



SPARTAN

Warrior Series

Standard, Hi-Flow & Ultimate

Owner's Manual

Record the Serial Number of your

Warrior

and give the number to the factory
when ordering parts.

Serial

Number



Ultimate & High Flow Warrior



Standard Warrior

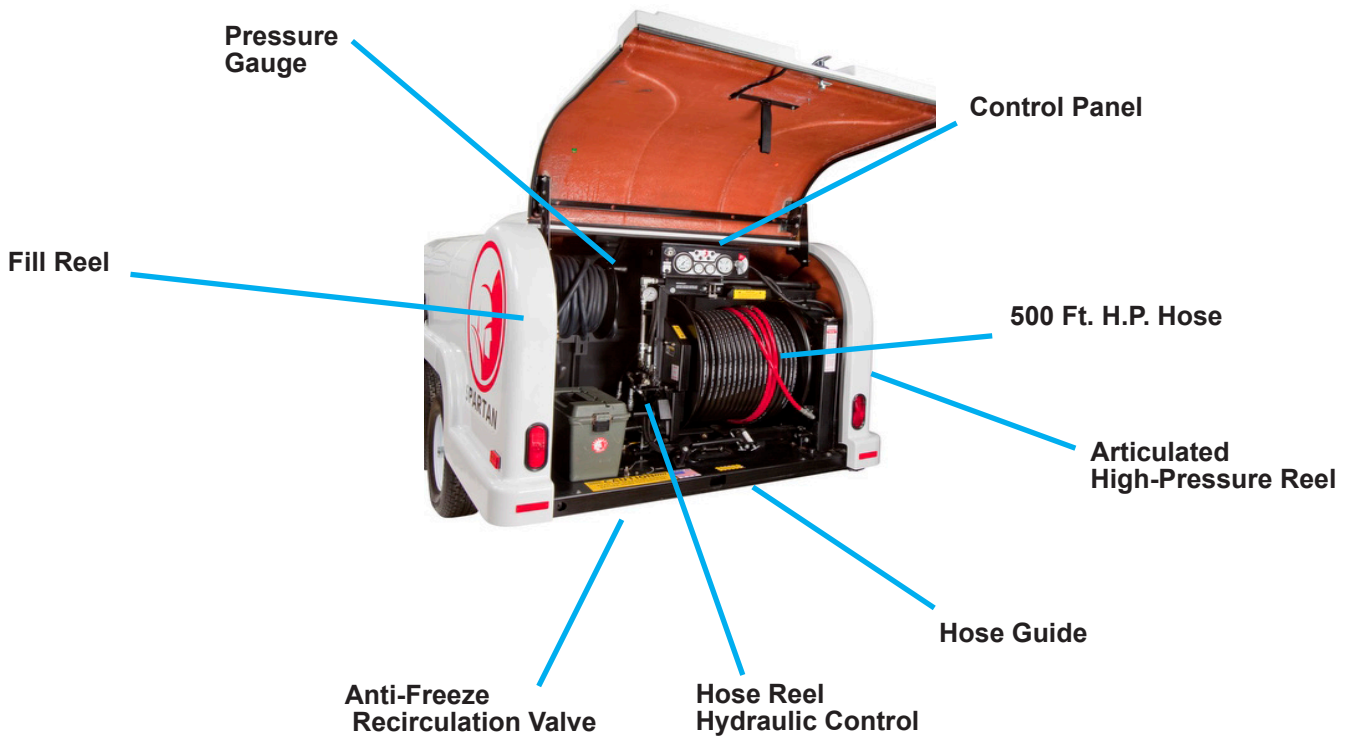
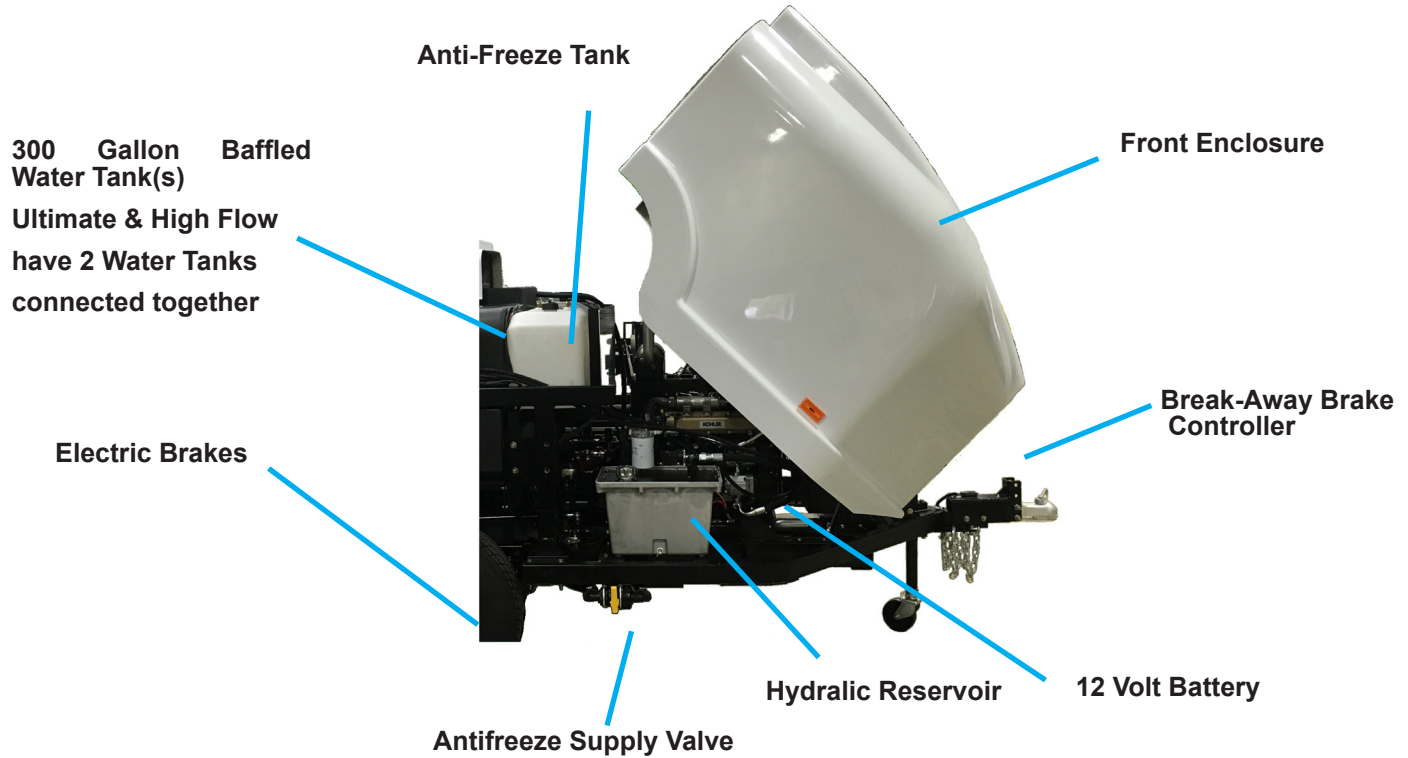
SPARTAN TOOL L.L.C.

800.435.3866

www.spartantool.com



Warrior Overview





Warnings



- Read the safety and operating instructions before using any Spartan Tool products. 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.
- Diesel is 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 diesel 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.
- Use Diesel STA-BIL Fuel Stabilizer during storage and during normal use to prevent fuel deterioration.
- 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.
- Insure 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 use the red leader hose provided.
- 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 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. 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.

“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.

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For Service and Part Information, please refer to the Warrior Service Manual r



Standard Warrior Water Jet Specifications



GENERAL

Pipe Sizes 3" to 24" Max. Water Delivery..... 18.0 GPM
Max. Pressure Delivery 4000 psi

TRAILER

Gross Vehicle Weight Rating (GVWR) 7060 Lbs (3202 kg)
Gross Axle Weight Rating (GAWR) 6460 Lbs (2930kg)
Trailer Length 160"
Trailer Width 73"
Trailer Height 74"
Hitch 2" Ball Type (Class IV)
Tires ST235-80-R16BE-I
Water Tank 300 Gallon Capacity
Tires (Max Load) 3520 lbs (each)
Cold Inflation Pressure 80 PSI/552 kPa (each)
Rim (Diameter X Width X Capacity) 16" x 6" x 3750 lbs (each)

ENGINE Kohler Turbocharged Diesel (Tier IV)

Model KDI 2504 TCR
Horsepower 74@2600 RPM
Cylinders 4
Bore & Stroke 3.46 x 4.02
Displacement 151.45
Fuel Diesel Fuel Oil No. 2-D (ASTM D975-09 B-Grade 2-D S15)
Fuel Tank Capacity 20 Gal.
Cooling Water Cooled
Oil Capacity 3.5 Gal.
Alternator 65 Amp
Electric 12 Volt/Negative Ground
Powered Engagement Clutch WPT Clutch/Power Take Off
..... enables engine to run without circulating pump

PUMP

Max. Pressure 4000 psi RPM 1250
Max. Water Output 18 GPM Plungers 3
Max. Temperature 140° F

REWIND

Hydraulic/Capacity Hydraulic Pump & Motor with 8 Gallon Reservoir



Ultimate Warrior Water Jet Specifications



GENERAL

Pipe Sizes 3" to 24" **Max. Water Delivery..... 18.0 GPM**
Max. Pressure Delivery 4000 psi

TRAILER

Gross Vehicle Weight Rating (GVWR) 9900 Lbs (4495 kg)
Gross Axle Weight Rating (GAWR) 4700 Lbs (2134kg each)
Trailer Length 191"
Trailer Width 73"
Trailer Height 74"
Hitch 2-5/16" Ball Type (Class IV)
Tires ST225-75-R15BD
Water Tank 600 Gallon Capacity
Tires (Max Load) 2540 lbs (each)
Cold Inflation Pressure 65 PSI/448 kPa (each)
Rim (Diameter X Width X Capacity) 15" x 6" x 2600 lbs (each)

