



SPARTAN

Soldier Water Jet Owner's Manual

Record the VIN Number of your

Soldier

and give the number to the factory
when ordering parts.

Serial

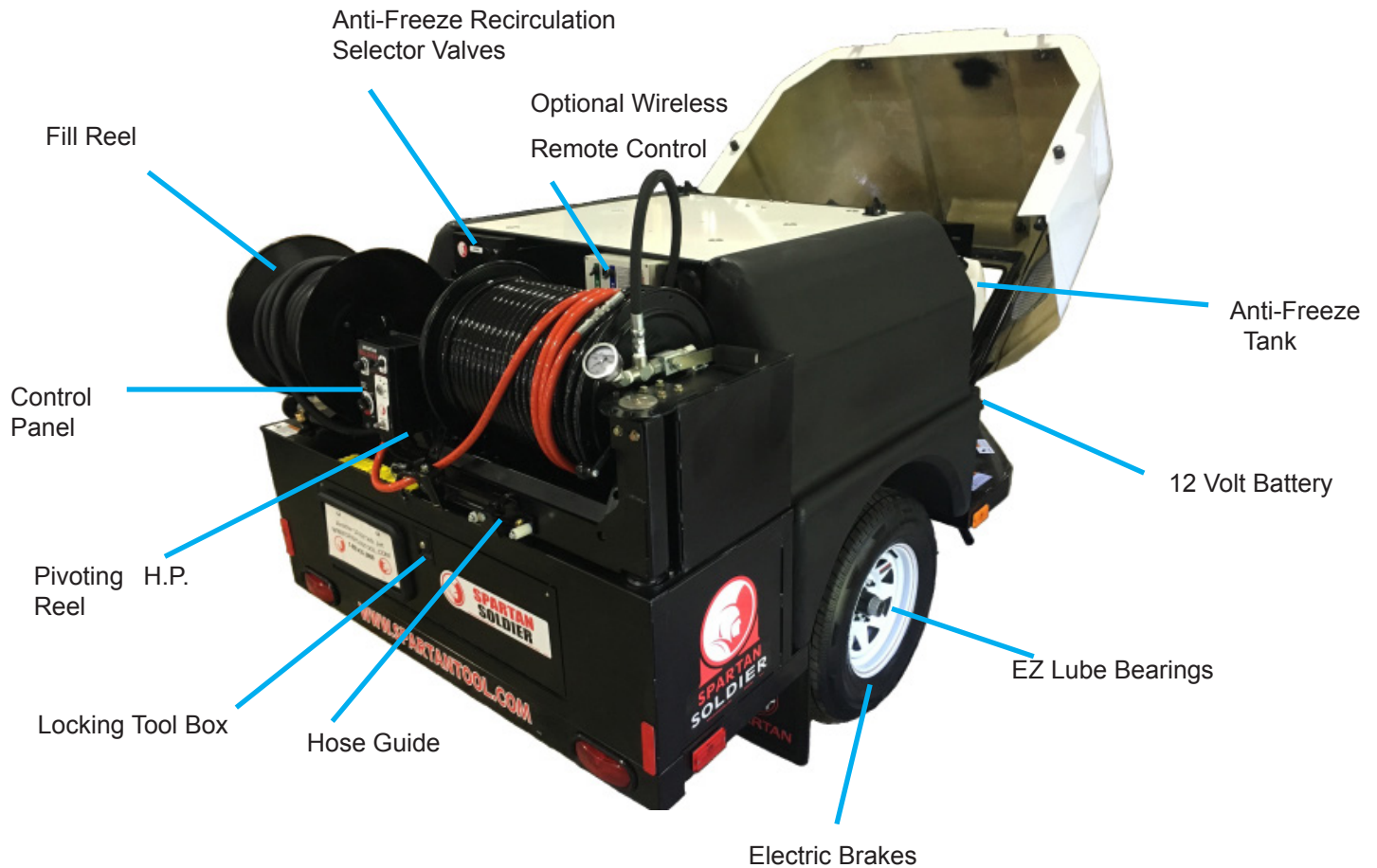
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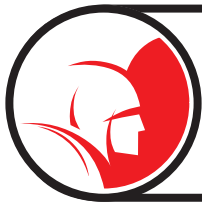


SPARTAN TOOL L.L.C.
800.435.3866
www.spartantool.com



Soldier Overview





Warnings



- Read the safety and operating instructions before using any Spartan Tool product. Drain and sewer cleaning can be dangerous if proper procedures are not followed and appropriate safety gear is not utilized. Read the Engine Owner's Manual for instruction and safety precautions on engine operation.
- Gasoline is extremely flammable and is explosive under certain conditions.
 - Refuel in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in the area where the engine is refueled or where gasoline is stored.
 - Do not overfill the fuel tank (there should be no fuel in the filler neck). After refueling, make sure the tank cap is closed properly and securely.
- Before starting unit, be sure to wear personal protective equipment such as safety goggles or face shield and protective clothing such as gloves, coveralls or raincoat, rubber boots with metatarsal guards, and hearing protection.
- Carbon monoxide exhaust and/or gasoline fumes from this equipment can create a hazardous atmosphere in confined spaces (which may include, but are not limited to, manholes, septic tanks, closed garages, or other areas which may not be properly ventilated). In particular, excess gasoline fumes can create an explosion hazard. Such hazardous atmospheres can cause death or severe injury. Do not operate this equipment in any confined space or area with inadequate ventilation. Operate this equipment only when located outdoors or in an open, well-ventilated area.
- Ensure the jet hose has been placed in the pipe (minimum of 6 feet suggested) before engaging the water pressure to prevent the hose from coming out of the pipe prematurely and causing injury.
- Always shut the water pressure off before pulling the hose out of the pipe. Mark the hose a minimum of 6 feet from the end to help insure the hose is not accidentally pulled out of the pipe while still under pressure. Shut off the water pressure when the hose mark is encountered. **Warning:** Portions of the system can still be under pressure even if the unit is not operating.
- Never point the wash gun at anyone while operating the unit. Injury may result.
- Drains and sewers can carry bacteria and other infectious micro-organisms or materials which can cause severe illness or death. Avoid exposing eyes, nose, mouth, ears, hands, and cuts and abrasions to waste water or other potentially infectious materials during drain and sewer cleaning operations. To further help protect against exposure to infectious materials, wash hands, arms, and other areas of the body, as needed, with hot soapy water. If necessary, flush mucous membranes with water. Also, disinfect potentially contaminated equipment by washing such surfaces with hot soapy water and a strong detergent.
- **“California Prop. 65: This product may contain an extremely small amount of lead in the coating. Lead is a material known to the State of California to cause cancer or reproductive toxicity.”**
- For any questions contact the company at the address shown below.

SPARTAN TOOL L.L.C.
1506 W. Division Street
Mendota, IL 61342
800.435.3866 ♦ Fax 888.876.2371
www.spartantool.com



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For Servicing and Part Information, please refer to the Soldier Service Manual



Soldier Water Jet Specifications



GENERAL

Pipe Sizes	Up to 12"	Max. Water Delivery.....	12.0 GPM
		Max. Pressure Delivery	3000 psi

TRAILER

Gross Vehicle Weight Rating (GVWR)	3500 Lbs (1589 kg)
Gross Axle Weight Rating (GAWR)	3300 Lbs (1498kg)
Trailer Length	126"
Trailer Width	57"
Trailer Height.....	58"
Hitch	2" Ball Type (Class II) (Optional Pintle Ring)
Tires	ST205-75-R14
Water Tank	200 Gallon Capacity
Tires (Max Load)	1760 lbs (each)
Cold Inflation Pressure	50 PSI/350 kPa (each)
Rim (Diameter X Width X Capacity)	14" x 5.5" x 1865 lbs (each)

ENGINE Kawasaki Twin-Cylinder, Water Cooled

Model	FD750D
Cylinders	2
Bore & Stroke.....	3.07 in x 3.07 in
Displacement	45.5 cu. in
Fuel	Gasoline, Unleaded 87 Octane Minimum
Fuel Tank Capacity	8.0 Gal.
Cooling	Water Cooled/2.9 qt.
Oil Capacity	2.1 US qt.
Alternator	20 Amp
Electric	12 VDC
Spark Plug	NGK BPR2ES (0.030" Gap)

PUMP

Max. Pressure	3000 psi	RPM.....	1420
Max. Water Output	12.6 GPM	Plungers	3
Max. Temperature	140° F		

REWIND

12V Electric Motor with Variable Speed Controller



Soldier Water Jet Features



FEATURES

- 3/8" x 250' high pressure jetting hose (350' available as option)
- 5/8" x 100' water supply hose
- 180 degree pivoting high pressure hose reel
- Torsion Single-Axle Suspension System with Electric Brakes
- Rear mounted operator's controls
- Electric powered hose rewind
- Hose rewind guide
- Variable Speed Rewind Control
- Pulsation
- Unloader pressure control
- Open and Closed nozzles for 3/8 inch hose
- Easily accessible pump inlet filter assembly
- Pre-Wired lighting with standard 7-Pole plug
- Antifreeze Water Recirculation/Winterization System
- Low water shut off
- Low engine oil pressure shut off
- High engine temperature shut off
- Fillable by either Garden Hose or Hydrant Fill Hose
- Locking tool box
- Quick connect washdown gun & adjustable spray lance
- Manhole hose protection
- 12 volt accessory plug
- National Association of Trailer Manufacturers Certified



Towing Instructions



Before hitching and towing on public roads, check that the tow vehicle uses a 2" ball on a hitch rated class II minimum, make sure keeper engages ball to secure hitch. Adjust if necessary.



The following 2 rules may limit your vehicle's towing capacity and the tank fill when towed. Determine towing capacity as described below and follow guidelines in using the lowest value from the 2 rules.

Trailer Hitch

- Check rating of vehicles trailer hitch -

Warning: Class 1 hitches often uses 1 7/8 ball which is unsafe to couple with a 2" hitch. Class 2 - 3,500 lbs. Towing capacity is required.

Vehicle GCWR (Gross Combined Weight Rating)

- Towing capacity = GCWR minus vehicle weight minus cargo weight minus passenger weight.

Note: GCWR is provided on your vehicle or in vehicle manual.

Vehicle Towing Capacity

- Refer to the Vehicle Owners Manual for listed trailer towing capacity.
- Trailer towing capacity should equal GCWR minus vehicle weight, cargo weight, people weight, and (vehicle) fluids weight.
- Check axle load ratings.

Wire the plug receptacle to your vehicle as shown below.

Note: The wire colors used on the jet running lights are also indicated in Fig. 7-1 for re-wiring to a different plug design.



- Always use safety chains.
- Always use trailer lights.

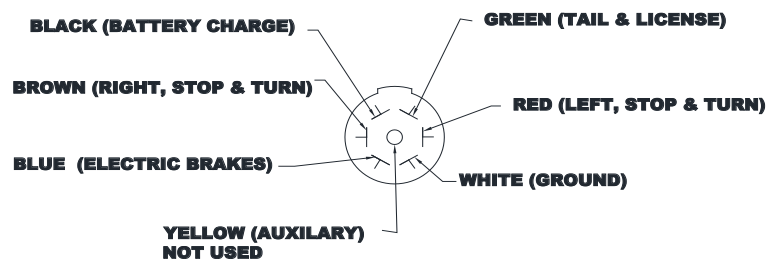


Fig. 7-1



Towing Instructions (cont.)



