MAINTENANCE SCHEDULE

DAILY OR AFTER EVERY 10 HOURS

Engine Crankcase	Check oil level
Hydraulic Tank	Check level of oil with boom fully retracted and lowered
Fuel Tank	Fill tank (see separate engine manual)
Radiator	Check coolant level in surge tank
Operator's Cab	Clean thoroughly; check controls for binding and proper adjustment
Hoist Cable	Check for kinks and frays
Tires	Check pressure (100 PSI)
Wheel Lugs	Check tightness

WEEKLY OR AFTER EVERY 50 HOURS

Engine and Engine Components	See Engine Manufacturer's Manual
Boom Wear Plates	Apply wheel bearing grease to wear areas
Differential	Check oil level
Forward-Reverse Unit	Check oil level
Brake Master Cylinder	Check fluid level
Power Steering Reservoir	Check fluid level
Air Cleaner	Empty dust from collector tube
Transmission	Check oil level
Fan Belt	Check tension
Radiator Core	Clean spaces
Radiator & Connections	Check for leaks or loose connections
Lubrication Points	Grease with Multipurpose No. 2 Lithium Base grease
Hand Brake	Check tension (50 lbs. of pull to set brake)
Swing Gearbox	Check oil level
Winch Gearbox	Check oil level
Auxiliary Recessed Winch	Check oil level

TWO WEEKS OR AFTER EVERY 100 HOURS

Engine Air Cleaner	Remove and clean or replace element
Battery(s)	Check electrolyte level and add

MONTHLY OR AFTER EVERY 250 HOURS

Sheaves, Drums, Hooks and Wire Rope	Inspect for defects
Bubble Level Indicator	Re-calibrate
Controls	Inspect for wear and proper adjustment
Boom and Jib	Inspect structurals for weld fractures, cracks or signs of fatique

EVERY 6 MONTHS OR AFTER EVERY 1500 HOURS

Engine and Engine Components	See engine manual
Engine Cooling System	Drain, flush and refill
Hydraulic System	Drain & refill
Hydraulic Filter Screen	Clean; replace if necessary
Transmission	Drain and refill
Steering Axle Wheel Bearings	Repack
Swing Gearbox	Drain and refill
Winch Gearbox	Drain and refill
Battery	Clean posts and connections
Swing Chain	Check for proper tension
Auxiliary Recessed Winch	Drain and refill
Differential	Drain and refill

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1. Attach drive plate and reinforcement plate to torque converter with the place bolts provided in the kit. Tighten bolts to specified torque. See Torque Charts in back of this manual.

2. Thoroughly clean the pilot bore in engine flywheel.

3. Install torque converter to engine flywheel. Check for proper alignment to the flywheel.

NOTE

The drive plate on the converter will compensate for small amounts if misalignment, but large misalignments will cause excessive stress to the drive plate and should be corrected.

4. Tighten the drive plate mounting bolts to specified torque. See Torque Charts.

5. Thoroughly clean and lubricate the splines of the transmission input shaft.

6. Assemble the transmission assembly and torque converter housing to the engine. Ensure that splines on transmission input shaft engage properly with the torque converter impeller splines. Install mounting bolts and tighten to torque specified in Torque Charts.

7. Install torque converter cooling lines. Replenish oil supply as necessary.

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The following trouble shooting charts will serve as a guide for trouble diagnosis in the forward - reverse unit and in the three speed transmission.

TROUBLE ANALYSIS CHARTS

NOISY OPERATION

PROBLEM	POSSIBLE CAUSE	REMEDY
All Gears	Misalignment of converter housing or converter with transmission or engine	Align converter assembly and housing
	Worn universal joints.	Inspect and service as necessary.
	Rough or worn main drive bearing in three speed transmission.	Inspect and replace bearings as necessary
	Worn or rough gears in three speed transmission.	Replace gears as necessary.

