

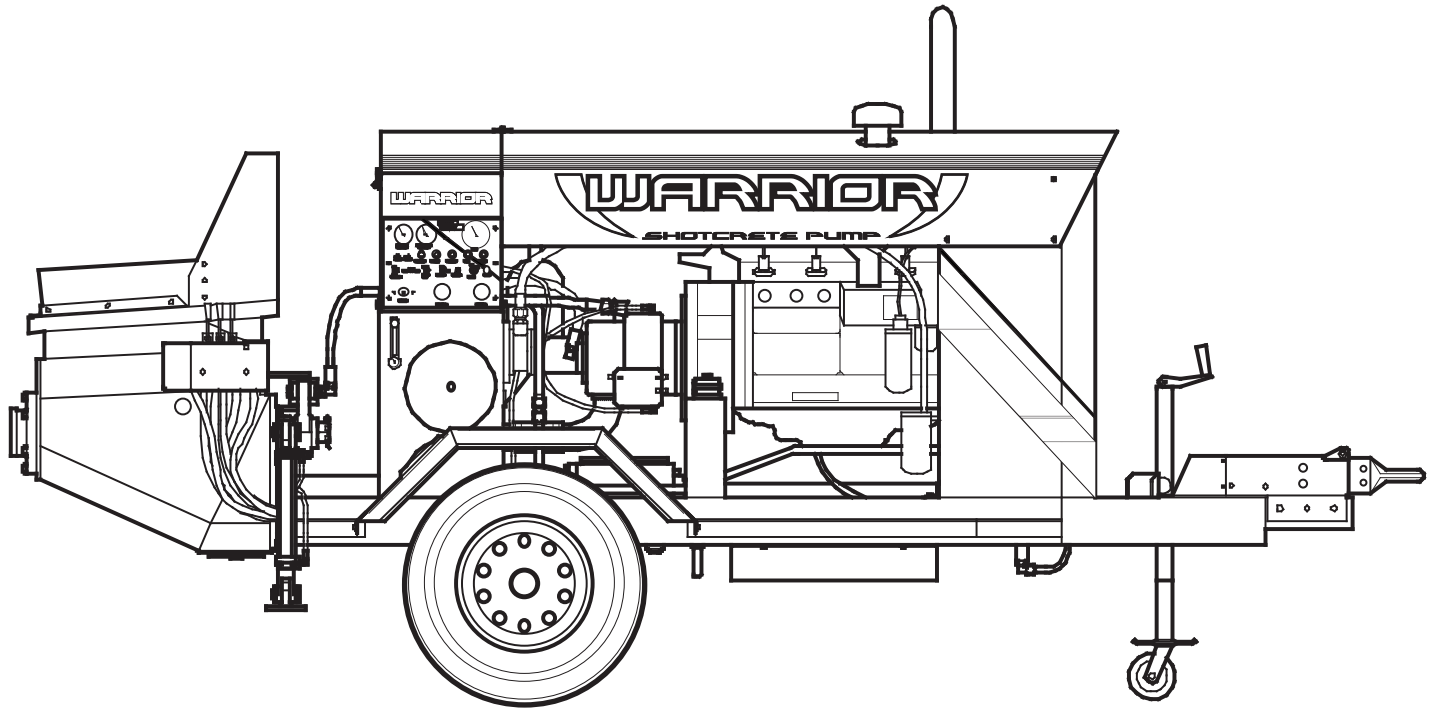
WARRIOR™

Model 3050™ Shotcrete Pump

Owner's Manual

Look Inside For:

- Solving Problems
- Parts Lists
- Technical Schematics



www.wse-shotcrete.com
Toll Free: 1-887-592-7746

Western Shotcrete Equipment, Inc.

Western Shotcrete Equipment, Inc.
Warrior Model 3050
Operation, Maintenance, and Safety Manual

The following individual, who has signed below, hereby acknowledges receipt of this manual on behalf of the purchaser of the shotcrete pump.

Machine Serial No. _____

Sold To: _____

Manual Received by:

Name: _____

Title: _____

Signature: _____

Date: _____

After signing for this manual, please mail the manual back to the following address.

Western Shotcrete Equipment, Inc.
3026 Scott Lane
West Haven, UT 84401

NOTE! Warranty void until Western Shotcrete Equipment, Inc. receives the signed Signature Page.

NOTICE

THIS MANUAL IS IMPORTANT!

This is the operation and maintenance manual for your shotcrete pump. It contains information necessary for safe and proper operation of the pump. All personnel who operate the pump must read and understand this manual. Call Western Shotcrete Equipment, Inc. toll free if you have any questions. (877-592-7746) This manual should be kept near the pump at all times.

This manual also contains Western Shotcrete Equipment's written Warranty for the pump on the following page. Please read that warranty, which is the sole warranty by Western Shotcrete Equipment, Inc. for shotcrete pumps.



WARRANTY

Western Shotcrete Equipment, Inc. warrants each new shotcrete pump sold by it to be free from defects in material and workmanship under normal use and service for a period of twelve (12) months from the date of delivery to the first retail purchaser.

Western Shotcrete Equipment is not responsible for failures resulting from accident, owner or operator abuse or neglect, improper repair, modification of standard parts or the use of parts not authorized by Western Equipment.

This warranty does not apply to normal maintenance service or to normal replacement of certain machine parts such as concrete cylinders, valve mechanisms, o-rings, seals, delivery systems, etc. which are subject to normal wear.

Western Shotcrete Equipment's sole obligation under this warranty shall be to cause the repair or replacement without charge or granting of a credit reimbursement, at its discretion, through its warranty processing procedures, for any defective part of a concrete pump sold by Western Shotcrete Equipment when returned prepaid to an authorized concrete pump dealer appointed by Western Shotcrete Equipment, Western Shotcrete Equipment's factory in Fairdealing, Missouri or a point designated by Western Shotcrete Equipment. Determination of defect shall result from the exclusive examination of the part by Western Shotcrete Equipment or the authorized dealer.

Western Shotcrete Equipment, Inc. does not warrant components or accessories which bear the name of another company, such being subject to the warranties of their respective manufacturers.

Western Shotcrete Equipment will not be responsible for travel or transportation expenses, rented equipment, outside contractor's fees or unauthorized repair shop expenses.

Western Shotcrete Equipment assumes no liability for loss of use or any direct, indirect or consequential damages of any kind in respect to the use or operation of concrete pumps sold by Western Shotcrete Equipment or any equipment or accessories in connection therewith.

THIS WARRANTY IS THE SOLE WARRANTY BY WESTERN SHOTCRETE EQUIPMENT FOR CONCRETE PUMPS. THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED AND THERE IS NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Western Shotcrete Equipment does not authorize any person or company to assume for it any other warranty obligation in connection with the sale of the Western Shotcrete Equipment product. Any enlargement or modification of this warranty by a dealer or other selling agent shall become the exclusive responsibility of such dealer or selling agent





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GENERAL INFORMATION

1 Foreword

Dear Customer,

Thank you for your purchase of our Warrior Shotcrete Pump. By Selecting this machine, you have place yourself in a distinguished family of shotcrete/ concrete pump owners and operators.

If you have any suggestions on how we could provide better products or services, please let us know by calling us toll free at 1-877-5-WARRIOR. Your input is an extremely useful tool that rates our products and measures our service and support to you, our valued customer.

Sincerely,

A handwritten signature in black ink, appearing to read "Joe Harpole". The signature is fluid and cursive, with the first name "Joe" being particularly prominent.

Joe Harpole
President

2 Safety

Warning

Do not attempt to operate this equipment without a thorough understanding of the operating, maintenance, and safety considerations contained in this manual. To prevent damage to equipment and or injury to you or other personnel, these instructions must be carefully followed.

Warning

Diesel is extremely flammable and is explosive under certain conditions. Work in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in your working area or where diesel is stored.

Warning

If the engine must be running to perform maintenance, make sure your workspace is well ventilated. Never run the engine in an enclosed space. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

Warning

Use dry nitrogen gas only to pressurize the accumulator bladder. Never use compressed air. The use of an unstable gas such as compressed air can cause a fire or explosion resulting in serious injury or death.

Warning

California Proposition 65 Warning:

Diesel engine exhaust and some of its constituents are know to the state of California to cause cancer, birth defects, and other reproductive harm.

OPERATING INSTRUCTIONS

1 Operator Qualifications

Introduction

Western Shotcrete Equipment, Inc. Warrior Shotcrete Pumps are high-pressure hydraulically powered piston pumps for shotcreting or pumping of concrete. This manual describes the operation, maintenance, and safety considerations that must be followed. Close attention to these details by the operator and maintenance personnel are necessary to ensure a minimum of problems while striving for maximum productivity and safety.

Prior to pump operation an operator must be thoroughly familiar with the equipment and its operation so that he or she can operate it in a SAFE manner. His or her eligibility to operate the pump shall be based on the following qualifications.

1.1 Qualifications

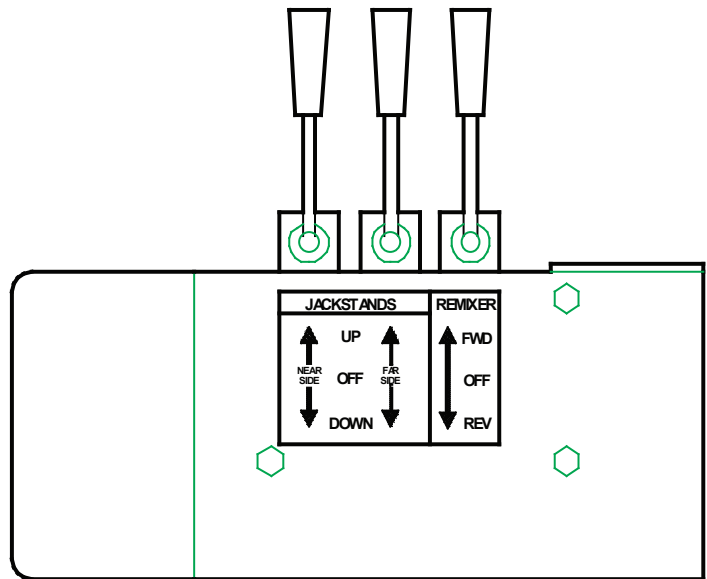
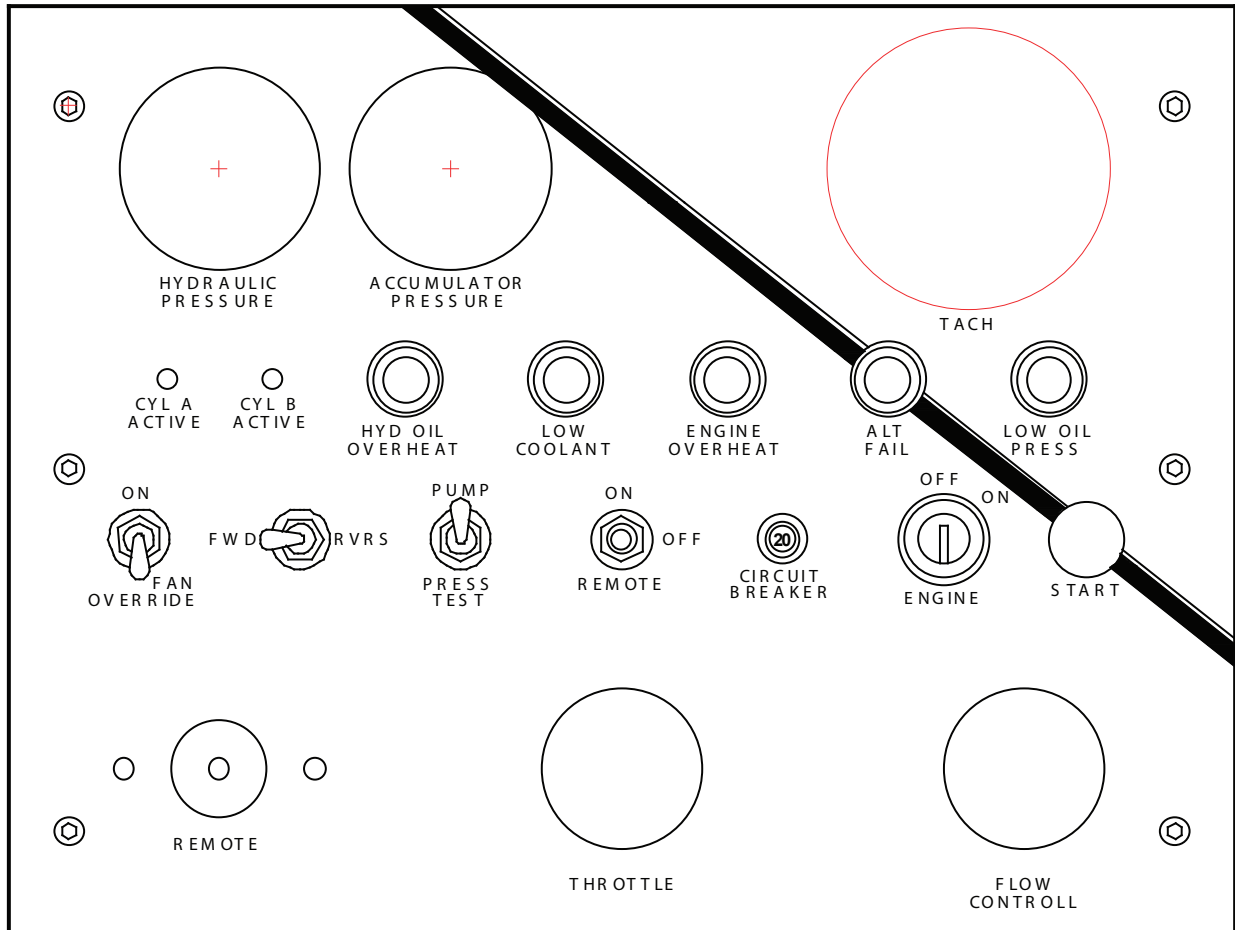
- Only experienced operators, or trainees under the direct supervision of an experienced operator, shall operate the equipment. No unauthorized person should be permitted to assist or remain in the immediate vicinity of the machine while it is in operation or during the performance of any maintenance, inspection, cleaning, repair, or in preparatory operations.
- Individuals who cannot read and understand the signs, notices, and operating instructions that are part of the job shall not operate the machine.
- Individuals who are not familiar with the operating instructions, have not received some on-the-job supervised training, or are not familiar with the signal codes used at the construction site shall not operate the machine.
- Anyone under the age of 21 years shall not operate the machine.
- Anyone with seriously defective eyesight or hearing and/or physical or mental impairment shall not operate the machine. (Such as epilepsy or heart disease) This should be verified annually.
- The machine shall not be operated while the operator is eating, drinking, reading, talking on a phone, or is more that six feet distance from the controls.
- An operator who has asked to be relieved because he or she feels physically or mentally unfit shall not operate the machine.
- Machine shall not be operated at any new site, or at the start of a new shift, until a visual inspection is made of the condition of the equipment.
- The operator shall report and damage, defects, problems, or accidents to his/her work supervisor and next shift operator.

2 Operating Principle

The Warrior Shotcrete Pump consists of a receiving hopper, two material cylinders and pistons, and a swingtube valve. A continuous flow of concrete through the delivery line is produced by the sequence of operation of the two concrete pistons with the swingtube valve. The swingtube shifts between the two material cylinders under a controlled Electro/Hydraulic sequence to direct the flow between the two material cylinders, the hopper, and the discharge outlet. The swingtube allows one material cylinder to be directly open to the hopper on the suction stroke, while simultaneously the other cylinder is directly connected through the swingtube to discharge. At the end of the piston travel the direction changes and the swingtube is shifted to direct the flow output from the other cylinder to discharge.

3 Controls

3.1 Control Panel Diagram & Outrigger Controls



3.2 Machine Controls - Control Panel

- 1) The IGNITION Switch has two positions: OFF and ON. On allows the engine to start. Off shuts off the fuel to the engine.
- 2) The START Button Engages the starter motor.

Note:

To avoid premature starter wear, do not operate the starter motor for more than 4 seconds at a time. Allow the starter motor to rest 10 seconds between starting attempts.

