PREVENTIVE MAINTENANCE SCHEDULE

DAILY OR EVERY 10 HOURS

Engine	Check oil and coolant
Engine Air Cleaner	Check restriction indicator
Fuel Tank	Fill at end of shift to prevent condensation
Air Reservoir	Drain moisture at end of each shift
Hydraulic Reservoir	Check fluid level and fill
Turntable Open Gear	Lubricate with open gear lubricant
Boom	Lubricate all grease fittings
Tires	Check for proper inflation
Operator's Cab	Clean thoroughly
Outrigger Arm Channel	Clean

WEEKLY OR EVERY 50 HOURS

Engine	Check V-belt deflection (See Engine Manual)
Drop Box Transmission	Check oil level and fill
Torque Converter and Forward/Reverse Unit	Check fluid level and fill
Differentials	Check oil level and fill
Planetary Hubs	Check oil level and fill
Swing Gearbox	Check oil level and fill
Accelerator Master Cylinder	Check fluid level and fill
Brake Master Cylinder	Check fluid level and fill
Batteries	Check Electrolyte level and fill
General Machine Lubrication	Grease (See Pictorial Listing)
Shifting Linkage Tubes	Lubricate with dry lubricant

EVERY 2 WEEKS OR 100 HOURS

Engine Air Cleaner	Clean or replace element

MONTHLY OR EVERY 250 HOURS

Turntable Capscrews	Retorque
Service Brake Control Valve	Lubricate lever roller and roller pins with light engine oil

EVERY 2 MONTHS OR 500 HOURS

Air Compressor Strainer	Clean or replace
In-line Hydraulic Filters	Clean 100 mesh screen, replace paper filter
Torque Converter and Forward/Reverse Unit	Drain and refill, clean breather, and replace filter element

EVERY 6 MONTHS OR 1500 HOURS

Hydraulic System	Drain and refill; clean reservoir breather
Drop Box Transmission	Drain and refill, clean breather
Differentials	Drain and refill; clean or replace magnetic drain plugs; clean breather
Planetary Hubs	Drain and refill
Steering Knuckles (Rzeppa joints only)	Disassemble and repack with grease
Swing Gearbox	Drain and refill; clean breather
Batteries	Clean battery case, posts and clamps
Radiator and Cooling System	Drain, flush and refill

ANNUALLY

Air Compressor	Disassemble, clean and inspect cylinder head and components

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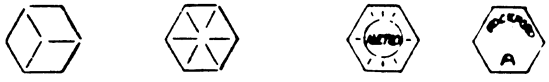
RECOMMENDED TORQUE VALUES FOR GRADE 5, GRADE 8 AND SPECIAL DROTT Bolts

LUBRICATED TORQUE VALUES IN LB-FT FOR GRADE 5,8, and SPECIAL DROTT BOLTS (NC OR NF THREADED)		
SIZE DIAMETER	GRADE 5 BOLTS	GRADE 8 & SPECIAL DROTT BOLTS
1/4	8	12
5/16	17	26
3/8	26	42
7/16	43	66
1/2	65	100
9/16	95	150
5/8	130	200
3/4	220	360
7/8	350	560
1	530	860
1-1/8	750	1200
1-1/4	1050	1700
1-1/2	1800	2950
1-3/4	2850	4700
2	4400	7250

Hardened washers shall be used with grade 8 or better bolts.

Torque values for bolts listed above are with engine oil applied to threads and under head.

Torque values are in foot pounds. Torque values specified are with residual oil remaining on bolts. If special lubricants of high stress ability, such as never-seez compound, graphite and oil, molybdenum, di-sulfide, collodial copper or white lead are used, multiply the torque figures in the chart by the factor .90.



