

1650K

Crawler dozer

**1650K**  
**Crawler dozer**

Operator's Manual

6-38101



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## SAFETY RULES

Keep operator's compartment, stepping points, grab-rails and handles clear of foreign objects, oil, grease, mud or snow accumulation to minimise the danger of slipping or stumbling. Clean mud or grease from shoes before attempting to mount or operate the machine.

Keep shoes free of mud or grease before climbing or driving the machine.

Never attempt to operate the machine or its tools from any position other than seated in the operator's seat.

When maintenance operations require moving hydraulically operated attachments by means of machine's hydraulic system remember that all manoeuvres must be made only when seated in the operator's seat. Before starting machine or moving attachment or tools, set brakes, sound horn and call for an all clear. Raise attachment slowly.

Always block booms or parts of the machine which must be raised to perform interventions under them with external devices. Do not allow persons to move into the vicinities nor standing under equipment not being blocked. Unless you are totally sure about your safety, avoid staying under raised equipment, even in case it is blocked.

Do not place the body, limbs or fingers into sharp articulation uncontrolled openings of the machine and without proper protections, unless they are blocked in a safe manner.

Never perform interventions with engine running, except as called for in a Manual. Do not wear loose clothing or jewellery near moving parts.

When servicing or maintenance require access to areas that cannot be reached from the ground, use a ladder or step platform that meet local and national regulations, to reach the service point. If such ladder or platform are not available, use the machine hand holds and steps as provided. Perform all service or maintenance carefully.

Shop and/or field service platforms or ladders must be constructed and maintained in accordance with local and national regulations.

Disconnect batteries and tag all controls according to current regulations to warn that work is in progress. Block machine and all attachments that must be raised according to current regulations.

Due to the presence of flammable fluids, never check or fill fuel tanks, batteries, nor use starting fluid near lighted smoking materials or open flames.

**BRAKES ARE INOPERATIVE** when manually released for servicing. Provisions must be made to maintain control of the machine by blocking or other means.

The fuel filling nose must be kept constantly inside the filling neck. Keep this contact from the beginning to the end of the fuelling operation to avoid the possibility that sparks due to static electricity are generated.

Use only designated towing or attaching points. Use care in making attachments. Make sure pins and/or locks are secure before pulling. Stay clear of drawbars, cables or chains under load.

To move a disabled machine, use a trailer or a low-boy, if available. In case towing is needed, use all necessary signals required by local and national regulations, and follow the directions provided in this Manual.

To load/unload a machine from transporter, choose a level surface ensuring firm support to the wheels of truck or trailer. Use strong access ramps, with adequate height and angle. Keep surface free of mud, oil or slippery materials.

Anchor the machine securely to the bed of truck or trailer and block wheels or tracks with appropriate wedges.

Never align holes with fingers or hands; always use appropriate aligning tools.

Eliminate all sharp edges and burrs from re-worked parts.

Use only approved grounded auxiliary power sources for heaters, chargers, pumps and similar equipment to reduce the hazards of electrical shocks.

Lift and handle heavy parts with a lifting device of proper capacity. Be sure parts are supported by proper slings and hooks. Use lifting eyes if provided. Watch-out for people in the vicinity.

Never pour gasoline or diesel fuel into open, wide and low containers. Never use gasoline, solvent or other flammable fluid to clean parts. Use exclusively qualified, non-flammable, non-toxic commercial solvents.

When using compressed air for cleaning parts, use safety glasses with side shields or goggles. Limit pressure to 2 bar, in accordance with local and national regulations.

Do not run the engine in closed areas without proper ventilation to remove deadly exhaust fumes.

Do not smoke or permit any open flames or spark near when re-fuelling or handling flammable materials.

Do not use an open flame as a light source to look for leaks or for inspection anywhere on the machine.

Make sure that all mechanic's tools are in good conditions. **NEVER USE** tools with mushroomed heads or frayed. Always wear eye protections.

Move with extreme care when working under the machine, its attachments and or on or near them. Always wear protective safety equipment as required, such as hard hat, goggles, safety shoes, ear plugs.

When performing operations requiring running of the engine, have a qualified operator in the operator's seat at all times with the mechanic on sight. Place the transmission in neutral and set the brakes and safety lock.