ENGINE Kohler Turbocharged Diesel (Tier IV)

Model KDI 2504 TCR
Horsepower..... 74@2600 RPM
Cylinders 4
Bore & Stroke 3.46 x 4.02
Displacement 151.45
Fuel Diesel Fuel Oil No. 2-D (ASTM D975-09 B Grade 2-D S15)
Fuel Tank Capacity 20 Gal.
Cooling Water Cooled
Oil Capacity 3.5 Gal.
Alternator 65 Amp
Electric 12 Volt/Negative Ground
Powered Engagement Clutch..... WPT Clutch/Power Take Off
enables engine to run without circulating pump

PUMP

Max. Pressure 4000 psi **RPM.....1250**
Max. Water Output 18 GPM **Plungers 3**
Max. Temperature 140° F

REWIND

Hydraulic/Capacity Hydraulic Pump & Motor with 8 Gallon Reservoir



Hi-Flow Warrior Water Jet Specifications



GENERAL

Pipe Sizes 4" to 36" Max. Water Delivery..... 35 GPM
Max. Pressure Delivery 3000 psi

TRAILER

Gross Vehicle Weight Rating (GVWR)..... 9900 Lbs (4495 kg)
Gross Axle Weight Rating (GAWR) 4700 Lbs (2134kg) (each)
Trailer Length 191"
Trailer Width 73"
Trailer Height 74"
Hitch 2-5/16" Ball Type (Class IV)
Tires ST225-75-R15BD
Water Tank 600 Gallon Capacity
Tires (Max Load) 2540 lbs (each)
Cold Inflation Pressure 65 PSI/448 kPa (each)
Rim (Diameter X Width X Capacity) 15" x 6" x 2600 lbs (each)

ENGINE Kohler Turbocharged Diesel (Tier IV)

Model KDI 2504 TCR
Horsepower 74@2600 RPM
Cylinders 4
Bore & Stroke 3.46 x 4.02
Displacement 151.45
Fuel..... Diesel Fuel Oil No. 2-D (ASTM D975-09 B Grade 2-D S15)
Fuel Tank Capacity 20 Gal.
Cooling Water Cooled
Oil Capacity 3.5 Gal.
Alternator 65 Amp
Electric 12 Volt/Negative Ground
Powered Engagement Clutch..... WPT Clutch/Power Take Off
enables engine to run without circulating pump

PUMP

Max. Pressure 3000 psi RPM.....1000
Max. Water Output35 GPM Plungers 3
Max. Temperature 140° F

REWIND

Hydraulic/Capacity Hydraulic Pump & Motor with 8 Gallon Reservoir



Warrior Features



FEATURES

Low Water and Oil Protection

- High Engine Temperature Protection
- 1/2" x 500' Thermal Plastic High Pressure Hose (5/8" Hose for High Flow)
- 1/2" x 15' Colored Leader hose
- 5/8" x 100' Supply Hose, Mounted On Reel
- Torsion Axle Suspension With Electric Brakes (Dual Axles for Ultimate & High Flow)
- Tier IV Diesel Engine Meets US Emissions Standards Thru 2016
- Easy Access Pump Inlet Filter
- Safety Engagement Clutch (enables engine warm up without running pump)
- Hydraulic Hose Rewind and Hose Rewind Guide
- Rear Operator Control and Instrument Gauge
- 12 Volt Accessory Plug
- Negative Ground Wiring
- 5' Break Away Wiring Harness
- Hitch Jack with Swivel Caster Wheel
- Class IV 2" (Standard) 2-5/16" (Ultimate & High Flow) Hitch with Safety Tether Brake
- Automatic Pressure Regulator
- 180 Degree Pivoting Hose Reel and Controls
- Fully Enclosed
- Nozzle Storage
- Wash Down Wand
- Top-Mounted Amber Strobe Light
- 4 Preassigned Engine Speed Settings
- ST235-80-R16E-I Tires/Wheel on Standard (ST225-75-R15BD for Ultimate & High Flow)
- Bearing Buddies
- Open and Closed Nozzles
- Hose and Hydrant Fill Valves
- Anti-Freeze Recovery/Winterization System
- Electric Operated Water Pulsator
- National Association of Trailer Manufacturers Certified



Towing Instructions



Before hitching and towing on public roads, check that the tow vehicle uses a 2-5/16" ball on a hitch rated class IV, (2" diameter for Standard Warrior) make sure keeper engages ball to secure hitch. Adjust if necessary.

The 300 gallon water tank(s) are equipped with internal baffles which minimize water sloshing when towed, however; the following 2 rules may limit your vehicles towing capacity and the tank fill level 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 vehicle's trailer hitch - Standard Warrior: Class IV - 10,000 lbs. Towing Capacity
- Ultimate & High Flow Warrior: Class IV- 12,000 lbs Towing Capacity

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

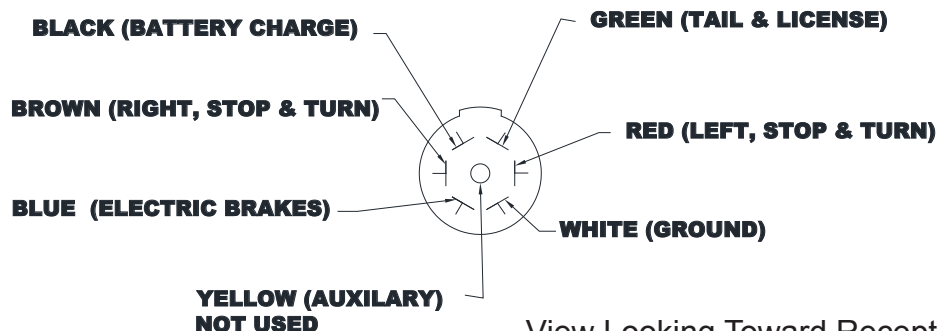
- Refer to your Vehicle Owner's Manual for listed trailer towing capacity.
- Trailer towing capacity should equal GCWR minus vehicle weight, cargo weight, people weight, and (vehicle) fluids weight.
- Check axle load rating.

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. 8-1 for re-wiring to a different plug design.



— Always use trailer lights.



View Looking Toward Receptacle
Fig. 7-1



Towing Instructions (cont.)



Towing

1. Check that the Ball Load Rating is the same or greater than the Coupler Load Rating.
2. Check that the ball size is the same as the coupler.
3. Loosen loop nut until spring pushes lip down far enough to insert trailer hitch ball.
4. Position hitch coupler above trailer hitch ball.
5. Lower trailer tongue until ball rests in ball socket..
6. Tighten loop nut to pull lip up to ball. While tightening loop nut feel under the coupler to make sure square bolt head is up in the square lip cavity is under the ball head. Jiggle coupler up and down while tightening to make sure it is snugly seated on ball.
7. Lift coupler upwards to test that it will not separate from ball.

Caution: Hand-Tighten coupler snug on ball. Do not use a wrench or bar to tighten coupler. Over-tightening strains wears bolt and nut threads, and may cause coupler to seize on the ball and turn on its own nut thus loosening the ball on right turns.

8. 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.

9. 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.

10. Cross safety chains under tongue and securely attach to bumper or frame of tow vehicle.

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

11. Fully retract hitch jack and remove skid plate. This will provide adequate ground clearance for transport.
12. Return high pressure reel to towing position, engage the transit lock, and place the hydraulic control lever in the neutral position.
13. 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.

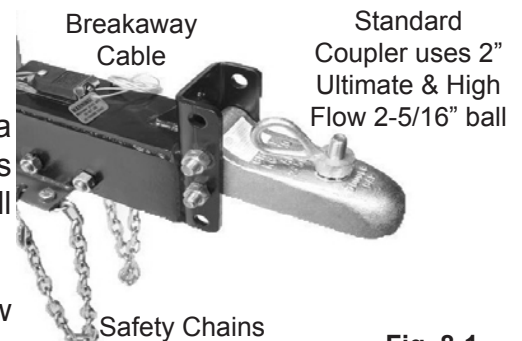


Fig. 8-1



Fig. 8-2



Towing Instructions (cont.)



