



TERRI 2040D

TERRI 2040D 4x4

OWNER'S MANUAL

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INTRODUCTION

Terri 2040D / 2040D 4x4 is a frame steered load tractor (forwarder), which loading space is 1,2 m².

Terri 2040D is a special machine, which usages are wide and versatile. Besides of so-called Scandinavian type timber hauling concerning transport length 2 m - 6 m, Terri has also other equipments for the timber hauling, pressure bench, Skidder. With these solutions the transport length can be 6 - 25 m.

The great number of other optionals diversified Terri both Terri-owner's side and different user's side. Terri has a engine which is reliable and fuel economically found Kubota D 1105 -dieselengine, which has past exhaustgas emission norms of CARB (California Air resources Board). Carb is the hardest norms, which defines amount of the carbon, hydrocarbon, carbon monoxide and nitric oxide in dieselengine exhaust gases. Transmission is hydrostatic/mechanical with a closed hydraulic circuit. In front side the hydraulic engine is using the 2-step preselection type gear box, equipped with a mechanical differential lock and the tracks via a sprocket-wheel..

The trailer has two hydraulic engine, which are turning the tracks with a sprocket wheel. The trailer has automatic hydraulic lock. The trailer drive is engaged electrically. When it is switched off the trailer drive is lightened the be freely running at the same time, reaching maximum transport driving speed (with 2-gear).

The system is using a power controlled adjustable hydraulic pump.

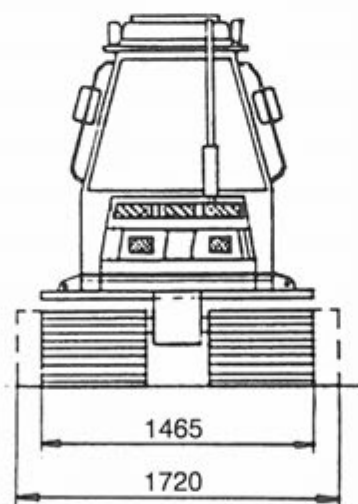
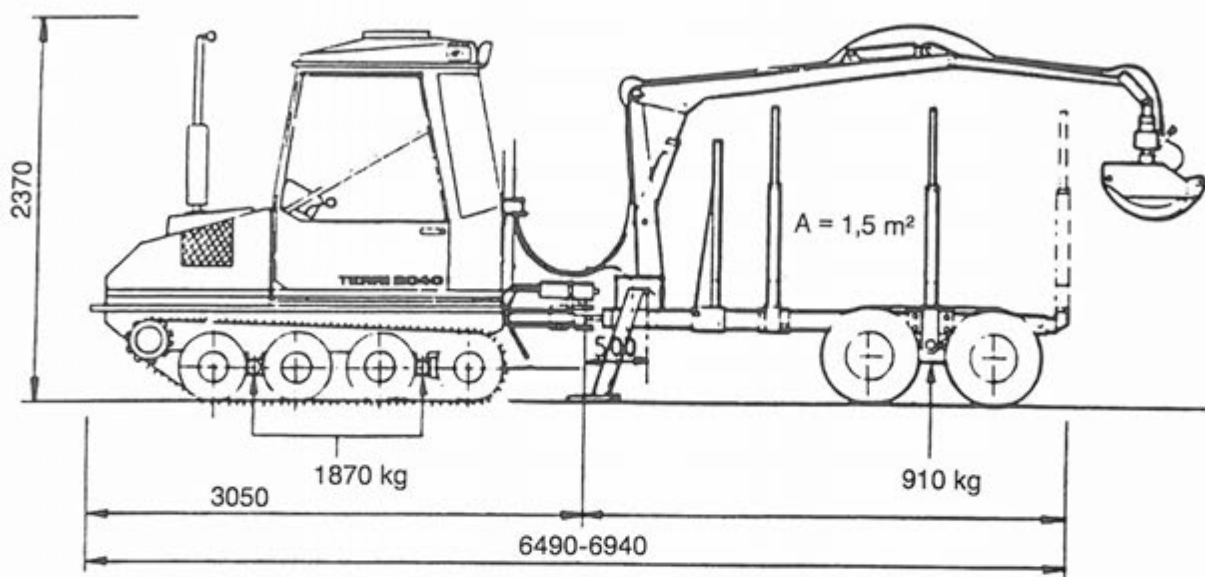
The system moves softly and it is easy to use and it gives high pulling power under all driving circumstances. The closed hydraulic circuit is at same time working as an very effective brake for instance driving downhill fully loaded.

The cabin is spacious and for the working all controls are within easy reach of the driver.

The amount of operations are minimized for controlling the TERRI. Driver has ergonomically good driving- and working positions. There are two alternatives for the loader traditional 7-stick system or proportional 2-stick system with the top grip handle which are located at the arm rests of the seat. The seats are available with either mechanical or airsuspension.

TECHNICAL SPECIFIKATION

Total length with trailer	6490 - 6940 mm
Max height	2370 mm
Max width (trailer)	1460 mm (1600 mm)
Ground clearance between the tracks	280 mm
Summer tracks	4720 mm x 480 mm
Special snow tracks	4720 mm x 675 mm
Snow tracks	4720 mm x 510 mm
Weight, combination with trailer	2550 kg
Weight, combination with 4x4	2780 kg
Weight, combination with snow runners	2150 kg
Load space	1,5 m ²
Bogie wheels	2 x 4 st
Bogie wheels size	4.00" x 8"/8 pr
Air pressure of bogie wheels	6,5 kp/cm ² (640 kpa)
Trailer wheels	610 x 145-13/8 pr
Air pressure of trailer	6,5 kp/cm ²
Transmission	Hydrostatic/mechanical with closed hydraulic circuit. Gear box/driveshaft with mechanical differentiallock.
Steering	Hydraulic frame steering.
Engine	Kubota D 1105-B.
Number of cylinders	3 pcs.
Operating	4-stroke precombustion diesel + glow plugs.
Cooling system	Liquid cooled.
Power	21 kW / 28 hp / 3000 rpm
Torque	73 Nm / 2000 rpm
Displacement	1124 cm ³
Fuel	Diesel fuel no. 2
Starting engine	12 V / 1,4 kW (2 hp)
Alternator	12 V 480 W
Compression ratio	22:1
Fuel tank capacity	35 l
Hydraulic oil tank capacity	50 l
Engine, oil capacity	5,1 l
Gear box, oil capacity	12 l
Cooling system capacity	about 3,5 l
Hydraulic system pressure	180 kp /cm ²
Hydraulic oil pump oil flow	30 l / min.



SAFETY

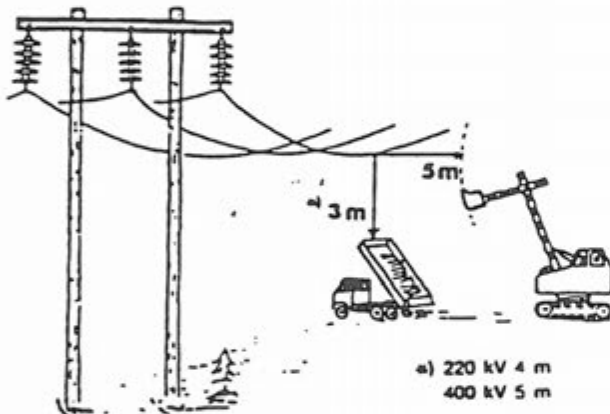
EXTRACT FROM THE ELECTRIC CONTROL OFFICE'S PUBLICATION D 10-76 (Finland)

WORKING CLOSE THE OPEN ELECTRICAL WIRES

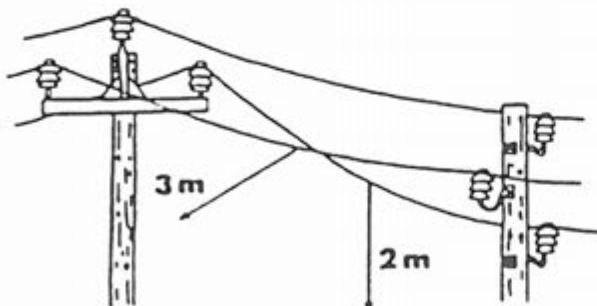
Do not go too close the wires!

In the electric security regulations 49 section is given orders how to work near by the open wires. Working with moving or portable machine any part of the machine, load or burden can not accidentally get closer to the wire than these measures.

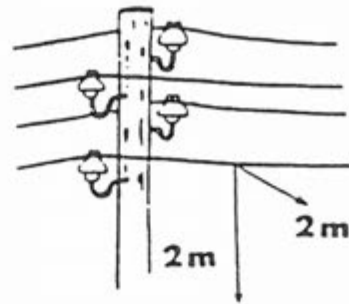
High tension 110 kV.



The electric does not need any touching, on high tension it "jumps" even longer distance!



High tension 6-45 kV.

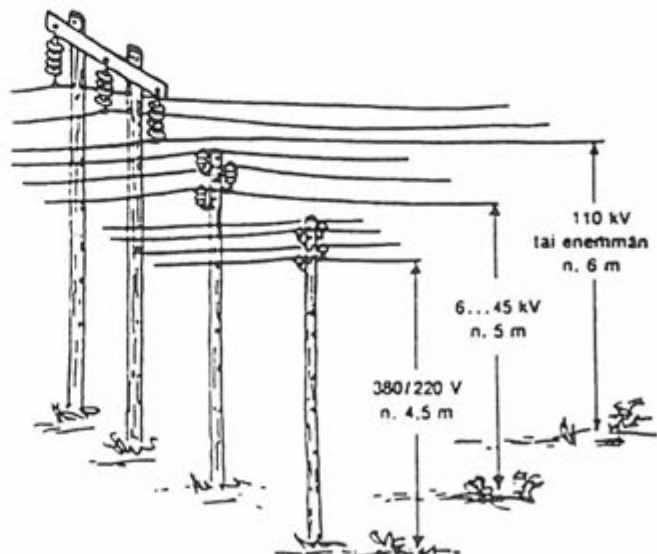


Low tension 380/220 V.

REMEMBER THAT THE LOW TENSION TOO IS DANGEROUS! 60 % OF ELECTRIC ACCIDENTS WHICH ENDS WITH DEATH HAPPENS AT 380/220 V.

AVOID WORKING CLOSE TO THE OPEN ELECTRICAL WIRES

If it is difficult to follow the safety orders in working, it has to be absolutely taken contact with the owner of the electric wire to find the safe way of working. In any case you cannot work close to the electric wires trusting in a good luck. If needed you have to move the load even by hands far enough from the electric wires before loading.



Height of the wires.

THE WIRES CAN LIE LOW

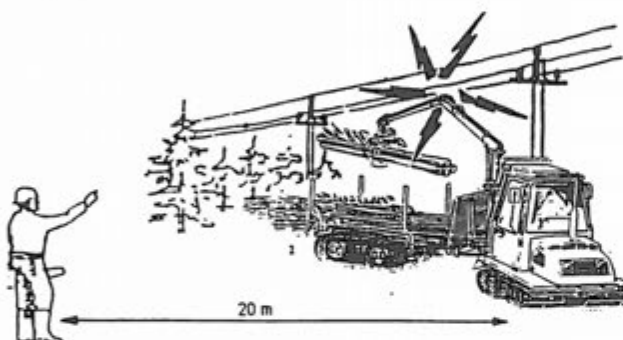
It is to remember when moving in forest or at forest road that it is difficult to notice the electric wire which are crossing the route. The wire can also be subrisely low in comparison with crossing at the roads.

When the snow and the ice is straining the wires, these can be even lower than these measures.

IN CASE OF ACCIDENT

If in spite of all the accident happen, DO NOT RUSH, BUT CONSIDER CAREFULLY WHAT YOU DO: At first you are usually best safe in the vehicle.

THE GREATEST DANGER IS WHEN THE VEHICLE AND THE GROUND ARE TOUCHED AT THE SAME TIME.

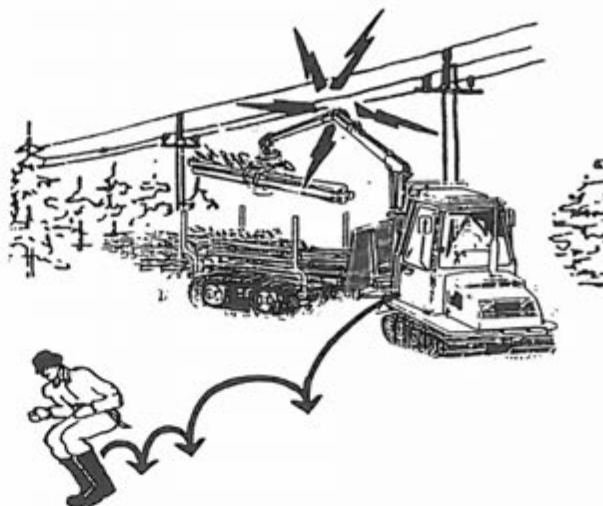


Safety distance is 20 m.

If there is a helper outside who can secure that the loader or the couch is not stuck to the wires, only lean against it, you can try to loose your vehicle from the electric wire. Drive carefully back or lay down the loader, if you can do it without going away from your place. Follow the helper's instructions who is sufficient far away outside.

NOTE! TERRI ALL-TERRAIN VEHICLE'S HEIGHT EVEN WHEN THE LOADER IS DOWN IS ABOUT 2,4 M. IN POSITION ABOVE THE PICTURE LOADER HEIGHT IS OVER 5 M.!

The vehicle which is stucked on the wire can catch fire. Leave the vehicle at least when the rubber tyres start smoking. JUMP!!!! Do not make yourself to a wire where the electric goes through.



