHOWN

See closer view of this section on next page.



26	3035-0015	5 X 9 AUTOBAG-CLEAR 3MIL	1
25	6031-0451	LABEL, 2.625 X 4.0	1.25
24	6031-0299	DECAL - PRINTED	1
23	3035-0017	AUTOBAG 10.5 X 15 CLEAR	1
22	3031-0166A	INSERT	1
21	3031-0166	CARTON-INDIV	1
20	2300-0051	PORT PLUG, SAE-10	2
19	2300-0022	COVER-BEARING	1
18	2300-0020	COVER-BEARING	1
17	2300-0007	PORT PLUG, 15/16	2
16	2210-0004	HEX HEAD CAP SCREW	3
15	2112-0001T	SEAL	2
14	2008-0001	BEARING, M, TEFLON	2
13	1720-0014	O-RING	1
12	1610-0059	KEY, .250 SQ. X 1-1/4"	1
11	1610-0005	KEY	1
10	1410-0120	SPACER	3
9	1410-0111	SPACER	1
8	11621-SHU	SCREW	3
7	1055-0004	ROLLER-TEFLON	8
6	0750-7500C	MOUNTING FLANGE-COMPLETE	1
5	0524-2500	COUPLER	1
4	0510-7500	SHAFT, FLOATING ROTOR	1
3	0404-7500ST	7500 SERIES PM ROTOR, COATED	1
2	0254-7500X3	END PLATE, MACH	1
1	0154-7500X	BODY, MACH	1
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.