Cast Steel Couplers

No Wrench or Bar Needed to Tighten Nut Down Snug

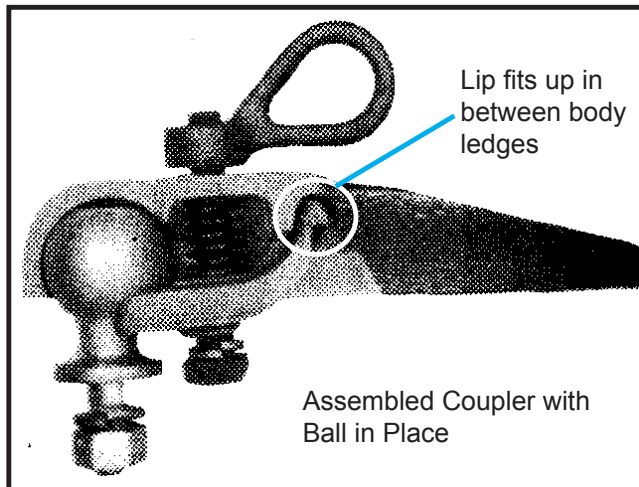


Fig. 9-1

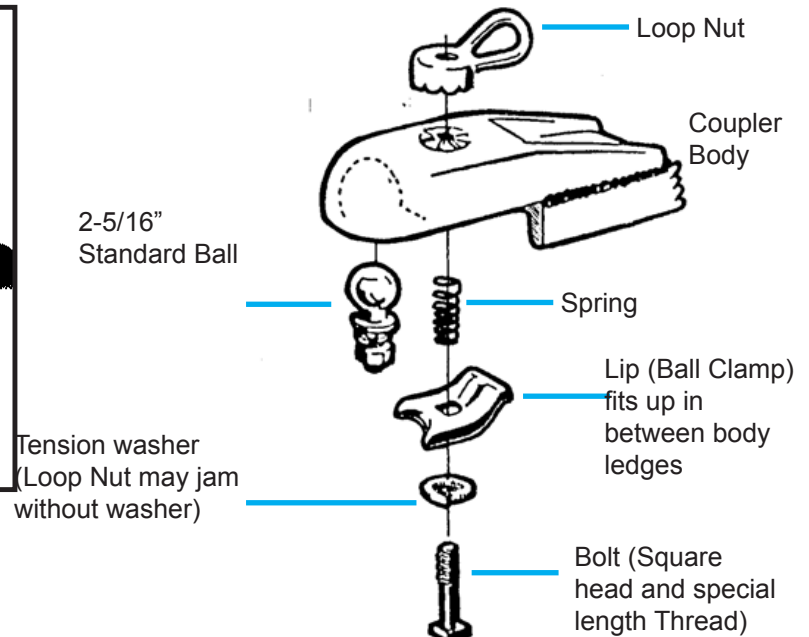


Fig. 9-2

Parts Function. There is a definite safety purpose for each part. Install ALL parts as shown. The body and parts shown comprise a positive locking device. The square bolt head cannot turn in the lip (ball clamp), the loop nut must turn uphill against gravity and ratchet up and down over the ribs around the bolt hole in order to loosen. Both the washer and the spring exert pressure down, joining the ribs and notches securely. A safety chain may be passed through the loop nut handle for added safety. All these features prevent loosening. Do not ignore them.

DO NOT substitute regular nuts or other loop nuts.

DO NOT use hex head bolts in place of square head bolt.

DO NOT leave out washer or spring. Check coupler to make sure the lip and all parts are in place correctly before using or renting.



Fig. 9-3

Optional - P/N 79853600
2 5/16" Ball Coupler



Fig. 9-4

Optional - P/N 79853700
2 1/2" ID Pintle Ring



Pump and Pressure System



The pump and relief valve are the heart of your jet. They have been specially designed for use with cold water (140°F max) 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 Standard and Ultimate Warrior pump, valving, and hoses can support 4000 psi working pressures. The High Flow Warrior supports up 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 4000 psi, (3000 psi for High Flow Warrior) and the wash down gun operates at lowest engine speed. If leaks develop in the system between the relief valve and hose reel valve (or gun valve) you will hear intermittent engine surges in by-pass as the by-pass 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 maximum regulator setting. If these pressures are seen with normal engine speed check and clean the nozzles. When using optional lengths of 1/4" hose (>75') the operating pressure can also exceed maximum setting at full gpm. Reducing engines rpm will produce lower pressures to prevent regulator valve from by-passing off and on.

Clean water filter daily. A clogged filter will cause pump to run dry and can cause expensive damage to pump

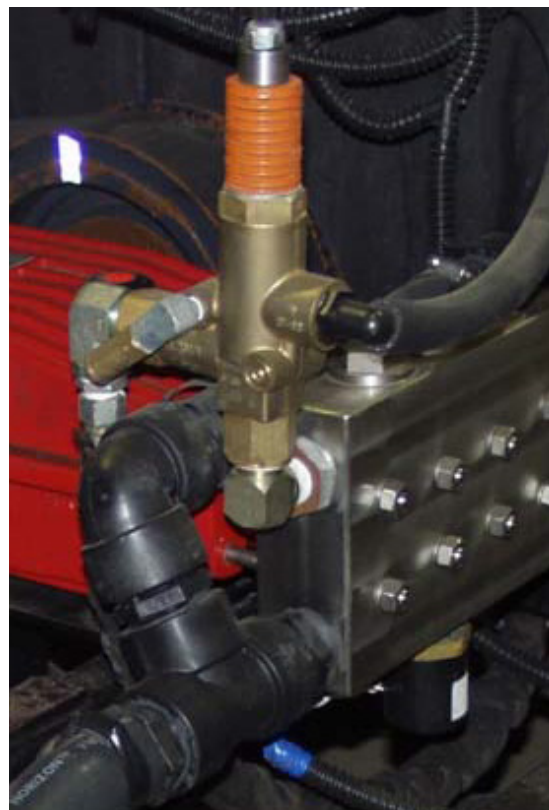
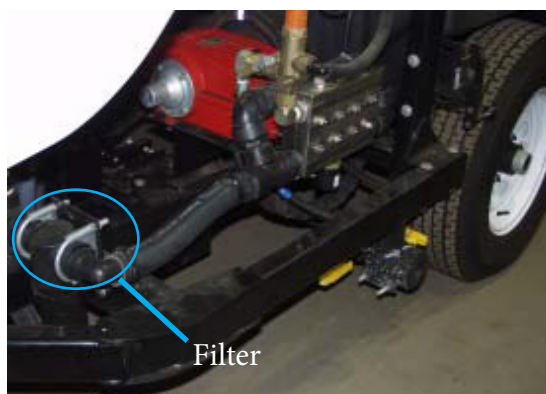


Fig. 10-1





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.

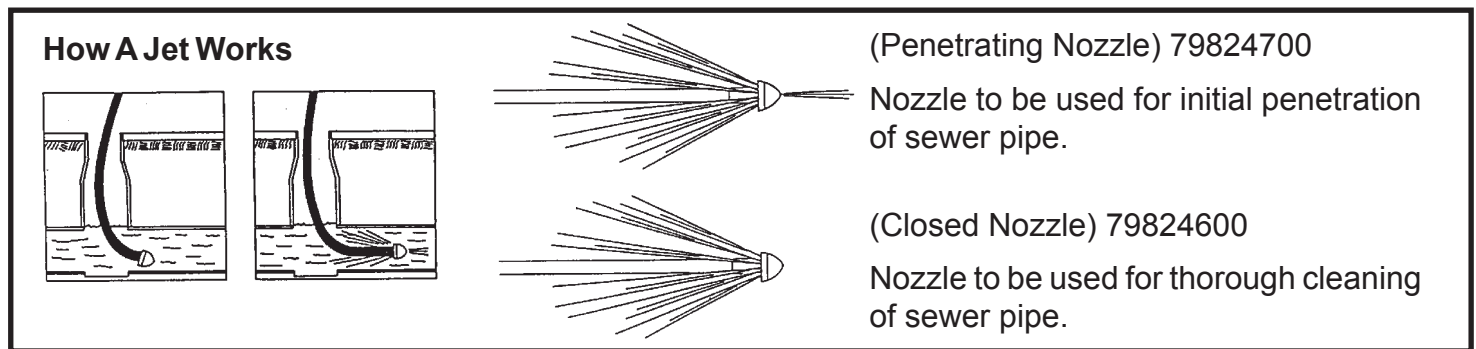


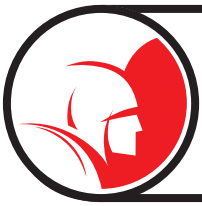
Fig. 11-1



Included Nozzles



	Penetrating Nozzle	Closed Nozzle
Standard Warrior	79824700	79824600
Ultimate Warrior	79924700	79824600
High Flow Warrior	79966100	79966000



Engine Operating Procedure



Kohler Diesel Engine is equipped with an electronic governor for speed control and engine regulation. Engine speeds are preset at the factory and should require no adjustment in the field. The Warrior is also equipped with a low water safety gauge, which indicates critical water levels in the supply tanks. When tripped, the low water safety switch will automatically shut down the engine.

Start Up

- Check water tank level. This water jet is equipped with a Low Water Shut-Off switch that will prevent the clutch from engaging at low water levels.
- Check fuel level.
- **Note:** Also Check engine and pump oil levels per manufacturer specifications (attached).
- Confirm fuel valve on top of fuel tank is ON.
- Turn key switch to crank position and start engine
- Allow engine to warm up on lowest engine speed for several minutes.

Note: Engine will operate at a preset slow idle for 30 seconds after starting. Engine speed change will not operate during the preset 30 second slow idle.

Note: If the low water switch is tripped, the engine will automatically shut down and will not continue to run. Operate low water over ride if desired to run despite low water. Do not engage clutch when over riding low water condition

Engine Shut-Down

- Reduce engine speed to idle by pressing down arrow button
- Idle engine for at least 5 minutes to allow systems to cool.
- Move all panel rocker switches to OFF.
- Turn OFF key switch

Fig. 11-1



Water Tank Filling



Fill the water tank from a clean water source. Always flush rust out of hydrants before connecting fill hose. 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.



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.13-1 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 suction) end at the downhill side.

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 corners.



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

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

- Disconnect ball hitch by loosening ball clamp and jacking hitch up.
- Disconnect safety chains and light cord before driving away.

