

Instruction book



TERRI
2040

From 199561010

604732

Foreword

By studying this Manual you will learn how to operate and look after your new Terri 2040. For those of you already familiar with Terri, this Manual also contains certain information which you must know.

Apart from lubrication and simpler maintenance tasks, which you can easily do yourself, you should let your dealer, who has trained personnel, be responsible for the servicing.

We reserve the right to change without previous notice data and equipment, as well as maintenance and other service instructions.

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THT AB
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Tel: +46-224- 341 40
Fax: +46-224-318 95**

Machine type: **TERRI 2040**

Machine nameplate: **Located to the left in the
front of the engine
compartment**

Serial number:

Engine number;

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1	Serial number
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DESCRIPTION

TERRI 2040

Terri 2040 is a articulated-steered off-road tracked vehicle (forwarder), with a load capacity of 1.2 m². *Terri 2040* is a special machine with a wide and versatile range of applications.

A 3-cylinder Kubota D1105 diesel engine with precombustion chamber is used as power source in *Terri 2040*.

Terri 2040 has a hydrostatic/mechanical transmission with a closed hydraulic circuit. The system is driven by a power-limited variable hydraulic pump, which is directly coupled to the diesel engine. In the trailer a high-speed hydraulic motor drives a 2-speed preselector gearbox with mechanical differential lock. The gearbox drives the tracks via two sprocket wheels.

Terri 2040 is easy to operate, having smooth driving characteristics and providing a substantial pulling power in all situations. The closed hydraulic system is just as effective as a brake as a power unit, when, for example, the forwarder is driven with a full load down a slope.

The safety cab is spacious and the controls used during normal work are in easy reach of the driver. The number of functions needed to operate *Terri 2040* has been reduced to a minimum. The driver therefore sits comfortably when both driving and working. The versatile grab-loader is operated with a conventional multi-stick system. Different driver seats with mechanical or air suspension are available.

At the front of the machine there is a built-in winch. This can be used to pull the machine loose or to haul timber from inaccessible terrain.

TRAILER WITH HYDRAULIC DRIVE

The trailer has two low-speed hydraulic motors, which drive the tracks via sprocket wheels. It is equipped with an automatic hydraulic differential brake. An electric switch in the cab is used to engage and disengage the trailer drive. When the trailer drive is disengaged, the hydraulic motors are disconnected at the same time from the load, which enables the trailer to move freely. The highest transport speed is obtained with the trailer drive disengaged and the gearbox in top gear engaged. The trailer has a built-in parking brake, which is operated with an electric switch in the cab. When the diesel engine is stopped, the trailer is automatically braked.

Remember that safety always depends on the driver. Therefore always follow the safety instructions carefully.

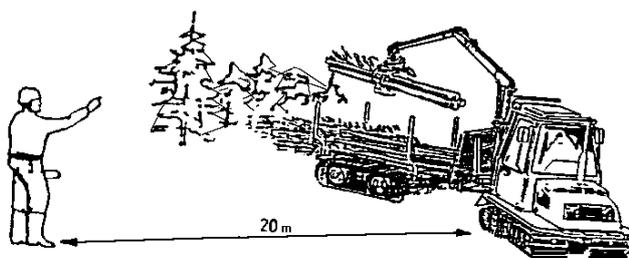
SAFETY

This chapter summarizes the rules, which must always be followed when you are working with *Terri 2040*. These rules do not exempt the driver, however, from taking into account statutory or other valid national regulations and directives concerning traffic safety and industrial safety.

To be on the safe side

Get thoroughly acquainted with *Terri 2040* and its operating instructions.

Don't lend *Terri 2040* to anybody who is not used to operating your machine. You may be held responsible for any injury or damage that may occur.



THE DANGER ZONE IS 20 METRES!

Nobody may stay in the danger zone when the machine is in use.

Terri 2040 does not have any room for a passenger.

Never start the diesel engine, or let it run indoors in premises with closed doors. Warning for carbon monoxide poisoning.

If the *machine* overturns, hold on to the seat or handles. **DON'T JUMP OUT!**

Don't drive the forwarder with a load hanging from the grab-loader.

Before getting out of your *Terri 2040*, lower the gripper, stop the engine and turn off the main switch.

Don't walk or stand under a hanging load.

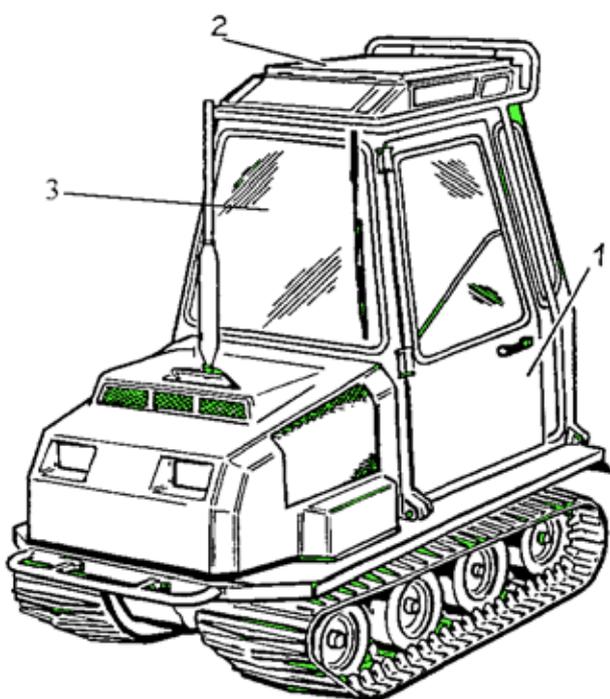
Carry out regularly the maintenance points according to the schedule. Before servicing or checking the machine, always stop the engine.

Familiarize yourself with the emergency exits in the cab:

1. Side doors
2. Roof opening

The safety bolts of the roof opening must be withdrawn when you drive on a lake or river covered with ice.

When checking the level of the fuel tank and the battery electrolyte, never use a naked flame.



If possible, inspect in advance the terrain on the route to be taken, particularly during the winter, when snow may cover unevenness in the ground. Note the slope of the terrain and its influence on the stability of the tractor.

Be aware of the total height of the grab-loader and load, before driving anywhere with height restrictions. Pay particular attention to any temporary structures, sagging overhead lines, etc.

Never load the trailer above the height of the load protection.

Never allow children to stay in the cab or in the vicinity of the machine, when the engine is running.

WORKING CLOSE TO OVERHEAD LINES

When you are working in the vicinity of electric overhead lines, no part of the machine or the load must come closer to the line than the distances given in the following:

Low voltage 2 metres

High voltage <40 kV 4 metres

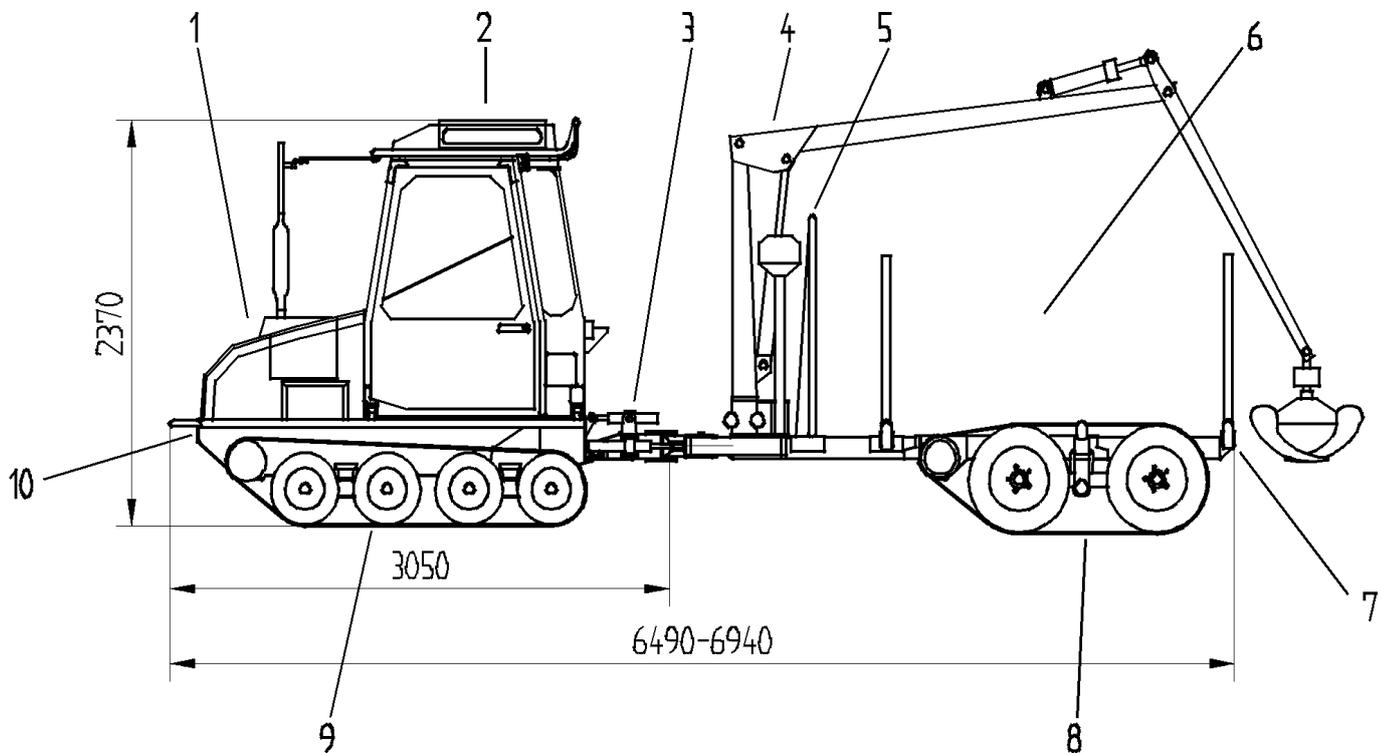
High voltage >40 kV 6 metres

If it is difficult to follow the above-mentioned safety regulations, contact the owner of the overhead line in order to de-energize it. Under no circumstances whatsoever can you rely on good luck when working close to an overhead line. Where applicable, material must be moved by some other means a sufficient distance from the overhead line before it is loaded.

When driving in forests and along forest roads, remember that it is difficult to see an overhead line crossing the route. In addition, the line may be sagging heavily due to snow and ice.

ELECTRICITY DOES NOT NEED ANY DIRECT CONTACT. A HIGH VOLTAGE CAN JUMP ACROSS EVEN LONGER DISTANCES.