**KEEP HANDS AND CLOTHING AWAY FROM MOVING PARTS.**

For field service, move machine to level ground, if possible, and block it. If work on an incline is absolutely necessary, first block machine and its attachments securely, than move it to level ground as soon as possible.

Do not trust worn and /or kinked chains and cables: do not use them for lifting or pulling operations. To handle them, always use heavy gloves.

**CAB**

Modular type, elastically suspended by elastic blocks, integrated in the safety structure.

The cab offers maximum visibility of the blade and rear equipment for maximum productivity.

Also, the cab provides maximum comfort to the operator, in all weather conditions.

**WEIGHT AND SPEED**

Machine weight without ripper, with 500 mm (19.7 in) shoes, for LT and XLT version, with 800 mm (31.5 in) shoes for LGP version, including cab, coolant, lubricant, full fuel tank and operator:

1650K LT PAT ..... 19915 kg (43905 lb)  
 1650K LT BD (HSU) ..... 15011 kg (33093 lb)  
 1650K XLT PAT ..... 15677 kg (34561 lb)  
 1650K LGP PAT ..... 16810 kg (37059 lb)

MAX. SPEEDS (forward - reverse) in km/hr (mph):

<b>Speeds</b>	<b>I</b>	<b>II</b>	<b>III</b>
Forward	4.3 (2.6)	7.0 (4.3)	11.0 (6.8)
Reverse	5.4 (3.3)	8.7 (5.4)	13.0 (8.0)

**RIPPER (Optional)**

Model ..... RP12F  
 Parallelogram type with welded box steel elements frame. Three position tool bar with three semi-curved shanks with replaceable tips.

Controlled by two double stroke hydraulic cylinders.

Weight: ..... 1360 kg (2,999 lbs)