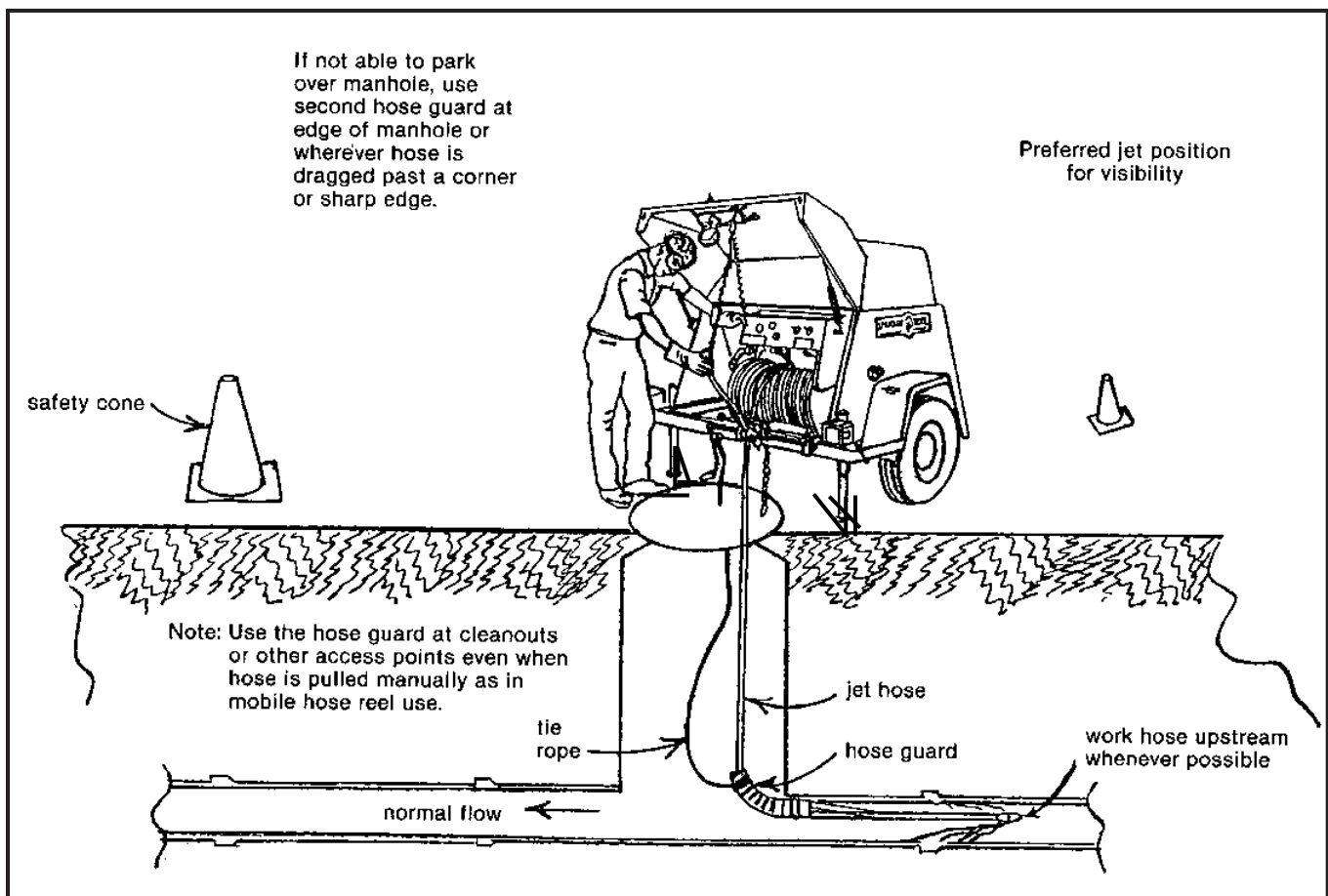


Fig. 13-1



Hydraulic Rewind Operating Instructions



The hydraulic rewind control valve can be used to feed out high pressure hose and rewind hose back to the reel. The control lever should be left in its neutral position while transporting trailer jet unit.

The high pressure hose reel is hydraulically locked from rotating when in neutral (position between hose in and out). Move hydraulic control back to rewind hose on reel and forward to power feed hose off reel. Move hydraulic control completely forward until spool goes into detent; reel will now free spin.

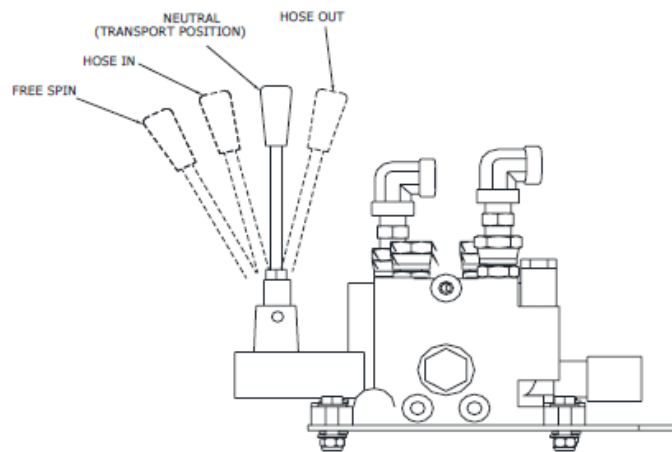


Fig. 14-1



Operating Instructions



Operation:

Move hydraulic control lever completely forward into “Free Spin” position. Select and install nozzle, hose guard(s), and roller guides.



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

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

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



Operating Instructions (cont.)



Turn H.P. water control switch to ON and choose operating pressure desired. As the nozzle pulls hose into the pipe, the hose reel can free spin or hydraulically feed hose out. 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 few ft. Repeat until water runs clean from the pipe.

Warning: Do not operate unit in the high engine speed with reel supply valve closed or clutch disengaged for longer than necessary.



When finished, turn water control switch to OFF, idle down engine, and disengage clutch before removing nozzle from pipe.

Hint: Use 15' leader hose as indicator of how close the nozzle is to the pipe opening.

Wind hose back onto reel, remove hose guard and nozzle from hose. Secure hose end to recirculation valve located on the right side of the H.P. reel. Store all parts in tool box compartment. Follow engine shut down procedure.

Reminder: All rocker switches, including the Engine key switch must be off to prevent battery drain while engine is shut down.

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

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. 16-1 & 16-2).

— 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 all Warriors are capable of various high pressure cleaning jobs, jetting pipes of 4" - 36" is typically the major work required of the jet.

The hose reel is designed for outdoor applications. An optional portable hose reel and 1/4" drain hose can be purchased for indoor applications, remote applications, and for lines smaller than 6". The sewer hose should always be replaced when the reinforcement cord can be seen due to a worn cover.

The Warrior 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 79966100 and 79966000 are standard equipment for the High Flow model. (See page 13 additional nozzles). Nozzle holes will wear after continuous use. If the system pressure 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 Obstructions Are Encountered



Fig. 16-1



Fig. 16-2

- When obstruction or corners are encountered it may be necessary to manually rotate the hose (See Fig. 16-1) 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. 16-2).



Pulsation



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



Fig. 17-1

Electric
Pulsator

Pulsator
Switch

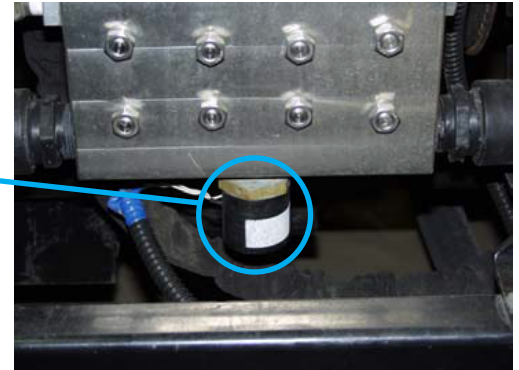


Fig. 17-2

Note: Operating pressure will decrease and fluctuate when pulsation is activated. See below (Fig. 17-3) for approximate pressures.

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

Fig. 17-3



Wash Down Gun



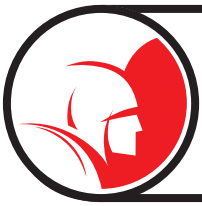
Note: To use wash-down gun do the following:

- 1 Disengage Clutch, (Turn water control switch OFF, (if equipped with optional remote control).
- 2 Connect wash-down gun to end of 500' HP hose.
- 3 Select Lowest Engine Speed setting. Engage clutch and turn water control switch ON, (Remote control units).

The wash down gun is used to control the spray lance. 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 an adjustable spray nozzle for general use. The wash down gun can also be used with the optional portable hose reel with 1/4" drain hose.

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!



Cold Weather Protection



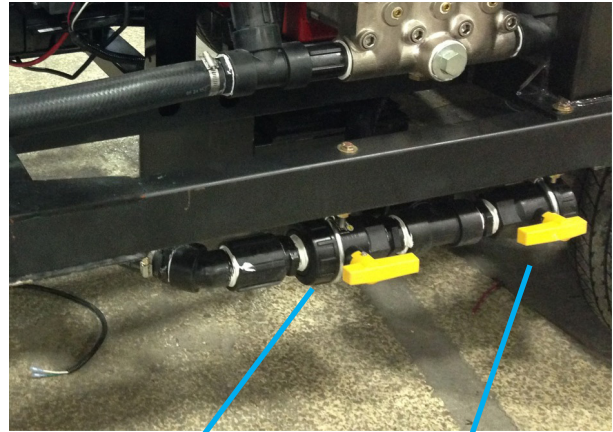
The Warrior comes equipped with versatile antifreeze system that allows the user to choose between different levels of protection.

Antifreeze Recirculation: Full Winterization

The pump and all hoses charged with antifreeze solution. Antifreeze is conserved by recirculating back to antifreeze tank.

Water Recirculation: Temporary Freeze Resistance

Water is recirculated through hoses and returned to main water tank.



Water Supply Valve **Fig. 18-1** Drain Valve

Full Winterization Procedure

1. Fill antifreeze tank with Propylene Glycol Antifreeze and water mixture (Follow manufacturer's recommendation regarding ratio of water to antifreeze).
2. Close water supply valve at pump and open antifreeze supply valve.
3. Remove nozzle or handgun from H.P. (high pressure) hose.
4. Move the selector valve to "Antifreeze Re-circulate."
5. Confirm the H.P. hose is secured and pointed in a safe direction before turning the water on.



