912E
912ES
912HM

OPERATOR'S MANUAL

HYDRAULIC

3799354 – 01/2014

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The purpose of this manual is to assist you in getting to know your Hydrema machine in the best possible way and to operate and maintain the machine safely and effectively.

Read the manual carefully before operating the machine and always keep the manual in the cab.

The manual is devided into three sections:
First part: General instructions
Second part: Operation
Third part: Lubrication and maintenance.

To ensure the constant high performance of your HYDREMA machine and that it is safe to operate, it is important always to observe the inspection intervals, which appear on the instrument display of the machine, and which are described in this manual.
We also call on you always to follow the service instructions given on the instrument display.

If you follow the descriptions in this manual you will be able to perform some service and maintenance work yourself.

If you experience problems you cannot solve yourself, just contact the nearest service department and the best possible service will be provided.

We welcome you as a HYDREMA owner and we are convinced that HDYREMA will meet your expectations.

HYDREMA

1. Front frame
2. ROPS/FOPS safety cab
3. Dumper body
4. Dumper body support device
5. Pivot/steering cylinders
6. Pivot safety lock
7. Hydraulic oil tank
8. Battery box
9. Bonnet
10. Rear frame
11. Pendulum bar
12. Stabilizer
13. Fuel tank
14. Tool box
15. Suspension (912ES and 912HM)

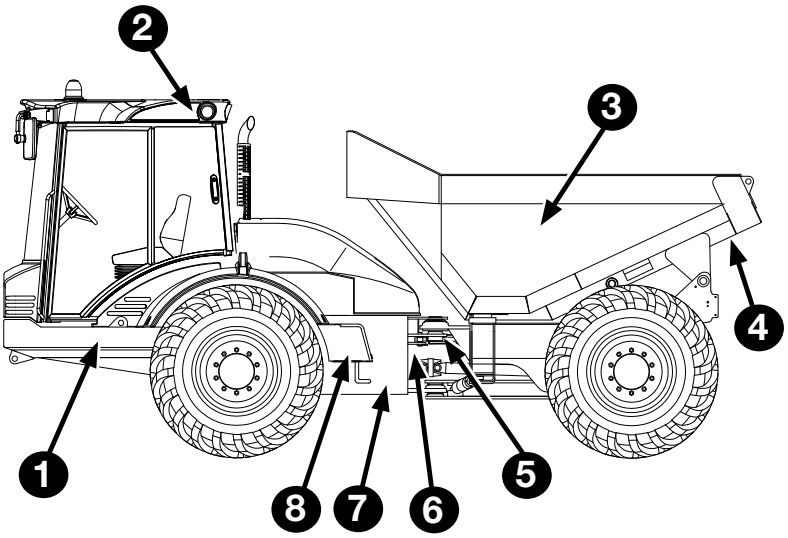


Fig. 1

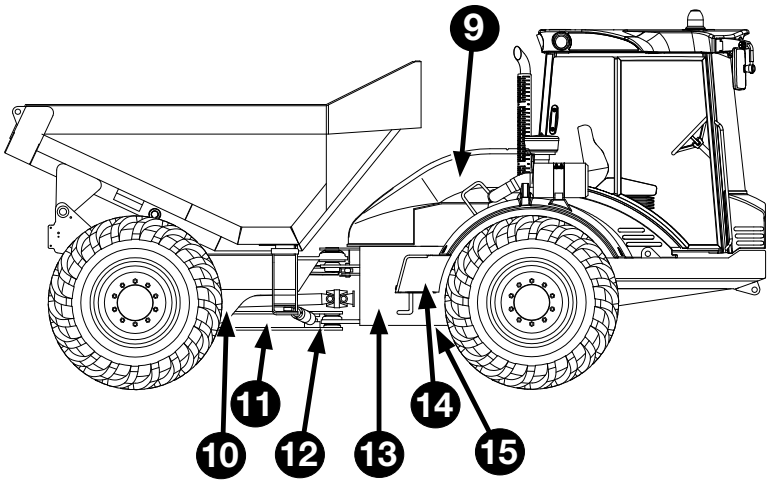


Fig. 2

Year, type and number can be read on the type inscription plate fig. 3. This information must be stated when enquiries are made to authorised workshops.