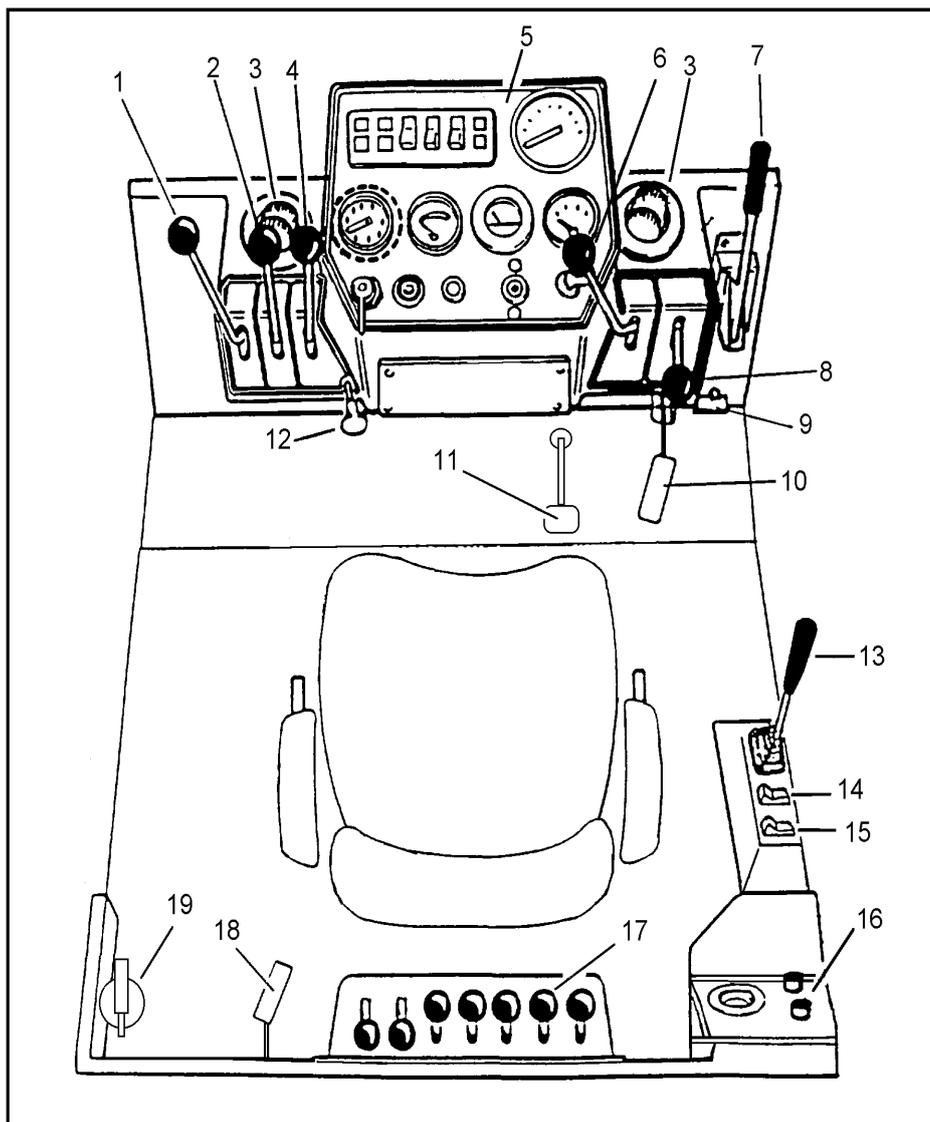
Main components of Terri 2040

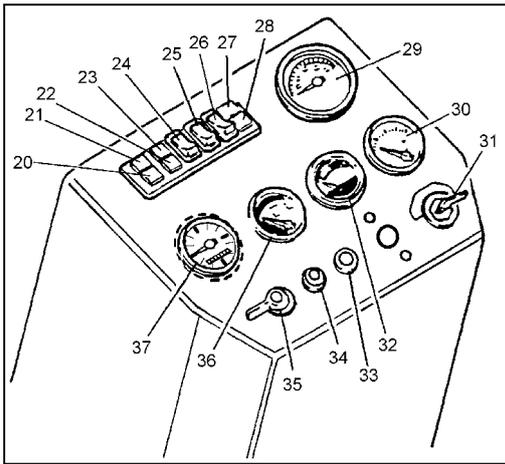


- 1 Drive unit
- 2 Cab
- 3 Pulling bar with support cylinder
- 4 Grab-loader
- 5 Load shifting protection
- 6 Load area
- 7 Trailer
- 8 Track-bogie system
- 9 Track-bogie system
- 10 Winch

Instrumentation and controls

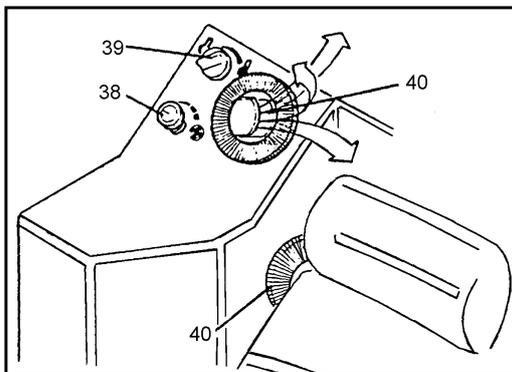
- 1 Load cylinder control lever
- 2 Differential lock (not Sweden)
- 3 Air vents
- 4 Winch lock control lever
- 5 Front dashboard
- 6 Winch control lever
- 7 Parking brake
- 8 Gear shift lever
- 9 Main switch
- 10 Accelerator pedal, front
- 11 Brake (only Sweden)
- 12 Hand throttle (optional equipment)
- 13 Drive lever
- 14 Switch with indicator for trailer drive
- 15 Switch with indicator for trailer parking brake
- 16 Rear dashboard
- 17 Grab-loader controls
- 18 Accelerator pedal, rear
- 19 Fire extinguisher





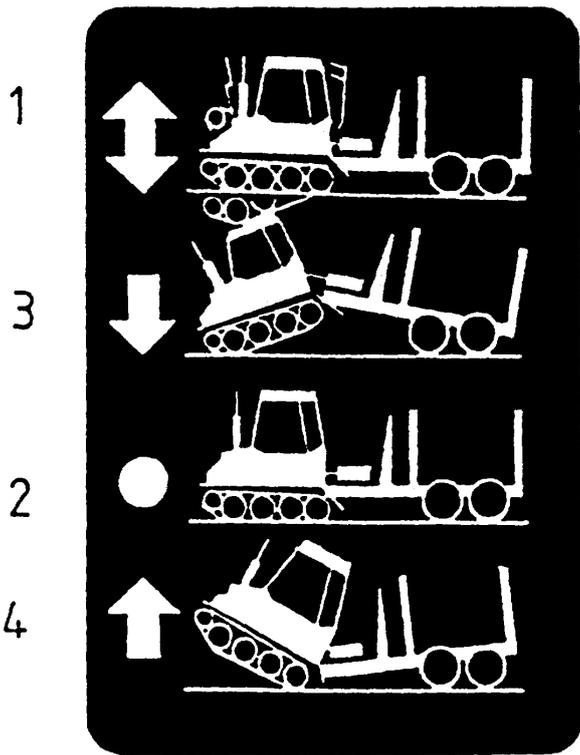
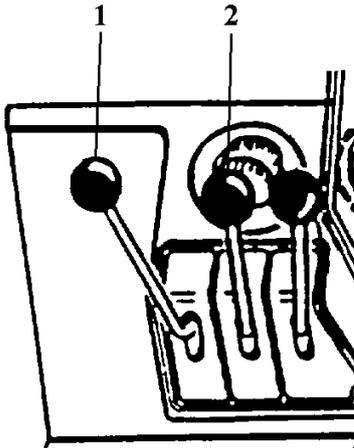
5 Front dashboard

- 20 Warning light for low hydraulic oil level
- 21 Warning light for differential lock engaged
- 22 Indicator for main beams
- 23 Glow plug indicator
- 24 Switch with indicator for main-dipped beams
- 25 Switch with indicator for working lights, side
- 26 Switch with indicator for working lights, rear
- 27 Warning light for low oil pressure in diesel engine
- 28 Charging indicator
- 29 Tachometer
- 30 Engine temperature gauge
- 31 Ignition switch
- 32 Hydraulic oil temperature gauge
- 33 Pushbutton for windscreen washer
- 34 Pushbutton for horn
- 35 Direction indicator
- 36 Fuel gauge
- 37 Running-time meter



16 Rear dashboard

- 38 Ventilation blower control
- 39 Cab heating control
- 40 Air vents



1 Load cylinder

With the help of the load cylinder, which is located between the tractor and the trailer, it is possible to adjust the position of the front of the tractor depending on different situations. The load cylinder is operated with a lever to the left on the dashboard.

Position 1: The lever pushed upwards = the tractor 'moves freely', i.e., the tractor can freely follow the terrain. It is recommended that this position should always be used.

N.B. Spring-loaded locking of the lever in this position!

Position 2: The lever in the mid-position, with spring loading in the centred position = 'locked position'. The position of the tractor in relation to the trailer is locked. It is recommended that this position should only be used during driving in loose snow without any track or when the tractor is driven over a ditch or the like.

Position 3: When the lever is moved forwards, the front of the tractor is lowered. The lever returns with spring loading to the 'locked position' (2), when it is released.

CAUTION! Do not turn sharply when the front of the machine is lowered.

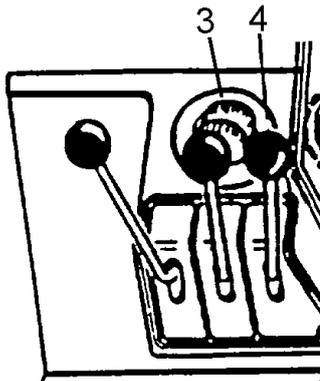
Position 4: When the lever is moved downwards, the front of the tractor is raised. The lever returns with spring loading to the 'locked position' (2), when it is released.

Practical example: Driving over a ditch of normal size:

- Raise the front slightly when approaching the ditch.
- Lower the front before the tractor's bogie has completely crossed the ditch so that the front of the bogie touches the ground on the other side of the ditch.
- Drive the vehicle with the load cylinder in the locked position until the trailer wheels have crossed the ditch.
- Continue to drive the vehicle with the load cylinder in the 'free position'.

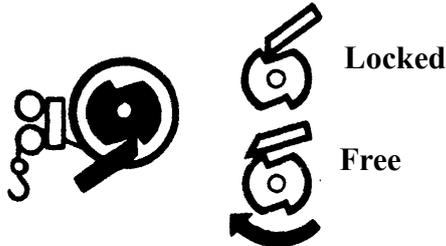
2 Differential lock

The tractor's gearbox is provided with a mechanical differential lock, which is controlled with a lever on the dashboard. When the lever is in its lowest position, the differential lock is disengaged.



3 Front air vents

The direction of the incoming air is controlled with the air vents. The air is directed towards the front windscreen to provide a defroster action.

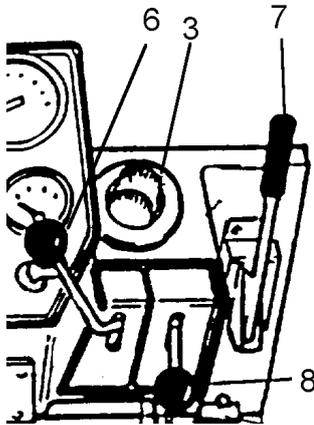


4 Winch lock

The winch lock prevents the wire rope from running out. It is operated with a lever to the left on the dashboard. The winch lock is released when the lever is in its upper position. Release the winch lock and draw out the wire rope.

N.B. Wear protective gloves!

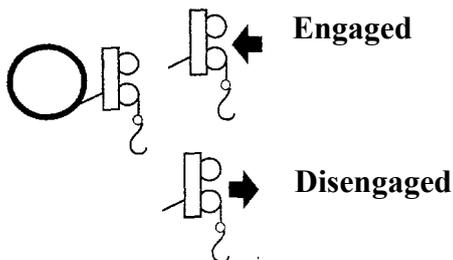
N.B. Never drive backwards with the drive lever while using the winch! This may damage the gearbox.



6 Winch

The winch is operated with a lever to the right on the dashboard. When the lever is in the upper position, the gear in neutral, the trailer drive disengaged, the drive lever forwards and the accelerator pedal is pushed, the wire rope is wound up on the drum.

N.B. Never drive backwards with the drive lever while using the winch! This will cause the wire rope to be wound up in the wrong direction on the winch drum.



7 Parking brake

This lever actuates a mechanical brake yoke. When the lever is moved backwards, the machine is braked. The lock is released with the button at the end of the lever.

8 Gear shift lever

Two gears can be selected with the lever. If the lever is moved upwards, the low gear is engaged, while if the lever is moved downwards, the high gear is engaged. When the lever stands in the middle, the gearbox is in neutral.



9 Main switch

All the power supply is disconnected with the main switch.

N.B. Never open the main switch when the engine is running!

10 Accelerator pedal, front

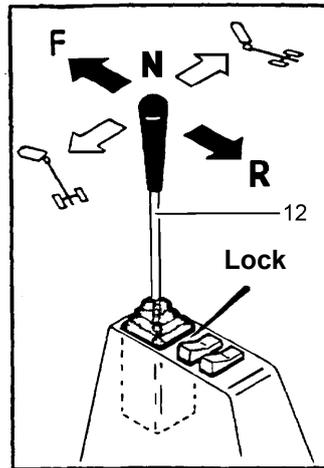
The engine speed is controlled with the accelerator pedal during driving.

11 Brake pedal

The machine is braked with the brake pedal.

12 Hand throttle (optional equipment)

The engine speed can be set with the hand throttle.
Rough setting: press the button and withdraw it.
Fine setting: turn the knob.



13 Drive lever

The driving direction and steering are controlled with the drive lever.

When the drive lever is moved forwards, the machine goes forwards.

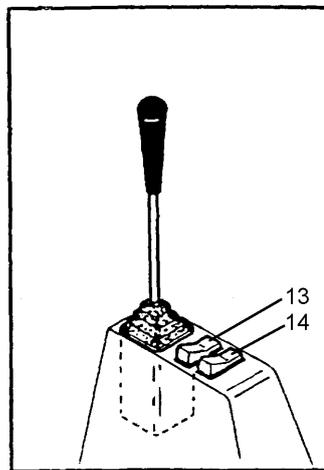
When the drive lever is moved backwards, the machine goes backwards.

When the drive lever is moved to the right, the machine turns to the right.

When the drive lever is moved to the left, the machine turns to the left.

The steering does not automatically return to 'straight forwards' but must be moved back with the drive lever.

The drive lever can be locked in the neutral position with the lock.



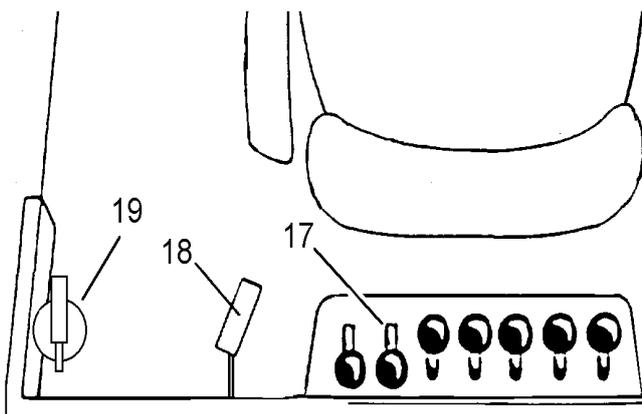
14 Trailer drive

The trailer drive is engaged and disengaged with the switch. The indicator shines when the trailer drive is engaged.

