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INTRODUCTION

CAUTION! This symbol and text in bold letters is used throughout this manual to call your attention to an emergency which, if not avoided, may result in minor or slight injury.

The two following signs and text in italics are used throughout this manual to call your attention to important procedures or steps having influence on the right functioning of a machine. Failure to follow such instructions may result in the damage of a machine or affect machine's lifetime.

IMPORTANT*: This sign and text in italics is used throughout this manual to call your attention to key problems for machine operation. Failure to follow such instructions may result in damage of a machine and heavy material losses.*

NOTE: *This sign and text in italics is used throughout this manual to call your attention to an important function having influence on the right functioning of a machine or for informational purposes.*

1.2. SERIAL NUMBERS

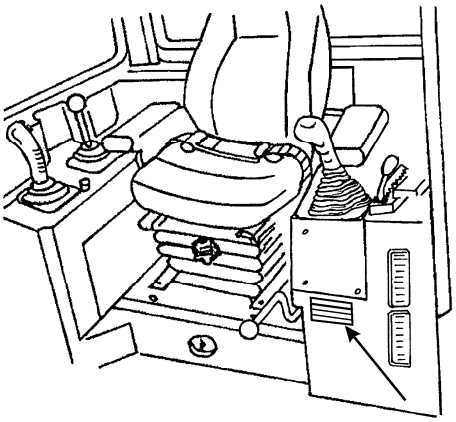


Fig. 1.2. Machine Serial Number in Cab

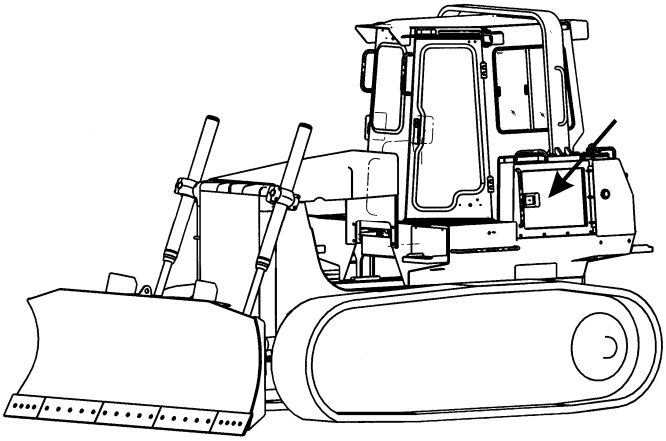
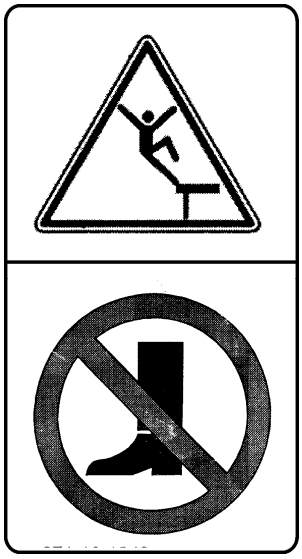


Fig. 1.2A. Machine Serial Number on the Filters Cover

Machine Serial Number is stamped on the plate attached to the front wall of the control console at the left hand side of the operator's seat (Fig. 1.2) or on a plate attached to the filters cover at the left hand side of the machine (Fig. 1.2A) as well as at the main frame upper corner, machine RH side, beneath the fender (Fig. 1.3).

SAFETY PRECAUTIONS



Falling from high place

DO NOT stay and remain on machine areas marked with this sign.

USE extra platforms or ladders to provide access for maintenance and repair.

Decal 6. Safety Graphics - Danger of Accident at Work

Runover/ backover - Loader.

Stay a safe distance of the loader when the engine is running.

Decal 7. Safety Graphics - Crossover

OPERATING

4.3. INSTRUMENT PANELS

GENERAL

This section covers the location and function of the various instruments and controls. More detailed information regarding operation of controls can be found in the following text within this section. Regardless of previous experience as an operator; you must be thoroughly familiar with the location and use of all instruments and controls before operating the machine.

CAUTION! Understand all control functions before starting the engine.

IMPORTANT: *After starting and while operating observe instruments and warning lights frequently.*

