SERVICE MANUAL
Tigercat 230B/240B Loader

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ISSUE 2.1, JUNE, 2005

230B-SM00

230B/240B Available Literature

Operator's Manual	Part No. 13040A
Service Manual	Part No. 13041A
Parts Catalog	Part No. 13042A
CD - Master Parts Catalog	Part No. 24995A
CD - Master Operator's and Service Manual	Part No. 24996A
Hydraulic Adapters Book	Part No. 1472A
Hydraulic Hose assemblies Book	Part No. 3707A

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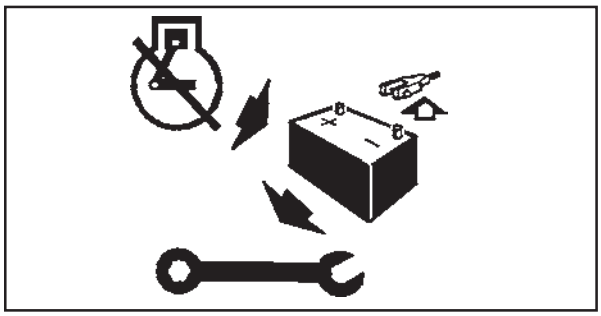
SERVICING SAFETY PRECAUTIONS



Conduct maintenance inspections at least as frequently as recommended in section 3 of the operator's manual.

When servicing or repairing equipment, shut the engine down. Turn Master Disconnect switch OFF.

Install a “DO NOT START ENGINE” sign on the operator’s cab door when making repairs to the machine.

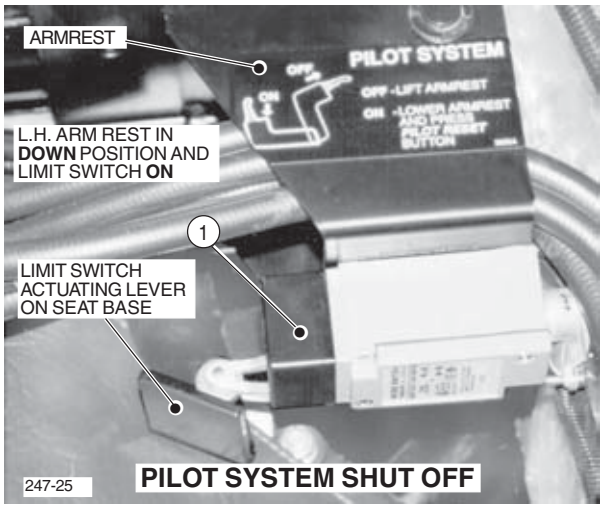
Before performing maintenance or repair work on any equipment, consult the manufacturer’s instruction manual and follow recommended procedures.

The radiator and the engine cooling system should be inspected daily and cleaned as necessary to maintain moderate engine temperatures.

SAFETY INTERLOCK SWITCH ON LEFT ARMREST:

The left arm rest is equipped with a safety interlock switch (1) to prevent the machine from being operated while the armrest is in the raised position (pilot system is shut off).

NOTE: The engine can be started but the machine functions cannot be operated with the left arm rest up.



To operate:

With the engine running and the left arm rest DOWN, push the pilot reset switch.

Once the safety interlock system has been activated, the safety of both the operator and all persons outside the cab becomes the responsibility of the operator.

The left arm rest safety interlock switch (pilot system shut off limit switch) and the pilot reset switch are a safety feature and their function must not be defeated in any way.

SCHEDULED MAINTENANCE

Clean/replace:~

- Air conditioner re-circulation filter
- Cab fresh air filter
- Refer to diesel engine service manual and attachment manual for additional required maintenance at this scheduled time period.

EVERY 250 HOURS:~

- **Perform 8 hour maintenance**
- **Perform 24 hour maintenance**
- **Perform 125 hour maintenance**

And in addition:~

- Replace engine oil and filter
- Replace engine fuel filter
- Replace fuel/water separator filter
- Replace air cleaner primary element
- Check fire extinguisher and turn it to mix contents
- Check torque on trailer mounting studs.

EVERY 500 HOURS:~

- **Perform 8 hour maintenance**
- **Perform 24 hour maintenance**
- **Perform 125 hour maintenance**
- **Perform 250 hour maintenance**

And in addition:~

- Replace air cleaner safety element
- Replace hydraulic oil return filters †
- Replace hydraulic oil pilot pressure filter †
- Replace oil in swing gearbox. Fill reservoir to half way mark
- Lubricate door and cover hinges; 8 fittings - 1 shot

Check:~

- Torque on swing bearing and swing gearbox retaining bolts
- Refer to diesel engine service manual and attachment manual for additional required maintenance at this scheduled time period.

† Use of filters other than genuine Tigercat replacement filters is not recommended.

EVERY 1000 HOURS:~

- **Perform 8 hour maintenance**
- **Perform 24 hour maintenance**
- **Perform 125 hour maintenance**
- **Perform 250 hour maintenance**
- **Perform 500 hour maintenance**

And in addition:~

- Check intank fuel strainer. Drain tank, clean or replace as necessary.
- Replace air cleaner unloader valve.

EVERY 2000 HOURS:~

- **Perform 8 hour maintenance**
- **Perform 24 hour maintenance**
- **Perform 125 hour maintenance**
- **Perform 250 hour maintenance**
- **Perform 500 hour maintenance**
- **Perform 1000 hour maintenance**

And in addition:~

- Drain and refill hydraulic oil tank with recommended hydraulic oil. Refer to APPROVED HYDRAULIC OILS in THIS SECTION.

APPROVED HYDRAULIC OILS

Use *only* one of the following oils to fill or replenish the hydraulic system.

