SPARTAN TOOL

FOR TOUGH CUSTOMERS. SINCE 1943.

PRODUCT MANUAL

Soldier

Spartan Tool LLC | 1618 Terminal Road | Niles, MI 49120
order by phone **800.435.3866** order online **SpartanTool.com**

Part #7584F000

Contents

Contents

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 owners' manual for instructions 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 and 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 with its cart (used to house the engine and gasoline tank) located in any confined space or area with inadequate ventilation. Operate this equipment only when the cart is located outdoors or in an open, well-ventilated area.
- Ensure the jet hose has been placed in the pipe a minimum of 6 feet before engaging the water pressure to prevent the hose from coming out of the pipe prematurely and causing injury.
- Always shut off the water pressure before pulling the hose out of the pipe. Mark the hose a minimum of 6 feet from the end to help ensure 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.
- Never point the wash gun at anyone while operating the unit. Injury may result.
- Drains and sewer can carry bacteria and other infectious micro-organisms or materials which can cause death or severe illness. 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 and, if necessary, flush mucous membranes with water. Also, disinfect potentially contaminated equipment by washing such surfaces with a hot soapy wash using a strong detergent.
- For any questions, contact Spartan Tool at the address shown below.

CAUTION: Portions of the system can still be under pressure even if the unit is not operating.

CONTACT US

Spartan Tool LLC
1618 Terminal Rod
Niles, MI 49120
800.435.3866
SpartanTool.com

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.

Technical Information

GENERAL

- Pipe Sizes: up to 12" diameter
- Max Water Pressure: 3,000 psi
- Max Water Flow: 12 GPM
- Water Capacity: 200 gallons

TRAILER

- Gross Vehicle Weight Rating (GVWR): 3500 lbs (1589 kg)
- Gross Axle Weight Rating (GAWR): 3300 lbs (1498 kg)
- Hitch: 2" Ball Type (Class II) (Optional Pintle Ring)
- Tires: ST 205-75-R14 (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)
- Maximum Recommended Towing Speed: 55 mph

ENGINE

- Model: ECH749 (Kohler Command PRO EFI)
- Cylinders: 2 (26.5 Horsepower)
- Bore & Stroke: 3.3" x 2.7"
- Displacement: 45.5 cu. in.
- Fuel: Gasoline, Unleaded 87 Octane Minimum
- Fuel Tank Capacity: 8.0 gal
- Cooling: Air
- Oil Capacity: 2.0 US qt (10W-30 oil)
- Alternator: 20 Amp
- Electric: 12 VDC
- Spark Plug: NGK BPR2ES (0.030" gap)

