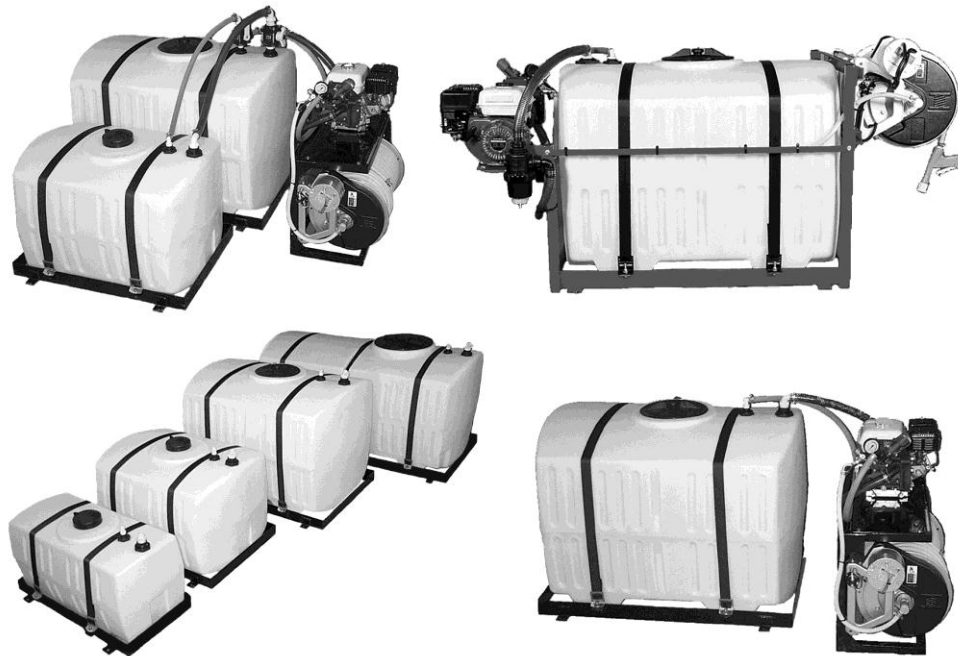


Gregson-Clark V-Series Sprayers and Modular Systems

Operator's Manual



Do not hesitate to call your dealer or Gregson-Clark directly with any questions or concerns. We welcome your comments and suggestions on how we can continue to improve this product. There are separate manuals for the hose reel, pump, and engine included with the sprayer.

Toll free: 800 . 706 . 9530
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SAFETY PRECAUTIONS

Pesticides can cause personal injury and harm the environment when used improperly. Be sure to follow label recommendations concerning safety and disposal. Observe all safety precautions including wearing protective clothing and equipment.

- Calibrate and test using clean water.
- Check before each use for leaks or damage.
- Read and follow the label instructions of the products used.

NOTE:

V-Series skid sprayers and modular systems are available with many different component options. The photos and information shown herein are intended to be general guidelines. Please refer to the additional manuals provided for information regarding the specific components of your sprayer or call us at 1-800-706-9530.

SET-UP AND ASSEMBLY

Check for apparent signs of shipping damage and that the order is complete. Carefully uncrate the sprayer and report any freight damage or shortages. Claims must be within five days of delivery. The sprayer was completely assembled and tested prior to shipping. Some disassembly may have been required for shipping. Re-attach the reel to the frame in the desired location. Mount the reel on the end opposite the pump for use in pick-up trucks or under the pump when used in enclosed trailers or vans. (See photos 1 & 2)



Photo 1 Reel mounted opposite pump.

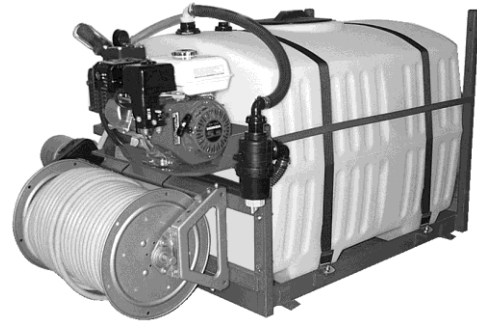


Photo 2 Reel mounted under pump

In a pick-up truck, the sprayer typically is mounted in the forward-most position against the front wall of the truck bed. Secure the frame by bolting through the truck bed or by using a ratchet strap if suitable anchoring locations are available. (See photo 3) Note that your skid must be secured in compliance with your local Department of Transportation regulations.

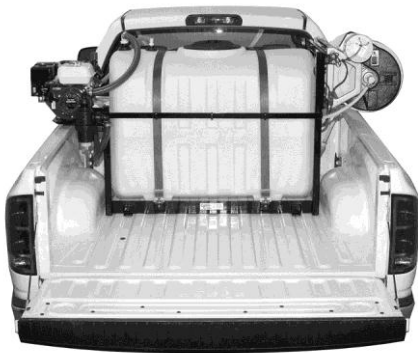


Photo 3 Sprayer mounted in truck

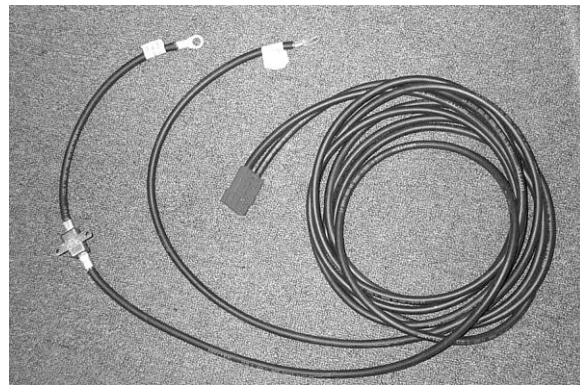


Photo 4 Wiring Harness

Do not exceed weight limitations of vehicle. The weight should be balanced left-to-right and positioned for-and-aft to distribute the weight in accordance with the capacities of the vehicle's axles.

If the sprayer is equipped with an electric hose reel, install the quick-disconnect wiring harness provided. (See photo 4) Once installed, the shorter section will stay with the sprayer and the longer section will remain with the truck. When removing the sprayer from the truck, simply pull the modular connectors apart. Refer to Diagram 1 (See page 4) and connect according to the labels on the terminals at the ends of the harness cables.

When connecting the ground wire to the truck frame, be sure to clean the contact area down to bare metal to ensure a good contact. When a reel will not rewind, it is often due to a faulty ground connection. Use extra care in protecting the wires from the exhaust system and any moving parts. Avoid any sharp edges that could cut through the wire insulation.