GRADE 5 GRADE 8 SPECIAL DROTT Bolts

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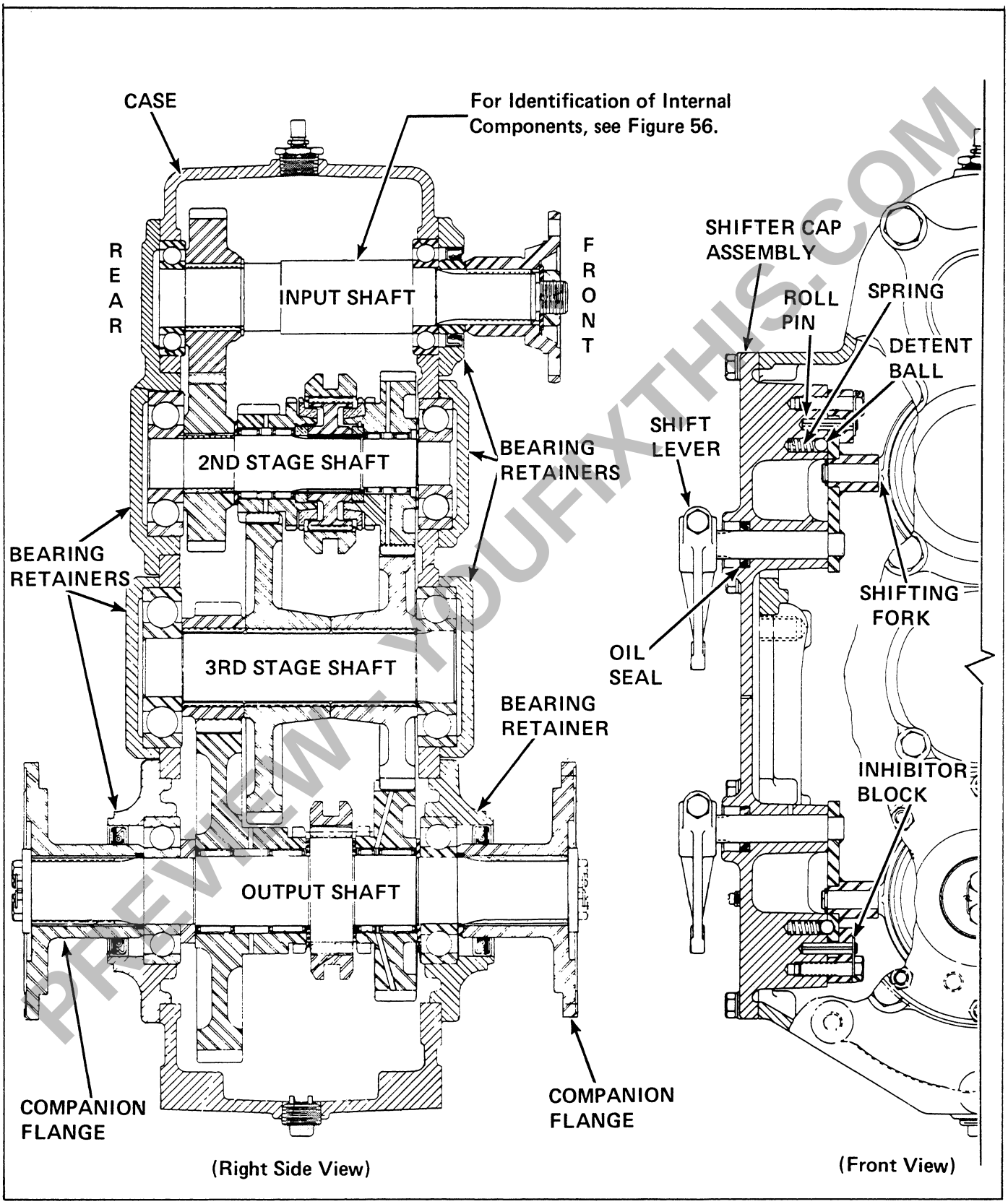


Figure 55. Drop Box Transmission

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3. If a pressure bleeder is used, be sure it contains sufficient fluid. Insert the proper adapter on the master cylinder filler opening and connect the hydraulic hose from the pressure bleeder to the adapter. Charge the bleeder with air (20 psi or 140 kPa max.).

4. Slip a hose over the end of the bleed fitting on the slave cylinder. Submerge the other end in a glass jar partly filled with brake fluid, so that air bubbles escaping from hydraulic system can be seen.

5. Open bleed fitting on slave cylinder, then open pressure bleeder supply valve and permit fluid to flow from the accelerator system until bubbles are no longer visible in the glass jar.

6. Close the bleed fitting on the slave cylinder.

7. Close pressure-bleeder supply valve and remove hose and adapter from master cylinder fill port (if pressure bleeder was used). Fill master cylinder reservoir with clean fluid to within 1/4" (6.3 mm) of top. Replace cap.

NOTE: If frequent bleeding is required, check system for leaks, look for dark accumulations of dirt around line connections.

NOTE: If accelerator response is still sluggish, it is possible the line leading to the swivel may need bleeding. To bleed this line, use the procedure below.

Bleeding Accelerator Swivel Line:

1. Pump up pressure using accelerator pedal. Place a heavy weight on the pedal to keep the pressure in the line. Pumping the accelerator pedal should create enough pressure for proper bleeding.

2. Crack the accelerator hydraulic line at the top swivel fitting to bleed air out of the line. Close fitting and re-tighten. Remove weight from accelerator and test for proper response.

TROUBLESHOOTING GUIDE - ENGINE

PROBLEM	POSSIBLE CAUSE	REMEDY
A. Engine lacks power, stalls at idle speed	1. Clogged air cleaner 2. Engine needs tune-up	1. Remove and clean or replace element 2. See engine manual
B. Engine overheats	1. Insufficient coolant or dirty fins 2. Defective thermostat 3. Insufficient lubricating oil	1. Check coolant level and fan belts; clean fins 2. Replace, see engine manual 3. Add oil, see engine manual
C. Engine does not develop full rpm	1. Low fluid in accelerator master cylinder 2. Accelerator linkage out of adjustment 3. Engine needs tune-up	1. Check;refill if necessary 2. Adjust linkage to governor 3. See engine manual
D. Engine responds sluggishly when accelerator pedal is depressed	1. Air in hydraulic linkage 2. Accelerator lock not fully disengaged 3. Worn or defective master or slave cylinder 4. Defective fuel system	1. Bleed accelerator system 2. Check and correct 3. Disassemble and repair or replace item found defective 4. See engine manual
E. Engine won't start	1. Faulty cranking system 2. Faulty fuel system	1. See engine manual and Electrical System 2. See engine manual