15 Trailer brake

The trailer brake is applied and released with the switch. The indicator shines when the trailer brake has been applied. When the oil pressure drops below 10 bar, the trailer brake is automatically applied.

N.B. The trailer brake is a parking brake. Always release the trailer brake when driving the machine; the brake may otherwise be damaged!



17 Grab-loader controls

See separate instruction manual.

18 Accelerator pedal, rear

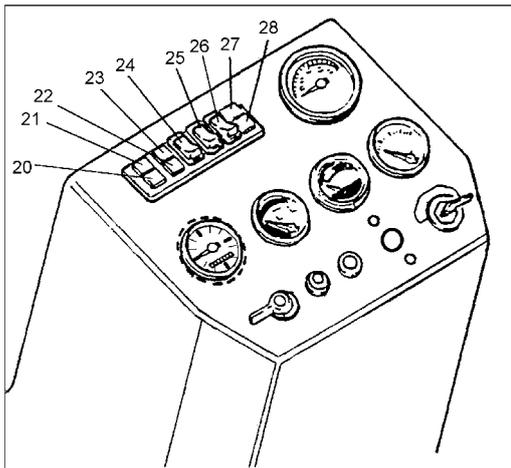
The engine speed is controlled with the accelerator pedal during operation of the grab-loader.

19 Fire extinguisher

The fire extinguisher is a 2 kg powder extinguisher. See the extinguisher instructions regarding its use.

Regularly check that the extinguisher's pressure gauge needle stands in the green field.

When the hydraulic oil level drops to the minimum level, the warning light shines.



20 Warning light for low hydraulic oil level

When the hydraulic oil level drops to the minimum level, the warning light shines.



21 Warning light for differential lock

The indicator shines when the differential lock is applied.



22 Indicator for main beams

The indicator shines when the main beams are switched on.



23 Glow plug indicator

The indicator goes out when the heating is ready.



24 Light switch

The headlights are turned on, and the change-over between dipped and main beams is made with the switch. The indicator shines when the dipped beams are switched on.



25 Working light switch, sides

The working lights on the sides are turned on with the switch. The indicator shines when the lighting is turned on.



26 Working light switch, rear

The working light on the rear is turned on with the switch. The indicator shines when the lighting is turned on.



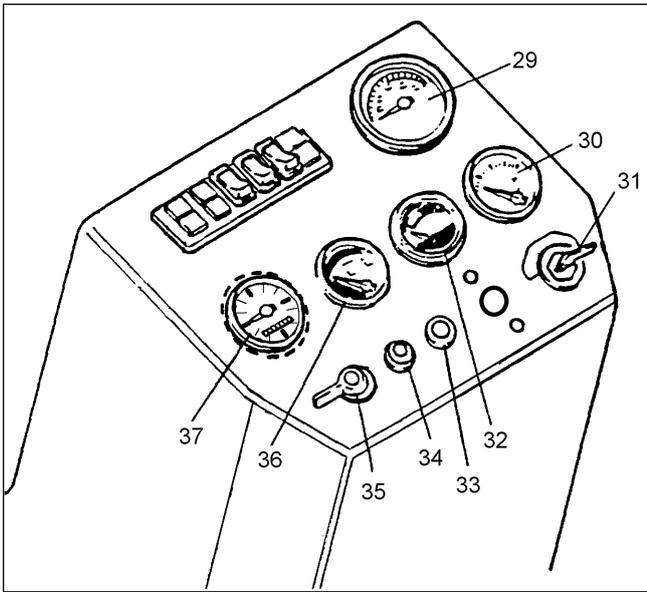
27 Warning light for oil pressure in the engine

The warning light goes out when the engine starts. When the oil pressure drops below 0.5 bar, the warning light shines. You must then immediately stop the engine, investigate the cause and remedy the fault before starting the engine again.



28 Charging indicator

The indicator must be extinguished during normal running. If the indicator shines, there is some electrical fault, which must be investigated and remedied.



29 Tachometer

The tachometer shows the engine speed.

30 Engine temperature gauge

The temperature gauge shows the temperature of the engine cooling water. The normal operating temperature is about 90 °C.

31 Ignition switch

The ignition switch has four positions: OFF-ON-GL-ST:

OFF = locked

ON = unlocked

GL = glow plugs (sprung)

ST = start (sprung)

32 Hydraulic oil temperature gauge

Shows the temperature of the hydraulic oil.

33 Pushbutton for windscreen washer

When the button is pressed, water is sprayed on to the windscreen.



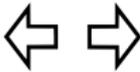
34 Pushbutton for signal horn

When the button is pressed, the signal horn sounds.



35 Direction indicator control

If the knob is moved to the left, the left-hand indicator flashes. If the knob is turned to the right, the right-hand indicator flashes. The light shines when the direction indicator is switched on.



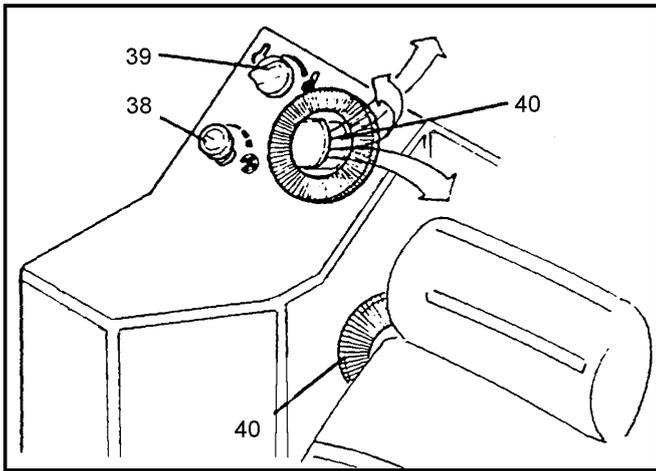
N.B. If a direction indicator bulb fails, the light flashes more quickly!

36 Fuel gauge

Shows the level of fuel in the fuel tank.

37 Running-time meter

Shows the running time of the machine. When the engine is running, the meter functions.



38 Ventilation blower control

The control has three positions: OFF-LOW-HIGH.

39 Cab heating control

The heating control is steplessly adjustable. When the knob is moved to the left, the heating is switched off. When the knob is moved to the right, the maximum heating is obtained.

40 Air nozzles

Used for directing the flow of incoming air. To obtain the maximum defroster effect, direct the air flow towards the windscreen.

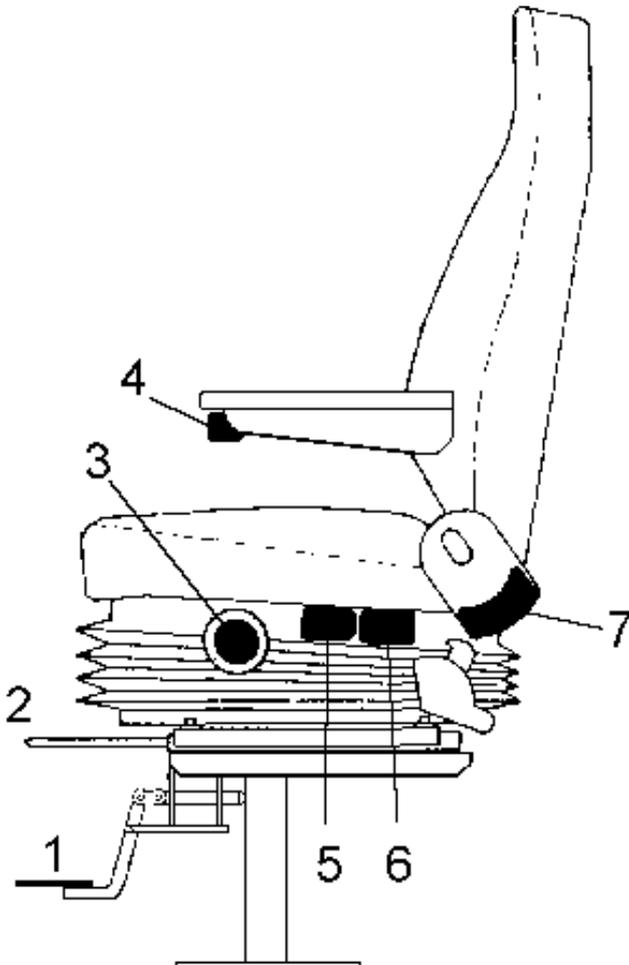
Driver's seat

Turning of the driver's seat

The driver's seat can be turned and fixed in three positions: forwards for driving, 60 degrees to the left for entering and getting out, and backwards for operating the grab-loader. The seat is released with the foot pedal 1.

Adjustment of driver's seat

The seat is moved forwards-backwards with the lever 2 and the height is adjusted with control 3. The vertical suspension of the seat is adjusted with the crank 4. The suspension can be read off on the scale; the set value shall correspond to the weight of the driver. The horizontal suspension of the seat can be locked with the lever 5. The angle of the seat back can be adjusted with control 6.



DRIVING INSTRUCTIONS

Routine check before starting the engine

- Make certain that the accelerator pedal automatically returns to the idling position.
- Make certain that the drive lever is in the mid-position and that the winch is disengaged.

Starting of cold engine

Turn the ignition switch to the drive position (ON). Warning lights for charging and oil pressure shine. Turn the switch to the 'glow plug' position (GL). When the indicator is extinguished, turn the switch to the start position (ST).

Make certain that the ignition switch automatically returns to the 'drive' position (ON), when the engine has started.

Don't run the starter motor continuously for more than 10 seconds at a time. Repeat the heating with the glow plugs before the next starting attempt.

Starting of warm engine

No heating with the glow plugs is required for the starting of a warm engine. Turn the ignition switch direct to start (ST).

Starting during cold weather

At extremely low temperatures it may prove necessary to use the glow plugs twice at an interval of 15 seconds. A full throttle gives the injection pump the maximum amount of fuel.

Engine heater (option)

During cold weather there may be reason to use an electric or diesel-powered engine heater to heat the engine's cooling water.

Warming up before driving

The engine requires about 4 to 5 minutes' warming up, before you can start to drive the machine. Avoid engine speeds exceeding 1,500 r.p.m. before the hydraulic oil has become warm. Drive with the gearbox in neutral and the trailer drive disengaged.

STOPPING OF ENGINE

Allow the diesel engine to slow down to the idling speed and turn the ignition switch to the position 'OFF'.

CAUTION! *Don't stop the engine when it is running at high speed and is warm.*

When you leave the machine

Turn off the main switch and take the ignition switch with you when leaving the machine. In this way you make certain that all the electrical loads are disconnected and that unauthorized persons cannot start the machine.

DRIVING

Driving

N.B. Check that the load cylinder's lever is in the upper position, 'free position'. The gearbox used in Terri is of preselector type with two speeds. This means that gear changes can only be made when Terri is at a standstill.

- Release the brakes
- Move the load cylinder lever to the 'free position'
- Engage the gears (low/high)
- Select the driving direction with the drive lever
- Increase the engine speed with the accelerator pedal

Stopping of machine

The machine stops when the accelerator pedal returns to the idling position or the drive lever is moved to the mid-position. When the drive lever is in the mid-position, the hydraulic circuit is closed and the tracks do not rotate. (See the text about the brakes.)

MAINTENANCE

The preventive maintenance which you yourself carry out is the most important form of care. It involves lubrication and various checks and adjustments.

Most of these service measures are easy to perform and do not require any detailed explanation. In some cases, however, more detailed instructions are needed, as described in the following.

DIESEL ENGINE

Running in

Observe the following during the running-in period. Change the engine oil and oil filter after 50 hours of service. Never run the machine when it is cold, but first let the engine and the hydraulic oil become warm.

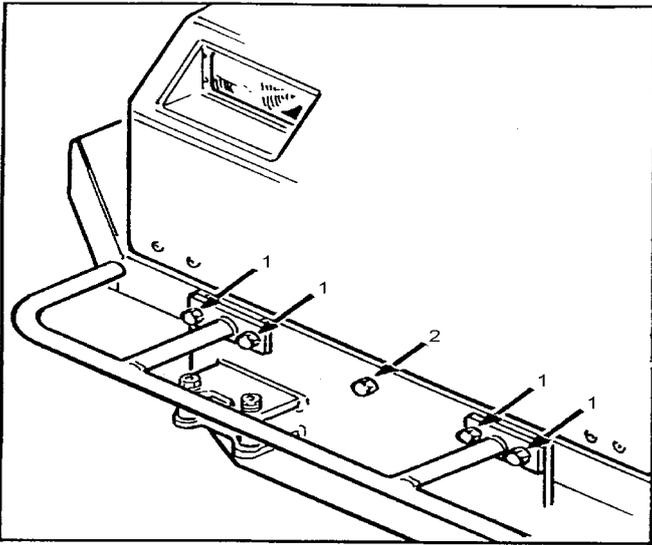
Measures during cold weather

Under winter conditions with temperatures below 0°C observe the following:

- Make certain the cooling water has sufficient anti-freeze protection according to the instructions on page 22.
- Use oils recommended for winter use, see page 34.
- Fill the fuel tank after finishing your work to prevent the formation of condensation water in the tank.