Chevron	**Mechanism LPS 68 (summer)**
Citgo	**Mystik HVI-68 (summer)**
Imperial/ESSO	**Univis N68 (summer)** **Univis N22 (winter)**
Shell	**Tellus T68 (summer)** **Tellus T22 (winter)**
Texaco	**Rando HDZ 68 (summer)**

PRESSURE SETTINGS

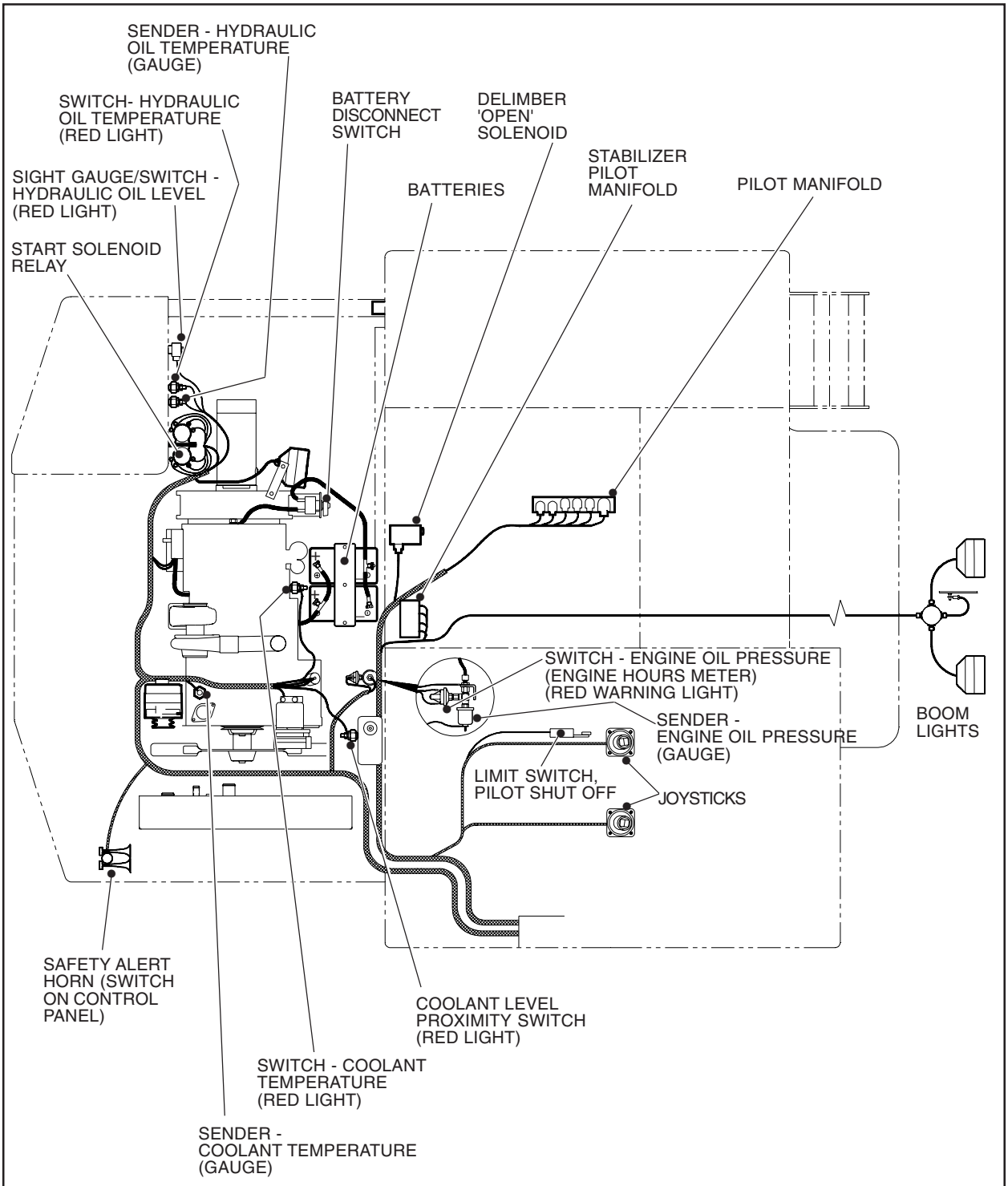
SERIAL NUMBER	2300501 and up	2400501 and up
Pilot relief valve	450	450
Main relief **stick** valve	2500*	2600*
Port relief grapple rotate ccw	1750	1750
Port relief grapple rotate cw	1750	1750
Port relief stick out	3000***	3000***
Port relief stick in	1500	1500
Port relief saw retract	1500	1500
Port relief slasher cut	3000***	3000***
Main relief **hoist** valve	2500*	2600*
Port relief grapple open	3000***	3000***
Port relief grapple close	3000***	3000***
Port relief hoist up	3000***	3000***
Port relief hoist down	1500	1500
Port relief spare	3000***	3000***
Port relief top saw cut	3000***	3000***
Main relief **swing** valve	2500*	2500*
Port relief swing ccw	3000***	3000***
Port relief swing cw	3000***	3000***
Port relief stabilizers down	3000***	3000***
Port relief stabilizers up	2000***	2000***
Port relief delimber open	3000***	3000***
Port relief spare	3000***	3000***
Crossline reliefs **swing** motor	1650	2000

* Do not adjust pressure over 3000 psi or pump may be damaged.
*** Factory set at 10 gpm.

IMPORTANT

1. System to be at **operating temperature** when setting pressures.
2. All pressures measured in **psi**.
3. All main and port relief valves to be set at **full engine rpm**.
4. Swing motor crossline relief valves to be set at **engine idle** and;
   Using the following procedure:
   a. Install swing locking device or secure boom to keep the machine from swinging.
   b. Disconnect and cap the pilot hose running to the swing motor crossline relief valves.
   c. At **idle** adjust both swing motor crossline relief valves to the value given on the chart.
   d. Reconnect the pilot hose and purge the air out of the lines.