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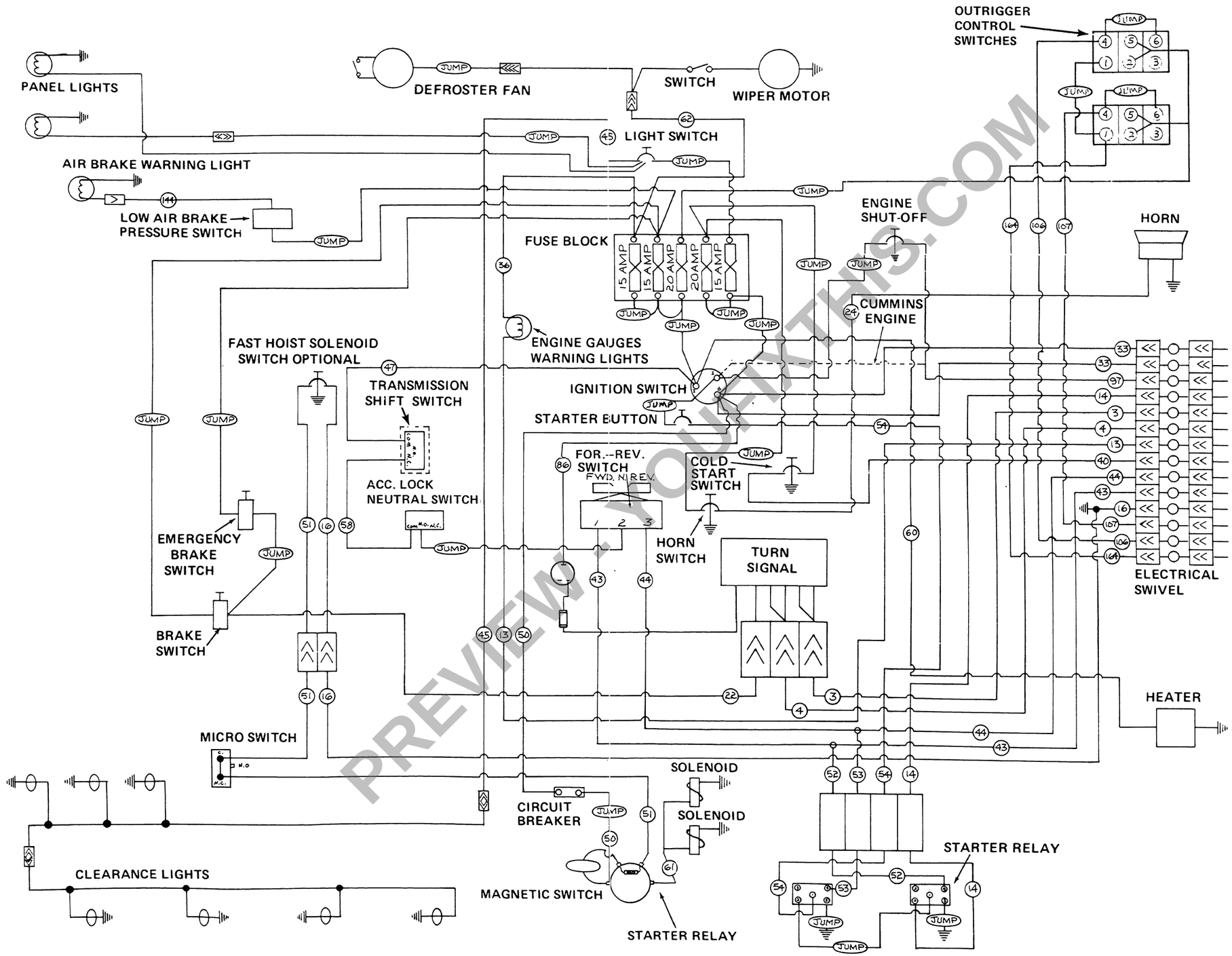