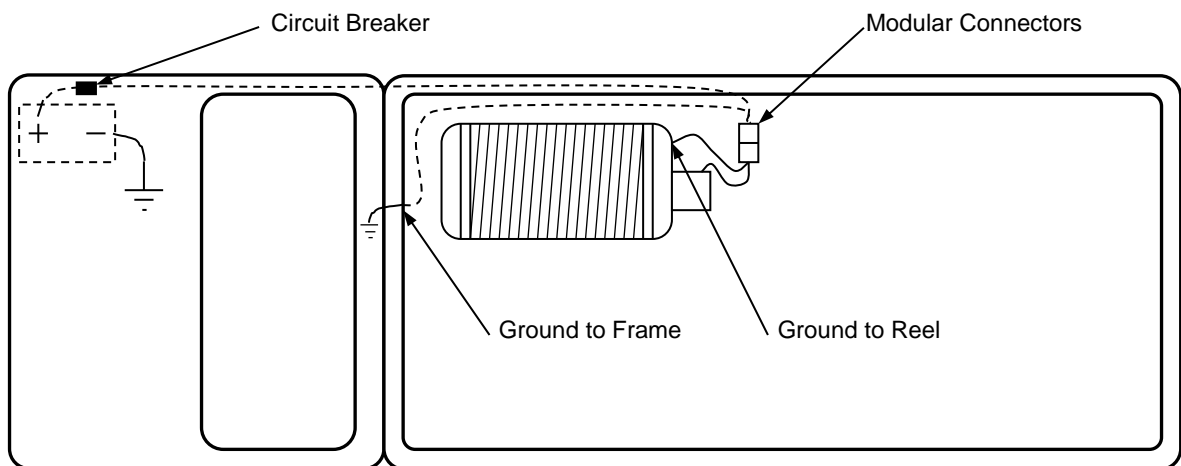
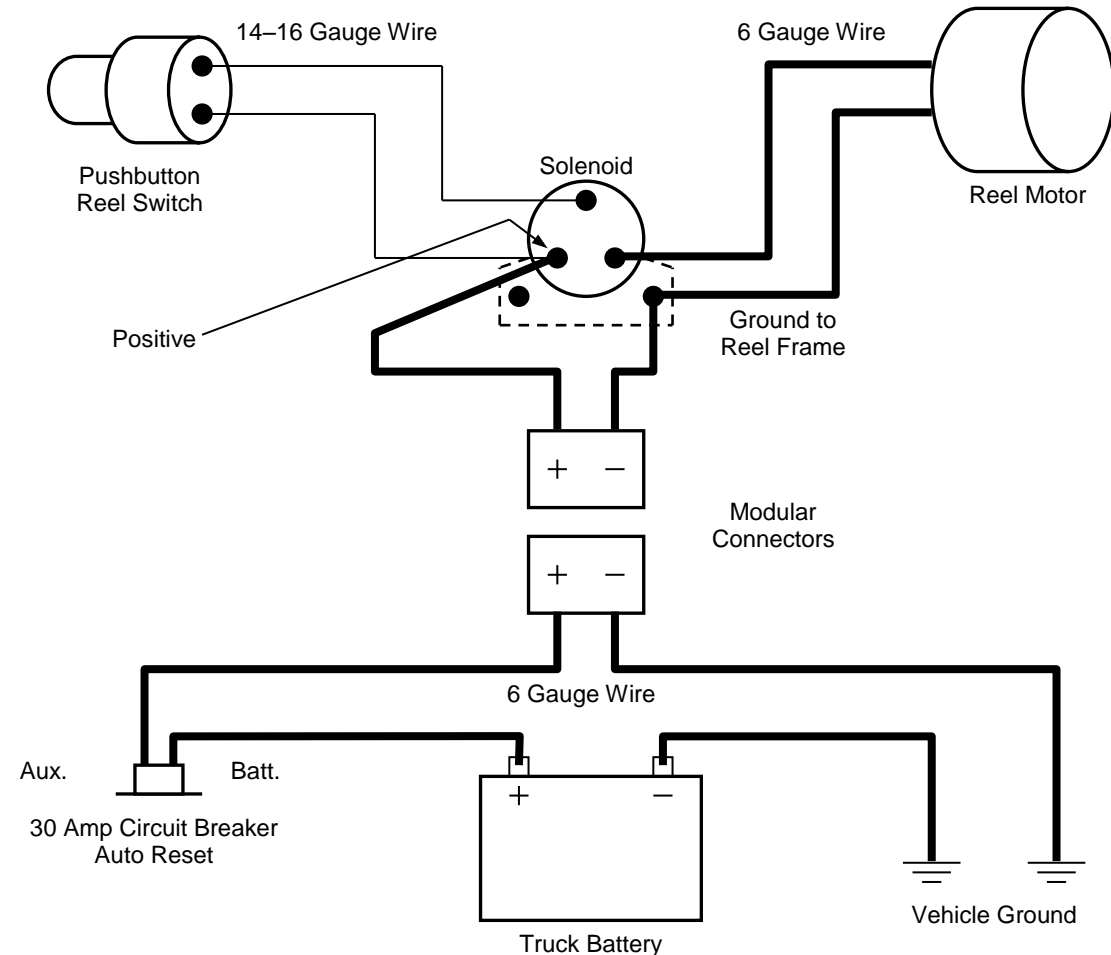


Diagram 1 Electrical Connections

Set-Up and Assembly – Cont.

The engine oil, (SAE 10W30) gearbox oil, (SAE 80/90W) and pump oil (30W or 40W non-detergent) were added at the factory. The oil levels are as follows:

- Pump Crankcase – On the Kappa 43, 55 and Kappa 75 pump, the oil level is visible in the oil bowl. (See photo 5) Other pump models may be slightly different.

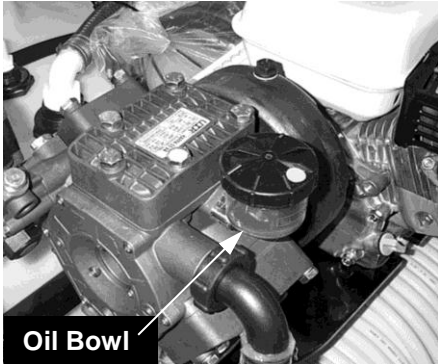


Photo 5 Kappa 43, 55 & 75 Pumps

- Engine– The oil level should be up to the edge of the filler hole or at least to the tip of the dipstick when inserted without screwing it into the filler neck. (See photo 6) See the Honda Engine Owner's Manual.