Fig. 8-1

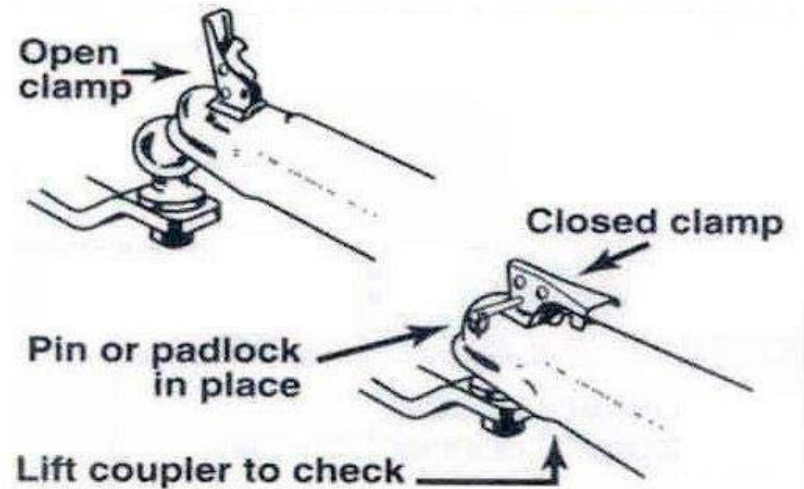


Fig. 8-2



Fig. 8-3

Optional
Pintle Ring
75849200

Towing

1. Check that ball size is same as coupler.
2. Check that Ball Load Rating is the same or greater than Coupler Load Rating.
3. Open clamp on hitch coupler
4. Position hitch coupler above trailer hitch ball.
5. Lower trailer tongue until ball rests in ball socket.
6. Close hitch coupler clamp and secure with a pin or padlock.
7. Connect breakaway cable solidly to bumper or frame of tow vehicle as near to center as possible. The cable must hang clear of trailer tongue and be long enough to permit short radius turns without pulling breakaway cable forward.
8. Make sure breakaway cable is in the released position.



Caution: Do not use breakaway cable as a parking brake.

Note: Check location of breakaway cable periodically during each trip. Accidental application will cause brakes to drag and heat up, causing failure.



Towing Instructions (cont.)



9. Cross safety chains underneath coupler. Allow slack for trailer to turn. Attach chain hooks securely to tow vehicle frame.



Caution: Always use safety chains. Chains hold trailer if connection fails.

- 10 Fully retract hitch jack and remove caster wheel. This will provide adequate ground clearance for transport.
11. Return high pressure reel to towing position, engage the transit lock (Fig. 10-1), and confirm reel lock (Fig. 10-2) is engaged.
12. You are now ready to tow your trailer.



Caution: Avoid sharp turns. This could bend, create extreme stress or fracture either the actuator or trailer tongue.

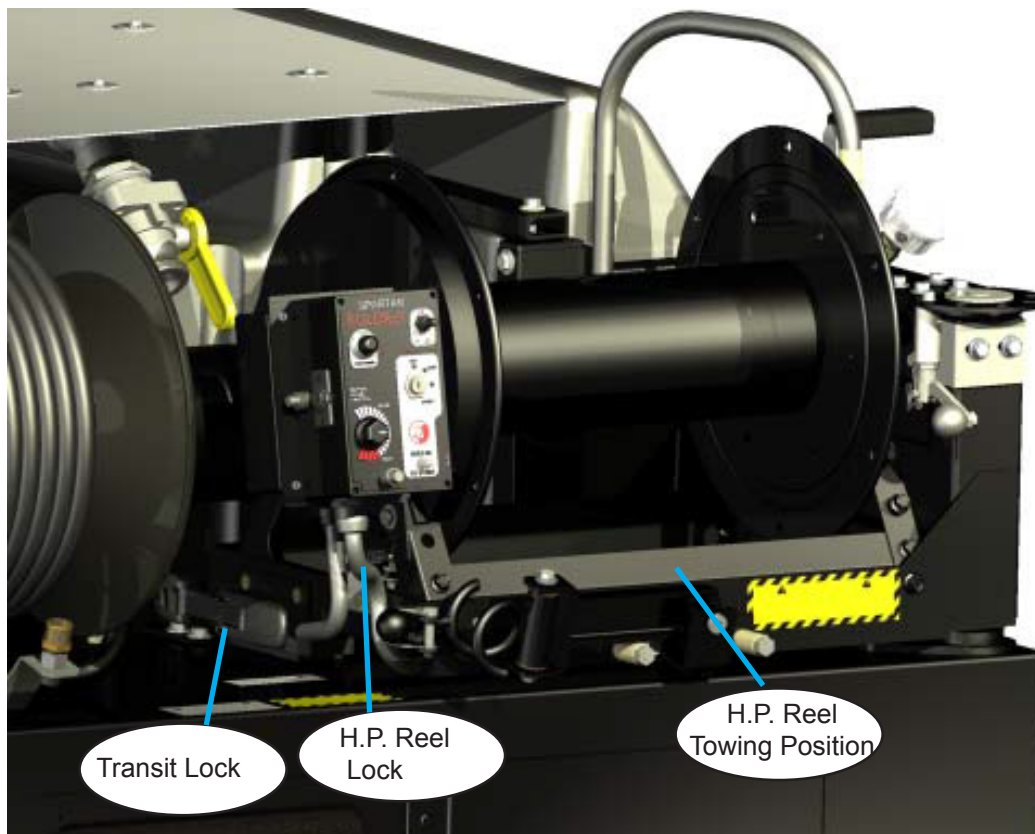


Fig. 9-1



Pump and Pressure System



The pump and relief valve are the heart of your jet. They have been specially designed for use with water temperatures up to 140°F for pipe jetting, but can provide useful water flow for many other cleaning jobs using the optional wash down gun and special attachments. The positive displacement pump (each crankshaft revolution has to move a certain amount of water) uses 3 plungers (similar to pistons in an engine) to create water flow. Pressure is not created until the pump outlet is restricted with a valve or nozzle. The pump, valving, and hoses can support pressures to 3000 psi.



The regulator valve acts to direct the water flow to the water tank when the hose reel and gun valves are off, or if nozzles provide too much restriction for total flow. Always use clean water to keep the regulator valve operating properly. The hose and nozzle are designed to allow full flow at 3000 psi (at 3200 engine rpm) and the wash down gun operates at 1600 psi max pressure. If leaks develop in the system between the relief valve and hose reel valve (or gun valve) you will hear intermittent engine surges as the bypass pressure gradually drops and is built up again by the pump. Tighten or otherwise repair the leaks for smooth running. Always stop engine and release pressure before any plumbing changes or repairs.



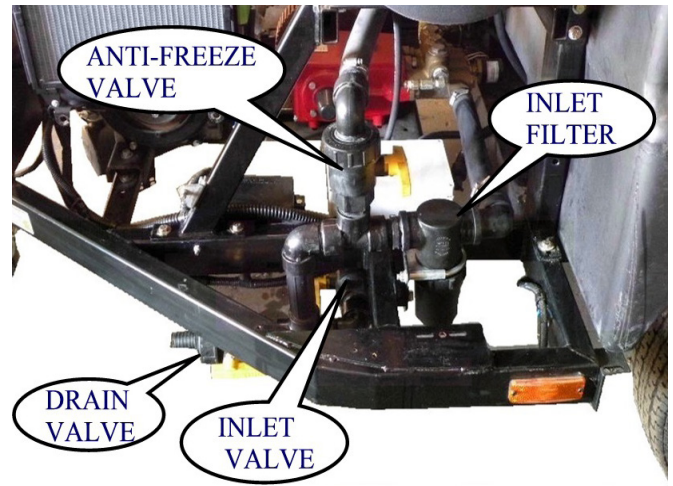
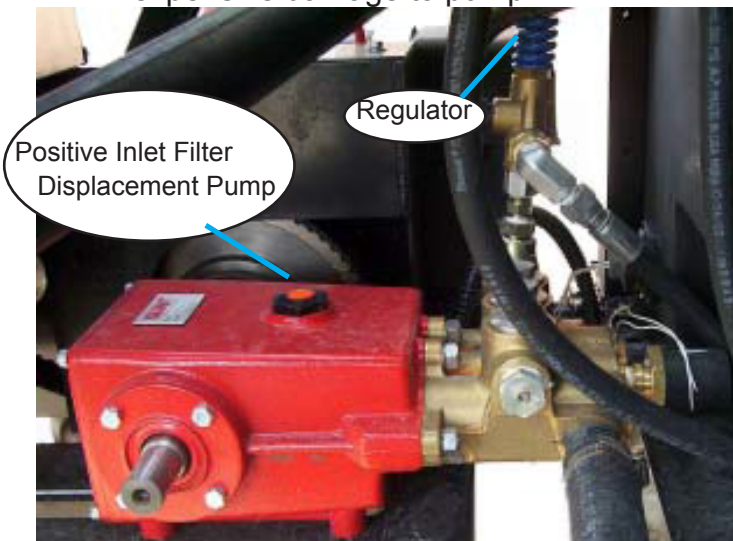
Because of the inherent hazards with high pressure, use only Spartan high pressure hoses and components when repairing your machine.

If the nozzles become worn or if the gun is used with the jet hose, the regulator valve allows the same total flow but at lower pressure because the restriction is lower. To maintain desired pressure - replace nozzles.



If nozzles become plugged, the regulator valve will direct some of the flow back to the water tank while providing pressures over 3000 psi. If these pressures are seen with normal engine speed (3200 rpm), check and clean the nozzles. When using optional lengths of 1/4" hose the operating pressure can also be over 3000 psi at full gpm. Reducing engines rpm will produce lower pressures to prevent regulator valve from bypassing off and on. Continued operation at pressures over 3000 psi can cause engine overheat and reduce engine life.

Clean inlet filter daily (Fig. 10.2). A clogged filter will cause pump to run dry and can cause expensive damage to pump.





High Pressure Water Jetting



High pressure water jetting is the utilization of high pressure water combined with sufficient water flow to remove debris in drain/sewer pipes. High pressure water jetting can also be used to remove debris on surfaces.

A high pressure water jet consists of a pump, a motor or engine, a hose reel, a given length of hose, and a various assortment of nozzles.

A pipe is cleaned with a high pressure water jet by directing water pressure and flow through a nozzle. Controlled water pressure and flow propels a water jet through the sewer pipe allowing it to remove and wash away the obstruction (See Fig. 11.1).

Ideally, a sewer pipe is cleaned from the lower end of the pipe and the hose propels itself to the higher end of the pipe. By slowly withdrawing the jet hose, the water pressure and flow cleans the line most effectively. When it is impossible to clean from the lower end of the pipe, the pipe must be water jetted several times to remove all the debris. A skilled operator can effectively clean a drain/sewer regardless of the obstacles in his or her way.

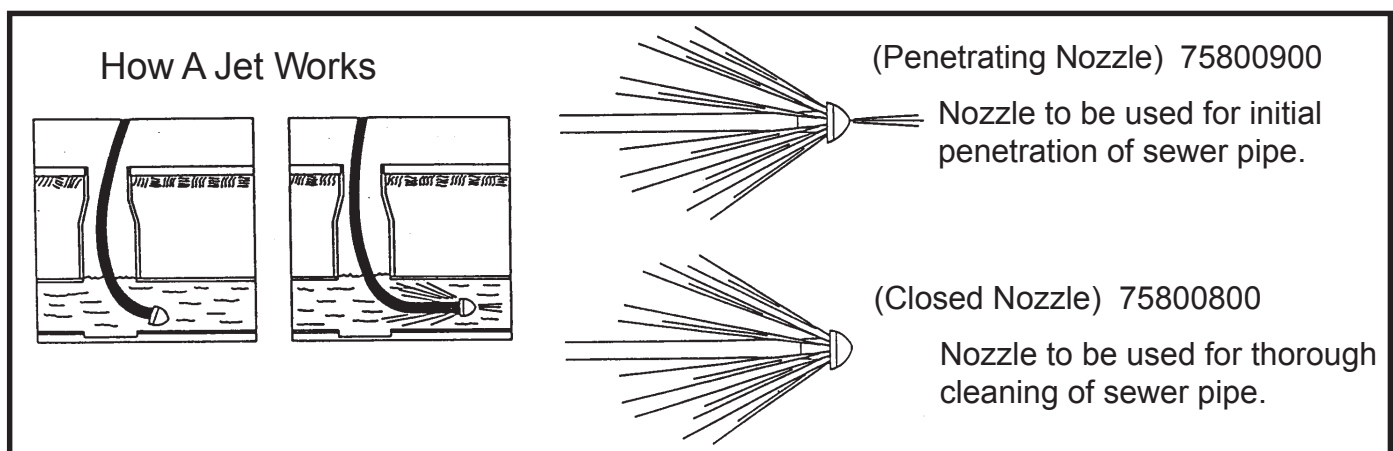


Fig. 11.1



Water Tank Filling



Fill the water tank from a clean water source. Always flush rust out of water supply before connecting fill hose (with garden hose fitting) to top fill valve. Trailer jet unit can be filled using 5/8" garden hose on fill reel or using fire hydrant fill. Fire hydrant fill requires fire hose with 2" cam lock female quick coupler.