- 3) ON, OFF, REMOTE Switch will turn the pump on and off at the Control Panel. When in the Remote position, the pump can be turned on and off with a Remote Control Cable.
- 4) FORWARD/REVERSE Switch is used for forward or reverse pumping.
- 5) PRESSURE TEST Switch must be up in the Pump position for normal operation. In the Pressure Test position, the pump will make one reverse stroke, stop, then the main hydraulic system will go to maximum pressure. (3800psi)
- 6) FAN OVERRIDE Switch will activate the hydraulic fluid Cooling Fans regardless of hydraulic fluid temperature. (Only on machines equipped with electric cooling fans.)
- 7) THROTTLE CONTROL sets the engine speed. Twisting the control counter-clockwise for more RPM or clockwise for less RPM sets the engine speed. The throttle can be rapidly set by depressing the center button and simultaneously pushing or pulling the control to the desired setting. Pulling the control out increases engine RPM, pushing the control in lowers engine RPM.
- 8) FLOW CONTROL sets the hydraulic pump output and thus the concrete pump output. Twist the control counterclockwise for more flow, clockwise for less flow or volume.
- 9) TACHOMETER indicates the engine speed in rpm. The tachometer also has a built-in Hour meter that measures machine time in elapsed hours.
- 10) HYDRAULIC PRESSURE Gage indicates hydraulic system pressure in psi. Note this is hydraulic fluid pressure not actual pump outlet pressure. The pressure on the concrete is a 2.25 to 1 ratio to the hydraulic pressure gage on the control panel. For example: When the hydraulic pressure gage reads 2000-p.s.i. the actual concrete pressure at the 5" outlet flange is 889-psi. ($2000/2.25 = 889$)
- 11) ACCUMULATOR PRESSURE Gage indicates stored hydraulic pressure within the accumulator in psi.
- 12) REMOTE Receptacle for Remote Control Cable. The On-Off-Remote switch must be in the Remote position to activate the remote control.
- 13) LOW OIL PRESSURE Light illuminates when the engine oil pressure is low.
- 14) ALTERNATOR FAIL Light illuminates when the engine Alternator is no longer powering the electrical system.
- 15) COOLANT TEMPERATURE Light illuminates when the engine Coolant temperature exceeds the normal operating range. (Applies to water-cooled engines only.)

- 16) COOLANT LOW Light illuminates when the engine Coolant Level falls below the normal operating range. (Applies to water-cooled engines only. On air-cooled engines this light is renamed “V-Belt Failure” and will illuminate if the engine cooling fan drive belt breaks)
- 17) HYDRAULIC FLUID Light illuminates when the hydraulic fluid temperature exceeds the normal operating range. (>200°)
- 18) CYLINDER A ACTIVE Light illuminates when main drive cylinder A is pumping.
- 20) CYLINDER B ACTIVE Light illuminates when main drive cylinder B is pumping.

3.3 Machine Controls @ Hopper

1) REMIXER FORWARD / REVERSE Lever shifts the Remixer motor between Forward, Reverse, or Neutral. This control lever is detented to remain in position selected by the operator. This lever is normally in the Forward position so that stiff concrete will be drawn from the walls of the hopper and pushed into the material cylinders.

Warning

The operator shall carefully determine that the hopper is clear of personnel and/or equipment before engaging the Remixer.

2) HYDRAULIC JACK STAND Levers control the extending/retracting of the machine support stands. These control levers are spring returned.

Warning

The operator shall carefully determine that personnel and/or equipment are clear of the jack stand feet before extending the Hydraulic Jack stands.

3.4 Hydraulic Fluid Level and Temperature Gauge

Never operate the pump when oil level is below the Low Level mark. Inspection of oil level periodically during operation and at shutdown is considered good operator awareness. This will protect against accidental loss of oil. With the motor running, the proper level should be at the High Mark.

Normal range of oil temperature is 100°-160°F. Oil temperature of less than 50°F is in the cautionary range. The machine should not be operated at full output until the oil temperature is above 50°F, otherwise hydraulic pump damage may occur. Oil that is below 10°F should be preheated to 50°F ideally but at least to 20°F prior to starting the engine.

4 Procedures

4.1 Set up

Positioning of the shotcrete pump will, of course, differ from job to job. The operator must determine how close the machine can be placed to the work location while still providing good access to ready-mix trucks. After a relatively flat location is found, the outrigger legs must be extended to isolate the machine's road suspension from the weight of the loaded hopper.

Warning

The operator shall carefully determine that personnel and/or equipment are clear of the jack stand feet before extending the Hydraulic Jack stands.

4.2 Start up

An important part of pumping is the proper lubrication of the pipeline and/or hose system at the start of the pour. More downtime has been caused by inattention to this detail than any other reason.

First, the hopper must be wetted. Then a rich, sloppy grout must be introduced to the hopper and slowly pumped into the pipeline system. The grout should be a 1 x 1 sand/cement mix about the consistency of thick soup. It coats the pipeline system ahead of the concrete mix and prevents packing or bleeding of the material to be pumped when it is introduced to the line.

The amount of grout depends on the length of line and its diameter. The minimum is 5 to 6 cubic feet for short runs of small diameter line. It can be a cubic yard or more for several hundred feet of 5" line. Experience will indicate the proper amount, but it is always safer to have too much rather than too little.

A small amount of grout should be kept in the hopper and blended with the mix to provide a transition into the pumping operation.

Before turning the pump on, turn the Flow-Control knob clockwise until it stops. This will set the hydraulic pump output to minimum. Use the throttle control to set the engine speed to about 1800~2000 rpm. Make sure that the Forward/Reverse switch is set to "FWD" and the Pressure Test switch is set to "Pumping". Turn the pump on by setting the pump switch to the "ON" position. Slowly turn the Flow-Control knob counter-clockwise to increase the pumping rate. As the mix is starting to flow through the line careful attention must be paid to pump pressure to see if a plug or blockage is forming. Only after this should the pump speed be increased to the planned operation rate.

Note: The Western Shotcrete Equipment Warrior Shotcrete Pump is a high-pressure pump. The Shotcrete machine is designed to develop a theoretical pressure of 1700-psi at the discharge outlet of the machine. Although the average pumping pressure will normally be somewhat less than the maximum, remember that the pressure on the concrete is a 2.25 to 1 ratio to the hydraulic pressure gage on the control panel. For example when the hydraulic pressure gage reads 2000-psi. ($2000 / 2.25 = 889$) The actual concrete pressure at the 5" outlet flange is 889-psi.

The transport system shall be capable of withstanding the maximum pumping pressure of 1700-psi. (Check with the manufacturer on products not supplied by Western Shotcrete Equipment.)

Pressures are highest at the pump's 5" outlet flange and reduce uniformly to zero at the discharge end of the transport line under normal pumping conditions.

Warning

If a dry-pack or blockage does occur in the delivery system, pressures up to 1700-psi will be developed and contained within the entire delivery system from the pump to the point of pack or blockage. USE extreme cautionary procedures under these conditions.

Warning

It is the responsibility of each pump owner/operator to check with the manufacturer of the delivery system pressure capability that is not supplied by Western Shotcrete Equipment. Failure to observe these guidelines can result in serious personal injury and/or damage to equipment.

Western Shotcrete Equipment recommends only the usage of shouldered or heavy-duty pipeline system, hose, and clamping devices that are specifically designed for high-pressure concrete pumping applications.

4.3 Clearing a Dry Pack

When a block or dry-pack occurs in the delivery system, the pumping pressure gauge will reach the maximum 3800-psi. Immediately switch the pump off. Switch the swingtube from forward to reverse, pump at least two or more strokes in reverse to relieve the pressure from the dry-pack back to the concrete pump. Shut the pump off.

Warning

It is possible there will still be pressure contained in the delivery system. Extreme caution must be used when opening the clamping devices on any part of the delivery system. Warn all persons in the immediate area of this danger. Clear the area of persons prior to opening the clamp and protect eyes and body while opening clamp.

After the dry-pack has been cleared and the reducer, pipeline, and/or hose system restored, return the swingtube to forward. Start the pump up at a low volume rate until a steady flow of material is being pumped.

Warning

Never attempt to clear a pack in the transport system with pump pressure.

4.4 Shut Down & Clean up

It is very important that the operator knows and follows the correct procedure for cleaning the machine. Because there are moving parts in the hopper, the operator must use caution when cleaning the machine. The operator SHALL USE EXTREME CAUTION when using his or her hands to clean in the hopper area. When it is necessary to clean out the hopper or swingtube, the operator must shut down the engine and carefully determine that the accumulator has discharged. The operator shall also warn anyone that may assist him in cleaning the machine.

Clean the machine with the following procedure:

- 1) Pump the remaining material out of the hopper until it is half empty, and then turn the pump off.
- 2) Add enough water to the material in the hopper to make a thin slurry.
- 3) Switch the swingtube to reverse and turn the pump on. The reverse pumping will cause the water to mix with the material to form a thin slurry.
- 4) Pump the slurry through the line followed with water.
- 5) Remove and thoroughly clean the hopper clean-out door.
- 6) With the pump turned on and in reverse pumping, turn a water hose into the discharge outlet. This will draw water into the concrete cylinders and push rock and sand out through the hopper door.
- 7) Before cleaning the inside of the hopper the operator must shut down the engine and carefully make sure that the accumulator pressure is fully discharged. Check that the accumulator is discharged in the following manner:
 - a) With the engine shut down, turn the ignition key-switch to the on position.
 - b) Turn the pump switch to the on position.
 - c) Repeatedly switch the swingtube from reverse to forward until the swingtube no longer shifts.

Note: The Western Shotcrete Equipment Warrior Shotcrete Pump, frame No. 109 and higher are equipped with an automatic accumulator discharging system* that will discharge the accumulator if the ignition key-switch is in the off position or if the electrical system loses power, NOT if the engine stalls. (i.e. Engine runs out of fuel, etc.) The operator should not rely solely on this system: he or she shall use the precautionary procedure outlined in the above paragraph.

8) Clean the hopper out using a stiff brush and water.

Warning

THE OPERATOR SHALL NEVER PUT HIS OR HER HANDS IN THE CYLINDERS!

9) Start the engine and turn the pump on. Cycle a few times to make sure there is no material left in the cylinders.

10) With a bent rod or broom handle remove any build up of material.

11) Clean the clean-out door opening. The clean door and opening must have a good seal. (Not leak water) If the seal is not good the pump will suck air through it instead of concrete- resulting in partially filled material cylinders.

12) Lubricate the pump module at these five locations:

- a) Flange Bearing.
- b) S-Tube shift Cylinder Base.
- c) S-Tube shift Cylinder Yoke.
- d) Remixer Housing.
- e) Outlet Flange.

It is important to lubricate the pump module after clean up. This pushes out water, cement, and other contaminants before they can harden. Failure to lubricate the pump module properly even once will cause premature wear and or damage to the machine resulting in expensive downtime.

* SEE Hydraulic System Sec. 2.4 Accumulator

MAINTENANCE

1 Service Information

Recommended engine oil: Shell Rotella T 15W-40 or comparable. Capacity: 4 gallons.

Recommended hydraulic fluid: ISO-68, AW-68 (20W), Qualified against Denison HF-0. Meeting requirements of Vickers M-2950-S and 1-286-S specifications. Capacity: 55 gallons.

Engine oil filter: Napa part #1820

Engine fuel filter: Napa part #3358

Engine air filter: Napa part #2126

Hydraulic fluid filter element: Western Shotcrete Equipment part #83621

2 Maintenance Schedule

Grease machine twice daily at all grease fittings especially after clean up.

Replace engine oil, oil filter, and fuel filter every 250 hrs.

Inspect and/or replace engine air filter Every 250 hrs.

Replace Cups (85704) and Cup adapter O-Rings (85707) when water-box is full of slurry or every 250 hrs. Fill water-box halfway with used or new hydraulic fluid.*

Replace Wear-plate (85131) & Wear-ring (85334) every 300 hrs.#

Change hydraulic fluid and Filter and inspect tank plumbing for loose fittings and/or breaks at the 1st 300 hrs, then every 6 months or every 1000 hrs.

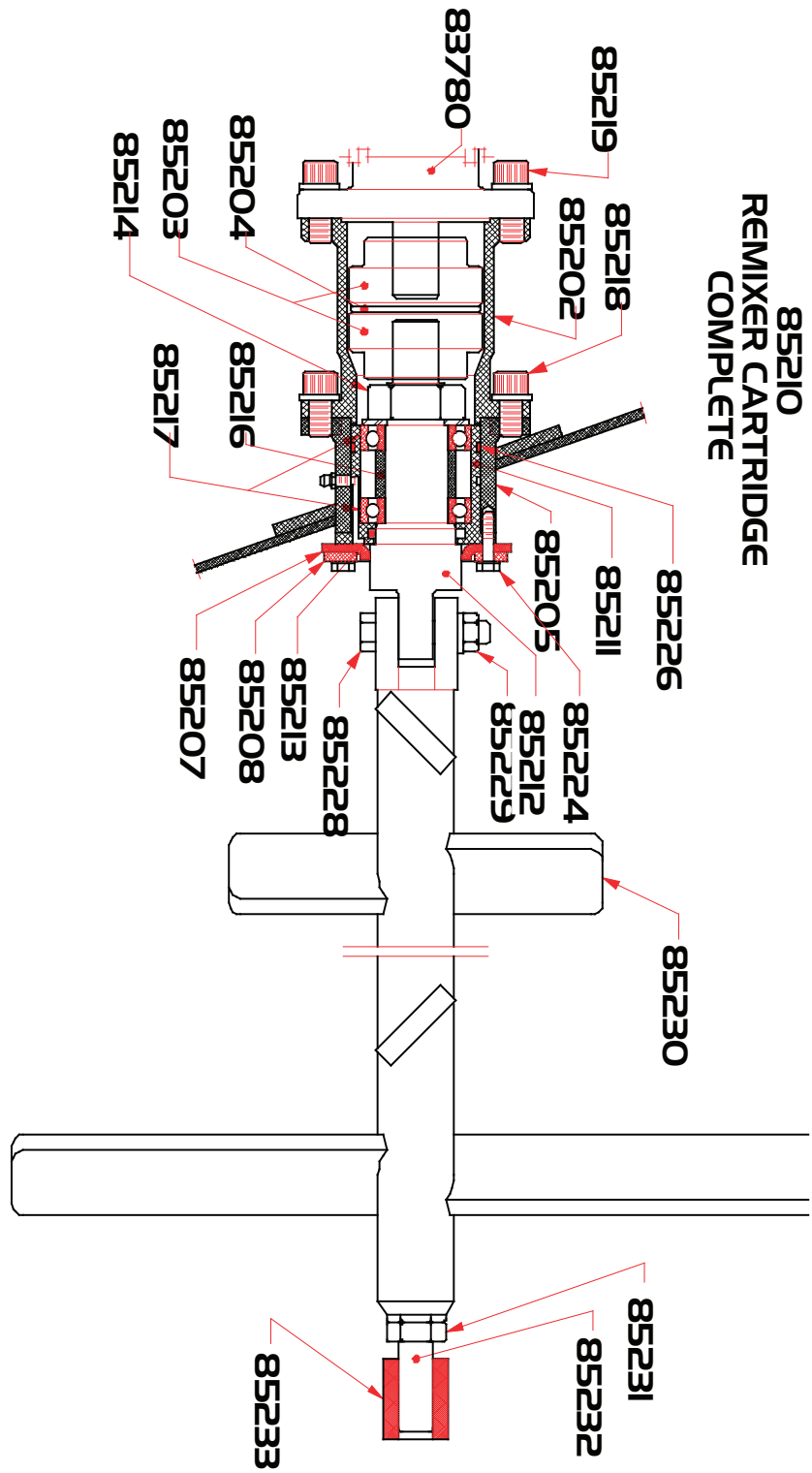
Inspect frame for cracks every 500 hrs.

Inspect surge brake assembly for proper operation every 500 hrs.

*Refer to Maintenance sec. 2 for Cup and O-Ring replacement procedure.

Refer to Maintenance sec. 3 for Wear-plate / Wear-ring replacement procedure.

1.2 Remixer Assembly Cross Section



2 Piston Cup Replacement Procedure

Warning

Make sure your workspace is well ventilated. Never run the engine in an enclosed space. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

Warning

Extreme caution is needed when working in the hopper and waterbox. Use lock-out tag-out procedures. Always remove the ignition key and put it in your pocket or other secure place when working in the hopper and water-box.

Note: The Western Shotcrete Equipment Warrior Shotcrete Pump, frame no.109 and higher are equipped with an automatic accumulator discharging system* that will discharge the accumulator if the ignition key-switch is in the off position or if the electrical system loses power, NOT if the engine stalls. (i.e. Engine runs out of fuel, etc.) The operator should not rely solely on this system: he or she shall USE the following precautionary procedure:

- a) With the engine shut down, turn the ignition key-switch to the on position.
- b) Turn the pump switch to the on position.
- c) Repeatedly switch the swingtube from reverse to forward until the swingtube no longer shifts.
- d) Toggle the pump switch to the off position.
- e) Turn the key-switch to the off position.

Note: The electrical system must work properly for this procedure to work.

- 1 Remove key from engine ignition.
- 2 Remove water-box cover.
- 3 Drain oil and slurry out of water-box by removing the drain plug.
- 4 Using a squeegee, putty-knife, or similar tool, clean out water-box.
- 5 Start engine and turn the pump on in forward mode. Carefully wash out remainder of oil and slurry.
- 6 With the pump “on” and in “forward”, toggle the pump mode switch to “Pressure Test”.
- 7 When the pump goes to high pressure, turn off key, remove key.
- 8 Observe the accumulator gauge. Make sure it reads 0 psi.
- 9 Remove Remixer paddle-shaft.
- 10 With a chipping gun or hammer and chisel, remove concrete build-up around cup bolt. Care must be exercised not to damage chrome in the material cylinder.
- 11 With a 1-1/8” size HD socket remove cup bolt.
- 12 Remove cup retainer.