6. Follow engine start up procedures. Select the lowest (1000 psi) Speed setting. Engage clutch lever. (Turn water control switch to ON if unit is equipped with optional remote control system) **Caution: Running the engine faster than the lowest setting during recirculation will result in excessive pressure which could cause serious damage and personal injury.**

7. Allow water to discharge from H.P. hose. Once the water has visibly changed to antifreeze, Disengage clutch (Turn water control switch to OFF).
8. Connect the handgun to the 500 foot H.P. hose. Maintain speed selection at its lowest setting (1000 psi) Engage Clutch, (Turn water control switch to ON) and leave on for 10 seconds. Turn water OFF. With a firm grasp of the handgun. Press handgun trigger to release pressure. **Caution: HOLD HAND GUN WITH TWO HANDS AND ALWAYS POINT HANDGUN AWAY FROM ANY OTHER PERSON(S).** Disconnect handgun from H.P. hose.

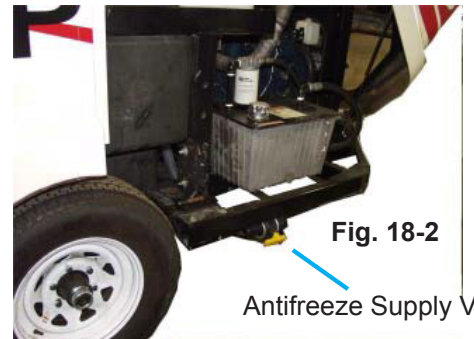


Fig. 18-2

Antifreeze Supply Valve

9. Connect the 500 foot H.P. hose to the recirculation connection fitting located on the baseplate. Connect the 100 foot Fill hose to the recirculation fitting located on the fill reel mounting bracket. Open fill hose valve.
10. Keeping the engine speed set to its lowest speed setting. Turn on water by engaging clutch (and changing water control switch to ON, if equipped with remote control). **Caution: Running the engine faster than the lowest setting during recirculation will result in excessive pressure which could cause serious damage and personal injury.**
11. Monitor the antifreeze tank. When antifreeze begins flowing into the antifreeze tank, turn the water control to OFF and shut down engine.
12. Close the antifreeze supply valve.
13. Open drain valve and water supply valve at pump to empty tank completely.
14. Open hydrant fill valve to confirm that no water is trapped.



Cold Weather Protection



Antifreeze Recovery Procedure

1. Close the drain valve and antifreeze valve.
2. Open water supply valve at the front of the unit. Open the fill hose valve at the rear of the unit.
3. Fill the water tank at least 1/4 full of water.
4. Connect the fill hose and H.P. hose to their recirculation connections.
5. Move selector valve to "Antifreeze Re-circulate."
6. Follow engine start up procedures. Select lowest engine speed(1000 psi) setting. Engage clutch lever (Turn water control switch to ON if unit is equipped with optional remote control system).

Caution: Running the engine faster than the lowest setting during recirculation will result in excessive pressure which could cause serious damage and personal injury.

7. Monitor the antifreeze tank.
8. Deactivate clutch (and move the water control switch to OFF), when either the antifreeze tank is full of antifreeze or when water is present in the stream.
9. Shut down engine.

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. Remove nozzle or handgun from H.P. hose reel.
2. Connect the 500 foot H.P. hose to the recirculation connection fitting located on the baseplate.
3. Connect fill hose to recirculation fitting located on the fill reel mounting bracket.
4. Set selector valve to "Water Recirculate."
5. Follow engine start up procedures. Select engine lowest speed (1000 psi) setting. Turn on water by engaging the clutch lever (Change water control switch to ON if unit is equipped with the optional remote control system).

Caution: Running the engine faster than the lowest setting during recirculation will result in excessive pressure which could cause serious damage and personal injury.

6. Recirculate water for as long as desired. Disengage clutch (Turn water control switch to OFF), and stop engine.



Fig. 19-1

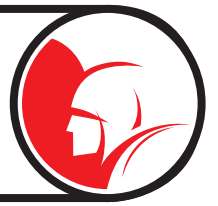
Used only on units with optional remote control



Fig. 19-2



Lubrication and Maintenance



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

Engine PTO and clutch.

Grease every 100 hours (a).

Apply about one grease gun shot of an NLGI No. 2 Lithium Grease.

Clean, repack, and set main bearing endplay every 2 years or 4000 hours of operation. Inspect sealed for life pilot bearing for wear.

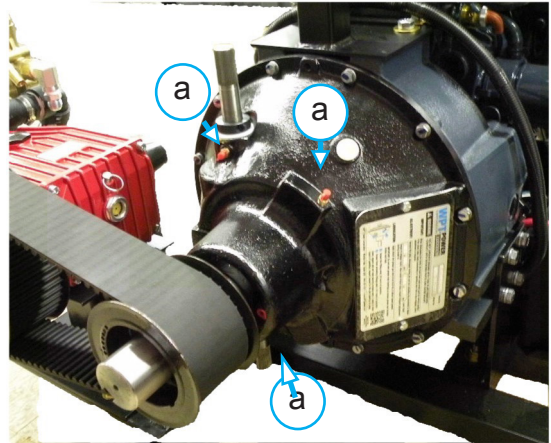


Fig. 20-1

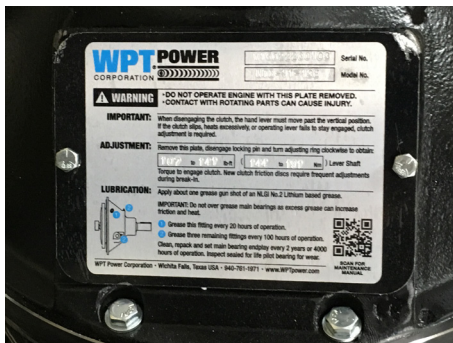


Fig. 20-4

High pressure reel

Oil chain every 200 hours (SAE 30 or heavier oil)

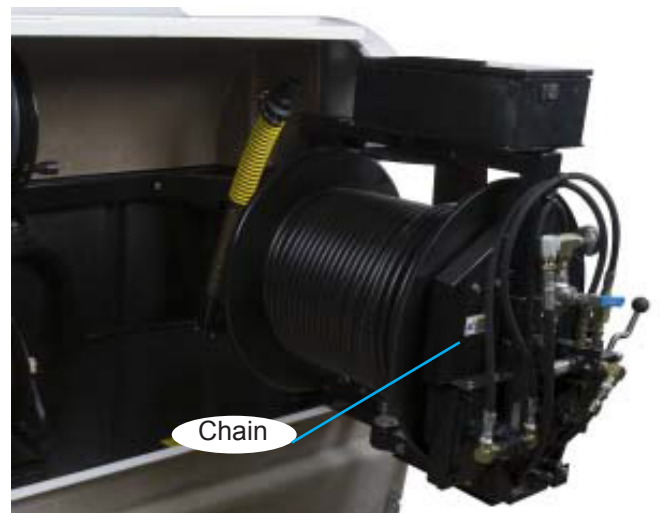


Fig. 20-2

Change hydraulic oil and filter every 500 hours.

Use Amoco - Rykon AW Oil 46.

Hydraulic Oil Filter: Spartan P/N 79807100.

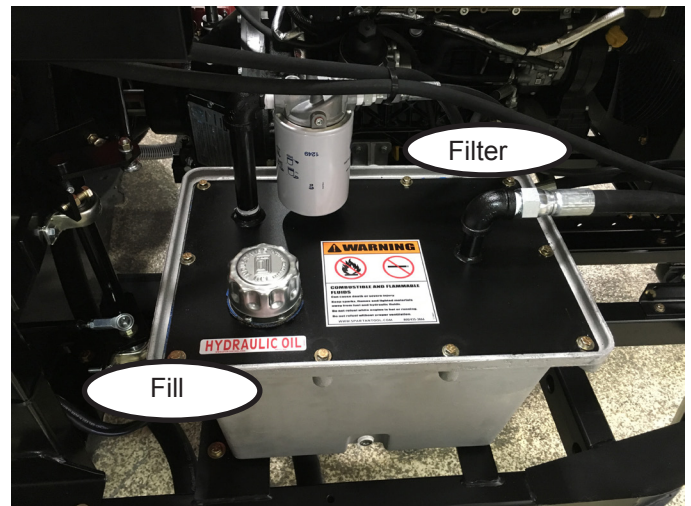


Fig. 20-3



Lubrication and Maintenance (cont.)



Change pump oil after first 50 hours and every 500 hours thereafter. Use SAE 80 gear oil.

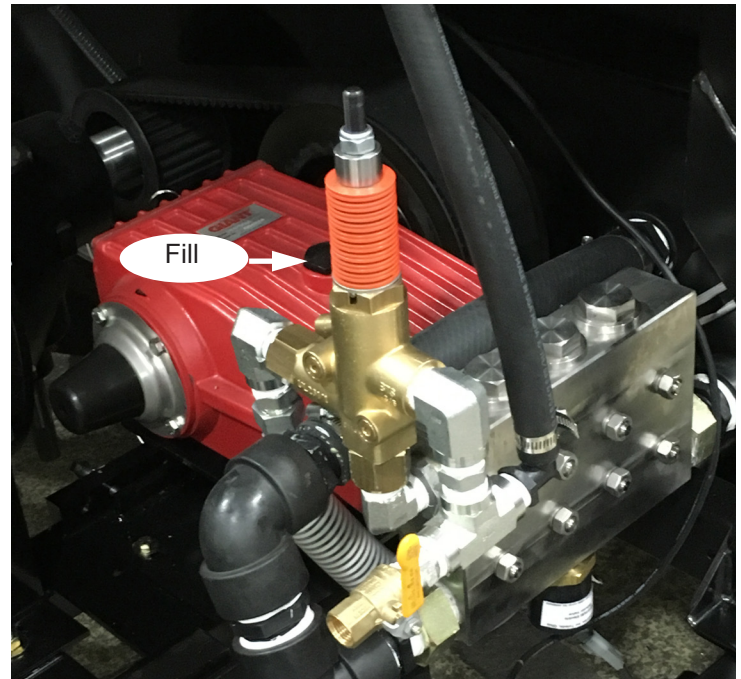


Fig. 21-1

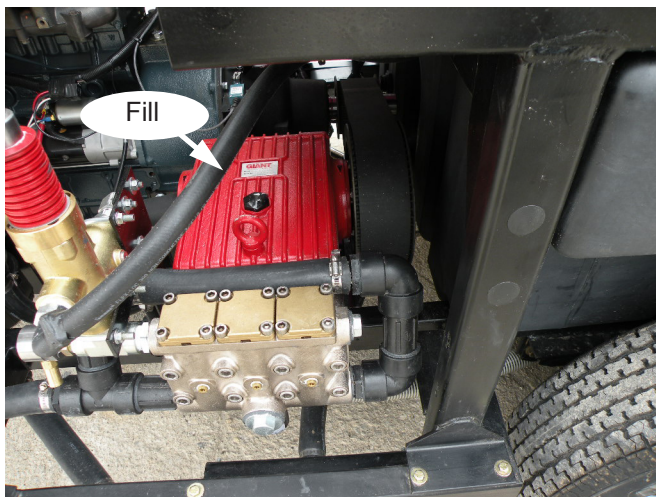


Fig. 21-2

High Flow Pump

Inlet Filter. Clean daily.