Important Note: If the next 4 items are not followed, cavitation of the pump could occur and reduce operating efficiency and severely damage the pump.

- Use water temperatures under 140°F.
- Ensure that water strainer is clean (check daily or as needed).
- Make sure the strainer valve (between the tank and the pump) is fully open during operations. This valve stops tank flow to allow strainer service.
- The pump drain valve must be closed. It must not drip when engine is off and strainer valve is open.



Operator Controls



Fig. 12.2

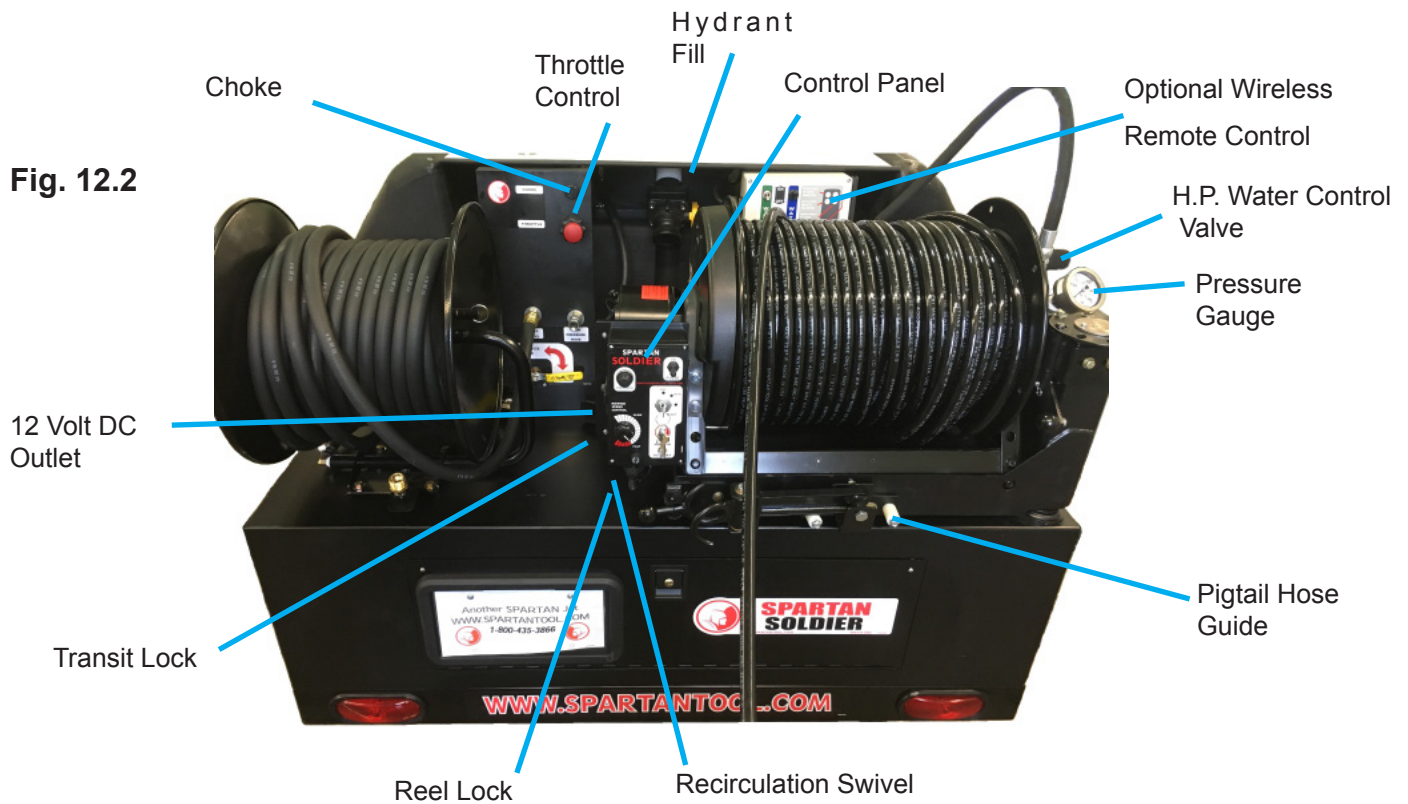
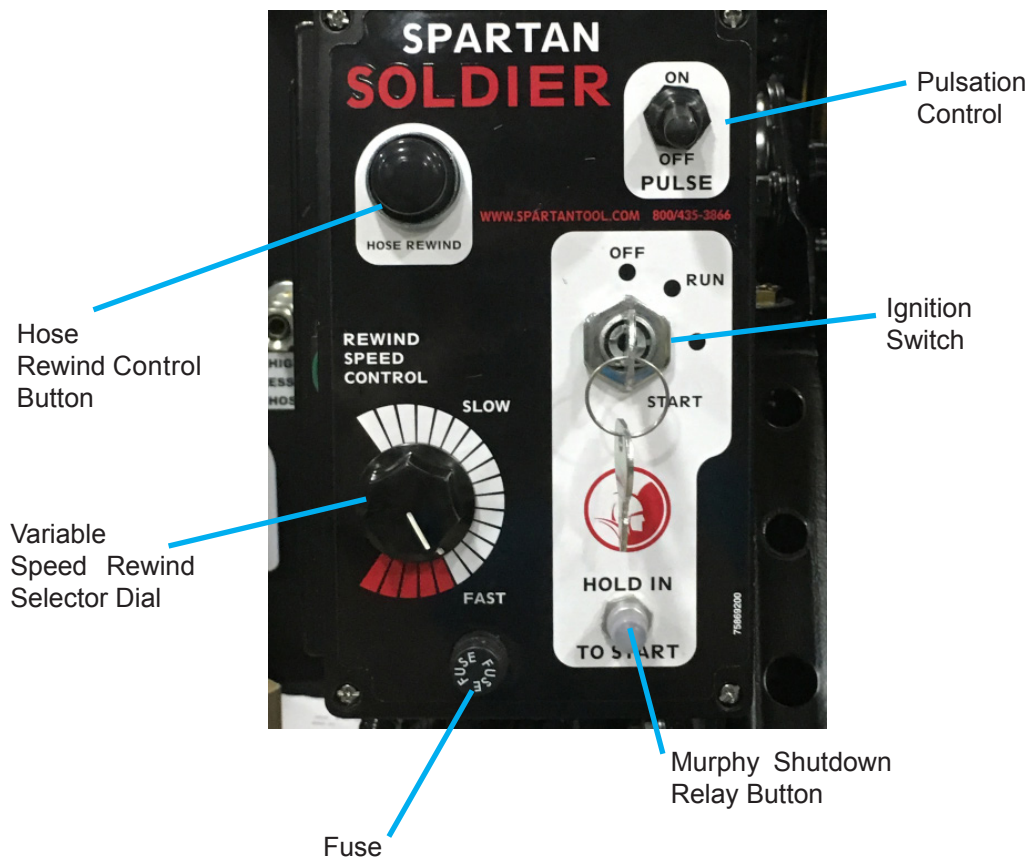


Fig. 12.2





Operator Controls (cont.)

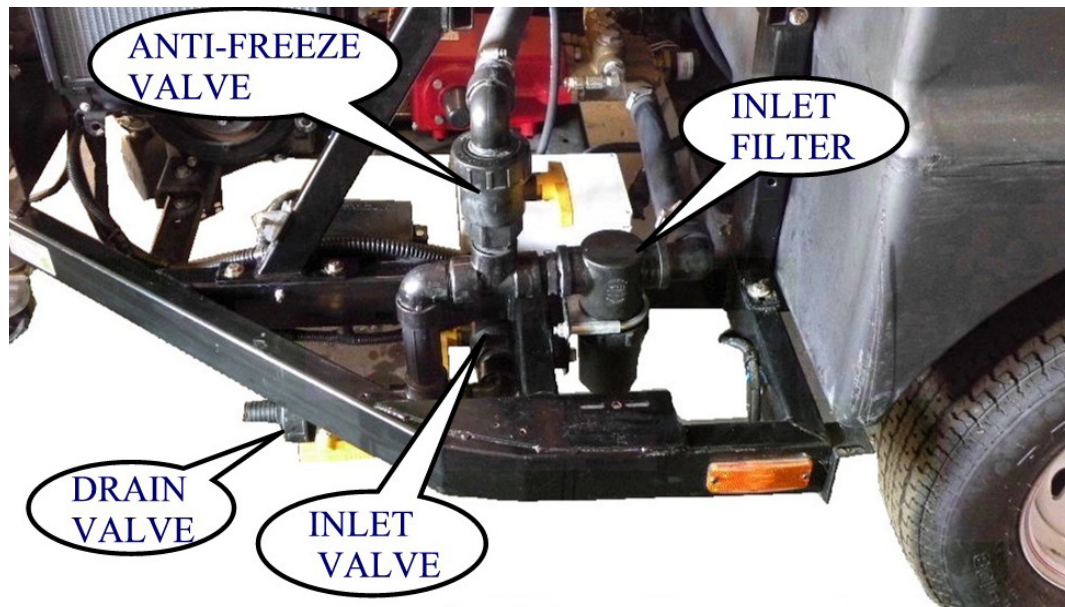


Fig. 13.1



Engine Operating Procedure



Start Up

- Check water tank level. This water jet is equipped with a Low Water Shut-Off switch that will prevent the engine from starting at low water levels.
- Check fuel level.

Note: Also check engine and pump oil levels per manufacturer specifications (included).

- Turn high pressure water control valve OFF.
- Hold in red relay button and key start the engine. Choke as necessary.
- Allow the engine to warm up at idle for 3 to 5 minutes before putting engine under load.

Engine Shut-Down

- Turn high pressure water control valve OFF.
- Allow engine to idle for 1 to 2 minutes
- Turn the engine key switch OFF (The engine key switch must be OFF when the engine is not running to avoid battery draining).



Setting up for Operation



Always locate the jet in the driest and safest place possible. Avoid high traffic areas and use flashers and safety cones. Position the jet so that hose can be pulled directly off of the reel for use. Remember that jetting is most effective when you jet against the water flow. See Fig. 14-1 for the recommended positioning of the jet for best visibility during manhole work. Note that loose hose and damaging corners are minimized when the jet is parked as shown.



When operating upon unlevel ground, position trailer with the hitch (tank sump) end at the downhill side.

Warning: Trailer must be level for low water shutdown to operate correctly. When trailer is on an incline with hitch end at the down hill side and tank is empty, enough water can be held in the lower front corner of tank to keep float switch in the operating position, defeating this protective feature.

For non-manhole use, allow extra space for handling the hose before it is wound back on the reel or run the hose directly to the pipe inlet using extra hose guards to protect the hose from cutting when going around

Warning: Do not unhitch or operate trailer jet unhitched upon unlevel ground.

When unhitching the machine from towing vehicle, always follow these steps:

- Place wheel chocks around trailer jet wheels.
- Disconnect ball hitch by raising lever and jacking hitch up. Disconnect safety chains and light cord before driving away.