REWIND

- 12V Electric Motor with Variable Speed Controller

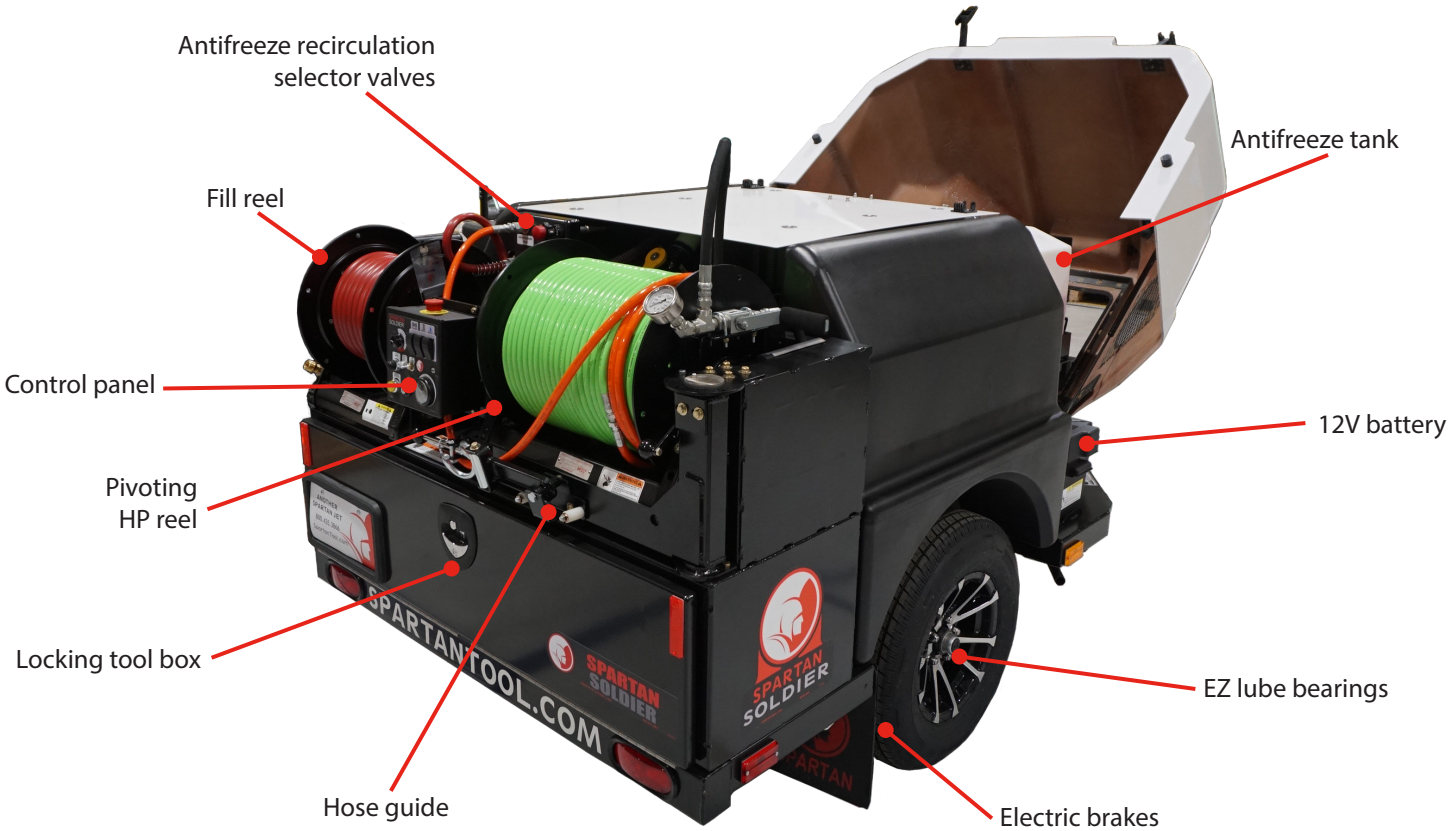
FEATURES

- Torsion single-axle suspension with electric brakes
- Noise-reducing engine shroud protects the unit while in tow
- Pressure can be continuously adjusted with accessible handwheel
- Electronic controlled pump pulsation for maximum cleaning distance
- Manhole hose protection
- 3/8" x 350' of Maxflow HP hose
- 5/8" x 100' of supply hose
- Pivoting and swiveling 180° hose reel, hydraulically operated with freewheel system
- Single-valve full-system winterization with antifreeze recirculation
- Rear mounted operator controls with an electric powered variable-speed hose rewind

SAFETY

- 12" nozzle anti-turn device
- Automatic engine shutdown protection for high water temperature, engine temperature, low engine oil, or low engine coolant

Machine Overview



Towing Instructions

Fuel Shut Off must be turned "OFF" when towing jet. Failure to shut off fuel can cause fuel to flow through the carburetor and fill the engine cylinders.

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

TRAILER HITCH

Check rating of vehicle's trailer hitch

- **Warning:** Class 1 hitches often use 1 ⅞" 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 rotatings.

Wire the plug receptacle to your vehicle as show 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.