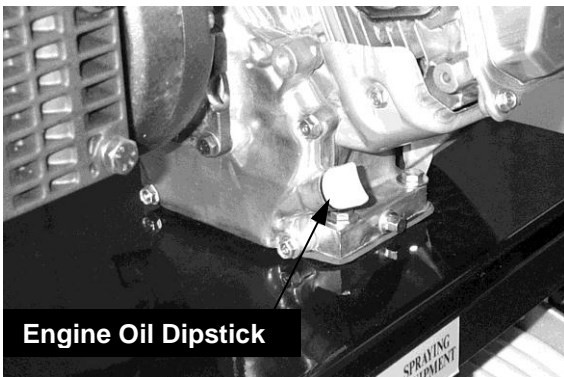


Photo 6 Engine Oil Dipstick

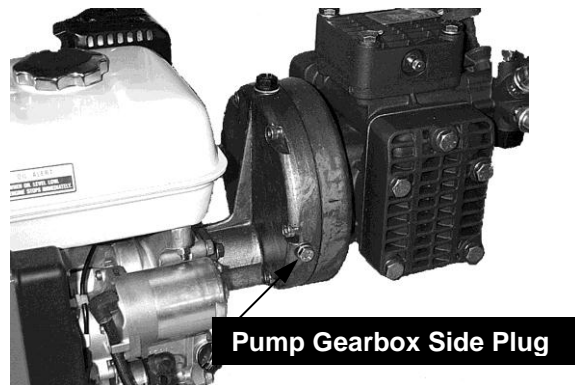


Photo 7 Pump Gearbox Side Plug

- Pump Gearbox– The oil level should be up to the lower edge of the side-plug hole. Do not overfill. (See photo 7)

START-UP AND TESTING

1. Re-attach the hoses to any modular tanks that were disconnected for shipping.
Note: The hoses may be longer than necessary; trim to length as required.
2. Ensure that suction strainer bowl is on tight.
3. Fill the spray tank 1/4 full of clean water.
4. Put gas in engine gas tank.
5. Turn on fuel shut-off valve lever on the carburetor. (See photo 8)

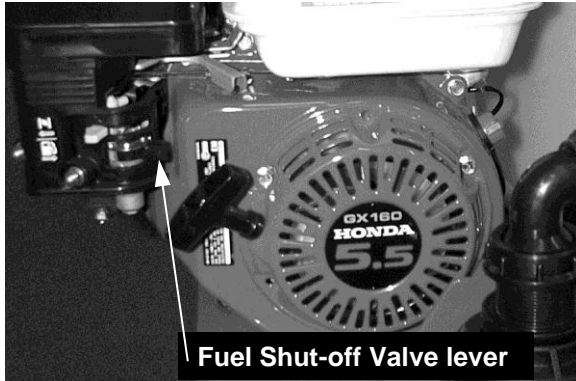


Photo 8 Fuel Shut-off

6. Recheck the engine oil level and check the oil in the pump and gearbox.
7. Put regulator lever in the **Bypass** position. (See photos 9 and 11)

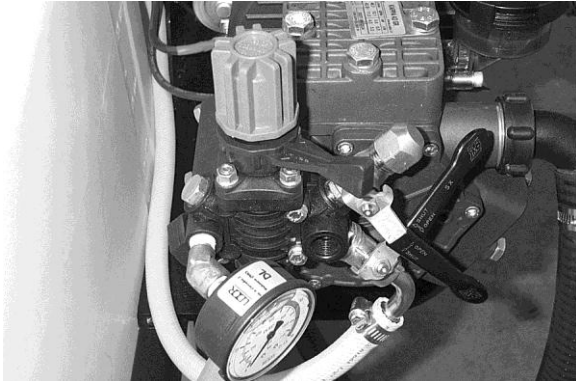


Photo 9 Kappa 43 Pressure Regulator Bypass Position



Photo 10 Kappa 43 Pressure Regulator Spray Position

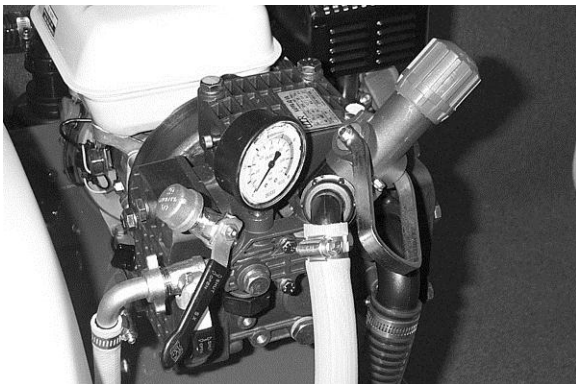


Photo 11 Kappa 40/55/75 Pressure Regulator
Bypass Position

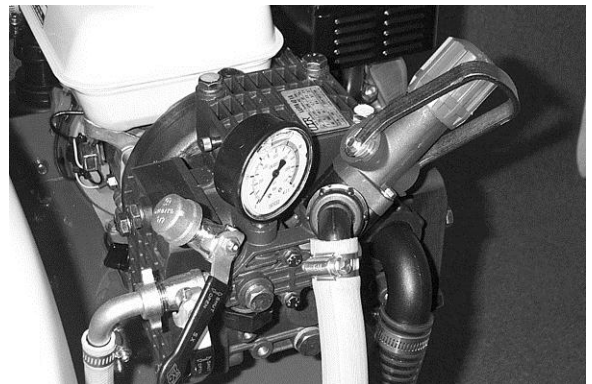


Photo 12 Kappa 40/55/75 Pressure Regulator
Spray Position

START-UP AND TESTING - CONT.

8. Turn engine switch on.
9. Choke engine.
10. Start engine and adjust throttle. Once engine is running and warmed up, un-choke the engine.
11. Liquid should be visible after a few seconds as it moves through the suction hose. Liquid agitation in the tank should also be visible. Run the engine at full throttle until there is no air in the suction lines. Lower the engine speed to about 1/2 throttle.
12. Turn the regulator pressure-adjustment knob counter-clockwise until there is no longer any resistance. Rotate the black plastic lever clockwise to the spray position.
(See photos 10 and 12) Slowly turn the adjustment knob clockwise. Note the increasing pressure on the gauge. Adjust to the desired pressure for your application. (See photos 13 and 14)

Although the pump and engine can safely operate at full throttle, reducing the engine speed to the minimum required for your application will ensure fuel savings and reduce wear of the pump.