Valve mechanism

Check the valve clearance after every 800 hours of service. If necessary, adjust the clearance. This valve adjustment must be carried out by an authorized service centre.



Checking of oil level

Check the oil level daily. The oil level shall lie between the marks on the dipstick (4). Top up if necessary. See page 34 regarding oil grades.

Changing of engine oil

Change the engine oil after every 100 hours of service.

Run the engine so that it becomes warm.

Slacken the bolts (1) of the undershield by the bumper, take out the bolt (2) in the middle and lower down the undershield and withdraw it.

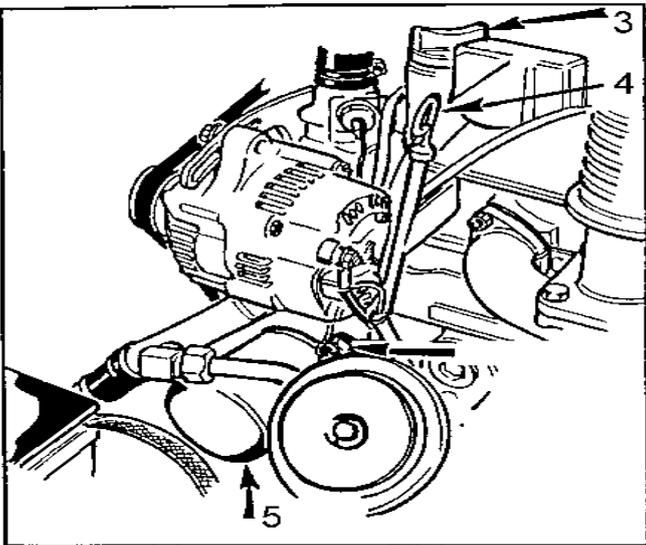
Place a suitable container between the tracks.

Open the drain plug through the hole in the bottom and let the oil run out.

Replace the drain plug and fill new oil through the oil filling opening (3). See page 34 regarding the amount of oil needed.

Check the oil level with the dipstick (4).

Replace the undershield.

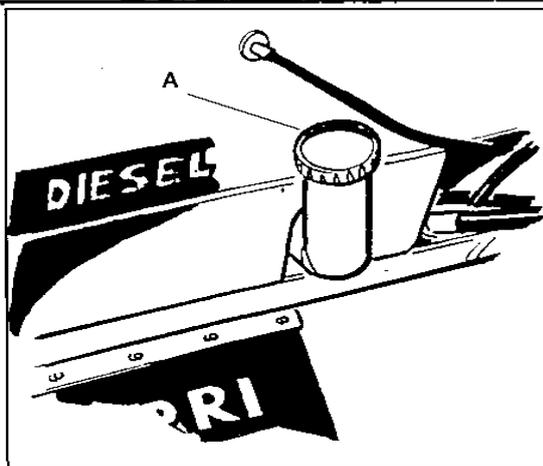
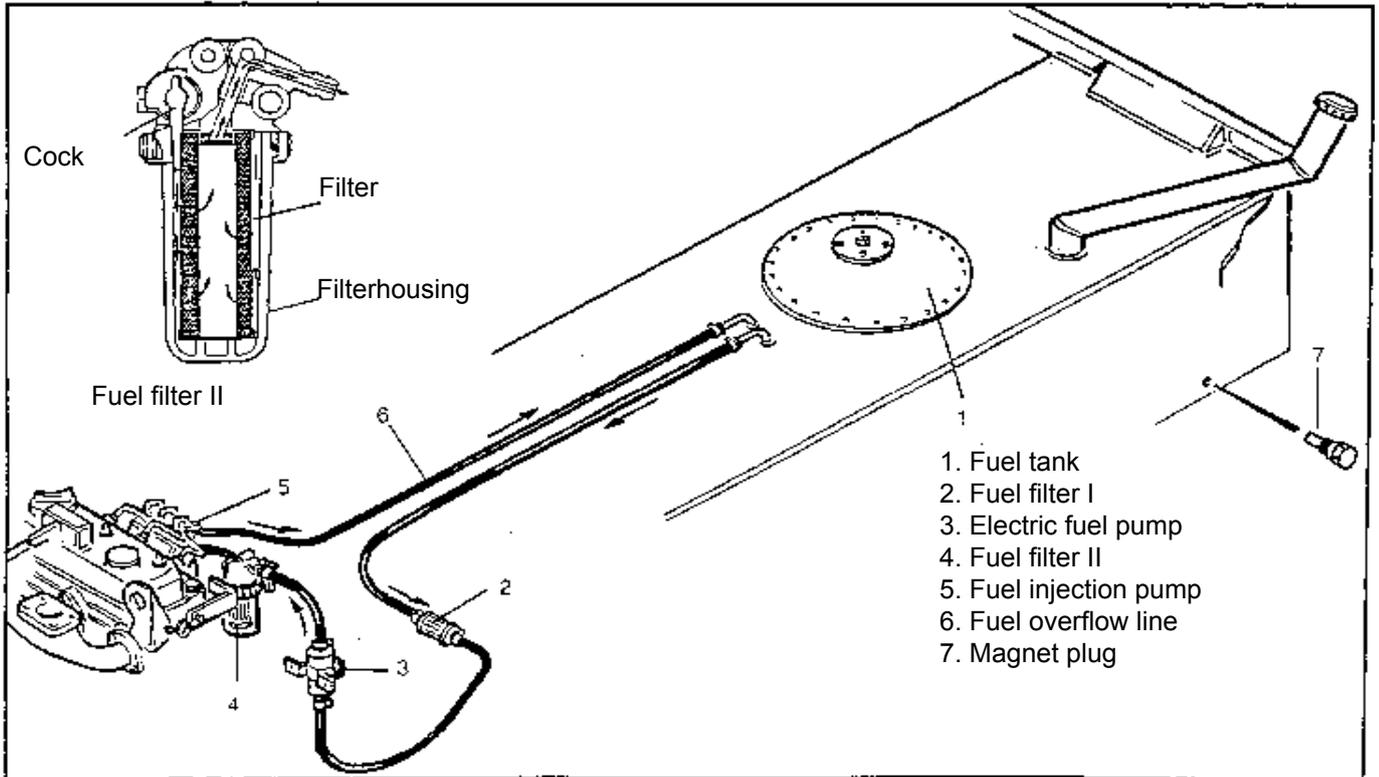


Changing of oil filter

Change the oil filter (5) after every 200 hours of service. Unscrew the old filter, smear the washer of the new filter with engine oil and tighten the filter by hand.

FUEL SYSTEM

The fuel system consists of the fuel tank (1) located in the rear part of the chassis, a pre-filter (2), an electric fuel pump (3), a water separator/filter (4) and a fuel injection pump (5), which distributes the fuel to the different cylinders via injector nozzles in the cylinder head.



Filling of fuel

Fill the tank with fuel at A located behind the cab.

IMPORTANT! *Observe great care with the fuel. Make certain that there is no water present in the fuel or that snow enters the fuel tank. Always filter the fuel to prevent the ingress of particles in the fuel system. Both water and particles of dirt damage the fuel injection pump.*

Changing of fuel filter I

The pre-filter is of disposable type and shall be changed at least every autumn before the cold weather starts.

Changing of fuel filter II

The filter element in the water separator is of disposable type and shall be changed after every 400 hours of service.

Carry out the following:

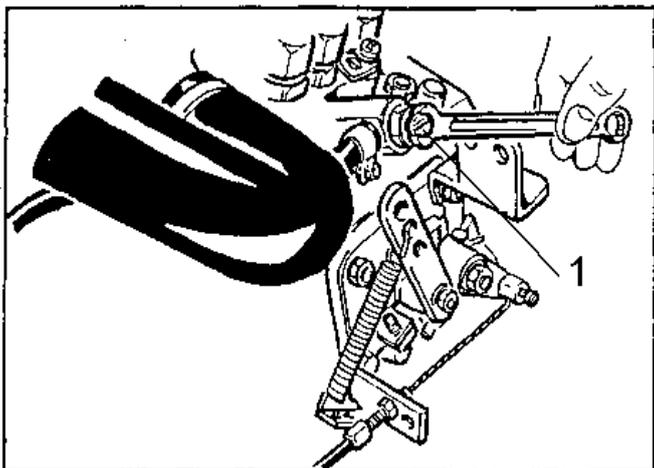
Close the fuel cock of the filter.

Unscrew the filter housing and dispose of the fuel and any water.

Take out the filter element and insert a new one.

Screw on the filter housing.

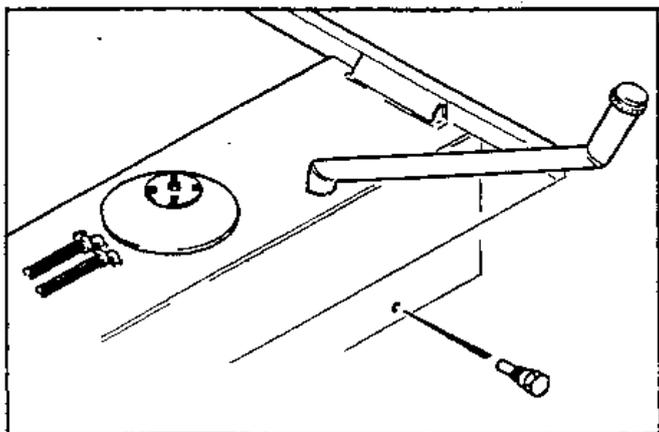
Open the fuel cock.



Bleeding of fuel system

If the fuel runs out or any fuel hose has worked loose allowing air to enter, the fuel system must be bled. Open the bleed screw (1) on the fuel injection pump, and turn the spanner so that the electric fuel pump then feeds fuel. Tighten the bleed screw as soon as there are no air bubbles visible in the fuel flowing out.

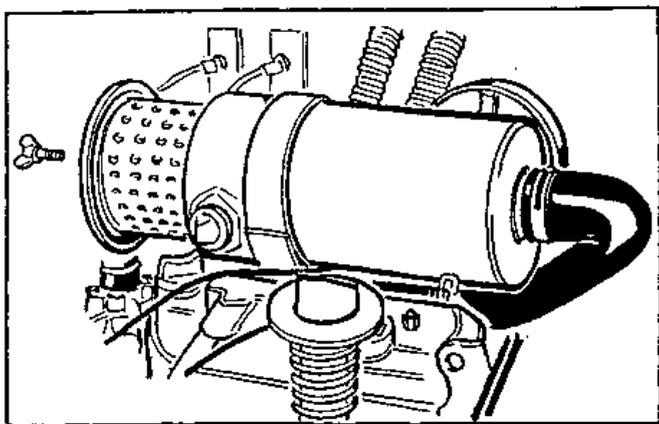
If the engine fails to start, loosen the pressure lines at one distributor at a time and run with the starter motor until fuel free from air is sprayed out. Then tighten the pressure line bolted joints.



Fuel tank

Drain and clean the fuel tank once a year to prevent the ingress of any condensation water in the fuel injection pump.

Tilt the machine to the left and remove the magnet plug. This magnet drain plug is located to the left, behind the rear bogie axle.



AIR FILTER

The air filter prevents the ingress of dust and other impurities in the engine. The engine wear is highly dependent on the cleanliness of the intake air. It is therefore extremely important to inspect the filter at regular intervals and to look after it in the correct way.

Do not run the diesel engine under any circumstance without the air filter or with a damaged filter. Check that the hose between the air filter and the engine intake is tight.

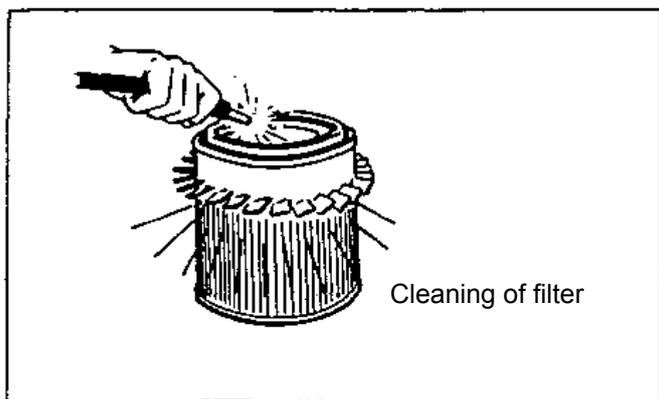
The air filter is located at the top of the engine. It is of the dry filter type with a paper filter element.