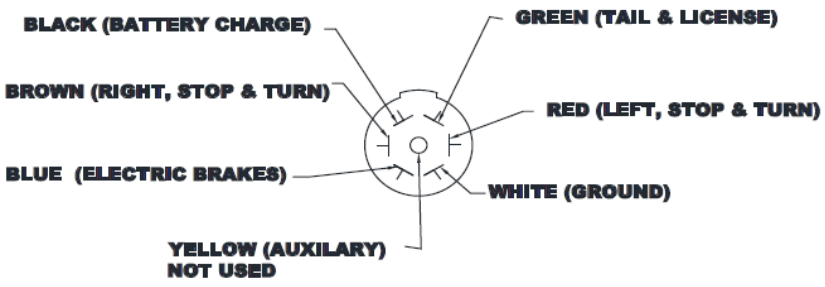
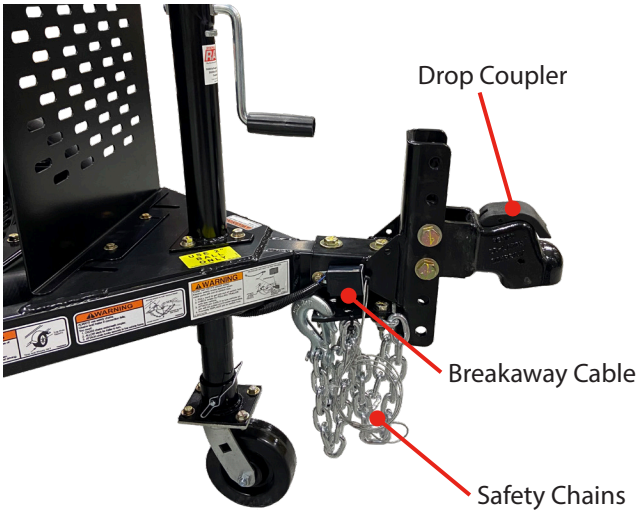
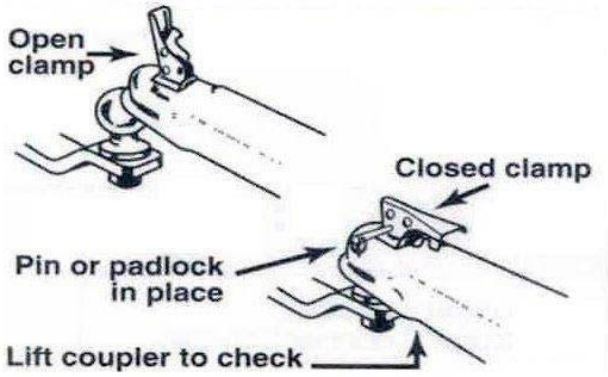


FIG. 7-1

Towing Instructions





Adjust the coupler up or down depending on vehicle hitch height to ensure the jetter is towed level.

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 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.

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

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

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, and confirm reel lock is engaged.
12. You are now ready to tow your trailer. The maximum recommended towing speed is 55 mph.

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

- 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 the hose can be pulled directly off of the reel for use. Remember that jetting is most effective when you jet against the water flow.

UNLEVEL GROUND

- Position the trailer with the hitch (tank suction) end at the downhill side.

WARNING: Trailer must be level for low water shutdown to operate correctly. When trailer is on an incline with the 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.

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.

UNHITCHING

- 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.

Engine Operation

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 fuel valve ON.
- Turn high pressure water control valve "Off".
- Key start the engine. Choke if necessary or equipped. If the unit has low water, press yellow button with key start.
- Allow the engine to warm up and 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.)
- Turn the fuel valve OFF.

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. 16-1

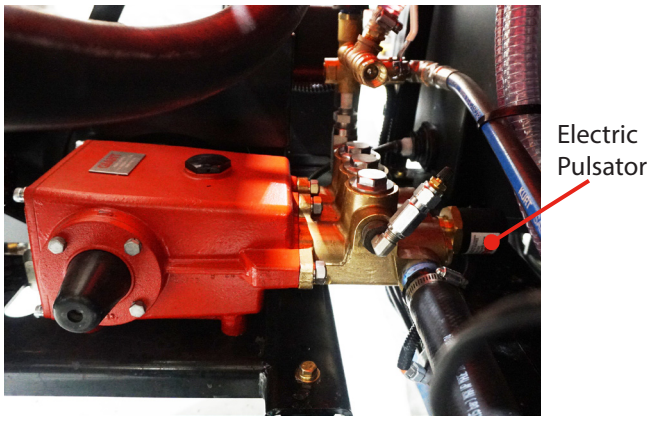


Fig. 16-2

NOTE: Operating pressure will decrease and fluctuate when pulsation is activated. See below (Fig. 16-3) for approximate pressures.

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

Fig. 16-3

Operating Instructions

OPERATION

- Release the reel lock (see previous instructions) 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 "Setup Section," work upstream whenever possible.

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

- Fill the tank and follow engine starting procedures to begin pipe cleaning operations. Advance engine throttle to full speed.
- Move the H.P. water control valve to ON (up) and let out hose as nozzle pulls into pipe, untwisting hose kinks as necessary. Proceed slowly and cautiously.
- Pull back 1-2 feet for every 4-5 feet of progress to make sure 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.
- 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 clear from the pipe.