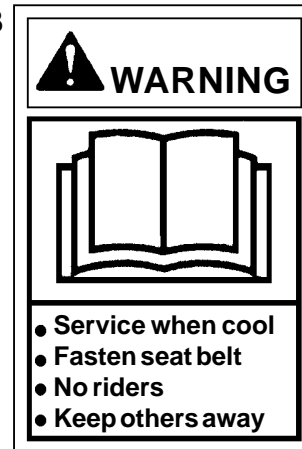
## LIST OF SAFETY DECALS

## Group B - Warning decals

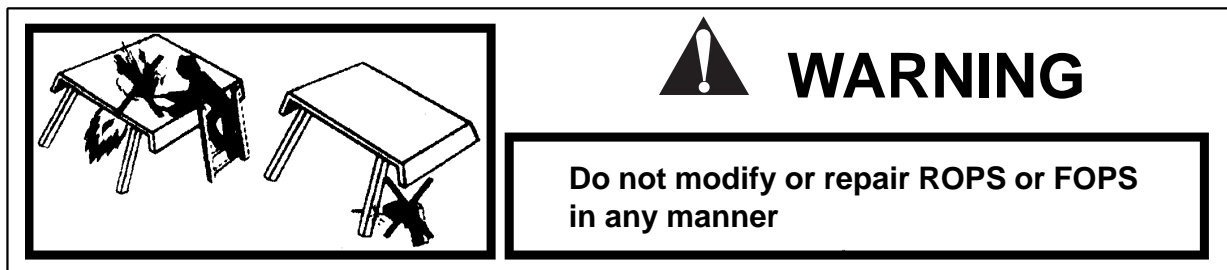
1B



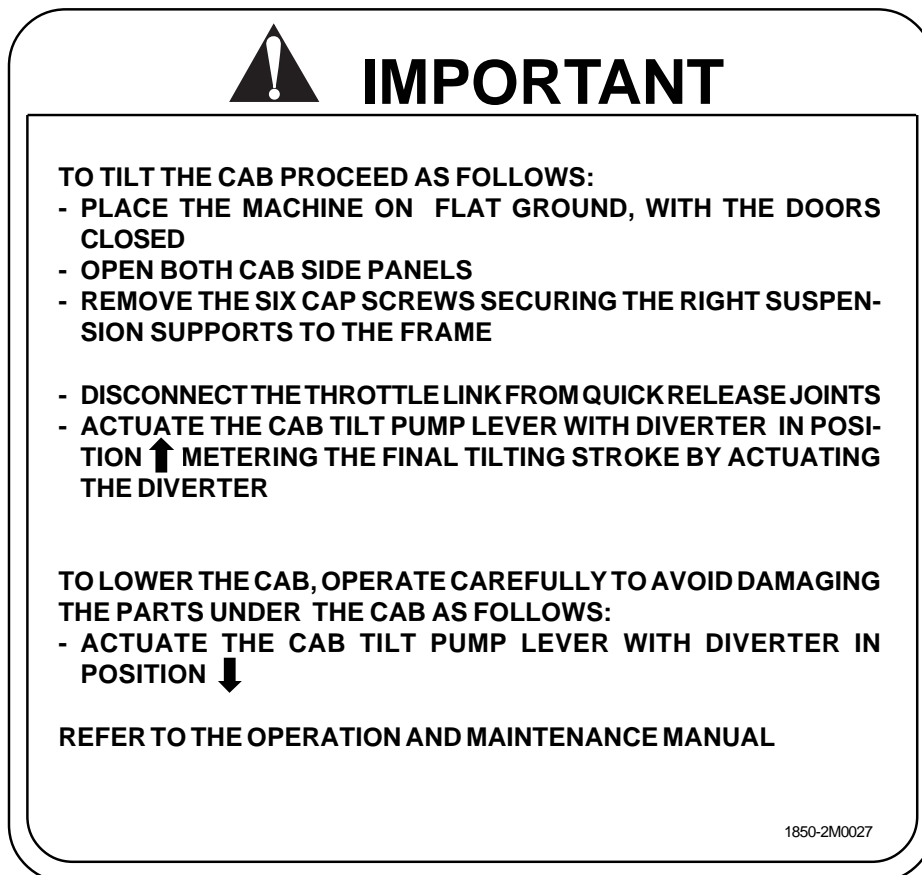
2B



3B



4B

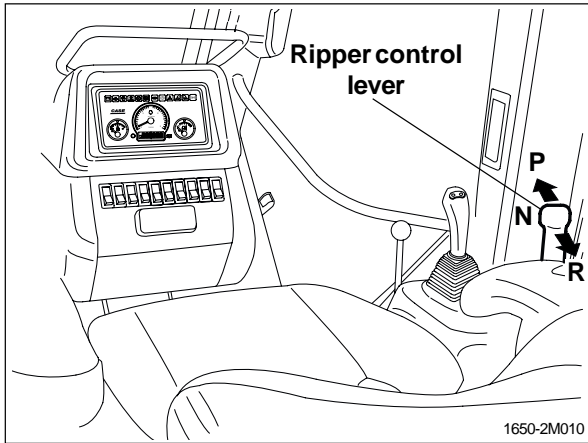


**4. RIPPER CONTROL LEVER (upon request)**

- With lever forward in **P** = ripper lowering
- With lever backward in **R** = ripper raising
- Lever in **N** = neutral

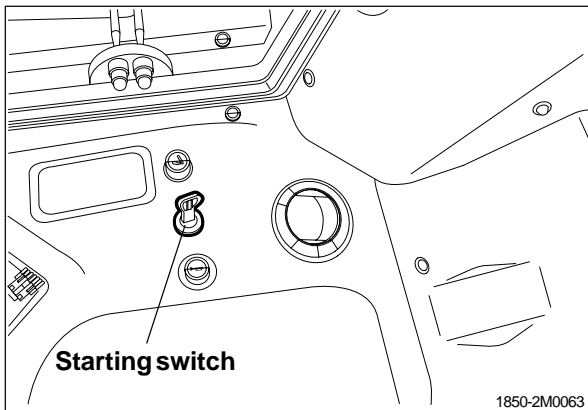


1850-2M0060



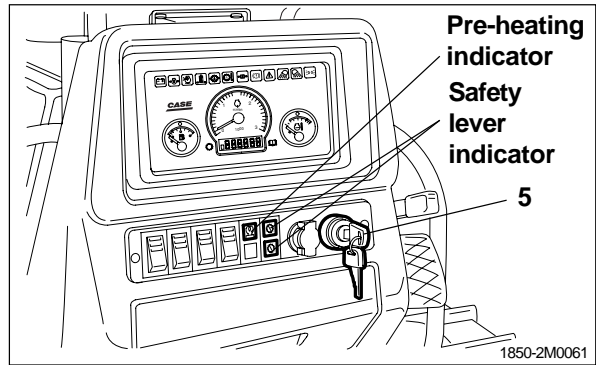
1650-2M010

**5. ENGINE STARTING SWITCH**



1850-2M0063

on CAB



1850-2M0061

on ROPS

**! WARNING**

Prior to starting the engine, make sure that the Joy-stick is in neutral position and that the parking brake is engaged.