Leaving the vehicle

Leave the vehicle bounding or jumping with both feet together so that only one foot is on ground at time. The electric field in ground can cause highly dangerous tension between your feet. When you are about 20 m. away you start to be safe.

Make announcement of the incident to the local electricity plant.

If the damage is already happened call immediately the owner of the wire and inform exact damage place. So, you speed up the repairing of fault and the dangerous situation get off.

IF TOUCHING OF THE WIRE IS HAPPENED, DO THE ANNOUCEMENT, EVEN WHEN THE PROPER DAMAGE WOULD NOT HAPPENED.

Arrange the guarding of the vehicle, and do not in any case try to get in it.

Follow the instructions what the electricity plant gives.

MEASURE INJURY TO PERSON

If you come to place where has happen an electric accident, do not get your own life in danger by unsafely action.

First find out wether it is high- or low tension (see working close to open wires).

If it is high tension, do not start rescue action before the electricity plant has cut the current.

Approach of the victim who is in electric wire or vehicle stucked to the wire can be dangerous. Remember that high tension wire "do not burn the fuse", it is always dangerous until the professional has done it to untension. Even when the current cuts off it can be coupled again due to operating tecnical reasons after a moment. This can be repeated several times.

From low tension wire or vehicle which is stucked on it you can loosened the victim using a tree pole, board, string or item of clothing. Do not touch the victim with bare hands or using the wet wood or metallic object.

Start immediately to resuscitate the unconscious when he is loosened from the tensionest vehicle or electric wire.

LEARN THE FIRST AID WITH THAT YOU SAFE YOUR NEIGHBOUR.

SECURITY

For safety 's sake

1. Get acquainted with the construction of your Terri and user's manual.

2. Do not let outsiders handle the machine which is trusted to you. Tractor driver is responsible for that the machine will not cause any damage to others.

THE DANGER ZONE IS 20 M! No one can be inside the danger zone when the machine runs.

3. Check before starting that seatbelt is fasten and no one is on your way.

4. Avoid sudden stops and starts.

5. If it is possible, check before the route in terrain, especially in winter when the snow cover the roughs.

6. Be consious of total height of loader and load before you drive on places where height is limited. Be especially careful of temporary constructions, hanging wires etc.

7. Do not move the vehicle when there is a burden in loader.

8. If your Terri fall down hold on seat or handlers. DO NOT JUMP!!!!

9. Be noticed of terrain influence of inclination to balance of tractor.

10. Do not walk or stand on under the hanging burden.

11. Check regularly the bolt joints of loader.

12. Stop the engine, cut off the main current switch always when you leave your Terri. Put down the grapple to the ground.

13. Keep your Terri clean especially the adjusters and controls.

14. Perform regularly maintenance of your Terri. So you secure the best both secure function and safe operation of your Terri.

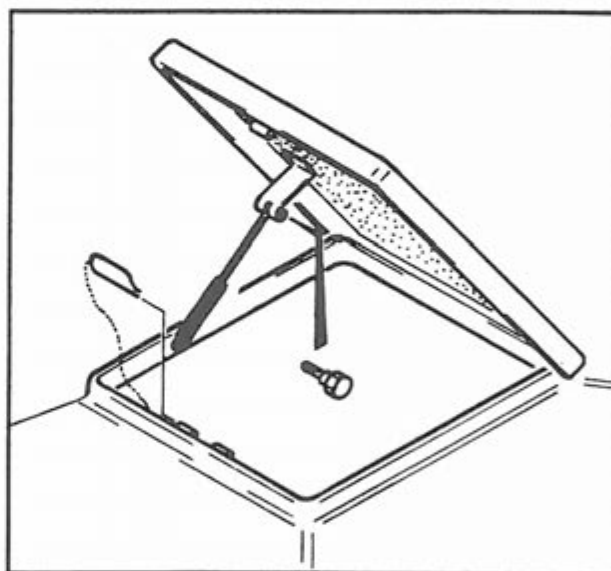
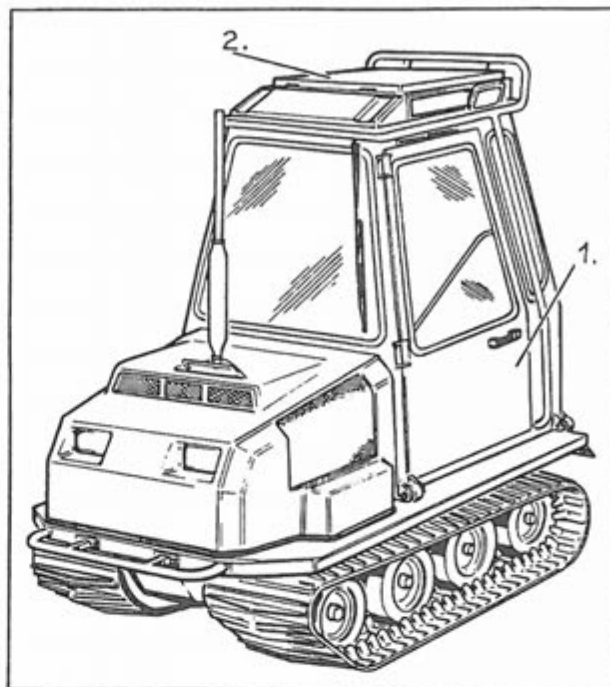
15. For the maintenance- and checking always stopp the engine.

16. To check the fuel tank and the battery liquid levels is using of open fire is absolutely forbidden.

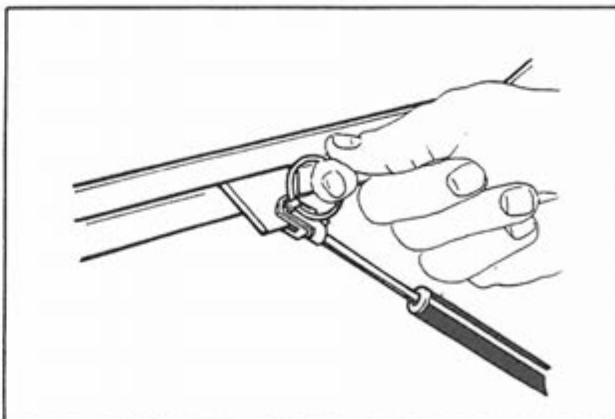
17. Hot radiator has excesse pressure so the plug is to be open slowly and with care.

18. Announce immediate faults what you see in your Terri to your boss or that who is responsible of repairing.

Emergency exits.



Screw loosen.



The loose of pump cotter-pin.

19. Remember in problem situations that patience is a virtue. Consider first and act then.

20. Keep the roof door open when driving on ice.

21. Higher than load protection fens is loading forbidden.

22. During the maintenancing and repairing only such person who knows well the control and equipments can be in cabin.

23. Consider in advance the emergency exits of the cabin..

Emergency exits are:

1. Normal side door.
2. Roof door.

NOTE! Do not work under the machine when it is lifted.

ROAD TRAFFIC RULES TO THE FOREST MACHINES.

Before driving with Terri on official road check that the Terri is in accordance condition with road traffic ordinance:

Brakes, parking brake;

The brakes have to work effectively.

Driving lights;

Two white or yellow driving light have to be switched on.

Directive- and parking lights are in separate forth fasten light combination.

Rear lights

Two red lights

Blinkers

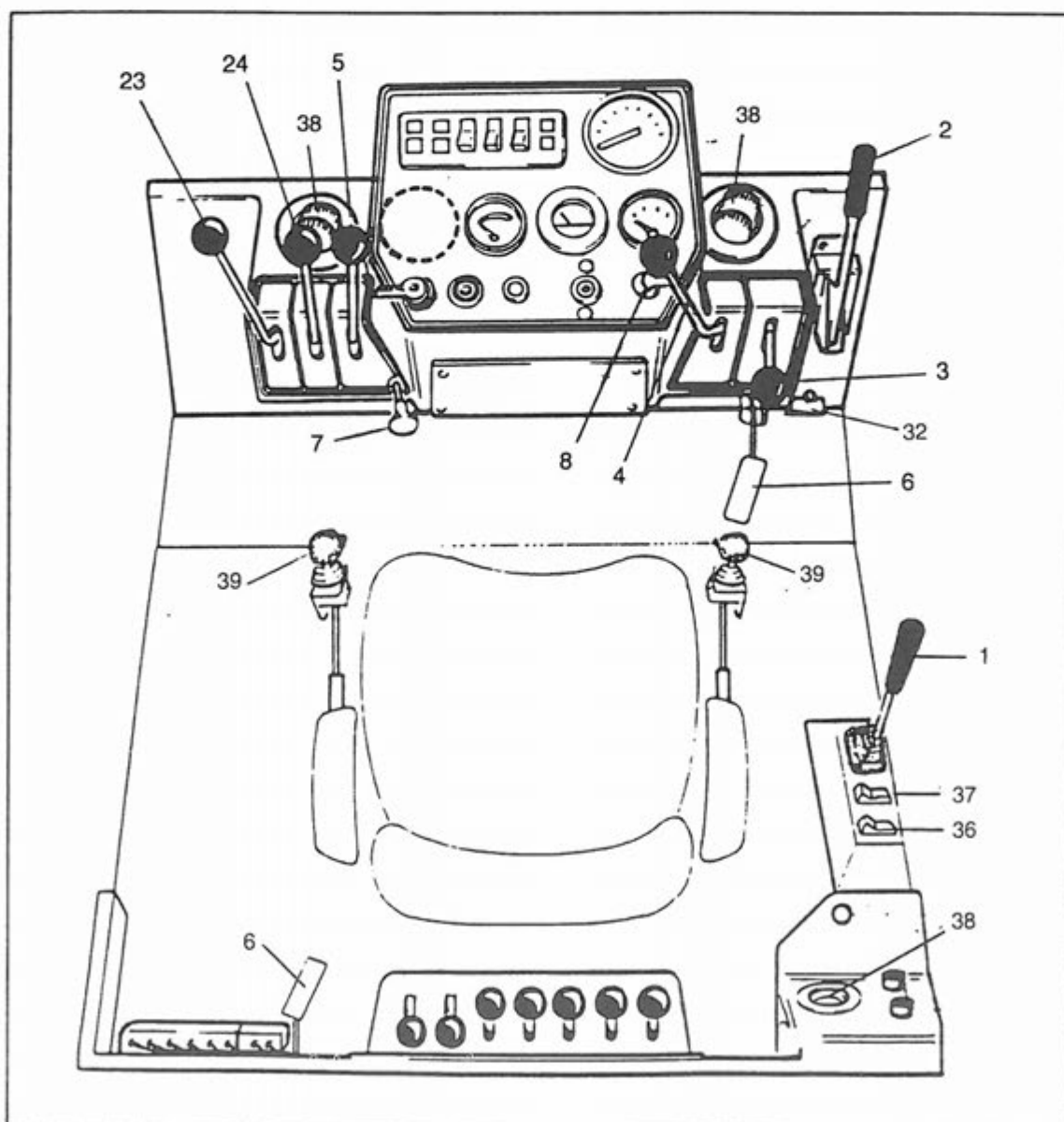
Blinkers lights must be seen well frontwards and backwards.

Rear mirrows;

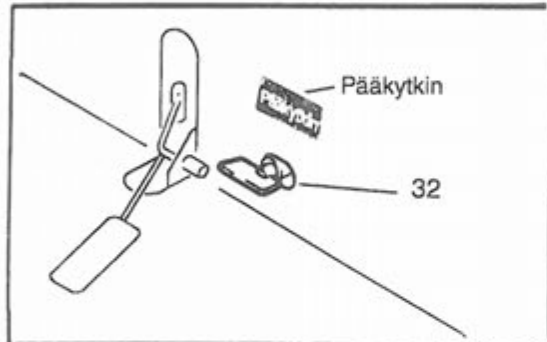
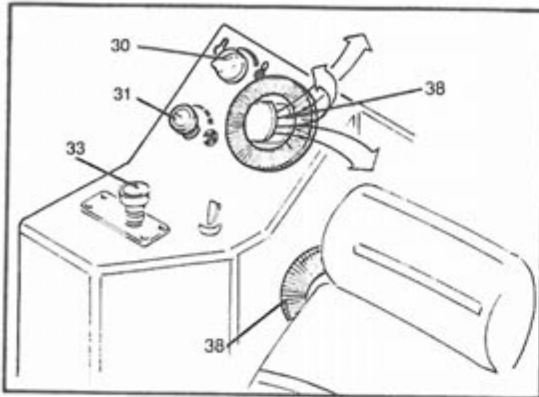
Check adjusting from the both outside mirrows.