NOTE:
The above values are for reference purposes only,
SEE SERVICE MANUAL FOR SETTING PROCEDURE



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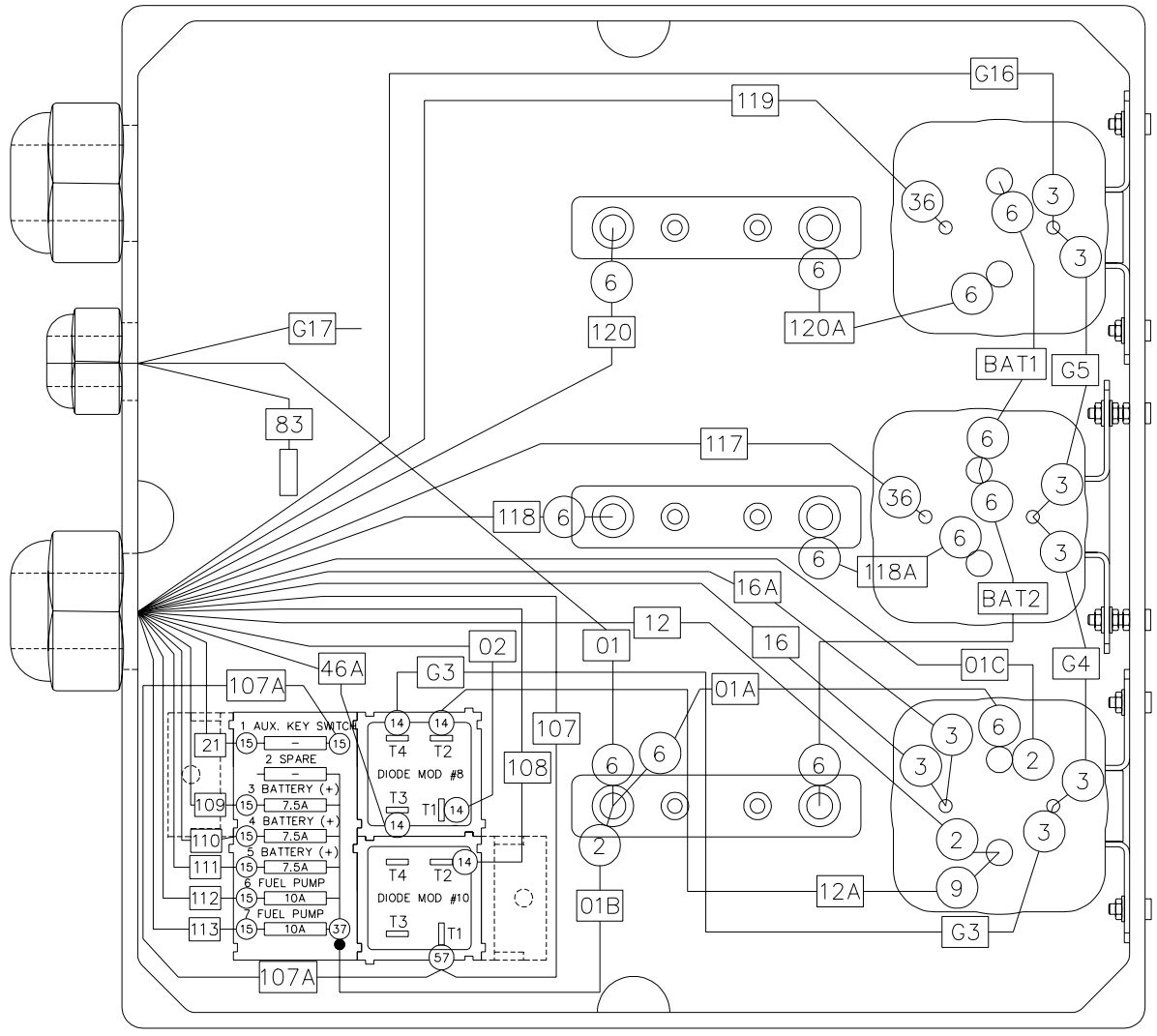
SENSOR LOCATIONS - EARLY MACHINES