The starter switch starts and shuts-off the engine. To actuate it, turn the key:

**Position H:** Operation to be performed only on machines equipped with cold starting device. Arrange the machine as described at point (STARTING THE MACHINE AT COLD TEMPERATURES)

**Engine pre-heating position**

Place the starter key onto "H" position when the temperature is particularly low (less than - 15 °C (5 °F)).

Keep the key in this position for a time sufficient to allow the pre-heating. The time changes depending upon the ambient temperature.

see Table A. In this position, for the entire duration of the pre-heater, the pre-heater indicator light is ON.

**! WARNING**

Do not pre-heat the engine more than 30 seconds, to avoid possible damages to the glow plug.

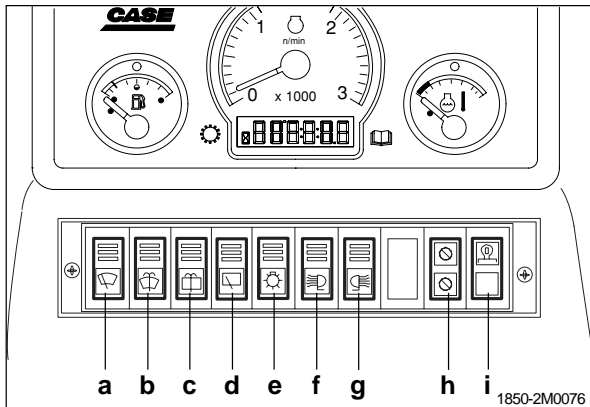
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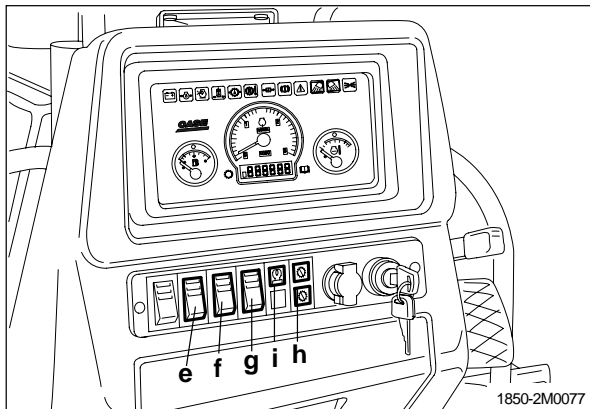


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on CAB



on ROPS

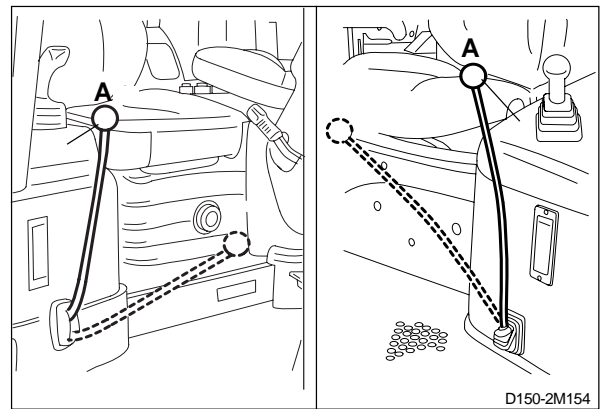
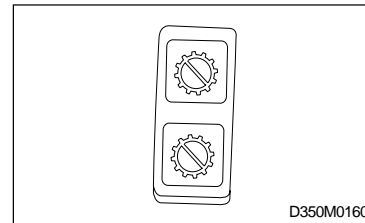
- a. FRONT/REAR WIPER 1 speed SWITCH (with cab only) -
- b. FRONT/REAR WASHER BUTTON (with cab only) -
- c. SIDE DOORS WASHER BUTTON -
- d. SIDE DOORS WIPER 2 speed SWITCH -
- e. LIGHT SWITCH -
- f. FRONT WORK LIGHT ACTIVATION SWITCH -
- g. Rear work light activation switch -
- h. Safety lever indicator -
- i. Pre-heating indicator light.

**g. REAR WORK LIGHT ACTIVATION SWITCH**

**h. SAFETY LEVER INDICATOR**

The indicator lights come ON when the machine is started and the equipment control safety lever (1) and gearshifting safety lever (2) are in raised position (A) (NEUTRAL).