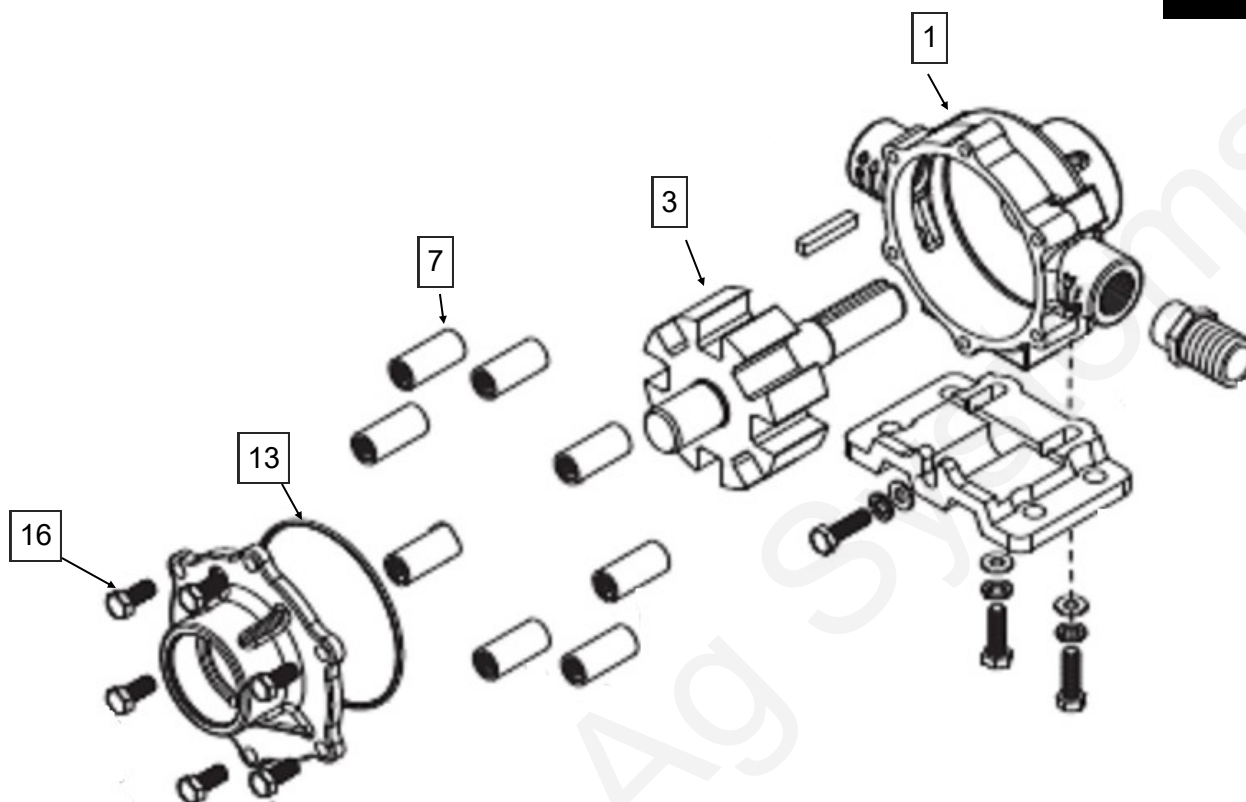
Super Roller Repair Kit: No. 3430-0381

Consists of (8) Ref. 7 Super Rollers, (1) Ref. 13 O-Ring, and (2) Ref. 15 Viton Seals.

Use the above Repair Kit if Teflon rollers show physical wear with regular fertilizer application.

If using aggressive chemicals, replace the above Rollers, O-Ring, and Seals with the parts in the list at the right.

Exploded view of pump and rollers

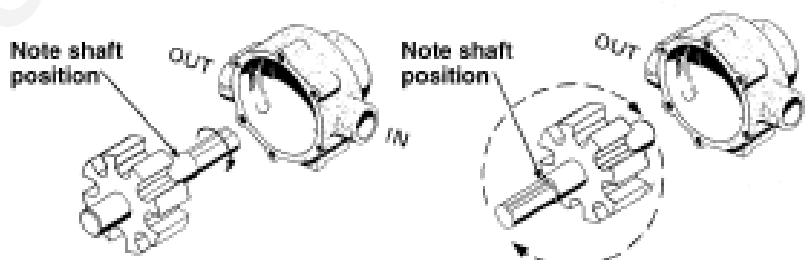


Reversing Rotation of Pump

It should not be necessary to reverse the rotation of your Odyssey pump. However, if a circumstance should arise where that is necessary, here are the instructions.

1. Follow the instructions for disassembly of the pump in Repair Instructions on page 15.
2. The rotor can be reversed merely by turning the rotor/shaft assembly around intact (without changing the position of the rotor on the shaft). Reassemble the pump with the driving end of the shaft out the endplate side of the pump.

Standard NON-SCOOP Rotor



Standard CCW rotation to CW rotation

Figure 6

Repair Instructions

To Take the Pump Apart

1. Remove the mounting flange and hydraulic motor from the pump shaft.
2. File off any burrs on the pump shaft.
3. Using a screwdriver, pry off the bearing cover on the End plate and pump body.
4. Remove the end plate bolts.
5. Support the pump at its ports in an end plate support fixture with the end plate down. Use wood blocks for Series 1500, 1700 and 4001/4101. Place on press bed. Center press on pump shaft and apply pressure to press the pump apart. (See Figure 13).