* See Hydraulic System sec. 2.4 Accumulator

- 13 With a small pry-bar, remove cup.
- 14 Remove all tools and parts from the hopper and the water-box.
- 15 Make sure the pump is “off”, in “forward” and “pumping” mode.
- 16 Start engine and turn the pump on. When the S-tube shifts, toggle the pump mode switch to “Pressure Test”.
- 17 When the pump goes to high pressure, turn off key, remove key.
- 18 At the hopper, remove the 2nd cup using the same procedure as outlined in steps 10-14.
- 19 At the water-box, remove the two 5/8” bolts from the cup-adapter using two 15/16” wrenches. NEVER use a pipe wrench on the chroma rod to hold it from spinning! (If you must use a pipe wrench, place the jaws on the rod adapter- not the chrome rod.)
- 20 Remove the cup-adapter using a twisting motion.
- 21 Inspect the rod-adapter (85710) bolts for proper torque. (65 lbs.)
- 22 Remove the o-ring from the cup-adapter and carefully scrape and clean the o-ring groove.
- 23 Apply white-lith grease to o-ring groove and install new 85707 O-ring taking care not to twist the o-ring.
- 24 Apply generous amount of white-lith or similar grease to material cylinder and install cup-adapter using a twisting motion.
- 25 Install the two 5/8” bolts and torque to 100 lbs.
- 26 Remove all tools from the hopper and the water-box.
- 27 Start engine and turn the pump on. When the S-tube shifts, toggle the pump mode switch to “Pressure Test”.
- 28 When the pump goes to high pressure, turn off key. Remove key.
- 29 At the hopper, use a plastic mallet to install one new 85704 cup. Use a light amount of grease to ease cup entry into the material cylinder.
- 30 Install cup retainer plate and bolt. Make sure that the retainer plate and bolt are free from concrete build-up and clean.
- 31 At the water-box remove and re-install the 2nd cup-adapter using the same procedure outlined in steps # 19-25.
- 32 Start engine and turn the pump on. When the S-tube shifts, toggle the pump mode switch to “Pressure Test”.
- 33 When the pump goes to high pressure, turn off key. Remove key.
- 34 At the hopper install 2nd cup using the same procedure outlined in steps # 28-29.
- 35 Replace the water-box drain plug.
- 36 Fill the water-box halfway with new or used hydraulic oil.
- 37 Install the water-box cover.

3 Wear-Plate/Wear-Ring Replacement Procedure

Warning

Extreme caution is needed when working in the hopper and waterbox. Use lock-out tag-out procedures. Always remove the ignition key and put it in your pocket or other secure place when working in the hopper and water-box.

Note: The Western Shotcrete Equipment Warrior Shotcrete Pump, frame no.109 and higher are equipped with an automatic accumulator discharging system* that will discharge the accumulator if the ignition key-switch is in the off position or if the electrical system loses power. NOT if the engine stalls. (i.e. Engine runs out of fuel, etc.) The operator should not rely solely on this system: he or she shall use the following precautionary procedure:

- f) With the engine shut down, turn the ignition key-switch to the on position.
- g) Turn the pump switch to the on position.
- h) Repeatedly switch the swingtube from reverse to forward until the swingtube no longer shifts.
- i) Toggle the pump switch to the off position.
- j) Turn the key-switch to the off position.

Note: The electrical system must work properly for this procedure to work.

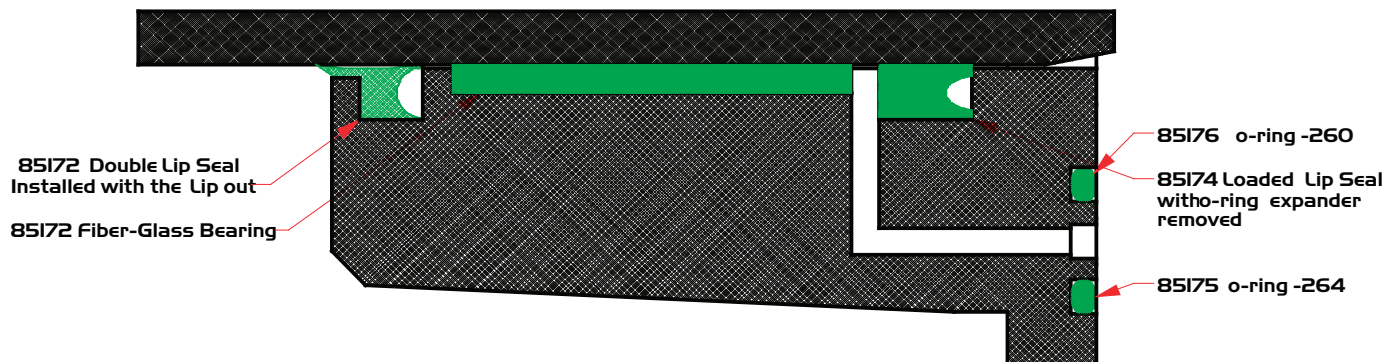
- 1 Remove key from engine ignition.
- 2 Remove Remixer paddle-shaft.
- 3 Remove 5" Outlet flange. (85150)
- 4 Remove cotter key and 1 3/8" nut (85511) from S-tube shaft.
- 5 Slip off the Spacer cap. (85512)
- 6 Remove Bell-crank assembly (85500) by loosening the two 3/8" locking bolts then removing the two 1" bolts, also the 3/4" clevis bolt.
- 7 Slip off the Bronze spacer. (85513)
- 8 Examine both the 3/4" id bushing (85503) in the Bell-crank and the 3/4" clevis bolt (85522) for wear. Replace if necessary.
- 9 Remove Outlet Housing. (85171) If you have difficulty removing the housing use Western Shotcrete Equipment's housing puller tool. (87104)
- 10 Slide the S-tube back through the opening in the rear of the hopper.
- 11 Remove the hardened outlet (85320) by removing the six 3/8" bolts.
- 12 Wrap a shop towel around the threaded end of the S-tube shaft.
- 13 Carefully remove the S-tube valve (85300) by rotating it upside down and letting the shaft go into one of the material cylinders. (Do not scratch the chrome finish on the inside of the material cylinder) then you will be able to lift the S-tube valve out of the hopper. The S-tube valve weighs about 135 lbs., so care must be used to remove it. Do not try to lift it out by yourself. Two people can remove it with care.

* See Hydraulic System sec. 2.4 Accumulator

- 14 Thoroughly clean the outlet cavity on the back of the hopper.
- 15 Thoroughly clean the 5" outlet flange.
- 16 Use a chipping gun to remove concrete build-up around the Wear-plate.
- 17 Remove the four Wear-plate bolts. (85132)
- 18 Tighten the Wear-plate push-bolt (85134) until the Wear-plate pops free. The push-bolt is located on the front of the hopper, operator side, near one of the side Wear-plate bolts. Do not use an impact gun! Use hand tools only.
- 19 Loosen, but do not remove, the Wear-plate push-bolt almost all the way out.
- 20 Remove the Wear-plate. Care must be used because the edges are sharp.
- 21 Thoroughly clean the hopper surface where the Wear-plate mounts using a medium grit rotary sanding disk. This surface must be free of concrete and slurry so that the Wear-plate does not crack.
- 22 Remove the chip-rings (85405) from the material cylinder openings, clean and replace. The chip-rings must fit slightly below the surface of the hopper.

Note: This is a good time to replace the piston cups and cup adapter o-rings if necessary. Refer to the cup change procedure.

- 23 Determine if the back of the Wear-plate is usable. Both sides of the Wearplate are usable. If both sides are worn then have the plate Blanchard ground flat, or replace with a new Wear-plate. (85131)
- 24 Test fit the Wear-plate against the surface: it must sit flat and not rock back and forth. If the Wear-plate does not sit flat, determine why. (Piece of dirt, Metal chip?)
- 25 Install Wear-plate. Make sure that the push-bolt has been retracted almost all the way back. If the plate has a used side, seal it with silicone. Exercise care when tightening the four Wear-plate bolts. Tighten the center bolts first then the outer bolts. Tighten the bolts incrementally to about 25 lbs. Of torque. Do not over tighten! The Wear-plate is very hard and brittle. It will crack if you over tighten the bolts.
- 26 Hand tighten the push-bolt.
- 27 Place S-tube valve in Western Shotcrete Equipment S-tube stand. (87103)
- 28 Remove old Wear-ring and discard.
- 29 Remove old rubber seal strip and with a chipping gun or hammer and chisel thoroughly clean seal strip recess out.
- 30 Install new rubber seal strip. (85332) Trim if necessary to fit.
- 31 Install new Wear-ring. (85331)
- 32 Remove old seals and bearing from the outlet seal housing. (85171)
- 33 Thoroughly clean outlet seal housing. Make sure that the two grease passages are free of obstructions.
- 34 Install new seals, o-rings, and fiberglass bearing (kit# 85170) into the outlet seal housing as shown. Use a little grease to hold the o-rings in place.



- 35 Examine the seals in the flange bearing assembly. (85160) If they are in good condition, proceed to step # 43.
- 36 Remove the flange bearing assembly by removing the four mounting bolts then tighten the two-push bolts evenly.
- 37 Remove the outer seal and the inner seal and discard.
- 38 Thoroughly clean the flange bearing assembly. Make sure that the three grease passages are free of obstructions.
- 39 Install new inner seal (85164) and outer seal. (85163)
- 40 Thoroughly clean the bearing cavity in the hopper.
- 41 Retract the two push-bolts in the flange bearing almost all the way back.
- 42 Install the flange bearing assembly into the hopper. Make sure that the grease zerks are positioned so that they are accessible. Tighten the four mounting bolts evenly and then hand tighten the two push-bolts.
- 43 Using the same procedure as before, install the S-tube valve into the hopper by first placing the shaft into the material cylinder then pull the valve back into the outlet and then turn it upright.
- 44 Examine the hardened outlet (85320) for excessive wear. Replace if necessary.
- 45 While the back flange of the S-tube is hanging out of the hopper outlet cavity, bolt on the hardened outlet.
- 46 Move the S-tube all the way forwards so that the Wear-plate and ring are against each other.
- 47 Install the seal housing into the back of the hopper outlet cavity. Use never-seize or similar lube to keep the housing from seizing into the hopper.
- 48 Make sure the O-rings in the seal housing are in place and bolt on the 5" outlet flange.
- 49 Slip the bronze spacer (85513) onto the S-tube shaft.
- 50 Install the bell crank assembly but do not tighten the 1" bolts yet.
- 51 Slip the spacer cap (85512) onto the S-tube shaft.
- 52 Hand tighten the 1 3/8" nut. Do not overtighten. Then pin with a cotter key.
- 53 Tighten the 1" bell crank cap bolts. Then tighten the 3/8" lock bolts.
- 54 Make sure that the grease fittings are all accessible and work.
- 55 Install remixer paddle-shaft.

HYDRAULIC SYSTEM

1 General/Safety

1.1 Hydraulic Fluid Precautionary Measures

Avoid prolonged breathing of vapor, mist, or gas. Workers should wash exposed skin several times daily with soap and water.

1.2 Hydraulic Fluid First Aid

Eye contact: Flush eyes with plenty of water for several minutes. Get medical attention if eye irritation persists.

Skin contact: Wash skin with plenty of soap and water for several minutes. Get medical attention if skin irritation develops or persists.

Ingestion: If more than several mouthfuls of hydraulic fluid are swallowed give two glasses (160 oz) of water. Get medical attention.

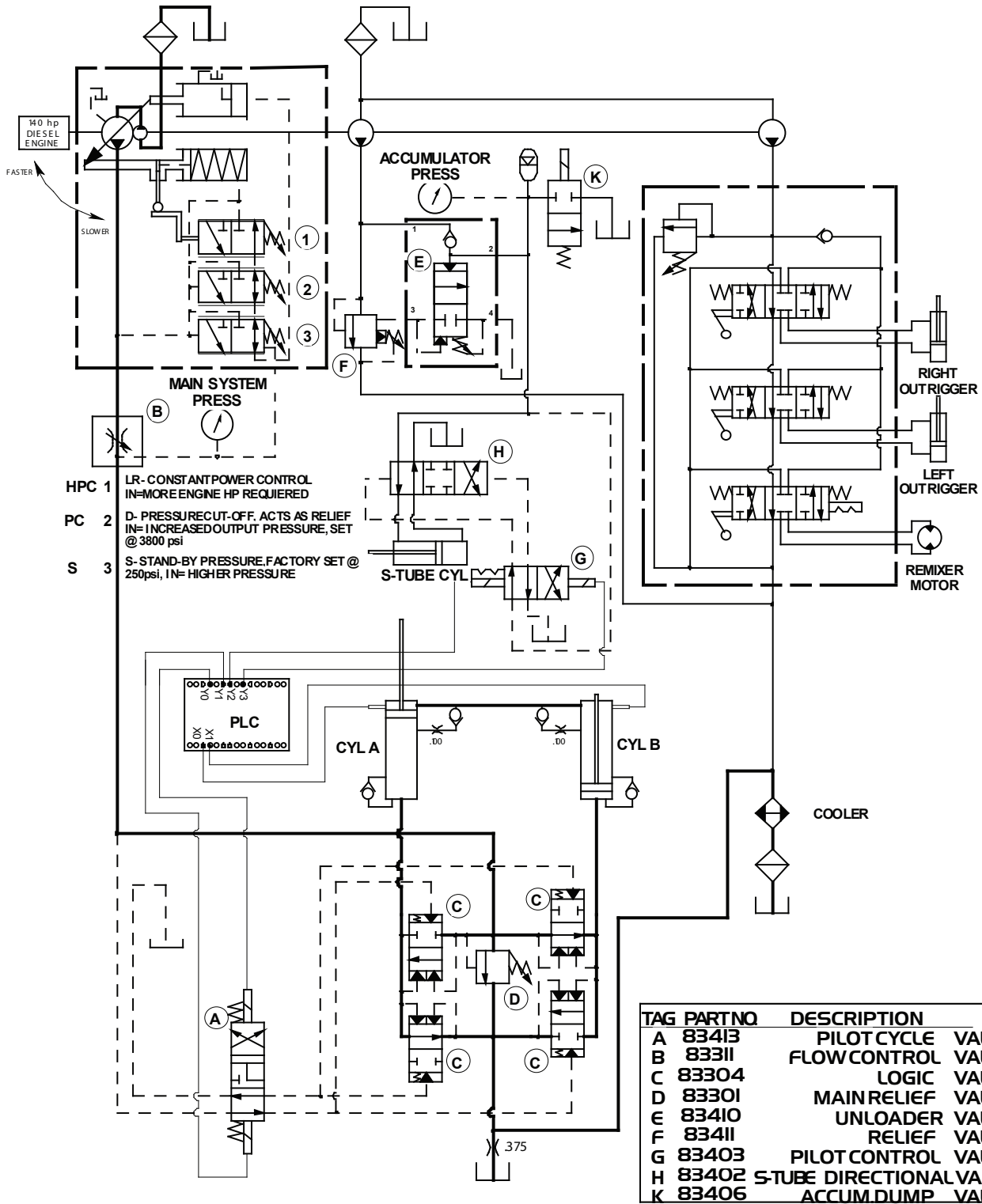
Inhalation: If irritation, headaches, nausea, or drowsiness occurs, remove to fresh air. Get medical attention if breathing becomes difficult or respiratory irritation persists.

Note to Physician: High-pressure injection of material can cause severe injury. Failure to debride the wound of all residual material can result in disfigurement, loss of function, or may require amputation of the affected area.

1.3 Hydraulic fluid Fire

In case of fire use water spray, dry chemical, or carbon dioxide. Water may cause frothing. Use water spray to cool fire-exposed containers.

1.4 Hydraulic Schematic



- HPC 1 LR- CONSTANT POWER CONTROL
IN= MORE ENGINE HP REQUIRED
- PC 2 D- PRESSURE CUT-OFF. ACTS AS RELIEF
IN= INCREASED OUTPUT PRESSURE, SET
@ 3800 psi
- S 3 S- STAND-BY PRESSURE. FACTORY SET @
250psi, IN= HIGHER PRESSURE

TAG	PART NO	DESCRIPTION
A	83413	PILOT CYCLE VALVE
B	83311	FLOW CONTROL VALVE
C	83304	LOGIC VALVE
D	83301	MAIN RELIEF VALVE
E	83410	UNLOADER VALVE
F	83411	RELIEF VALVE
G	83403	PILOT CONTROL VALVE
H	83402	S-TUBE DIRECTIONAL VALVE
K	83406	ACCUM. DUMP VALVE

1.5 Operation

The Western Shotcrete Equipment Warrior Shotcrete Pump has two 6" id x 42 (85401) chrome plated concrete pumping cylinders powered by the 4" x 39" hydraulic main drive cylinders. (83200 or 93200, Cyl. A & B)*

The main pump is an axial piston pump (L), which generates the main oil flow. Flow from this pump is directed through a flow control valve (B) then into the Cycle block. The Cycle block (Anodized Gold) houses four cartridge logic valves (C) and one relief valve (D) and is located on top center of the hydraulic fluid tank. (83650) The cartridge logic valves are required to duplicate the functions of a spool type four-way directional valve. By controlling the opening and closing of each valve, four different flow paths are obtained. The Logic valves are opened by venting the pilot oil from the main pump to the tank through the solenoid actuated pilot cycle valve. (A)

The timing circuit (P) is the oil that is on the rod-end side of the main cylinders. The oil from the rod side on cylinder A when extending is forced through the crossover tube located on the bottom side of the cylinder next to the water-box and causes the cylinder B piston to retract. While the cylinder B piston is retracting, a constant flow of make-up oil is supplied by bypass oil from the cylinder A piston, thus overfilling the B cylinder. This overfilling ensures that the cylinder B ram will be fully retracted and ready to deliver a full stroke. As the retracting piston reaches the end of its stroke. It passes a crossover port. When this occurs, the overfill oil is exhausted through the crossover line and check-valve then into the end cap, through the Cycle block and into the tank. When the cylinder B ram starts to extend it retracts the cylinder A ram in the same manner.