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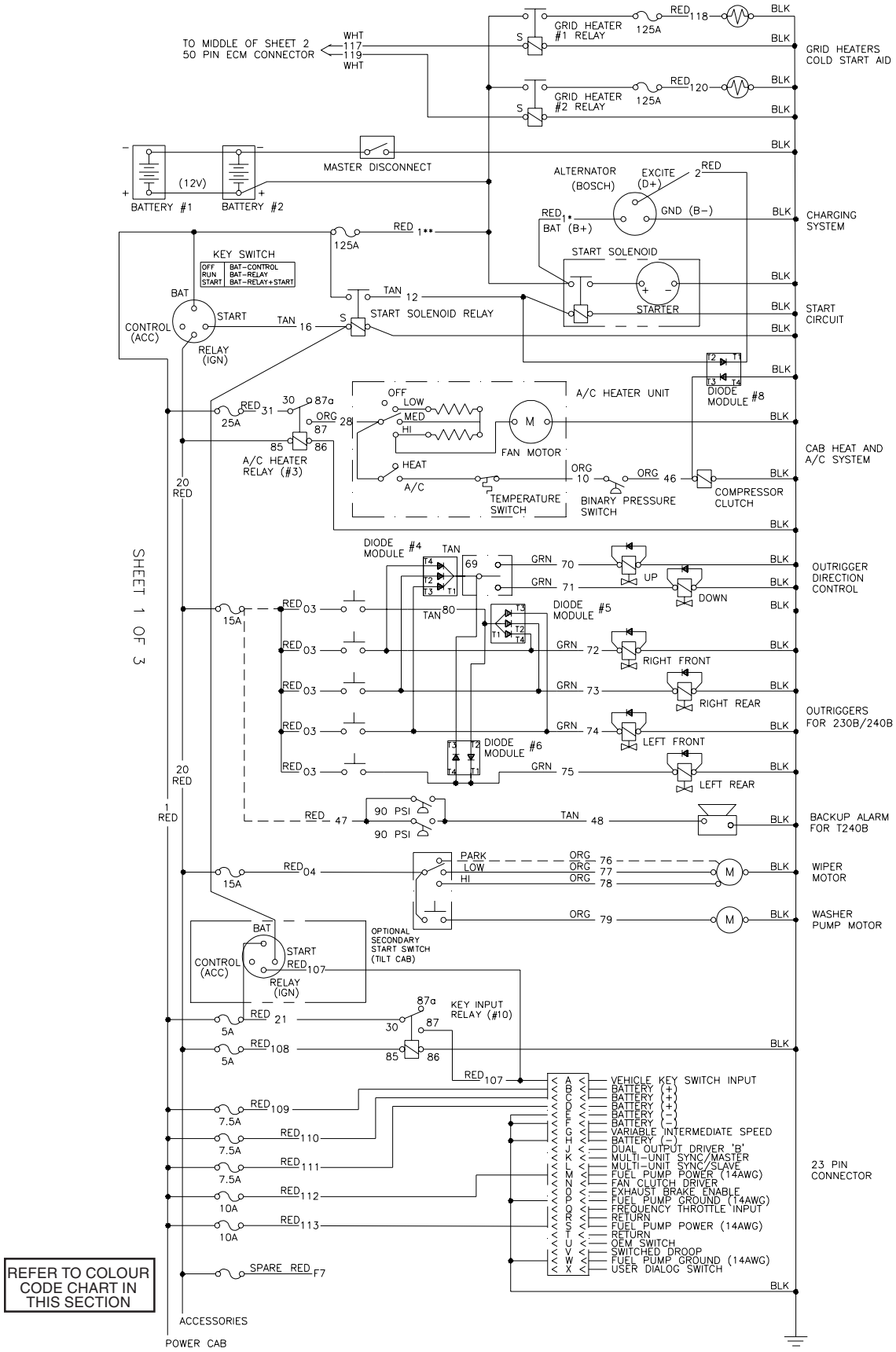
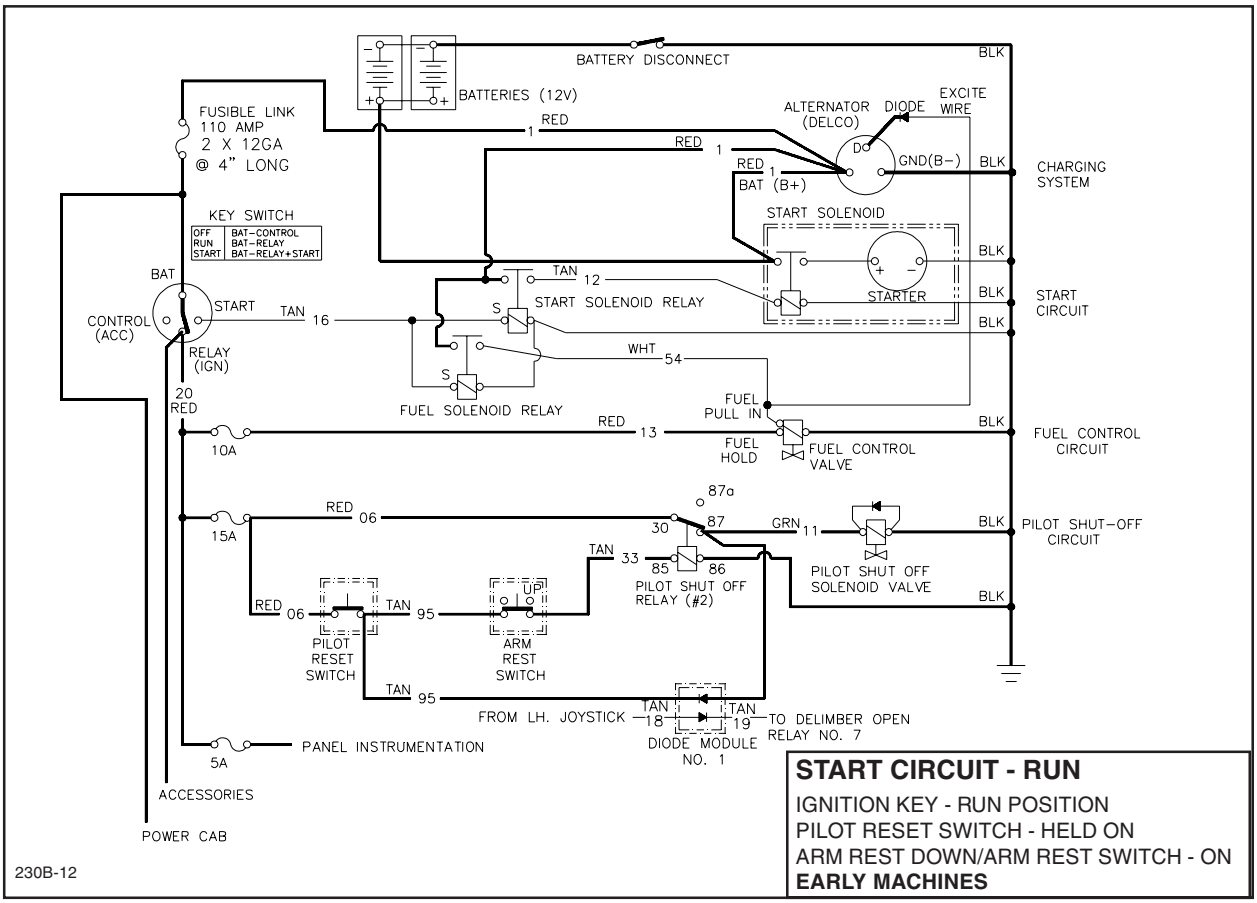
FUSES AND RELAYS - ELECTRICAL BOX - SN 2300851 TO 2300871 AND 2401001 TO 2401071