Machine no.: _____

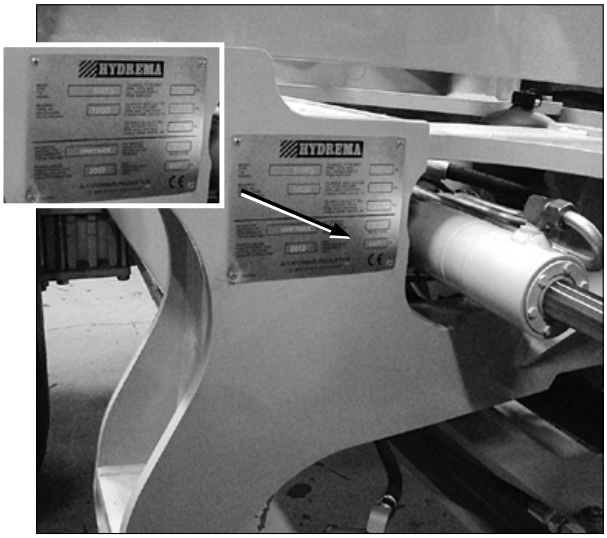


Fig. 3 Machine type inscription plate

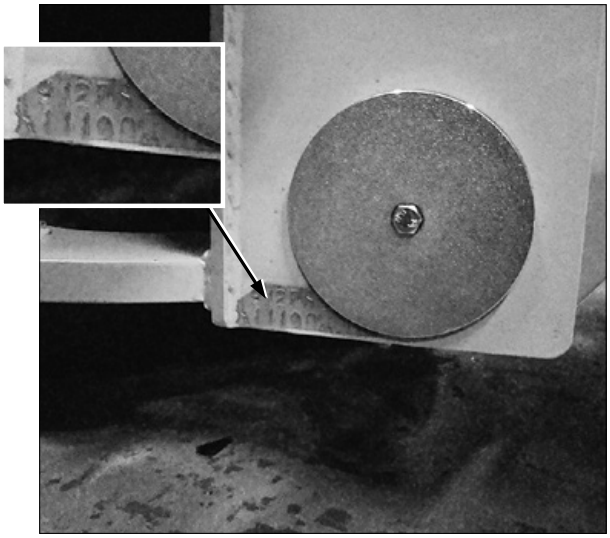


Fig. 4 Fig. Chassis no.

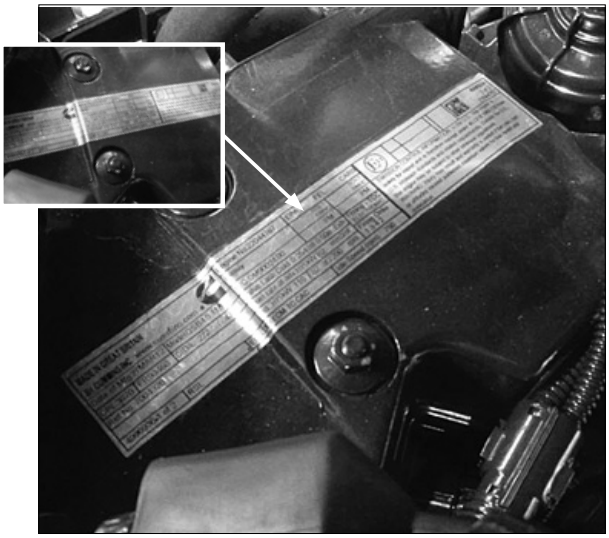


Fig. 5 Engine no.