Note: Should the rams become out of sync simply put the machine in pressure test mode. Through the water-box window, observe the retracting ram. When the ram has fully retracted, toggle the Pressure Test switch to the normal (Pumping) position.

The secondary pump is a tandem gear pump. The pump is mounted piggyback style on the main pump. The 1st stage pump (M) charges the accumulator. (Q) Flow from this pump is directed through the Control block to the accumulator. (Q) The Control block houses the unloading/relief valve (F) and the unloading/check valve. (E) The solenoid operated accumulator dump valve (K) must be energized by the PLC in order for the accumulator to retain a charge. This is so that the accumulator will automatically discharge when the machine is shut down.

Note: The Western Shotcrete Equipment Warrior Shotcrete Pump's, frame No.109 and higher are equipped with this automatic accumulator discharging system' that will discharge the accumulator if the ignition key-switch is in the off position or if the electrical system loses power, NOT if the engine stalls. (i.e. Engine runs out of fuel, is manually shut off, etc.) The operator should not rely solely on this system: he or she shall use extreme caution when working around the hopper.

*Refer to Hydraulic Schematic on preceding page

See Hydraulic System SEC. 2.4 Accumulator

The accumulator (Q) charge is directed through the pilot operated directional valve (H) then into the swingtube-actuating cylinder. (R) The pilot operated directional Valve is controlled by pilot oil from the solenoid operated pilot control valve. (G) The solenoid operated pilot control valve is controlled by the PLC.

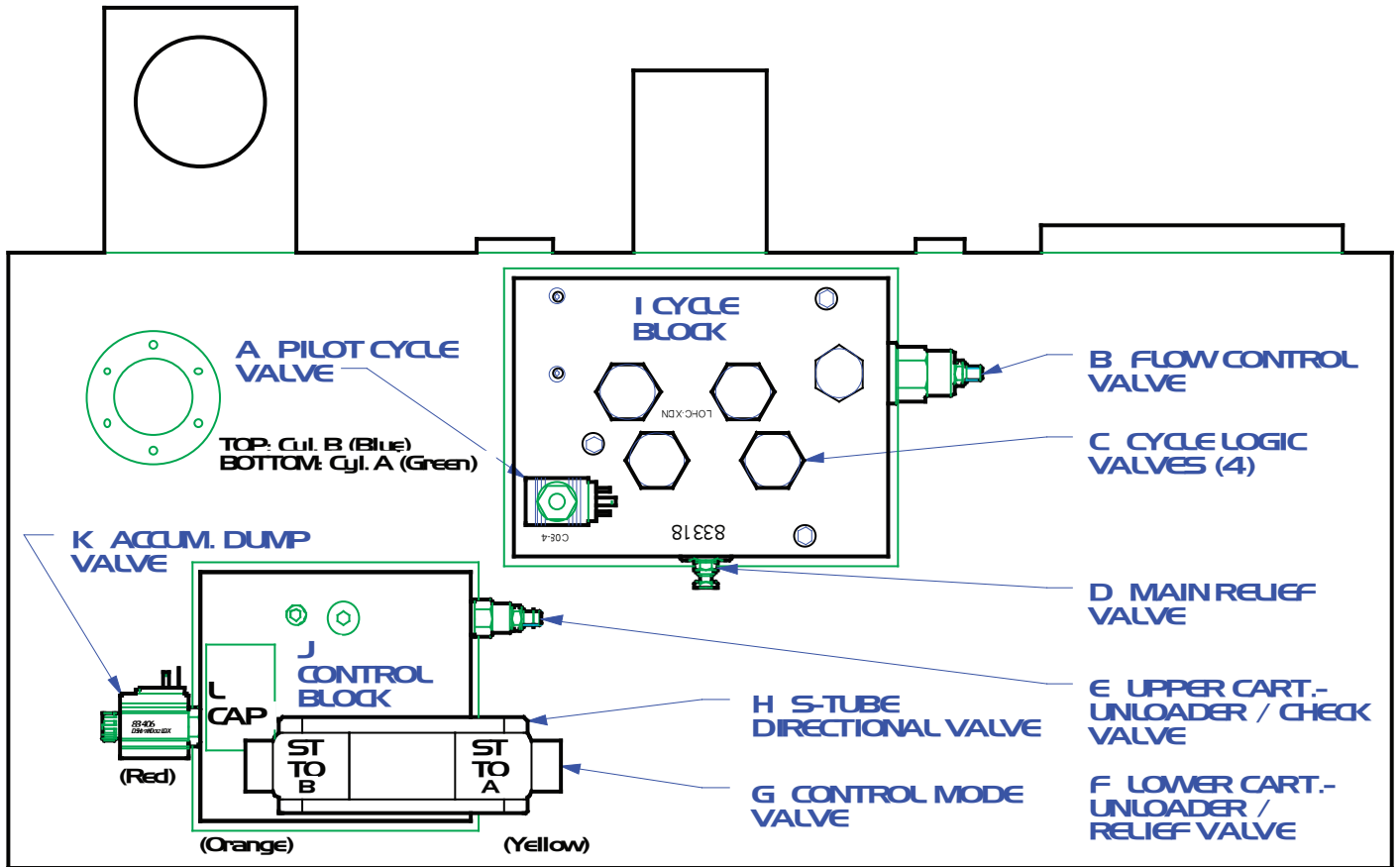
The 2nd stage of the tandem gear pump (N) powers the Remixer motor (S) and/or the jack stands. (T) The oil from this pump (N) is directed through the hand operated triple spool valve with a built-in relief valve (U) then to the Remixer motor (S) and/or the jack stands. (T) The oil is then routed to the hydraulic fluid storage tank through the oil cooler and the 10-micron filter.

The system has two electrically powered proximity sensors* (V) that send a signal to the PLC when the cylinder piston has reached the end of its stroke. The PLC also receives signals from the operator control panel. The PLC then automatically controls the switching of the solenoid operated pilot cycle valve (A) and the solenoid operated pilot control valve (G) to pump a smooth flow of concrete in forward or reverse depending on the operators input.

*See Electrical System 3.1 Proximity Switches

2 Components

2.1 Control Components Diagram



TAG	WSE PART NO.	DESCRIPTION	MANUFACTURER PART NO.
A	834B	PILOT CYCLE VALVE	DSH085C4MDO12LD
B	83311	FLOW CONTROL VALVE	NFED-LHN
C	83304	CYCLE LOGIC VALVE	LOHC-XDN
D	83301	MAIN RELIEF VALVE	RPGC-FCN
E	83410	UNLOADER / CHECK VALVE	QCDB-LAN
F	83411	UNLOADER / RELIEF VALVE	RVCA-LAN
G	83403	CONTROL MODE VALVE	4ME6D60/OF6E12N255L
H	83402	S-TUBE DIRECTIONAL VALVE	4ME110D4X/OF6E12N255L
I	83318	MKV CYCLE BLOCK	83318
J	83412	MkIII CONTROL BLOCK	83407
K	83406	ACCUM. DUMP VALVE	DSH091INDO12LD-X
L	83718	COVER PLATE	ZJ5

2.2 Valves

Setting the main relief valve 83301 (Sun RPGC-FCN)

- Loosen locking nut with a 9/16" wrench.
- Turn adjuster all the way out.
- Start engine, place in pressure test mode, turn pump on and observe main hydraulic pressure gauge.
- Turn adjuster in until the pressure gauge stops climbing. (It should stop climbing when it reaches the pump setting at 3800 psi.)
- Turn adjuster in an additional 1/2 turn and tighten locking nut.

Setting the Unloader/Check valve 83410 (Sun QCDB-LAN) and the Unloader/Relief valve. 83411 (Sun RVCA-LAN)

- Loosen locking nuts with a 9/16" wrench.
- Screw top valve (Unloader/Check-83410) adjuster all the way in using a 3/16" hex key.
- Screw the bottom valve (Unloader/Relief-83411) adjuster all the way out.
- Start engine and observe accumulator pressure gauge.
- Screw the bottom valve (Unloader/Relief) adjuster in until the accumulator gauge reads 2200~2500 psi.
- Screw the top valve (Unloader/Check) adjuster out until the pump unloads then turn out an additional 1/4 turn. You can tell when the pump unloads by three ways:
 - a) Listening for a slight clicking noise in the Unloader/Relief valve.
 - b) Hearing the engine work less.
 - c) Seeing the accumulator charge hose relax.
- If you have difficulty determining when the pump unloads, place a 4000# gauge in-line at the pump output. When the pump unloads the gauge will drop from 2500 psi to near 0 psi.
- Tighten locking nuts.
- Test operation by shifting S-Tube with the Forward/Reverse switch and observing Accumulator gauge. The pump should promptly charge the Accumulator to 2300~2500 psi and then unload.

2.3 Cylinders

2.4 Accumulator

Warning

Use dry nitrogen gas only to pressurize the accumulator bladder. NEVER use compressed air. The use of compressed air or any other unstable gas can cause a fire or explosion resulting in serious injury or death.

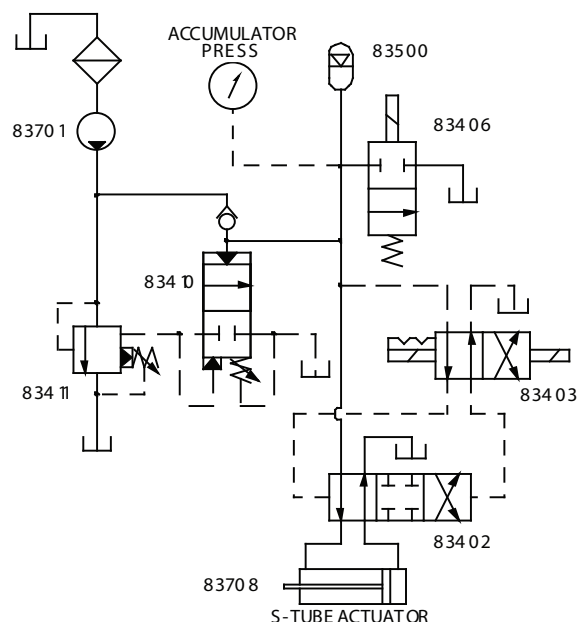
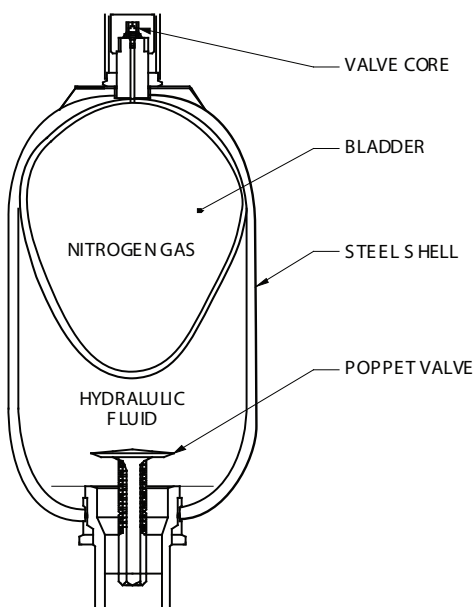
An accumulator stores hydraulic pressure. This hydraulic pressure is potential energy since it can change to kinetic energy.

The Warrior Shotcrete Pump is equipped with a 1 gallon bladder type accumulator (83500) rated @ 5000 psi maximum.

A bladder type accumulator consists of a synthetic rubber bladder inside a metal shell: the bladder contains the nitrogen gas. As hydraulic fluid enters the shell, gas in the bladder is compressed. Gas pressure decreases as fluid flows from the shell. When all fluid has been discharged, gas pressure attempts to push the bladder through the outlet. But, as the bladder contacts the poppet valve at the outlet, flow from the shell is automatically shut off.

Since the charged accumulator is a source of hydraulic potential energy, stored energy of an accumulator can be used to develop system flow when system demand is greater than pump delivery. This is the case for the S-Tube valve actuator circuit. Since the actuator cycles infrequently, a small displacement pump (33701) is used to fill the accumulator over a period of time. When the moment arrives for the S-Tube valve to operate, a directional valve (83402) is shifted downstream and the accumulator delivers the required pressurized flow to the 2.5" x 5" actuator (83708). Using an accumulator in combination with a small pump in this manner conserves peak horsepower. For instead of using a large pump/motor to generate a large horsepower all at once. The work can be evenly spread over a given time period.

2.4b Accumulator Diagram & S-Tube Valve Actuator Circuit



2.5 Hydraulic Fluid

Recommended hydraulic fluid: ISO-68, AW-68 (20W), Qualified against Denison HF-O, Meeting requirements of Vickers M-2950-S and I-286-S specifications. Capacity: 55 Gallons.