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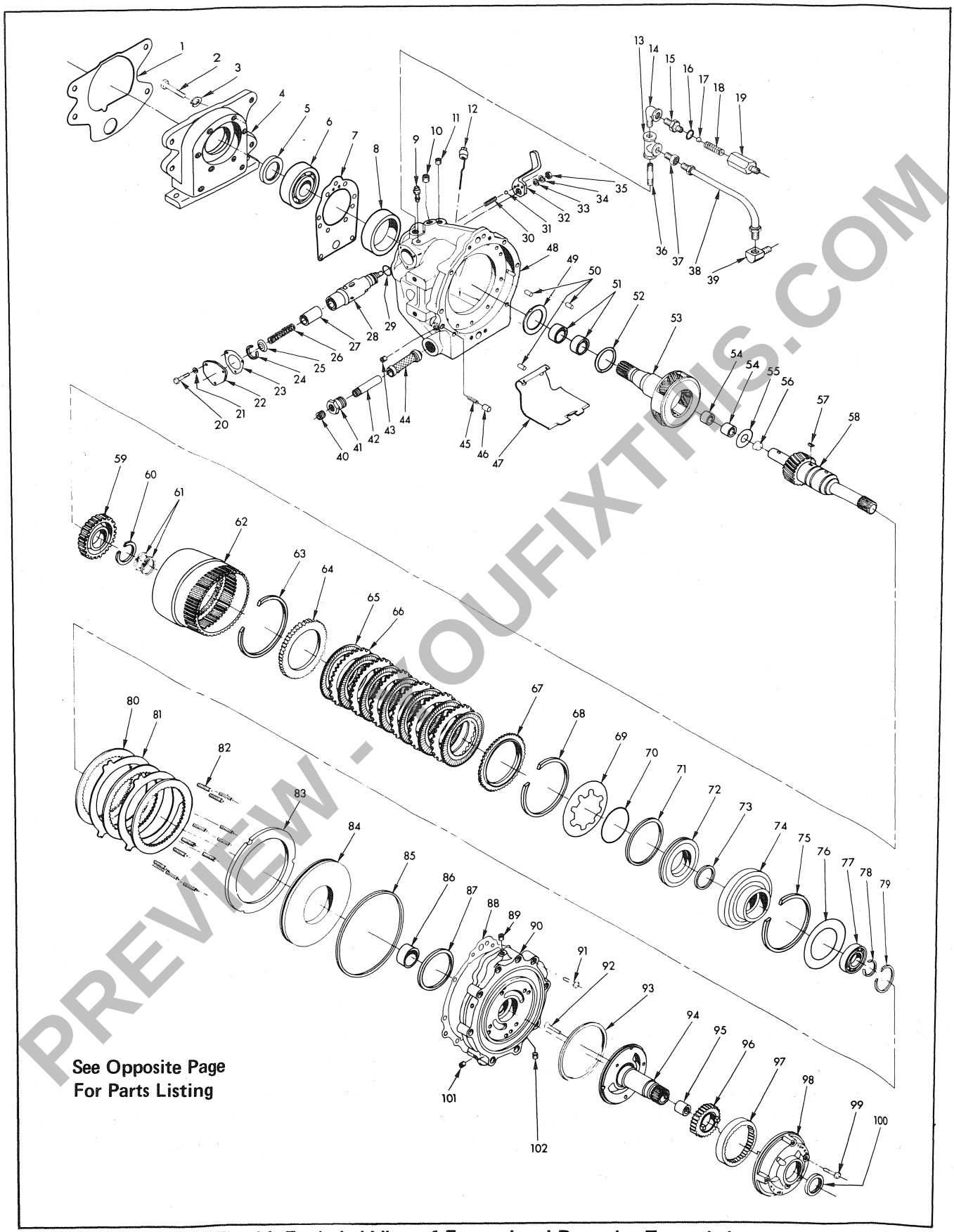

Fig. 14 Exploded View of Forward and Reversing Transmission

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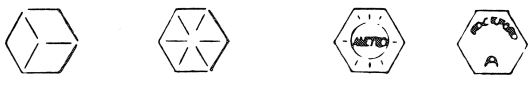
RECOMMENDED TORQUE VALUES FOR GRADE 5, GRADE 8 AND SPECIAL DROTT BOLTS

LUBRICATED TORQUE VALUES IN FOOT-POUNDS FOR GRADE 5, GRADE 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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WARNING: Never operate the alternator on an open circuit. With no battery or other electrical load on the circuit, a voltage buildup will occur within the alternator. This voltage buildup could be extremely hazardous to anyone touching the alternator "BAT" terminal.