WARNING: Do not let the 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 350' 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 to 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 must be off to prevent battery drain when not using.

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

OPERATING HINTS

- Grab the hose into an "S" shape and twist the hose to help it get around corners and off of pipe edges (See Fig. 19-1).
- 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

- 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 ¼" drain hose for indoor or remote applications and for lines smaller than 6".
- For ***safety*** reasons, 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.

Fig. 19-1

Fig. 19-2

ENCOUNTERING OBSTRUCTIONS

- When obstruction or corners are encountered it may be necessary to manually rotate the hose (See Fig. 19-1) to enable feed through that area. The rotation will cause the jetting nozzle to jump over or around those areas. 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. 19-2).

Wash Down Kit - 73817300

Contents of Kit: ¼" x 50' hose, lance assembly, ¼" nozzle, hand gun.

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 350 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 ¼" drain hose. The lance is attached by pulling back on the ring of the guns quick connect fitting. Insert adapter nipple of lance (or ¼" 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 want / 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 serous damage to eyes or other bodily tissue and may even cause death!

Pressure Washing Instructions

- Attach the handgun and lance with quick disconnect fitting to the 5/16" jetting hose for pressure washing applications. Refer to jetting start-up procedures.
- Adjust the Vari-Nozzle at the end of the lance to achieve the best spray pattern for the pressure wash job being done.

WARNING: Avoid running the machine with the handgun in the closed position for more than 1 minute. Extended shut-off causes the water recycled in the pump to overheat, which will cause the thermal valve to open and vent hot water.

Water Tank Instructions

- Always flush out water supply before connecting fill hose (with garden hose fitting) to the top fill valve.

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 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.

Jetting Nozzles

The following nozzles are provided in sizes to fit both the 5/16" I.D. (1/4 NPT) hose and 3/8" I.D. (1/8 NPT) hose, except for the rotating nozzle, which is only provided to fit the 5/16" I.D. hose.

THRUSTER JETTING NOZZLES—FOR DISTANCE
These nozzles have four jets in reverse at a low angle for maximum thrust

OPEN JETTING NOZZLES—FOR PENETRATION
These nozzles have four jets in reverse at a low angle, plus one forward penetrating jet. These penetrating jetting nozzles are used to jet through grease, ice, or other residue.

ROTATING JETTING NOZZLE
This nozzle is used to clean the wall of the sewer line after the line has been unclogged.

Cold Weather Protection

The Soldier comes equipped with a 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 the anti-freeze tank.

WATER RECIRCULATION: TEMPORARY FREEZE RESISTANCE

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

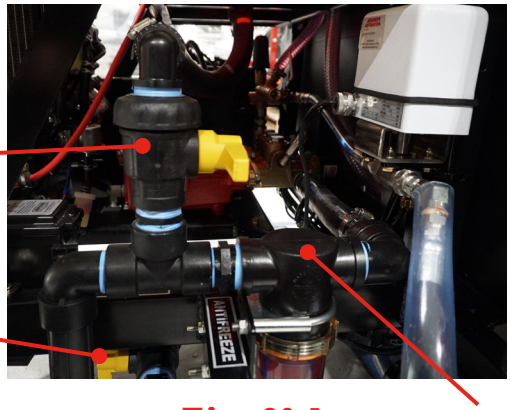


Fig. 20.1

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. 21.3).

NOTE: 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. 22.1).
5. Close the water supply valve and open the antifreeze supply valve (Fig. 21.1).
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.
9. Water will discharge and once the water has visibly changed to antifreeze, shut off the H.P. control valve.

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.