ELECTRICAL SCHEMATIC DIAGRAM 23057B (SHEET 1)
EARLY MACHINES S/N 2300872 TO 2301020 AND 2401072 TO 2401270

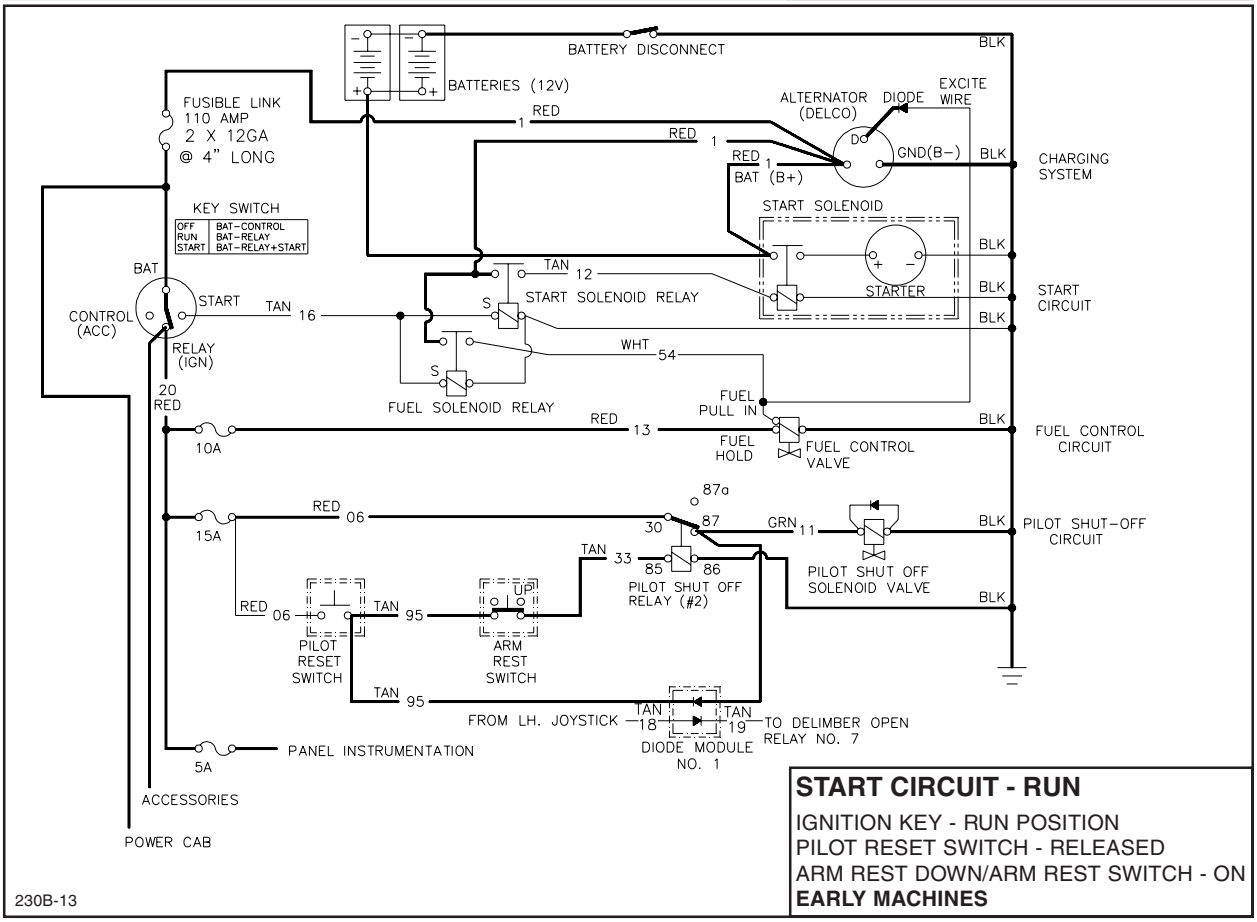
230B-05A



START CIRCUIT - RUN

IGNITION KEY - RUN POSITION
PILOT RESET SWITCH - HELD ON
ARM REST DOWN/ARM REST SWITCH - ON
EARLY MACHINES

230B-12



START CIRCUIT - RUN

IGNITION KEY - RUN POSITION
PILOT RESET SWITCH - RELEASED
ARM REST DOWN/ARM REST SWITCH - ON
EARLY MACHINES

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CONTROL VALVE OPERATING DESCRIPTION

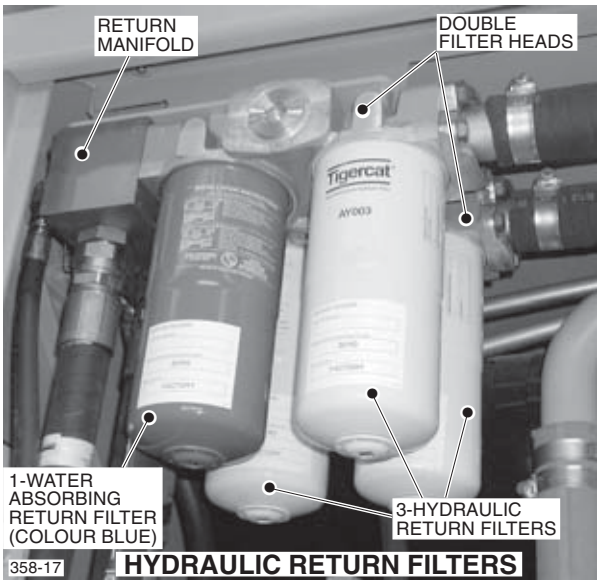
Oil enters the *inlet* section and is allowed to pass through the three *spool* sections and back to tank via the *outlet* section. Each of these spool sections has a self centering 3-position spool which is open centered. A spring in the spool end cap holds the spool in the center neutral position. The spool is shifted by pilot pressure being applied to either end of the spool. Shifting the spool directs oil to operate any one of the three functions (or all at the same time if required but with reduced flow to each).

To protect components and hoses when the valve is closed, each work port in the valve sections have a **port relief valve** with an anti-cavitation function.

A **main relief valve** is installed in the *inlet section* of the valve to protect the hydraulic system against overload pressures.