85RM2 Electrical System

The Carrydeck is equipped with a 12 volt, direct current negative ground system. The system supplies current at regulated voltage for all lights, instruments and electrical controls of the machine.

For purposes of discussion and ease of troubleshooting, the machine's electrical system will be divided into three parts: 1) Charging System, 2) Control Circuits, and 3) Lights and Instrument circuits.

Electrical Circuit Protection

Electrical circuit protection is provided by a thermal type circuit breaker located in back of the instrument panel (figure 144). The circuit breaker is connected between the ammeter and the ignition and light switches. If the breaker fails to reset automatically replace it with one of identical rating.

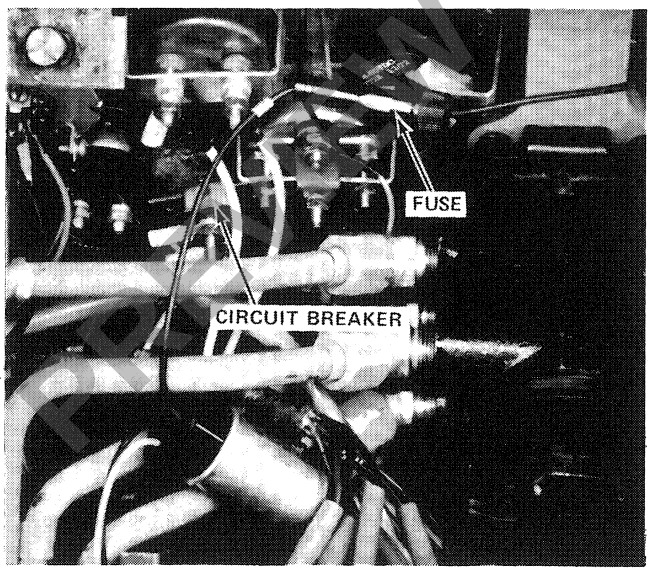

Figure 144. Circuit Breaker Location

In addition, the defroster fan, flasher and wiper circuits are each protected by in-line fuses.

THE CHARGING SYSTEM

General Description

The Charging System consists of Alternator, Ammeter, Battery(s), Voltage Regulator and connecting wires. Its purpose is to provide current for operation of the machine's electrical components, as well as to maintain a full charge on the Battery(s).

Alternator:

A 12 volt, 55 amp alternator is used on all units. The Alternator consists of a ROTOR assembly which rotates inside a series of windings called a STATOR. The rotor contains FIELD windings which receive regulated current from the Voltage Regulator to produce a magnetic field around the windings. Iron segments on the rotor called POLES concentrate the magnetic field to create a NORTH magnetic pole in each pole of one rotor segment, and a SOUTH magnetic pole in each pole of the other rotor segment. As the rotor turns, the NORTH and SOUTH poles pass each of three stator windings, inducing an a-c voltage into the windings. Voltage is controlled by the strength of the magnetic field. The a-c voltage is rectified by POSITIVE and NEGATIVE DIODES. Diodes act much like one-way check valves, permitting current flow in one direction only.

Ammeter:

The Ammeter is connected in SERIES between the Alternator and the batteries, and indicates current flow to/from the batteries.

Battery(s):

Two 12 volt batteries, connected in parallel are used on units equipped with a diesel engine. On units with a gasoline or LP engine, only one 12 volt battery is used. The batteries are lead-acid type and have a 55 amp-hour at 20 hour rating.