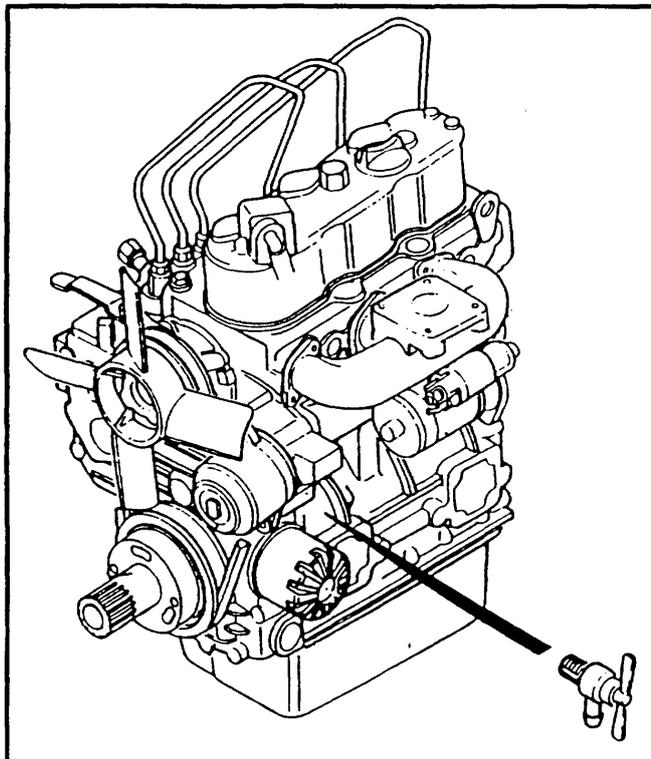
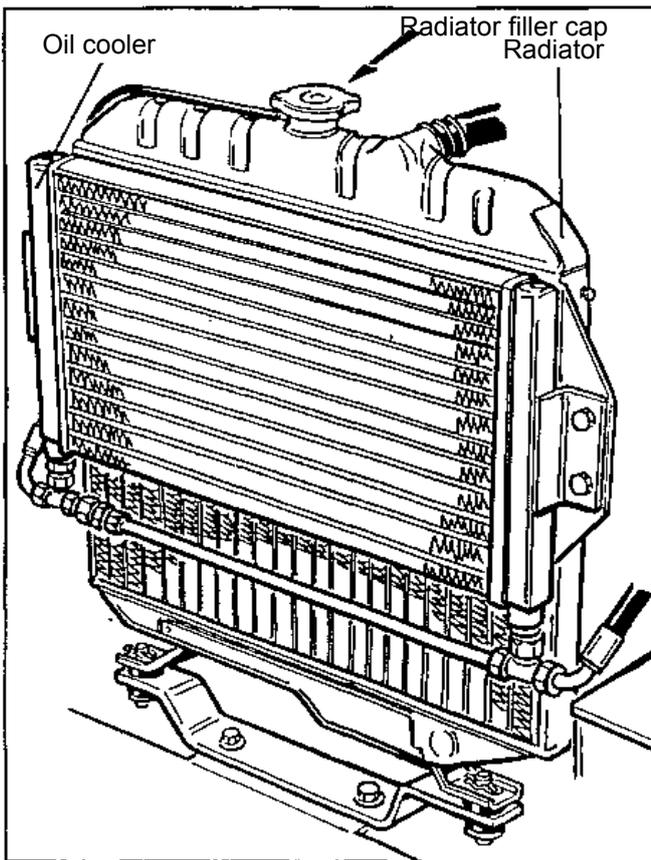
Cleaning and changing of the air filter

Clean the filter element after every 150 hours of service, e.g., with compressed air, see the illustration.

Change the filter element after every 400 hours of service.

- Open the engine hood.
- Detach the air filter from its support.
- Unscrew the wing nut at the end of the air filter and take out the filter element.
- Clean it or change it.
- Replace in the reverse order.





COOLING SYSTEM

The cooling system consists of a radiator with fan and air outlet on the right-hand side of the engine, a circulation pump and thermostat in the engine, and hoses and ducts. It contains about 4 litres of coolant.

On delivery from the factory the machine is provided with an anti-freeze mixture having a freezing point of -35°C . The ability of the anti-freeze mixture to prevent the formation of rust in the cooling system decreases with time. Replace the anti-freeze mixture once a year, at the start of each winter. Don't forget to flush the cooling system thoroughly, before filling the anti-freeze mixture.

CAUTION!

The system functions with an excess pressure. Therefore open the radiator filler cap with care when the engine is warm and gradually release the pressure before opening the cap. The hot escaping coolant may scald your hands.

Tensioning of fan drivebelt

Check at regular intervals that the fan drivebelt is correctly tensioned, see the section 'Electricalsystem'

Draining

A drain cock for the cooling system is located in the cylinder block on the front of the engine.

Filling

The coolant is filled through the radiator filler cap on top of the radiator. The system has a capacity of about 4 litres.

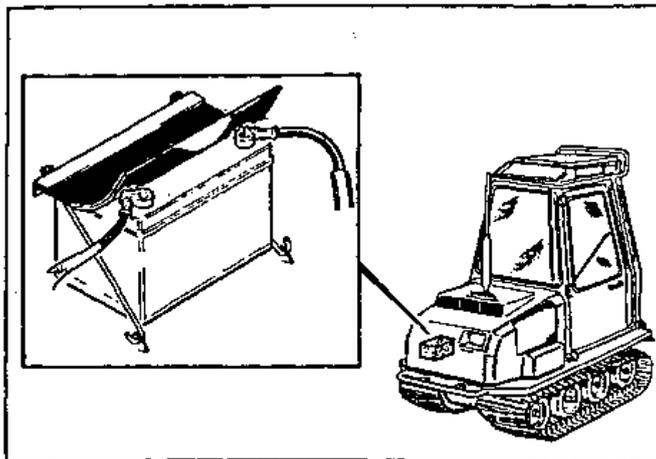
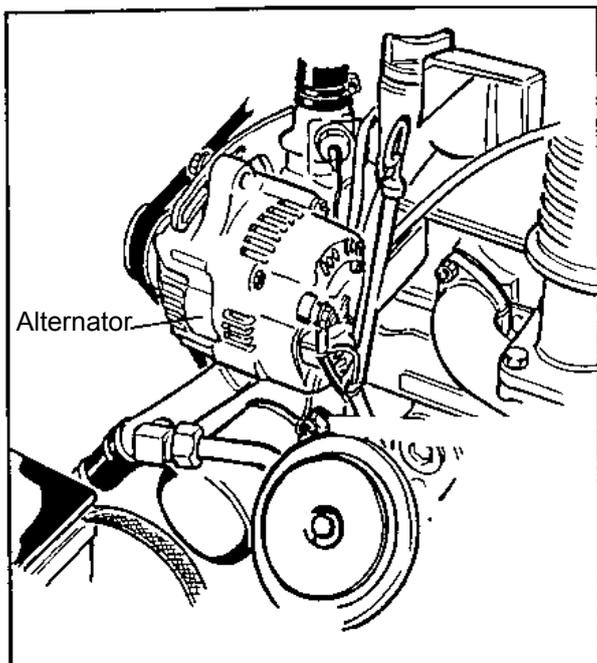
Never fill a warm engine with cold coolant. The amount of coolant is correct when the level of the liquid lies 20 mm below the filler cap. Check the level of coolant and clean the air intake daily.

ELECTRICAL SYSTEM

Terri 2040 is equipped with a 12 V electrical system of negative earth type.

Alternator

The machine is provided with an alternator, which charges the battery. It is located on the left-hand side of the engine, at the front of the machine. The alternator is driven by the fan drivebelt.



The fan drivebelt is correctly tensioned when it can be pushed down with firm thumb pressure (10 kgf) 7 - 9 mm between the alternator and the crankshaft. The drivebelt is tensioned by slackening the screw on the tensioner bracket and pushing forward the alternator. Lock the adjusting screw when the correct tension has been obtained. Check the fan drivebelt

tension once a week or after every 50 hours.

N.B. When the diesel engine starts, the charging indicator shall go out. If the indicator does not go out, the fan drivebelt may not be correctly tensioned.

Battery

The battery is located to the right in front of the engine. Check weekly that the battery electrolyte level is about 10 mm above the plates. If the level is too low, top up with distilled water. Check that the cable shoes and terminal posts are clean, tightened and smeared with grease.

Check the state of charge of the battery with a hydrometer. During the winter it is particularly important that the battery is not discharged, since the electrolyte in a discharged battery freezes and the battery will be destroyed.

Disconnection of battery

The alternator system is sensitive to wrong connection and therefore the following instructions must be observed.

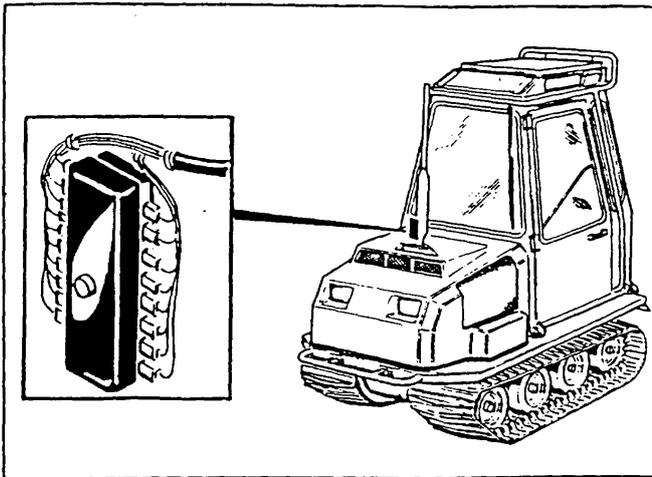
The battery and alternator leads must not be disconnected while the engine is running. A fault may then occur in the alternator. Detach and isolate the two battery cables before doing anything with the alternator equipment.

Connection of the battery

The battery terminal posts must not be mixed up. A + or - sign is punched on the respective terminal post. If a wrong connection is made, the alternator's rectifier will be destroyed. When connecting up the battery, always connect the battery cable to the chassis last.

Quick charging

Do not use a quick charging set when the alternator is connected to the battery. The alternator's rectifier may then be destroyed.



Electric welding

If electric welding is to be done on the machine or equipment coupled to the machine, both battery cables must be disconnected.

Connect the return lead of the welding set as close as possible to the location of the weld.

Jump starting with booster battery

When jump starting with a booster battery, observe the following. Check that the booster battery has the correct voltage. Let the battery in Terri remain connected up. Connect the jump lead from the positive (+) pole on the booster battery to the positive (+) pole on the Terri battery, and then connect the other jump lead from the negative (-) pole on the booster battery to the negative (-) pole on the Terri battery.

When the engine has started, first remove the jump lead between the positive (+) poles and then the jump lead between the negative (-) poles.

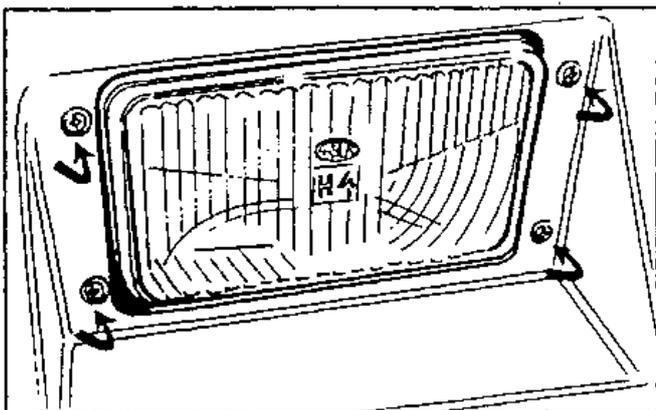
Caution! Due to the current inrush the batteries may burst if a fully charged battery is wrongly connected to a fully discharged one.

Fuses

The fuses protect the electrical circuits against overloading. The fusebox is located to the right, below the engine hood.