The indicator lights go OFF, when the levers are lowered to operate the machine (Position B).



Position A = NEUTRAL

Position B = operation position

**i. PRE-HEATING INDICATOR LIGHT**

## MOVING THE MACHINE WITH OUTSIDE MEANS

### Towing and recovering the machine

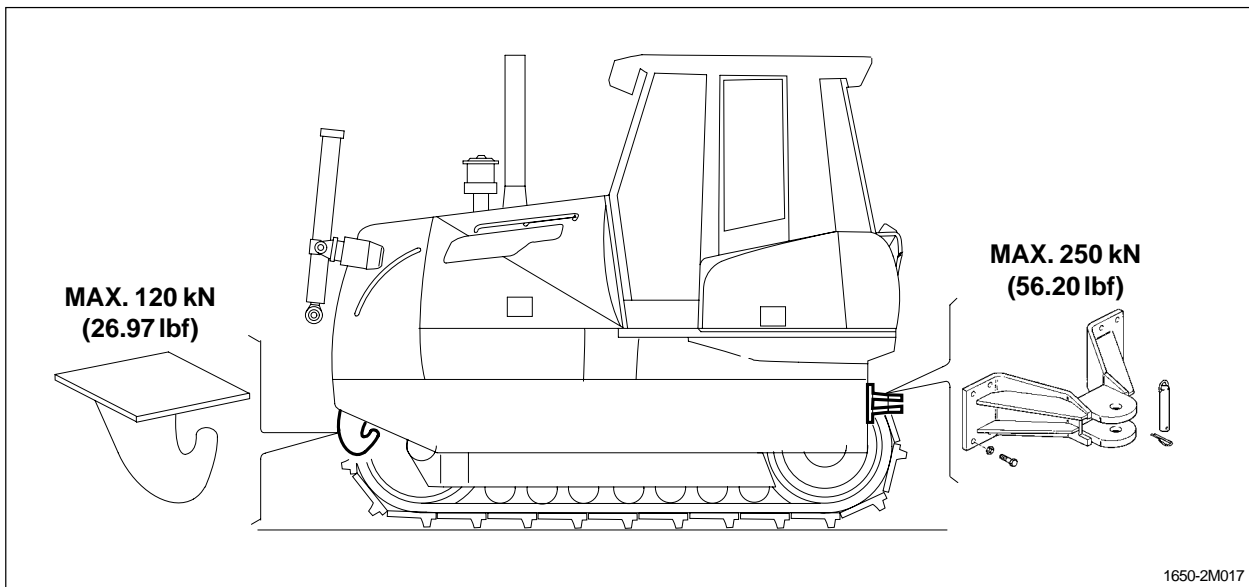
Should the engine fail to start or when the machine must be towed, it is necessary to disengage manually the brakes, as described in chapter "TOWING THE MACHINE" of the Instruction Manual.

For this operation, use equipment or vehicles appropriate for this purpose.

When using cables for towing or recovery, make sure that all parts are in good conditions and are free from defects or troubles.

The maximum allowable load on the rear towing hook is 250 kN (56.20 lbf) (only for machine excluding ripper). The maximum allowable load on the front hook is 120 kN (26.97 lbf).

Cables must be firmly secured; make sure that they are attached to a point strong enough in relation to the effort to be made, which, in any case, must not exceed the maximum allowed value for the towing hook involved.



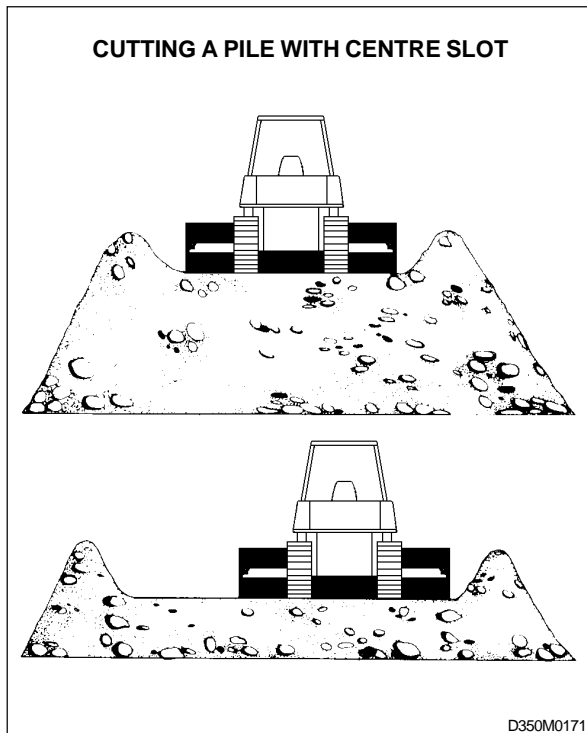
### Operating weight of machine 1650K with 500 mm shoes without ripper