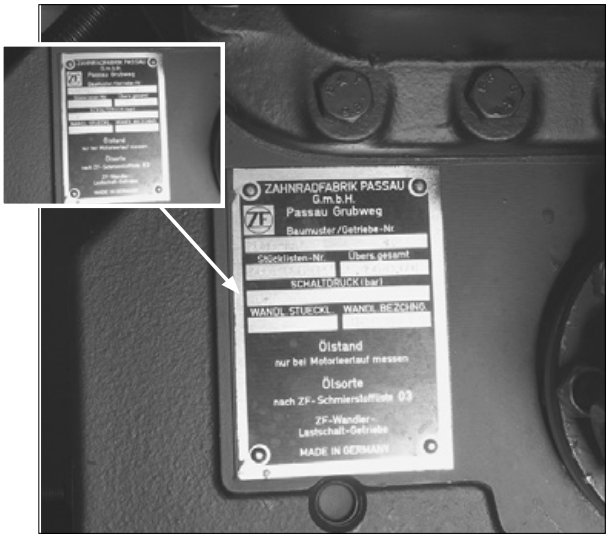


Fig. 6 Transmission no.

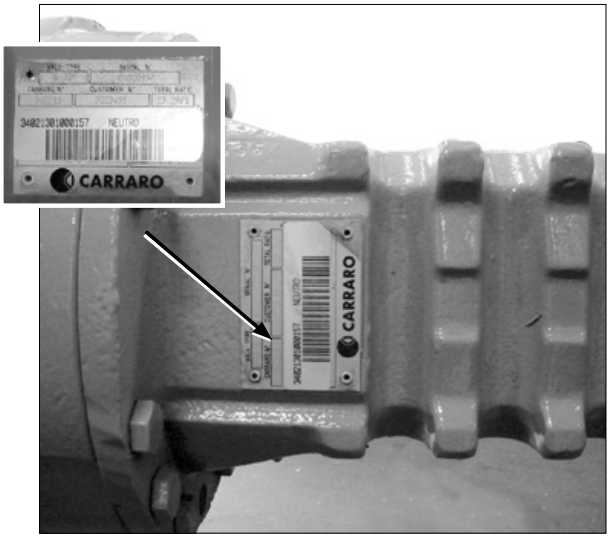


Fig. 7 Axle type no.

SAFETY IN GENERAL

Most accidents happen because simple and elementary safety precautions are not observed. Accidents can often be averted if the operator avoids bringing himself and his machine in dangerous situations.

Wrong use or operations with the machine may result in accidents.

Read the operator's manual and learn all safety precautions and warnings before entering and working with the machine.
Ignoring the instructions or warnings may cause injuries or death.

The fundamental safety precautions and warnings are described in the manual and warning signs are placed on the machine.

In this manual and on the machine you will find safety signs beginning with a symbol. The meaning of these signs are as follows:

means that extreme danger exists. Take immediately the necessary precautions or there is imminent danger that the driver may be killed or seriously injured.

means that a dangerous situation may occur. There is the risk for the operateur to be killed or injured if no necessary precautions are taken.

IMPORTANT!
means that you must not forget the safety precautions. Disregard of them may result in injury or damage of the machine.

GENERAL PRECAUTIONS

Clothing etc.
Do not use loose-fitting clothes or jewellery that may catch hold of the control levers, etc.
Safety footwear, protective helmet, working gloves, ear protectors, etc. may also be necessary to protect yourself.

If you usually wear glasses, wear them when you read the safety procedures and labels which are placed in different places on the machine.
Do not overstretch or put yourself in a dangerous situation to read the labels, or in connection with the maintenance of the machine.

Visibility:

Poor visibility may cause accidents. Keep windows clean. Use the headlights and lamps of the machine to improve the visibility. Do not drive the machine if the visibility is reduced.

Be prepared for emergency situations. Always have a first aid box and fire extinguisher available and be familiar with the use of it.

Make sure you know the signalling used at your workplace. Follow the instructions from the responsable foremen, the signs, etc. Make sure you know rules, laws and the necessary safety equipment for driving on public roads.

IMPORTANT!
Make sure that you are informed, if the machine is registered for driving on public roads with a certain loading capacity or certain speed.

If the operation procedure is not specifically recommended, you must personally make sure that it can be carried out without danger to persons or the machine. It is the operator's duty to make sure that operating the machine is of no danger to other persons or the surroundings.