LIST OF FUSES

- 1-3. Spare
4. Engine stop coil
5. Trailer drive, Trailer brake
6. Main beams
7. Dip beams
8. Position light, left-hand, tail light, cab, tail light trailer, right hand, instrument panel lights
9. Position light, right-hand, rear light trailer, right-hand, instrument panel lightning
10. Signal horn, working light, rear, rotating warning light
11. Working lights, side
12. Fuel pump, stop lights, ventilation blower, windscreen washer, direction indicators, windscreen and rear window wipers, oil level light, oil pressure light, differential lock light, oil temperature gauge, fuel gauge, cooling water temperature gauge



Adjusting of headlights

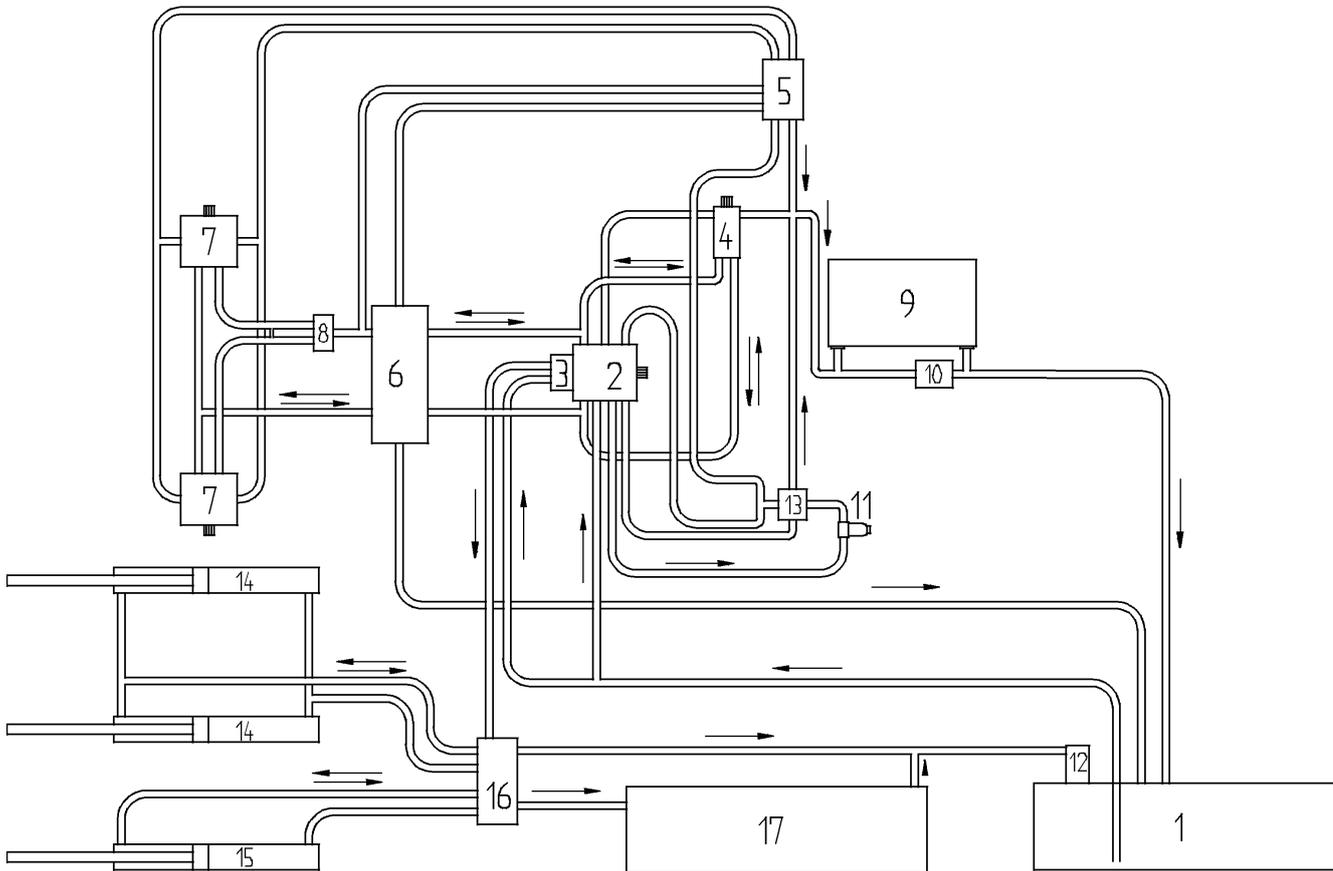
The headlights are secured with four fixing screws, which at the same time serve as adjusting screws. When the lower screws are slackened, the light beam is lowered. When, for example, the left-hand screws are tightened, the light beam moves to the left.

HYDRAULIC SYSTEM

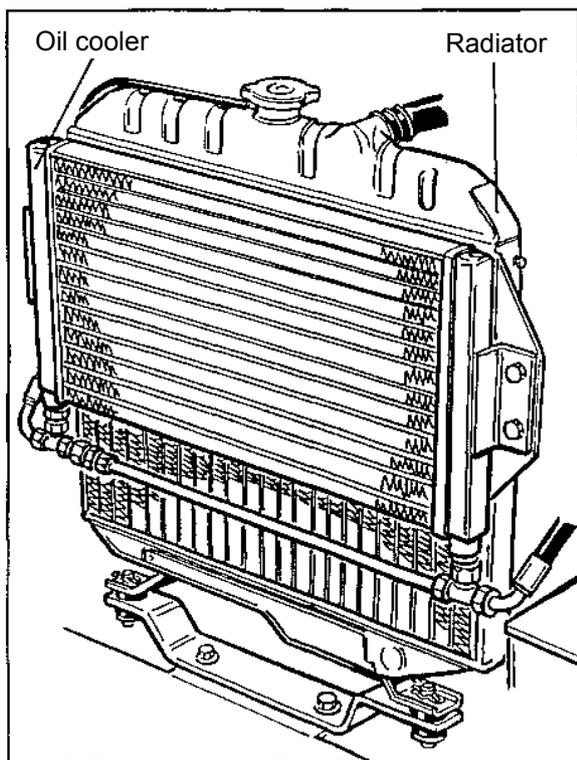
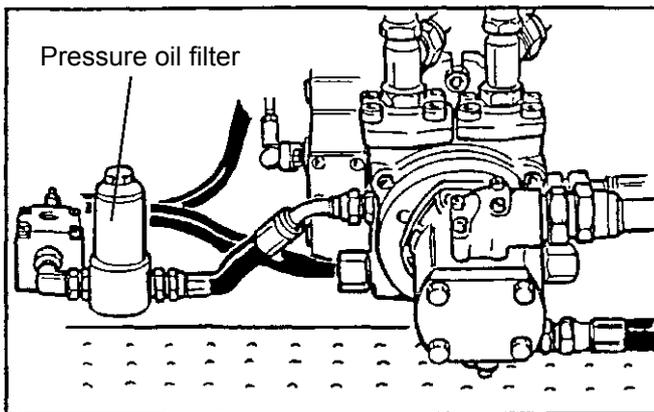
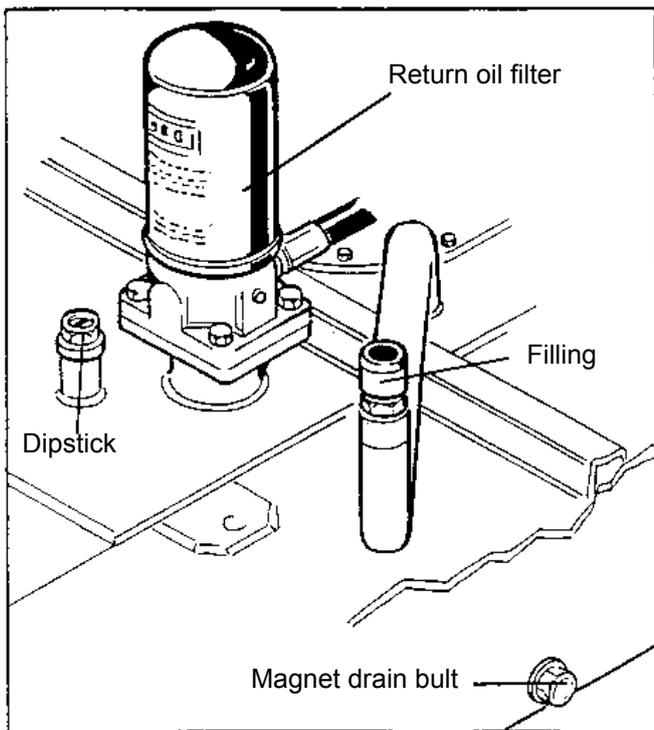
General

The hydraulic equipment represents an important part of Terri's functions. Regular service and maintenance are therefore important. The hydraulic system is sensitive to impurities. Great cleanliness must therefore be observed during work on the hydraulic system, including filling of oil and oil changes. Never therefore detach a hose or coupling except in the case of extreme emergencies. This will ensure disturbance-free operation of the hydraulic system and prevent the risk of damage. Follow the instructions regarding the changing of the filters and oil.

The repair of hydraulic components should be carried out by personnel in an authorized service centre.



- | | |
|-------------------------------------|-------------------------|
| 1. Hydraulic oil tank | 10. Overflow valve |
| 2. Hydraulic pump for driving | 11. Pressure oil filter |
| 3. Hydraulic pump for steering, etc | 12. Return oil filter |
| 4. Hydraulic motor on gearbox | 13. Control valve |
| 5. Valve block trailer drive brake | 14. Non-return valve |
| 6. Valve trailer drive | 15. Control cylinders |
| 7. Hydraulic motors on trailer | 16. Support cylinder |
| 8. Flow distributor | 17. Control valve |
| 9. Oil cooler | 18. Grab-loader valve |



HYDRAULIC OIL TANK

The hydraulic oil tank is located in the machine chassis. The hydraulic system contains about 50 litres of oil.

N.B. The hydraulic oil tank has an excess pressure of 0.4 bar. It is absolutely essential that the original tank cap be used!

Checking of hydraulic oil level

Check the level of the hydraulic oil daily. The oil level shall lie between the marks on the dipstick, which is located between the cab and the engine. There is a warning light for low hydraulic oil level on the dashboard. Top up as required. The filling opening for hydraulic oil is located between the cab and the engine. See page 34 regarding the oil grade.

N.B. When filling hydraulic oil, use a separate filling filter or pre-filtered oil!

Changing of oil filters

Change the return oil filter after every 400 hours of service. The return oil filter is located between the engine and the cab. Unscrew the filter by turning it anti-clockwise. Smear the packing on the new filter with oil and screw it on by hand. Do not tighten it too much.

Change the pressure oil filter after every 400 hours of service. The pressure oil filter is located to the left in the engine compartment. Change the filter element when the engine is cold. Unscrew the filter housing. Change the filter element and replace the filter housing.

Changing of hydraulic oil

Change the hydraulic oil after every 1,200 hours of service. Tilt the machine to the left and remove the magnet drain plug. The drain plug is located in the chassis, to the left in front of the front bogie axle. Replace the magnet drain plug when all the oil has run out and fill with new oil.

Oil cooler

The oil cooler is located in front of the radiator. Regularly clean the ribs of the cooler.

Hydraulic power outlet

A hydraulic power outlet is fitted by the valve on the back of the cab. It is used for gripper loaders etc. The hydraulic power outlet is fitted with snap-on couplings. The pressure line of the outlet is fitted with a FEMALE coupling half. The return line of the outlet is fitted with a MALE coupling half.

The connecting hose must always be connected when the power outlet is not in use.

Equipment coupled to the hydraulic power outlet must have an unobstructed flow for the hydraulic oil through it.

TRACKS - BOGIE SYSTEM

BOGIE SYSTEM

The bogie system is built up from movable bogie arms with pneumatic tyres. The air pressure in the tyres shall be at least 640 kPa - 6.5 kgf/cm².

Tensioning of tracks on the tractor

The tracks have the 'correct tension' when the upper part of the track just touches the second bogie wheel and the machine is standing on a flat surface. The tracks are tensioned by moving the rear bogie wheel. When the tensioning bolt is tightened (clockwise), the track is tensioned. Lock the tensioning bolt with the locking nut.

Tensioning of tracks on the trailer

The tracks have the 'correct tension' when the upper part of the track can be pressed down, with a force of about 75 kgf, about 10 mm between the bogie wheels. When the tensioning bolt is tightened (clockwise), the track is tensioned. Lock the tensioning bolt with the locking nut.

Changing of tracks on the tractor

Run the machine so that the track joint is at the front between the driving axle and the front bogie wheel.

Reduce the track tension as much as possible.

Remove the bolts retaining the three track bars in the joint.

Jack up the machine with axle stands or the like.

Remove the track and fit the new track.

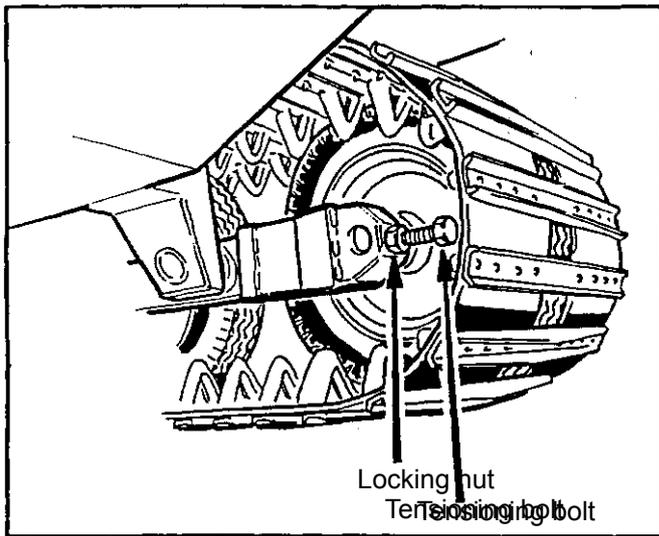
Use a strap to facilitate the joining of the track.

N.B. When the broad snow tracks are to be fitted, the broader rubber belt must be turned outwards, and the track bars must be turned so that the side of the bar pulls when the tractor moves forwards. See the illustration

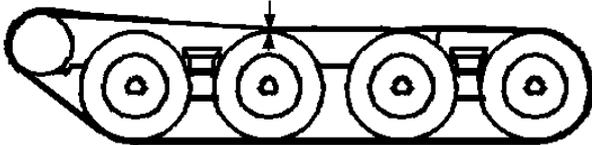
Changing of tracks on the trailer

Reduce the track tension as much as possible. Jack up the trailer with axle stands or the like. Remove the rear wheel. Take off the track. Fit the new track in the reverse order.