Photo 13 Kappa 43 Pressure Adjustment

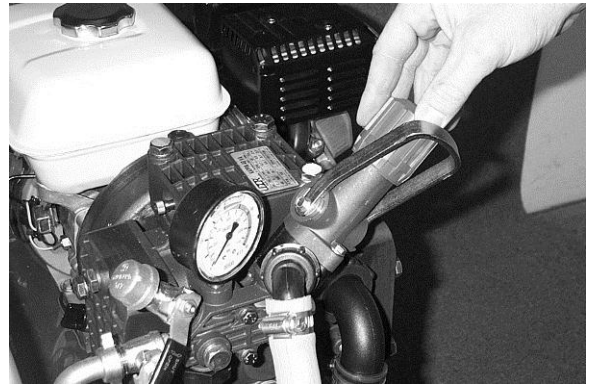


Photo 14 Kappa 40/55/75 Pressure Adjustment

13. Shut off the engine and clean the filter. There may be small plastic particles remaining from the manufacturing process. See the Maintenance section (page 13) for instructions.

OVERVIEW OF OPERATION

Liquid is drawn from the tank and through the suction strainer by a positive displacement diaphragm pump. Excess flow returns to the tank through a pressure regulator. The returning flow provides agitation in the tank.

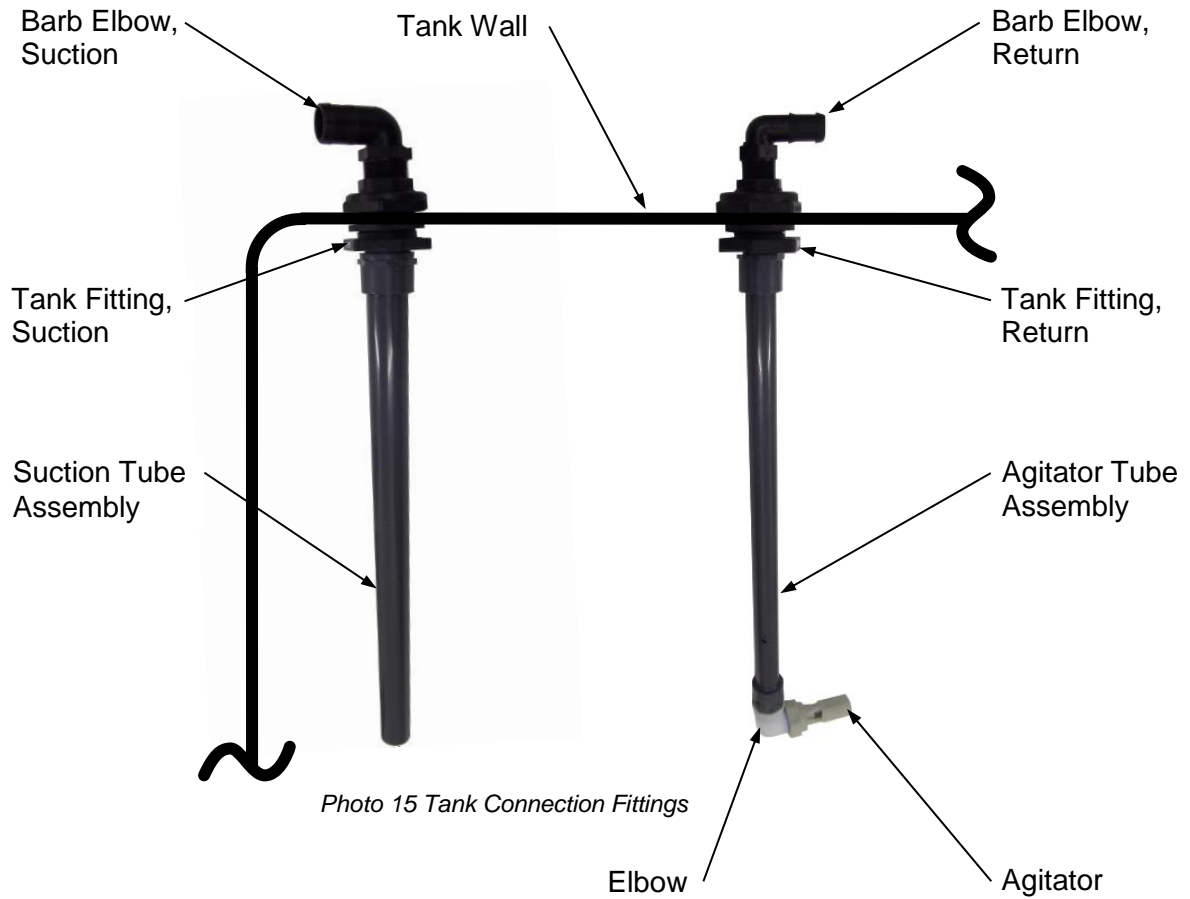
When the lever is in the bypass position, (See photos 9 and 11) the fluid returns to the tank under no restriction, therefore the system is at very low pressure. Move the lever to the bypass position when starting and shutting down the engine, when priming the pump, and when maximum agitation is desired. All spraying is done when the lever is in the spray position. (See photos 10 and 12)

Operating pressure is adjusted by turning the plastic knob on the regulator clockwise to increase pressure and counter-clockwise to decrease pressure. Pressure is only achieved when the lever on the regulator is in the spray position. (See photos 10 and 12)

It is important that all fittings on the suction side of the pump, particularly the suction strainer, remain tight. Otherwise, the pump can draw air into the system and that will affect performance. The pump fittings are sealed with O-rings and should not be over-tightened.