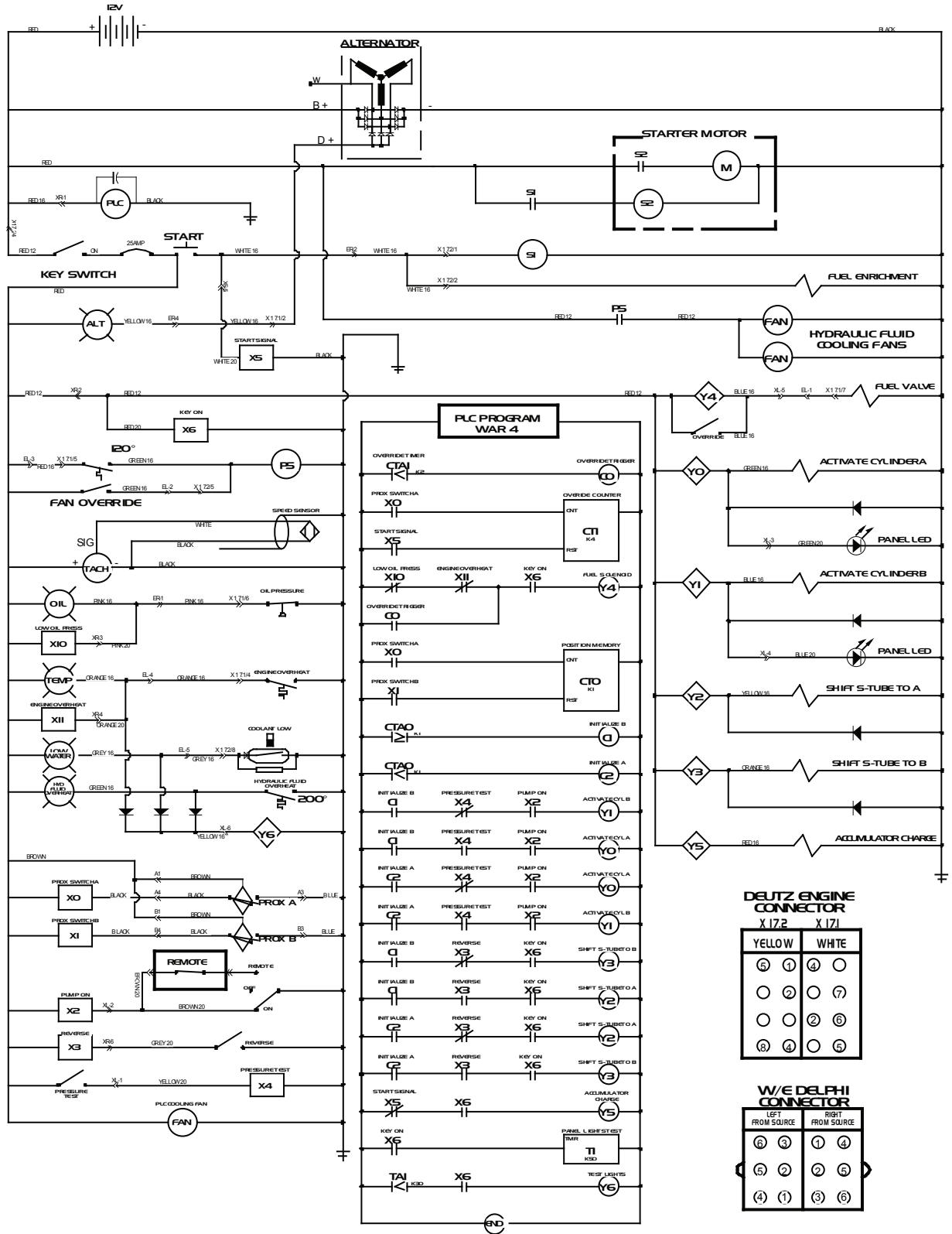
2.6 Oil Cooler

ELECTRICAL SYSTEM

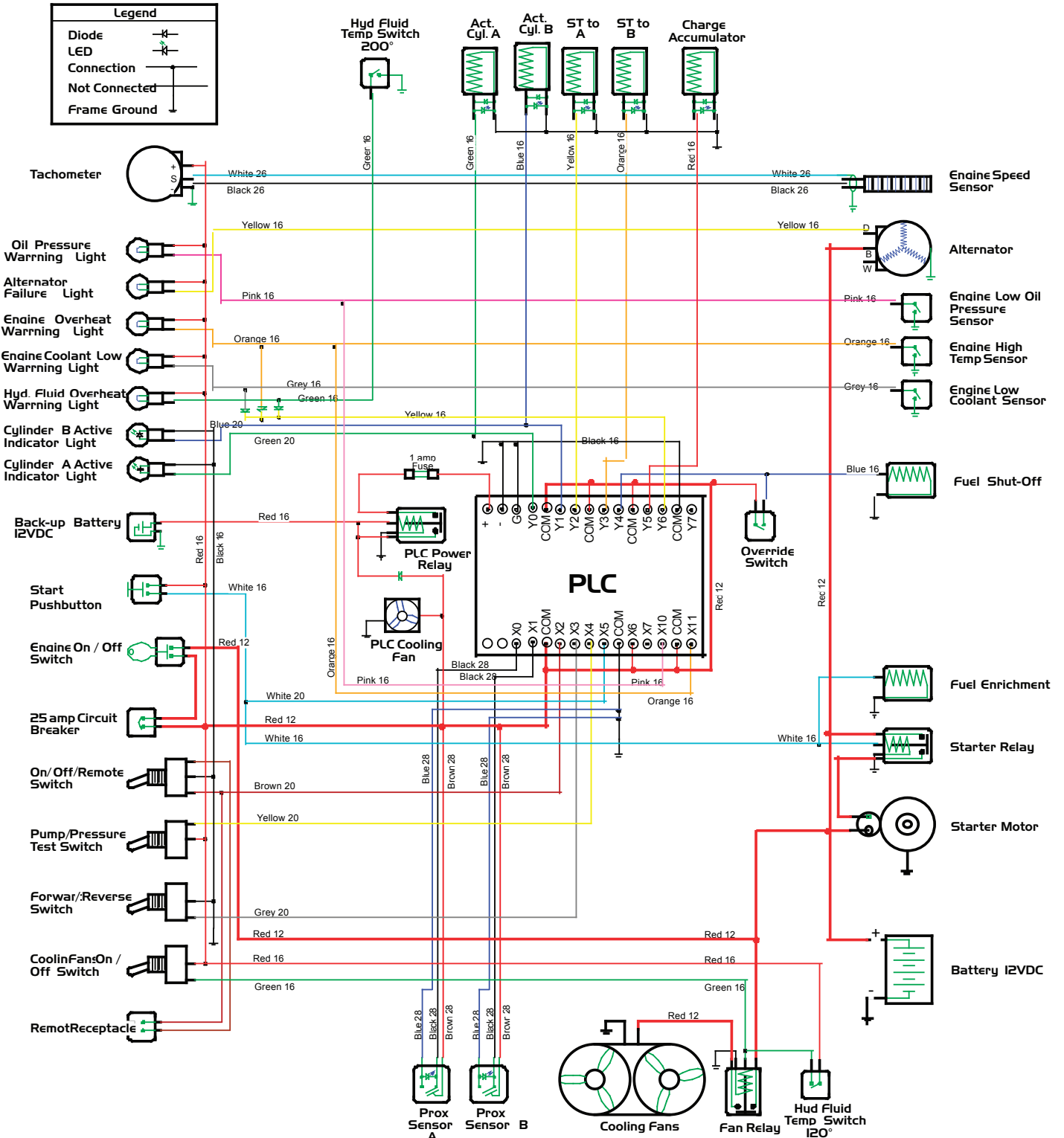
1 General/Safety

2 Wiring Diagrams

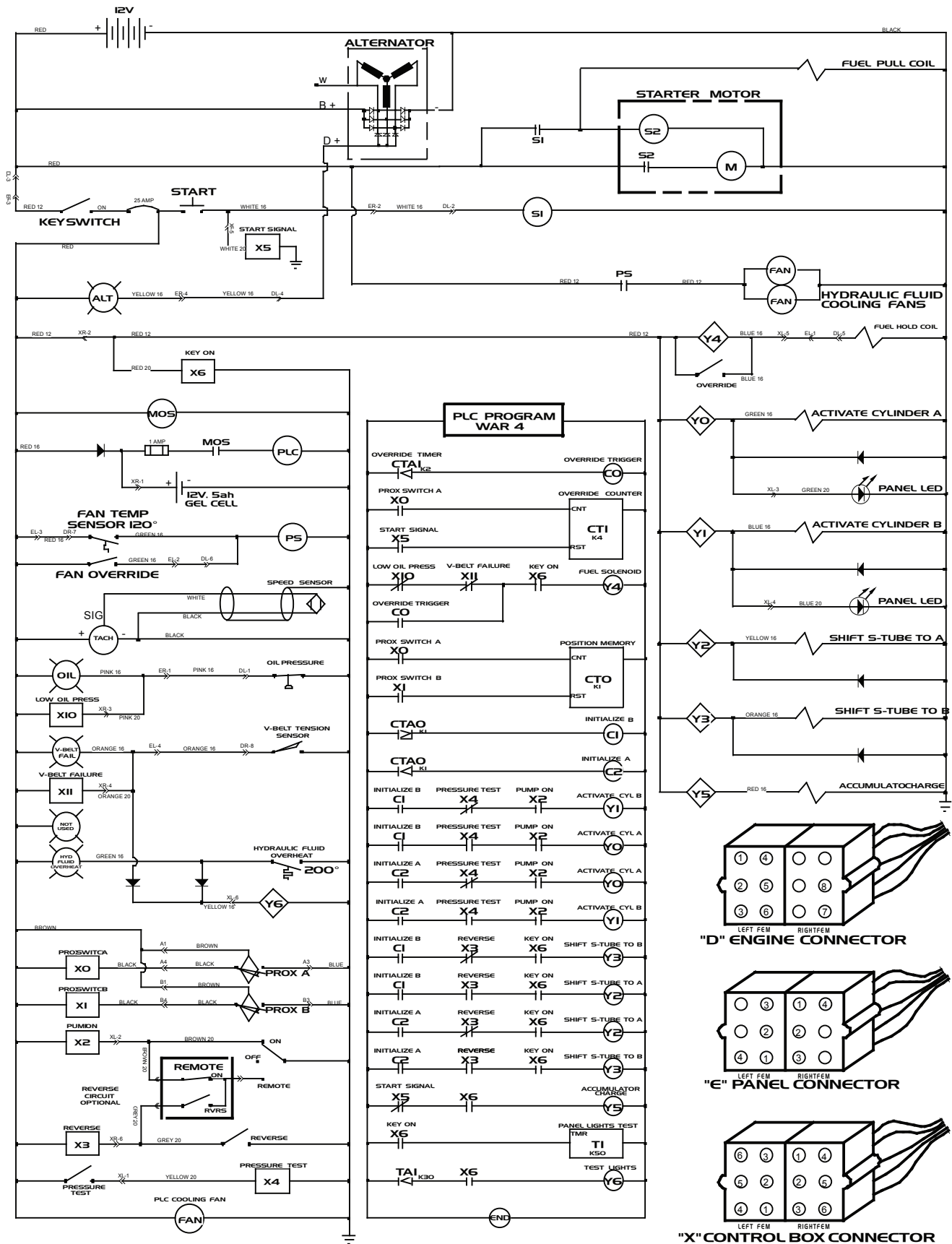
2.4 Ladder Diagram for pumps with a Deutz BF4M 1013C Engine



2.5 Wiring Diagram for pumps with a Deutz BF4M 1013C Engine

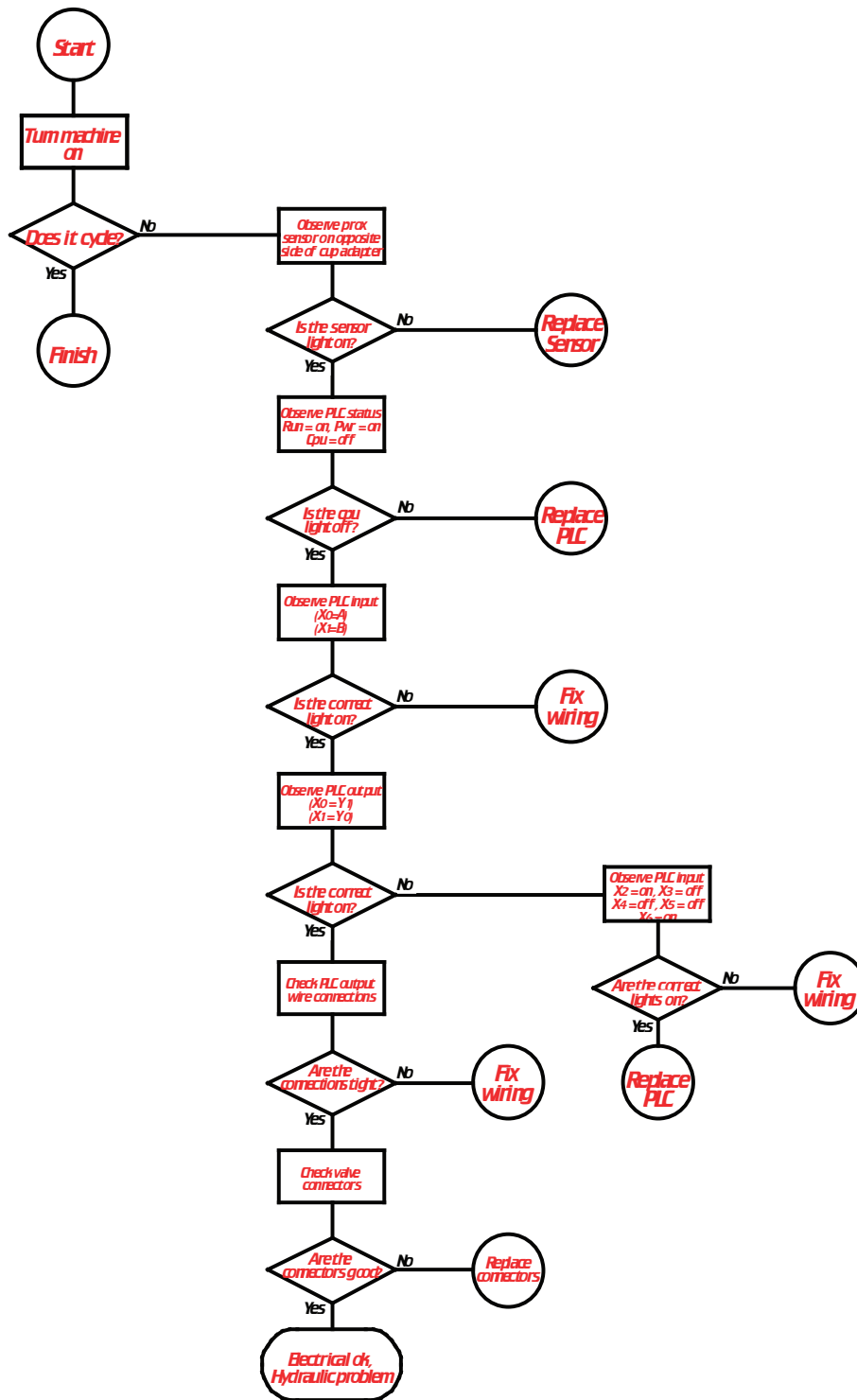


2.6 Ladder Diagram for pumps with a Deutz BF6L 913 Engine



3 Components

3.1 Proximity Switches



ENGINE

1 General/Safety

1.1 Diesel Fuel Safety

Warning

Diesel is extremely flammable and is explosive under certain conditions. Work in a well-ventilated area with the engine stopped. Do not smoke or allow flames or sparks in your working area or where diesel is stored.

Warning

If the engine must be running to perform maintenance, make sure your workspace is well ventilated. Never run the Engine in an enclosed space. The exhaust contains poisonous carbon monoxide gas that may cause loss of consciousness and lead to death.

Warning

California Proposition 65 warning:

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

FRAME

TROUBLESHOOTING

1 Pumping

Pump cylinders are making very short strokes and S-Tube is switching rapidly back and forth.

Probable cause-

Out of sync

The pumping cylinders can become out of sync when idling a long period of time between trucks.

Should the cylinders become out of sync simply put the machine in pressure test mode by setting the Pressure test switch to “Press Test” and turning on the pump. Through the water-box window, observe the retracting ram. When the ram has fully retracted turn the pump off and the set the pressure test switch to the normal (Pumping) position: this will place the rams in sync.

Overheating Hydraulic Fluid

Probable cause-

Heat generation.

Heat is generated in a hydraulic system whenever oil dumps from a higher to a lower pressure without producing a mechanical work output. Bad o-ring seals, worn or improperly adjusted valves, and/or worn-out hydraulic pumps can cause this.

Examine the o-ring seals on the four logic valves (83300) in the cycle block. (83318) Examine the o-ring seals and the setting of the main relief valve Examine the o-ring seals and the setting of the unloading relief (83411) and check valves. (83410) Examine the o-ring seals and the proper function of the accumulator dump valve. (83406)

Measure the temperature of the tandem gear pump (83701) while the machine is in operation. It should only be about 10” higher than the tank temperature. If the pump temperature is excessive, or it struggles to charge the accumulator it should be replaced.

Cooling fan failure.

If both of the cooling fans (83719) are not operating the hydraulic system will overheat rapidly. Does the override switch operate the fans but not the temperature switch? Use a test light and check the temperature switch on top of the hydraulic oil cooler for proper operation. The switch should turn on at 120°.

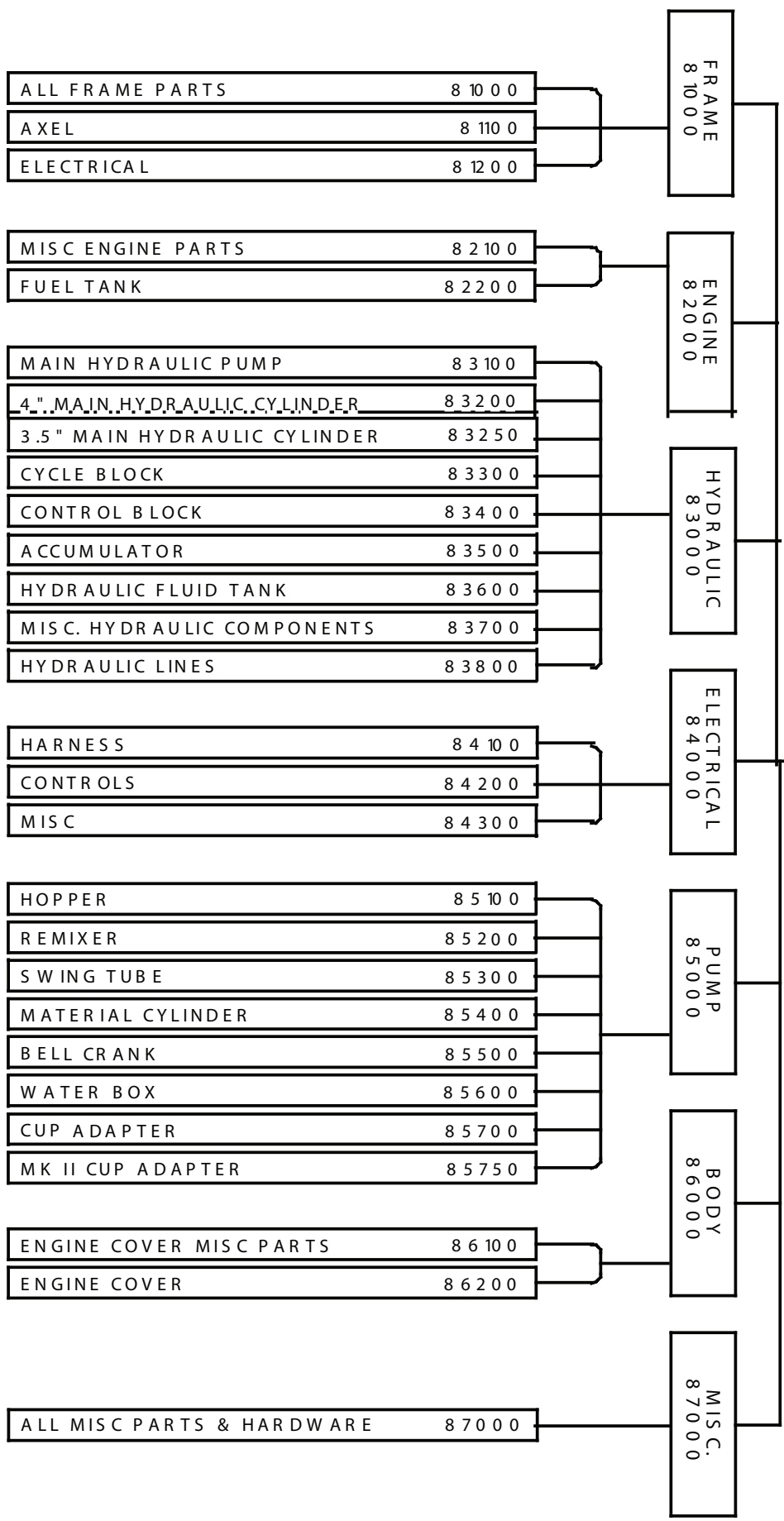
Do the fans not work at all? Examine the fan relay for proper operation.