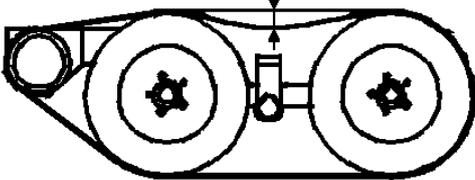
Broad snow track Direction of rotation



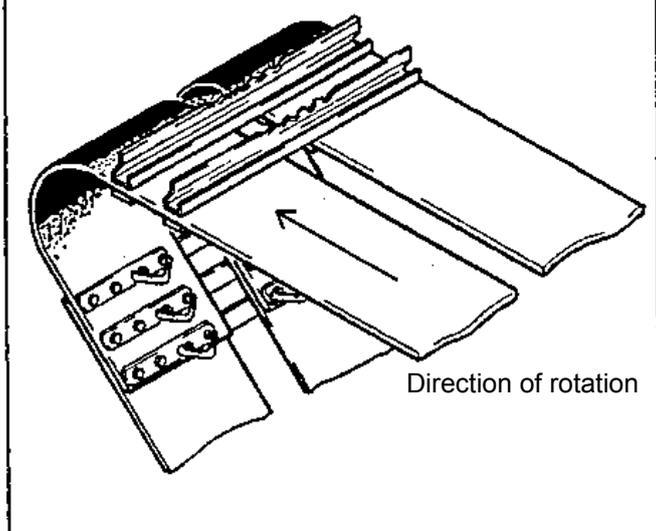
0-2 mm

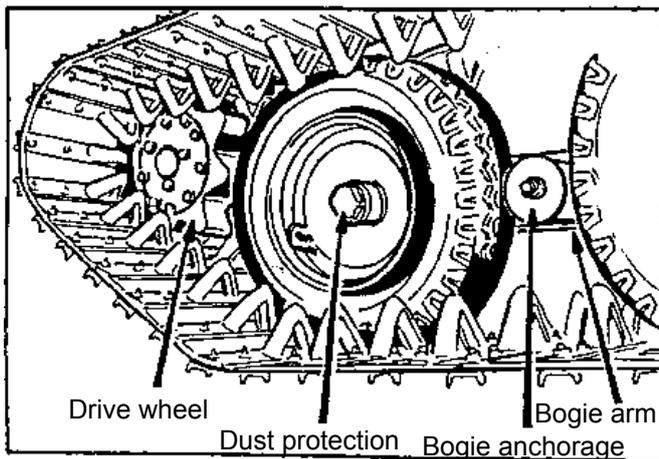


Approx 10 mm



Broad snowtrack





Changing of rear bogie wheels on the tractor

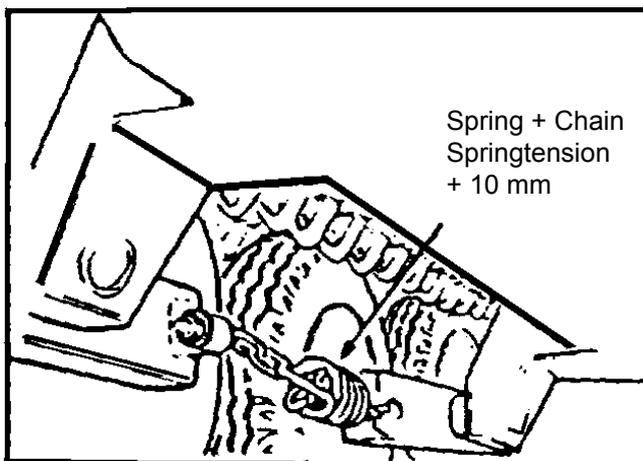
- Loosen the dust protection.
- Slacken as much as possible the tensioning screw of the intermediate chain.
- Fully release the tension of the track.
- Jack up the machine with axle stands or the like.
- Remove the centre nut of the rear bogie arm. Pull off the bogie arm from the axle.
- Remove the dust protection. Remove the split cotter pin and the bearing locking nut.
- Take off the wheel from the axle using the puller provided in the tool bag.
- The spare wheel is mounted on the front of the load protection.
- Replacement in the reverse order. Make certain that the bearing is properly tensioned. The wheel must be able to move freely without any play.
- Use a strap secured to the trailer to facilitate the mounting.

Changing of the other bogie wheels on the tractor

- Loosen the dust protection.
- Fully release the tension of the track.
- Jack up the machine with axle stands or the like.
- Place, for example, a piece of wood between the track sections by the wheel to be changed so that the wheel moves freely.
- Take off the dust protection. Remove the split cotter pin and the bearing locking nut.
- Take off the wheel using the puller provided in the tool bag.
- The spare wheel is mounted on the front of the load protection.
- Replacement in the reverse order. Make certain that the bearing is properly tensioned so that the wheel can move freely without any play.

Changing of bogie wheels on the trailer

- Fully release the tension of the track.
- Jack up the machine with axle stands or the like.
- Remove the four wheel bolts
- Remove the wheel from the hub.
- Replacement in the reverse order.



Limiting spring

A spring and chain are located between the front and rear bogie. The spring is hooked, with the opening towards the wheels, in the second link of the chain at both ends. The spring shall hang down about 10 mm when the machine is standing on a level surface.

Brakes

Hydrostatic brake (driving brake)

Moving the drive lever to the mid-position brakes the machine so that it stops.

N.B. The hydrostatic brake does not function when the gear is in neutral!

N.B. The trailer drive must always be engaged when you are driving down a steep slope!

Hydraulic foot brake (driving brake)

The machine is braked by treading on the pedal.

Mechanical parking brake

The parking brake consists of a mechanical disc brake working on the gearbox. The brake is applied with a brake lever in the cab.

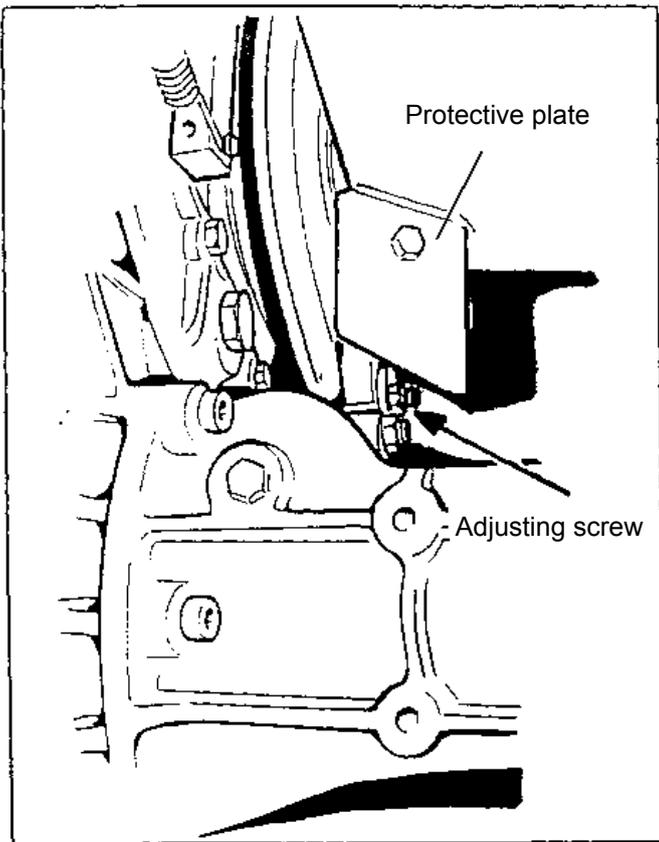
Adjustment of the parking brake

If necessary, the parking brake can be adjusted with the adjusting screw on the brake unit. The adjusting screw is accessible inside the left-hand track, when the protective plate of the brake unit has been removed.

Hydraulic multiple-disc brake (reserve brake)

The brake of the trailer drive is applied and released with an electric pushbutton in the cab. The trailer brake must not be engaged during driving. If the hydraulic pressure drops below 10 bar, the multiple-disc brake is automatically applied.

N.B. If the machine does not have any hydraulic pressure, the brakes must be released before towing! See page 32.



WINCH

The winch is operated with a lever to the right on the dashboard. There is a separate lever for operating the winch lock to the left on the dashboard.

Overload protection

The winch has a built-in overload protection, which cannot be adjusted.

N.B. If the overload protection trips, winching must be immediately stopped. A block can be attached to the anchorage point and the winching can be continued with a double wire rope so as to halve the pulling force of the winch.

Using the winch

Towing of objects

Release the lock, draw out the wire rope and secure it to the object to be towed. Engage the lock and reverse the machine.

Winching in of objects

Release the lock, draw out the wire rope and secure it to the object to be winched in. Shift the gear to neutral and disengage the trailer drive. Apply the parking brake and engage the winch. Move the drive lever forwards and accelerate. If required, the machine can be anchored.

Dragging out of the machine

Release the lock, draw out the wire rope and secure it to a tree or other anchorage point. Shift the gear to neutral and engage the trailer drive. Engage the winch. Move the drive lever forwards and accelerate.

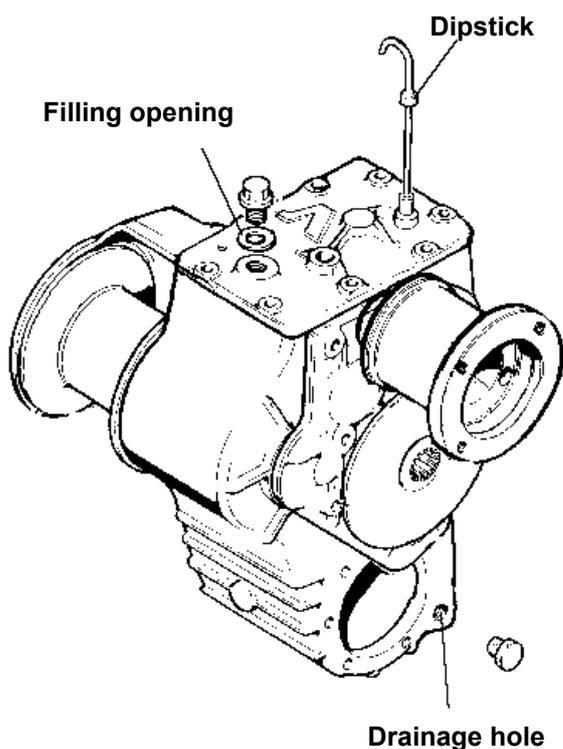
N.B. If the winch lock cannot be released after winching, engage the gear and move the drive lever forwards. Move the winch lock into the free position at the same time as you accelerate.

*N.B. **Never** drive backwards with the drive lever while the winch is being used! This may damage the gearbox and the wire rope.*

N.B. The wire rope speed of the winch is less than that obtained with the top gear of the machine. Make certain that the wire rope does not get under the machine or become tangled in the bogie system.

N.B. Make certain that the wire rope lies in the longitudinal direction of the machine when the winching is started. Max. deviation $\pm 15^\circ$.

N.B. The winch is intended to pull objects or the machine along the ground. The winch must not be used to lift material or people.



Changing of wire rope

The wire rope must be changed as soon as there is any visible damage.

Release the winch lock, pull out the entire wire rope. Wear gloves. Detach the wire rope from the drum. Attach the new wire rope. Make certain that the wire rope is under tension while being wound up.

Gearbox

The gearbox is of two-speed type with neutral in the middle. Gear changes must be made while the machine is at a standstill. The gearbox has a built-in differential, which can be locked when required (not in Sweden).

Checking of oil level

Check the oil level daily. The oil level shall lie between the marks on the dipstick. Top up if required. Oil grade, see page 34.

Changing of oil

Change the oil in the gearbox the first time after 50 hours of service and subsequently after every 400 hours of service.

Remove the undershield (see Changing of engine oil).

Take out the drain plug and let the oil run out.

Replace the drain plug and fill the gearbox with new oil through the filling opening. Amount of oil approx. 11 litres.

Check the oil level with the dipstick.

Replace the undershield.

Cab ventilation

The cab ventilation system has a filter by the intake grid. Change the filter as required.

Changing of filter

Unscrew the intake grid behind the door on the right-hand side (4 screws).

Change the filter and replace the grid.

Trailer adjustments

Alternative location of stanchions

The stanchions may be set up in three different places. Take out the stanchion from its sleeve and move it to the desired position.

N.B. The centre of gravity of the load shall always lie just above or slightly in front of the bogie centre!

N.B. The stanchions must not be lengthened!

Moving of central bench

Slacken the nuts (4) of the tensioning bolts. Loosen the clamps holding the hydraulic hoses by the central bench. Disengage the trailer drive and apply the trailer brake. Then carefully drive the trailer forwards or backwards to the desired position. Tighten the nuts and clamps.

N.B. Check that the hydraulic hoses do not get caught when moving the bench!

Moving of rear bench

Take out the bolt passing through the central tube. Pull the bench to the desired position and insert the bolt into a new hole.