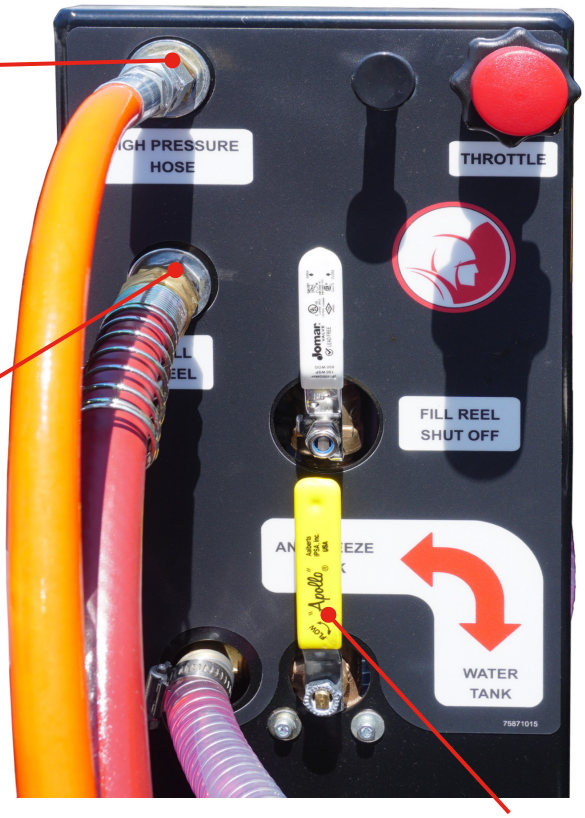


Fig. 22.1

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. 23.1).

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. 21.1-3).
2. Fill water tank at least 1/4 full of water.
3. Ensure the fill hose and H.P. hose are connected to their respective recirculation fittings (Fig. 21.1).
4. Confirm recirculation selector valve is set to "Antifreeze Tank" (Fig. 22.1) and fill reel valve is open (Fig. 21-3).
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.

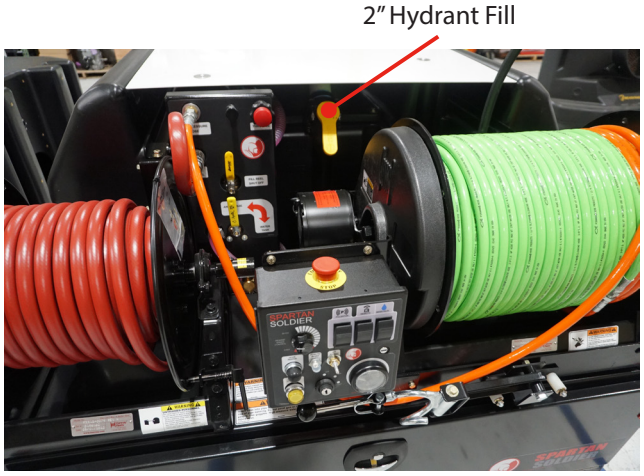


Fig. 23.1

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.

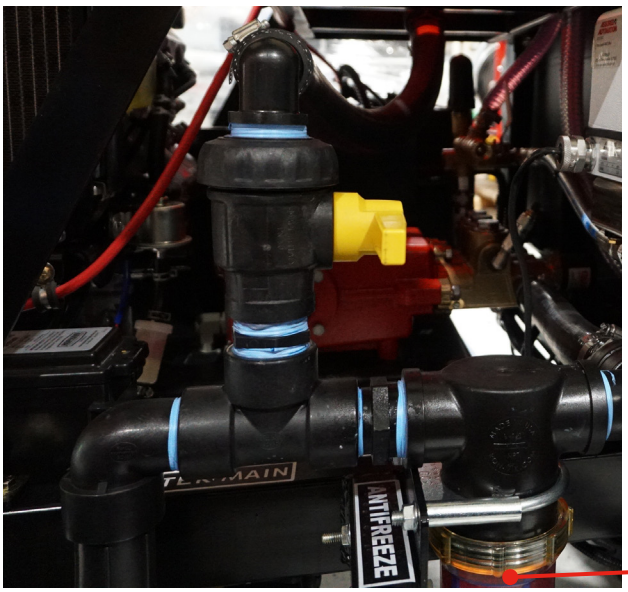
1. Open water supply valve at pump. Confirm antifreeze and drain valves are closed.
2. Open fill reel valve (Fig. 21.3).

NOTE: 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. 22-2).
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.