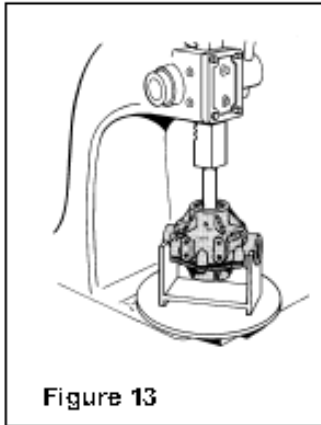


Figure 13

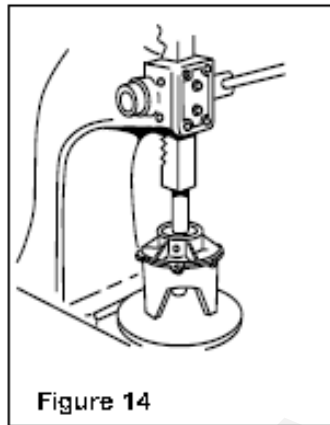


Figure 14

6. With the rollers exposed, remove them examining each one carefully for excessive wear. When replacing damaged rollers, always replace the full set.
7. To remove the rotor with shaft from the end plate support the end plate in an end plate support fixture with the rotor down. Center the bearing disassembly tool or 3/8" bolt on pump shaft. Apply pressure to press shaft out of ball bearing (See Figure 14).
8. To remove the ball bearing place the end plate in a end plate support fixture with the front of the end plate down (See Figure 15). Center bearing support tool and slowly press bearing out of casting. Repeat procedure to remove bearing from pump body (See Figure 16) using body support fixture.
9. After removing the ball bearing, check the seals in both end plate and pump body. If wear is evident or leakage has been noticed, punch the seals out with a screwdriver and hammer. Seals cannot be removed without damaging them.
10. To press the shaft out of the rotor, first carefully wash the rotor and shaft with kerosene removing all traces of rust and other foreign matter. Use steel wool or emery cloth, rinsing parts afterward to wash off all emery dust. Remove the Allen set screw. Support the rotor in the press through the slot in the base and press shaft through.

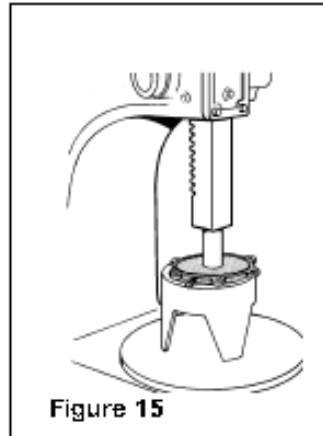


Figure 15

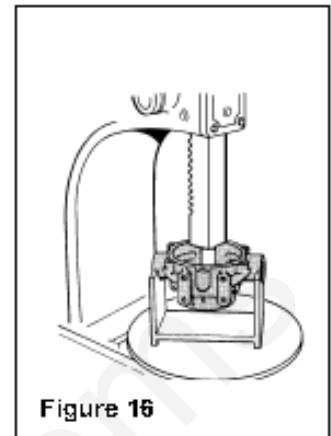


Figure 16

While the Pump is Apart

Carefully inspect all parts for wear, such as:

- Undersize or swollen rollers, in both length and diameter.
- Worn seals.
- Worn shaft at drive end, and pitted or grooved at the seal area.
- Rough bearings and loss of grease from the bearings.
- Undersize rotor and/or worn roller slots.
- Excessive wear in body both on inside diameter and at back face.
- Body cracks at the bolt holes and at the o-ring sealing area.
- End wear (body, end plate, and rotor).
- Proper size o-ring in the end plate.

After the above parts have been checked and the various points have been considered, you may decide if the pump is repairable. When worn parts have been replaced, always take up the end clearance by lightly sanding the end plate and matching body surface (See Figure 17). **NOTE: End clearance should not be more than .004 inches.**

Inspect Inside of End Plate

If a groove is noticeable, the end plate should be resurfaced by rubbing it on a sheet of 80-grit emery paper (placed on flat surface) until all trace of wear has been removed. Rotate the end plate frequently to remove evenly the same amount of metal over the entire surface. **NOTE: This surface of the end plate must be perfectly flat. If attempt has been made to pry pump apart with a screwdriver, file off all nicks, burrs and other damage marks around the bolt holes.**

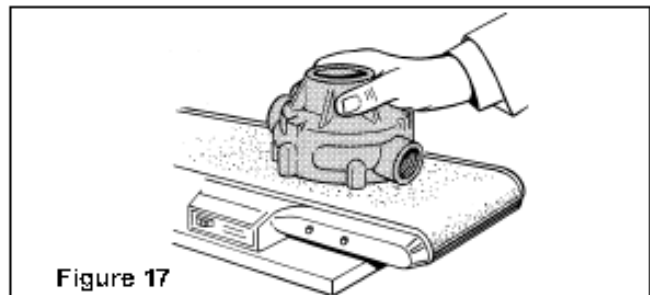


Figure 17

Repair Instructions from Hypro® L-0100R (5-11, Rev.C)

Re-Assembly

Replace Seals and Bearings

Carefully place the seal in the pump body with crimped side down. Press the seal to the bottom of the cavity, using the stepped end of the Bearing & Seal Assembly Tool (Figure 18). Then put the bearing in position in the pump body and press into place with counter bored end of Bearing & Seal Assembly Tool (Figure 19). Repeat the above procedure with the end plate. Seat the o-ring in the groove. If necessary, make sure the o-ring stays in place by stretching it.