Figure 176. Electrical Schematic

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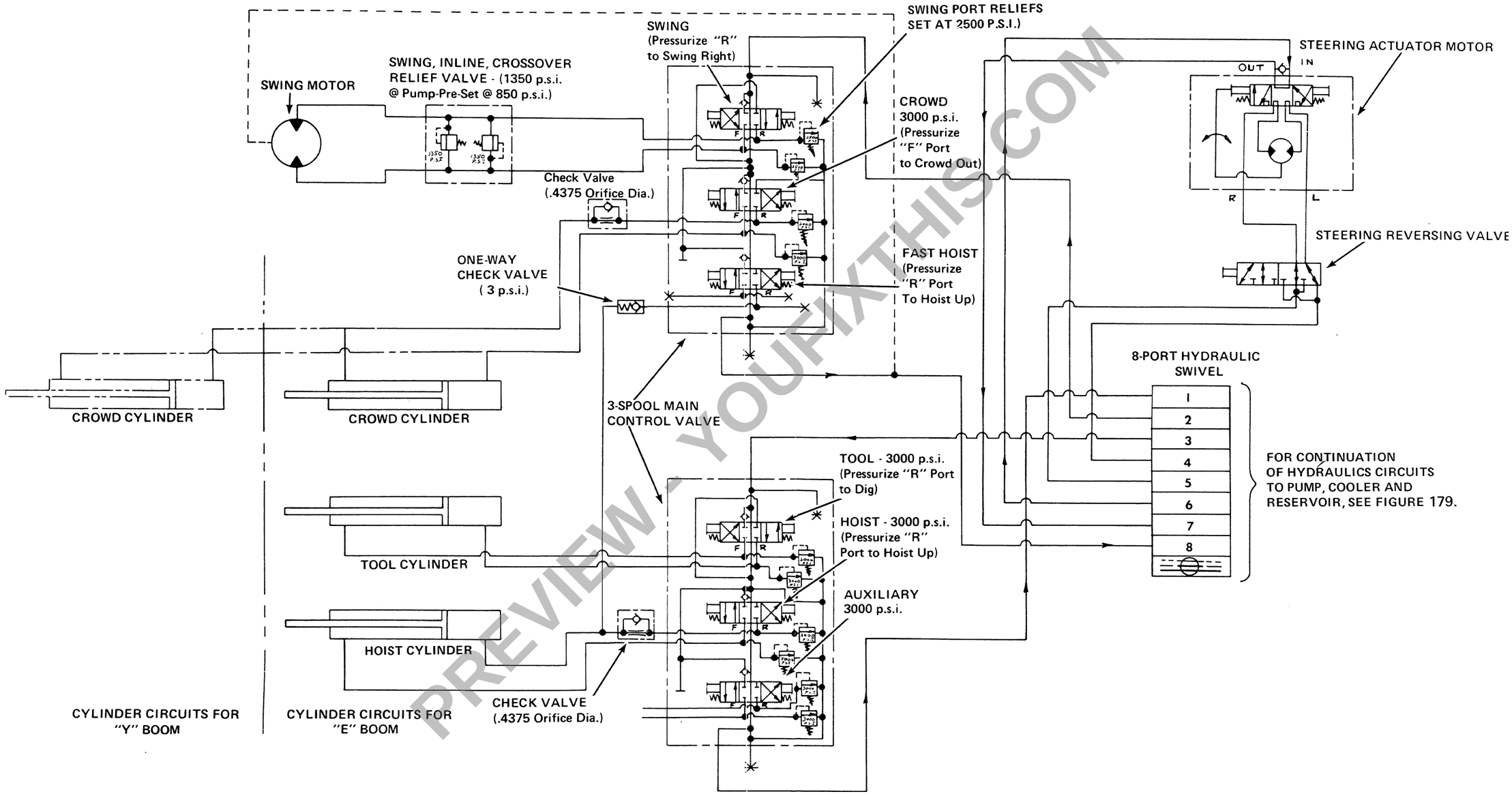


Figure 178. Hydraulic Schematic (Upper)