Remixer motor.

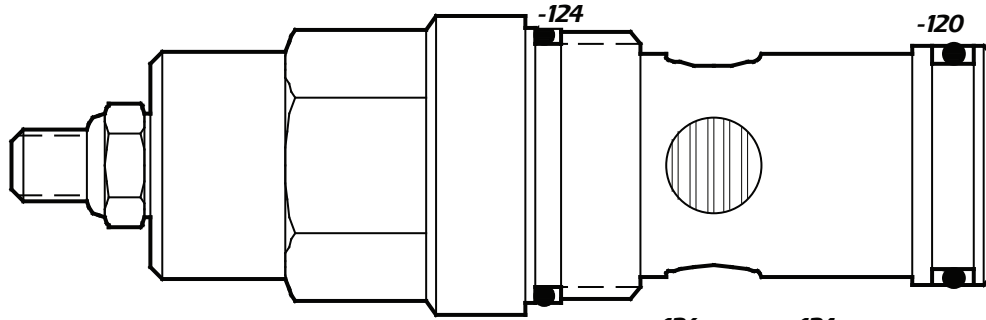
Examine the remixer motor (83780) operation. Is it turning unusually slow? A worn remixer motor will generate a lot of heat. Also check the built-in relief valve in the hand operated triple spool valve for proper operation.

WARRIOR SHOTCRETE MACHINE PART HIERARCHY

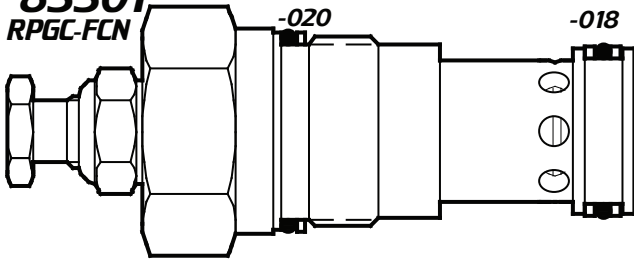
WARRIOR SHOTCRETE
MACHINE
3050



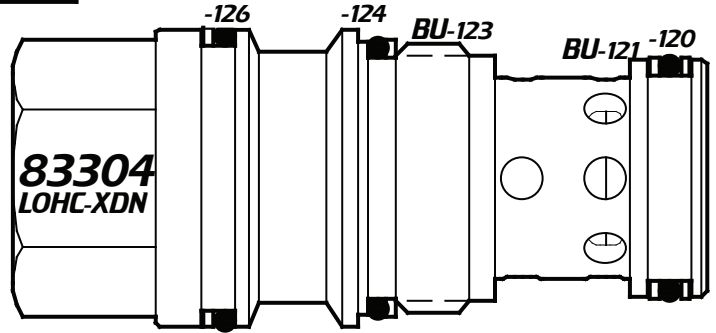
83311
NFED-LHN



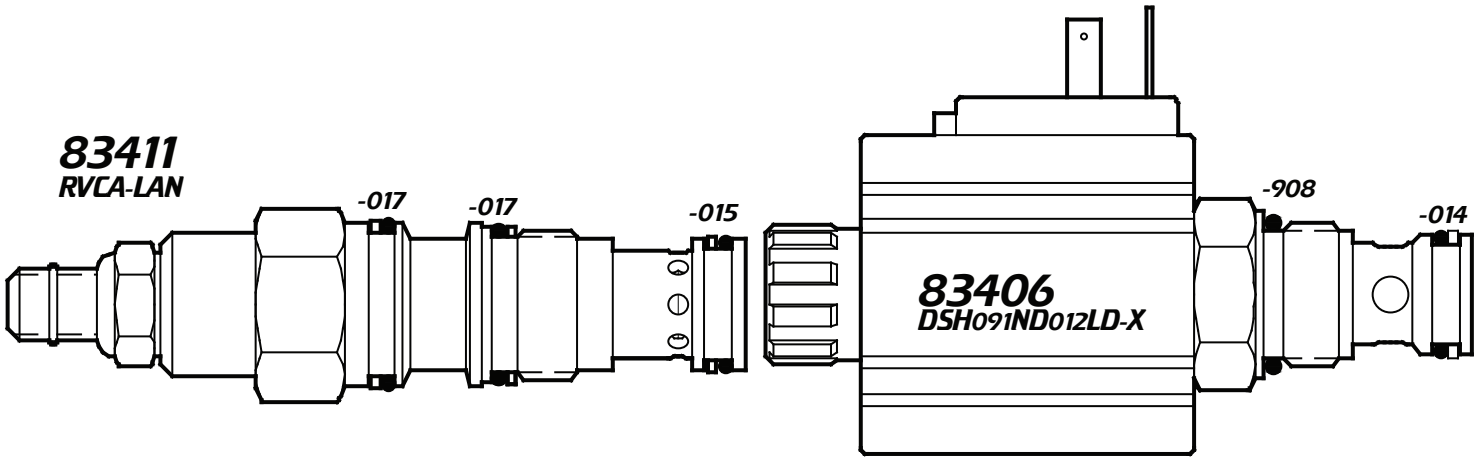
83301
RPGC-FCN



83304
LOHC-XDN



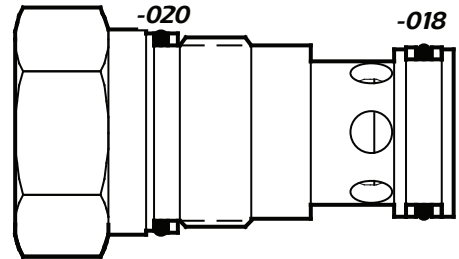
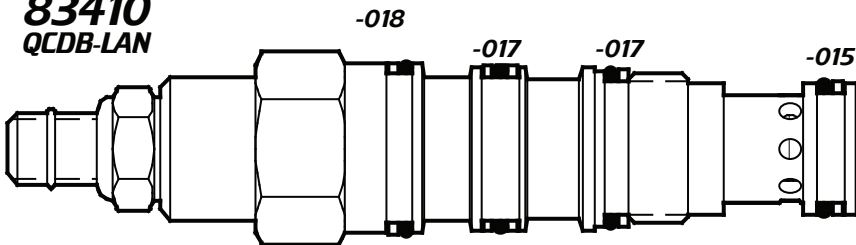
83411
RVCA-LAN



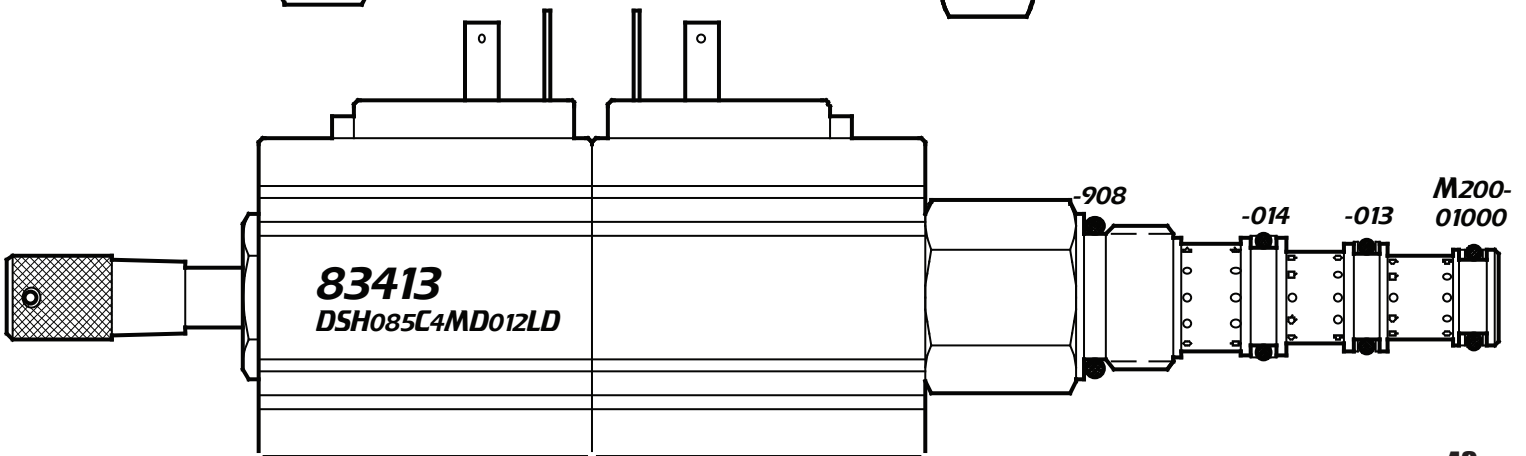
83406
DSH091ND012LD-X

83723
CXFA-XAN

83410
QCDB-LAN



83413
DSH085C4MD012LD



Part Number	Description
80000	WARRIOR 3050
81000	FRAME GROUP
81001	BRACKET, Brake Actuator, Mating
81002	GUSSETT, Corner
81003	CROSS MEMBER, Front
81004	CROSS MEMBER, Mid
81005	CROSS MEMBER, Rear
81006	FRAME RAIL, RH
81007	FRAME RAIL, LH
81008	GUSSETT, Top
81009	GUSSETT, Bottom
81010	MOTOR MOUNTS
81011	TONGUE, Frame Rail, RH
81012	TONGUE, Frame Rail, LH
81013	GUSSETT, Jack Stand, Rear
81014	GUSSETT, Jack Stand, Front
81015	MOUNT, Hyd. Cyl. Lower
81016	MOUNT, Hyd. Cyl. Upper
81017	TONGUE, Tube, Front
81018	CHAIN, Safety
81019	WELD LOOP, Chain, Safety
81020	HANGER, Spring, Front
81021	HANGER, Spring, Rear
81022	BRAKE LINE, RH
81023	BRAKE LINE, LH
81024	DIAMOND Plate, Running Board, RH
81025	DIAMOND Plate, Running Board, LH
81026	DIAMOND Plate, Fender Cover
81027	MOUNT, Jackstand, Manual
81028	RUNNING Board
81029	CROSS Tab, LH
81030	CROSS Tab, RH
81031	BRACKETS, Fender
81032	TUBE, Inner, Jackstand
81033	FOOTPAD, Jackstand
81034	GUSSETT, Fender
81035	FENDER, Rounded Corner
81037	GUARD, Brake Actuator, 4"
81038	STEP, Diamond Plate, LH
81039	STEP, Diamond Plate, RH
81041	CHAIN, 3/8 x 35, W/ Latch Hook
81042	TAIL LIGHT, Oval, Rubber
81043	GUARD, Brake Actuator, 4.25"
81044	JACKSTAND, Manual H-BLOW JACK DROP LEG 7KSW 15" LIFT
81044.001	PIN, HITCH, MANUAL JACKSTAND 7/8" X 3 1/2" (USABLE LENGTH)
81045	LATCH, SAFETY CHAIN
81046	LEG, Jackstand, Hydraulic

Part Number	Description
81047	GUARD, Brake Actuator, 4.5"
81048	Battery Box, Single
81049	BRACKET, Support, Jack-Stand
81050	SUB-FRAME, Rear Step
81051	Safety Chain Attachment Bracket
81052	Bracket,Hyd.,Cyl.,Support; Front, Drive Cylinders
81053	Corner Gussett 9" length 1/4" Sheetmetal
81100	AXLE, Complete, 6.0K, W/Hydro. Brakes
81101	AXEL, 6.0K, Beam Only
81102	WHEEL, 16x6, 8H, Bw, R&B
81103	TIRE, 750-16 10 Ply
81104	BUSHING,NYLON
81105	8-Leaf Spring, AWS-8
81106	U-Bolt Kit
81107	Valve Stem, Metal, TR416
81110	Tire / Wheel combo
81111	IMPORT BIAS PLY LT TIRE LRE 7.50 X 16
81150	Axel, Torsion Bar, Complete
81151	Tire
81152	BRACKET, Weld-On, #12 Torflex
81153	3/16" Flex Hose
81154	BRACKET,WELD-ON FOR 3/16" STEEL HOSE
81155	CLIP, BRAKE HOSE
81156	TRAILER,CONNECTOR 7WAY RV; TRAILER END
81200	ACTUATOR, Brake
81300	JACK, 5000#
81303	TUBE, Jackstand, Outer
81304	TUBE, Jackstand, Inner
81305	ACTUATOR, Surge Brake, HD
81306	3" Pintle Eye
81307	HHCS, 5/8x4.5
81308	5/8 Lock-nut
81309	Frame to Hopper Connector Bracket
81310	Hopper Leg Bracket 2 X 2 X 3 X .25
81311	1/2-20 Lug Nut: Hex Wheel Nut 60 Deg. Cone
82000	ENGINE GROUP: All Engine Parts Including Fuel System
82001	Engine, Diesel BF4M1013C Power Unit
82002	MANIFOLD, Exhaust For BF4M1013C Power Unit
82003	GASKET, Exhaust
82004	GASKET,Turbo
82005	Alternator
82006	415214, Tensioner, V-Belt
82101	Lever, Throttle
82102	Bushing, Drain, Oil,
82103	DIESEL ENGINE, BF6L913, Air-Cooled 6 Cyl T
82104	HHCS, 1/2-13x5

Part Number	Description
82105	FILTER, Oil, 2qt, (1820)
82106	FILTER, Fuel, (3358)
82107	DEFLECTOR, Air
82108	Starter
82109	Water pump
82110	KIT, Gasket, Seal, Water-pump
82111	Thermostat for Deutz BF4M1013C
82112	KIT, Seal, Thermostat for Deutz BF4M1013C
82113	SOLOINOID, KIT, SHUT-DOWN, BF6L913 ,DUETZ
82114	SOLOINOID, KIT, SHUT-DOWN, F4L912,DUETTZ
82150	Throttle Cable Assembly, 96"
82151	Throttle Cable, 96"
82152	Ball-Joint, Throttle Cable, 10/32x1/4
82153	Throttle, Controller only
82154	THROTTLE ARM for: DEUTZ BF6L 913
82155	THROTTLE BRACKET for: DEUTZ BF6L 913
82200	TANK, Fuel
82201	TANK, Fuel, Top Half
82202	TANK, Fuel, Bottom Half
82203	MOUNT, Tank, Fuel
82204	TUBE, Pick-Up, Fuel
82205	FILLER Neck
82206	CAP, Filler Neck
82207	WELD-ON, 1/2" Female Pipe
82208	WELD-ON, 3/4" Female Pipe
82209	WELD-ON, 1 1/2" Female Pipe, 2" Long
82210	GAGE, Level, Fuel
82211	PLUG, Pipe, 3/4"
82212	BARB, Hose, 3/8" Pipe, 6loc-4rmp
82213	Valve, Check,Fuel, 3/8"
82214	FILLER NECK, Fuel Tank, Long
82215	FILLER NECK, Fuel Tank, Short
82250	TANK, Fuel, 37 gal.
82251	TANK, Fuel, Top Half, MkII
82252	TANK, Fuel, Bottom Half, MkII
82253	ANGLE, Tank, Fuel, MkII
82254	GUAGE, Tank, Fuel, MkII
82255	PICK-UP TUBE,Tank, Fuel, MkII
82256	BAFFLE, Tank, Fuel, MkII
82257	Lockable Diesel Cap Chain & Anchor
82258	DIESEL FUEL NECK @ CAP
82259	Water Separator,Fuel Stanadyne Complete assy.
82300	Exhaust System, Complete
82301	FLANGE, Turbo, Duetz
82302	PIPE, Exhaust, 3"
82303	ELBOW, Exhaust, 3"

Part Number	Description
82304	PIPE, Exhaust, 3"
82305	CLAMP, Exhaust, 3"
82306	MUFFLER, 24", 3" In, 3" Out
82307	MOUNT, Rear, Exhaust System
82308	MOUNT, Front, Exhaust System
82309	ELBOW, 3"
82311	STACK, 3"
82312	STACK, 3", Chrome
82313	BLANKET, Insulation
82400	Intake System
82401	CAP, Air Cleaner
82402	FILTER, Air
82403	COUPLING, Flex, 3"
82404	CLAMP, Hose, 3"
82405	TUBE, 3" x 16.5" x 16ga
82406	COUPLING, Rubber, 90°, 3"
82407	TUBE, 3" x 12" x 16ga
82408	TUBE, 3" x 19" x 16ga, w/ 3/4" Y
82409	VENTURI, 3" OD, 4 Cyl.
82410	BANDS, MTG. 8"; 2 Req.
82411	End Cap , Air Cleaner
82412	VENTURI, 3" OD, 6 Cyl.
82413	Fuel/Water Separator Mounting Bracket
82414	Air Filter Element
82415	Banjo Bolt for Oil Change Kit
82416	OPP CU SEAL for Oil Change Kit
82417	Banjo Fitting for Oil Change Kit
83000	HYDRAULIC GROUP All Hydraulic Components
83100	Pump, Variable Displacement , 130 cc , Rexroth
83101	Valve, Needle, Assembly, Sun flow control valve & manifold
83102	PUMP SUPPORT PLATE
83103	CONTROL, Pump, LRDS
83110	Flange Elbow
83111	Flange, 3", Pump Intake
83112	ELBOW, 3", Long Radius, Black Pipe
83113	NIPPLE, 3" Black Pipe
83200	CYLINDER, Hydraulic, 4", MKII, Complete
83201	CYLINDER, Hydraulic, Main, MKII
83202	Rod, Cylinder, Chrome, 2", Mk II
83203	PISTON, 4", MKII
83204	HOUSING, Gland, 4", MKII
83205	RING, Target, Proximity Sensor
83206	Retainer
83207	HEAD, Cylinder, MKII
83208	FLANGE, Cylinder, 4" MKII
83209	Bolt, Locking; Cyl. Piston Retainer Bolt