SAFETY EQUIPMENT OF THE MACHINE

DANGER

ROPS/FOPS protection

The machine is equipped with a protective construction against rolling over (ROPS) and against falling objects (FOPS). The operator can put himself and others in danger if the machine is driven with a damaged or missing ROPS/FOPS. If the construction of this protection is damaged in an accident, do not use the machine until it has been repaired. Changes or repairs which have not been approved by the supplier may be dangerous and would invalidate the ROPS/FOPS certification.

DANGER

Machine condition

A defective machine can cause injuries. Do not operate the machine if it is defective or missing any parts.

DANGER

Machine limitation:

The machine must only be used for its original purpose, otherwise it may be damaged and become deadly dangerous. Do not try to upgrade the machine performance with modifications not being approved.

WARNING

Fire

If the machine is equipped with a fire extinguisher, check it regularly. It must be kept in the cab.

DANGER

Seat belts

Always fasten your seat belt before you drive. Check the tightness and condition of the securing bolt regularly.

MATERIAL, FLUIDS AND GAS

WARNING

Battery

The battery electrolyte contains corrosive sulphuric acid. If applied to the skin, remove immediately. Wash with cloths and plenty of water. If the fluid gets into your eyes or other sensitive parts of the body, apply plenty of water and call for a doctor.

Danger of explosion!

Due to voltage drop the battery can explode if a fully charged battery is connected to a flat or partly discharged battery. Avoid sparks and open fire near the battery.

Danger of corrosion!

The battery electrolyte contains corrosive sulphuric acid. Avoid direct contact!

WARNING

Fuel

Diesel fuel is inflammable. Do not use open fire near the machine. Do not smoke while refueling or working on the machine, and the engine must be turned off. Disregard of these precautions may cause injuries and fire.

WARNING

Oil:

Oil is toxic. If you swallow oil avoid vomitting. Consult a doctor.
Used engine oil contains harmful, carcinogenic chemicals. Do not work with engine oil more than necessary. Always use barrier cream or gloves to avoid skin contact. In case of skin contact, rinse carefully with soapy water. Do not use petrol, diesel or paraffin for cleaning your hands.

WARNING

Hot oil:

Hot oil can cause burns. Avoid direct contact.

WARNING

Exhaust gas:

Exhaust gas can be lethal. If you work with the machine in a closed room, provide for good ventilation.

BEFORE YOU START

DANGER

Loose objects
Remove all loose objects from the place near the operator's seat and from the machine.
Loose objects may block the control levers and can cause accidents.

WARNING

Check that all doors, covers and caps are correctly closed or fitted.

IMPORTANT!
Every day before starting, go around the machine and make sure there are no oil leakages etc.

WARNING

Around the machine
Make sure there are no foreign objects or oil on the step and cab handle, as this may cause accidents.
When getting in or out of the machine always turn towards the machine. Always use step and handle.

WARNING

Starting the engine
The engine must be started only from the operator's seat. Attempts to start the engine by short-circuiting or other methods may cause accidents because the safety system of the machine is put out of function. It may also damage the electric system.

BEFORE YOU DRIVE THE MACHINE:

WARNING

Functions
Check that all control devices function normally and that the machine works properly.
Do not drive the machine until the pilot lamp for the brake system is out.
When working after nightfall check that all lamps and lights function as they should.

DANGER

Seat belt:
Always fasten your seat belt before you drive.

DANGER

Other persons:
Do not let other persons enter the machine. Unauthorised persons may fall off or cause accidents. Be alert and always keep an eye on the other people at the workplace. Keep them at a safe distance from the machine.

DANGER

Practice
You and others may be injured or killed if you make operations you are unfamiliar with. Practise on a clear area next to the building site.
Do not perform any task until you are sure you can do it safely.

WARNING

Traffic
Observe laws and local regulations. Know the signalling used at the workplace.

DRIVING

WARNING

Brake pressure
Do not drive the machine until the pilot lamp for the brake pressure goes out. Make sure that no persons are arround the machine.

DANGER

Driving
Always adapt the speed to the conditions.
Always drive slowly downhill, in curves and on uneven terrain as the machine may otherwise roll over.

DANGER

Terrain
Do not work in risky terrains such as ditches, steep hills, slopes, etc. Take a walk into the work area before you begin and check whether there are especially dangerous elements.