4.3.1. MACHINE INSTRUMENT PANEL

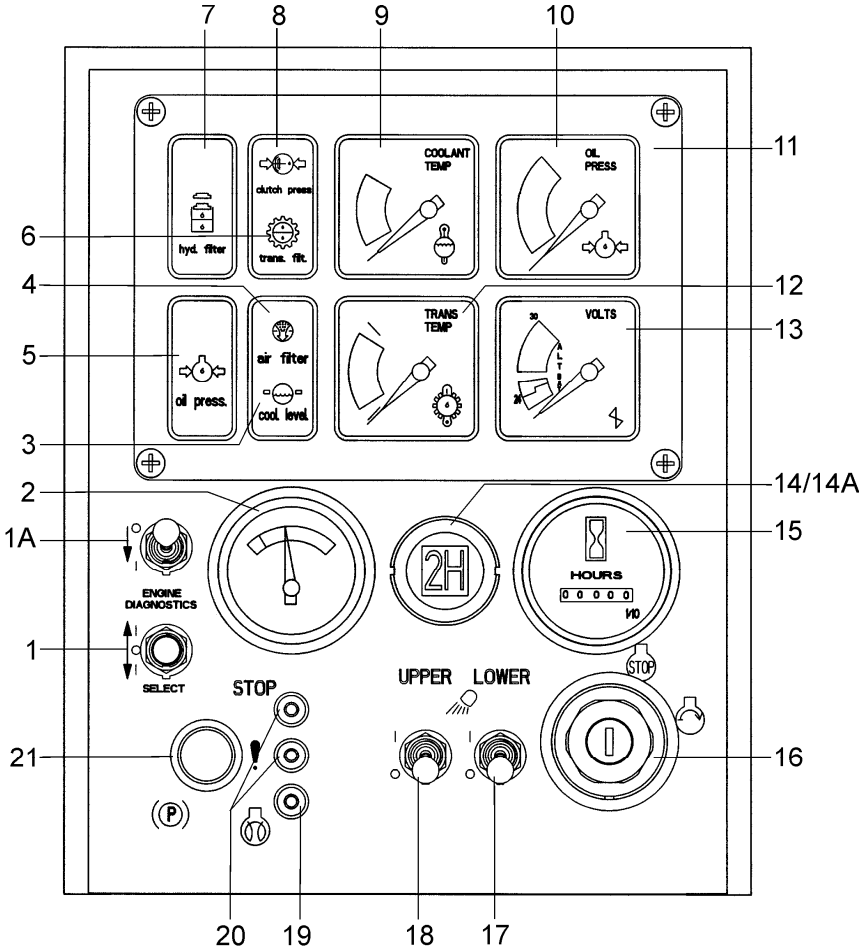


Fig. 4.2. Machine Instrument Panel up to S/N 33662 and from S/N 33760 up to 33799

1. Engine ECM Failure Code Display Momentary Switch
1A. ECM Failure Code Activation Momentary Switch
2. Fuel Level Gauge
3. Low Engine Coolant Level Warning Light
4. Air Cleaner Contamination Warning Light
5. Low Engine Oil Pressure Warning Light

2. Inspection diagnostics

Inspection diagnostics is used to check selected components of drive train control system. This happens when the controller is unable to decide at normal operation, if the controller input is active or the output external signal fails to enter the controller.

Depress the **"F"** (Fig. 4.3G) button to enter the inspection diagnostics mode. Light **"C"** is solid then.
The display will present the first page of messages:

1. "UP" button upshift signal is checked at drive train control lever.

UP	**?!**

If the circuit hooked to this input is OK, then "**UP**" and "**OK!**" message will display after the drive train control lever button is depressed.

UP	**OK**

The message will display for as lond as button is depressed if button (UP, DN) input is checked. If switch input is checked (HL, HR, WB, WO, WF, WR, etc), then the message displays all the time until a change to display page is made.
If message:

Does not change, this means:

UP	**?!**

- circuit discontinuity or
- controller input faulty or
- controller failure.

Depress button **">E"** or **"<G"** to read the next messages pages. Depress the center button "F" to return to display normal mode of operation.

Following are messages for inspection diagnostics:

2. "**DN**" and "**?!**" - checking the downshift button signal (drive train control lever)

3. "**HL**" and "**?!**" - checking high left range key signal (drive train control lever)

4. "**HR**" and "**?!**" - checking high right range key signal (drive train control lever)

5. "**WB1/2**" and "**?!**" - checking presetting switch setting 1/2 (instrument panel)

6. "**WB2/2**" and "**?!**" - checking presetting switch setting 2/2 (instrument panel)

7. "**WO**" and "**?!**" - checking auto downshift switch mode (instrument panel).