CONTROLS

1. Drivelever
2. Parking brake
3. Gear shift lever
4. Winch operating lever
5. Winch latch control lever
6. Throttle pedal
7. Stop button
8. Ignition switch
9. Light switch
10. Work lights
11. Glow plug indicator
12. Signal horn button
13. Speedometer (optional)
14. Km-meter (optional)
15. Tachometer
16. Thermometer for hydraulic oil
18. Hourmeter
19. Signal light for charging
20. Oil pressure warning light
21. Thermometer for cooling liquid
23. Load cylinder control lever
24. Differential lock
26. Fuel meter
27. Blinker signal
28. Signal light for hydraulic oil level
29. Differential lock signal
30. Heat regulation
31. Heating blower
32. Main current switch
33. Main current switch for 2-stick system
34. Wind screen washer
36. Switch for trailer brake
37. Switch for trailer drive
38. Air nozzles
39. Top grip handle



CONTROLS

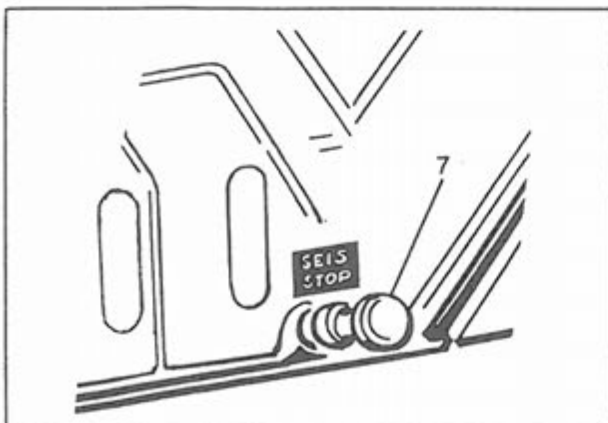
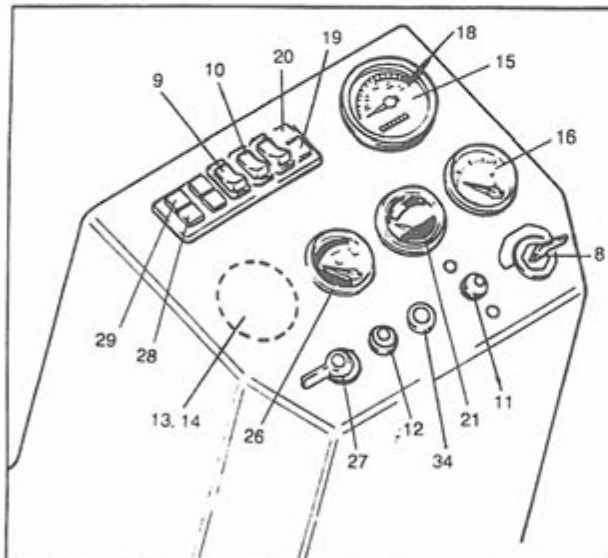


- | | |
|------------------------------------|--|
| 7. Stop button | 26. Fuel meter |
| 8. Ignition switch | 27. Blinker signal |
| 9. Light switch | 28. Signal light for hydraulic oil level |
| 10. Work lights | 29. Differential lock signal |
| 11. Glow plug indicator | 30. Heat regulation |
| 12. Signal horn button | 31. Heating blower |
| 13. Speedometer (optional) | 32. Main current switch |
| 14. Km-meter (optional) | 33. Main current switch for 2-stick system |
| 15. Tachometer | |
| 16. Thermometer for hydraulic oil | |
| 18. Hourmeter | |
| 19. Signal light for charging | |
| 20. Oil pressure warning light | |
| 21. Thermometer for cooling liquid | |

USING HEATER

- Stepless regulation of heater.
- Heater blower 2-speeds.

OPERATION OF WARNING LIGHTS



When the engine oil pressure goes below 0,5 bar warning lamp for oil pressure turns on.

When the level of hydraulic oil level goes to minimum, the warning light get on.

When trailer brake is switched on, warning lamp gets on.

Signal light for charging get off when the generator starts producing current to the battery.

NOTE! Also when main electric switch is turned off the charging light is not burning.

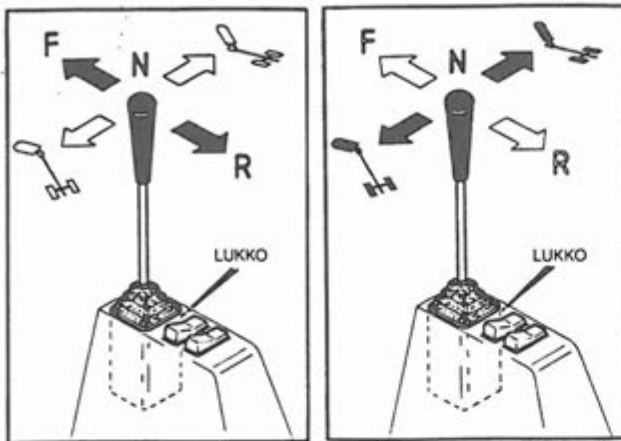
Signal light for blinkers blinks when the blinkers is on.

When the main beam is on the signal light is burning (blue).

Signal light burning when the differential is locked. NOTE! Do not turn the machine when the differential is locked.

Warning lights gets on when trailer drive is engaged.

FUNCTIONS OF DRIVELEVER



Drivelever function

NOTE! Drivelever adjust for hydraulic driving engine the amount of oil together with rotation of pump. Max. driving speed can be reached when the drivelever is fully forward and engine has maximum rpm. Alternatively speed of Terri can be adjusted only with the drivelever, for instance braking when driving in steep downhill.

Multiple disc brake of trailer drive is measured to keep the machine with full load in leaning terrain. Power of hydraulic engine is however bigger, so it is possible to drive with the brakes on. As a result damaging the multiple disc brake.

WARNING! The multiple disc brake of the trailer must allways be disconnected before driving or towing.

Steering system

Hydraulic frame steering consists of two doubleacting steering cylinders fastened to the jointed drawbar and of the steering valve being connected to the drivelever through a pull / push wire. The hydraulic pump gets the power from the engine and generates sufficient oil pressure for the adjusting valve, from which the hydraulic oil is conducted to the steering cylinders when turning the drivelever.

In the adjusting valve there is an overflow for the hydraulic oil. The steering has no return to the middle position (straight on), but after the machine has turned, the returning to the middle position is to be done by turning the drivelever in the opposite direction.

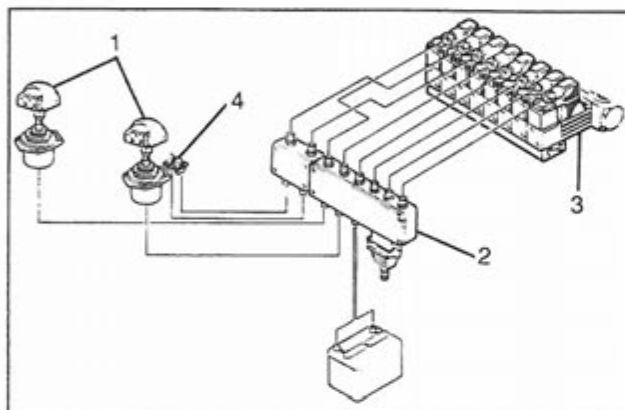
CONTROLS FOR LOADER

General description

To Terri can be chosen both 7-stick and 2-stick handling of loader. The 2-stick handling is with top grip handles located to the arm rests of the drivers seat.

With 7-stick handling the loader hydraulic operation is carried out traditionally with the handling sticks operating directly the hydraulic valve spindles.

In 2-stick handling system the loader hydraulic pre-operating is organized by XXX-pre-operating system where belongs YYY- adjusting units for individual adjusting of the loaders every working movements.

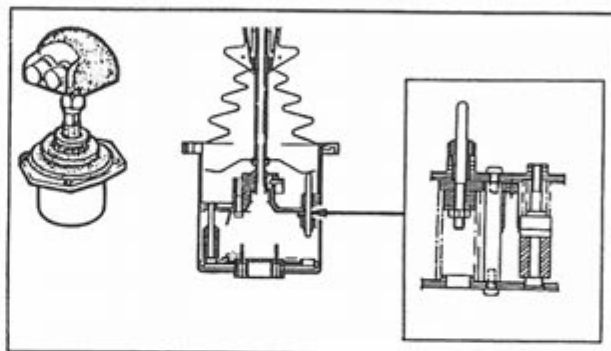
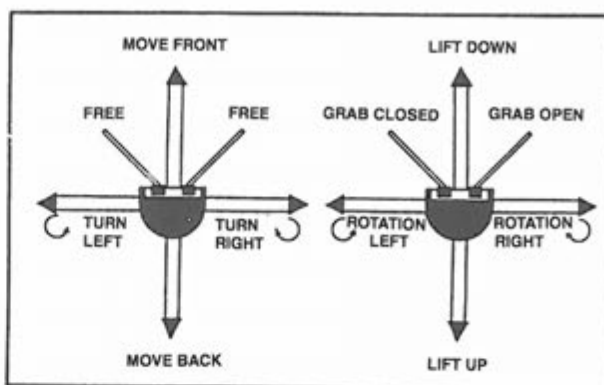


2-stick handling systems general description

1. Top grip handle
2. XXX-pre-steering
3. YYY-adjusting unit
4. Supporting legs switches

The control values have to be checked at least in periods of 500 hours or in case when the function of loader is unsatisfied or hydraulic system develops too much heat. Adjusting has to be done by authorized service workshop.

FUNCTIONS OF TOP GRIP HANDLES



Handlers function

NOTE! Functions of loader engaged when the main switch is on.

Clean up the top grip handlers once a year to make sure disturbance-free operating. Do the cleanliness by open the handlers and brushing lightly slide potentiometers with soft brush.

STARTING THE ENGINE

ROUTINE CONTROLS BEFORE STARTING

- Check that the gas pedal resets the idling position when the hold is loosened.
- Check that the drive lever is in middle position and the winch is in neutral.
- Check that there is no snow or ice in the tracks.

Check that there are no hindrances which could damage the tracks or other parts of the machine.

- Check that the stop button has been pushed in.
- Check that the amount of the cooling liquid.
- Check the amount of the engine oil.
- Check the amount of the hydraulic oil.

NOTE! Terri with 2-stick loader handling, check that the electrical emergency switch for the loader is pressed down.

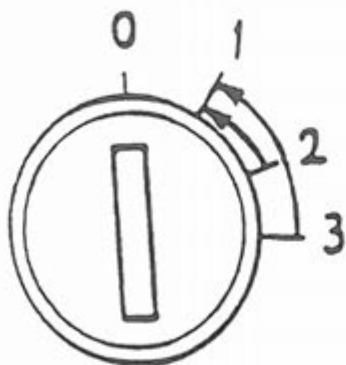
GENERAL

The engine is of pre-combustion type diesel engine, so it is equipped with glow plugs to make the starting easier when it is cold.

STARTING

- Turn the ignition key to the position "driving", the signal lights for oil pressure and charging get on.
- Turn the ignition key to the position "glowing" and when the glow indicator begins to glow turn the ignition key to starting position until the engine starts. Check that the ignition key get back automatically to the position "driving" after the engine has starting. Do not start the engine more than 10 sec at one time.

Check that the stopbutton is pushed in and repeat the glowing before starting the engine.



Ignition switch

If the weather is very cold can glowing be made two times with about 15 seconds interval before starting.

Start the engine with full gas, then the injection pump feeds the fuel in maximum.

WARM UP

In cold circumstances is good to use a blockheater electric or liquid gas for preheating of the cooling water. The engine need about 4 - 5 min. warm up before driving, avoid higher rounds than 1500 rpm before hydraulic oil is warmed up.

After the engine has started the signal lights for oil pressure and charging have to go out. If not, there is some defect in the lubrication or charging systems; stop the engine and repair the damage

STOPPING THE ENGINE

Let the engine idle and pull the stop button out. Turn the ignition key to the stop position.

CAUTION! The engine may not be stopped when hot directly from high speed.

NOTE! Take always the ignition key with you and turn the electrical main switch off before you leave the machine. So you can be sure that the current and the lights are turned off and no one can start the machine.

NOTE! When cold, drive engine 1-2 min at 200-2500 rpm and all current consumer off, before engine is stopped.

DRIVING/SELECTING GEAR

NOTE! Check that control lever for load cylinder is in top position "floating position".

The gear box in Terri is of pre-selection type with 2-speeds. This means that selecting of gear can be made only when Terri is not moving.

Driving

- Select the gear (high/low).
- Select driving direction with the drivelever.
- Rise engine rpm with the accelerator.

In beginning there are reasons to check the tachometer, because the low noise level of the engine makes it difficult to judge the real rpm.

Stopping

The machine stops when the gas pedal resets the idling position or the drivelever resets the middle position.

When the drivelever is in the middle position the hydrostatic transmission circuit is closed and the tracks are not rotating. (watch the BRAKES: hydrostatic brake.)

The drivelever

With the drivelever is adjusted the oil flow of the pump to the drive-engine and also to the engines of the trailer drive. During certain circumstances, driving speed can be changed with the drivelever.

The trailer drive

The trailer drive switch is with electrical function the switch is on the drivelever konsol. The signal light will tell that the trailer drive is coupled.

The driving speed

To the driving speed effects:

- witch gear is selected
- the position of the drivelever
- the coupling of the trailer drive
- engine rpm.

The highest speed, 19 km/h, is reached by choosing the 2nd gear, and the drivelever full forward and without the trailer drive.

The highest pulling power gets with the 1st gear and the trailer drive is coupled.

The differentiallock

The gear box of the tractor is equipped with the mechanical lock of the differential.

USE THE LOCK ONLY WHEN THE TRACK BEGIN TO SLIP. WHEN THE LOCK POSITION IS FREE IS THE TURNING EASIER AND LESS STRAIN WILL BE DIRECTED TO THE POWER TRANSMISSION.

The trailer drive is equipped with the automatic hydraulic lock.

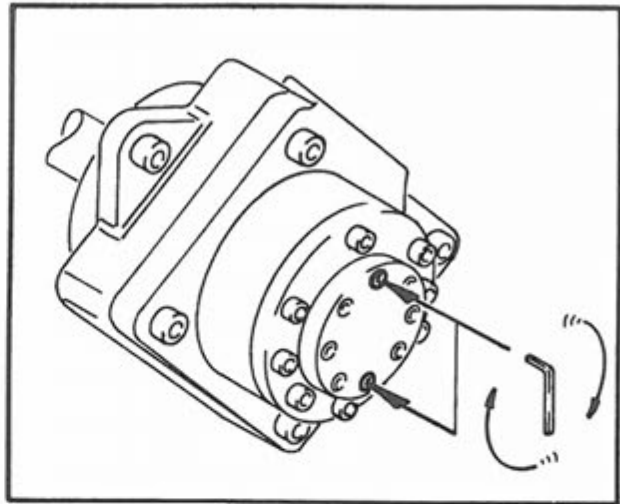
The trailer

In addition to the standard trailer any trailer can be used.