With HS bulldozer blade ..... 14915 kg (32881 lbs)

With PAT blade (6-way) ..... 15677 kg (34561 lbs)

### Weight of machine 1650K LGP with 800 mm shoes without ripper

With PAT blade (6-way) ..... 16810 kg (37059 lbs)

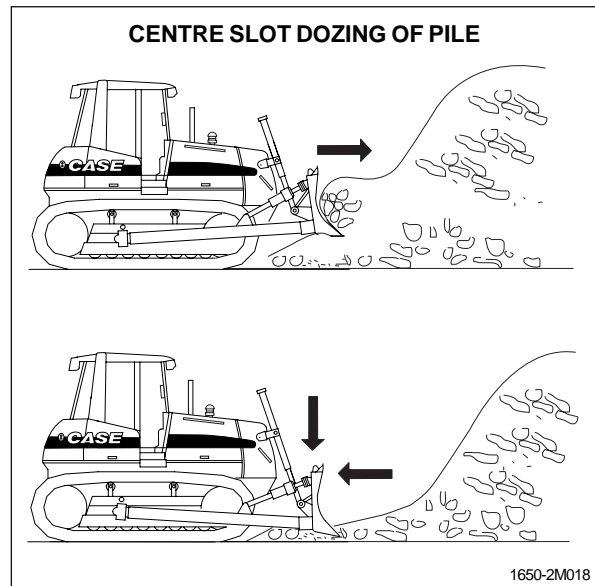


### Going over obstacles

Any obstacle (logs, roots, ridges etc.) must be removed, if possible, or avoided. If this is impossible, crossing must be done very slowly and at an angle so that one track will reach the top and starts to descend on the other side, while the track is still climbing. This method of operation slows down the dropping and decreases the shock against the ground, which could cause damages to the machine and the operator.

If the obstacle is made of soft material it is good practice to sharply turn the machine while crossing, so that the track edges will help cut the material down. When the dozer is operating in heavy work, the tracks often spin, forming small pile of earth near their rear end. Under these circumstances, when reversing direction, it is good practice to move sideways as much as required, to avoid the tracks hitting these windrows.

A ditch may be crossed without danger only if its width is not greater than  $\frac{1}{3}$  the track length and if the track movement will not collapse the banks. To prevent the latter from occurring, move the machine over wooden planks, even if not very strong.



### Hill work

Dozing on side slopes requires special care. Even when the dozer appears to have sufficient margin of safety, the sudden running over an unseen obstacle by the upper track or the lower track moving into a hollow, the machine could tip over.

Chances of this occurring are lessened when the machine is dozing as it is moving along using the load as an additional stabiliser. Also, the machine is stabilised by the low windrow.

Dozing on frozen slopes is hazardous as the grousers act as skates causing the machine to slide uncontrolled downhill. There is a danger of tipping over rocky slopes as well, especially shale with beds parallel to the surface and on soft fills where the lower track sinks deeper than the upper one.

If the machine starts to slowly roll over, sometimes it is possible to prevent the trouble by quickly turning downhill, lowering the blade at the same time.

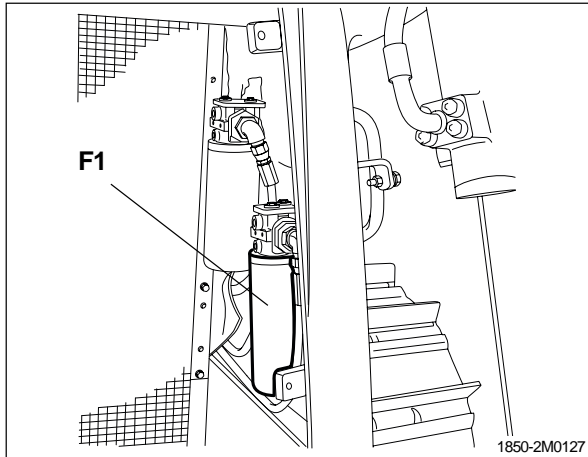
Slopes too steep to be safely worked sideways, sometimes, may, be dozed by operating the machine along it diagonally.