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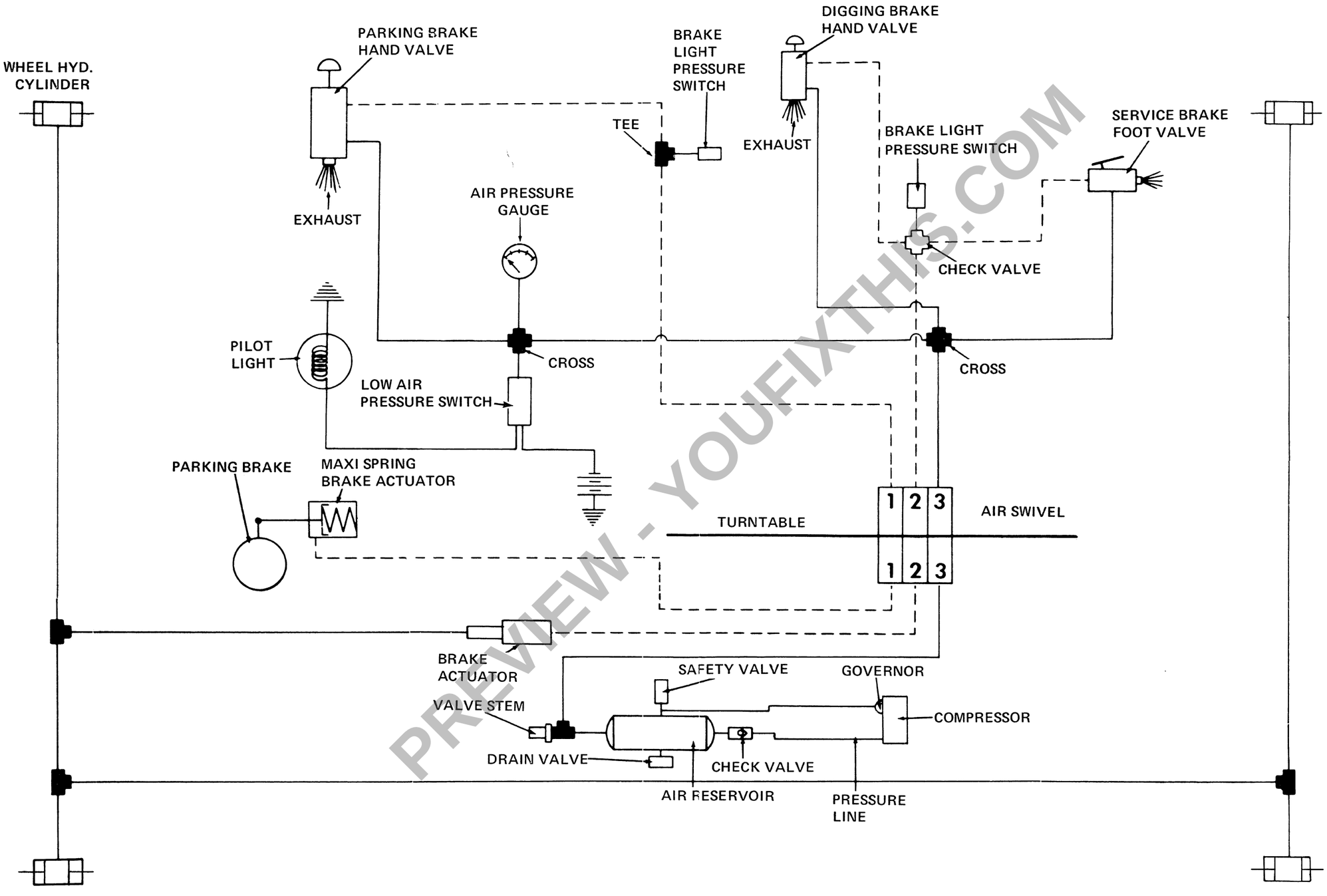


Figure 175. Air Schematic

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Look for this symbol which points out important safety precautions. It means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

WARNING: Always use a non-flammable solvent for cleaning component parts. Do NOT use gasoline or other flammable substances.

CAUTION: When servicing the machine, tag mark the ignition switch to alert other operators and prevent accidental start-ups.

WARNING: Storage batteries give off highly explosive hydrogen gas when being charged. Keep sparks or open flames away from batteries.

WARNING: If battery electrolyte contacts skin or clothing, flush immediately and thoroughly with water.

CAUTION: DO NOT service the machine with engine running. If necessary to make checks with engine running, have one man stay at the controls while the other makes the check.

CAUTION: Keep hands, feet and loose clothing away from fan belts, fans, and pulleys whenever machine is operating.

CAUTION: When working on the hydraulic system or air system, be sure to relieve all pressure in the lines by working the controls back and forth several times before removing component.

CAUTION: Always deflate tires before removing them from the machine for servicing. Tires can come apart with an explosive force if not handled properly.

CAUTION: When servicing the cooling system, be sure to relieve pressure in the system by carefully turning the radiator cap to its first position before removing it completely.

CAUTION: Wipe oil spills immediately to prevent accidents. Keep work area as clean as possible. A cluttered work area invites accidents.

CAUTION: Disconnect the positive lead from the Batteries when working on the engine or Electrical System.

WARNING: Never smoke while refueling, servicing the fuel system or working with batteries.

CAUTION: When removing major components such as the boom or turntable, ensure that they are properly slung and adequately secured.

WARNING: To prevent eye injuries, wear safety glasses when servicing this machine.

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6. Boom and Tool

General Description

Either a "Y" boom or an "E" boom can be used on the CRUZ-AIR, plus a variety of attachments.

The "Y" boom can be easily distinguished from the "E" boom by the location of the crowd cylinder. On the "E" boom, the crowd cylinder is located on top of the main boom whereas on the "Y" boom, it is located on the underside of the boom (See figure 44). With its relatively short main boom and its adjustable tool boom, the "Y" boom is more of an all-purpose boom, and can be used for a wide variety of jobs such as grading, sloping, ditch cleaning, loading, etc. The "E" boom is used almost exclusively for excavating and trenching.

Boom and Tool Maintenance

Lube fittings are installed at all pivot points in boom, cylinders and tools. (See Pictorial Listing on Page 13). Grease these areas DAILY with a Lithium Base EP No. 2 bearing grease or functional equivalent.

Periodically check pins and retaining hardware to ensure that they are securely installed. Keep hose clamps tightly fastened to prevent hoses from getting damaged or pinched during operation.

Boom and Tool Adjustments

Refer to Operator's Manual for the various boom and tool adjustments.