NOTE! The weight of the trailer must be great enough to make sure that turning can be made. The trailer is connected to the draw shaft with a bush. The bush is fixed by welding. The bush can be orded by Terri representatives. The part number of the bush is 4152133.

TOWING

Towing of Terri is possible only limited distance, because hydraulic engines of trailer drive cannot get oil refill and can be damaged. Before towing, loosen the multiple disc brakes of trailer, see picture



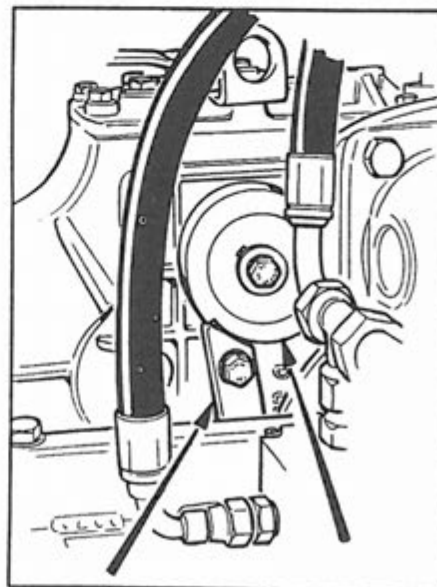
Multiple discs of rear draught.

THE WINCH

The winch is used with a lever at the dash board on the right.

There is a seperate lever for the latch wheel holding at the dash board on the left.

NOTE! Never change driving direction with the drivelever. When loosing stucked machine with the winch and the winch latch is engaged. When you drive with the strong motor against the latch it may damage the gear box immediately.



The latch gear and the latch

The using lever of the latch stays in free position and then it is possible to draw the wire out from the reel by oneself.

The winch itself reels the wire in. The reeling begins when the throttle lever is pressed and stops when the throttle lever is in neutral, and the drivelever in position for driving forward.

The reel of the winch does not rotate when the tracks are not rotating when one of the gears are selected.

The winch has an overload safety. The safety is not adjustable.

NOTE! If the winch latch is not released at the end of the draw situation, couple the gear forward and pressing the throttle lever push the latch lever to free position at the same time.

Using the winch

1. Fasten the wire in subject to be towed, lock the latch and back the machine.
2. Fasten the wire in subject to be towed, keep the gear in neutral, press the brake and couple the winch. The machine can be anchored for instance at a tree.
3. Fasten the wire in a tree or something else and couple the winch. By using the winch you can be drive forward with the machine at the same time, for instance by loosening the stucked machine.

NOTE! The reeling speed of the winch is smaller than the speed of the 2nd gear. Check that the wire stays not wholly under the machine or either caught in the track carrie.

NOTE! So that the tracks would not be damaged or the machine fall down, make sure that when pulling the machine the wire runs lengthwise with the machine.

NOTE! The winch is meant to pull the subjects or the machine on the ground. Don't use the winch as a lift.

NOTE! The speed and pulling power of the wire is depending on the diameter of the reel (with wire).

NOTE! Do not pull in loose wire on the reel.

WARNING! The direction of rotation of the reel is changed with the position of the drivelever. Do not drive the winch against the latch.

LOADCYLINDER

With the load cylinder between the basic machine and the trailer (draw shaft) it is possible to change the position of the front of the basic machine by the circumstances.

The load cylinder is controlled with the lever on the left side of the dash board.

1. The control lever is pushed forwards = the basic machine "floats" freely, in other words, it freely follows the ground. This position is recommended for constant use.

NOTE! In this position the control lever is locked with spring.

2. The control lever in the middle, with springs centered position = "rigid position". The position of the basic machine is regard to the trailer is stationary (not floatable). This position is recommended for use only when driving in soft snow without any tracks and for instance by crossing the ditches.

3. The front of the basic machine goes down from position 2 by pushing the lever forward. The spring load returns the lever to the "rigid" position (2) when you loose your hold.

CAUTION! Do not turn the machine sharply when you press the front down.

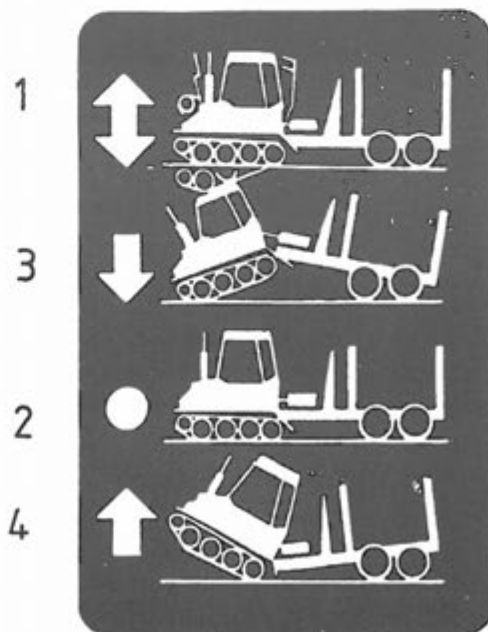
4. The front of the basic machine goes up from position 2 by pulling the lever backwards. The spring load returns the lever to the "rigid" position (2) when you loose your hold.

Practical example: Crossing a ditch

When approaching the ditch rise the front a little. Before the tracks of the basic machine has crossed the ditch lower the front so that the tracks touch the ground on the other side of the ditch.

Drive on with the "rigid" load cylinder until the trailer has crossed the ditch.

Keep on driving with the load cylinder in the "floating" position 1.

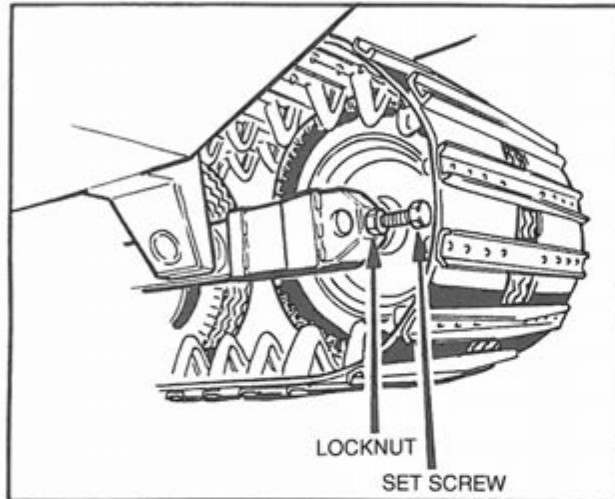


Load cylinder positions.

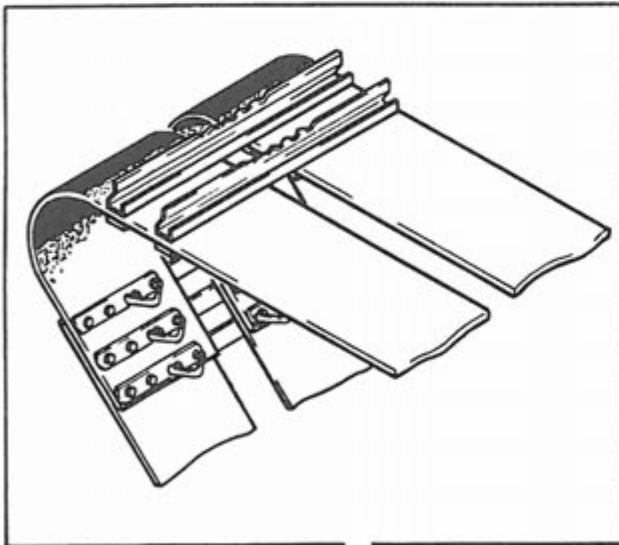
TRACK AND TRACK CARRIER

TENSION

The tension is correct when the track just gets loose from the second bogie wheel counted from front and Terri is standing on a plane base. The tracks are to be tightened separately by moving the rear bogie wheel. When the screw 1 is turned clockwise, the tracks will tighten. Lock the set screw with the nut.



CHANGE OF THE TRACK (SNOW TRACKS)



- Drive Terri so that the joint of the track is in front between the drive shaft and the front bogie wheel, or lift up Terri at the rear end and place the joint between the rearmost bogie wheels.
- Loosen the tension of the tracks as much as possible

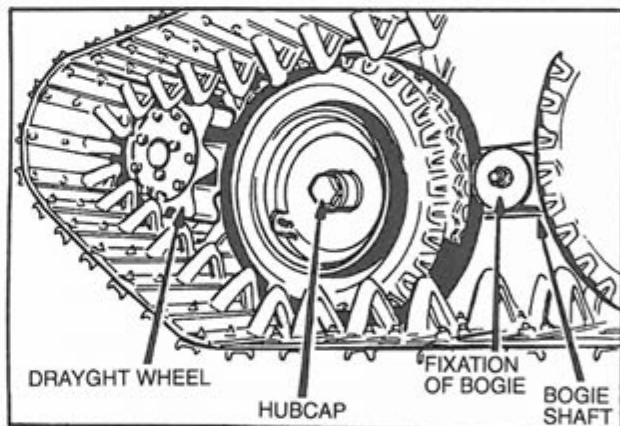
- Open the bolts holding the tracks bars (3 pcs) in the track joint and pull out the track.
- Assemble the new track. There is a special tool ET 30 - 21 to facilitate the jointing. With the tool the ends of the tracks can be tightened together.

NOTE! When assembling the special snow track, the broader rubber belt has to be outwards, and turned so that the smooth side of the trackbar meets the level of snow.

CAUTION! The snow tracks are designed for moving in very hard conditions, so the bearing surface is great and the construction light. So the snow tracks may not be used in summer, only in snow.

TRACK CARRIER

The track carrier consists of free moving bogie levers with pneumatic rubber tires as the snow does not gather into the rubber tires. The air pressure in the tires has to be 6,5 kp/cm² (590 kpa) min.



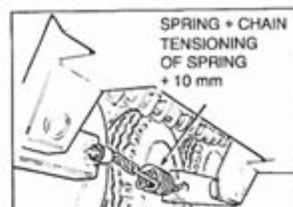
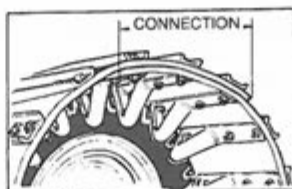
CHANGE OF BOGIE WHEELS

- Loosen the tension of the track.
- Lift the machine a little bit up, support properly, or drive the machine to a leaning position so that the side to be fixed is upwards. Put a club between the upper and the lower part of the track so the track gets loose from the wheel to be changed.
- For pulling out the wheel there is a tool, part number ET 20-20. It includes in the tool set.
- Remove the dust cover and remove the cotter pin and the locking nut of the bearing.

- Pull the wheel off from the shaft.

Assembling is done in reverse order. Check that the bearings are properly tightened. Some clearance is allowed.

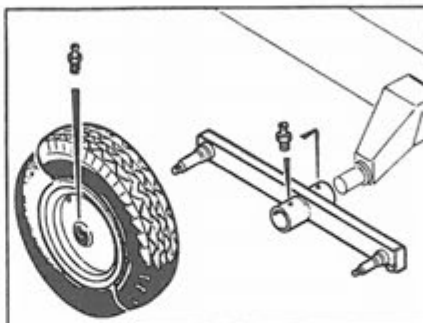
NOTE! When changing the rearmost bogie wheel, the track joint must be opened.



LUBRICATION

Bogie wheels

There is one grease nipple in every bogie wheel, and two in the joints of bogie levers. The lubrication with the grease gun is to be made daily.

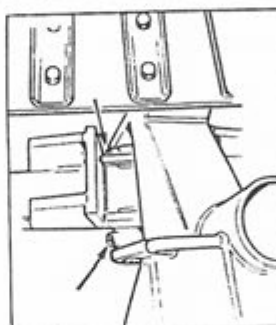


Bogie wheels.

Trailer

The air pressure in tires is 6,5 kp/cm² (590 kpa). There is a grease nipple in the wheel hub and two in the joints of bogie levers. The lubrication with the grease gun in periods of 40 service hours.

Use the Litium LGTM 3 in wheel bearings and molybden disulfide grease in bogie levers.

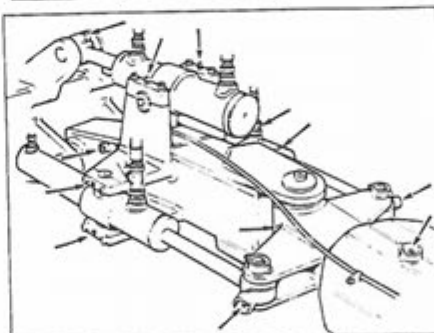


Trailer.

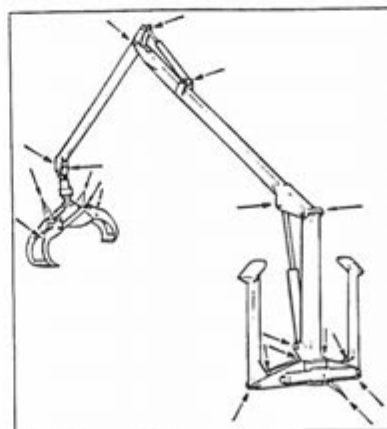
Draw bar

The sleeve in front of the trailer, the articulated pins of the draw shaft, the fixing pins of the steering- and load cylinders as well as the eye bearings of the piston rod have grease nipples.