On the other hand, the machine overcomes safely steep slopes downhill. Steering is apt to be tricky on steep slopes, whether up or down, because when one steering clutch is released, the track on that side slips and turns faster and the machine pulls to this side under gravity and might place itself transversally of the grade with the consequent danger of tipping over.



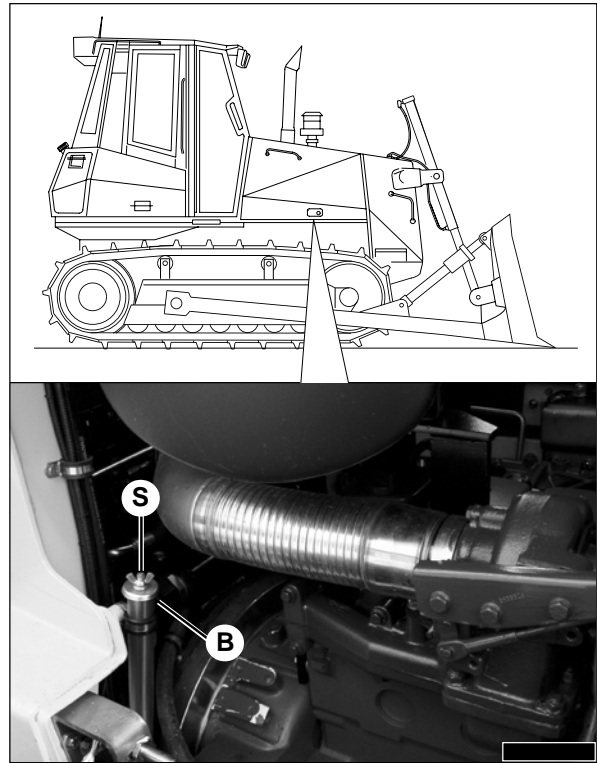
## 16. OIL FILTER ON THE STEERING/BRAKES DELIVERY CIRCUIT - Replace cartridge

1. Clean the support base and the surrounding area.
2. Loosen filter **F1** and replace it with a new one. Before installing a new filter, lubricate the gasket with engine oil, then screw it on the support. After the gasket touches the base, tighten the filter 3/4 turn further. The tightening must be done by hand.



If required, top-off the oil level, as described at point (6) of the MAINTENANCE TABLE.

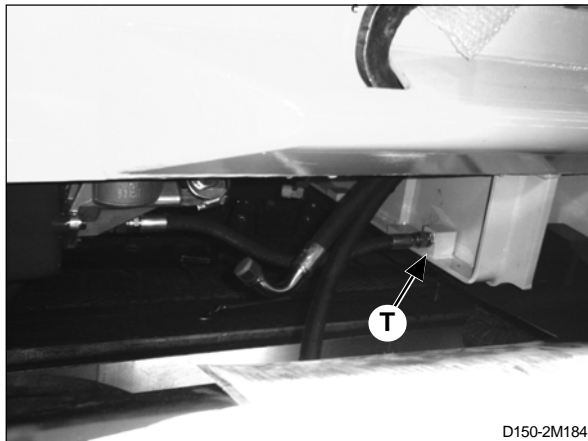
To facilitate the draining, open the engine panel indicated on the right side of the machine. Loosen cap **S** on the transmission oil filler neck **B**.



## 17. TORQUE CONVERTER/TRANSMISSION HYDRAULIC CIRCUIT Change oil and delivery filter cartridge

### Oil draining

Remove plug **T** at the bottom of the machine [using a 10 mm (0.39 in) Allen wrench] and let the oil drain into a container of at least 40 litre (10 ½ US Gal) capacity.