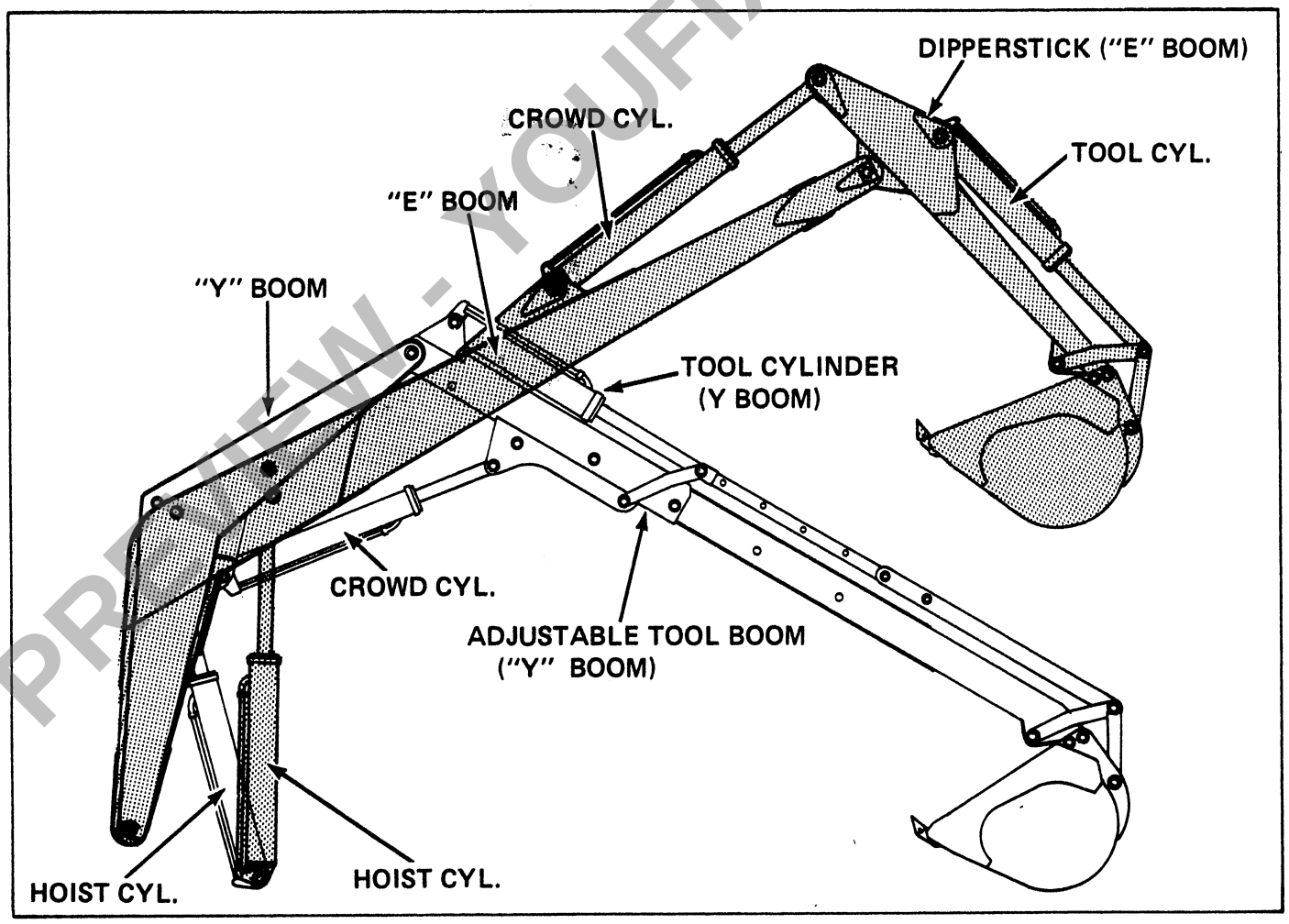


Figure 44. Boom Assembly

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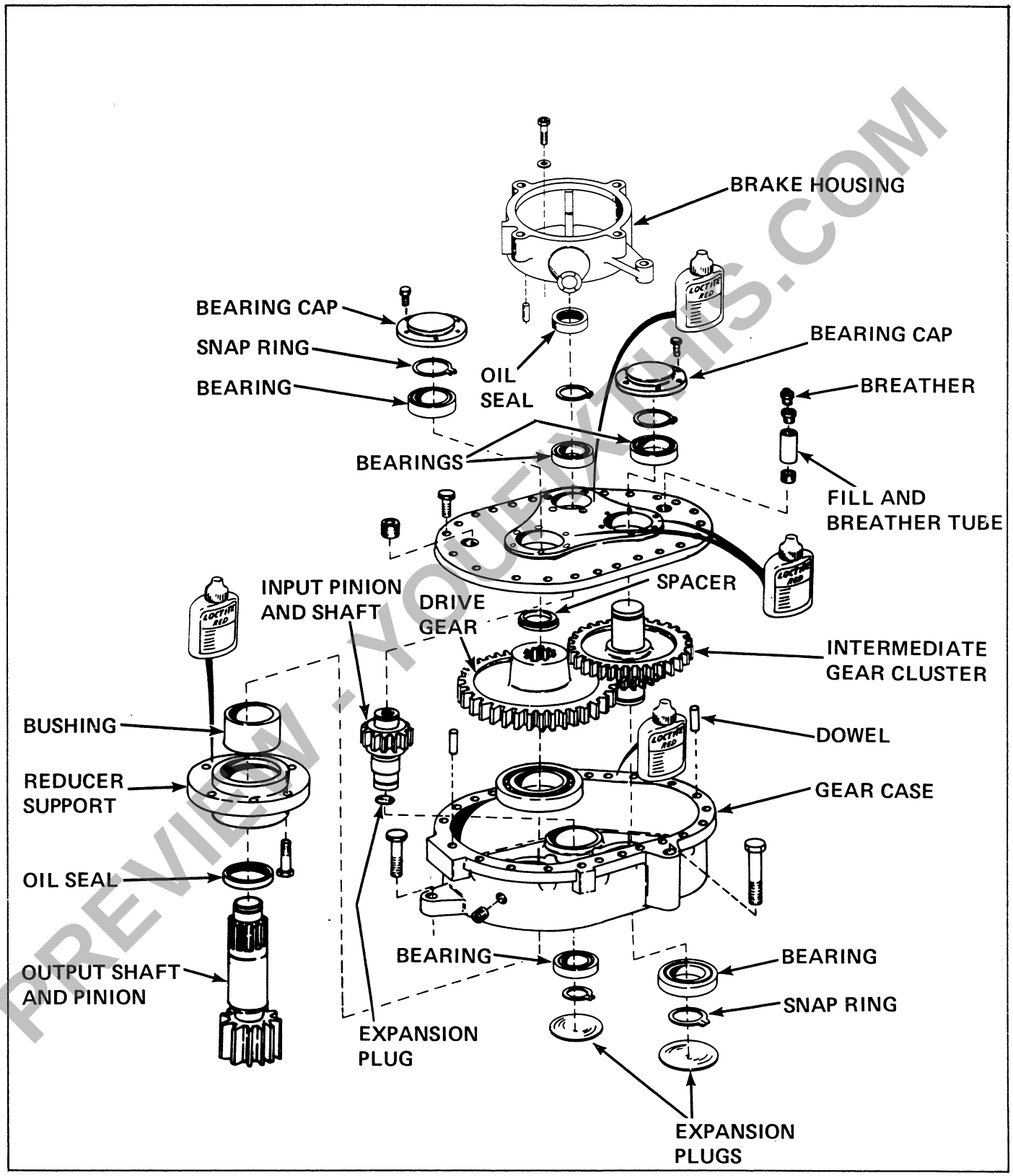


Figure 73. Swing Gearbox - Type 2

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TROUBLESHOOTING GUIDE - CHARGING CIRCUIT

PROBLEM	POSSIBLE CAUSE	REMEDY
A. Fully Charged Batteries and High Charging Rate (Over - Charged Battery)	1. Water level in Batteries low 2. Defective System wiring 3. Loose or dirty system connections 4. Defective Voltage Regulator or Regulator needs to be adjusted	1. Refill to proper level - Perform LIGHT LOAD TEST 2. Locate, repair or replace bad wiring 3. Tighten or clean connections 4. Repair or replace Regulator; or adjust
B. Low Batteries and little or no Charging Rate (Under-charged Battery	1. Defective or loose fan belt 2. Defective Battery 3. Ground circuits 4. Defective system wiring 5. Loose or dirty system connections 6. Defective Alternator 7. Defective Voltage Regulator	1. Replace or adjust fan belt 2. Perform LIGHT LOAD TEST 3. Locate and correct grounded circuit 4. Locate, repair or replace defective wires 5. Tighten or clean connections 6. Check Alternator output (See ALTERNATOR OUTPUT CHECK) 7. Repair or replace Voltage Regulator (See VOLTAGE REGULATOR CHECK)

2. Control Circuits

Introduction

The Electrical Control Circuits include the Engine, Revers-O-Matic, Outrigger and Fast Hoist (Optional) Control Circuits. All of these circuits, except Cold Start, connect to the IGNITION terminal of the ignition switch and will function only with the switch ON.

Each of the Control Circuits is described briefly below. Refer to ELECTRICAL SCHEMATICS in back of this manual when troubleshooting.

Engine Control Circuits

STARTING - Pressing the starter button completes a circuit to the starter relay providing the starter relays in the Revers-O-Matic control circuit are closed. These relays are energized when the transmission is in neutral. When the starter relay is energized, voltage from the Batteries is available to the starter to crank the engine.

SHUTDOWN - When the Ignition Switch is set to "off", the diesel engine will continue to run. An ENGINE SHUTOFF BUTTON is provided on the Cab Instrument Panel to shutoff engine fuel flow by energizing an ENGINE SHUTOFF SOLENOID on the engine.

COLD START - The Cold Start Kit makes engine starts easier in cold weather by injecting fluid into the engine intake manifold. A thermostat prevents injection of the fluid into a hot engine by keeping the circuit to GROUND open when the engine is hot.