The lubrication with the grease gun in periods of 40 service hours. Use Litium LGTM 3 grease.



Draw bar.

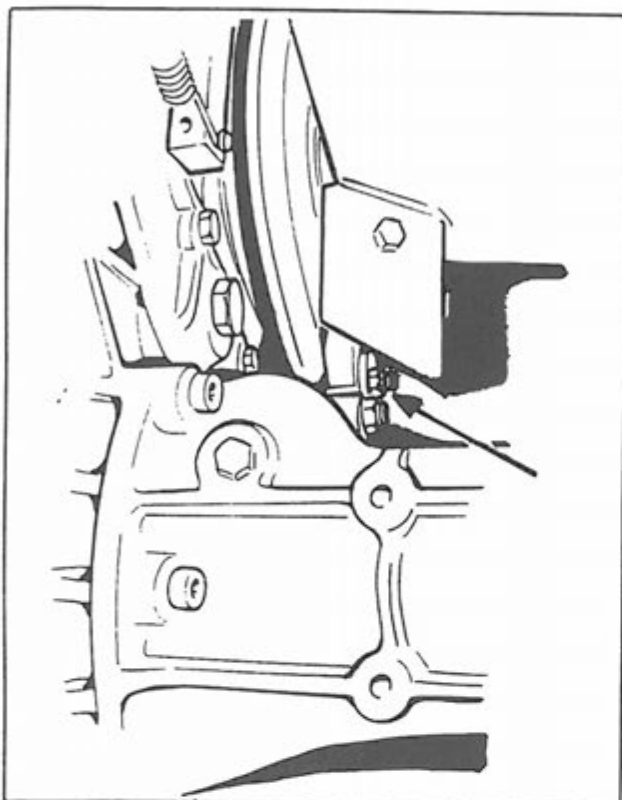


Crane.

BRAKES

THE DRAW MACHINE

- Hydrostatic brake
- Mechanical parking brake



Adjust of parking brake.

THE TRAILER DRIVE

- Hydraulic multiple disc brake

Hydrostatic brake (driving brake)

Hydrostatic transmission is operated with the drivelever. When the drivelever is in middle position there is no oil flow to the basic drive engine it is fully closed and the gear box, drive gear and the tracks are locked.

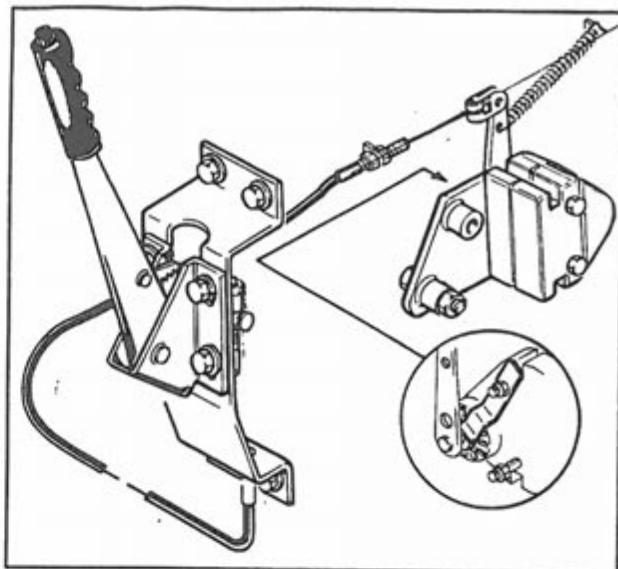
When moving the drivelever to middle position from highest drive speed causing immediate stop of the machine. The adjusting of drive speed/braking for instance in steep downhill can be done with the drivelever and gas pedal together.

NOTE! Trailer drive must allways be engaged when driving steep hill down.

REMARK! The hydrostatic brake is no parking brake. Use the mechanical parking brake for parking.

Mechanical parking brake

The parking brake is mechanical disc brake located at the gear box. The brake is connected with the lever in the cabin. The parking brake can be adjusted if needed with the adjusting screw in the brake caliber, which can be reachen from the front under the engine support.



MECHANICAL PARKING BRAKE

The parking brake is mechanical disc brake located at the gearbox. The brake is connected with the lever in the cabin. The parking brake can be adjusted if needed with the adjusting screw in the brake caliber, which can be reached from the front under the engine support.

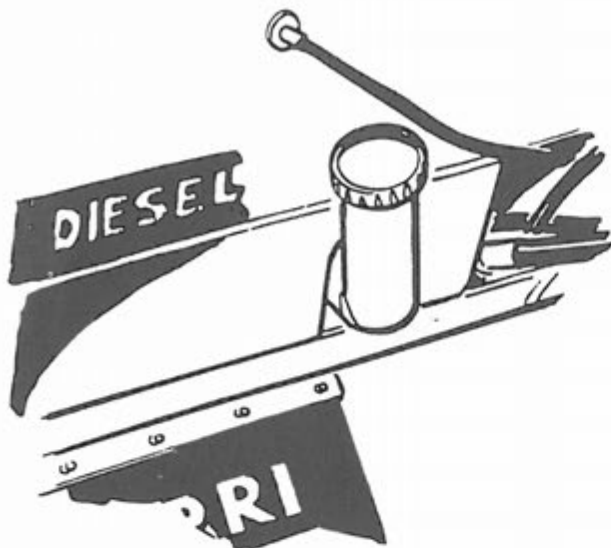
MULTIPLE DISC BRAKE OF THE TRAILER DRIVE

The brake of the trailer drive is functioning with ON/OFF principle. The brake of the trailer drive is used by electric switch in the cabin. With the switch iscontrolled the hydraulic pressure to the brake calibres which are in the engines of trailer drive, which is loosened the brake. When the hydraulic pressure goes down the brakes are engaged automatically.

ADJUSTMENT OF THE PARKING BRAKE

The adjustment of parking brake is made with the adjusting nut of the brake.

FUEL



Terri 2040 Diesel is equipped with a diesel engine requiring diesel fuel no. 2. The following fuels meet the requirements of diesel fuel no.2: diesel oil, heating oil (Finland).

IN SUMMER

When the temperature is -5°C or higher, the heating oil can be used (summer quality).

IN WINTER

When the temperature is under -5°C the taxed diesel oil are to be used, as these brands stand better cold without solidfuing. However, if the fuel begins to freeze, as much as 30 % kerozin can be mixed in to better the liquidity.

NOTE! Any kind of non-freezing stuff may not be used as these may damage the fuel injenction pump and they can also easily clog up the fuel filter.

REFUELING

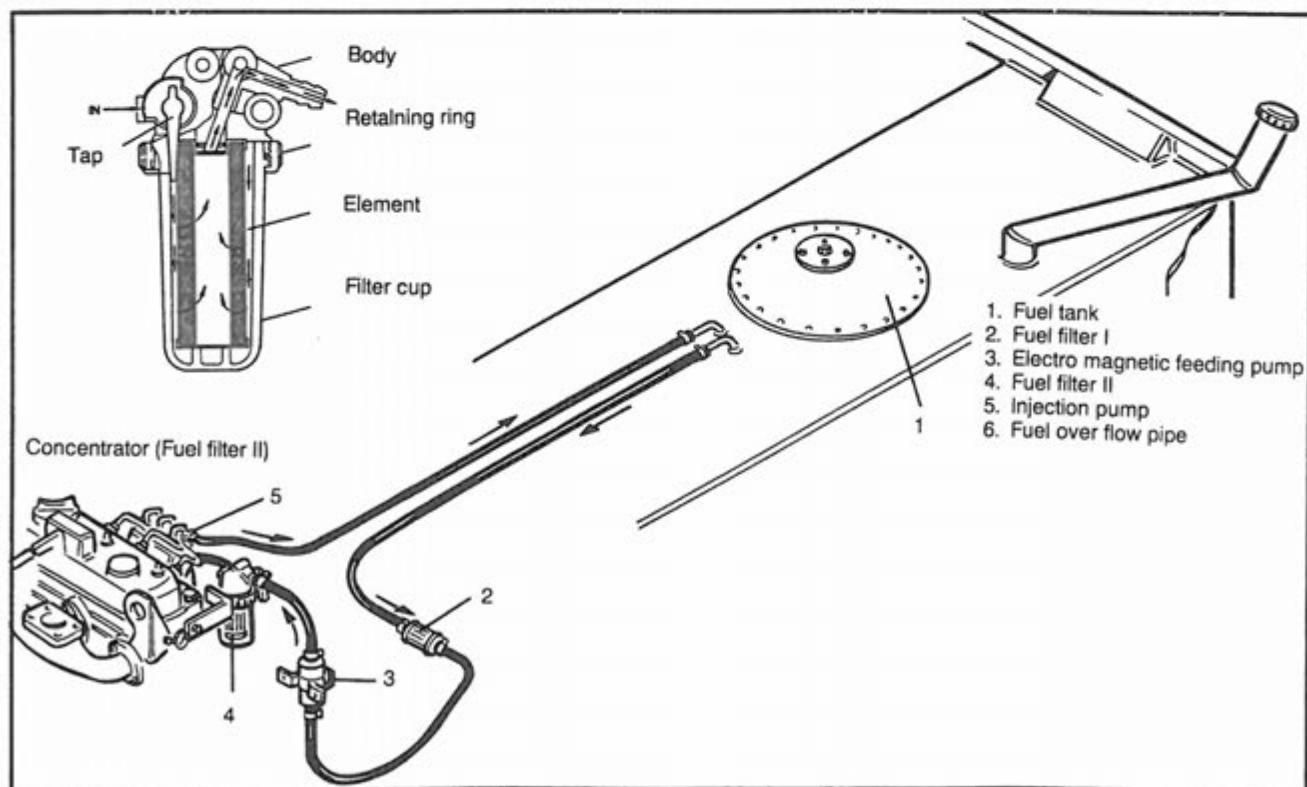
IMPORTANT!

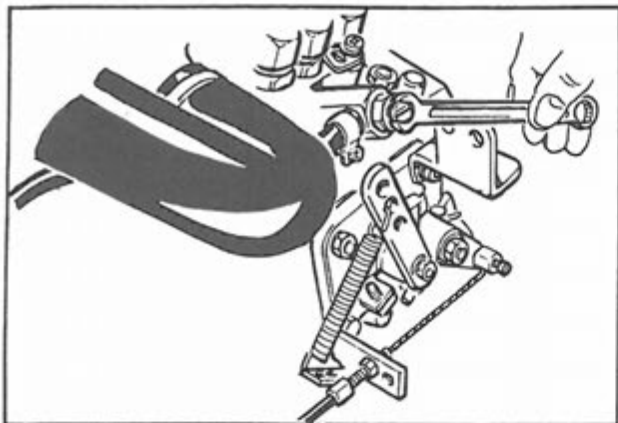
Be careful with the fuel. It is important that there is no water in it or that any snow does not get in the fuel tank. Do always strain the fuel so that no foreign matters get into the fuel system. Both water and the foreign matters may damage the injection pump.

The fuel tank is located at the rear end of the chassis. The filling gap is behind the cabin on the left.

AIRBLEEDING

In case of the fuel has run out or some fuel hose is loosened, the fuel system is to be bled. Open the bleeder-screw at the fuel injection pump and switch on the current, then the electric fuel pump feeds the





FUEL SYSTEM

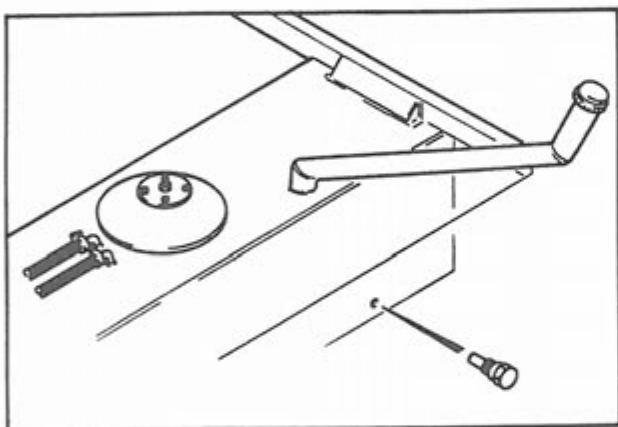
GENERAL

The fuel system includes the fuel tank at the rear part of the chassis, the fuel fore-filter, the electrical transmission pump, the fuel filter and the fuel injection pump which rations the fuel equally to various cylinders.

The most important maintenance concerning the fuel system is to take care of that the fuel is quite pure and there is no water in it, as the construction of the injection pump is very precise and it can be damaged by rust or foreign matters.

fuel. Tighten the bleeder screw when there are no air bubbles in the fuel running out.

NOTE! If the engine does not start or it runs unevenly, loosen the nozzle pipe and let the fuel run out until there are no air bubbles more and tighten the nozzle pipe again.



The fuel tank has to be emptied once a year so that ev. water does not get into the injection pump. Decline the engine to the left and open the plug. The magnetic drain plug is located on left side behind rearist bogie shaft. In order to keep the engine reliable in running and the effect in its optimum value, so called diesel equipment (nozzles, injection pump) have to be checked regularly in some diesel repairing shop. The nozzles have to be checked in 1600 service hours' periods. The injection pump has to be checked in about 5000 service hours' periods, or when the engine is overhauled.

MAINTENANCE

The fuel fore-filter is a disposal element which has to be changed at least every autumn before the season of cold.

The filter element in the fuel filter is disposable, and is to be changed after 400 service hours.

Close the tap.

Screw out by hand the filter cup and pour out the fuel and ev. water.

Pull out the filter element and push on the new one.

Moisten the packing of the filter cup and screw on the cup again by hand.