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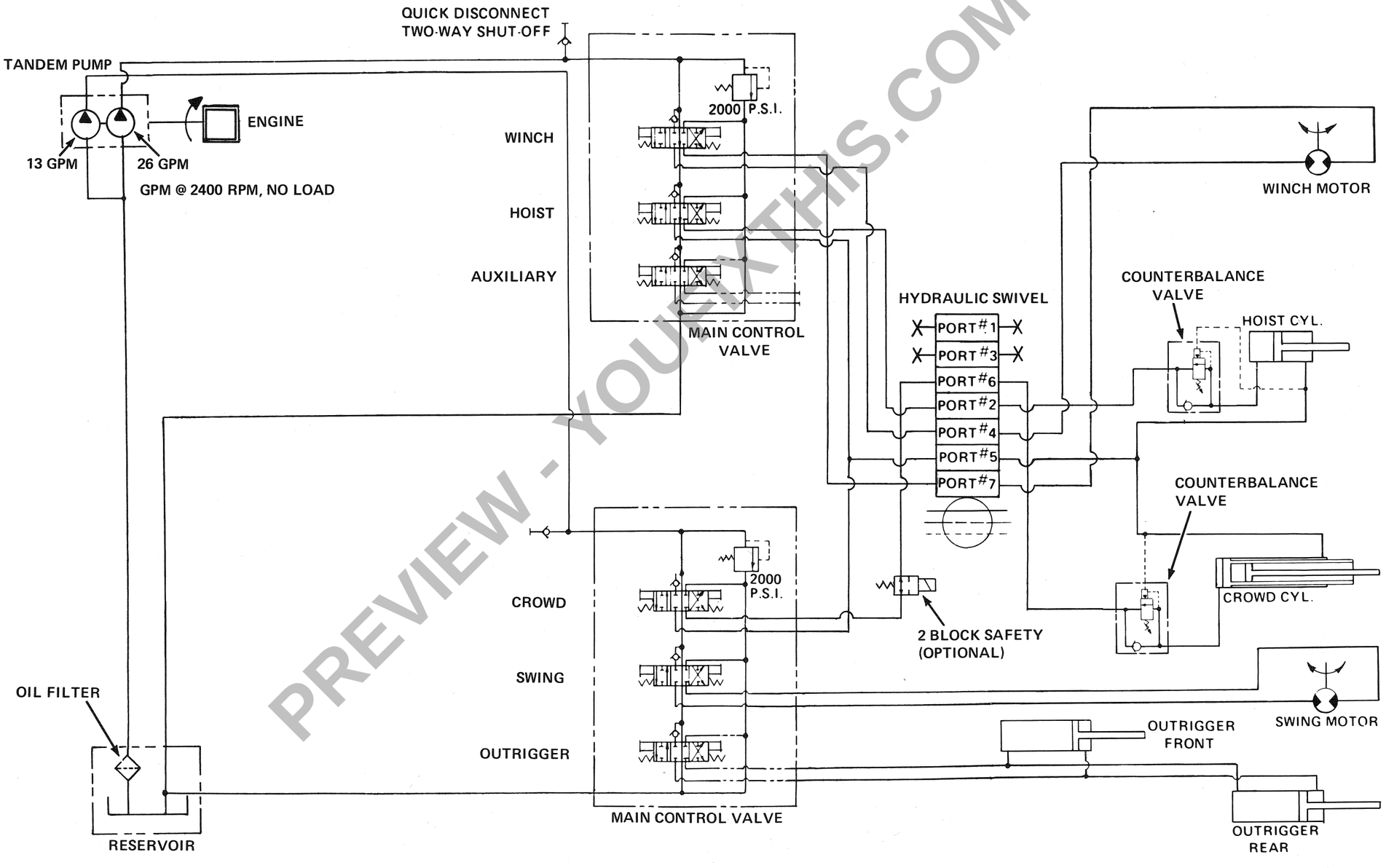

Fig. 125. Hydraulic Schematic

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iron or rubber), scratched surfaces, loose bolts, foreign particles between mating surfaces or surfaces which are not flat. Surfaces may be lapped to correct flatness. Damaged seals and sealing rings may be replaced. Torque loose bolts.