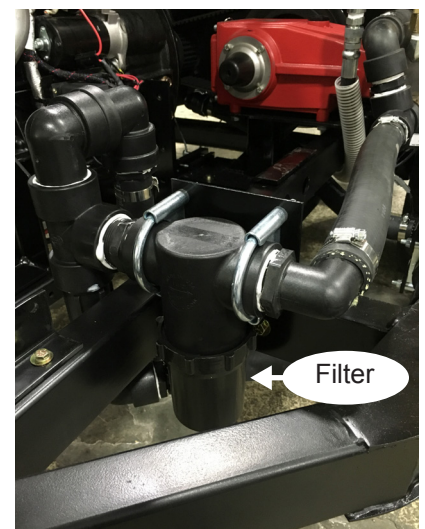


Fig. 21-3



Lubrication and Maintenance (cont.)



Fig. 22-1

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

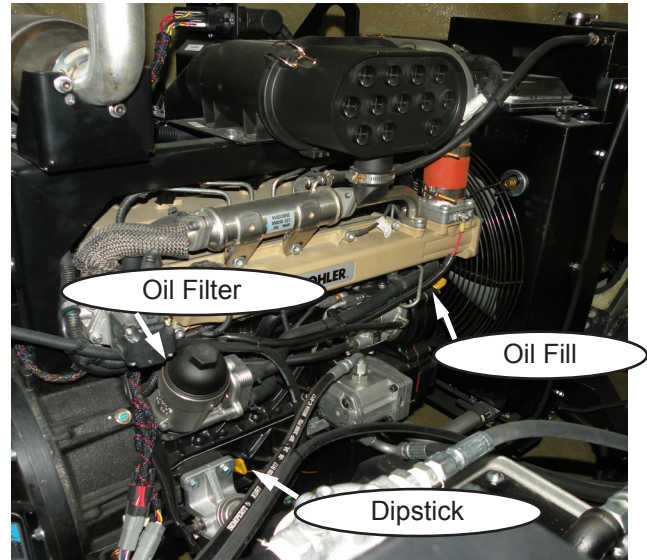


Fig. 22-2

Follow maintenance instructions in Kohler Diesel Engine Operator's Manual.

Note: Use the same type of diesel fuel as used in cars. (ASTM D975 reg. S 15) Keep fuel system clean.

- Use only Kohler approved filters, available at local Kohler diesel dealers:

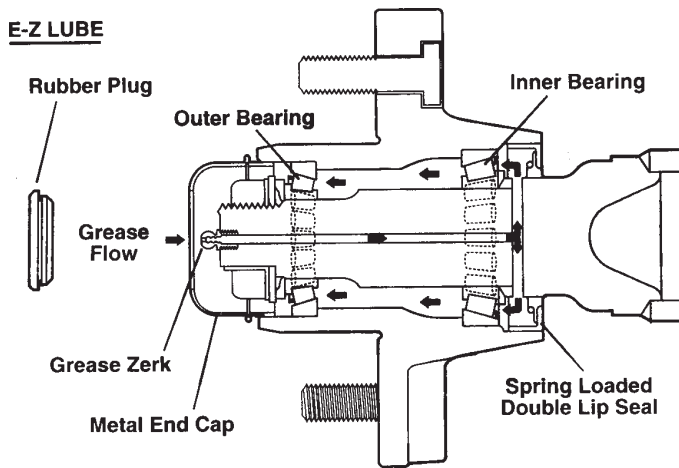


Fig. 22-3

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 section in the Dexter Axle Service Manual:

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



Fig. 22-4



Lubrication and Maintenance (cont.)



Check clutch engagement pressure:

Check clutch engagement force after the first 4 hours of engine operation. Then check again after another 4 hours. Then 8 hours after that. After the initial breaking period, check clutch engagement force periodically.

- With clutch in the disengaged OFF position, remove actuator bolt from front clutch lever. See Fig. 23-1.
- Using a torque wrench, 1-1/2" socket, and an extension (if needed), attach socket to clutch lever hex nut. See Fig. 23-2.
- Check the engagement torque. The correct clutch engagement force is between 107-141 ft.-lbs. If the engagement force has decreased below lowest allowed setting specified, adjustment to the clutch needs to be made (refer to clutch adjustment procedure on page 26). If the clutch is properly adjusted, reattach clutch linkage by reversing step "a."

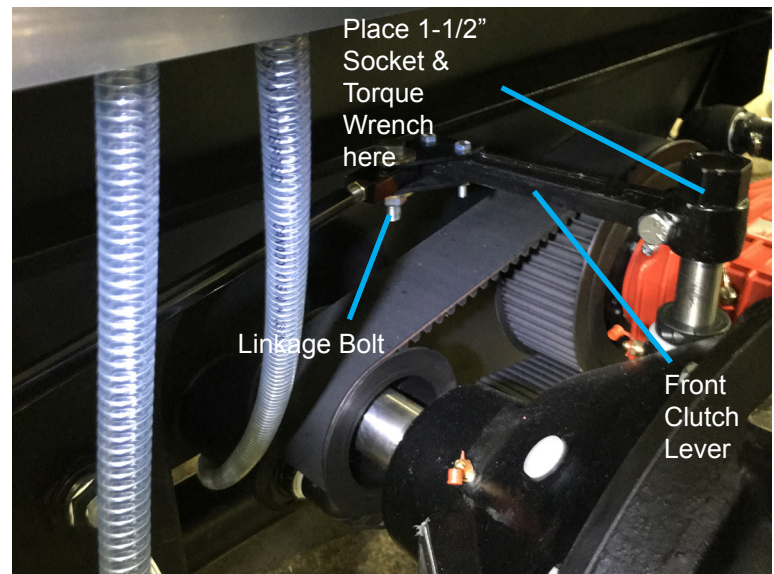


Fig. 23-1

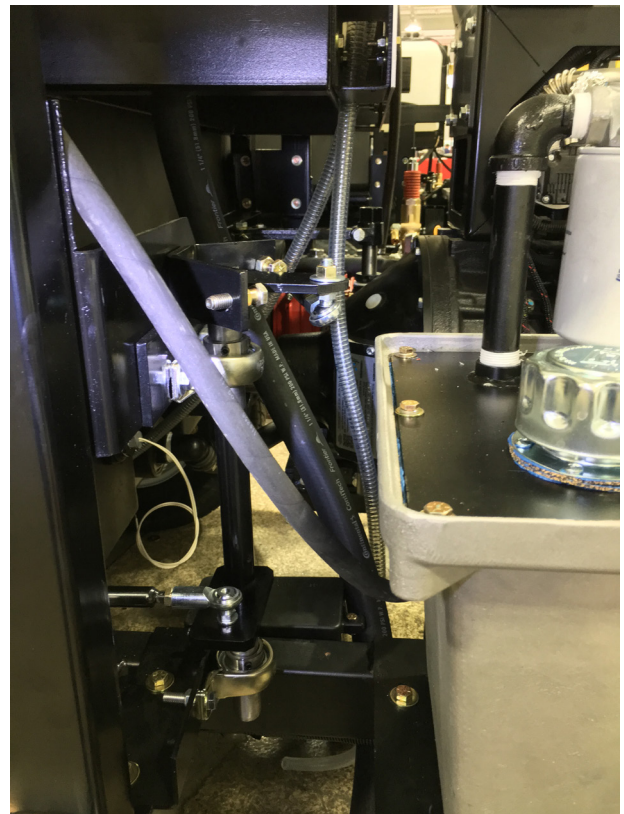
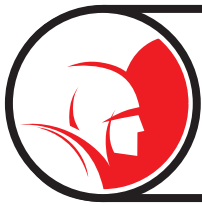
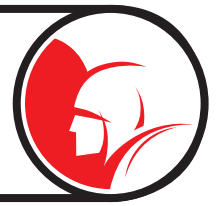


Fig. 23-2



Lubrication and Maintenance (cont.)



Clutch Adjustment Procedure:

PTO
NamePlate

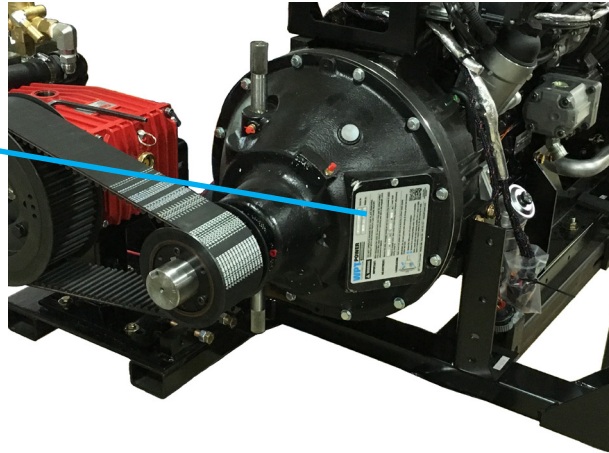


Fig. 24-1

- Remove PTO nameplate and rotate the shaft until you can access the adjusting ring lock.
- Remove the lock bolt and adjustment lock.
- Rotate the adjusting ring counter-clockwise to tighten the clutch. Rotating the adjusting ring clockwise will loosen the clutch. Adjust to obtain the proper handle engagement force.
- Recheck the engagement force using the torque wrench. Once clutch is properly adjusted, reposition the locking finger in a slot and tighten the adjustment lock.
- Secure PTO nameplate onto clutch.