Revers-O-Matic Control Circuit

Positioning the Selector Switch to either FORWARD or REVERSE energizes one of the transmissions shift solenoids, provided the FORWARD/REVERSE DISCONNECT pedal is not depressed, the ACCELERATOR LOCK is OFF and the IGNITION SWITCH is ON.

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7. Tool Hydraulics

General Description

The Tool Cylinder Circuit consists of the tool cylinder, tool control spool in the Tool-Hoist-Auxiliary control valve, two port reliefs and the necessary hydraulic lines.

Operation

When the control valve spool is shifted, oil is directed out one work port to the tool cylinder. Oil from opposite cylinder end returns through the other work port where it is available to operate other functions downstream in the valve.

Tool Port Reliefs

The port reliefs are discussed under the Main Control Valves. See page 139. The tool port reliefs are set at 3000 psi (20 685 kPa).

Tool Cylinder

The tool cylinder is similar to the hoist and crowd cylinders. To check out the cylinder, refer to instructions on page 154.

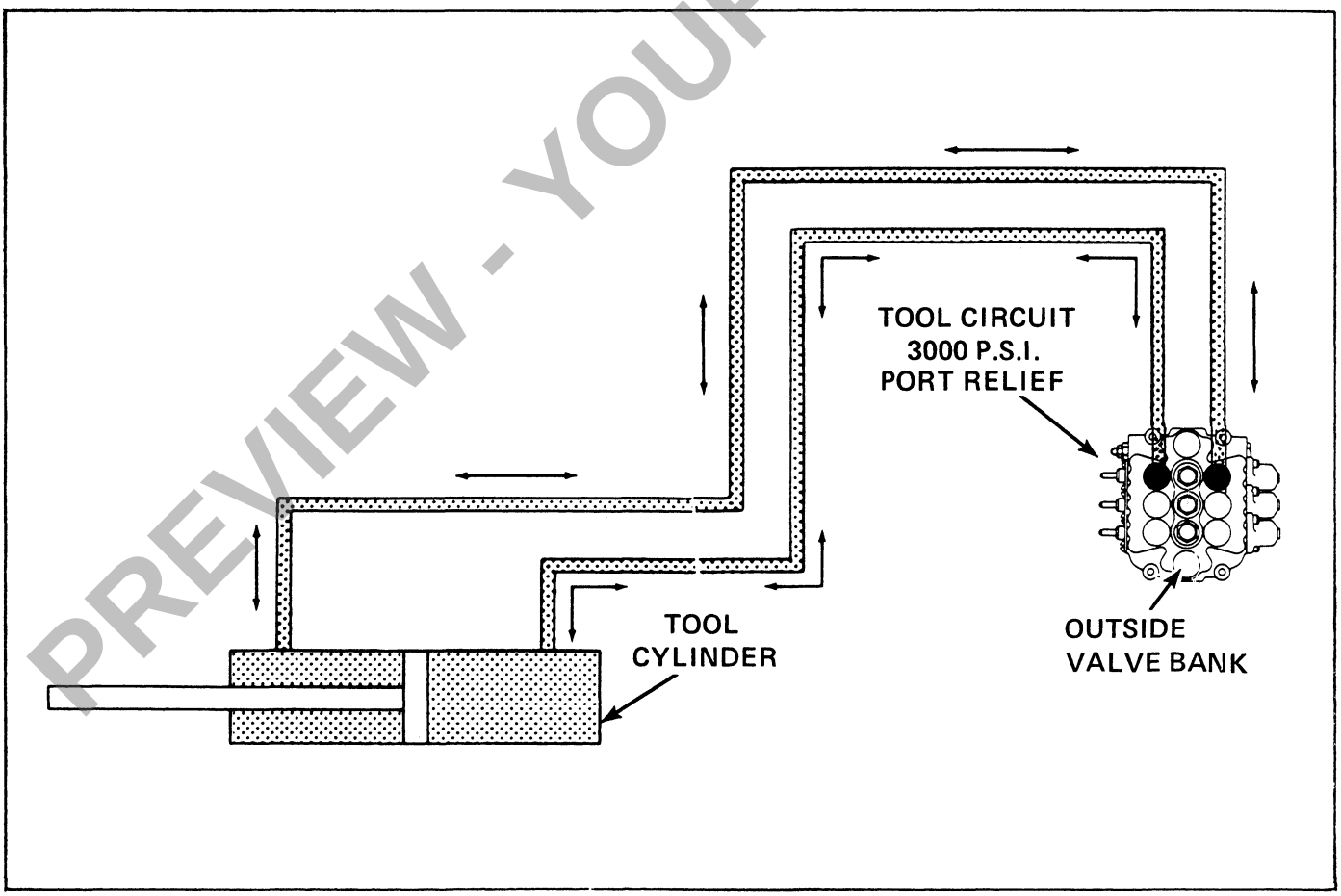


Figure 146. Tool Hydraulic Circuit

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