Checking Pressures

Use test gauges when trouble shooting. Gauges must be accurate to be of any value. Check the various hydraulic oil pressures by installing suitable gauges, a 0 to 300 PSI (0 to 21.09 kg./cm^2) for clutches, 0 to 100 (0 to 7.03 kg./cm^2) for cooler, and 0 to 50 (0 to 3.52 kg./cm^2) for lube, in the outlets indicated in Figure 13. Clutch pressures should be between 140 and 220 PSI (9.84 and 15.47 kg./cm^2) depending upon engine speed, temperature and transmission model. Check reverse clutch pressure when shift lever is in reverse position and forward clutch pressure when shift lever is in forward position. Check lube and cooler at any time; however, it is not normally a check that is required except when special problems show a need for it. Lube pressure should register on the gauge at idle speeds above 450 ERPM and will reach a maximum of 20 PSI (1.41 kg./cm^2); however, when cold oil and high speeds are encountered, pressures may exceed 80 PSI (5.62 kg/cm^2) at 2000 ERPM.

A pressure 5 PSI (.35 kg/cm^2) below normal usually indicates leakage in that circuit being tested. Low pressure in all circuits indicates leakage in portion of circuit common to all circuits or a weak pump, stuck regulator valve or restrictions in pump circuit.

OPERATING PRESSURES

Engine RPM	LINE PRESSURE		FORWARD CLUTCH		REVERSE CLUTCH		CONVERTER IN		CONVERTER OUT	
	PSI	kgs/cm^2	PSI	kgs/cm^2	PSI	kg/cm^2	PSI	kg/cm^2	PSI	kg/cm^2
450	117-130	8.23-9.14	117-130	8.23-9.14	117-130	8.23-9.14	0 - 1	0 - .07		
2000	125-140	8.79-9.84	125-140	8.79-9.84	125-140	8.79-9.84	75-105	5.27-7.38	15 - 30	1.05-2.11

DISASSEMBLY AND REPAIR OF FORWARD AND REVERSE UNIT

Prepare for Disassembly

Use a hoist to position the transmission on end and rest it on the converter housing. Remove attaching bolts and separate the adapter by pulling straight away from the forward and reverse transmission.

Sit transmission upright on a bench and remove converter housing bolts and housing from the forward and reverse transmission.

Disassembly should not begin until the transmission has been drained and the transmission and work area have been thoroughly cleaned. Remove the cooler return line bushing and pull the oil screen from transmission to permit oil to drain from the forward and reverse transmission.

NOTE

Refer to Figure 14 for parts reference during the disassembly and assembly procedure.

Pump Assembly

Remove pump to adapter bolts (99) and pull pump straight forward from transmission. It may be necessary to tap pump with a plastic hammer to free it from the gasket and snap fit. Never strike the pump bolt bosses as the pump bolts seal against boss face.

Place pump on bench and remove the flat head screw. Two flat head screws were used on early units. Lower the housing and gears straight down to bench. Mark

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TABLE OF CONTENTS

GENERAL . . . . . **1 thru 4**
- Safety Precautions 3,4
- Nomenclature 5

SCHEDULED MAINTENANCE . . . . . **6 thru 9**
- Hydraulic Oil Recommendations 6
- Maintenance Schedule 7
- Lubricants and Fluids 8
- Pictorial Listing of Grease Fittings 9

ENGINE **10,11**
- Engine Performance Check 10
- Air Cleaner Maintenance 11

DRIVE TRAIN . . . . . **12 thru 63**
- Forward and Reverse Transmission
  - Description and Operation 12,13
  - Maintenance 14
  - Trouble Shooting 15,16
  - Disassembly and Repair . . . . . 16 thru 25
- Three Speed Transmission
  - Description and Operation . . . . . 26 thru 28
  - Maintenance 28,29
  - Disassembly and Repair . . . . . 29 thru 44
- Torque Converter . . . . . 45 thru 47
- Trouble Analysis Charts . . . . . 47 thru 50
- Drive Shafts 51
- Drive Axle and Differential
  - Maintenance 51
  - Disassembly and Repair . . . . . 51 thru 57
  - NoSPIN Differential . . . . . 58 thru 61
- Drive Wheel Bearings 61,62
- Steering Axle Wheel Bearings 62,63