DANGER

Driving on slopes

To ensure driving without danger of rolling over, you must judge if weather, road or terrain conditions allow to work safely on hills, slopes or in uneven terrain.

DANGER

Danger of rolling over

If the machine starts to roll over, DO NOT TRY TO JUMP OUT OF THE CAB. STAY IN THE CAB WITH YOUR SEAT BELT FASTENED.
Never drive on slopes with a gradient larger than the roll over angle.
Pay special attention to this in uneven terrain.
If possible, always drive straight upwards or downwards and not transversely to the slope.

IMPORTANT!

Gear selector

Do not put the transmission into neutral when driving down a steep hill. This can damage the transmission.

WARNING

Dumper body

Never drive with lifted dumper body. The visibility would be restricted and the stability reduced.

DANGER

Alarms

If the acoustic alarm goes on while driving, immediately stop the machine.
It is for example dangerous to drive with a brake pressure being too low.

LOADING MATERIAL

WARNING

Weight

Never drive with excessive loads. The driver is responsible for the machine being properly loaded. The max. loading capacity is 10000 kg.
This capacity results from materials with a density of 1800 kg per m^3 being loaded to the upper edge of the dumper body and a heaped gradient of 2:1.

If the material is heavier, the dumper body must not be totally filled up. See page 51 Material density chart.

DANGER

It is dangerous to drive with loads exceeding the indicated capacity.

UNLOADING MATERIAL

WARNING

Do not reverse too near to a slope. Pay attention to the fact that the rear axle load is increasing when the load is being tipped, especially when the material does not slip easily, or if there is any risk that the material is frozen up.
Place the machine in non-articulated position before starting with the tipping.

WARNING

Take care that there is room enough upwards when the dumper body is tipping.

WARNING

When the dumper body is turned to the side the load on the wheels on that side increases.

BEFORE YOU LEAVE THE MACHINE

WARNING

Before parking the machine and leaving the operator's seat always lower the dumper body.
Activate the parking brake, stop the engine and remove the ignition key.
Never leave the machine with the transmission in forward or reverse gear.
Always turn towards the machine and use handle and step when you leave the cab. Take it easy and do not jump off the machine.

SPECIAL CONDITIONS

DANGER

Towing

Service brake and steering gear do not work when towing with the engine turned off.
Towing should never take place on public roads or with the loaded machine.

DANGER

Transport

It can be deadly dangerous to transport the machine, if it is not properly fastened to the trailer.
When lifting the machine make sure the lifting equiment is in good condition and certified to the lifting capacity.

WARNING

It is important that the safety bar and safety bolt for turning the dumper body (if MultiTip) is mounted during the transport of the machine.

STARTING WITH AUXILIARY BATTERY

IMPORTANT!

Reverse polarity may damage the voltage relay and alternator.

WARNING

Danger of explosion!

Due to voltage drop the battery may explode, if a fully charged battery is connected with a partly or completely discharged battery. Avoid sparks and open fire close to the battery.

Danger of corrosion!

The battery electrolyte contains corrosive sulp-huric acid! Avoid direct contact!

DANGER

Starting the engine

The engine must be started only from the operator's seat. Attempts to start the engine by short-circuiting can cause accidents as the start barrier of the machine is put out of function.

IMPORTANT!

Ether

Ether start must not be used at the same time as the preheater.

LUBRICATION AND MAINTENANCE

DANGER

Incorrect lubrication and maintenance of the machine can make it dangerous to work with.
It is therefore very important that the operator is thoroughly familiar with the procedure in view of lubrication and maintenance before any maintenance work on the machine.

The procedure recommended for lubrication and maintenance is described in chapter »LUBRICATION AND MAINTENANCE«

Follow safety instructions and safety notices placed on the machine.

WARNING

Use original or certified parts only.

WARNING

The operator is responsible for correct operation and maintenance.

WARNING

In general

Before you start lubrication and maintenance make sure that:

- The machine is standing on a plane surface.
- The transmission is in neutral.
- The parking brake is activated
- The ignition key is removed - unless the transmission oil level has to be checked.
- The pivot safety lock is mounted.
- The support device is mounted, when the dumper body is tipped.