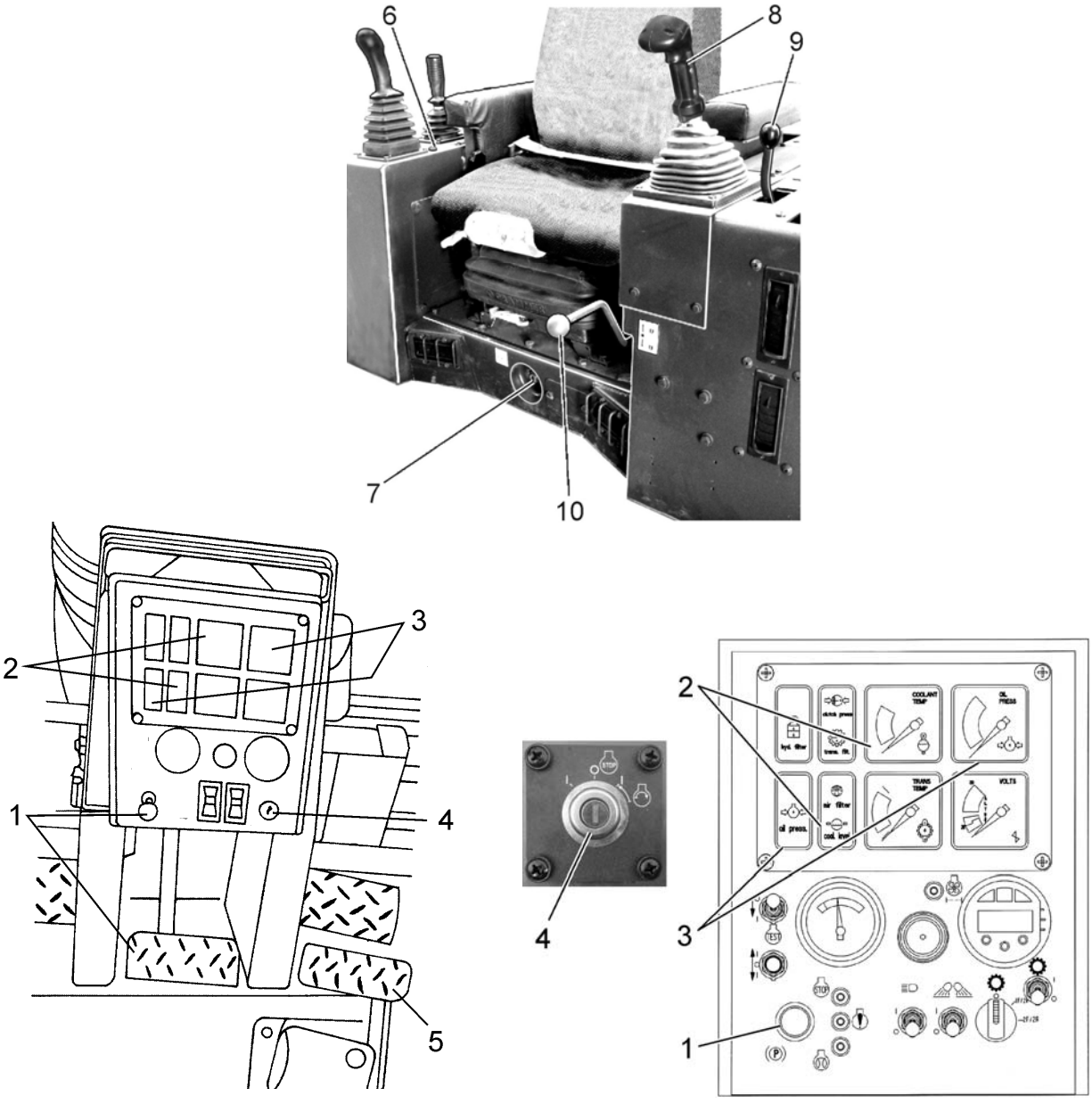
***IMPORTANT: "WO"** can be checked with the brake pedal released. The fault will display a message **"WO"** and **"?!".** Care should be taken when the brake pedal is released.*

RIPPER CONTROL LEVER (2) (if equipped).

The ripper can be lifted, lowered, shifting the ripper control lever to the required position.

NOTE: *For proper control of the ripper control lever and observation of working tool swivel the operator's seat 15 [°] to the right.*

4.6. STARTING THE ENGINE



for machine up to S/N 33799 for machine S/N 33800 and up

Fig. 4.21. Starting the Engine

1. Brake Pedal and Brake Lock Knob
2. Engine Coolant Gauge and Light
3. Engine Oil Pressure Gauge and Light
4. Starting Switch
5. Decelerator Pedal
6. Horn
7. Electrical System Master Switch
8. Drive Train Control Lever
9. Engine Speed Control Lever
10. Drive Train Lock Lever

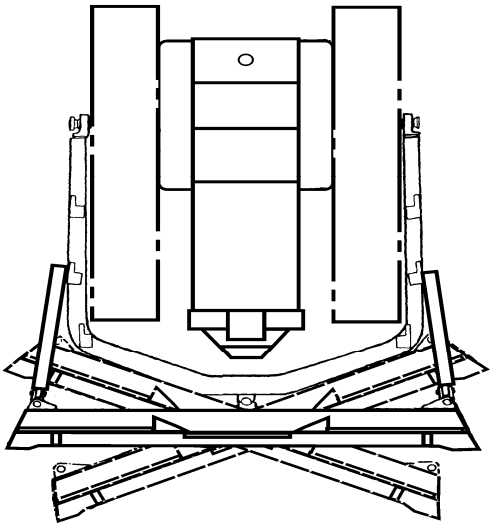


Fig. 4.36. Adjusting the Blade Angle

4.17.4.2. TILTING THE BLADE (MECHANICAL OPTION)

1. Raise the blade 300 [mm] above the ground and shut off the engine. Refer to “STOPPING THE ENGINE”.
2. Remove the lower strut trunnion from its bracket on the side to be raised, and position the strut close to the „C” frame.
3. Adjust the opposite side to get the desired tilt by shortening the upper strut. Tilt of the blade after shortening the strut should be approximately half of required tilt value.