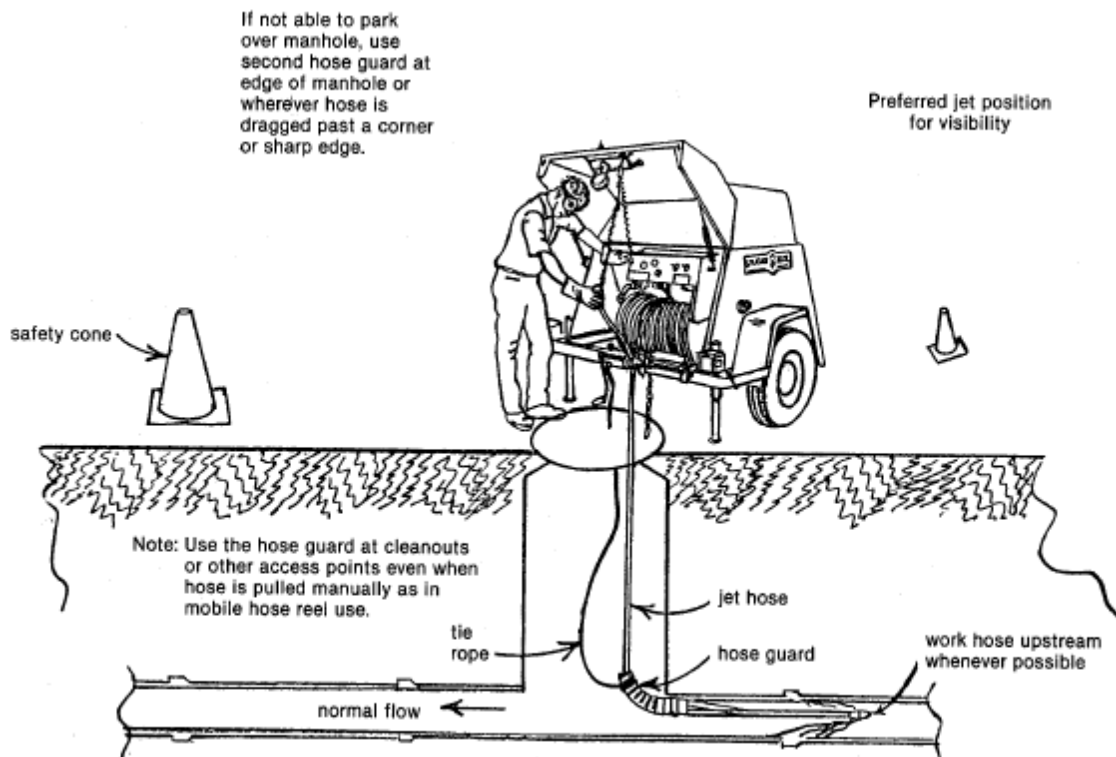


Fig. 14.1



Power Rewind Instructions



To Rewind Hose on Reel

- Release reel lock.
- Turn Speed Selector Dial counterclockwise to begin rewind in “Slow” position
- Use panel mounted push button to initiate rewind.
- Adjust Selector Dial to desired rewind speed.



Pulsation



To activate the pulsation feature, turn toggle switch labeled PULSE to the ON position. To deactivate pulsation, turn toggle switch to OFF position.



Fig. 15-1

Electric
Pulsator

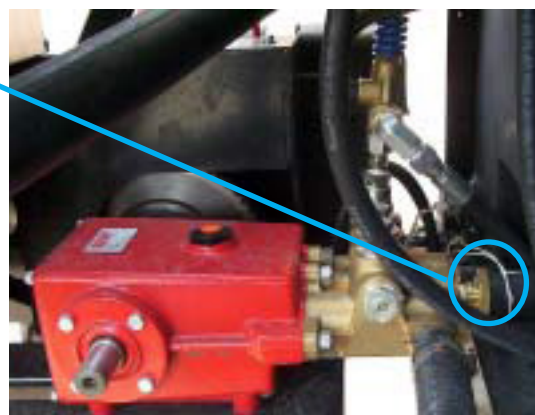


Fig. 15-2

Note: Operating pressure will decrease and fluctuate when pulsation is activated. See below (Fig. 15- 3) for approximate pressures.

PRESSURE SELECTOR SWITCH SETTING	PULSATION PRESSURE (PSI)
1000 psi	200 - 700
2000 psi	800 - 1600
3000 psi	1100 - 1700

Fig. 15-3



Operating Instructions



Operation:

Release the reel lock and install nozzle and hose guard(s).

Always insert sewer hose several feet into pipe opening before actuating hose reel valve. Never stand in front of pipe opening when nozzle is near pipe opening. As described in the setup section, work upstream whenever possible.



Note: At this time, put on safety goggles to prevent eye injury from flying water and debris.

You are ready to start pipe cleaning operations after tank filling and engine starting procedures are followed. Advance engine throttle to full speed.

Now move H.P. water control valve ON (up) and let out hose as nozzle pulls into pipe. Untwist hose kinks as necessary before they enter the pipe. Since it is impossible to know exactly what the nozzle “sees” as it advances in a pipe, always proceed slowly and cautiously. Pull back 1-2 feet for every 4-5 feet of progress to make sure that the hose is not burying itself or tying itself up in an open cavity or larger pipe. Continue working up the line while watching and feeling for speed changes as the nozzle makes its way into a blockage. When working over a manhole, you often will see dirty water, chunks of grease, or debris flow past as the nozzle penetrates a blockage. When backed up water flows, the line is probably open. Continue working up the line to open restrictions as desired. Now pull the “working” nozzle back slowly to re-clean and scour the pipe walls. When working through heavy and long blockages you may have to flush debris back to machine every 5- 10 ft. Repeat until water runs clean from the pipe.

Do not let engine run at full throttle without load (hose reel valve OFF) for longer than 1-2 minutes.

The Soldier Water Jet will pull out past 250’ but you will find the going slower because of the pressure loss from extra hose length. Unless longer operation is common, we recommend the hose extensions be added only when needed. If moving the jet before the job is done, the hose can be disconnected from the jet to avoid pulling hose completely out of pipe and restarting.

When finished, turn H.P. water control valve OFF before removing nozzle from pipe.



Hint: Wind white tape around hose (a minimum of 6 ft. from end recommended) to warn of nozzle being too close to pipe opening.

Wind hose back onto reel, remove hose guard and install hose end and nozzle in holder. Place high pressure hose in hose holster. Lock reel. Store all parts in tool box compartment. Follow engine shut down procedure.

Reminder: Engine key switch and any optional equipment, (such as wireless remote control) must be off to prevent battery drain when not in use.

Reverse setup instructions: Drain tank and disconnect fill hose. Replace manhole cover or pipe caps and clean up machine before leaving job site.



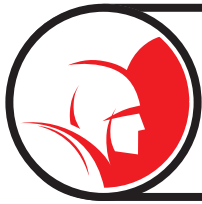
Operating Instructions (cont.)



Operating Hints:

The following techniques can be tried if the going gets slow.

- Grab the hose into an “S” shape and twist the hose to help it get around corners and off of pipe edges (See Fig. 18-1).
- Turn water valve off and pull hose back out of line. Look for traces of clay or other material to determine if nozzle is burying itself outside of pipe.
- Try different nozzle or different pipe openings.
- Walk to nearby buildings and manholes and listen for water sound to determine if hose is going where it should. The hose may tie itself up in a manhole and need help going into the next pipe. Use a pole or pipe to guide hose so entering the manhole can be avoided.



Pipe Jetting Procedure



Equipment:

Although the Soldier is capable of various high pressure cleaning operations, jetting pipes of 4” - 12” is typically the major work required of the jet. The hose reel is designed for outdoor applications. See sections on the mobile hose reel and 1/4” drain hose for indoor or remote applications and for lines smaller than 6”.

For safety reasons, (unless operating with optional remote control) always operate with 2 people when the pipe entrance is away from the jet location; one person should stay near the jet to control the machine operation while the other person works the hose and nozzle. The mobile hose reel should be used for remote control whenever the second person cannot be seen or heard by the machine operator.

The sewer hose should always be replaced when reinforcement sleeve can be seen because of a worn cover.

The Soldier nozzles are designed to match the pressure and flow performance of your jet. They are key to efficient operation because they convert all of the engine and pump power to water speed for hose pull and for cleaning impact.

Nozzles “Closed” (75800800) and “Open” (75800900) are standard equipment. See parts section for part numbers to order additional nozzles or root cutters. Nozzle holes will wear after several months of continuous use. If the system operating pressure gradually drops, try a new nozzle to check for wear. Check for nozzle plugging occasionally by removing the nozzle from the hose and holding up to the light. Clean by inserting small diameter wire if necessary. Plugged nozzles will cause poor hose pull even though the gauge pressure will show higher.



When Obstruction Are Encountered

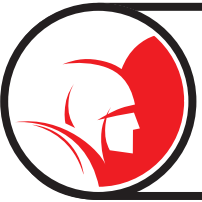


Fig. 18-1



Fig. 18-2

- When obstruction or corners are encountered it may be necessary to manually rotate the hose (See Fig. 18- 1) to enable feed through that area. The rotation will cause the jetting nozzle to jump over or around those areas. When it becomes necessary to manually rotate the hose to clear obstructions, any rotations in one direction must be followed by an equal number in the opposite direction to prevent kinks from building in the hose.
- At times, it will be necessary to move the hose slightly in and out of the drain line to assist the jetting nozzle in clearing stubborn clogs, obstructions, or tight corners (See Fig. 18-2).



Wash Down Kit - 73817300



Note: To use wash-down gun do the following:

- 1 Turn H.P. water control valve OFF (down).
- 2 Connect wash-down gun hose to end of 250 ft. hose.
- 3 Start unit and operate wash-down gun with H.P. water control valve ON (up).

The wash down gun is used to control the spray lance and the 1/4" drain hose. The lance is attached by pulling back on the ring of the guns quick connect fitting. Insert adapter nipple of lance (or 1/4" hose) until ring can slide back to original position. The lance is equipped with a spray nozzle for general use.

Caution: HOLD HAND GUN/WASH WAND WITH TWO HANDS AT ALL TIMES. Back pressure buildup on the wash wand/hand gun requires two hands firmly gripping the wand when the trigger is initially pulled.



Caution: Under no circumstances should you ever operate the wash down gun in the direction of any other person(s). To do so may cause serious damage to eyes or other bodily tissue and may even cause death!

Contents of Kit: 1/4" x 75' hose, lance assembly, 1/4" nozzle, hand gun.



1/4" Drain Hose



The 1/4" hose and nozzle may be used to clean smaller diameter lines. Attach the 1/4" hose to the forward end of the wash down gun as described on the previous page.

Use the 1/4" drain hose on lines 2" - 4" similar to the reel hose. Again, use care not to discharge water unless the hose is in the pipe. On inside lines, use short bursts of the gun to limit water backup.

If 75' or 100' 1/4" hoses are used with the reel hose, the pressure gauge may read more than 2800 psi. Adjust engine speed to reduce to desired pressure to avoid engine overheat.

Standard Equipment

PART NO	DESCRIPTION
77719500	1/4" X 75' Hose

PART NO	DESCRIPTION
77719400	1/4" x 50' Hose
77708700	1/4" X 100' Hose



Mobile Hose Reel - 73816800 (Optional)



The mobile hose reel (Fig. 19.1) is used for remote use and control of the sewer hose. 400' total length of hose is the practical maximum with the 250' or 150' length on the machine reel and the balance on the mobile reel. To use, attach the machine reel hose to the valve of the mobile reel. Attach nozzle to mobile reel hose and make sure the mobile reel valve is off (handle perpendicular to valve body). Start jet as usual and open machine hose reel valve.

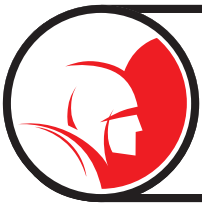
Now move the mobile reel to the pipe opening and use as before, using the mobile valve to control water flow (put hose in pipe before opening valve). To rewind hose, stand on front plate and use crank provided.

Replacement Parts

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	75800405	DISC, SIDE HP REEL
2	2	75800404	BEARING W/BALL INSERT
3	2	73853200	DISC WASHER
4	1	73828400	TENSIONER, CAM LOCK BRAKE
5	1	79827800	PLASTIC HANDLE W/ BOLT & NUT
6	1	77752601	HANDLE ASSY, MOBILE HOSE REEL



Fig. 19.1



Cold Weather Protection



The Soldier comes equipped with versatile anti-freeze system that allows the user to choose between different levels of protection.

Antifreeze Recirculation: Full Winterization

The pump and all hoses charged with anti-freeze solution. Anti-freeze is conserved by re-circulating back to anti-freeze tank.

Water Recirculation: Temporary Freeze Resistance

Water is re-circulated through hoses and returned to main water tank.