The fuel tank has to be emptied once a year so that ev. water does not get into the injection pump. Decline the engine to the left and open the plug.

In order to keep the engine reliable in running and the effect in its optimum value, the so called diesel equipment (nozzles, injection pump) have to be checked regularly in some diesel repairing shop.

The nozzles have to be checked in 1 600 service hours' periods.

The injection pump has to be checked in about 5 000 service hours' periods, or when the engine is overhauled.

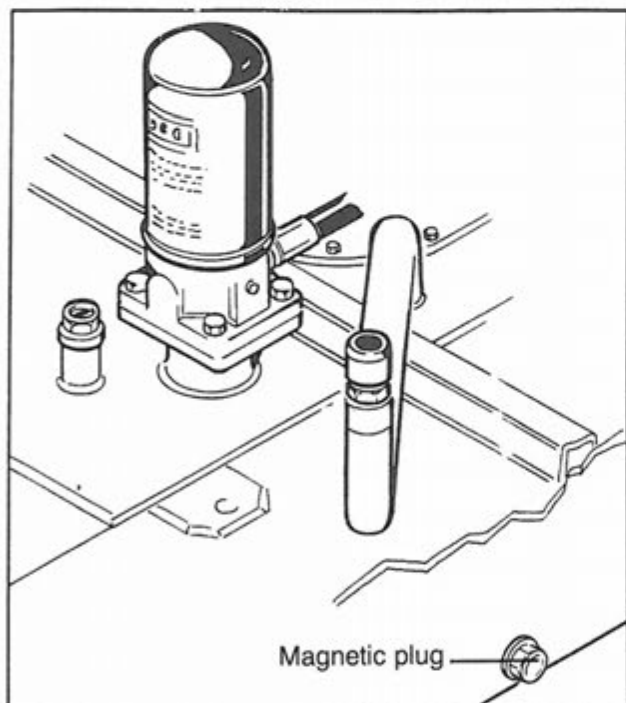
HYDRAULIC SYSTEM

The working hydraulic system has a return filter. The filter element has to be changed regularly in 400 - 450 service hours' periods, at least once a year. Open the filter by turning it counterclockwise. The hydrostatic drive has a pressure filter. The filter element has to be changed regularly with 400 - 450 service hours' intervall.

NOTE! Change the element when the machine is cold. Grease the packing of the new filter element before mounting it.

The hydraulic oil is to be changed at least once a year, preferably when the season of cold begins. The humidity of the air outside has fallen and so one can be sure that there is no water in oil to be used under the winter season.

NOTE! When filling up the hydraulic oil tank a separate filling filter has to be used absolutely.



HYDRAULIC OIL TANK

The hydraulic oil tank is located in the chassis of the machine. The oil amount is correct when the oil level is between marks on the dipstick. The dipstick is in the red cork between the engine and the cabin. In the instrument panel there is a warning light for the hydraulic oil minimum level. The filling cap is between the cabin and the engine on the left.

NOTE! There is a 0,4 bar excess pressure in the hydraulic oil tank and that is why the tank cork absolutely has to be of the original type.

The magnetic drain plug is in the chassis on the left in front of the bogie shaft farthest to the front.

Oil quality recommendation:

Summer use, when temperature is over -10°C , ISO standard VG 46 mm^2/s , with viscosity index at least 150.

Winter use, when temperature is below -10°C , ISO standard VG 22 mm^2/s , with viscosity index minimum 150.

NOTE! Recommended oil for winter use is not allowed to use when hydraulic oil temperature exceed 60°C .

NOTE! For use all seasons is recommended full syntetic (s.c. biologically dispensive) hydraulic oil for instance Neste biohydrauli 46.

WARNING! Use of turnip rape, or rape based hydraulic oils is forbidden.

First filling at factory Neste hydrauli 46.

COOLING SYSTEM

The engine is liquid cooled. The liquid getting warm in the engine is cooled in the radiator by a flow of air done by a fan rotating with the engine.

In connection with the engine there is a waterpump which makes the liquid circulate in the system. There is also a thermostat in the system to keep the temperature even.

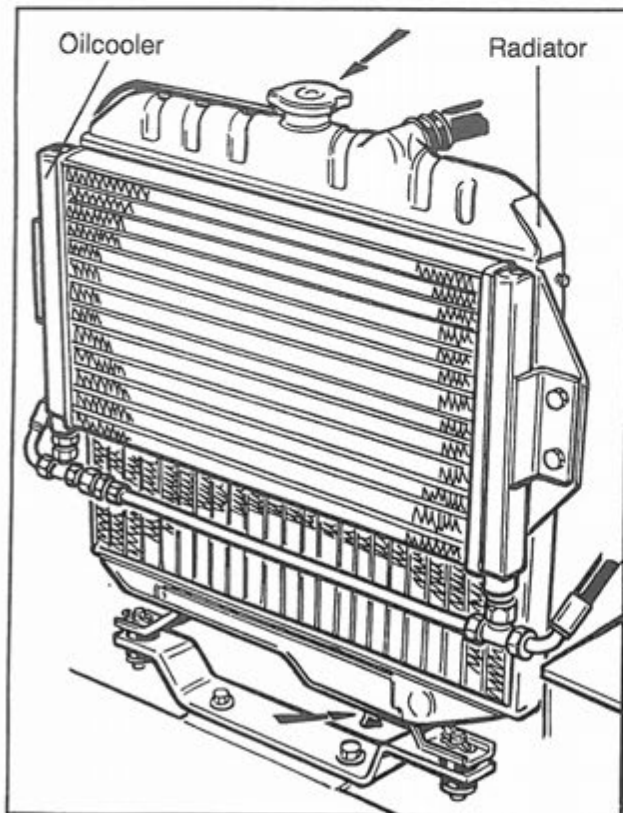
As cooling liquid in winter an antifreeze enduring about $-45\text{ }^{\circ}\text{C}$ is to be used. The antifreeze has to be corrosion resistant or some rust inhibitor has to be added in it.

REMEMBER! Only in summer when the temperature is over 0°C it is possible to use water. We recommend, however antifreeze to be used throughout the year.

NOTE! The amount of liquid is correct when the liquid surface is 20 mm under the filling gap.

CAUTION! There is excess pressure in the system. When the engine is hot, open the pressure cork carefully and let the excess pressure come out before you open the cork entirely. The hot steam may burn your hands.

The tension of the fan belt is to be controlled regularly. The tightening instructions - see "Electric system".

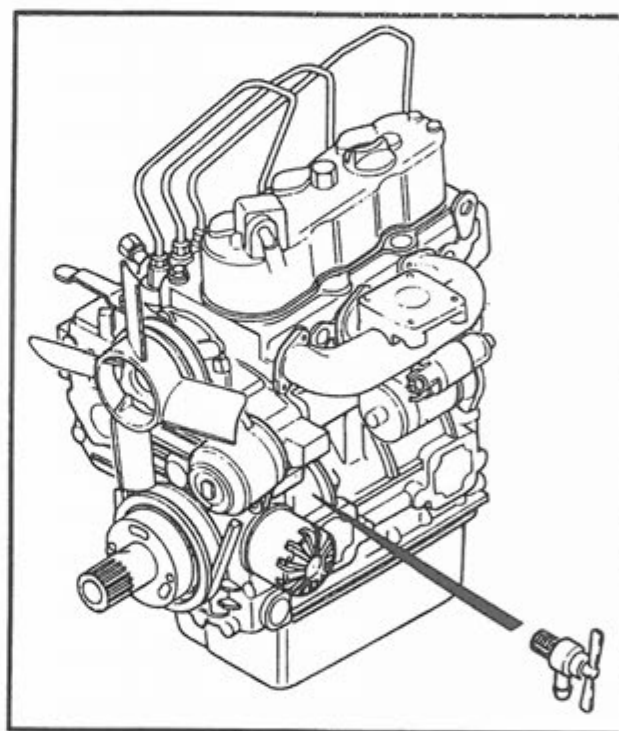


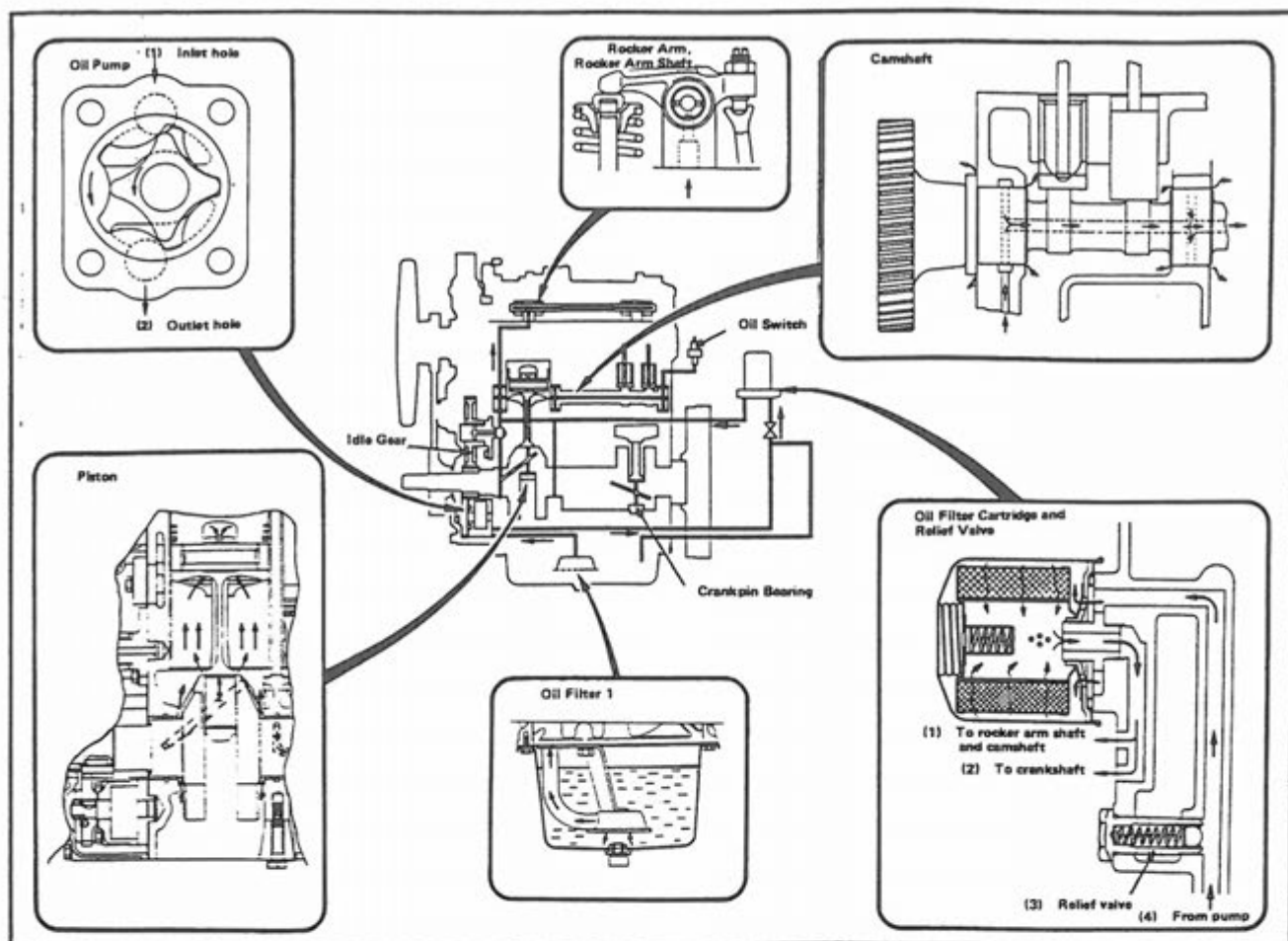
EMPTYING

At the bottom of the radiator there is a tap.

NOTE! There is a rubber plug in the tap which has to be removed first.

In the engine there is also another tap through which the liquid from the engine can be drained. This tap is located on the front side of the engine beneath the injection pump. Capacity of the system 4,0 litres.





LUBRICATION SYSTEM

There is a pressure oil lubrication system in the engine. The oil pump rotated by the crankshaft is sucking the oil through the pick-up strainer in the oil pan and is pressing all the oil through the oil filter along the canals to the bearings of the crankshaft, gears and so on. Then the oil runs back to the oil pan.

The oil pressure is adjusted 2,5 - 3,5 kp/cm².

The warning lamp for the oil pressure gets on when the oil pressure in canals goes down under 0,5 kp/cm².

Oil volume

- a. 4,5 l without filter
- a. 5,1 l with filter.

The lubrication oil has to be suitable for diesel engines according to API class CD/SD (MIL-L-2104C) for heavy diesel use.

In summer

- temperature over 25°C, viscosity SAE 30
- temperature 0-25°C, viscosity SAE 20.

In winter

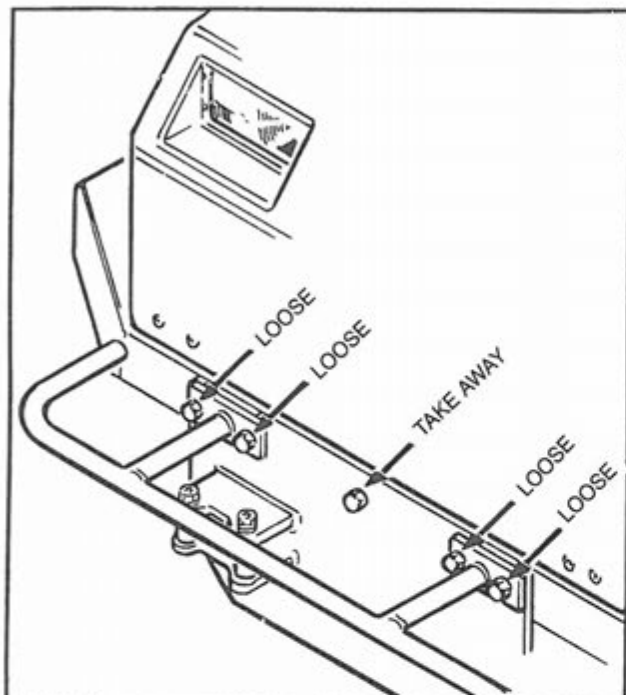
- temperature below 0°C, viscosity SAE 10 or 10W/30.