CAUTION! Always lower the side being adjusted first so that the lack of balance will not cause the loose strut assembly to swing out and result in unexpected injury or damage.

4. Return to the side of the machine on which the lower strut was disengaged and lengthen the upper strut until the lower strut trunnion can be inserted in its bracket on the „C” frame. Install the lower strut to the „C” frame and secure with a pin.

NOTE: *Do not tilt the blade more than 480 [mm] tip to tip.*

5. After angling the blade, raise the blade above the ground 300 [mm] and shut off the engine. Refer to “STOPPING THE ENGINE”. Adjust the upper struts to a „neutral” position (no compression nor stretching) so the blade connecting pins are free in their brackets.
6. Whenever the blade is tilted, adjustments to one upper strut must always be equal and opposite to the adjustment made on the other upper strut. (For example: if a strut on one side is shortened 1 turn, lengthen the opposite strut 1 turn too).

4.17.4.3. TILTING THE BLADE (HYDRAULIC OPTION)

To obtain required tilt of the blade proceed as follows:
a) raise the blade 450 [mm] off the ground.
b) shift the blade control lever to the tilt position on the side to which the blade is to be tilted (lowered) until the desired tilt is obtained.

MAINTENANCE

5.3.1. MAINTENANCE AND SERVICE CHART

SERVICE INTERVAL	REF. No	POINT/PLACE OF SERVICE	SERVICE POINTS	LUBRICANT	SERVICE
Every 10 hours	1	Coolant Level	1	AF	check
	2	Fuel Filter Water Separator	1		drain
	3	Engine Oil Level	1	EO	check
	4	Hydraulic Reservoir Oil Level	1	HDTF	Check
Every 50 hours	5	Mainframe Oil	1	HDTF	Check
	6	Ripper Pins	10	MPG	Lube
	7	6-WAY Blade Cylinders Piston Rod Bearings	10	MPG	Lube
Every 250 hours	8	Upper Struts	4	MPG	Lube
	9	Diagonal Struts	2	MPG	Lube
	10	Fuel Tank Dirt Trap	1		Drain
Every 500 hours	11	Engine Oil Filter	1		Change
	12	Engine Oil	1	EO	Change
	13	Coolant Filter	1		Change
	14	Pivot Shaft Housing Oil Level	2	MPL	Check
	15	Final Drive Oil Level	2	MPL	Check
	16	Fuel Filters	2		Change
Every 1000 hours	17	Main Frame Breather	1		Change
	18	Final Drive Oil	2	MPL	Change
	19	Main Frame Oil	2	HDTF	Change
	20	Transmission System Pressure Filter	1		Change
	21	Universal Joints	2	MPG	Lube
	22	Blade Lift Cylinders Yoke	2	MPG	Lube
	23	Hydraulic System Return Filter	1		Change
	24	Hydraulic Reservoir Breather Filter/Fuel Tank Breather	1/1		Clean /Change
	25	Drive Train Suction Strainer	1		Clean
Every 2000 hours	26	Cooling System Coolant	1	AF	Change
	27	Hydraulic System Oil	1	HDTF	Change
	28	Hydraulic System Suction Filter	1		Clean
	29	Hydraulic Reservoir Strainer	1		Clean
	30	Hydraulic System Pilot Filter	1		Change
As needed (once a year, minimum)	31	Air Cleaner Element	1		Clean
	32	Pilot Valve Plungers Ends, Hand and Foot Cables	All	MPG	Lube
	33	Fuel Tank Strainer	1		Clean
	34	Transmission Scavenger Strainer	1		Clean
	35	Fuel Strainer	1		Change

5.8.6. CHANGING THE COOLANT

5.8.6.1. DRAINING THE SYSTEM

1. Position the machine on level ground.
2. Run the engine until it reaches the temperature of 50 [ºC]. Stop the engine.
3. Remove the radiator cap. Refer to “RADIATOR CAP”.
4. Open the machine RH engine compartment door.
5. Open cab heating shut-off valves at the engine RH side.
6. Remove the protective plug and thread on the drain hose to the drain valve located at the tube (Fig. 5.8A). Drain the coolant to the container.
7. Open the engine drain valve (Fig. 5.8) and drain coolant completely to the container.
8. Change the coolant filter (1, Fig. 5.9). Use initial coolant filter of higher inhibitor concentration.