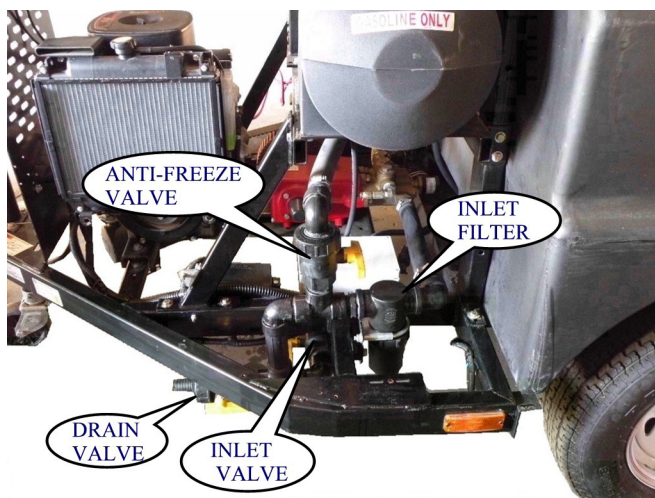


Fig. 20.1

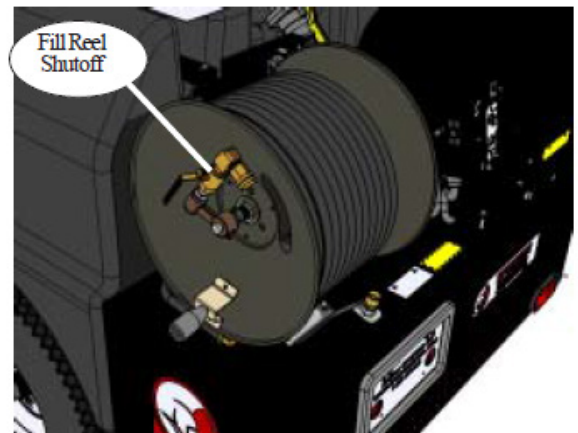


Fig. 20.3

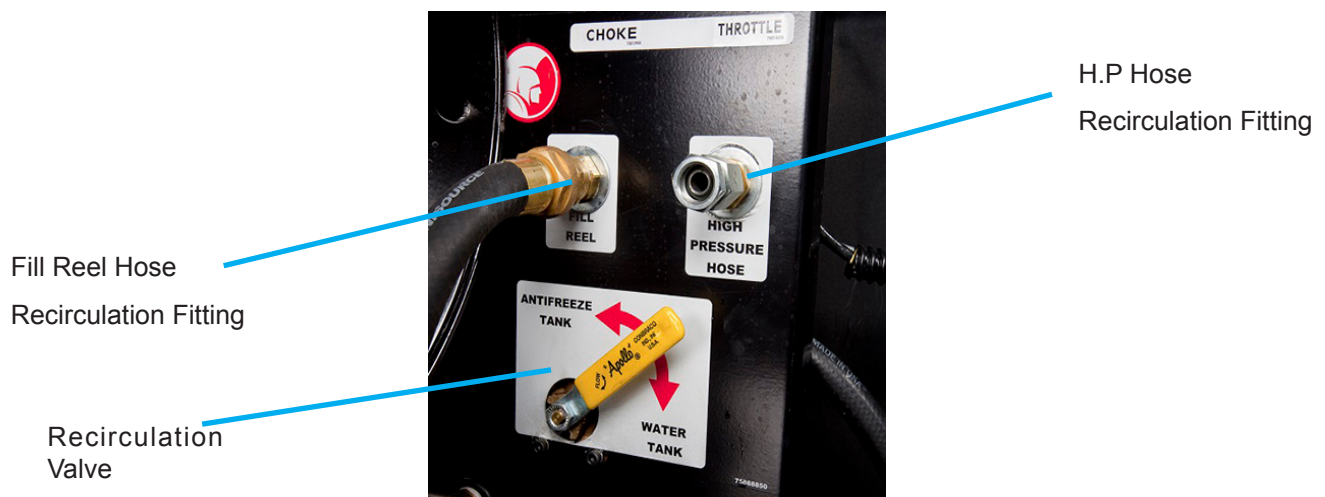


Fig. 20.2



Cold Weather Protection



Winterization Procedure

1. Fill antifreeze tank with Propylene Glycol Antifreeze and water mixture (Follow manufacturer's recommendation regarding ratio of water to antifreeze).
2. Connect the fill hose to the recirculation connection.
3. Open fill reel valve (Fig. 20.3).

Always open the fill reel valve before recirculation to prevent water bypassing out of the relief valve.

4. Move the selector valve to "Antifreeze Tank" (Fig. 21.1).
5. Close the water supply valve and open the antifreeze supply valve (fig. 20.1).
6. Remove handgun or nozzle from the end of the high pressure (H.P.) hose.
7. Confirm the H.P. hose is secured and pointed in a safe direction before turning the water on.
8. Follow engine start up procedures. Set throttle to its midpoint position. Open H.P. water control valve on reel.

Note: A Soldier with the 350' hose option will require additional antifreeze. During Step 8 of the winterization procedure, it is recommended that one additional gallon of antifreeze be added to the antifreeze tank.

9. Water will discharge and once the water has visibly changed to antifreeze, shut off the H.P. control valve.
10. Connect the H.P. hose to the recirculation connection.
11. Re-open the H.P. control valve.
12. Monitor the antifreeze tank. When antifreeze is flowing into the tank, shut down the engine.
13. Close the antifreeze supply valve.
14. Open drain valve and water supply valve at pump to empty tank completely.
15. Open hydrant fill valve to confirm that no water is trapped (Fig. 22.1).



Fig. 21.1

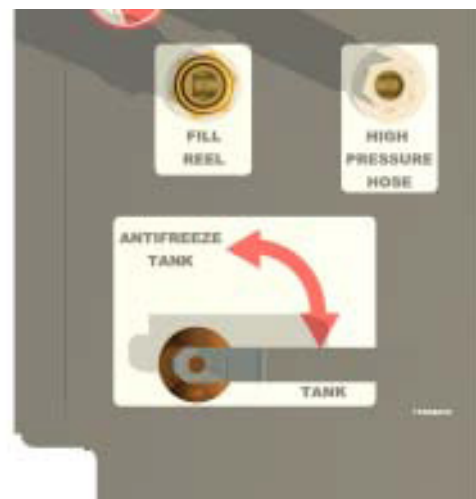


Fig. 21.2



Cold Weather Protection



Antifreeze Recovery Procedure

To reactivate the Soldier following the winterization procedure, follow these steps to preserve the antifreeze.

1. Confirm drain valve and antifreeze valve are closed. Confirm water supply valve and fill reel valve are open (Fig. 20.1-3).
2. Fill water tank at least 1/4 full of water.
3. Fill hose and H.P. hose are connected to their respective recirculation fittings (Fig.20.2).
4. Confirm recirculation selector valve is set “Antifreeze Tank” (Fig. 21.1) and fill reel valve is open (Fig. 20.3).
5. Follow engine start up procedures. Set throttle to its midpoint position. Open H.P. control valve.
6. Monitor antifreeze tank. Move the water control switch to OFF when either the antifreeze tank is full of antifreeze, or when water is present in the stream.
7. Recovery is complete. Close H.P. control valve and shut down engine.



Fig. 22.1

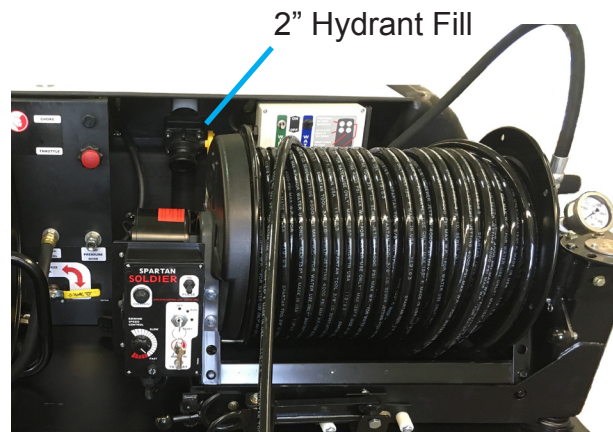


Fig. 22.2

Water Recirculation Procedure

To provide temporary freezing resistance, plain water can be set to recirculate continuously. The moving water will resist freezing, but only provided the pump continues to run. This condition can only be maintained for a limited time. It must be noted that water recirculation will not prevent freezing in very low temperature conditions. When operating in below freezing weather, monitor the water condition closely to avoid costly damage to the system. It also must be noted that the recirculation plumbing itself needs to be protected from freezing by draining or antifreeze treatment.

1. Open water supply valve at pump. Confirm antifreeze and drain valves are closed.
2. Open fill reel valve (Fig. 20.3).



Always open the Fill Reel Valve before recirculation to prevent water bypassing out of the relief valve.

3. Remove nozzle or handgun from H.P. hose reel.
4. Connect H.P. hose and fill reel hose to their respective recirculation connections.
5. Move the selector valve to “Water Tank” (Fig. 21-2).
6. Follow engine start up procedures. Set throttle to its midpoint position. Open water control valve.
7. Re-circulate water for as long as desired. When finished, close H.P. control valve and stop engine.



Lubrication & Maintenance



Engine

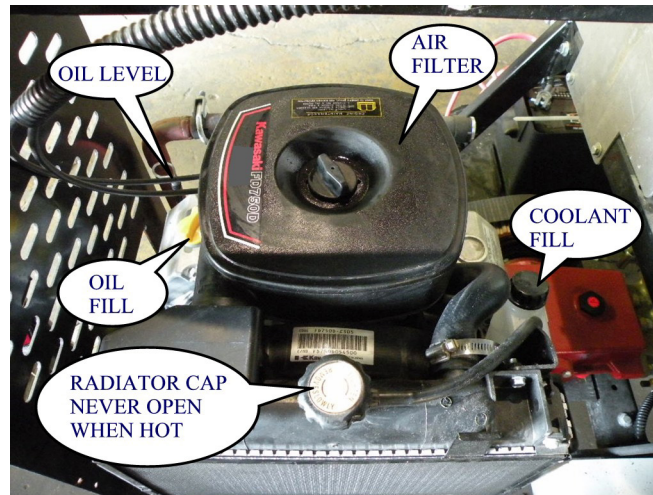


Fig. 23.1

See Periodic Maintenance Chart below.

For Fuel, Oil, and Coolant Recommendations see page 27.

See Engine Owner's Manual for additional information.

Periodic Maintenance - Engine

Periodic Maintenance Chart - Kawasaki F0661 Engine

WARNING								
Always remove the spark plug cap from spark plug when servicing the engine to prevent accidental starting.								
MAINTENANCE	INTERVAL							
	Daily	First 8 hr.	Every 25 hr.	Every 50 hr.	Every 100 hr.	Every 200 hr.	Every 300 hr.	Every 400 hr.
Check and add engine oil.	•							
Check for loose or lost nuts and screws.	•							
Check for fuel and oil leakage.	•							
Check battery electrolyte level.	•							
Check or clean air intake screen.			•					
Tighten nuts and screws	•							
★ Clean air cleaner foam element			•					
★ Clean air cleaner paper element					•			
Clean fuel filter element				•				
Change engine oil (without oil filter)		•		•				
Change engine oil (with oil filter)		•			•			
Clean and regap spark plug					•			
Change oil filter						•		
★ Replace air cleaner paper element							•	
★ Clean dust and dirt from cylinder and cylinder head fins							•	
K Clean combustion chamber							•	
K Check and adjust valve clearance							•	
K Clean and lap valve seating surface							•	
K Inspect radiator and hoses						•		
K Check fan belt conditions and tension-FD620/FD661						•		
K Change coolant								•

Note: The service intervals indicated are to be used as a guide. Service should be performed more frequently as necessary by operating condition.

★ Service more frequently under dusty conditions.

K: Have an authorized Kawasaki engine dealer perform these services.

Fig. 23.2

Note: The service intervals indicated are to be used as a guide. Service should be performed more frequently as necessary by operating condition.

★ Service more frequently under dusty conditions.

K: Have an authorized Kawasaki engine dealer perform these services.



General Maintenance

- Check entire unit daily for water, fuel, and oil leaks.
- Inspect machine daily for loose or lost nuts, bolts, etc.