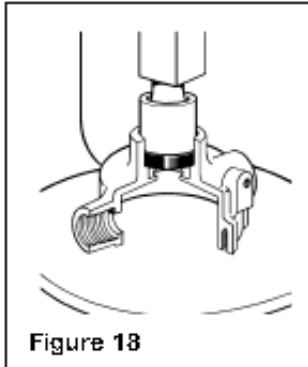


Figure 18

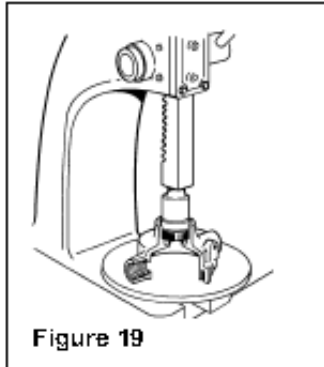


Figure 19

Assemble Rotor & Shaft To Endplate

1. Install the shaft rotor assembly by carefully pushing the short end of the shaft rotor assembly through the shaft seal into the end plate. Place in the arbor press with the drive end of the shaft pointed down. Use the Bearing Support Tool on top of the bearing and press the assembly together. (Figure 20). Leave just enough clearance between the rotor and end plate so that rotor can be turned by hand. If it turns too freely, sand a little more off the body end that faces the end plate. You should notice a slight drag, but be able to turn shaft with an adapter on it by hand. The "slight drag" will wear off after the pump has been used a short time. Installing new rollers, seals, bearings and shafts will not prove entirely satisfactory for volume and pressure unless end clearance is taken up.

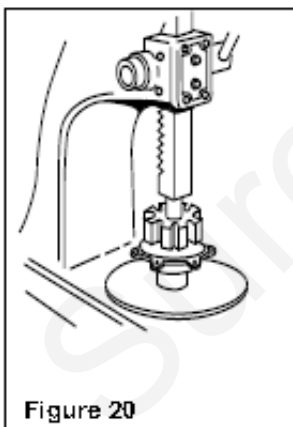


Figure 20

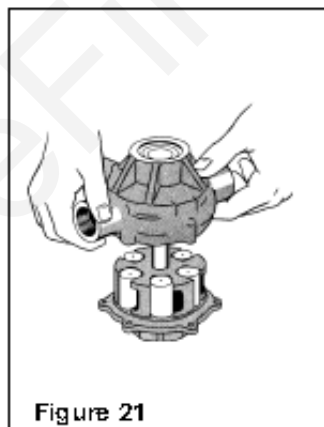


Figure 21

NOTE: If the end plate has been resurfaced, the body face must also be resurfaced to allow for material taken off the end plate. Follow same procedure as above with emery cloth. Before new parts are installed, all burrs should be removed – particularly in the rotor slots and body.

Do not machine the body casting clean. A more satisfactory job can be done by hand cleaning with an emery cloth. Wettable talc powder mixture (5 lbs. powder to 5 gallons water) may be used for breaking in a repaired pump, if pump appears to be binding. Run pump for about 5 minutes. This will also serve to clean and remove corrosion from the pump. Follow with a clear rinse, and protect from rust. (See Maintenance.)

2. Remove the assembled portion from the arbor press and invert it on the press table with the Bearing Support Tool under the bearing. Then place rollers in the roller slots as close to center of rotor as possible. Place the pump body over rotor and shaft, and carefully ease the end of the shaft past the lips of the seal in pump body (Figure 21). Center Bearing Support Tool with counter bored end down on inner race of ball bearing, and slowly press the pump body down to fit the end plate (Figure 22).
3. Turn pump over, line up bolt holes and replace assembly bolts. Alternately and evenly tighten the bolts as shown (Figure 23). **NOTE:** After bolts have been tightened, check to see if rotor is centered in pump case. Try to turn the pump shaft, using a crescent wrench on the shaft as a lever.