Fig. 5.8. Engine Block Coolant Drain Valve

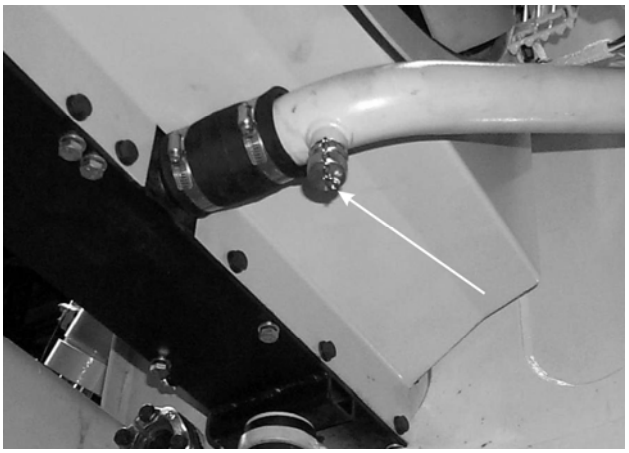


Fig. 5.8A. Cooling System Drain Valve

5.8.6.2. FILLING THE DRAINED SYSTEM

IMPORTANT: *Do not fill a cooling system with water alone. Use antifreeze and water solution fitted to the ambient temperature. Refer to “REFIL SPECIFICATIONS AND CAPACITIES CHART”.*

1. Unthread the drain hose from drain valve (Fig. 5.8A) and install the protective plug. Close the drain valve (Fig. 5.8).
2. Fill the cooling system slowly. This allows for better venting and the system to be filled to nominal capacity. Wait 2 to 3 minutes, before starting the engine, to allow the coolant level to stabilize. Add coolant to bring the correct coolant level in the sight gauge. Turn the starting switch key to activate the electrical circuits. Turn the cab heater temperature knob to max temperature in order to allow maximum coolant flow through the heater core. The blower fan does not have to be turned ON. Operate the engine at LOW idle for 2 minutes with the radiator pressure cap removed. Turn off the engine and add coolant to bring the correct coolant level. Run the engine at HIGH idle until the thermostat opens. Install the radiator cap.
3. Turn off the engine and check the coolant level. Add coolant, if necessary, to bring the correct cooling system level. Refer to “CHECKING THE COOLANT LEVEL”. Check the system for leaks.

BRAKE AND THROTTLE CONTROL LINKAGE

Remove the center cover in operator's cab to get access to the lubricating fittings.

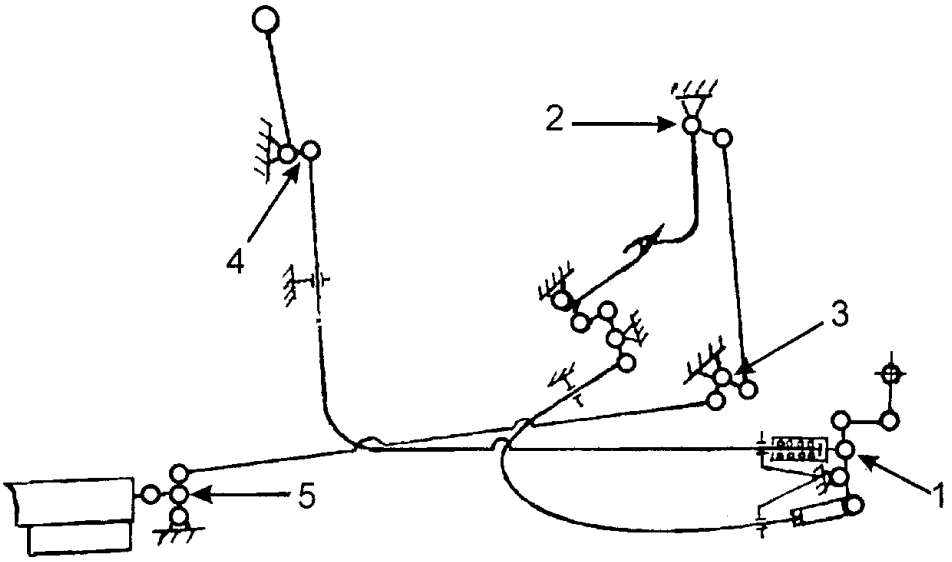


Fig. 5.29. Brake and Throttle Control Linkage Fittings

1.Throttle Linkage (1 lubricating fitting)
2. Brake Pedal Bracket (2 lubricating fittings)
3. Brake Pedal Lever (1 lubricating fitting)
4. Throttle Lever (1 lubricating fitting)
5. Steering Valve Brake Lever (1 lubricating fitting)