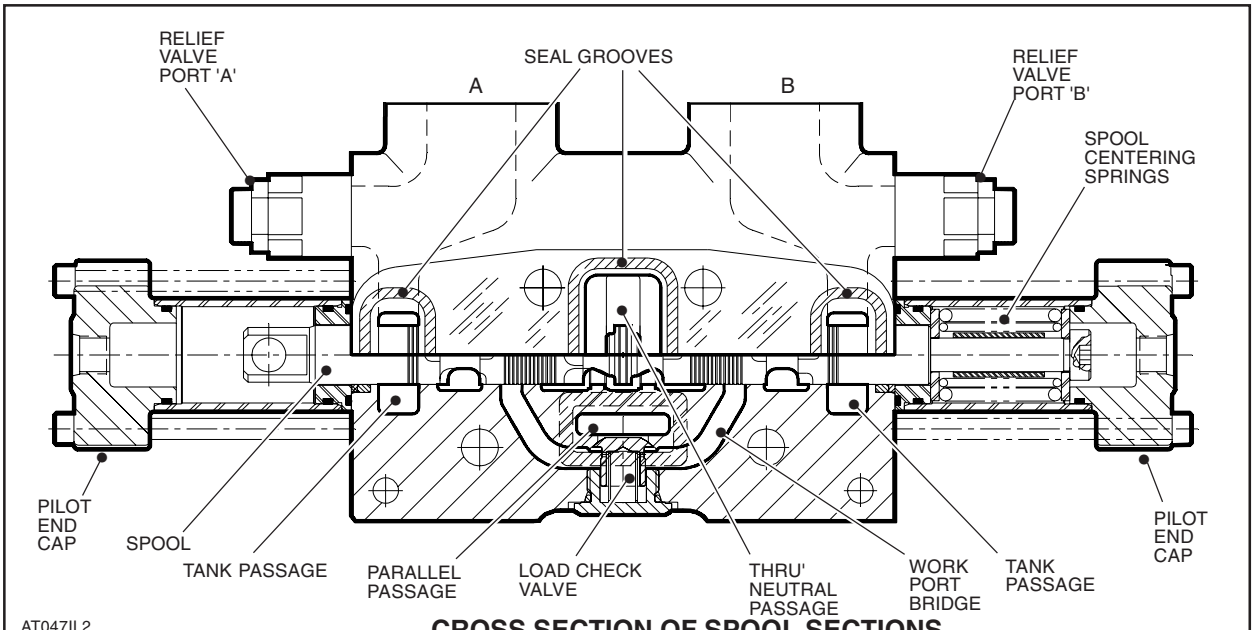
HYDRAULIC RETURN FILTERS

The majority of return oil entering the hydraulic tank passes through 4 spin-on hydraulic oil filters. One of the filters is a water absorbing filter (color blue) which is in place to assist with the removal of unwanted moisture from the hydraulic oil (the filters are rated 10m abs).



HYDRAULIC RETURN FILTERS

Each filter head has a bypass valve with a 25 psi cracking pressure so that oil can bypass the filters if they become restricted. The "in" side of the filter heads are connected to a return manifold. A filter restriction indicator and an oil sampling connector are mounted onto the manifold. To check the condition of the filter elements; With the hydraulic oil at **normal operating temperature**, place engine throttle control to FULL and with **no** machine functions operating, the filter restriction indicator should be in the GREEN zone. If the pointer is in the RED zone replace all four filter elements.

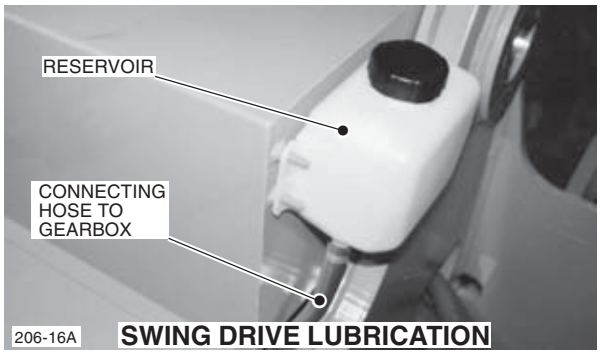


CROSS SECTION OF SPOOL SECTIONS

SWING DRIVE GEARBOX

Power is transmitted from the motor to a double reduction planetary gearbox. The swing gearbox upper gearing is lubricated by oil stored in a reservoir attached to the side of the gearbox cover. The reservoir must remain half full of oil* at all times. The lower bearing area is lubricated by grease where the cavity is filled with grease at assembly, a grease fitting is not provided since additional greasing is not necessary.