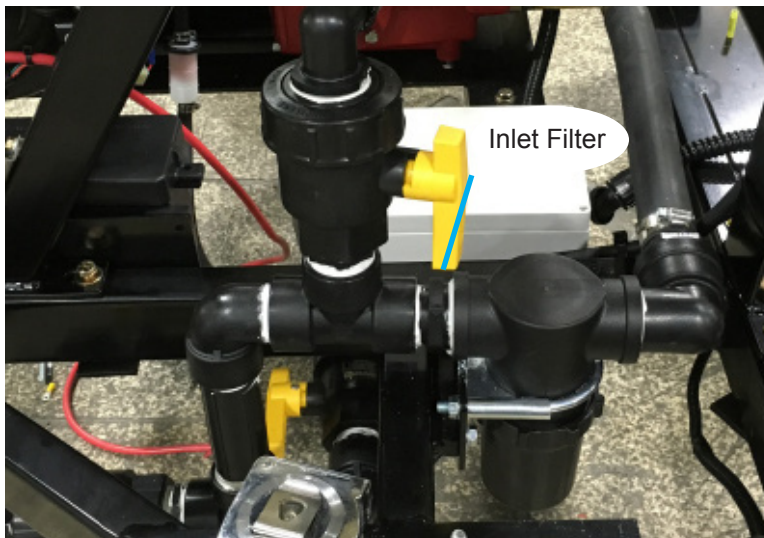


Fig. 24.1

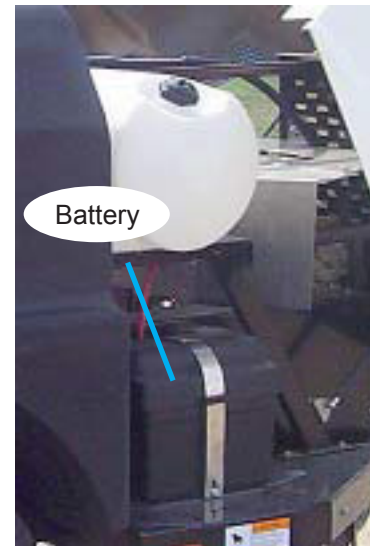


Fig. 24.2

- a. Clean inlet filter daily.
- b. Battery is maintenance free.

Pump

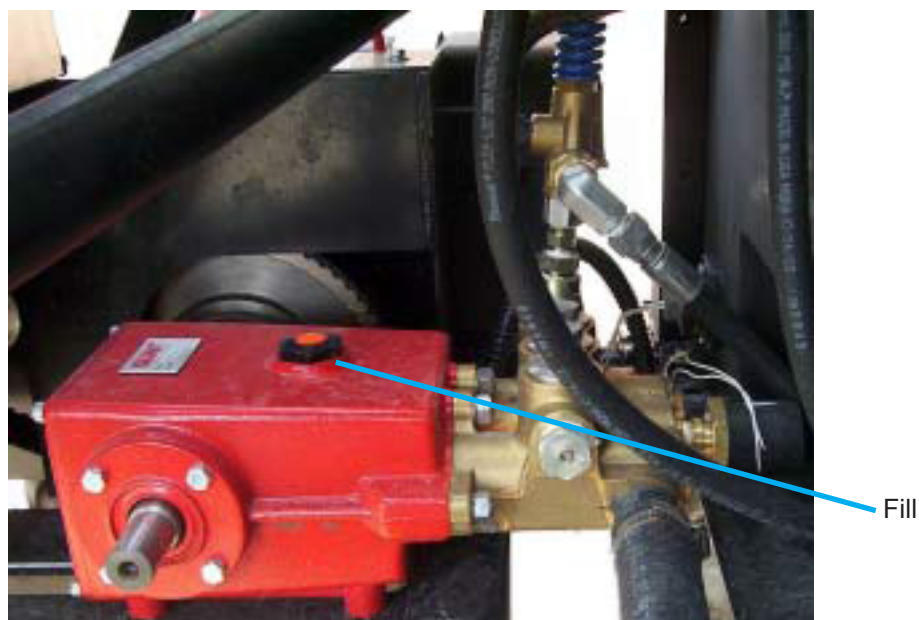


Fig. 24.3



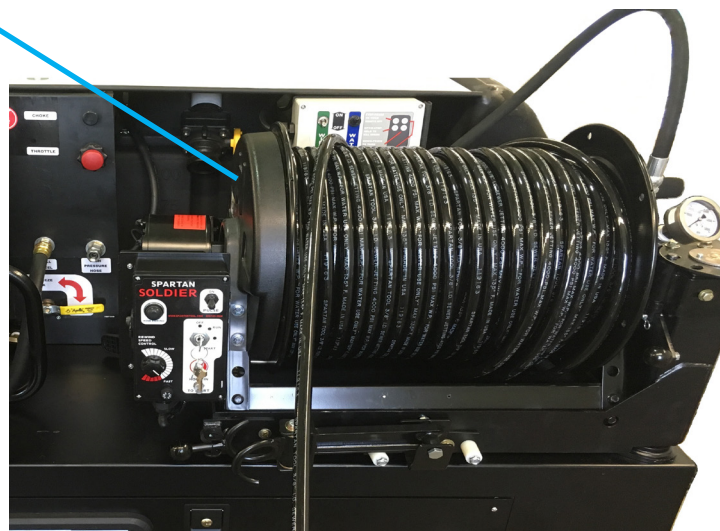
Lubrication & Maintenance (cont.)



Note: Use a #2 consistency lithium base grease formulated from a high quality mineral oil with rust and oxidation inhibitors.

High Pressure Reel Assembly

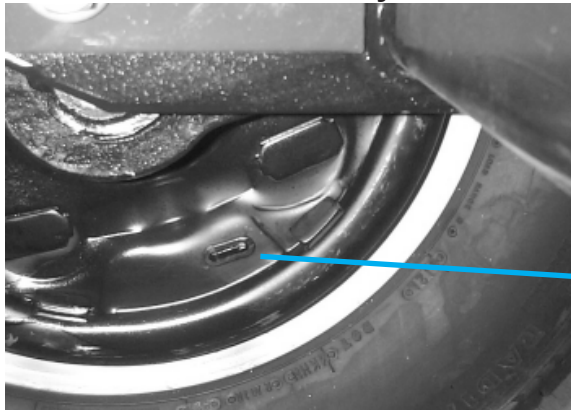
Oil Drive chain
every 50 hours
(SAE 30 or heavier)



Grease Reel
Pivot Bearings
every 100 hours

Fig. 25.1

Brake and Axle Assembly



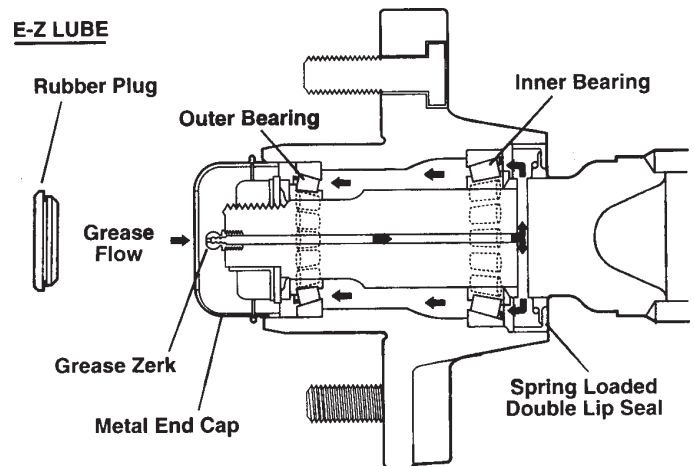
Brake
Adjustment
Slot

Fig. 25.2

Adjust brakes after the first 200 miles and at 3000 miles intervals thereafter, or as use and performance requires. For brake adjustment procedure refer to the Dexter Axle Service Manual

For additional maintenance information review the following section in the Dexter Axle Service Manual:

- Braking System - Electric
- Hubs/Drums/Bearings
- Wheels and Tires



Grease wheel bearings every 12000 miles or 12 months. Follow greasing procedure in the Dexter Axle Service Manual.



Fuel, Oil, & Coolant Recommendations



Fuel

Use only clean, fresh, unleaded, regular-grade gasoline.

Caution: Do not mix oil with gasoline.

Octane Rating The octane rating of a gasoline is a measure of its resistance to “knocking.” Use a minimum of 87 octane of the antiknock is recommended. The antiknock index is posted on service station pumps in the U.S.A.

Note: If “knocking or pinging” occurs, use a different brand of gasoline or higher octane rating.

Oxygenated Fuel Oxygenates (either ethanol or MTBE) are added to the gasoline. If you use the oxygenated fuel be sure it is unleaded and meets the minimum octane rating requirement.

The following are the EPA approved percentages of fuel oxygenates.

ETHANOL: (Ethyl or Grain Alcohol) You may use gasoline containing up to 10% ethanol by volume.

MTBE: (Methyl Tertiary Butyl Ether) You may use gasoline containing up to 15% MTBE by volume.

METHANOL: (Methyl or Wood Alcohol) You may use gasoline containing up to 5% methanol by volume, as long as it also contains cosolvents and corrosion inhibitors to protect the fuel system. Gasoline containing more than 5% methanol by volume may cause starting and/or performance problems. It may also damage metal, rubber, and plastic parts of your fuel system.

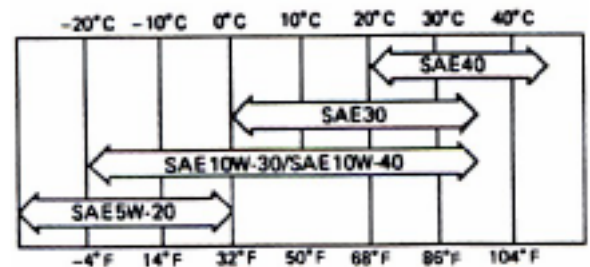
Engine Oil

The following engine oils are recommended.

API Service Classifications: SF, SG, SH, or SJ.

Oil Viscosity Choose the viscosity according to the temperature in the above chart.

Note: Using multi grade oils (5W-20, 10W30, and 10W40) will increase oil consumption. Check oil level more frequently when using them.



Engine Coolant

DEXCOOL® Extended Life Antifreeze/Coolant.

Note: Do not mix with other coolants.



Mixed Ratio: 50% mix.



Venturi Pump Attachment - 77763700 (Optional)



How the Venturi Effect works.

The Venturi Effect uses the venturi pumping attachment and your Spartan Jetter to create a vacuum effect to drain standing water. In Fig. 27.1, the black circles represent water from the jetter and the white circles represent the water to be pumped. The venturi has two parts: the Venturi Throat, which is a restricted section of the suction tube; above that is the venturi itself which is the part where the tube widens and connects to the discharge hose. The water from your Spartan Jetter is accelerated through a venturi restriction which causes it to increase speed causing a pressure drop and creates the vacuum that sucks in more water at the base of the attachment.

Venturi Pumping Attachment Operating Instructions

1. Attach high pressure hose directly to the suction head of the venturi attachment.
2. Lower suction head into water or liquid to be pumped. The discharge hose is 15 ft. long and this determines the maximum depth or distance liquids can be pumped.
3. At a depth of 15 ft., the venturi attachment will pump 35-40 gpm. If additional lengths of discharge hose are added, the pumped volume will decrease accordingly.
4. Be sure to keep the pumping head submerged at all times to ensure steady continuous operation.
5. Start engine and bring jet to full pressure. Use the ball valve on high pressure hose reel to control venturi operation.