WARNING

Bonnet

Must not be opened while the engine is running.

WARNING

Warm components
Hot oil and warm components can cause scalds and burns - avoid direct contact!

WARNING

Oil
Oil is toxic. If you swallow oil, avoid vomiting. Consult a doctor.
Used engine oil contains harmful, carcinogenic chemicals. Do not work with engine oil more than necessary.
Always use barrier cream or gloves to avoid skin contact. In case of skin contact, rinse carefully with soapy water. Do not use petrol, diesel or paraffin for cleaning your hands.

WARNING

Hot oil
Hot oil can cause burns.
Avoid direct contact.

WARNING

Hydraulic pressure
Hydraulic oil/diesel fuel that is released under pressure may penetrate the skin and cause injuries. Before removing or connecting hydraulic hoses, stop the engine and release the pressure, if any, from the hoses. Make sure that the engine cannot be started while the hoses are open.

IMPORTANT!
When servicing the hydraulic system, always remember to release the excessive pressure from the tank by loosening the filler cap. It is imperative that the machine is clean as the slightest impurity can damage the hydraulic components and cause a break-down.

WARNING

Release of hydraulic pressure
At working temperature the hydraulic tank is under pressure. Hot oil can cause serious burns.
The filler cap must only be removed when the engine is turned off and the tank has cooled down. The hydraulic system of the tippingfunktion and the brake system may be under pressure, also when the engine has been stopped. Before beginning with any repairs/maintenance, make sure that the systems have been completely released from pressure. See page 76.

WARNING

Fuel:
Diesel is inflammable. Do not use open fire near the machine. Do not smoke while refueling or working on the machine, and the engine must be turned off. Disregard of these precautions may cause injuries and fire.

WARNING

Cooling system
Coolant can cause skin irritation.

WARNING

The cooling system is working under pressure. It is therefore dangerous to remove the cover while the system is hot. Always turn the cooler cover carefully to allow for release from pressure and remove the cover only when the excessive coolant has disappeared.

WARNING

Cleaning the cooler
When you have brushed off the dry dirt, clean the cooler from the engine side with compressed air.

WARNING

Use dust mask and goggles.

WARNING

Air filter
Use dust mask and goggles when cleaning with compressed air.

IMPORTANT!
The pressure used must not exceed 205 kPa (2 bar). Higher pressure may damage the filter. Never mount a wet filter element. It can damage the engine.

WARNING

Wheels
Do not stand in front but beside the wheel when pumping up tyres with lock ring. It is recommended to use self-locking nozzles.

WARNING

Starting with auxiliary battery

- Check that the auxiliary battery has a voltage of 24V.
- Connect the start cable to the plus pole on the machine battery. Make sure that the start cable shoe does not touch the frame.
- Connect the start cable to the plus pole on the auxiliary battery.
- Connect the start cable to the minus pole on the auxiliary battery and the other end of the cable to the chassis of the machine away from the battery. It can be connected to the step for example or direct to the engine block at the mounting bolt of the starter.

DANGER

Starting the engine

The engine must only be started from the operator's seat. Attempts to start the machine by short-circuiting can cause accidents as the start barrier is put out of function.

DANGER

Charging the battery

When the battery is being charged, an explosive gas generates in the battery.

Danger of explosion!

Due to a voltage drop the battery can explode if a fully charged battery is connected to a completely or partly discharged battery. Avoid sparks and open fire near the battery.

Danger of corrosion!

The battery electrolyte contains corrosive sulphuric acid. Avoid direct contact!
Short-circuiting, open fire or sparks near the battery may cause a heavy explosion. Always cut off the charging current before removing the charge terminals from the battery. Ventilate thouroughly, especially when you charge in a closed room.

WARNING

Circuit

Know the electrical circuit before removing or connecting electrical components.
A wrong connection may cause injuries and/or damage.

DANGER

Raised dumper body

Never go under a raised dumper body before the support device is mounted.