DRIVE TRAIN CONTROL VALVE

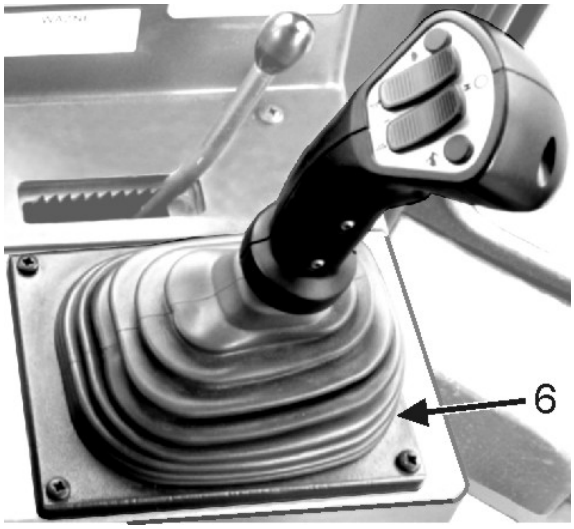


Fig. 5.30. Lubricating Drive Train Control Lever Valve Plungers Ends

6. Drive Train Control Lever – Steering Drive Control Valve Plungers' Dome Nuts (4 nuts)

5.17. FINAL DRIVES

5.17.1. CHECKING OIL LEVEL

Position the machine on level ground. Remove the magnetic filler and level plug, check the lubricant and, if the lubricant is low, fill to the level of the plug opening. Also, check the plug for metallic particles that may be present. If this condition continues after periodic checks, consult Authorized Distributor of Construction Equipment. Reinstall the plug and tighten.

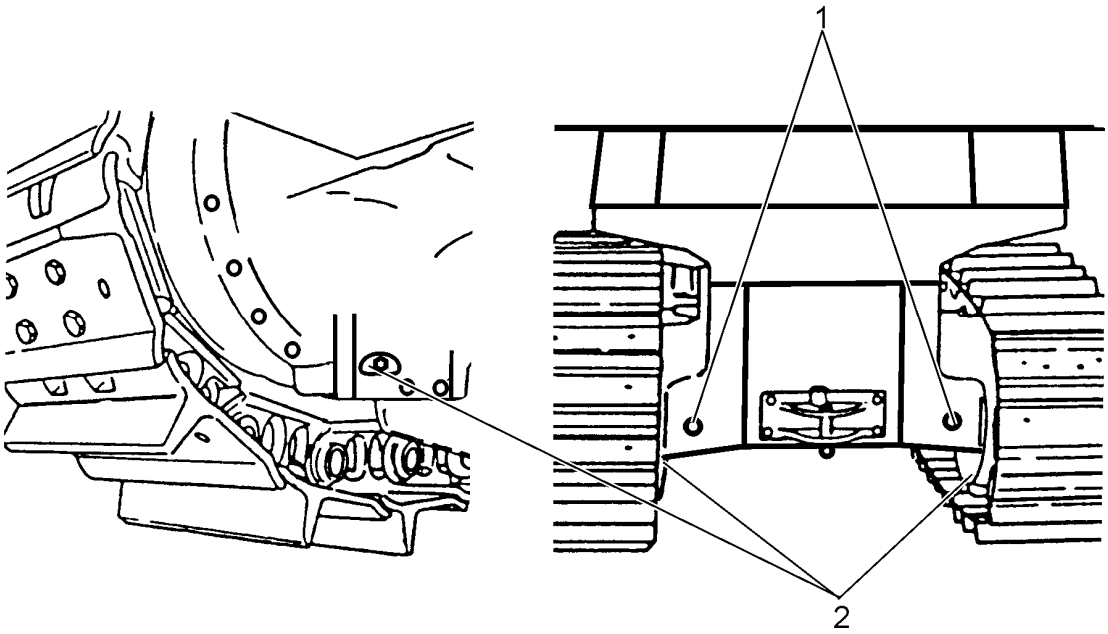


Fig. 5.44. Checking the Lubricant Level

1. Filler and Level Plug 2. Drain Plug

5.17.2. CHANGING THE OIL

1. While the oil is at operating or warm ambient temperature, park the machine on level ground. Remove drain plugs (2) and levels plugs (1) and allow the lubricant to drain into a suitable container. Remove metal particles from the magnetic plugs. Reinstall and tighten the drain plugs. Fill app.8 liters of fuel oil up to the housing and install the level plugs.
2. Operate the machine in low gear (with no load) for a few minutes. Remove the drain plugs and thoroughly drain the fuel oil into a suitable container. Reinstall and tighten the drain plugs. Remove the filler and level plugs. Fill the housing with fresh oil up to the bottom of the filler and level plug opening. Refer to “FLUIDS AND LUBRICANT – REQUIREMENTS” for the grade and quantity of the oil needed. Reinstall and tighten the filler and level plugs.

5.18. DRIVE TRAIN

Periodically, clean the outside surface of the transmission, torque converter, rear frame cover, engine and the frame inside components. This is especially true if the machine operates in an aggressive, dusted atmosphere, flammable.