Part Number	Description
83211	EXPANDER, 4"
83212	SEAL, Soft, 4"
83213	RING, Piston, 4" OD Cast Iron 3/16" Width
83214	O-RING, -129
83215	O-RING, -342
83216	B'UP RING, -342
83217	Bushing, Bronze, Oil Impregnated
83218	O-Ring, -229
83219	CARTRIDGE, Gland
83220	KIT, Seal, Wiper
83221	SEAL, Rod Lip, 2"
83222	SEAL, Rod Wiper, 2"
83223	Base, Proximity Sensor, 4" Cylinder
83224	Port, Coped, #10 SAE Boss
83225	Port, Weld-On, Coped, #16 SAE Boss
83226	TUBING, 5/8", Cylinder Head to Check
83227	KIT, Ring, Seal, 4"
83228	ROD, Cyl., 2" Mk II
83229	PISTON, 4", MkIII
83230	WEAR-BAND, 4" x .125" x .315
83231	KIT, Ring, 4" Piston
83232	Rod, Cylinder, Chrome, 2", Mk III
83250	CYLINDER, 3.5", Complete
83251	CYLINDER, 3.5", MKII
83253	PISTON, 3.5", MKII
83254	HOUSING, Gland, 3.5", MKII
83255	RING, Target, Proximity Sensor, 3.5"
83257	HEAD, Cylinder, 3.5", MKII
83258	FLANGE, Cylinder, 3.5", MKII
83261	Expander, 3.5"
83262	Seal, Soft, 3.5"
83263	RING, Cylinder, 3.5"
83265	O-RING, -338
83266	B' UP Ring, -338
83273	Base, Proximity, Cylinder, 3.5"
83274	Port, Coped, #10 SAE Boss, for 3.5" Cyl
83275	-161 O-RING , CYL. FLG. X WATER BOX
83276	PISTON, 3.5", Wear-Band
83277	WEAR-BAND, 3.5" x .125" x .315
83278	Gland Cartridge 2" Extended
83279	Wear Ring
83280	4" Piston, MK 4
83300	Cycle Block Group
83301	Valve, Relief, Cartridge, Main
83302	Valve, Pilot, Double Solenoid; 1/4" "J" Spool
83303	Valve, Pilot, Double Solenoid; 1/4" "D" Spool

Part Number	Description
83304	Valve, Logic, Cartridge, Sun
83305	Seal Kit, Valve Logic (VITON)
83306	SEAL KIT (LOHC-XDN)
83307	Block, Cycle
83308	Base Plate, Cycle Block
83309	Body, Sun To Fit CXFA-XAN
83310	Valve, Double Throttle Check
83311	Cartridge, Valve, Flow Control
83312	Cycle Block, Mk IV
83313	BEARING, Flange, 3/8 Bore
83314	KNOB, Flow Control
83315	U-JOINT, 3/8"
83317	VALVE, Control, Pilot, Cartridge, Parker
83318	Cycle Block, Mk V
83319	VALVE, RPGC-CCN, Sun Cart., 4200psi
83327	4" PISTON KIT VITON INCLUDES (4) CAST IRON RINGS &(2) SOFT SEALS W/EXPANDERS
83400	Control Block Group
83401	Valve, Logic
83402	Valve, Pilot Operated, Electrically Controlled; 3/8" "D" Spool
83403	Valve, Pilot, Double Solenoid; 1/4" "D" Spool
83404	Valve, Pilot, Single Solenoid; 1/4" "D" Spool
83405	Valve, Accumulator Charge, Assembly; Sun Cartridge
83406	Valve, Dump, Accumulator, Parker Cartridge Valve
83406	Valve, Dump, Accumulator, Parker Cartridge Valve
83407	Block, Control
83408	Base Plate, Control Block
83409	Valve, Pilot, Single, Solenoid; 1/4" "D" Spool
83410	VALVE, Unloader, Cartridge
83411	VALVE, Relief, Cartridge, Secondary
83412	Control Block Mk IV
83413	VALVE, Cartridge, 4-Way
83413.1HF	VALVE ,CARTRIDGE,4-WAY
83413.2 HF	COIL, 12VDC DIN43650 SIZE 8; TO FIT 83413.1 HF VALVE
83414	Manifold, Rex. D03 x Parker c08-4
83415	COIL, REX 021388 E 240 12VDC 2.5A, TO FIT 83403,5
83416	Coil, Parker, S8LDD012; To fit Parker Cart. Directional valve
83417	VALVE, Logic, S-Tube (Sun LOFC-XDN)
83420	MANIFOLD, Sun Cartridge Style with Dump Valve
83500	Accumulator, 5000#, 1-Gallon
83501	VALVE CORE, Gas
83510	REPAIR KIT, Hydac Accumulator, 1 Gal.
83511	Valve, Protection, Cap
83520	1, Gallon , 3000#, Accumulator
83521	CLAMP, Mounting, Accumulator
83600	TANK, Hydraulic Fluid
83600.1	Hydraulic Tank, Top Bracket, 2 x 2 x 3/16 Angle Bracket

Part Number	Description
83600.2	Mounting Rail for, Tank, Hydraulic Fluid
83601	Tank, Hydraulic, Top
83602	Tank, Hydraulic, Bottom
83603	Baffle, Tank, Hydraulic
83604	Cover, Access, Hyd. Tank, 12"
83605	Cover, Gasket, 12" Gasket & Washer Kit
83606	BRACKET, Accumulator
83607	RISER, Weld-on
83608	TUBE, Riser, Hyd. Tank
83609	FLANGE, Filter, Hyd. Tank
83610	TUBE, Inlet, Pump, Hyd. Tank
83611	TUBE, Return, Control Block
83612	Gauge, Liquid, Sight, LBD G615-05-A-1
83613	TUBE, Return, Cycle Block
83614	MOUNT, Accumulator
83615	SADDLE, Rubber, Accumulator
83616	TUBE, Return, Control Block
83617	TUBE, Return, Filter
83620	FILTER Assembly, Complete
83621	FILTER, Hyd. Fluid
83622	O-Ring, Hyd. Filter
83623	HOUSING, Hyd. Filter
83624	CAN, Plastic, Hyd. Filter
83625	GAUGE, Pressure, Hyd. Filter
83626	open #, Hyd. Filter
83627	Breather.Filler, Cap
83628	Bracket, Angle, 12" End Cover Mt.
83650	TANK, Hydraulic, 48 gal.
83651	TANK, Top, Hydraulic, 48 gal.
83652	TANK, Front, Hydraulic, 48 gal.
83653	TANK, Back, Hydraulic, 48 gal.
83654	TANK, Bottom, Hydraulic, 48 gal.
83655	TANK, Baffle, Hydraulic, 48 gal.
83656	Cover, Hyd. Tank, Left
83657	Cover, Hyd. Tank, Right
83658	OIL TANK BAFFLE BRACKET
83659	Hydraulic Tank Filler Neck
83660	Chain & Retaining Ring
83701	Pump,Gear Tandem
83702	Coupling, Drive, Pump
83703	Weld-On, SAE Boss, #16
83704	Strainer, Suction 3"
83705	Strainer, Suction, 1.5"
83706	Gauge, Hyd. 10,000#
83707	Gauge, Hyd. 5000#
83708	Cyl. Hyd. S-Tube Actuator

Part Number	Description
83709	Cooler, Oil, Single, Fan
83710	Filter, Return, Immersed, Tank
83711	Cyl. S-Tube Rod Seal Kit
83712	Cyl. S-Tube Gland Kit
83713	Weld-On, SAE Boss, #10
83714	Weld-On, 3/4 Pipe
83715	Gauge, Hyd. 5000#
83716	U-JOINT, 1/2"
83718	PLATE, Cover, D03
83719	Cooler, Oil, Fan, Double
83720	Valve, Contol, Directional
83720.001	Rocker Box, Walvoil
83720.002	Handles , Walvoil
83721	FITTING, 6403-NWO-10
83722	VALVE BODY, Inline, DCK-S
83723	VALVE, Check, Cartridge, CXFA-XAN
83724	SEAL KIT, CXFA-XAN
83725	FITTING, 6801-10
83726	FITTING, 6400-10
83727	RESTRICTOR, Pipe, 1/4NPT, .100 Orfice
83728	Fitting, 6801-10, w/ 1/4NPT Internal thread
83729	Fitting, 6807-10
83730	Fitting, MB-MJ-16
83731	BODY, Valve, Sun, DCK
83732	MOUNT, Line, Hydraulic, Accumulator
83733	FITTING, 8MB-6MJ90 (6801-6-8)
83734	FITTING, 6MB-6MJ(6400-6)
83735	FITTING, 6MB-6MJ90 (6801-6)
83736	FITTING, MB10-MJ6 (6400-6-10)
83737	FITTING, MJ6-FJX6 90 (6500-6)
83738	FITTING, MB16-MJ10 (6400-10-16)
83739	FITTING, MJ10FJX10 90 (6500-10)
83740	PLUG, 1 1/2", Pipe, Socket Head, (5406-HHP-24)
83741	FITTING, MB20-MJ16 (6400-16-20)
83742	FITTING, MJ16-MJ16 90 (6801-16)
83743	FITTING, MJ10-MJ10 (2403-10)
83744	PLUG, -2 SAE, Socket head (6408-HHP-2)
83745	PLUG, -8 SAE, Hex head, (6408-8)
83746	FITTING, MB4-MJ4 90 (6801-4)
83747	FITTING, MB6-MJ8 (6400-8-6)
83748	FITTING, MB8-MJ10 (6400-10-8)
83770-022	CYLINDER, Outrigger, 3/4-16 DEFORMED NUT
83749	FITTING, MB4-MJ4-MJT4 (6804-4)
83770-021	CYLINDER, Outrigger, KEY 1/8" x 6"
83750	PLUG, -12 SAE Hex plug (6408-12)
83770-020	CYLINDER, Outrigger, MB-MJ 90 6-6 FITTING

Part Number	Description
83751	PLUG, -16 SAE Hex plug (6408-16)
83770-019	CYLINDER, Outrigger, 2" x 12" CYLINDER
83752	ELBOW, 16FL5K-16MJ90
83770-018	CYLINDER, Outrigger- 6 SAE BOSS WELD-ON FITTING
83753	SPLIT-FLANGE, SFK-16
83770-017	CYLINDER, Outrigger MB-MJ 6-6 FITTING
83754	FITTING, MB12-MJ10 90 (6801-10-12)
83770-016	CYLINDER, Outrigger CYLINDER CAP
83755	FITTING, MB16-FJX16 45 (6502-16)
83770-015	CYLINDER, Outrigger CLEVIS
83756	FITTING, MB12-MJ10 90 (6801-10-12)
83770-014	CYLINDER, Outrigger
83757	SPLIT-FLANGE, SFXK-20 6K
83770-013	CYLINDER, Outrigger PIN 1/8" X 2"
83758	FITTING, MB6-MJ4 90 (6801-4-6)
83770-012	CYLINDER, Outrigger ROD 1 1/8" X 16"
83759	FITTING, Push-On 6 x Fem Pipe 6 (4312-6-6)
83770-011	CYLINDER, Outrigger, SEAL KIT
83760	FITTING, MJ10-MJ10-FJX10 (6602-10)
83770-010	CYLINDER, Outrigger, OR-018 PISTON x ROD SEAL
83761	FITTING, MJ16-MJ16 (2403-16)
83770-009	CYLINDER, Outrigger, OUTSIDE OUTRIGGER GLAND
83762	FITTING, MB20-MJ10 (6400-10-20)
83770-008	CYLINDER, Outrigger, OUTSIDE OUTRIGGER GLAND
83763	FITTING, MB8-MJ8 (6400-8)
83770-007	CYLINDER, Outrigger, FOR INSIDE OUTRIGGER GLAND
83764	FITTING, MB8-MJ6 (6400-6-8)
83770-006	CYLINDER, Outrigger, INSIDE OUTRIGGER GLAND
83765	Cooling Fan, Fan & Motor only
83770-005	CYLINDER, Outrigger, For Hydraulic Piston
83766	Weld Boss Adapter 8; LWBA-8
83770-004	CYLINDER, Outrigger For Outrigger Piston
83767	WELD BOSS ADAPTER-10, LWBA-10
83770-003	CYLINDER, Outrigger Gland Packing
83768	WELD BOSS ADAPTER-12 LWBA-12
83770-002	CYLINDER, Outrigger; 2" OUTRIGGER PISTON
83769	WELD BOSS ADAPTER-16; LWBA-16
83770-001	CYLINDER, Outrigger, 2" OUTRIGGER GLAND
83770	CYLINDER, Outrigger
83771	WELD BOSS ADAPTER-24; LWBA-24
83772	WELD BOSS ADAPTER, 1.5 NPT x 1.5 SAE FEMALE BOTH ENDS
83780	MOTOR, Hydraulic, Remixer
83790	ACTUATOR, S-Tube
83791	SUN CHECK VALVE; CXDA-XAN
83792	SUN BODY, GCI/S
83793	Heat Exchanger, TT PN/M20-S

Part Number	Description
83794	OIL COOLER FRONT MOUNTING KIT
83800	Hoses & Lines
83801	LINE, Bypass, Front, .625x90°
83802	HOSE, Valvoil In x P3
83803	HOSE, Valvoil out x Oil Cooler
83804	HOSE, Remixer
83805	HOSE, Jackstand, Top, RH
83806	HOSE, Jackstand, Bot, RH
83807	HOSE, Jackstand, Top, LH
83808	HOSE, Jackstand, Bot, RH
83809	HOSE, Press Gauge
83810	HOSE, Accum. Gauge
83811	HOSE, Pump Sensor x Cycle Block
83812	HOSE, Oil Cooler out x Filter
83813	HOSE, Tank x P2 In
83814	HOSE, Tank x Pump Case Drain
83815	HOSE, Main Pump out x Cycle Block
83816	HOSE, S-Tube Cyl, Long, x Control Block
83817	HOSE, S-Tube Cyl, Short, x Control Block
83818	LINE, P2 x Control Block
83819	LINE, Accum. x Control Block
83820	LINE, Oil Cooler x Control Block
83821	LINE, Bypass, Rear, .625x90°
83822	LINE, 1", Cylinder Crossover
83823	LINE, 1" x 18.5" Drop
83824	HOSE, Cycle Blk Out x Cooler in
83825	RH Hyd. Line 1" x .120 C.S. Tube Nuts & Sleeve Supplied by W/E 63.5 Inchs Long (SAE
83826	LH Hyd. Line 1" x .120 C.S. Tube Nuts & Sleeve Supplied by W/E 63.5 Inchs Long (SAE
83827	HOSE, P2 x Control Block Line
83828	Clamp, Line, 1", Plastic
83828.1	DPAL45 Cover Plates
83828.2	STSV100/3 Mount Rails
83828.3	GMV3-55 MTG. RAIL NUTS
83828.4	4254SPA 1" HVY CLAMP BODY
83828.5	Clamp, Line, Hex Head Bolt 3/8-16 X2.25
83828.6	Clamp, Line, Weld Plate, SPAL45, 1.77 O.C
83829	Clamp, Line, 1", Aluminum
83830	HOSE, Case Drain
83831	Tube, Clamp, Kit 1", Complete Assembly
83832	HOSE, 3.5" id, Tank x Main pump, Suction
83833	Rear Cylinder Line; .375 X 90
83834	2 X 12 Welded Hydraulic Cylinder For Jackstand
83900	CYLINDER, 2.5 id x 5 Stroke, MkII
83901	CYLINDER, 2.5x5 Stroke, MkII
83902	CLEVIS, Cylinder, 2.5x5 Stroke, MkII
83903	CAP, Cylinder, 2.5x5 Stroke, MkII