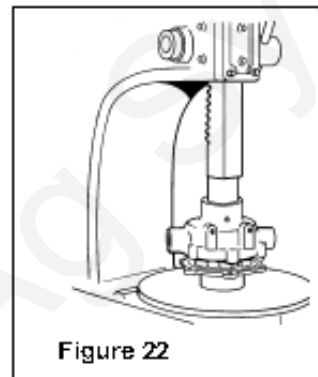


Figure 22

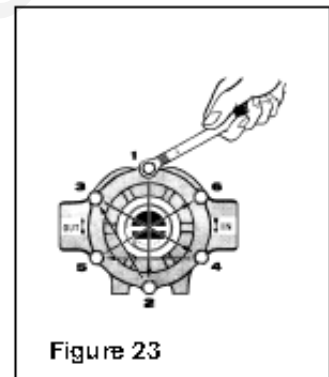


Figure 23

Center Rotor in Pump Case

If pump turns hard:

1. Place short brass rod (or hardwood dowel) against end of shaft (Figure 24). Center rod on shaft (not on bearing). Tap lightly with hammer. Try turning shaft again.

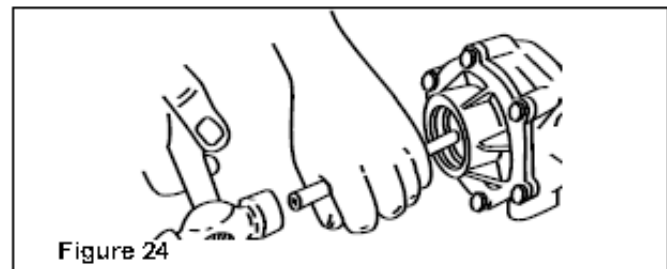


Figure 24

2. If this fails to center the Rotor to where it can be turned freely tap other end of shaft, protecting it as above. When the shaft can be turned by hand using wrench as above it is not binding.
3. If the pump binds within and tapping does not free it, it may be necessary to "run the pump in" to wear off high spots. Use talc solution mentioned earlier. Check pump frequently during run in.

Video Repair Instructions available at www.hypropumps.com. Click on Tools & Videos.

PWM Valve and Motor Parts

164-FTA1158

2.2 CID Hydraulic Motor with PWM Valve and Bypass Valve, **CCW Rotation** (includes all parts below EXCEPT hydraulic adapter fitting and elbows.)

H

Maintenance
& Parts

166-SP10-20M-0-N-00
H/F Prop 2-W Solenoid
Valve with Manual Over-
ride (cartridge valve only,
does NOT include electri-
cal coil)

166-NV10-22C-O-N
Needle valve for hydraulic
PWM motor

164-60564
Hydraulic Motor
Seal Kit for Eaton
T Series hydraulic
motor with 1" shaft

166-4303512
Coil, 12 Volt DC
EY Coil

166-050308-SS
.312 (5/16) x 3 - 1/2" SS
bolts for hydraulic motor

165-P15648-2
PWM Hydraulic Valve with
Bypass, Complete Manifold
Only for mounting to Eaton
T Series Motor

166-05LW-SS
5/16" SS lock washer
for hydraulic motor

166-158-4058-001
Eaton T Series Motor,
15/16" Shaft, 2.2 CID,
Manifold Ports

Qty 4 each

161-02-8MJ
-8FJX-90
Elbow - #8
Female JIC
x #8 Male
JIC - 90
(optional)

161-01-8MB-
8MJ
Adapter - #8
Male O-Ring
Boss x #8
Male JIC

161-07-1108R
Hydraulic
Check Valve -
#8 Male O-
Ring Boss Inlet
x #8 Male JIC
Outlet

166-ORING-012
O-ring for manifold
ports between
valve and motor
Qty 2

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