5.19.4. CHECKING THE TENSION

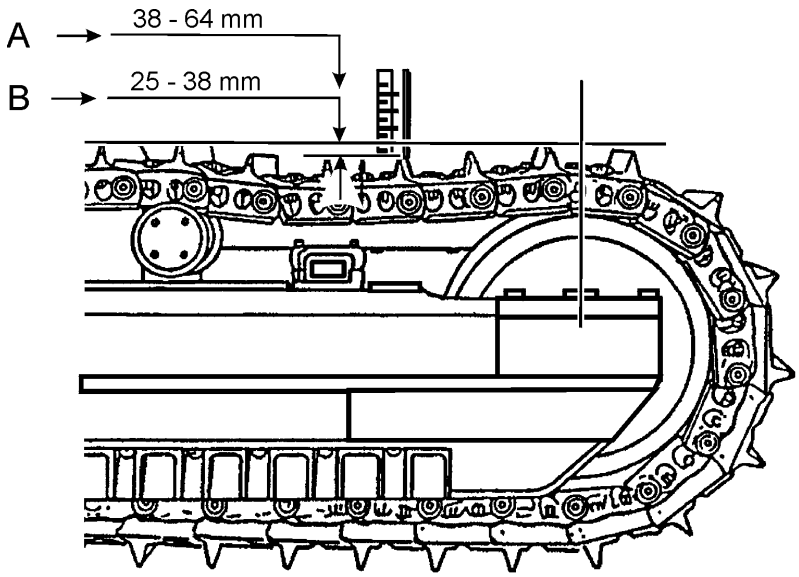


Fig. 5.53. Checking Track Tension

A. Track Sag of Lubricated Chain B. Track Sag of Non-lubricated Chain

1. Drive the machine forward until the track chain is tight along the ground and around the sprocket. Apply and lock the brake pedal, lock the transmission shift lever in NEUTRAL position and stop the engine, turn the master switch off and remove the key. Track tension measurement after drive in reverse and stopping shall give incorrect results.
2. Stand on the track between the front idler and the first track idler in order to accumulate all the chain slack at this point.
3. Place a straightedge on the track so the ends rest over the front idler and track idler. Measure the clearance between the bottom of the straightedge and the top of the shoe grouser with a ruler at the midway point between the idlers. If the distance is more than 64 [mm] or less than 38 [mm] for lubricated chain and more than 38 [mm] or less than 25 [mm] respectively for non-lubricated chain, adjust the track tension.
4. For mud and snow packing conditions track should be adjusted so sag is 64 – 76 [mm] for lubricated chain and 38 - 50 [mm] for non-lubricated chain.

5.19.5. ADJUSTING TENSION

The track chains are adjusted by hydraulic pressure. When lubricant is introduced into the front idler fork through the lubrication fitting, it acts upon the piston within the front idler fork forcing the front idler fork and front idler forward for track adjustment.

DANGER! To avoid possible injury, always stand to the side of the bleeder plug when making track adjustment. The pressure in the front idler fork is held by the check and safety valves. A loose or improper thread fit of either of these parts can allow them to be ejected by the pressure of lubricant, causing possible injury. When relieving track tension, never loosen the check and safety valves more than 2 – 2 ½ turns.

1. Remove the bolts and track adjuster cover.

5.22. UTILITY BOX

An utility box (Fig. 5.66) is located at the right side of the machine on the fender and utilized as an operator's cab step to get access to the cab. It can be used to hold tools needed for machine operation and maintenance. The tools can be chosen from the list in Section 6 "LIST OF TOOLS FOR TD-15M EXTRA MAINTENANCE".
The box can be pad locked when not in use.
To open, remove pad lock, pull down on the handle (1) and lift up on the deck plate (2).

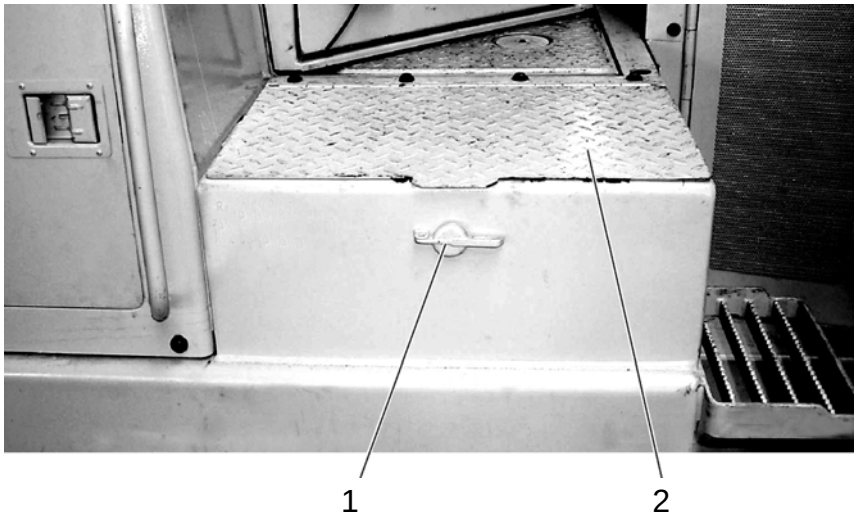


Fig. 5.66. Utility Box

1. Handle 2. Deck Plate

To close, pull down on the deck plate (2) so the lock gets latched. Secure the box with the handle (1) and a pad lock.