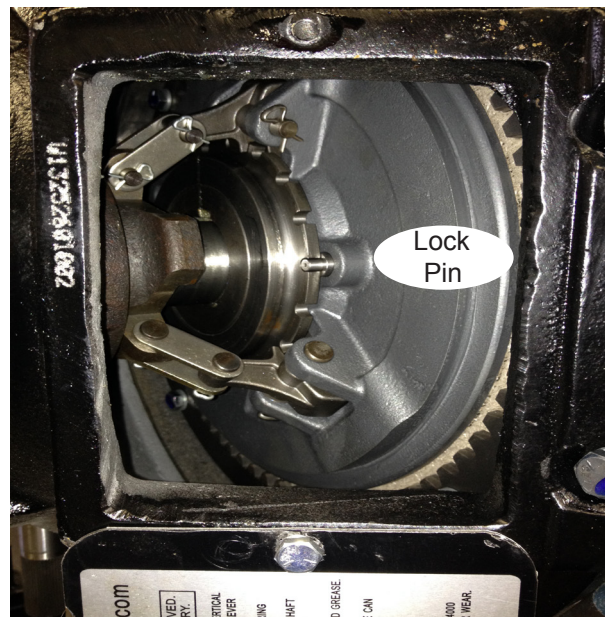


Fig. 24-2



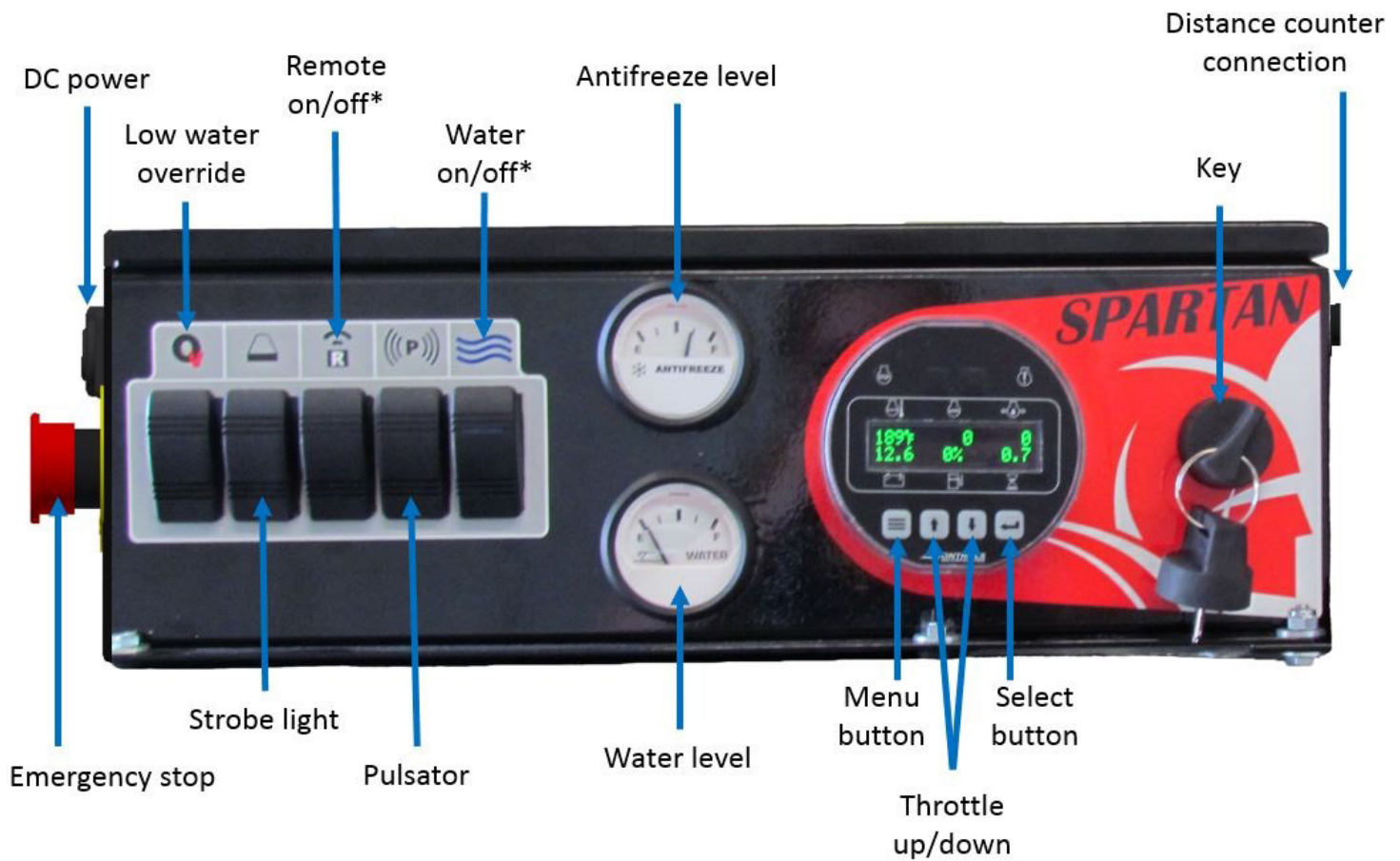
Pump System Malfunction Chart



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
Pressure Drop at Gun	Restricted Discharge Plumbing	Re-Size Discharge Plumbing to Flow Rate of Pump
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	Giant Oil is Recommended Adjust Oil Level to Proper Amount



Warrior Control Panel



* If your jetter is equipped with the optional remote control.

Fig. 26-1



Warrior Control Panel

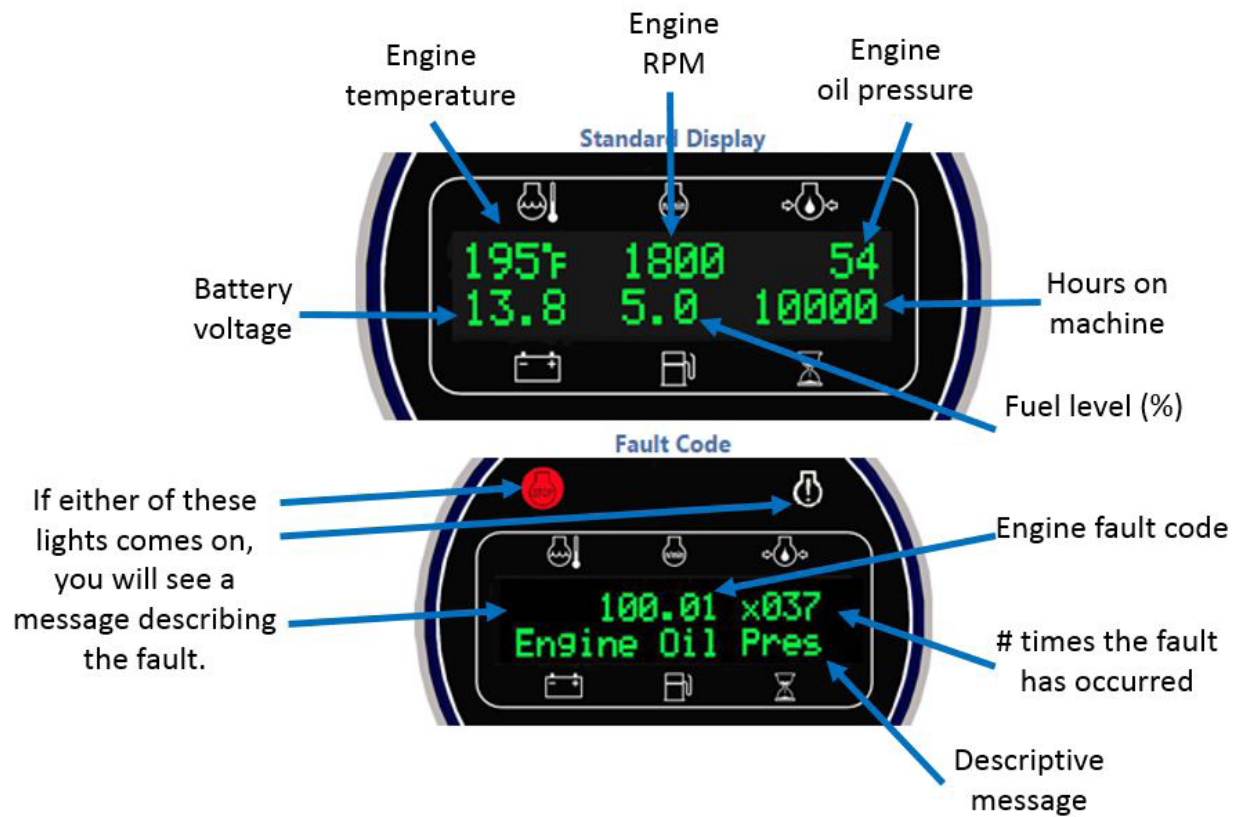


Fig. 27-1

Optional: Wireless Remote Control

If the Warrior is equipped with Wireless Remote Control Activation

Note: If this switch is in the ON position, all on-board controls are disabled (except ignition switch and beacon)