BRAKES . . . . . **64 thru 67**
- General Description 64
- Brake Master Cylinder 64,65
- Bleeding Procedure 65
- Wheel Brakes . . . . . 65 thru 67
- Parking Brake 67

STEERING . . . . . **68 thru 70**
- General Description 68
- Trouble Shooting 68,69
- Steering Actuator (Orbitrol) 69,70
- Steering Linkage 70
- Wheel Alignment 70

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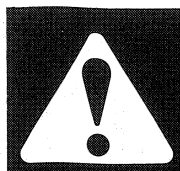

THIS SAFETY ALERT SYMBOL INDICATES IMPORTANT SAFETY MESSAGES IN THIS MANUAL. WHEN YOU SEE THIS SYMBOL, CAREFULLY READ THE MESSAGE THAT FOLLOWS AND BE ALERT TO THE POSSIBILITY OF PERSONAL INJURY OR DEATH.

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

CAUTION: Do not service 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.

When servicing the machine, tag mark both ignition switches to alert other operators and prevent accidental start-ups.

Before starting engine make sure all operating controls are in NEUTRAL.

CAUTION: Never leave engine running when machine is unattended.

CAUTION: Keep hands, feet and loose clothing away from moving parts when machine is operating.

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

Never handle wire rope with bare hands. Wear gloves.

WARNING: To prevent injury from burns always use a non-flammable solvent for cleaning component parts. DO NOT use gasoline or other flammable substances.

CAUTION: Be extremely careful when working with tires. Tires can come apart with explosive force. Never attempt to disassemble a wheel with an inflated tire mounted on it.

POISON/DANGER: BATTERY ACID CAUSES SEVERE BURNS. BATTERIES CONTAIN SULFURIC ACID. Avoid contact with skin, eyes, or clothing.
Anti-dote: EXTERNAL: flush with water. INTERNAL: drink large quantities of water or milk. Follow with Milk of Magnesia, beaten egg or vegetable oil. Call physician immediately. EYES: Flush with water for 15 minutes and get prompt medical attention. KEEP OUT OF REACH OF CHILDERN.

WARNING: Batteries produce explosive gases. Keep flames, sparks and cigarettes away. Ventilate when charging or using in enclosed space. Always shield eyes when working near batteries.

Disconnect both leads from the batteries when working on the engine or electrical system. Always disconnect the Ground lead first.

CAUTION: When checking coolant level, remove radiator cap slowly to relieve pressure within the system.

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TABLE OF CONTENTS

BOOM AND MAST . . . . . **71 thru 80**
- Boom Maintenance 71
- Removal of Sequencing Boom and Crowd Cylinder . . . . . 71 thru 74
- Boom Disassembly and Repair 74,75
- Mast Bearing Removal 76
- Swing Mechanism . . . . . 76 thru 78
- Winch Assembly 78,79
- Winch Cable Maintenance and Replacement 80
- Two-Blocking Damage Preventive Feature (optional) 80A
- Weigh Load Device (optional) . . . . . 80B thru 80D

HYDRAULIC SYSTEM AND COMPONENTS . . . . . **81 thru 122**
- Introduction 81
- Maintenance 82,83
- Main Hydraulic Pump . . . . . 84 thru 92
- Swing and Winch Motors . . . . . 93 thru 99B
- Auxiliary Winch Motor 99B
- Main Control Valves
  - Description and Operation 100,101
  - Maintenance 101,102
  - Checking Main Relief Settings 102,103
  - Disassembly and Repair 103,104
- Hydraulic Cylinders
  - General Trouble Shooting 104-105
  - Crowd Cylinder . . . . . 105 thru 108
  - Lift Cylinder . . . . . 108 thru 110
  - Outrigger Cylinders 110
  - Steering Cylinder . . . . . 110 thru 112
- Hydraulic Swivel . . . . . 112 thru 116
- Hoist and Crowd Counterbalance Valves 117
- Hydraulic System Trouble Shooting . . . . . 118 thru 122