Fig. 27.2

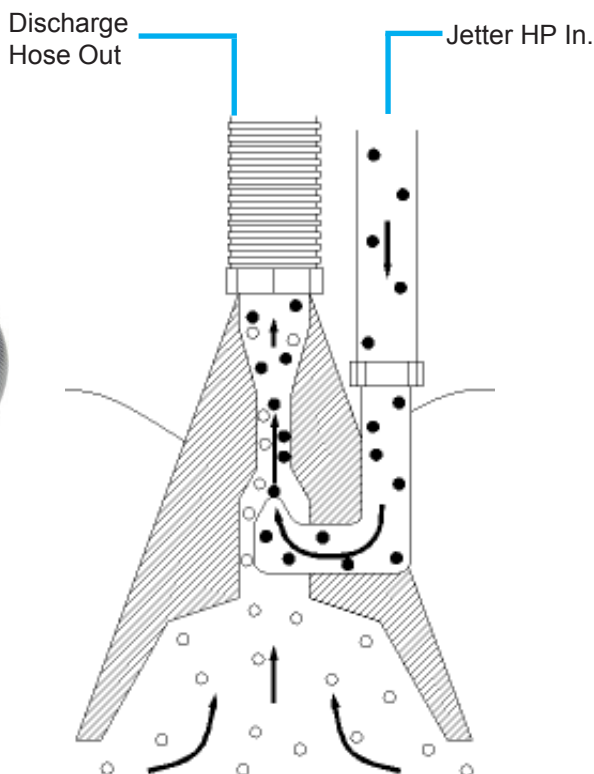


Fig. 27.1



Soldier Pump System Malfunction Chart



SYMPTOM	CAUSES	REMEDIES
The Pressure and/or the Delivery Drops	Worn Packing Seals Broken Valve Spring Belt Slippage Worn or Damaged Nozzle Fouled Discharge Valve Fouled Inlet Strainer Worn or Damaged Hose Worn or Plugged Relief Valve on Pump Cavitation Unloader	Replace Packing Seals Replace Spring Tighten or Replace Belt Replace Nozzle Clean Valve Assembly Clean Strainer Repair/Replace Hose Clean, Reset, Replace Worn Parts Check Suction Lines on Inlet of Pump for Restrictions Check for Proper Operation
Water in Crankcase	High Humidity Worn Seals	Reduce Oil Change Interval Replace Seals
Noisy Operation	Worn Bearings Cavitation	Replace Bearings, Refill Crankcase Oil with Recommended Lubricant Check Inlet Lines for Restrictions and/or Proper Sizing
Rough/Pulsating Operation with Pressure Drop	Worn Packing Inlet Restriction Accumulator Pressure Unloader Cavitation	Replace Packing Check System for Stoppage, Air Leaks, Correctly Sized Inlet Plumbing to Pump Recharge/Replace Accumulator Check for Proper Operation Check Inlet Lines for Restrictions and/or Proper Size
Pulsator doesn't Work	Wireless Remote Switch on Panel is in the ON Position	Turn Switch to OFF Position
Excessive Leakage	Worn Plungers Worn Packing/Seals Excessive Vacuum Cracked Plungers Inlet Pressure too High	Replace Plungers Adjust or Replace Packing Seals Reduce Suction Vacuum Replace Plungers Reduce Inlet Pressure
High Crankcase Temperature	Wrong Grade of Oil Improper Amount of Oil in Crankcase	Use SAE 90 Gear Oil Adjust Oil Level to Proper Amount



Electric Braking Systems



SYMPTOM	CAUSES	REMEDIES
No Brakes	Open Circuits Severe Underadjustments Faulty Controller Short Circuits	Find & Correct Adjust Brakes Test & Correct Find & Correct
Weak Brakes	Grease or Oil on Magnets or Linings Corroded Connections Worn Linings or Magnets Scored or Grooved Brake Drums Improper Synchronization Underadjustment Glazed Linings Overloaded Trailer	Clean or Replace Clean & Correct Cause of Corrosion Replace Machine or Replace Correct Adjust Brakes Refurnish or Replace Correct
Locking Brakes	Underadjustment Improper Synchronization Faulty Controller Loose, Bent, or Broken Brake Components Out-of-Round Brake Drums Insufficient Wheel Load Breakaway Protection Activated	Adjust Brakes Correct Test & Correct Replace Components Machine or Replace Adjust System Resistor and Synchronize Reset Breakaway Protection
Intermittent Brakes	Faulty Controller Broken Wires Loose Connections Faulty Ground	Test & Correct Repair or Replace Find & Repair Find & Repair



Electric Braking Systems (cont.)



SYMPTOM	CAUSES	REMEDIES
Brakes Pull to One Side	Wrong Magnet Led Wire	Find & Correct
	Color	
	Incorrect Adjustment	Adjust Brakes
	Grease or Oil on Magnets or Linings	Clean or Replace
	Broken Wires	Find & Repair
	Bad Connections	Find & Repair
Harsh Brakes	Underadjustment	Adjust Brakes
	Improper Controller	Change
	Faulty Controller	Test & Correct
	Improper Synchronization	Correct
Noisy Brakes	Underadjustment	Test & Correct
	Lack of Lubrication	Lubricate
	Incorrect Brake Components	Correct
	Broken Brake Components	Replace Components
Surging Brakes	Out-of-Round or Cracked Brake Drums	Machine or Replace
	Faulty Controller	Test & Correct
	Grease or Oil on Magnets or Linings	Clean or Replace
Dragging Brakes	Overadjustments	Re-adjust
	Out-of-Round or Cracked Brake Drums	Machine or Replace
	Incorrect Brake Components	Replace
	Loose, Bent, or Broken Brake Components	Replace Components
	Faulty Breakaway Switch	Repair or Replace
	Loose Wheel Bearing Adjustment	Adjust
	Bent Spindle	Replace Axle



Troubleshooting Symptoms



SYMPTOM	CAUSES	REMEDIES
Engine will not Run	No Fuel Low Water Level Low Oil Pressure High Coolant Temperature	Fill Fuel Tank Fill Water Tank or Check Low Water Float Switch. Check Oil Level. Check Coolant Level and Thermostat, Replace If Necessary.
Refer to Kawasaki Owner's Manual for additional troubleshooting.		
Low Pressure or Flow	Clogged Inlet Filter Jetting Nozzle Worn	Clean Inlet Filter Element Check for Wear or Orifice of Jetting Nozzle, Replace Nozzle If Necessary. Use only Approved Jetting Nozzles.
Erratic Flow or Pressure	Worn or Dirty Pump Valves Worn or Dirty Regulator Parts Worn Jetting Nozzle	Replace or Clean Replace or Clean Replace Jetting Nozzle
Pump Noisy	Low Oil Level Worn or Dirty Valves Bad Bearings	Add Oil Replace or Clean Inspect Bearings, Replace as Required
Water Leaking from Pump Head; Pump Seals Worn		Replace Pump Seals



Optional Hose Footage Counter 75875000



Fig. 32-1



Optional Foot Pedal Valve 77773903



use with trap hose





Optional Wireless Remote Control 75880000



Fig. 33-1

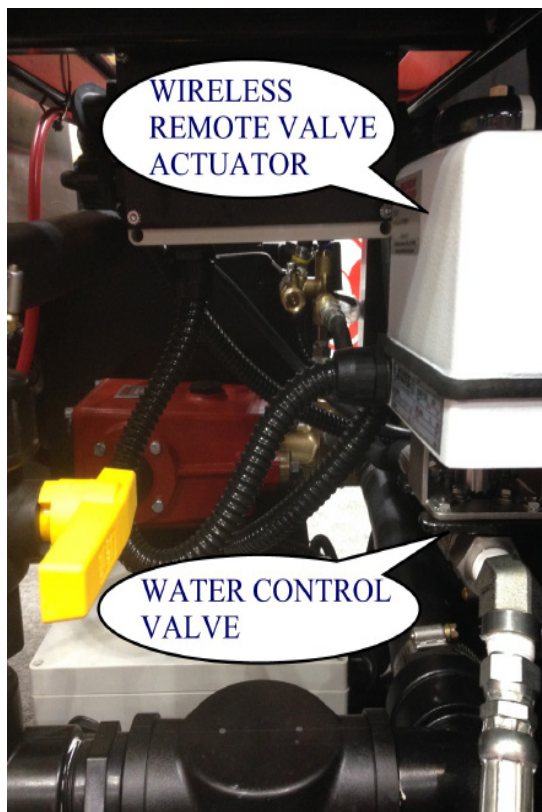


Fig.33-2



Fig. 33-3



Tire Safety Information



This portion of the User's Manual contains tire safety information as required by 49 CFR 575.6.

The National Traffic Safety Administration (NHTSA) has published a brochure (DOT HS 809 361) that discusses all aspects of Tire Safety, as required by CFR 575.6. It can be obtained and downloaded from NHTSA, free of charge, from the following web site:

http://www.nhtsa.dot.gov/cars/rules/TireSafety/ridesonit/tires_index.html

Tire Safety Terminology Glossary

- **Cold tire inflation pressure** - The pressure in the tire before you drive.
- **Gross Axle Weight Rating (GAWR)** - The maximum weight that any axle can support, as published on the Certification / VIN label on the front left side of the trailer. Actual weight determined by weighing each axle on a public scale, with the trailer attached to the towing vehicle.
- **Gross Vehicle Weight Rating (GVWR)**- The maximum weight of the fully loaded trailer, as published on the Certification / VIN label. Actual weight determined by weighing trailer on a public scale, without being attached to the towing vehicle.
- **Load rating** - The maximum load that a tire is rated to carry for a given inflation pressure.
- **Maximum load rating** - The load rating for a tire at the maximum permissible inflation pressure for that tire.
- **Maximum permissible inflation pressure** - The maximum cold inflation pressure to which a tire may be inflated.
- **Outer diameter** - The overall diameter of an inflated new tire.
- **Recommended inflation pressure** - The inflation pressure provided by the vehicle manufacturer on the Tire Information label and the Certification/VIN tag.
- **Rim** - A metal support for a tire or a tire and tube assembly upon which the tire beads are seated.
- **Vehicle maximum load on the tire** - The load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.

Tire Information Placard

The Spartan Warrior's Federal Certification/VIN label is located on the forward half of the left (road) side of the unit. The VIN label will identify the units GVWR and GAWR.

The Spartan Warrior's Tire Information Placard can be located adjacent to the trailer's VIN (Certification) label at the left front of the trailer. The placard includes the Warrior's tire size, cold tire inflation pressure, and load limitations. The load limitation statement will give an indication of the maximum cargo capacity. Any items (cargo) added to the Warrior must not cause the total weight of the Warrior to exceed the stated GVWR.

TIRE AND LOADING INFORMATION			
The weight of cargo should never exceed kg. or lbs.			
TIRE	SIZE	COLD TIRE PRESSURE	SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION
FRONT	ST205-75-R14	50PSI/350kPA	
REAR			
SPARE			



Tire Safety Information



Steps for Determining Correct Load Limit

- Locate the statement “The weight of cargo should never exceed 771 kg or 1700 lbs” on your tire information placard.
- This figure equals the available amount of cargo and luggage load capacity.
- Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity.

General Tire Information

- Tire inflation pressure is the level of air in the tire that provides the load-carrying capacity and affects the overall performance of the vehicle. The tire inflation pressure is a number that indicates the amount of air pressure a tire requires to be properly inflated. Since tires are designed to be used on more than one type of vehicle, tire manufacturers list the “maximum permissible inflation pressure” on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.
- - Improper inflation is the main cause of tire failure. Excessive loads and/or under inflation cause tire overloading, which leads to abnormal tire flexing. Check the cold tire inflation pressures at least once a week for proper inflation levels.
 - The proper air pressure may be found on the Certification/VIN label and/or the Tire Information placard.
- High speed towing in hot conditions degrades the life of the Warrior's tires. The internal heat generated from high speeds breaks down the tire's internal structure. It is recommended to drive at moderate speeds.
- If the trailer is stored for an extended period of time, the tires should be fully inflated to the maximum rated pressure. The Warrior should be stored in a cool, dry place. Use tire covers to protect the trailer tires from the harsh effects of the sun.

Tire Maintenance

Checking Tire Pressure

- The recommended tire inflation pressure that vehicle manufacturers provide reflects the proper PSI when a tire is cold. A cold tire is one that has not been driven on for at least three hours. Since driving raises the tires temperature, the internal air pressure also increases. To prevent inflated tire readings, the tire must be measured when cold.

Maintaining Proper Tire Pressure

- a. Locate the recommended tire pressure on the vehicle's tire information placard, certification label, or in the owner's manual.
- b. Record the tire pressure of all tires.
- c. If the tire pressure is too high in any tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until the correct pressure is reached.
- d. If the tire pressure is too low, note the difference between the measured tire pressure and the correct tire pressure. Add the missing pounds of air pressure to each tire that is under inflated.
- e. Check all the tires to make sure they have the same air pressure

Note: If the tires are warm due to driving, but testing confirms under inflation, fill the tire to the recommended cold inflation pressure. While the tire may be slightly under inflated due to extra pressure in the warm tire, it is safer to drive a slightly under inflated tire than to drive a significantly under inflated tire. Since this is a temporary fix, the tire must be re-checked and adjusted once a cold reading can be obtained.

Tire Size and Tread

- Tires should be replaced when the tread is worn down 1/16 of an inch.
- Treadwear indicators on the bottom of the tire can be used as a guide. The indicators are raised sections spaced intermittently in the bottom of the tread grooves. If they appear even with the outside of the tread, the tire should be replaced.
- Replacement tires should be the same size as the Warrior's original tires. To prevent error and maintain safety, it is recommended that all replacement parts be purchased through Spartan Tool LLC.