The oil amount is correct when the oil surface is between the Max. and Min. marks on the dipstick.

ENGINE SERVICE

CHANGE THE OIL

- Loosen the screws of the undershield from the bumper and let undershield fall down.



- Push the proper vessel between the tracks.
- Open the drain plug in the oil pan through the gap in the bottom.

NOTE! The draining is easier if the engine is warm.

Pour the new oil through the filling cap in the top of the engine. After a while check with the deepstick that there is the right amount of oil.

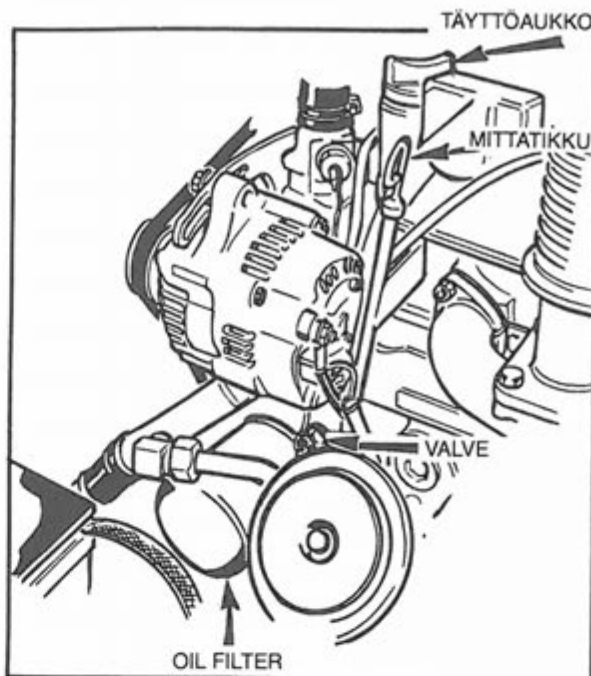
THE CHANGE PERIOD

The lubrication oil has to be changed for first time after 50 service hours. Thereafter the change period is 100 service hours.

OIL FILTER

The oil filter is to be changed in periods of 200 service hours (every second time when the oil is changed).

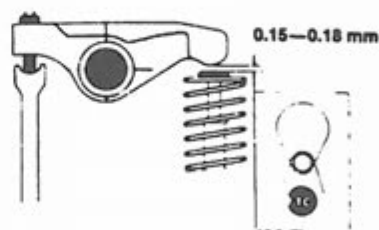
Screw out the old oil filter by hand, moisten the packing of the new one with engine oil and screw on the filter by hand.



Start the engine and let idle a couple of minutes, at the same time check that the filter has no leakage in the fastening. Stop the engine and add oil to the upper mark in the dipstick.

NOTE! If the engine is to be run in very dirty conditions, also the pressure regulating valve has to be removed and cleaned. The valve is located under the oil filter.

The engine valves are in the cylinder head. When rotating the cam of the cam shaft lifts the tappet the push rod turns the crab bars so that the valve opens. The valves have springs which strive to keep the valves closed.



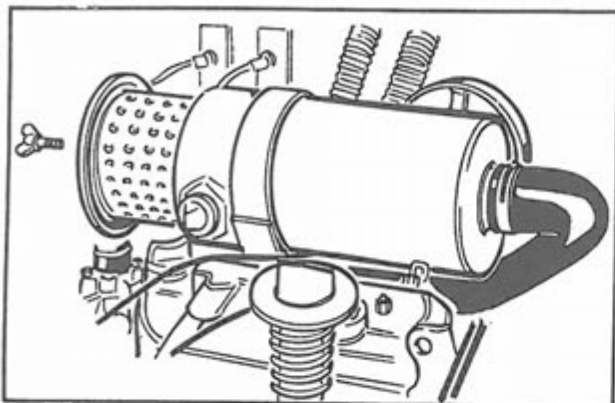
Valve clearance

VALVE CLEARANCE

The valve clearance is adjusted when the engine is cold. The correct clearance is 0,15-1,18 mm when the valves are closed and the piston at the top dead center.

AIR FILTER

The air filter is located on top of the engine. The filter is of dry type and is equipped with a paper filter element.



The filter element is to be cleaned in 150 service hours' periods with compressed air, see the picture.

The filter element is to be changed in 400 service hours' periods or at least once a year.

NOTE! A damaged element has to be changed absolutely.

REMARK! At very dusty conditions clean the filter every 40 h.

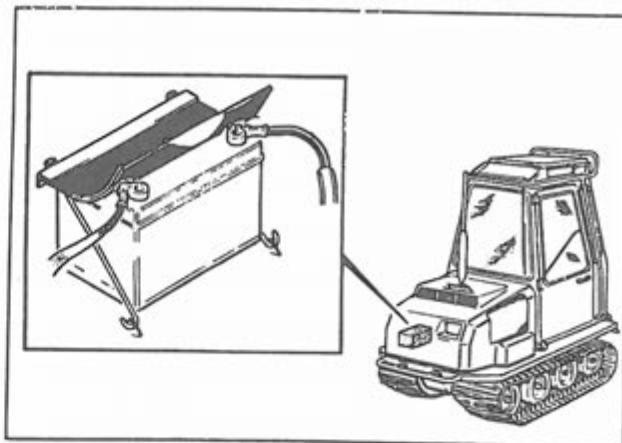


Cleaning the filter

CHANGE

- Open the hood.
- Loosen the air cleaner from the stay.
- Open the wing nut at the end of the cleaner, pull out the filter, clean or replace with new filter.

ELECTRIC SYSTEM



The system includes the battery and the alternating-current charger which charges the battery. There are two head light forward including long- and short distance lights. By the side there are a rear light, a parking light and a blinker fixed in a resilient arm. There is also 4 pcs working lights and the meter lighting. By turning the ignition key to the position 1 the charger is coupled on/current on, position 2, glowing on, position 3, the starter engine is coupled on. When the hold from the key is loosened, the key returns to position 1.

In the alternating current charger there is a rectifier changing the alternating current to direct current so that the battery could be charged. The direct control thyristor rectifier also keep the battery right charged.

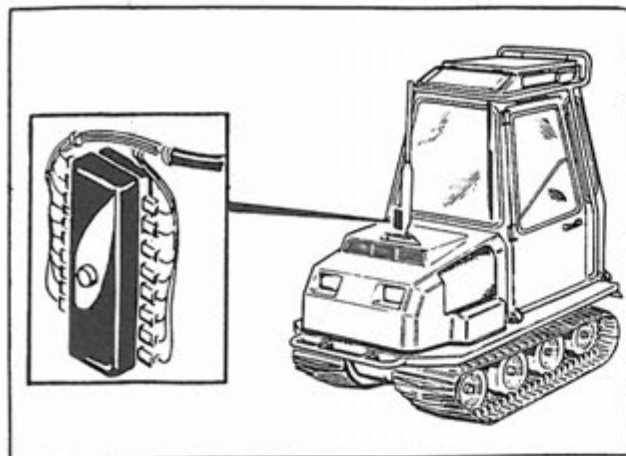
The components	Terri	Trailer
Battery	12V/88 ah	
Charger	12V 480 W (40A)	
Front light	12V 60/55W/H4	
Rear light	12V 5W	
Working light	12V 55W/H3	
Parking light	12V 6W	12V/5W
Glow Plug - resistance measuring about 1,6		
Fuse box		8 x 16A

CHARGER/FAN BELT

The fan belt rotates the charger. As the effect of the charger is relatively great, it is important that the fan belt is taut. The tension is right when the belt can be pressed by finger about 7 mm. The belt is tightened when the charges is pushed forward. Lock properly the adjusting screw after the tensioning, be sure that charger is properly grounded with the adjusting screw.

The tension of the fan belt has to be checked once a week or in periods of 40 service hours.

NOTE! When the engine has started the warning light for charging has to go out (crg). If the light does not go out, the fan belt is slack.



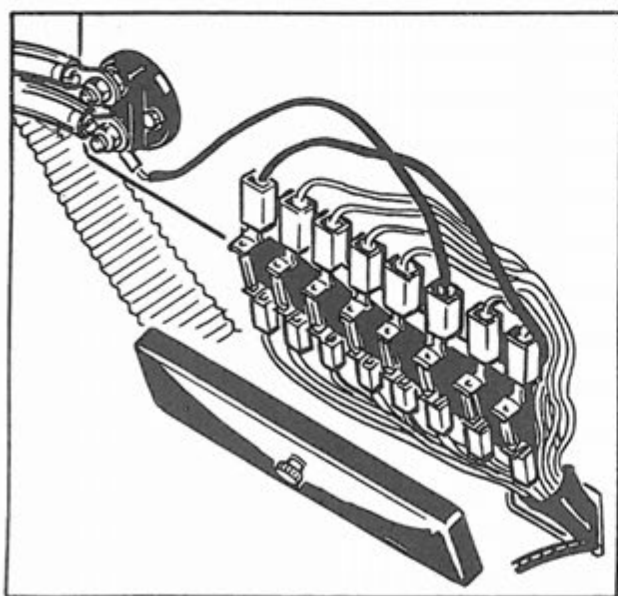
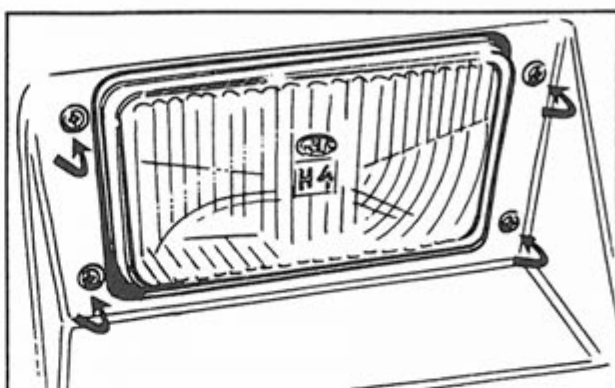
CAUTION! If you have to weld Terri or the trailer, the charger has to be loosened from the system by loosening the wire from the hubs of the battery. On machines with 2-stick handling must also electric cables (8 pcs) be taken off from the hydraulic ventill

In case of that the fuse has blown, turn the all levers to the position "open". Change the fuse on the information of the fuse list and notice that the fuse has the right size, coupled on all the functions one by one and controll which one is causing the blowing. When the fault is located turn off the current from the main current switch for the repairing time. The cabin, the engine and the frame ground connection causing fire danger.

WHEN YOU ASSEMBLE ELECTRIC ACCESSORIES TO THE MACHINE, THE COUPLINGS HAVE TO BE APPROVED BY THE MACHINE MANUFACTURER.

LIGHT ADJUSTING

The lights have been fixed with four screws which also are adjusting screws. When tightening the lower screws the light beam goes up. When for instance the screws on the left are tightened, the light beam turns to the left.



TRANSMISSION

Terri vehicle has a hydrostatic transmission connected to the mechanical gear box. The hydrostatic transmission circuit is closed. The hydraulic transmission pump is mounted to the crankshaft of the diesel engine. The hydraulic pump is adjusted with the drivelever.

The power from the adjustable pump drives the main driving engine which is connected to the gear box and the hydraulic engines of the trailer drive. The driving engine transmits the power to the basic machine 2 step, pre-selective gear box.

From the gear box of the machine the power is transmitted via differential to the driveshafts, draw wheels and to the tracks. In the gear box of the machine is a mechanical differential lock and the trailer drive has automatic hydraulic lock.

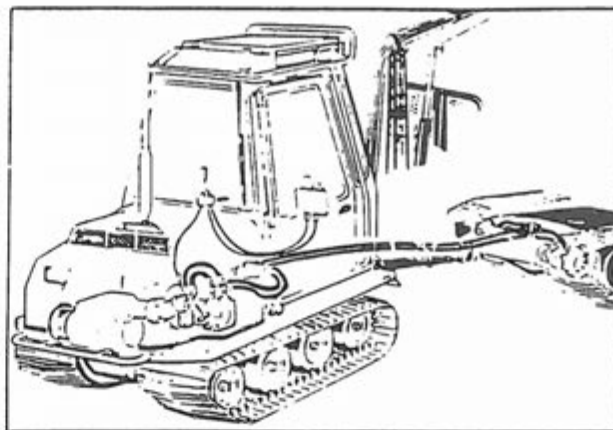
The trailer drive is electrically engaged with a switch at the dash board.

GEAR BOX OIL RECOMMENDATION

API GL4/GL5
SAE 75W/90 syntetic

CHANGE OF OIL

1st change after the 50 service hours
The next changes is to be done in periods of 400 service hours.



HYDRAULIC POWER OUTLET

As a standard feature there is a hydraulic power outlet in the machine. The fast couplings for the pressure and return hoses are behind the cabin.

NOTE! The outlet tubes are connected with a connection hose always has to be in its place when the outlet is not in use.

The pressure hose of the outlet is equipped with a FEMALE fast coupling. A grab-loader, a hydraulic ski track making machine or any other device can be connected to the outlet.