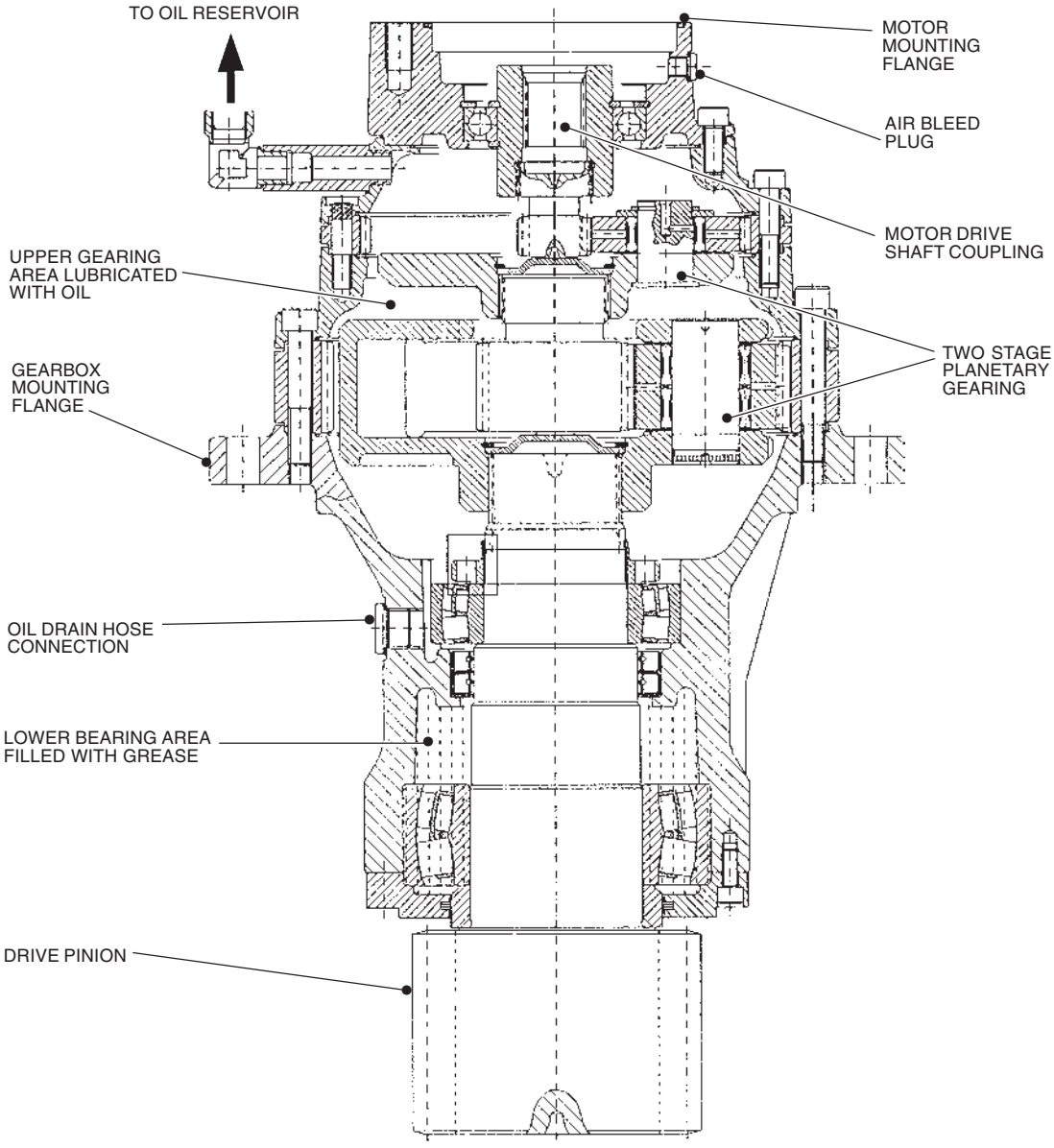
To fill the gearbox with oil, unscrew the air bleed plug located on the motor flange, remove the cap on the reservoir and add oil to the reservoir. When oil begins to come out of the air bleed hole replace the plug and continue to add oil until the reservoir is half full. Replace the cap on the reservoir.



SWING DRIVE LUBRICATION

To drain the gearbox unscrew the drain plug and allow oil to drain into a suitable container. To facilitate draining, the oil should be warm.

*For correct oil specification and maintenance schedule, refer to SECTION 3 in THIS MANUAL.



SWING DRIVE GEARBOX

STABILIZER CIRCUIT DESCRIPTION

Refer to STABILIZER CIRCUIT DIAGRAM

The stabilizer circuit is supplied with hydraulic oil by a fixed displacement gear pump. The stabilizer/swing valve receives oil at the inlet section and directs it through the three open center spool sections, to the outlet section. From there it is directed back to tank via the oil cooler, a check valve to the return manifold and two dual element filters, which are equipped with an internal 25 psi element bypass valve. A 50 psi. relief valve is installed in the oil cooler line to bypass the oil around the oil cooler, usually on cold start ups when the oil is cold and thicker.

Six switches on the instrument panel control the stabilizers, One 3-position switch OFF/UP/DOWN and five more switches to operate the stabilizers either ALL at the same time or each one INDIVIDUALLY. For a detailed description of these switches, refer to SECTION 2 in the OPERATOR'S MANUAL.

Placing the 3-position *stabilizer direction switch* in the OFF position removes all current from the stabilizer circuit to prevent the stabilizers from operating. The switch should remain in this position when the stabilizers are in the stationary position, either UP or DOWN.

⚠ CAUTION

When loading/unloading, the Operator must always ensure that all four stabilizers are firmly placed on the ground. Soft ground conditions can cause instability.

RAISING STABILIZER(S)

Place *direction* switch in UP position. Press and hold one of the stabilizer control switches. Electrical current will flow along wire RED 3, through a series of diodes and energize the UP solenoid operated pilot valve on the *pilot manifold.* Pilot oil will then be directed to the *stabilizer control valve* spool UP pilot end cap to shift the spool.

Current will also flow to energize a solenoid pilot valve(s) on the *stabilizer pilot manifold* and allow pilot oil, via internal porting, to shift a spool in a *directional valve* in the manifold.

In this condition, hydraulic oil will flow from the UP side of *stabilizer control valve* to the *rotary manifold* and on to the cylinder *counterbalance valve* where it will be directed to the rod end of ALL *selected cylinders*. Return oil from the base end of the cylinder will be directed back to tank via the counterbalance valve, through the rotary manifold, through the stabilizer pilot manifold, to the stabilizer control valve and the oil cooler.

LOWERING STABILIZER(S)

Place *direction* switch in DOWN position. Press and hold one of the stabilizer control switches. Electrical current will flow along wire RED 3, through a series of diodes and energize the DOWN solenoid operated pilot valve on the *pilot manifold.* Pilot oil will then be directed to the *stabilizer control valve* spool DOWN pilot end cap to shift the spool.

Current will also flow to energize a solenoid pilot valve(s) on the *stabilizer pilot manifold* to allow pilot oil, via internal porting, to shift a spool in a *directional valve* in the manifold.

In this condition, hydraulic oil will flow from the DOWN side of *stabilizer control valve*, through the *stabilizer pilot manifold* to the *rotary manifold* and on to the cylinder *counterbalance valve* where it will be directed to the BASE end of the *selected cylinder*. Return oil from the ROD end of the cylinder will be directed back to tank via the *counterbalance valve*, through the *rotary manifold* to the *stabilizer control valve* and the oil cooler.