COMPONENT DESCRIPTIONS

Tank Connections



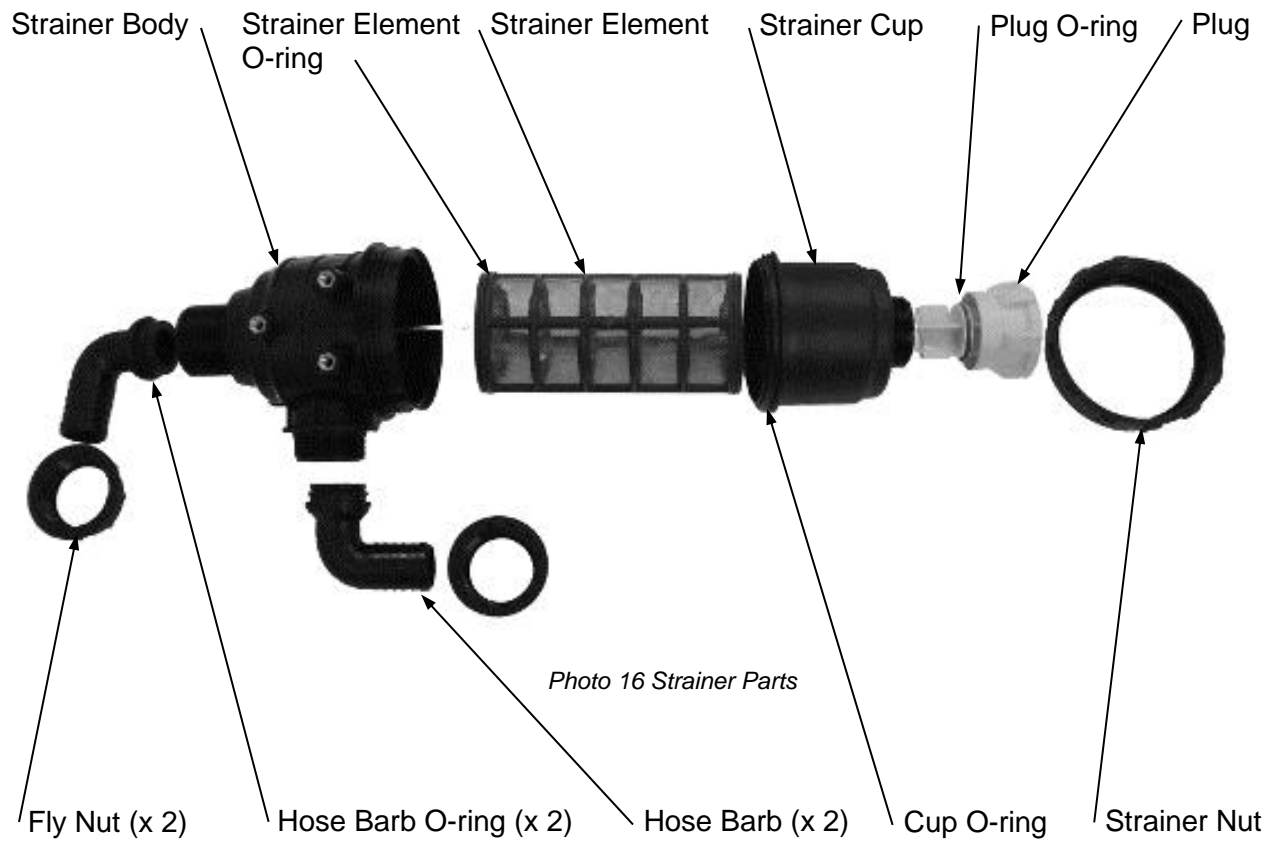
Part Numbers

	Suction Tube Assembly	Agitator Tube Assembly	Tank Fitting Assembly, Suction	Barb Elbow, Suction
V-50 & 50B-SA	STA-20	AGIT-14, 14" Lg.	TF125	HB125-90
V-100 & 100B-SA	STA-20	AGIT-20, 20" Lg.	TF125	HB125-90
V-150 & 150B-SA	STA-26	AGIT-20, 20" Lg.	TF125	HB125-90
V-200 & 200B-SA	STA-35	AGIT-29, 29" Lg.	TF125	HB125-90
V-300 & 300B-SA	STA-37	AGIT-29, 29" Lg.	TF125	HB125-90

	Tank Fitting Assembly, Return	Barb Elbow, Return	Elbow, Agitator	Agitator
V-50 & 50B-SA	TF075	HB075-90	SE34	500262
V-100 & 100B-SA	TF075	HB075-90	SE34	500262
V-150 & 150B-SA	TF075	HB075-90	SE34	500262
V-200 & 200B-SA	TF075	HB075-90	SE34	500262
V-300 & 300B-SA	TF075	HB075-90	SE34	500262

COMPONENT DESCRIPTIONS, CON'T.

Strainer Assembly with Barbs - P/N 3142561-A
 Strainer Assembly without Barbs - P/N 3142561