Moving of front bench

Slacken the nuts (4) of the tensioning bolts. Pull the bench to the desired position. Tighten the nuts.

Moving of load protection

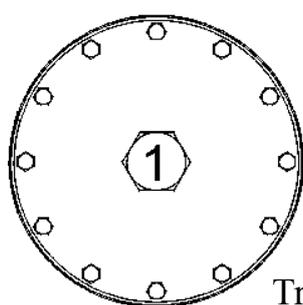
Slacken the nuts (4) of the tensioning bolts. Pull the load protection to the desired position. Tighten the nuts.

Anchorage eyes

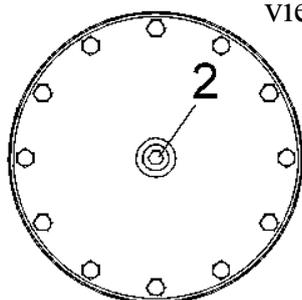
Eyes for securing the load are provided by the stanchion sleeves.

TOWING

Towing of *Terri* is possible only over a limited distance, since the motors of the trailer drive do not receive any oil and may therefore be damaged. Prior to towing release the multiple-disc brake. If the trailer is loaded, it must be unloaded. Remove the cover at the front edge of the trailer (16 bolts). Remove the plug (1). Using the 8 mm socket spanner (included in the tool bag) screw (clockwise) the release plug to the bottom.



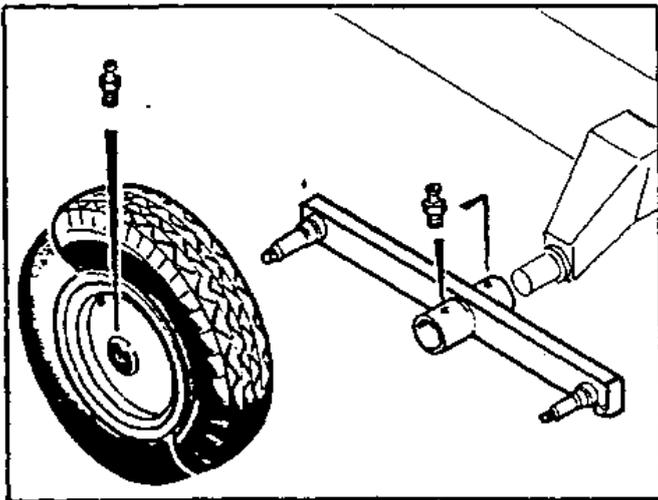
Trailer hydraulic motor viewed from behind



LUBRICATION

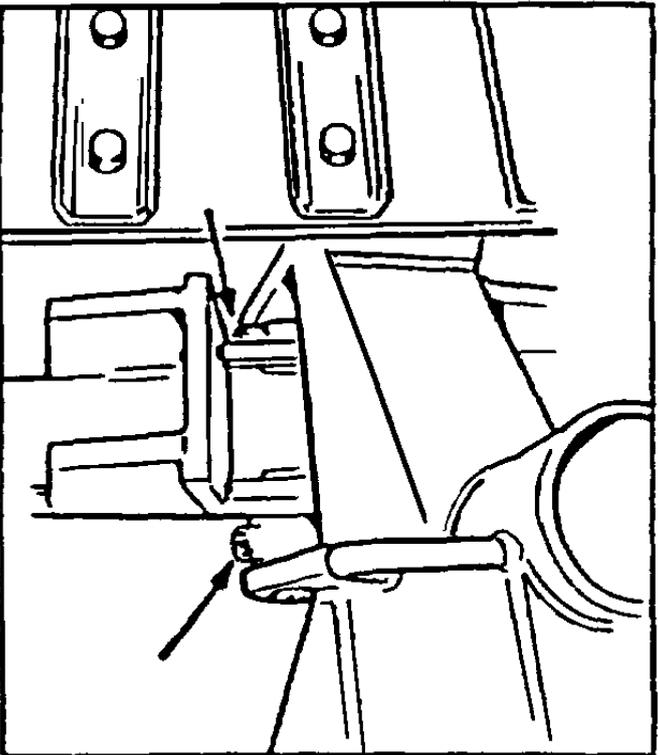
Tractor

Each bogie wheel has a grease nipple in the hub. Lubricate after every 100 hours of service. The bogie arms have two grease nipples by the middle bearing. Lubricate daily. Use Castrol APS2 or the equivalent.



Trailer

Each bogie wheel has one grease nipple in the hub. Lubricate after every 100 hours of service. The bogie arms have two grease nipples in the middle bearing. Lubricate daily. Use Castrol APS2 or the equivalent.

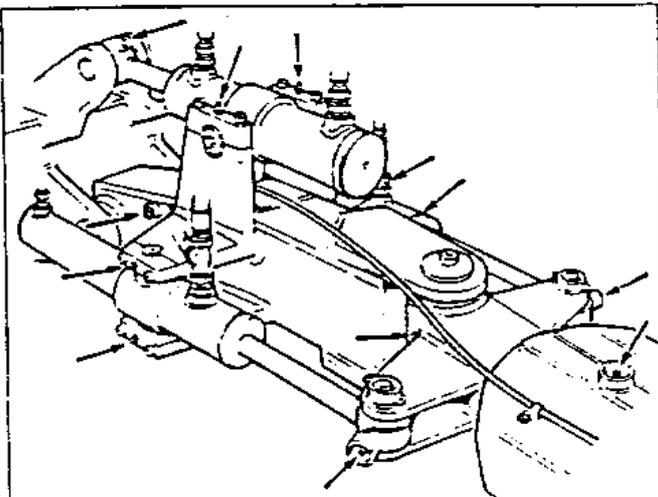


Pulling bar

The sleeve in the central tube of the trailer, the pivot pins of the pulling bar, the retaining pins of the steering and load cylinders and the joint balls of the piston rod have 12 grease nipples. Lubricate daily. Use Castrol APS2 or the equivalent.

Door hinges

The door hinges have four grease nipples. Lubricate with a grease gun as required. Use Castrol APS2 or the equivalent.



Recommended lubricants

Engine

Engine oil API CD	SAE 10W/30
Capacity	5.1 litres

Gearbox

Gear oil API GL5	SAE 75W/90
Capacity	11 litres

Hydraulic system

Hydraulic oil	Castrol HYPIN SHS 32
Index	250
Hydraulic oil	Shell TELLUS TX 32
Index	183
Capacity, total	Approx. 55 litres
Capacity at oil changes	Approx. 45 litres

Brakes

Brake fluid	SAE J 1703 (70 R3)
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Grease nipples

Universal grease	Castrol APS 2
Dropping point	185°

Maintenance schedule

Action	Intervals in hours							Comments
	Daily	50	100	200	400	800	1200	
<u>Engine</u>								
Engine oil	check			change				See p. 19
Oil filter on engine					change			See p. 19
Valve clearance						check		Service centre
Injection pump							check	Service centre
Spray nozzles							check	Service centre
<u>Fuel system</u>								
Air filter		clean		change				See p. 21
Fuel filter I					change			See p. 20
Fuel filter II					change			See p. 20
Fuel tank						clean		See p. 21
<u>Cooling system</u>								
Coolant	check							change 2000 hour See p. 22
<u>Electrical system</u>								
Battery electrolyte level	check							See p. 23
Drivebelt tension		check						See p. 23
<u>Gearbox</u>								
Oil in gearbox	check				change			See p. 31
<u>Hydraulic system</u>								
Hydraulic oil	check					change		See p. 26
Return oil filter					change			See p. 26
Pressure oil filter					change			See p. 26
<u>Bogie, tracks & pulling bar</u>								
Bogie arm bearings	grease							See p. 33
Bogie wheels			grease					See p. 33
Track tension	check							See p. 27
Pulling bar	grease							See p. 33
<u>Brakes</u>								
Brake fluid level		check						
<u>Winch</u>								
Lubr. of winch wire rope								As required
Changing of winch wire rope								As required, see p. 30
<u>Greasing of door hinges</u>								
								As required, see p. 33
<u>Grab-loader</u>								
								See separate manual

Troubleshooting

Problem	Cause	Action
Engine does not start	Stop magnet does not pull No fuel left Fuel filter clogged up Air leakage in fuel system Injector nozzle tube loose or broken Injector defective Fuel pump not working Starting spring of injection pump damaged	Check cable to stop magnet Fill with fuel and bleed if necessary Change fuel filter Trace fault and take action Tighten or change Change injector Check power supply/change fuel pump Change/repair injection pump
Engine does not rotate	Battery discharged Battery cable loose Main switch turned off Starter motor defective Engine has seized	Charge battery Secure battery cable Turn on main switch Repair/change starter motor Repair/change engine
Engine lacks power	Speed governor not working properly Engine overheated Fuel filter clogged up Air filter clogged up Injectors worn Injector nozzle tube loose or broken Poor compression	Change injection pump Clean cooling system Change fuel filter Change air filter Repair/change Tighten or change Check cylinder head gasket and valves
Engine runs unevenly	Fuel filter clogged up Air in the fuel Spray nozzles not working properly Speed governor functions poorly	Change fuel filter Bleed fuel system Lifting roller of injection pump worn Change/repair injection pump
Exhaust white or blue	Leaking cylinder head gasket	Change cylinder head gasket
Exhaust black	Injection pump piston worn or return spring broken Injector hung up or return spring broken Injector heavily clogged up Injection pressure too low Air filter blocked	Change/repair injection pump Change injector Clean injector Change injector Change air filter
Engine runs warm	Thermostat not working Fan drivebelt slack Insufficient coolant Radiator clogged up Radiator frozen	Change thermostat Tension fan belt Top up coolant Clean radiator Add more glycol
Machine does not move (engine running)	Gear in neutral Winch connected up, wire rope locked Drive lever wire defective	Change gear Disconnect winch Adjust or change
The machine does not turn	No hydraulic oil left Drive lever wire defective Hydraulic pressure too low	Fill up with hydraulic oil Adjust or change Check overflow valve

TECHNICAL SPECIFICATION

Dimensions

Total length (with trailer)	6490 - 6940 mm
Total width, standard and snow tracks (across trailer)	1600 mm
Total width, special snow tracks (across Terri)	1810 mm
Cab height	2370 mm
Ground clearance between tracks	280 mm
Load area	1.2 m ²

Weights

Weight in working order, incl.trailer with tracks and grap-louder	2960 kg
Total weight	4950 kg
Load capacity	2010 kg
Front bogie pressure	2000 kg
Rear bogie pressure	2960 kg

Wheels and tracks

Terri:

Standard tracks	4720 x 480 mm
Snow tracks	4720 x 510 mm
Special snow tracks	4720 x 675 mm
Number of bogie wheels	2 x 4
Tyre dimensions	4.00" x 8"/8 PR
Air pressure, bogie wheels	640 kPa(6.5 kgf/cm ²)
Driving wheels	Sprocket wheels, diam. 235 mm

Trailer:

Standard tracks	4720 x 480 mm
Number of bogie wheels	2 x 2
Tyre dimensions	640 kPa(6.5 kgf/cm ²)
Air pressure, bogie wheels	610 x 145-13/8 PR
Driving wheels	Sprocket wheel, diam. 235 mm

IC engine

Make	Kubota
Type	D1105-E
Number of cylinders	3
Mode of operation	4-stroke diesel engine with precombustion chamber and glow plugs
Cooling system	Liquid cooling
Max. output	17.6 kW/24 h.p./3000 r.p.m.
Torque	73 Nm/2000 r.p.m.
Displacement	1124 cm ³
Fuel	Diesel fuel
Compression ratio	22:1

Transmission

Hydrostatic, mechanical with gearbox and closed hydraulic circuit	
Number of mechanical gears	2
Differential lock, Terri	Manual mechanical
Differential lock, trailer	Automatic hydraulic
Trailer drive	Disconnectible

Hydraulic system

System pressure	180 bar
Pump capacity	33 litres/min at 3000 r.p.m.

Control

Hydraulic control	±50°
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Capacities

Fuel tank volume	35 litres
Hydraulic oil tank volume	50 litres
Engine oil volume incl. filter	5.1 litres
Gearbox oil volume	12 litres
Cooling system volume	Approx. 4 litres

Winch

Type	Built together with gearbox
Capacity	Pulling force 2000 kgf
Wire rope	8 mm
Wire rope length	30 metres

Electrical system

Battery	12 V, 88 Ah
Alternator	55 A
Starter motor	.4 kW

Grab-loader

See separate instruction manual

Set of tools

Spanner, 8 mm	1
Spanner, 10-13 mm	1
Spanner, 12 mm	1
Spanner, 17-19 mm	1
Spanner, 22-24 mm	1
Spanner, 27 mm	1
Spanner, 30 mm	1
Spanner, 36 mm	1
Socket spanner, 3 mm	2
Socket spanner, 8 mm	1
Screwdriver	1
Cross-slotted screwdriver	1
Special tool for dip-stick	1
Adjusting spanner for parking brake	1
Bogie wheel puller	1

Other data

Sound level in cab	84 db(A)
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