To raise or lower **all** of the stabilizers at the same time; Press *direction* switch, Press and hold the center 'ALL' switch, Electrical current will flow through all of the diodes to supply electrical current to all four solenoid operated pilot valves on the *stabilizer pilot manifold* and also through the *direction switch* and energize the solenoid operated pilot valve on the *pilot manifold.* Hydraulic oil will then flow as described above for either UP or DOWN except that all cylinders will operate at the same time.

CAUTION

Use caution when in the cab as a slight touch of the controls can cause sudden rotation of the upper frame and booms or movement of the stabilizers

CAUTION

Be aware of other personnel in the area. Operator is responsible for the safe operation of the machine.

IMPORTANT

Avoid blowing oil over relief for longer than five seconds, as this will cause excessive heating of the hydraulic fluid.

GRAPPLE ROTATE RELIEF VALVE SETTINGS

Grapple rotate/"Stick" main relief setting:-

S/N 2300501 and up ..... 2500 psi
S/N 2400501 and up ..... 2600 psi

Rotate clockwise port relief setting .... 1750 psi

Rotate counterclockwise port relief setting ..... 1750 psi

1. Position machine on flat level ground with stabilizers down.
2. Ensure that the hydraulic oil is at **operating temperature.**

WARNING

Ensure that no one is standing near the grapple during this procedure.

3. Position and secure grapple to prevent from rotating in either direction.
4. Loosen the locknut on the "stick" *main relief* valve and turn the relief adjusting screw all the way **in,** tighten locknut.
5. Loosen the locknuts on both *port relief* valve adjusting screws for the GRAPPLE ROTATE *spool section* of the "stick" valve and turn the adjusting screws **out** until spring pressure is relieved then turn adjusting screws **one full turn in**.
6. Connect a 0 - 5000 p.s.i. pressure gauge to the "stick" control valve test port on the inlet section of the valve.
7. Start the engine, and put the throttle control to the **FULL** position.
8. While holding the R.H. joystick in the ROTATE CLOCKWISE position, check gauge pressure reading. If less than set value, turn relief valve adjusting screw **in** until set value is obtained on gauge.

IMPORTANT

Approach the gauge reading slowly and deliberately by turning the adjusting screw in a little at a time. The pressure setting must not exceed the above value.

9. Tighten locknut on adjusting screw taking care not to turn the adjusting screw.
10. While holding the R.H. joystick in the ROTATE COUNTERCLOCKWISE position, check gauge pressure reading. If less than set value, turn relief valve adjusting screw **in** until set value is obtained on gauge.
11. Tighten locknut on adjusting screw taking care not to turn the adjusting screw.
12. Release grapple from it's secured position.

reset main relief valve:

13. Loosen locknut on "stick" *main relief* and unscrew adjusting screw **3 full turns**.
14. While holding the R.H. joystick in the STICK OUT position (fully extended), check gauge pressure reading. If less than set value, turn relief valve adjusting screw **in** until set value is obtained on gauge.
15. Tighten locknut on adjusting screw taking care not to turn the adjusting screw.
16. Remove pressure gauge and wipe up any excess oil from test port area.

PRESSURE SETTINGS FOR TOP SAW CUT, SLASHER CUT AND DELIMBER

CAUTION

Use caution when in the cab as a slight touch of the controls can cause sudden rotation of the upper frame and booms or movement of the stabilizers

CAUTION

Be aware of other personnel in the area. Operator is responsible for the safe operation of the machine.

WARNING

Ensure that no one is standing near the grapple during this procedure.

IMPORTANT

Avoid blowing oil over relief for longer than five seconds, as this will cause excessive heating of the hydraulic fluid.

NOTE:

The Delimber and/or Slasher hydraulic hoses must be disconnected at the loader bulkhead connections before carrying out the following procedure. Cap the hoses to keep clean and use the appropriate steel caps on the bulkhead fittings to prevent leakage during the pressure setting procedure.

RELIEF VALVE SETTINGS
TOP SAW CUT (HOIST VALVE)

Top saw cut/"Hoist" main relief setting:-

S/N 2300501 and up ..... 2500 psi
S/N 2400501 and up ..... 2600 psi

Top saw cut port relief setting ..... 3000 psi

Spare port relief setting ..... 3000 psi

1. Position machine on level ground with stabilizers down.
2. Ensure that the hydraulic oil is at **operating temperature.**
3. Loosen the locknut on the "hoist" *main relief* valve and turn the relief adjusting screw all the way **in,** tighten locknut.
4. Loosen the locknut on *port relief* valve adjusting screw for the TOP SAW CUT *spool section* of the "hoist" valve and turn the adjusting screw **out** until spring pressure is relieved then turn adjusting screw **one full turn in**.
5. Connect a 0 - 5000 psi.. pressure gauges to the "hoist" control valve test port on the inlet section of the valve.
6. Start the engine, and put the throttle control to the **FULL** position.
7. While holding the R.H. joystick switch in the SAW EXTEND position, check gauge pressure reading at "hoist" valve test connection. If less than set value, turn TOP SAW CUT port relief valve adjusting screw **in** until set value is obtained on gauge.
8. Tighten locknut on adjusting screw taking care not to turn the adjusting screw. TOP SAW CUT port relief on "hoist" valve is now set.

   NOTE:
   The SPARE port relief is not used, it is factory set to 3000 psi and serves only as a plug. The pilot line connected to the spool section pilot end cap is a "vent" to allow the spool to shift when pilot pressure is applied to the opposite end.

   reset main relief valve:

9. Loosen locknut on "hoist" *main relief* and unscrew adjusting screw **3 full turns**.
10. While holding the L.H. joystick in the HOIST UP position (fully extended), check HOIST gauge pressure reading. If less than set value, turn "hoist" main relief valve adjusting screw **in** until set value is obtained on gauge.
11. Tighten locknut on adjusting screw taking care not to turn the adjusting screw.
12. Stop engine, remove pressure gauges and wipe up any excess oil from test port area.