5.23. SERVICING THE AIR CONDITIONER

IMPORTANT: *During the season, in which the air conditioner does not operate for a long time, periodically turn the conditioner on for several minutes. Set the conditioner for maximum cooling to distribute the system oil to prevent compressor shaft seals from drying.*

NOTE: *Periodically, depending on ambient conditions, clean the condenser, blowing it with compressed air.*

Periodically, check the following:

- amount of refrigerant in the sight glass (3, Fig. 5.67).

  If the refrigerant features lots of bubbles, the refrigerant should be added to a proper level and the system checked for leaks. Visible oil signs will indicate where leaks can be found. If, with a charged A/C system the sight glass shows no bubbles at all with a condenser cooled with running water, some refrigerant should be evacuated from the system.

6.13.2. SINGLE SPEED STEERING

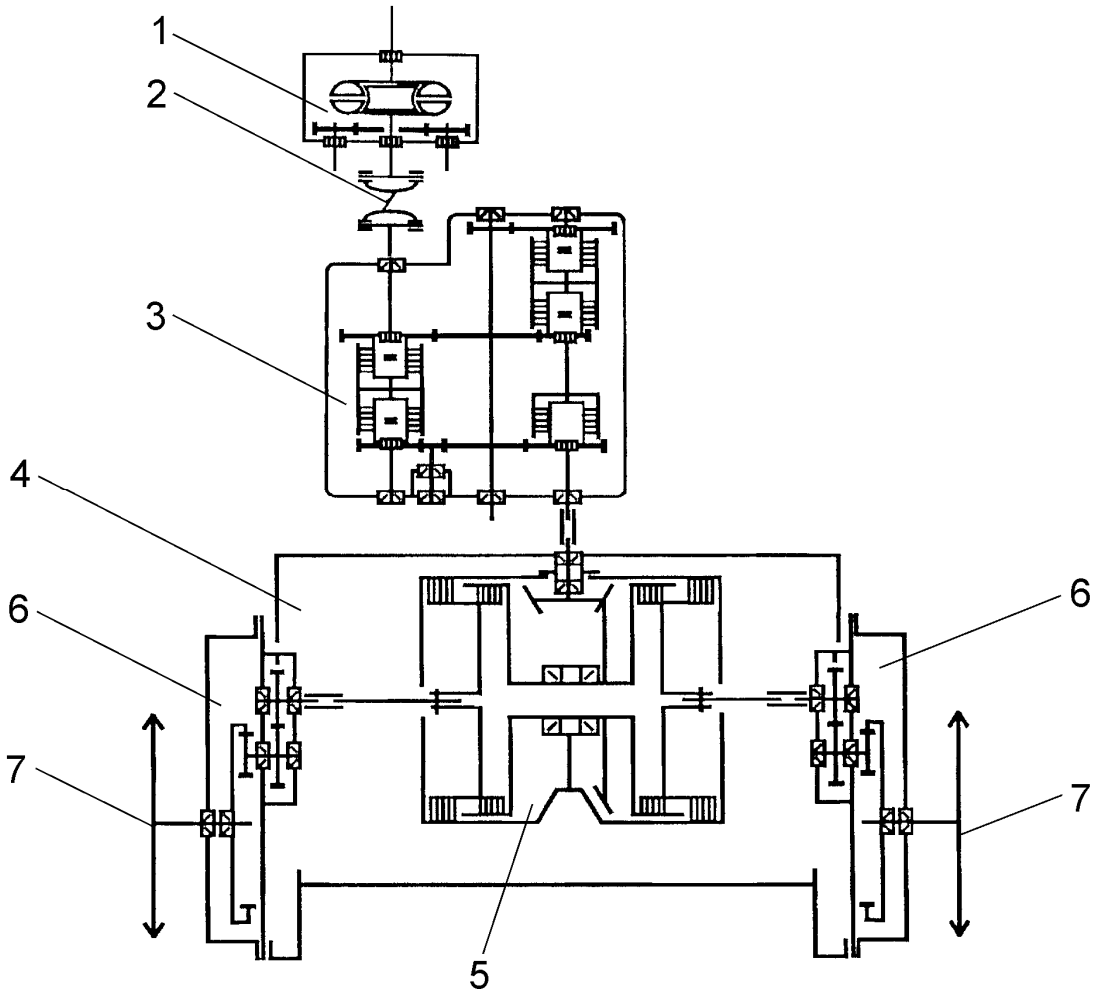


Fig. 6.3. Single Speed Steering Kinematics Schematic

1. Torque Converter
2. Universal Joint
3. Transmission
4. Rear Frame
5. Steering Drive
6. Final Drive
7. Sprocket