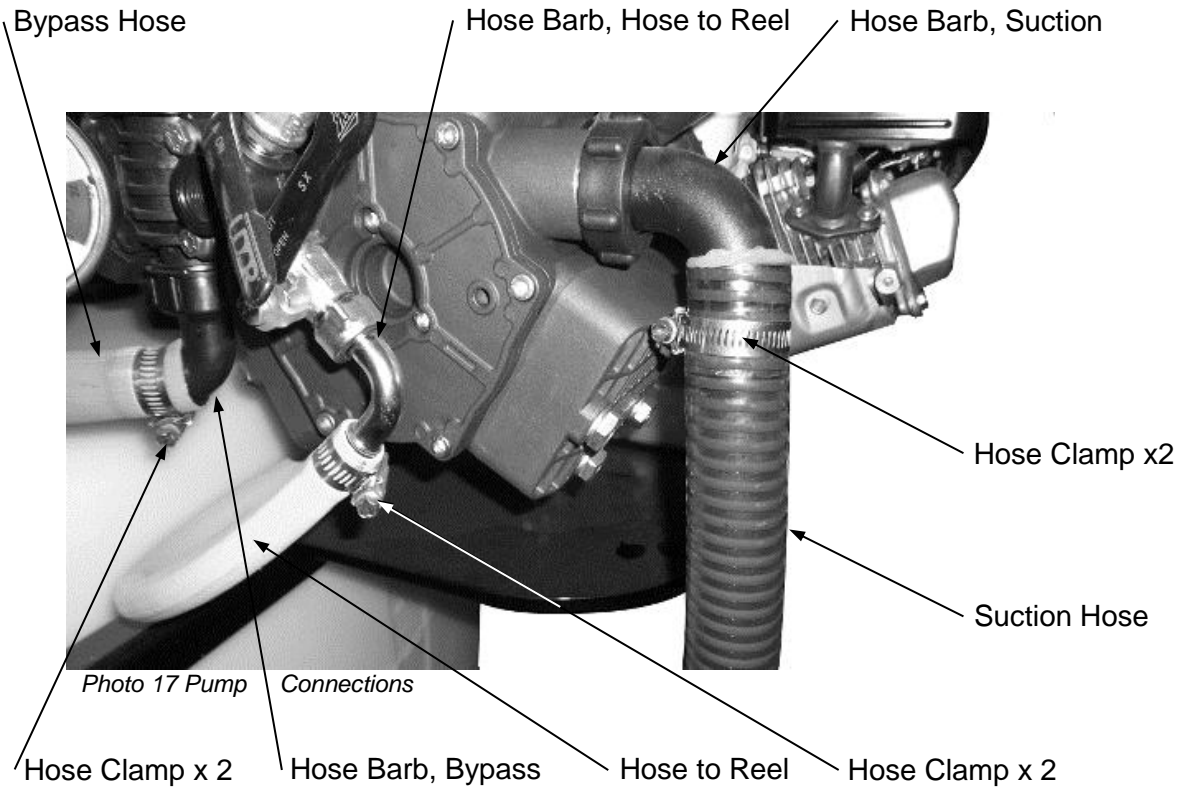
Part Numbers

Strainer Body Only (No Checkvalve)	Strainer Element O-ring	Strainer Element	Strainer Cup	Plug O-ring	Strainer Plug
3142060.010	314300.060	314001.030	3142400.020	462300.230	3142400.060

Fly Nut (x 2)	Hose Barb O-ring (x 2)	Hose Barb (x 2)	Cup O-ring	Strainer Nut	
2002060	G10061	116633	314000.050	314000.040	

COMPONENT DESCRIPTIONS, CON'T.

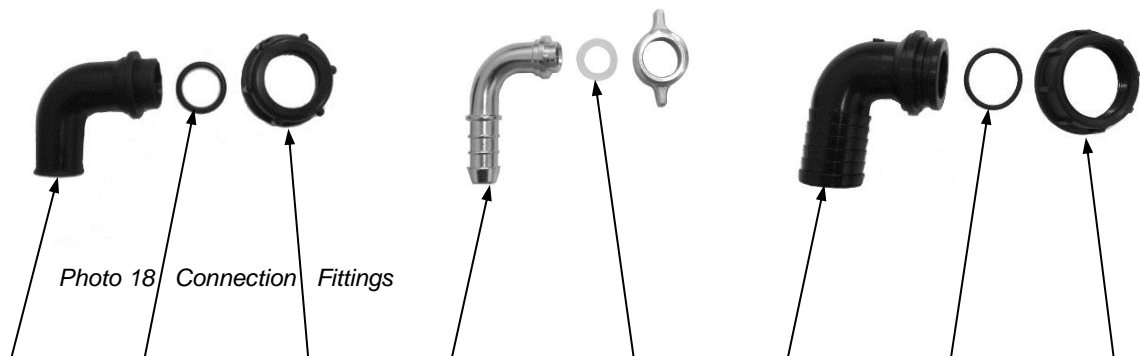
Pump Connections



Part Numbers

Bypass Hose, * 3/4"	Hose Clamp, Bypass	Suction Hose, * 1-1/4"	Hose Clamp, Suction	Hose to Reel, * 1/2"	Hose Clamp, Hose to Reel
A-1628-3/4	20J	K-125	20J	A-1661-1/2X1	10J

* Hose lengths may vary



Hose Barb, Bypass, 3/4"	O-ring, Bypass	Nut, Bypass	Hose Barb, 1/2" Hose to Reel, Includes Nut and Gasket	Gasket, Hose to Reel	Hose Barb, Suction, 1-1/4"	O-ring, Suction	Nut, Suction
0254.04	1101.12	0604.26	163.604.6	0605.05	0202.52	1101.41	0604.18

COMPONENT DESCRIPTIONS, CON'T.

Tank Strap Kits



Photo 19 Tank Strap

Part Numbers

Kit	Strap (2)	Clamp (4)	Hex Bolt (4)	Hex Nut (4)	Washer (4)
TDK-50	TS198 x 9.4, 64" Lg	TD-200	0115110	1137185	1133859
TDK-100	TS198 x 12.9, 77" Lg	TD-200	0115110	1137185	1133859
TDK-150	TS198 x 12.0, 80" Lg	TD-200	0115110	1137185	1133859
TDK-200	TS198 x 16.8, 98" Lg	TD-200	0115110	1137185	1133859
TDK-300	TS198 x 16.8, 98" Lg	TD-200	0115110	1137185	1133859

Tank Lids

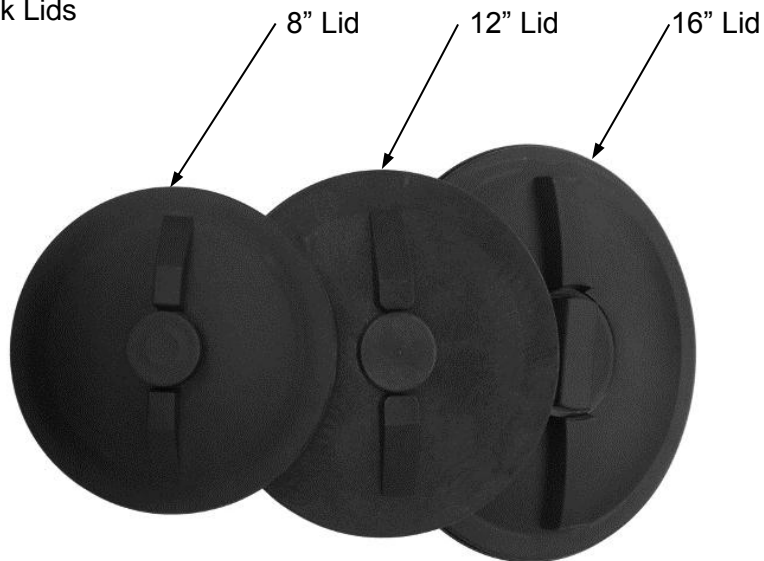


Photo 20 Tank Lids

Part Numbers

Tank	Size	Lid, Vented
50 Gallon PCO Style	8"	10525
100 Gallon PCO Style	8"	10525
150 Gallon PCO Style	12"	10527
200 Gallon PCO Style	12"	10527
300 Gallon PCO Style	16"	10528

MAINTENANCE

- Check and tighten all hose clamps.
- Check for worn hoses. (rubbing, cracking)
- Check Engine air filter, clean every 50 hours; change every year or 300 hours.
- Check Engine oil with each use, change after 20 hours and every 100 hours thereafter.
- Check Pump oil with each use, change every year or 500 hours.
- Check Pump Gearbox oil with each use, change after 20 hours and every 100 hours thereafter.
- Clean Suction Strainer. (See photos 21 and 22)

SPECIFICATIONS

Engine Crankcase Oil	10W30 (SJ or SL)
Engine Fuel Recommendation.....	86 Octane (Min) unleaded
Pump Crankcase Oil.....	30 Wt. or 40 Wt. Non-detergent
Pump Gearbox Oil	80W90 Gear Oil



Photo 21 Suction Strainer



Photo 22 Center Post

The suction strainer is equipped with an internal shut-off valve that closes when the cup is removed. It prevents the suction line from emptying when the strainer is disassembled for cleaning.