GENERAL MAINTENANCE

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



Inlet Filter

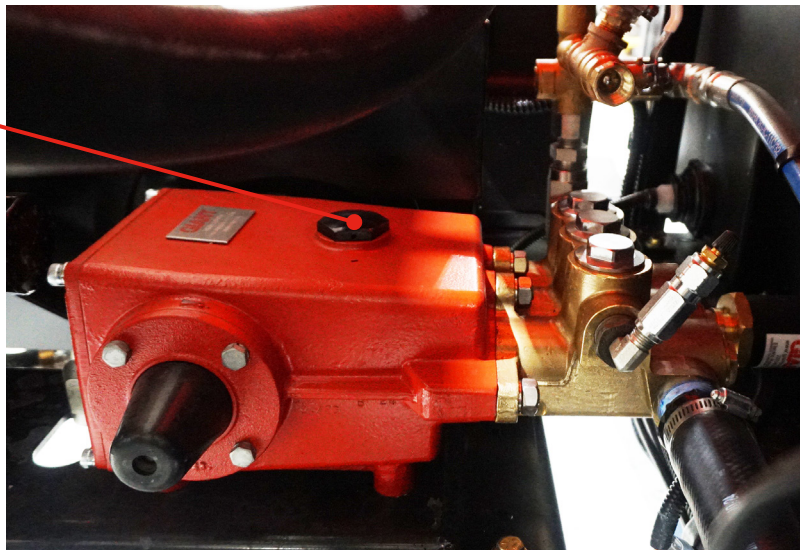
Fig. 25.1

Battery

Fig. 25.2

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

PUMP



Pump Oil Fill

Fig. 25.3

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

HIGH PRESSURE REEL ASSEMBLY

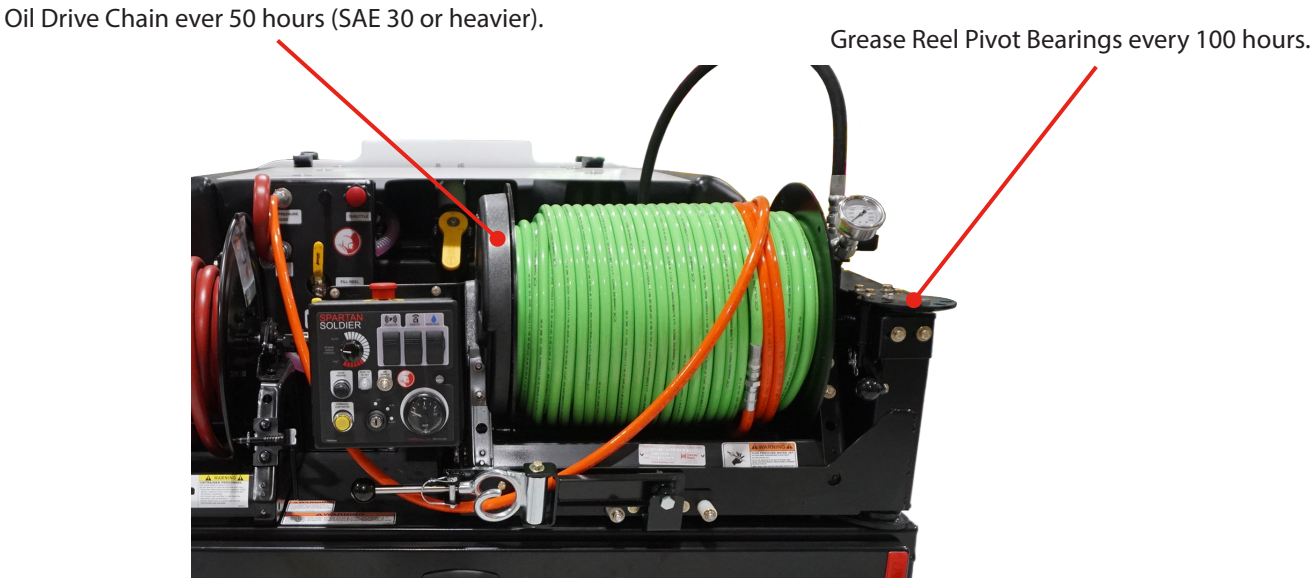
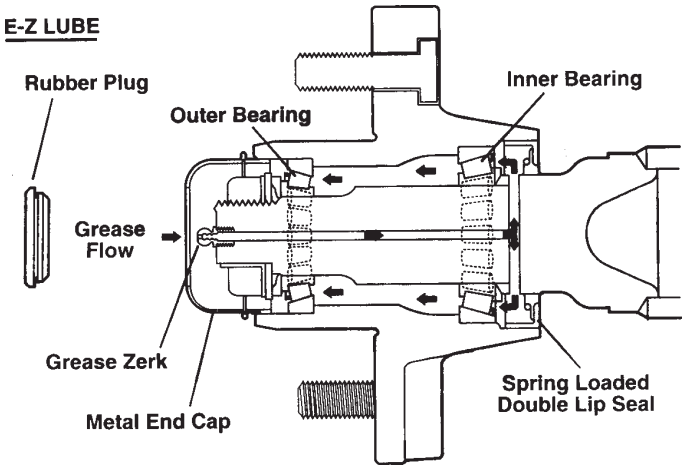


Fig. 26.1

BRAKE AND AXLE ASSEMBLY

Fig. 26.2

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



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

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

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

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.