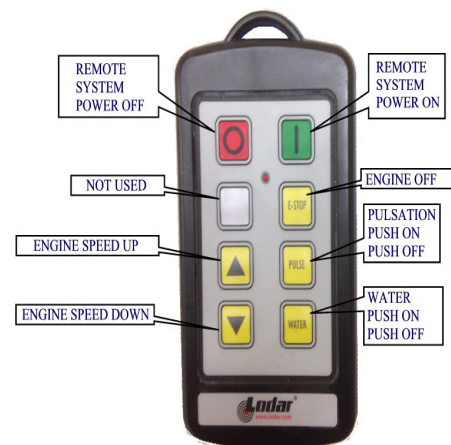


Fig. 27-2



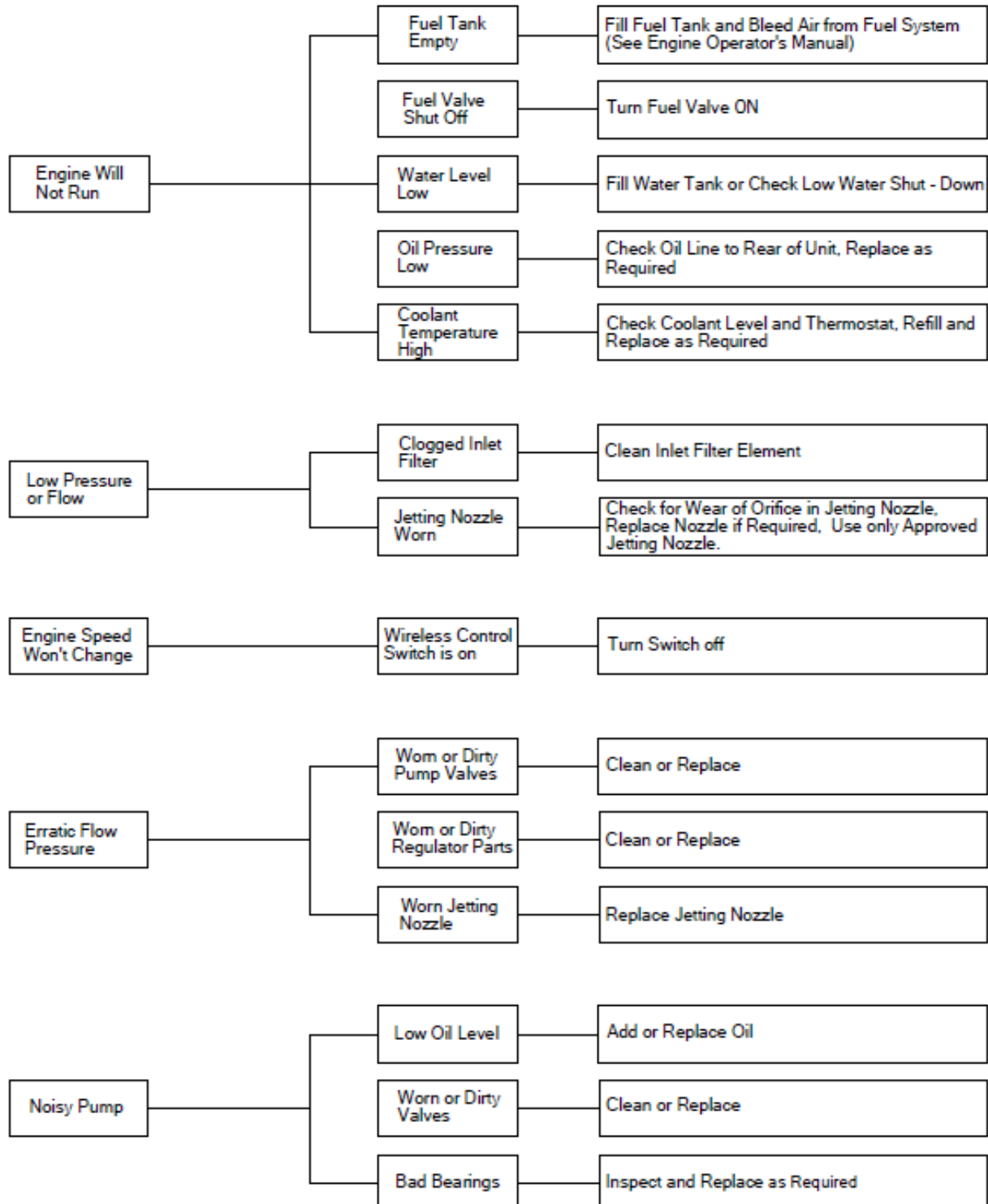
Troubleshooting



SYMPTOMS

CAUSES

REMEDIES





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 Reburnish 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 Color	Find & Correct
	Incorrect Adjustment	Adjust Brakes
	Grease or Oil on Magnets or Linings	Clean or Replace
	Broken Wires	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

Standard Warrior Tire Information


 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	ST235-80-R16E	552 KPA (80 PSI)	
REAR	NONE		
SPARE	NONE		

Fig. 34-1



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.

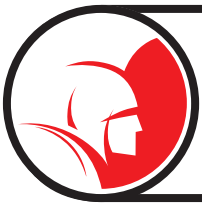
The Spartan Warrior's Tire Information Placard can be located adjacent to the trailer's VIN (Certification) label at the left front of the trailer. The placard includes the Warrior's tire size, cold tire inflation pressure, and load limitations. The load limitation statement will give an indication of 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.

Ultimate and High Flow Warrior Tire Information



TIRE AND LOADING INFORMATION		
The weight of cargo should never exceed kg. or lbs.		
TIRE	SIZE	COLD TIRE PRESSURE
FRONT	ST225-75-R15 D	5(D) 448 KPA (65 PSI)
REAR	ST225-75-R15D	5(D) 448 KPA (65 PSI)
SPARE	NONE	

**SEE OWNER'S
MANUAL FOR
ADDITIONAL
INFORMATION**



Tire Safety Information



Steps for Determining Correct Load Limit

- Locate the statement “The weight of cargo should never exceed 1157 kg or 2550 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

- Locate the recommended tire pressure on the vehicle’s Tire Information Placard, certification label, or in the Owner’s Manual.
- Record the tire pressure of all tires.
- 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.
- 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.
- 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 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 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

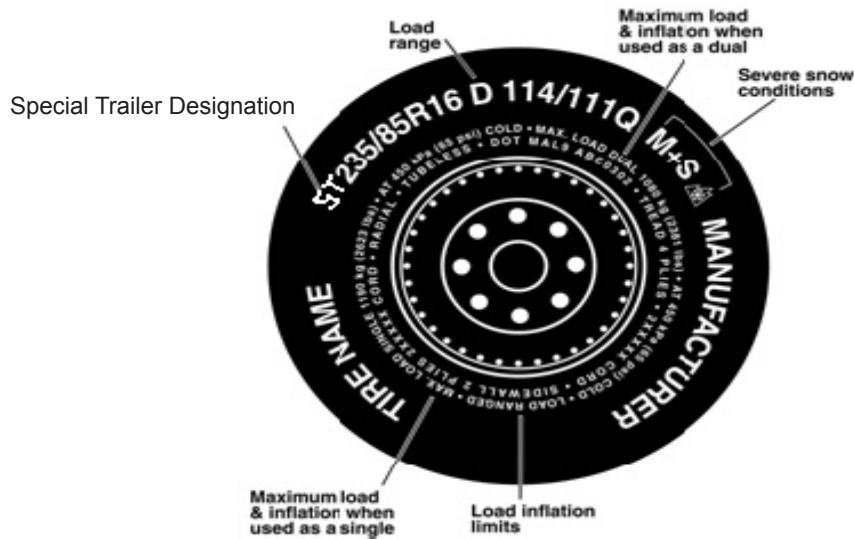


Tire Balance and Wheel Alignment

- 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

Fig. 36-1

- 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



Diesel Engine Emissions



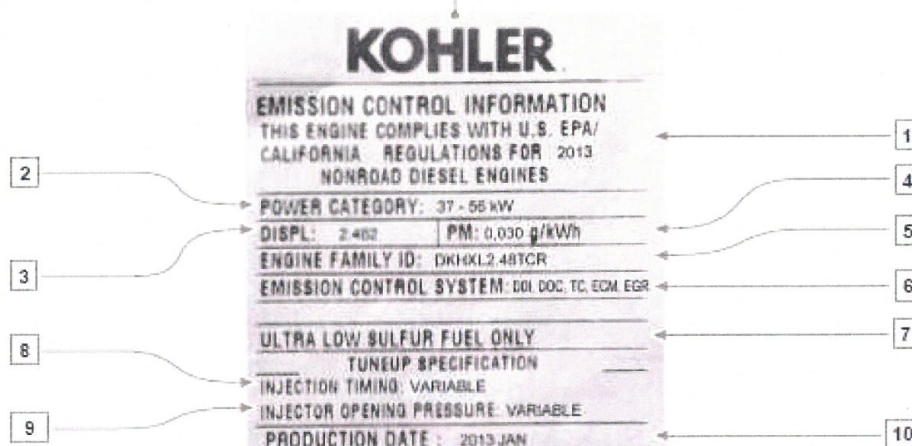
All Kohler Diesel engines are tested to meet emissions standards.

See below for the emissions authentication label.

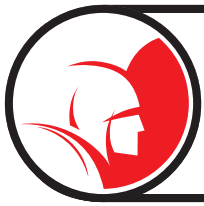
SAMPLE EMISSIONS LABEL



Fig. 83-2



POS.	DESCRIPTION
1	Model year in compliance with the rules
2	Power category (kW)
3	Engine displacement (L)
4	Particulate emission limit (g/kWh)
5	Engine family ID
6	Emission Control System = ECS
7	Fuel with low sulphur content
8	Injection timing (*BTDC)
9	Injector opening pressure (bar)
10	Production date (example: 2013.JAN)



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.

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