IMPORTANT!

When re-assembling the strainer, ensure that the center post in the cup engages the steel pin in the strainer head. (See photo 22) Otherwise, the valve will remain closed and damage to the pump may result.

TROUBLESHOOTING

Problem	Possible cause	Solution
Low or no pressure or Pump does not prime	Valve in suction strainer closed	Verify cup alignment with valve stem See page 12
	Plugged strainer	Clean screen
	Plugged suction hose	Clear obstruction - Check top of strainer for debris
	Faulty or missing o-rings in Strainer Assembly or pump Inlet Elbow Barb	Replace o-rings
	Air leak in pump suction hose	Check hoses and fittings for leaks
	Stuck or worn pressure relief valve on regulator	Repair or replace relief valve
	Low liquid level in tank	Refill tank
Fluctuating pressure (Excessive pulsation of Hoses)	Improperly seated check valve(s) in pump head	Clean or replace check valve
	Pulsation dampener pressure incorrect	Adjust pulsation dampener pressure -Should be at 20% of operating pressure
	Pump not purged of air	Run pump with regulator in the bypass position to purge air
	Defective regulator	Repair or replace regulator
Diaphragm Pumps		
Pump oil has milky color Pump oil level low	Ruptured diaphragm(s) in pump	Repair as necessary

Table 1

ABOUT DIAPHRAGM PUMPS

How the pump works

The diaphragm is what separates the pump oil from the spray solution. Each piston down-stroke lowers the piston-attached diaphragm, drawing spray solution into the pump head. As the piston passes below the cylinder sleeve side openings, oil is pulled into the lower diaphragm cavity. During each piston up-stroke, the cushion of oil between the piston and the diaphragm hydraulically pushes and cushions the diaphragm as the piston tops out. This discharges the solution from the pump head. The lower diaphragm cavity oil cushion also lubricates the diaphragm and pistons, ensuring minimal mechanical wear.

Remember – low crankcase oil level causes excessive mechanical wear on diaphragms and internal components. The transparent oil bowl makes checking the oil easy. Keep the oil filled to the mark on the bowl.

Do not run the pump with a starved suction

The diaphragm pump will not suffer any damage if run dry due to an empty tank. However, a starved suction due to a clogged suction strainer or a closed suction valve will cause premature failure of the pump diaphragms.

Note – Only use filter screens that are between 16 and 20 mesh. Never use a fine filter screen on a diaphragm pump.

Pulsation Dampeners

It is the nature of diaphragm pumps to have some pulsation. It is caused by the sudden changes in the piston direction. The pulsation dampener reduces pulsation by providing a cushion of air for the piston to bump against. The UDOR pulsation dampener uses a rubber bladder to separate the air cushion from the solution being pumped.

Pulsation Dampener Setting

The basic rule is to inflate the pulsation dampener to 20% of the systems' working pressure. For example, if the spraying pressure is set at 100 psi, the pulsation dampener should be inflated to 20 psi.

Always shut down the pump before adding air to the pulsation dampener or checking its pressure. Air pressure can be supplied from a compressor or a manual air pump. The diaphragm dome contains a very small volume of air. Take care when checking the air pressure that a minimum amount of air leaks out when the pressure gauge is applied to the air valve. It is possible to lose 5–10 psi when checking the pulsation dampener air pressure.

Note: Two-cylinder diaphragm pumps may require more air pressure than 20% of the operating pressure. The minimum pulsation dampener air pressure is 20 psi. DO NOT run two-cylinder pumps with less than 20 psi in the pulsation dampener.

SERVICE GUIDE FOR REPLACING PUMP DIAPHRAGMS

1. Drain Crankcase Oil – drain pump crankcase by removing the oil drain plug located at the bottom of the pump, also remove the oil fill cap or plug.
Note: On older pump models that do not have the oil drain plug, oil will need to be drained after the head diaphragm and piston sleeve have been removed.
Note: When re-installing piston sleeves, the oil holes must always be aligned parallel with the pump crankshaft.
2. External Manifold Removal – if your pump has external manifolds, they must be removed prior to head removal.
3. Head Removal – remove the head bolts, then, remove the pump heads, which may require some “light” prying.
4. Diaphragm Removal – turn the crankshaft to bring the piston up to the top of its stroke, remove the diaphragm bolt and washer, and remove the diaphragm.
5. Crankcase Cleaning – to properly clean the crankcase, remove the piston sleeves and wash the crankcase with a parts-washing solution or equivalent. Before re-installing the piston sleeves, apply a light coating of oil to the pistons and sleeves.
Note: Make sure the oil holes in the piston sleeve are aligned parallel to the pump crankshaft.
6. Installing New Diaphragms – install the diaphragm bolt and washer into the new diaphragm. Install this assembly to the piston with the flat side of the diaphragm down. Use blue thread locker or equivalent on the diaphragm bolt. Tighten the bolts to the recommended torque specs. Rotate the crankshaft to bring the piston and diaphragm to the bottom of its stroke and then seat the outside edge of the diaphragm into the pump body.
7. Installing Head – it is **very** important to ensure that the check valves are installed correctly when reinstalling the pump head. There are two valves for each cylinder; one valve lets the solution into the head, the other valve lets the solution out of the head. Tighten the pump head bolts to the recommended torque specs.
8. Installing Pulsation Dampener Diaphragm – bleed off the air in the chamber and remove the cover bolts, cover, and diaphragm. Install the new diaphragm with the dome down. Reinstall the cover and tighten the bolts to recommended torque specs. Recharge the pulsation dampener with compressed air to 20% of the pumps operating pressure.
9. Refilling Pump Crankcase – check the oil drain plug, making sure that it is installed in the crankcase. Fill the pump with UDOR LUBE premium pump oil or SAE 30 or 40-weight non-detergent oil to the recommended mark on the oil sight glass/gauge, about halfway on the oil sight glass/gauge. Rotate the crankshaft while filling to eliminate air pockets.
10. Initial Start Up – run the pump for five minutes under no load conditions. This will evacuate any remaining air pockets in the crankcase. Turn the pump off and re-check oil level. Refill as necessary to proper oil level.
IMPORTANT During initial startup, monitor the oil color. If it turns milky white, the diaphragms were not seated or installed correctly.