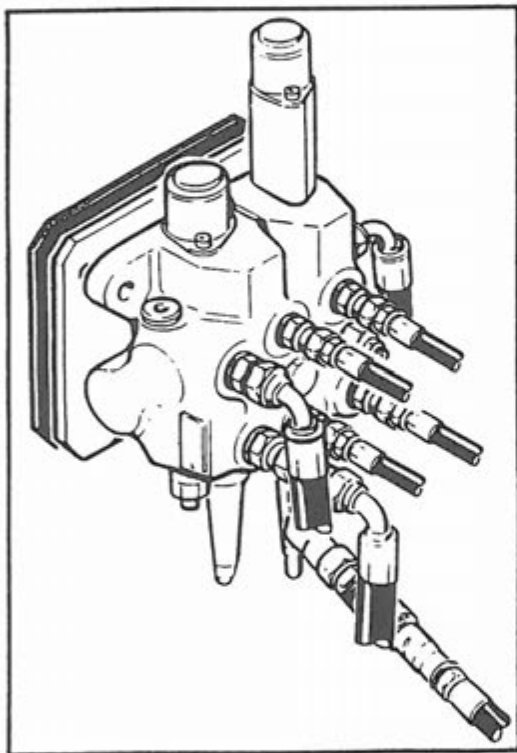
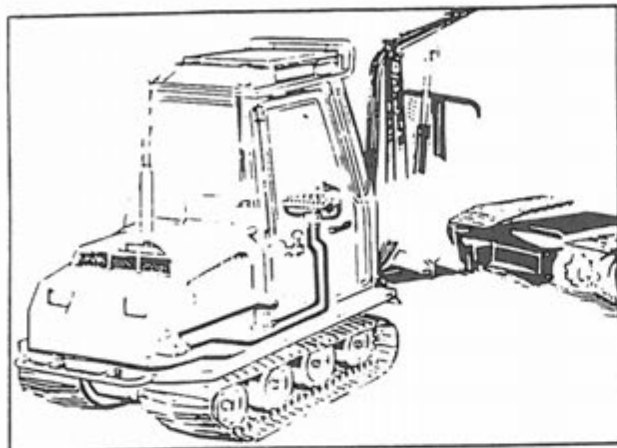
NOTE! The equipment used must have the overflow for the hydraulic oil or such a valve/ valve board which has the same.

The hydraulic outlet can be used regardless whether the machine runs or takes a turn.

Failure	Cause	Repair
Lack of power	incomplete function of the diesel engine	adjusted the engine
	air within the hydraulic system	add oil
	hydraulic oil pump failure	change the pump
	wrong oil	check oil recommendation
	power transmission feeding pump does not work	check the pump condition
	too low oil pressure	check the max. pressure
Overheating	oil cooler or pipes are clogged, safety valve is open all the time	check the oil and clean both coolers radiators
	amount of oil is too small	add oil
	leak on suction pipe to the pump	check the packings and joints
	worn-out oil pump	change the pump

WORKHYDRAULIC

GENERAL



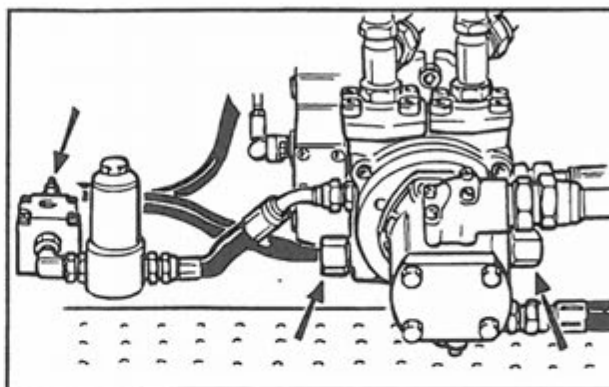
Hydraulic equipments operates a great deal of the Terri functions and that's why regularly service and maintenance is necessary.

Hydraulic system is sensitive for the uncleanness. To avoid damages and faults in operations complete cleanliness must be obeyed during all the hydraulic service- and assembling works including the oil adds and the oil changes

The uncleanness grains size in the hydraulic system are measured in micrometers and the size of harmful grains changing depending of the subject between 5-50 micrometer. The grains from causing the damage and leading the grains to the fault in operation can not

be seen the human eye. Because of that follow the giving change periods concerning the filters. The hydraulic of Terri- terrain vehicle is designed for demanding conditions and therefore it demands equally hydraulic oil.

With in the hose damages take care of removing uncleanliness from the broken place, place of joint and new hoses. In case of the joint stays open for a long time the connection must be closed by plugs. Repairing the hydraulic components must be leaved to the experts.



HYDRAULIC PUMP GEAR PUMP

flow 33 l/min/3000 rpm.

TANKS

1. Check when the change of hydraulic oil (at least once a year), that the tank is clean. Wash the tank necessarily with petrol. **DO NOT USE COTTON WASTE OR ANY KIND OF CLEANING SCARVES!**

2. Use a separate filter when filling the hydraulic oil. From the system the oil returns to the tank via returnfilter that's why the system have 0,5 bar excess pressure.

PERFORMED POSSIBLE NEEDED OIL FILLING WHEN THE ENGINE IS STOPPED, BECAUSE WHEN THE ENGINE RUNS THERE IS A EXCESS PRESSURE IN THE OIL FILLING PIPE CAUSED BY RETURFLOW.

3. Start the engine after the filling and move the pistons in the hydraulic cylinders back and forward to get out the air of the system. Check the oil amount with the dipstick.

4. The warning light alarmed when the amount of hydraulic oil has suddenly went down.

5. Loud or low-powered pump, pressure vibrations in the hydraulic pipe system and foaming oil in the tank can be the sign of that the pump suction pipe leak. To avoid damaging the pump repair the suction pipe leaks immediately.

MEMO

- Check amount of oil regularly every day.
- Check the leaks.
- Observe the cleanliness.
- Follow the oil quality recommendations.

TAKING INTO USE NEW HYDRAULIC PUMP

1. Check the amount of hydraulic oil.
2. Fill the hydraulic pump with oil.

Run the engine with the starter engine 4-5 times about 15 sec. periods when engine stop is on. Keep between the periods a. 20 sec. break.

3. Start the engine and let it run on idling for a. 10 min.

Control the noises which are due to functioning of hydraulic pump during the idling of engine. If the pump sounds unusually, stop the engine immediately. Check the joints, tightened the intake hose and tightening the joints if necessary. Start again the engine with the stopper on in 15 sec. periods 4-5 times with 20 sec. breaks.

Use all the hydraulic functions slowly back and forward avoiding the end positions.

CHECKING AND ADJUSTING OF HYDRAULIC PRESSURES

Stop the engine always before connection of pressure meters for the hydraulic system and always before adjusting the pressure levels at the hydraulic valves.

Start the engine and read the pressure meter. Stop the engine. Do the necessary adjusting operations, start the engine and read the pressure meter. Repeat the adjusting work with reference to the foregoing until the pressure levels are in accordance with the adjusting values.

Checking the pressure levels has to be done as well under same conditions. The oil temperature has to be 50°C.

The pressure level of the main safety valve for steering of machine is 180 bar.

SERVICE

For a reliable and secure functioning, the machine needs regular service and maintenance according to given instructions.

Daily controls, lubrication and small repairing works have to be made by the driver himself. Repairing- and adjusting works demands special equipments have to be done by the service workshop.

Nordtrac make schooling of service workshop personnel, informing about construction and maintenance of the machine, so that all workshops have the capability of making repair and service works properly.

Before delivery of the new machine testing and adjusting is carefully made at the factory. During the running-in period has to be done necessarily checks and adjustments.

CONTROLLING OF LOADER

2-STICK HANDLING SYSTEM

The loader ventill has a hydraulic presteering, with electrical operation. The electrical unit for each loader working movement can be individually adjusted. The loader is controlled with the top grip handles which are at the armrests of the seat.

7-STICK HANDLING SYSTEM

In the hydraulic ventill is every spindel directly operated mechanically with the stick. One stick for each movement.

USING THE LOADER

The electric main switch has to be turned on and the drive lever in the middle position and 2-stick handling systems emergency switch in position "ON". Use the loader peacefully and effectively. Adjust with gas pedal that the wanted moving speeds are realized for loaders different movements. Do not drive movements unnecessarily to the limiting stops.

NOTE! When starting the engine, the emergency switch for 2-stick handling system must be in off position.

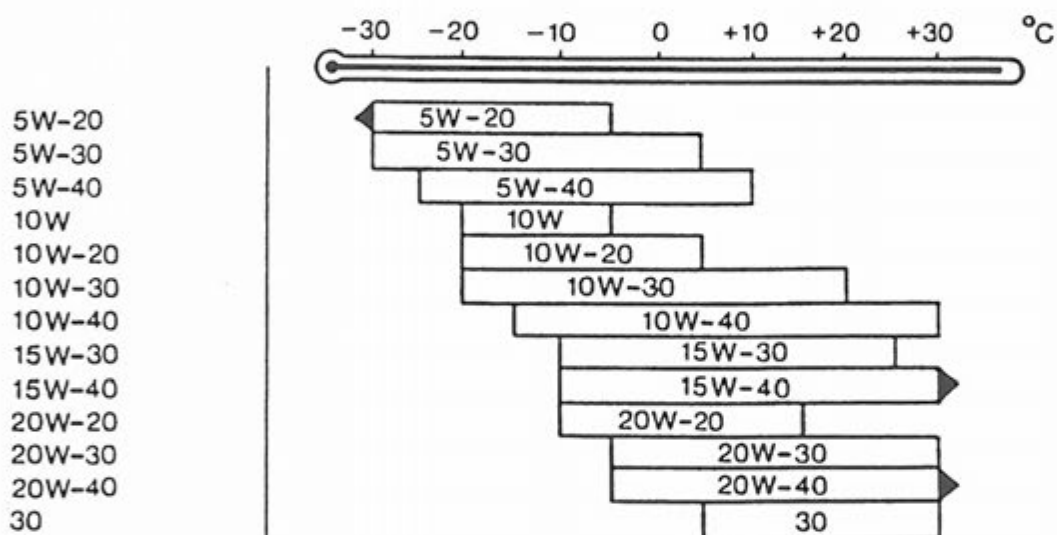
LUBRICANTS

The engine Kubota D1105	SAE 10W/30	API CD	volume	5,1	1
Hydraulic oil	NESTE BIOHYDRAUL 46	Index 250	volume	50	1
The gear box	SAE 75W/90	API GL5	volume	12	1
Lubrifications nipples	wheel bearing crane bogies arms	Litium LGTM 3 grease Molybden sulphite LGEM 2 Molybden sulphite LGEM 2			

LUBRICATION OIL TABLE

SAE-class

Temperature



SERVICE TABLE

	daily	50 h	100 h	200 h	400 h	1200 h	2000 h
Engine oil	check		change				
Oil filter				change			
Valve clearance						adjust	
Gear box oil	check				change		
Hydraulic oil	check					change	
Hydraulic oil filter					change		
Cooling liquid	check						change
Pressure filter					change		
Vertical joint	grease						
Horizontal joint	grease						
Steering cylinder	grease						
Bogie lever bearing	grease						
Draw shaft	grease						
Track tension	check						
Battery liquid		check					
Battery						clean	
Bogie wheel	grease						
Generator						clean	
Starter engine						clean	
Controls:							
— wires				grease			
— joints				grease			
— bearings					grease		
Fuel tank							clean
Fuel filter					change		
Air filter					change		
Rotator						clean	
Loader	grease						
Load cylinder	grease						

TROUBLE SHOOTING

Engine does not start

- The stop button has not been pushed down.
- No fuel, or fuel hoses/filter clogged up.
- Air leakage in fuel system.
- The nozzle tube loose, off or slack.
- The injection pressure incorrect adjusted or the nozzle broken.
- The injection timing wrong.
- The electric fuel pump does not work.

Engine does not rotate

- The battery is empty or battery cable broken.
- The starter engine does not function.
- The engine has seized.

Engine lacks power

- The ignition timing incorrect.
- The injection pump does not function properly.
- The engine overheated.
- The fuel filter clogged.
- The air filter clogged.
- The nozzle worn out.
- The nozzle tube loose or off.
- Poor compression.

Runs unevenly

- Fuel filter clogged.
- Air in fuel.
- The nozzle leaks or does not function properly.
- The lifting roller of the injection pump is worn out or leakage in valve.
- Valve clearance incorrect.
- The spring of the injection pump twisted or the pump does not function.
- Different compression between the cylinders.
- The starter spring twisted or broken.

Exhaust white or blue

- The ignition time late.
- Piston or piston rings worn out, lubrication oil comes into the combustion chamber.
- Too much oil in engine.

Exhaust black

- The ignition too early.
- The piston of the injection pump worn out, or the return spring broken.
- The nozzle clogged or the spring broken.
- The nozzle is sooty.
- The injection pressure too low.
- Not enough air, airfilter clogged.

Engine runs too warm

- The thermostat clogged.
- The fan belt loose or broken.
- Not enough cooling liquid.
- Radiator clogged.
- Radiator frozen (poor anti-freezer in winter).
- Engine is driven with standard adjustment on level over 1200 m (above sea level).

Machine does not move (engine runs)

- Gear is not coupled on.
- Winch coupled, winch wire locked.
- Drive levers wire off or joint is loose.
- Connection at adjusting lever of hydraulic pump loose.

Machine does not turn

- Too less hydraulic oil or leakage in tubes.
- Hydraulic cylinder is not coupled on.
- The tie wire of the hydraulic steering valve is loose or off.
- Trailer too light - glides sideways.
- Hydraulic pressure too low.
- Leakage in steering cylinder.
- Hydraulic oil tank is empty.



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