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.

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, free of charge, from the NHTSA website.

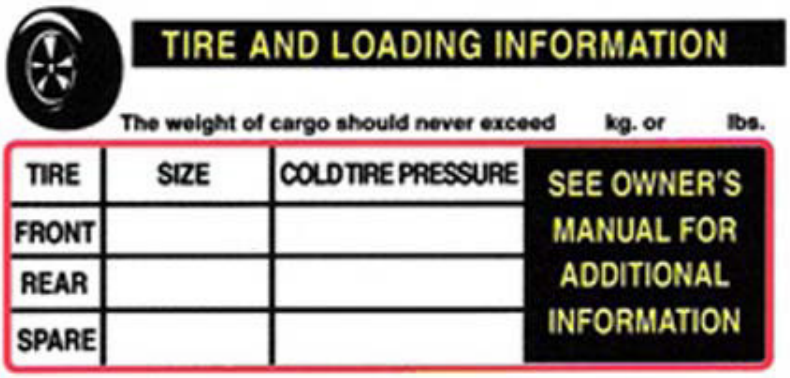
Tire Safety Terminology Glossary

- **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 Soldier'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 Soldier'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 Soldier'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 Soldier must not cause the total weight of the Soldier to exceed the stated GVWR.



Steps for Determining Correct Load Limit

1. Locate the statement "The weight of cargo should never exceed 771 kg or 1700 lbs" on your tire information placard.
2. This figure equals the available amount of cargo and luggage load capacity.
3. 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 Soldier's tires. The internal heat generated form 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 Soldier 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 then 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 groves. If they appear even with the outside of the tread, the tire should be replaced.
- Replacement tires should be the same size as the Soldier's original tires. To prevent error and maintain safety, it is recommended that all replacement parts be purchased through Spartan Tool LLC.

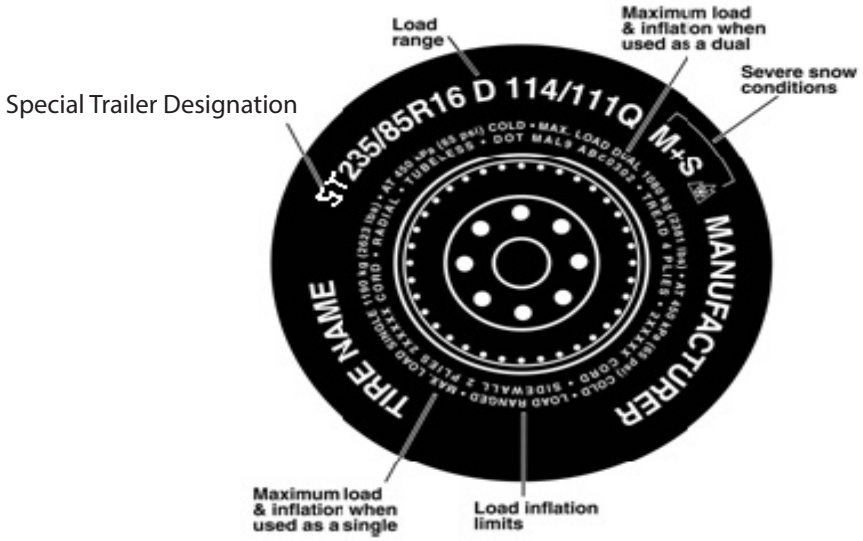
Tire Safety Information

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.

Care & Maintenance

ENGINE

- **Oil**—SAE 10W30 (1.16 qt capacity)
  - Check engine oil with every usage. Make the first engine oil change after (1) month or 20 hours of operation and every (6) months or 100 hours of operation thereafter.
- **Air Cleaner**—Dual element type
  - Check air cleaner with every usage. Clean every (3) months or 50 hours of operation.
- **Sediment Cup**
  - Check every (6) months or 100 hours of operation.
- **Spark Plug**—Champion RC12YC
  - Check every (6) months or 100 hours of operation.
  - Replace every year or 300 hours of operation.