Torque Specifications for UDOR Diaphragm Pumps							
All values are in Foot-Pounds unless otherwise noted.							
	Diaphragm Bolts (Use Blue Loctite™)	Head Bolts	Valve Caps	Inlet Manifolds and Inlet Manifold Covers	Discharge Manifolds (Brass/Aluminum)	Discharge Manifolds (Plastic)	Pulsation Dampener
KAPPA 7, 15, 18	8	10	N/A	N/A	N/A	N/A	10
KAPPA 33, 35, 43, 55, 75, 100	18	28	N/A	6 (72 In/Lbs)	N/A	N/A	28 (KAPPA 100 = 20 Ft/Lbs)
KAPPA 30, 40, 50	18	28	N/A	N/A	N/A	N/A	28
KAPPA 120, 150	25	32	N/A	6 (72 In/Lbs)	N/A	N/A	20
RO Series Pumps	25	28	N/A	5 (60 In/Lbs)	18 RO 106/121 Only	5 (60 In/Lbs)	18
IOTA – 17	8	15	4.2 (50 In/Lbs)	N/A	N/A	N/A	15
ZETA 85, 100	18	28	N/A	5 (60 In/Lbs)	N/A	5 (60 In/Lbs)	18

Table 2

WARNING

Be sure to follow the above torque specifications when reassembling diaphragms. Overtightening of the diaphragm bolts can strip the threads in the aluminum pistons. This will require a complete new assembly or a replacement of the pump.

WINTER STORAGE

Clean the tank with soap and water. Pump some of the soap solution through the hose and gun by spraying the gun into the tank through the top opening. Empty the tank and partially refill with clean water. Flush out the hose and gun, and spray the exterior of the tank and other components that were exposed to chemicals. Empty the tank completely. Dispose of rinse fluids in accordance with all applicable regulations.

Add undiluted RV anti-freeze through the suction strainer. (See photo 20) Circulate the anti-freeze solution through the pump regulator. Blow out the reel and hose with compressed air or pump undiluted RV anti-freeze completely through the hose. Empty the suction strainer.

For more information on winterizing your sprayer, refer to our Web site.
www.GregsonClark.com/resource_info.html



Photo 23 Add Anti-Freeze through Suction Strainer

ACCESSORIES

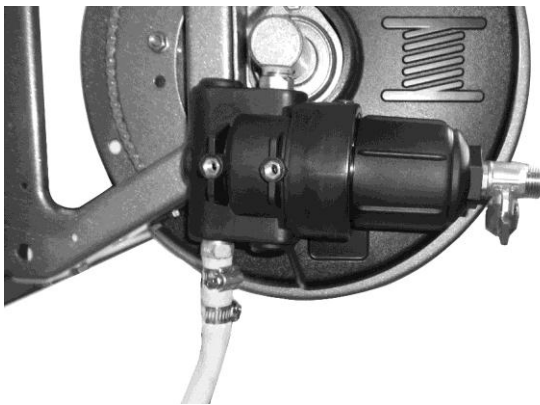
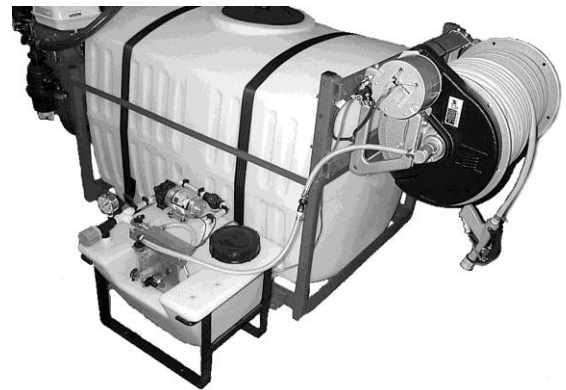


Modular Tank Assemblies

Modular tank assemblies provide an expandable, portable, versatile solution to accommodate a wide variety of needs.

Eco-505 Injection Spraying System

The Eco-505 Injection System is an add-on accessory for a turf spraying system that injects pesticide into the fertilizer stream on demand. The dual trigger spray gun and coaxial hose provide a means of minimizing unnecessary application and eliminating the need for spot spraying in a secondary operation.



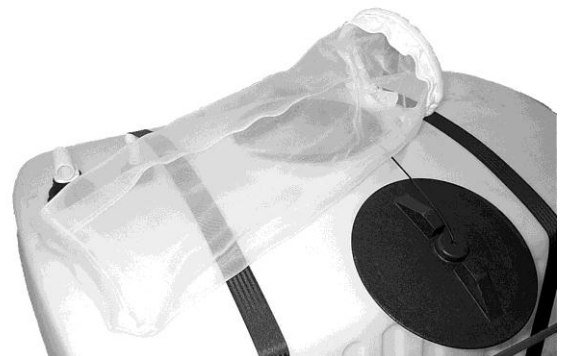
High-Pressure Strainer

The high-pressure Strainer is mounted between the reel and the pump. It is self-cleaning by means of an included flush valve mounted on the bottom of the strainer body.

The strainer eliminates the need for repeated cleaning of your gun nozzle by removing contaminants before they reach the gun.

Strainer Bags

The Strainer Bag is ideal for mixing dry fertilizers and chemicals in jet agitation sprayers. The strainer bag can hold a full bag of urea, saving mixing time and preventing potential plugging of the suction strainer or pump. The lid may be closed while the bag is in place.



WARRANTY

Gregson-Clark Sprayers are warranted by the manufacturer to the original purchaser to be free from defects in materials and workmanship for a period of one year. The pump elastomers and hoses are considered normal wear items and carry a 90-day warranty against defects in materials and workmanship.

Gregson-Clark's liability shall be limited to replacement of defective components, FOB shipping point. In no event shall Gregson-Clark be liable for any special, incidental, or consequential damages including loss of profits.

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