Tire Safety Information

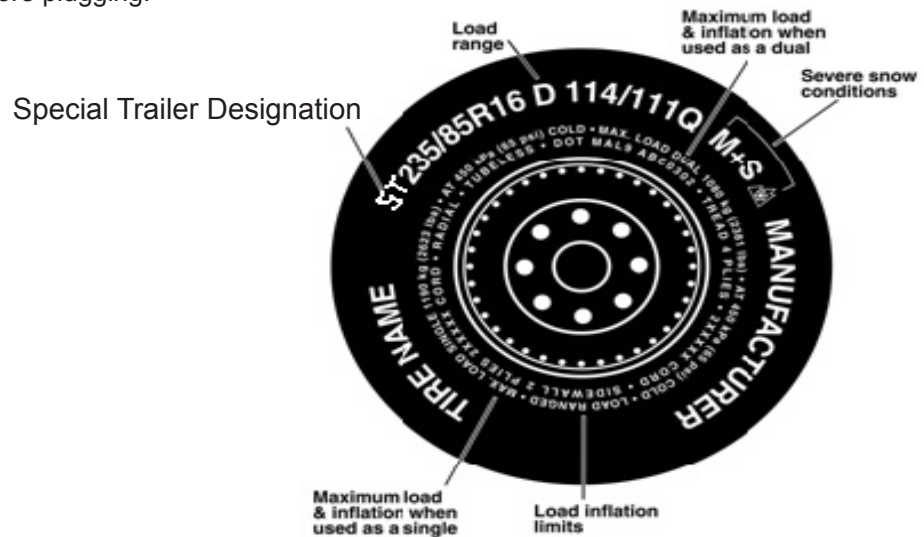


Tire Balance and Wheel Alignment

- Tires must be properly balanced to avoid vibrations and shaking of the trailer. A wheel alignment adjusts the angles of the wheels to position them correctly relative to the trailer's frame. Such adjustments can maximize the life of the tires, but should be performed by a qualified technician.

Tire Repair

- A punctured tire can be repaired by plugging the hole and patching the area that surrounds the puncture hole. A small puncture in the tire tread can be repaired, but punctures to the sidewall should not. Tires should be removed from the rim to be properly inspected before plugging.



Tire Fundamentals

- Federal law requires tire manufacturers to place standardized information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire. It also provides a tire identification number for safety standard certification and in case of a recall.

Tire Safety Tips

Preventing Tire Damage

- Slow down before driving over a pothole or other object in the road
- Do not run over curbs or other foreign objects in the roadway.

Tire Safety Checklist

- Check tire pressure regularly (at least once a month).
- Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma.
- Remove bits of glass and foreign objects wedged in the tread.
- Make sure tire valves have valve caps.
- Check tire pressure before any long trips.
- Do not overload trailer. Check the Tire Information Placard for the maximum recommended trailer load.



Safety Information



Confirm that:

- The coupler is secure to the hitch and is locked,
- Electrical connections are made,
- There is appropriate slack in the safety chains,
- There is appropriate slack in the breakaway switch pull-pin cable,
- The tires are not visibly low on pressure, and the cargo is secure and in good condition.

Reporting Safety Defects

If you believe that your vehicle has a defect that could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Spartan Tool LLC.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Spartan Tool LLC .

To contact NHTSA, you may either call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1- 800-424-9153), go to <http://www.safercar.gov>; or write to

Administrator
NHTSA
1200 New Jersey Avenue S.E.
Washington, DC 20590

You can also obtain other information about motor vehicle safety from <http://www.safercar.gov>.

Spartan Tool LLC
1506 W. Division St.
Mendota, IL 61342

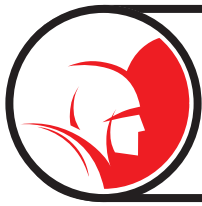


Soldier Accessories

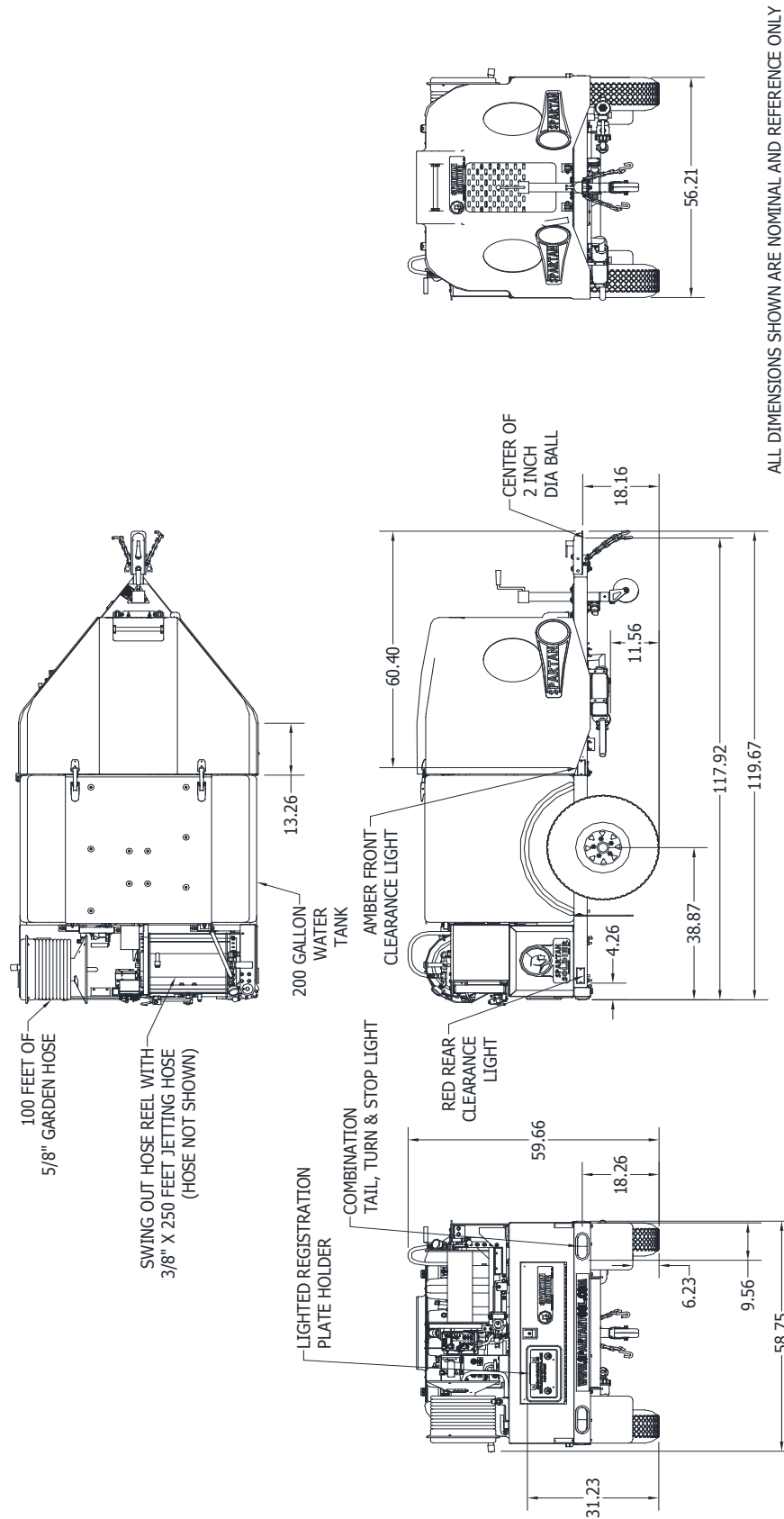


PART NO.	DESCRIPTION
02893400	1-1/2 Inch Flusher
02893500	2 Inch Flusher
02893600	4 Inch Flusher
02893700	6 Inch Flusher
02895300	3 Inch Flusher
44237200	Model 468 Root Cutter
44256000	Liner, Glove
44256200	Jetter Safety Gloves
44262200	Liner, Glove (Box of 25)
44262300	Handbook, Professional S&D
71109900	Tip Cleaner Set
71701700	Hose S.S. Trap 50'
71701800	Hose S.S. Trap 75'
71701900	Jet Head Brs Ball 1-1/4" Dia x 1/8
71702900	Hose S.S. Trap 100'
71704300	Portable Hose Reels
73700100	Rocket Nozzle
73808600	3/8 x 250 ft. Hose
73808601	3/8 x 75 ft. Hose
73808602	3/8 x 150 ft. Hose
73808603	3/8 x 350 ft. Hose
75827600	Nozzle Beacon Adapter
75875000	Hose Footage Counter
75880000	Wireless Remote Control
61023600	Beacon Assembly
75849200	Optional Pintle Ring Hitch
75875000	Optional Hose Footage Counter
75880000	Optional Wireless Remote Control
73817300	Wash Down Kit Includes *Items
77799800	<i>Hand Gun Lance Vari-Nozzle Assy</i>
77721400	<i>Coupler, Quick Gun, Male</i>
77719500	<i>Hose, 1/4" x 75'</i>
77815800	<i>Nozzle, 1/4" Domed (6) closed</i>
73816500	<i>Swivel Adapter, 3/8 Male to 3/8 Fmale</i>

PART NO.	DESCRIPTION
73816800	Mobile Hose Reel
73820500	Grenade Nozzle
75700200	Nozzle, 'Q' 2-3000 PSI
75700300	Nozzle, Rotating 2-3000 PSI
75800800	Nozzle, Closed
75800900	Nozzle, Open
75831000	Warthog Nozzle (3"-4" Lines)
75831010	Warthog Nozzle Service Kit
75831200	3000 PSI Performance Nozzle kit
75832000	Nozzle, WTHG 4-8" 3K@12 - 3/8"
77708700	1/4 x 100 ft. Hose
77719500	1/4 x 75 ft. Hose
77721800	0° Nozzle Lance
77724000	Reducer 1/2 x 3/8
77763700	Venturi Pump
77800600	Hose Guard (Tiger Tail)
79873500	Assy, Hose Anti-Turn Around
79922934	Nozzle, WTHG 2-4" 3K@8 - 3/8"
79944100	5/8" x 100' Tank Fill Hose
*77719400	1/4 x 50 ft. Hose
79968700	Sandshoe Nozzle
77773903	Hydro-Jet Foot Pedal (for remote operation)
Model 468 Accessories	
44236800	4" Tri-Blade Cutter
44236900	6" Tri-Blade Cutter
44237000	8" Tri-Blade Cutter
44260500	10" Tri-Blade Cutter
44235100	4" Operating Skid
44235200	6" Operating Skid
44235300	8" Operating Skid
44260600	10" Operating Skid
44236000	Installation Hardware
34003701	Leader Hose (Highly Recommended)



Soldier Reference Information





WARRANTY INFORMATION



Spartan Tool warrants its equipment to be free from defects in material and workmanship for one year from the date of purchase. To obtain warranty service, a purchaser should notify Spartan Tool in writing, at the address provided below, within the warranty period, and Spartan Tool will direct where to take or send the equipment for service. If the defect is covered by the warranty, Spartan Tool will repair or replace, at its option, the defective equipment, without charge for labor or materials. (Freight and insurance are the purchaser's responsibility.)

This warranty is limited to the original retail purchaser and is not transferable. Spartan Tool assumes no responsibility for damage due to accident, neglect, abuse, tampering or misuse, nor damage from repairs or alterations by others. This warranty does not cover damage to the equipment resulting from the use of replacement parts other than Spartan Tool parts.

Spartan Tool's sole obligation and the original retail purchaser's exclusive remedy under this warranty shall be for repair or replacement as described above. ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL SPARTAN TOOL BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

SPARTAN TOOL L.L.C.

MENDOTA, ILLINOIS 61342

Spartan Tool L.L.C. reserves the right to make changes at any time, without notice, to specifications and models and also discontinue models. The right is also reserved to change specifications or parts at any time without incurring any obligation to equip same on models manufactured prior to the date of change.

SPARTAN TOOL L.L.C.
1506 W. Division Street
Mendota, IL 61342
800.435.3866 ♦ Fax 888.876.2371
www.spartantool.com