Part Number	Description
83904	JEWEL GLAND, Cylinder, 2.5x5 Stroke, MkII
83905	KIT, Seal , Jewel Gland, Cylinder, 2.5x5 Stroke, MkIIKIT, Seal , Jewel Gland, Cylinder, 2.5x5 Stroke, MkII
83906	SHCS, 3/8-16x2.25
83907	ROD, Cylinder, 2.5x5 Stroke, MkII
83908	PISTON, Cylinder, 2.5x5 Stroke, MkII
83909	KIT, Ring, Piston, Cylinder, 2.5x5 Stroke, MkII
83910	O-RING, -141, Buna-n, Cylinder Cap, 2.5x5 Stroke, MkII
83911	B'UP RING, -141, Buna-n, Cylinder Cap, 2.5x5 Stroke, MkII
83912	NUT, 3/4-16, Rod 2.5x5 Stroke, MkII
83913	SET-SCREW, 10-24x.5, Cylinder, 2.5x5 Stroke, MkII
83914	O-RING, -116, Buna-N
83915	WASHER, 3/4, SAE
83916	NUT, Nylon lock, 3/4-10
83917	HHCS, 3/4-10x4.5, G8
83918	FITTING, 6801-10-10
84000	ELECTRICAL GROUP
84110	Harness, Wire, Engine Side
84111	Cable, Prox. Switch Connector
84112	PLUG, Fem, Molded, 10 Conductor
84113	Plug, Delphi-Packard 56, Male
84114	Plug, Delphi-Packard 56, Female
84115	Terminal, Delphi-Packard 56, Male
84116	Terminal, Delphi-Packard 56, Female
84117	BATTERY, Back-up, Gel-Cell
84118	RELAY, Battery Back-Up
84119	FUSE, 1Amp
84120	Harness, Wire, Panel Side
84121	PLUG, Molded, 12 Conductor
84129	Fuse Holder
84130	HARNESS, Valve side
84131	PLUG, Molded, 6 Conductor, Male
84132	LED, Indicating, 12v
84133	CONDUIT, 1/2"
84134	SWITCH, Key Lock, 2 pos
84135	SWITCH, SPST, on-off
84136	SWITCH, SPDT, on-off-on
84137	SWITCH, Disconnect, Key Lock
84138	DIODE
84139	Panel Light, Red
84140	Panel Light, Green
84141	Starter Button
84142	BOOT, Push Button Switch
84143	RELAY, Power, Bosch
84200	Box, Control
84201	PLC, Micro
84202	RELAY, Mosfet, Solid State

Part Number	Description
84203	RELAY, Gen Purpose
84204	SOCKET, Relay, Gen Purpose
84205	RELAY, Timer, Off-Delay, TCR2 U12D
84206	SOCKET, Relay, Timer, Off-Delay
84207	FAN, Tubeaxial, DC, 12v, Cooling, PLC
84208	ENCLOSURE, Control, PLC
84209	CORD-GRIP, Nylon, 3/8"
84211	CORD-GRIP, Nylon, 3/4"
84212	CORD-GRIP, Nylon, 1/2"
84213	RECEPTCLE, Fem, 6 Conductor
84214	RECEPTCLE, Male, 10 Conductor
84215	RECEPTCLE, Fem, 4 Conductor, Micro
84216	SHIELD, Splash, Fan, Control Box
84217	SHIELD, Splash, Vent, Control Box
84218	Enclosure, Control, Custom
84219	DIN Rail (DIN EN 50022)
84221	SOLENOID, Power, DC, 12v
84222	PLUG, DIN43650 Connector; 12V W/LED LIGHT,W /DIODE
84231	SWITCH, Temperature, Hydraulic
84251	SWITCH, Proximity
84252	BREAKER, Circuit, 10 amp
84253	BREAKER, Circuit, 20 amp
84254	Hourmeter, 12VDC ,Diesel
84255	TACHOMETER, 3-3/8, F.W.Murphy
84256	SENSOR, Magnetic, Tach
84257	Positive Battery Cable, 39"
84258	Negative Battery Cable, 24"
84259	RECEPTACLE, Remote
84260	BREAKER, Circuit, 25 amp
84261	Sender, Over Temp, Hydraulic
84262	BATTERY, Group 27, Delco 72 Month
84263	Tach Cable, 18/2ga
84264	Connector, 4-pole, Attachable
84265	Cable, Proximity Sensor
84266	Proximity Sensor, 18mm
84267	LED- Sealed Oval Taillight- Red
84268	Sealed Amber Taillight
84269	Trailer Connector 7 Pole Vehicle End Poly RV Type
84270	Trailer Connector 7 Pole Trailer End Poly Rv Type
84271	LED LIGHTS, DUAL LED-OT
84272	Proximity Switch
84273	GROMMET, TO FIT OVAL TAIL LIGHT
84274	Panel Bulb
84275	Proximity Sensor
84276	SPACER,PROX. SENSOR
84277	CABLE, PROXIMITY, RIGHT ANGLE, 3 meter length

Part Number	Description
84278	Adapter, SIGNAL CONVERTER, PNP-NPN SIGNAL
85000	PUMP GROUP
85100	Hopper, MkII
85101	Hopper, Front, Mk II
85102	Hopper, Rear, MkII
85103	Frame, Door, Hopper
85104	Guard, Splash, Hopper
85105	Cover, Hopper
85106	CORNER, Front, Hopper
85107	CORNER, Rear, Hopper
85108	PLATE, Bottom, Hopper
85109	PLATE, Corner, Lower, Hopper
85111	PLATE, Side, Hopper
85112	HOUSING, Bushing, Hopper
85113	PLATE, Side, Upper, Hopper
85114	PLATE, Rear, Upper, Hopper
85115	PLATE, Corner, Upper, Hopper
85116	PLATE, Front, Middle, Hopper
85117	PLATE, Front, Upper, Hopper
85118	GUSSET, Cylinder, Upper, Hopper
85119	GUSSET, Cylinder, Lower, Hopper
85120	MOUNT, Hydraulic Cylinder, S-Tube
85121	MOUNT, Housing, Hydraulic Cylinder, S-Tube
85122	BUSHING, Hardened, Cylinder Mount
85123	BRACKET, Controls, Remixer/Outrigger
85124	COVER, Remixer, Hopper
85125	SCREEN, Hopper
85126	Hopper Screen ,Brackets (2-Req.)
85127	Hopper, Screen Latch
85131	Wearplate
85132	SHCFHS, 5/8-11x3.5"
85133	NUT, 5/8-11
85134	HHCS, 1/2-13x2.5", G8, Push-bolt
85135	Washer, SAE, 5/8
85140	Door, Cleanout, Assembly
85141	Door, Clean Out
85142	Gasket, Door, Cleanout
85143	Handle, Door, Cleanout
85144	Stud, 3/8-16 x 1-1/4
85145	Nut, 3/8-16
85146	Washer, 3/8
85147	Pin, 1/2x3
85150	OUTLET FLANGE
85151	FLANGE, Outlet
85152	INSERT, Hardened, Outlet
85153	HHCS, 5/8-11x3 1/4, Grd8

Part Number	Description
85161	BEARING, Flange, 3",MK III
85162	BEARING, Brass, 3" MK III
85163	SEAL, Outer, Shaft, S-Tube, for 3" shaft
85164	Seal, Lip, Inner, 3", Flange Bearing
85165	HHCS, 1/2-13x2.5 Grd8
85166	Flange Bearing, MkIV
85170	KIT, Seal, Outlet
85171	HOUSING, Bearing, Outlet
85172	SEAL, Inner, Outlet
85173	BAND, Wear, Outlet
85174	SEAL, Outer, Outlet
85175	O-RING, Outer, Outlet,-264
85176	O-RING, Inner, Outlet,-260
85177	SCREEN, Hopper
85200	Remixer Drive Assembly, MkIII
85202	Housing, Coupling, Remixer, MkIII
85203	Coupling, Magnaloy, M20010008
85203	Coupling, Magnaloy, M20010008
85204	Insert, Coupling, Magnaloy, M270H
85204	Insert, Coupling, Magnaloy, M270H
85205	Tube, Housing, Cartridge, Remixer, MkIII
85206	Flange, Housing, Cartridge, Remixer, MkIII
85207	Seal, Wiper, Outer, Remixer, MkIII
85208	Retainer, Seal, Remixer, MkIII
85209	Flange, Remixer, MkIII
85210	Cartridge Subassembly, Remixer, MkIII
85211	Cartridge, Remixer, MkIII
85212	Drive Shaft, Remixer, MkIII Flame Hardened
85213	Seal, Inner, Remixer, MkIII, Parker #461518701750
85214	Nut, 1 1/4-12
85215	Washer, 1 1/4
85216	Spacer, Bearing, Remixer, MkIII
85217	Bearing, Roller, Remixer, MkIII, FAG 6007.2RSR
85218	SHCS, 1/2-13x1"
85219	SHCS 1/2-13x1.375"
85221	Washer, SAE, 1/2"
85222	Key, 1/4"x1"
85223	Grease Zerk, 1/4-28 Taper
85224	HHCS, 1/4-28x1"
85225	Washer, SAE, 1/4"
85226	O-Ring, -230
85227	Adapter, Grease Zerk,
85228	HHCS, 1/2-13x2.5
85229	HEX NUT, 1/2-13
85230	PADDLESHAFT, Remixer, Hardfaced
85231	HEX NUT, 3/4-10

Part Number	Description
85232	PIN, Threaded, 3/4-10
85233	BUSHING, Pin, Paddleshaft
85234	CLEVIS, Remixer Paddle-Shaft
85235	FITTING, HYDRAULIC MOTOR., MOR 10-MJ6 90 DEG.
85236	FITTING, HYDAULIC MOTOR. , MOR 10-MJ6
85300	SWINGTUBE, MKII
85301	SHAFT, Swing-Tube
85302	Droparm, Swingtube, 3", 1-1/4" Thick
85303	Adapter, Tapered, Pipe, Swingtube
85304	Flange, Swingtube
85305	Elbow, 90°, Reducing, 6" to 5"
85306	Tube, 5.5" id x
85307	Tube, 5" id x
85308	YOKE, Flame Cut
85309	GUSSET, Flame Cut
85320	OUTLET, Hardened, Complete
85321	Flange, Outlet, Hardened
85322	TUBE, Outlet, Hardened
85323	Nut, Flex-Lock, 3/8-16
85324	Capscrew, 3/8-16 x
85325	Washer, 3/8
85326	FLANGE, Harrdened Outlet, O-Ring, Mk2
85327	O-Ring, -163, Buna
85331	Wear-ring
85332	Gasket, Wear-Ring
85333	Wearwing
85334	Wear-Ring, MkII
85335	Seal,wear-ring
85401	Cylinder, Material, 6", 6" id x 41.5" Mk II Concrete Cylinder
85402	Flange, Retaining, Mk II Material Cylinder Flange
85403	Ring, Key, Mk II Material Cylinder Key Ring
85404	O-Ring, -259, W/back up ring, 6.25 x 6.5 x .125 O-Ring
85405	Ring, Chip, Mk II Cylinder Chip Ring
85406	Capscrew, Socket Head, 1/2-13 UNC x 2", Grade 8
85500	Belcrank Assembly, Complete
85501	Belcrank, Billet
85502	CAP, Belcrank
85503	BUSHING, Hardened, .75 id x1 od x 1.25" long, Belcrank
85504	BOLT, Belcrank, HHCS 1-14x4"
85505	HHCS, 3/8-16x1
85506	NUT, 3/8-16
85600	WATERBOX, Mk II
85601	PLATE, Front, Waterbox, MkII
85602	PLATE, Rear, Waterbox, MkII
85603	PLATE, Bottom, Waterbox, MkII
85604	CHANNEL, Side, Waterbox, MkII

Part Number	Description
85605	STIFFENING BAR, Waterbox, MkII
85606	SHCS, 3/4-10x2.25
85607	Half Coupling, Weld-on, 1 1/2 Pipe, 9/16" L
85608	PLUG, Pipe, 1 1/2
85609	WASHER, 3/4
85610	COVER ASSEMBLY, Waterbox
85611	FRAME, Cover, Waterbox
85612	WINDOW, Cover, Waterbox
85613	THUMBSCREW, 1/4-20
85614	COVER, MkII, One Piece Lexan
85615	GASKET, O-Ring, Water Box Cover
85616	Mounting Pad, Threaded, Water-box
85617	BRACKET, Angle, 4x4, Water-box
85700	Adapter, Cup
85701	Flange, Rod Side, Cup Adapter
85702	Tube, Cup Adapter
85703	Flange, Cup Side, Cup Adapter
85704	Cup, Piston, 6"
85705	Plate, Piston
85706	Cap Screw, Hex Head, 3/8-24 x 1-3/4
85707	O-Ring , 5-1/2id x 1/4, -433
85708	Cap Screw, Hex Head, 5/8-11 x 2-3/4
85710	Adapter, Rod
85711	Capscrew, Socket Head,
85712	Nut, lock, 5/8-11
85713	Rod Adapter, Mk II
85714	Rod Adapter, Mk II
85715	NUT, Lock
85750	ADAPTER, Cup, Mk II
85751	SHAFT, Adapter, Cup, Mk II
85752	PLATE, Adapter, Cup, Mk II
85753	HHCS, 3/4-10 x 3.5, Grade 8
85754	RETAINER, Cup, Mk II
86000	BODY GROUP
86101	Louver, Engine Cover
86102	Louver, Engine Cover, Front
86103	Bracket, Weld-on
86104	Bracket, Bolt-on
86105	Cover, Tank, Hydraulic
86106	Lid, Cover, Tank, Hydraulic
86107	PANEL, Rear, Aluminum, 14ga
86108	PANEL, Control
86109	BUSHING, Flow-Control, Panel
86200	ENGINE COVER
86201	COVER, Engine, Top Panel
86202	COVER, Engine, Front Panel

Part Number	Description
86203	COVER, Engine, Right Side Panel
86204	COVER, Engine, Left Side Panel
86205	COVER, Engine, Top Door Frame
86206	COVER, Engine, Bottom Door Frame
86207	LATCH, Door, Engine Cover
86208	HINGE, Door, Engine Cover
86210	LOUVER, Engine Cover
86211	SHROUD, Cooler, Oil, Hydraulic
86212	DOOR, Access, Engine Cover
86213	COVER, Exhaust hole
86214	PANEL, Right, Engine, 6 Cyl.
86215	COVER, Exhaust Hole, 4"
86216	Oil Cooler, Rear Mounting Bracket, 1.5 x 1.5 x 35.75 Angle
86300	COVER, Tank
86301	LID, Cover, Tank
86302	PANEL, Front, Cover, Tank
86303	COVER, Tank, Side
86304	LATCH, TANK COVER LID
86305	HINGE, TANK COVER LID
86306	COVER, Tank, Side, MkII
86306.1	Bracket, COVER, Tank, Hydraulic, 11 1/2" x 1 1/2" x 1 1/2" Angle bracket
86307	DOOR, Access, PLC, Tank
86308	HINGE, Lift-Off
86400	Panel, Complete
86401	PANEL, Control, MkII
87000	MISCELLANEOUS
87001	Grease Zerk, 1/4-28
87002	BHCS, 1/4-20x1, Stainless
87003	BHCS, 1/4-20x.75, Stainless
87004	WASHER, 1/4", Stainless
87005	PAINT, Touch-up, Green
87006	PAINT, Touch-up, White
87007	MOUNT, 5/16-18" Neoprene
87008	screw, Hinge, 8-32 x 1/4" pan hd. phillips
87009	Safety Decal, 3.5L X 5W
87010	SAFETY DECAL 5L X 7W
87011	SAFETY DECAL, 3.5L X 5W
87012	SAFETY DECAL, 5L X 7W
87013	SAFETY DECAL, 1.75L X 2.5W
87014	SAFETY DECAL, 1.75L X 2.5W
87015	SAFETY DECAL, 3.5L X 5W
87016	SAFETY DECAL, 5L X 3.5W
87017	SAFETY DECAL, 3.5L X 5W
87018	SAFETY DECAL, 2.5L X 5W
87019	SAFETY DECAL, 3.5L X 5W
87020	SAFETY DECAL, 5L X 7W

Part Number	Description
87021	SAFETY DECAL, 2.5L X 5W
87022	SAFETY DECAL, 2.5L X 5W
87023	WARRIOR Bolt Large Side Decal, 55" X 9" Engine Cover Decal
87024	Model 3050 Stripe decal, 49" X 5" Front stripe decal
87025	18" X 2" FRONT WARRIOR DECAL
87026	SIDE WARRIOR DECAL 15" X 2"
87027	PHONE NUMBER DECAL, 15" X 2"
87028	WEB SITE DECAL, 15" X 2"
87030	SAFETY DECAL Hopper, Guards, Eye Protection
87100	Warrior Specialty Tools
87104	Outlet Extraction tool
88000	O-Ring Kit, All Common O-Rings For Valves & Fittings
88001	BOX, 18 Compartment
88012	-012 Buna 70 O-Ring
88014	-014 Buna 70 O-Ring
88015	-015 Buna 70 O-Ring
88017	-017 Buna 70 O-Ring
88018	-018 Buna 70 O-Ring
88020	-020 Buna 70 O-Ring
88108	-108 Buna 70 O-Ring
88120	-120 Buna 70 O-Ring
88124	-124 Buna 70 O-Ring
88126	-126 Buna 70 O-Ring
88219	-219 Buna 70 O-Ring
88902	-902 Buna 70 O-Ring
88904	-904 Buna 70 O-Ring
88906	-906 Buna 70 O-Ring
88908	-908 Buna 70 O-Ring
88910	-910 Buna 70 O-Ring
88912	-912 Buna 70 O-Ring
88916	-916 Buna 70 O-Ring
90000	WARLORD 4060
91000	FRAME- WARLORD
91048	Battery Box, Double
92000	ENGINE- WARLORD
93000	HYDRAULIC- WARLORD
93200	CYLINDER, Hydraulic, 4", MKIII
94000	ELECTRICAL- WARLORD
95000	PUMP- WARLORD
95513	Bushing, Bronze, Bell-crank
96000	BODY- WARLORD
97000	MISC- WARLORD
98000	O-RING- WARLORD