PUMP

- **Oil**—Giant synthetic or a 15W-50 synthetic motor oil (Capacity: 21 fl oz)
  - Change oil after the first 50 hours of operation, then at regular intervals of 500 hours or less, depending on operating conditions.
- **Inlet strainer**
  - Check inlet strainer before every usage to ensure that it is not blocked. Take care to ensure that no dirt or particles are allowed to enter the pump system.

WARNING: Do not exceed 3,000 PSI. Injury or machine damage may result.

BATTERY

- **12V DC**, 17.5 Amp Hour—310 CCA
  - Maintenance-free battery. See battery for warnings.

WARNING: The battery contains sulfuric acid (electrolyte). Contact with skin or eyes may cause severe burns. Wear protective clothing and a face shield.

FREEZE PROTECTION

Cold Weather Protection: To avoid damage to the pump and water jet hose, keep the Soldier from freezing temperatures. If the Soldier must be stored in freezing temperatures, you must use one of the following methods:

- **Method 1:** Use pressurized air to blow out any remaining water left inside pump and hose by using the air blow-out feature (located next to the pressure gauge).
- **Method 2:** Attach a short garden hose (not to exceed 4 feet) to the pump inlet valve and put the other end of the garden hose into a mixture of 50% antifreeze and 50% water. Cycle antifreeze mixture through the system. When antifreeze flows from the outlet, the system is protected.

Troubleshooting

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Low pressure or flow.	Clogged inlet filter or improper size.	Clean. Use adequate size. Check more frequently.
	Inadequate water supply.	Check flow available to pump.
	Worn nozzle.	Replace nozzle of proper size.
	Leaky discharge hose.	Repair or replace.
	Pressure gauge inoperative or not registering accurately.	Check with new gauge. Replace worn or damaged gauge.
	Air leak in inlet plumbing.	Disassemble, reseal, and reassemble.
	Worn packing seals.	Replace packing seals.
	Fouled or dirty inlet or discharge valves.	Clean inlet and discharge valve assemblies.
	Worn or plugged relief valve on pump.	Clean, reset, and replace.
	Cavitation.	Check suction lines on inlet of pump for restrictions.
	Unloader.	Check for proper operation.
	Pump not fully primed.	Remove jetter hose at outlet. Turn pump inlet valve on. Run pump until fully primed.
	Low engine RPM.	Check full throttle speed (adjust to 3,200 RPM).
Rough/pulsating operation with pressure drop.	Pump not fully primed.	Remove jetter hose at outlet. Turn pump inlet valve on. Run pump until fully primed.
	Worn packing.	Replace packing.
	Inlet restriction.	Check system for stoppage, air leaks, and correctly sized inlet plumbing.
	Cavitation.	Check inlet lines for restrictions and/or proper size.
Water in crankcase.	High humidity.	Reduce oil change interval.
	Leakage of crankcase or seals installed backwards.	Replace packing.
	Worn seals.	Replace seals.
Noisy operation.	Pump not fully primed.	Remove jetter hose at outlet. Turn pump inlet valve on. Run pump until fully primed.
	Worn bearings.	Replace bearings. Refill crankcase with recommended lubricant.
	Cavitation.	Check inlet lines for restrictions and/or proper size.
	Coupler loose on crankshaft.	Check and tighten set screws.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Frequent or premature failure of the packing.	Damaged or worn plungers.	Replace plungers.
	Abrasive material in fluid being pumped.	Install proper filtration on pump inlet plumbing.
	Excessive pressure and/or temperature of fluid being pumped.	Check pressures and fluid inlet temperature. Be sure they are within the specified range.
	Over pressure of pumps.	Reduce pressure.
	Running pump dry.	Do not run with inadequate water supply.
Excessive leakage.	Worn or cracked plungers.	Replace plungers.
	Worn packing/seals.	Adjust or replace packing seals.
	Excessive vacuum.	Reduce suction vacuum.
	Inlet pressure too high.	Reduce inlet pressure.

Warranty Information

For our terms and conditions, including warranty, please visit https://spartantool.com/pages/terms-and-conditions. For warranty assistance, please contact us at (800) 435-3866 or customerservice@spartantool.com.

CONTACT US

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Notes

SPARTAN TOOL

FOR TOUGH CUSTOMERS. SINCE 1943.

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