ELECTRICAL . . . . . **123 thru 129**
- Introduction 123,124
- Electrical Circuit Protection 124
- Charging System . . . . . 124 thru 127
- Control Circuits 128
- Lights and Instrumentation Circuits 128
- Troubleshooting 128,129

CHARTS & SCHEMATICS . . . . . **130 thru 134**
- Torque Value Charts 130,131
- Hydraulic Schematic 132
- Electrical Schematic (Gas Engine) 133
- Electrical Schematic (Diesel Engine) 134

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NOISY OPERATION (CON'T.)

PROBLEM	POSSIBLE CAUSE	REMEDY
Valve Buzz Or Noise	Air in hydraulic system.	Running will remove air.
	Low oil level.	Add oil to full mark.
	Air leak on suction side of pump.	Find and repair.
	Restrictions in oil passages.	Remove restrictions.
	Restricted oil screen.	Clean and replace.
	Sticky valves.	Clean valve and add clean oil.

TRANSMISSION OVERHEATING

Forward And Reversing Unit Only	Oil level low.	Fill to Correct level.
	Cooler too small or restricted passages.	Cooler must be connected as shown in oil circuit diagram Figure 12. All external oil lines should have minimum inside diameter of 13/32 inch. Cooler must permit free flow of oil from regulator valves.
	Pump pressure low — worn or damaged pump.	Check transmission pressure at gauging outlets Figure 13 in accordance with oil circuit diagram Figure 12. Inspect pump assembly if pressures are low. Replace pump assembly if worn or damaged.
	Converter sprag clutch worn and slipping.	Replace converter assembly.

TRANSMISSION WILL NOT PULL

All Speeds	Converter drive lugs sheared or not engaged in pump.	Replace converter parts as necessary.
	Pump gear seized & converter lugs sheared.	Replace pump assembly and converter parts
	Insufficient oil in forward & reversing unit.	Fill to correct level.
	Worn or damaged bushings in forward and reversing unit.	Disassemble & inspect transmission. Replace worn parts or return to factory for repair.

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8. Stone the faces of the gear housing (53) to remove any burrs that might have occurred in handling. Blow or carefully wipe clean before installing pre-greased "o" rings (51, 54) in the grooves in the faces of the housing (53).

9. Place the gear housing (53) over the drive gear (50) and tap into position with a soft hammer (plastic or leatherhead). Be careful not to pinch the "o" ring (51) when positioning the housing. Install the driven gear (64) into its respective bore. Pour a small amount of oil over the gears to provide initial lubrication when putting the pump back into service.

10. Install the port end cover subassembly on the gear housing (53). Hubs of gears fit into the I.D. of the roller bearings (55, 62) and thrust plate (56) fits into the gear housing. Use a soft hammer to seat or position the port end cover assembly against the housing, making sure the "o" ring (54) on the face of the housing is not pinched.

Fig. 116. Installing Port End Cover

11. Thread the four studs (59) with a stud driver into the shaft end cover (9) leaving enough thread protruding above the port end cover (58) to accomodate the allen head nuts (60). Tighten the four nuts alternately to 100 ft. lbs. of torque. Be sure the drive shaft is easily rotated after tightening the nuts.

Fig. 117. Torquing Cover Nuts

12. Thread the grease fitting (19) into the shaft end cover (9) - IF - it was removed. Fill the cavity with a No. 2 consistency, lithium base, high temperature, ball bearing grease until a grease film appears around the shaft (6). The pump is now ready for installation and run-in.

IMPORTANT PRECAUTION TO OBSERVE BEFORE OPERATING NEW OR REBUILT HYDRAULIC PUMP

To avoid possible pump damage to a new or rebuilt hydraulic pump RUN THE PUMP FOR ABOUT 30 MINUTES AT ZERO PRESSURE (with all control levers in neutral position). Failure to observe this precaution can result in almost immediate failure of the hydraulic pump.

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