T. Converter/transmission oil draining plug

## Every 2000 hours work

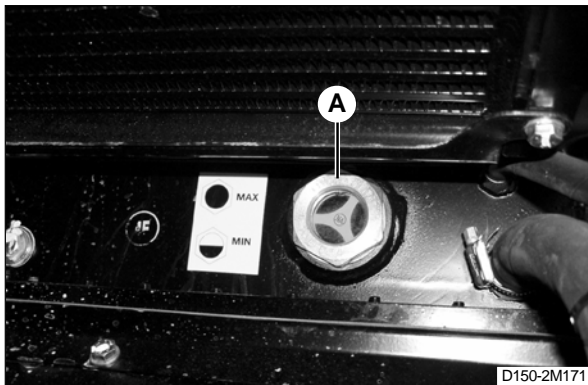
### 32. RADIATOR-Change coolant



**DANGER**

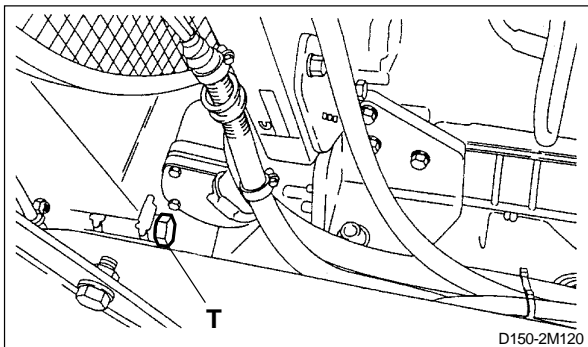
**FLUID UNDER PRESSURE; prior to removing the cap, turn it slowly to relieve the pressure. To avoid burns, do not loosen the radiator cap with an hot engine.**

Open the panel from the upper side of the engine compartment and remove the filler cap located on the radiator.



Change the coolant proceeding as follows:

- with cold engine, drain the coolant from the engine by loosening draining plug **T** at the bottom of the radiator;



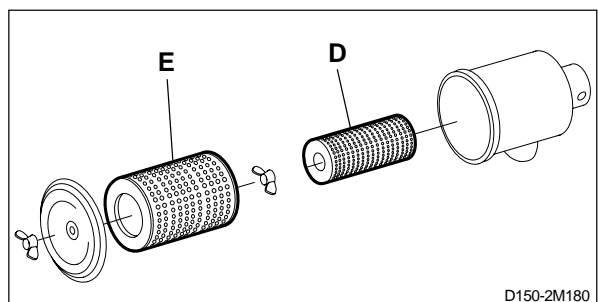
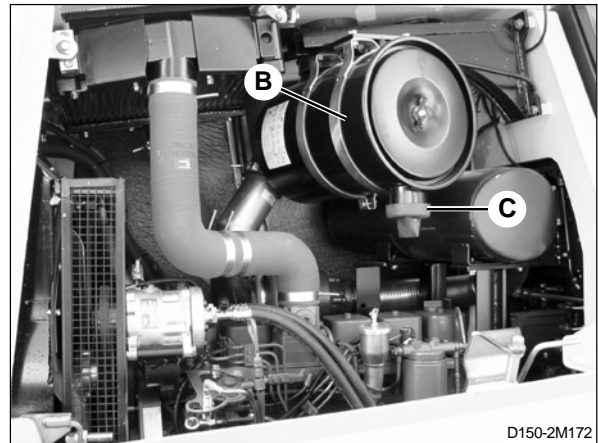
- re-install plug **T** and pour the coolant slowly through the filler neck of the radiator until it fills completely (up to **MAX** level) sight gauge **A**;
- retighten the radiator filler cap;
- start the engine and let it run for a few minutes,
- let the engine cool-off, the top-off the coolant level, through the radiator filler neck.

**Note** – If the engine cooling system is filled with water instead of coolant (having anti-oxidant, anti-scaling, anti-corrosion properties) flush the system as described here after.

- Dilute "Radiator flushing de-scaling product" or an equivalent product in water, following the dosage indicated on the container. Pour the solution into the radiator when the engine is cold.
- Operate the machine with engine at high speed, until it warms-up completely.
- Drain the solution. Wait for the engine to cool-off a little, then run water through the radiator filler neck letting it flush through the lower side of the radiator. Use antifreeze mixed with water at 50% for operation down to - 35 °C (- 31 °F).

### 33. CLOGGED ENGINE AIR CLEANER - Replace cartridges

Open the engine left side panel. Remove the cover from canister **B** loosening the screw. Remove the two filtering elements: one inner **D**, the other outer **E** and replace them.



Before installing the elements, clean inside canister **B** and check that dust discharge valve **C**, located on the lower side of the cleaner, is clean.

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