WARNING

Soft ground

On soft ground the machine may begin to sink. Never work under a machine on soft ground.

Remember: *Be careful!*
Be alert!
Be safe!

SERVICE

Before leaving the factory, this Hydrema machine has been thoroughly tested and run in.
However, it is important that further inspections and checks are carried out during its initial period of running.
Make sure that the checks and inspections displayed in the instrument panel service menu are performed when the service symbol appears on the screen. In addition, observe the specified service inspections carefully.
The instrument display will show the times at which such service inspections are due, and we ask you to contact your nearest Hydrema sales-service department in order to have this service carried out.

Service and claims:

The service and claims provisions that are applicable to the machine will appear in the service book that accompanies the machine.

IMPORTANT!
In order to always be able to carry out the best possible service on your machine, it is important that the service book is always present in the machine. It is recommended that it be kept in the pocket in the seat back.

IMPORTANT!
In certain countries a statutory annual inspection of the machine must be carried out. The owner of the machine shall ensure that he remains up to date with regard to such national and regional regulations.

IMPORTANT!
The following documentation accompanies your machine:

- Operator's manual
- Spare parts catalogue
- Instruction manual for radio
- CE declaration of conformity

912E

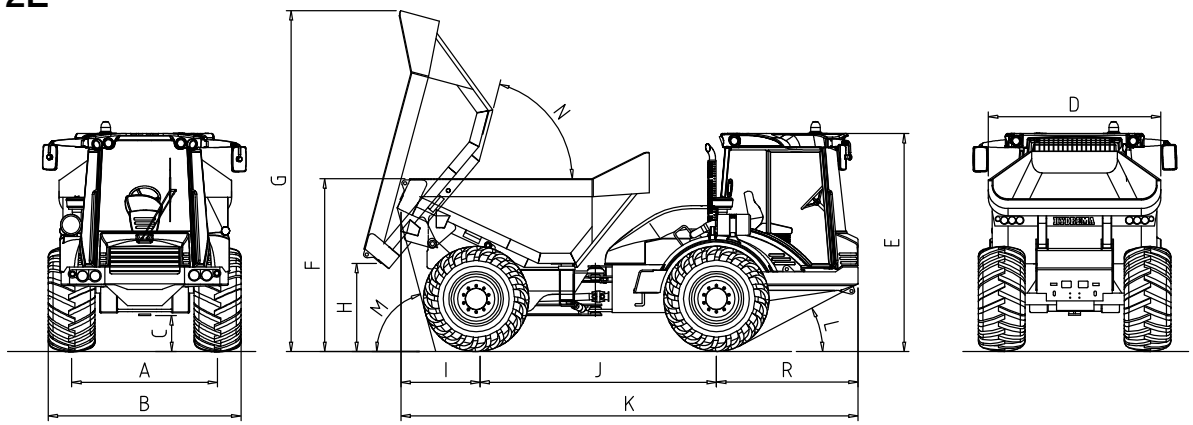


Fig. 8

Dimensions mm	Rear tip	MultiTip
A. Track	1860	1860
B. Overall width, std. tyres	2470	2470
Width over optional tyres	2200	2200
C. Ground clearance	450	450
D. Width dumper body	2210	2210
E. Max. height	2750	2750
F. Loading height	2170	2320
G. Total tipping height	4215	4450
H. Tipping clearance	1050	1200
I. Rear overhang	1000	920
J. Wheel base	3080	3080
K. Overall length	5870	5950
L. Front departure angle	27°	27°
M. Rear departure angle	73°	73°
N. Tipping angle	75°	67°
R. Front overhang	1870	1870
Body capacity	5.6 m^3	5.6 m^3
Turning radius	6.1 m	6.1 m

Weight kg	Front	Rear	Total
Rear tip unladen	4500	2770	7270
Rear tip laden	6680	10590	17270
MultiTip unladen	4580	3150	7730
MultiTip laden	7040	10690	17730

Capacities litres

Engine oil	13.0
Transmission oil	24.0
Oil change appr.	18.0
Differential oil	2x14.0
Hub oil	4x 1.3
Coolant	24.0
Hydraulic oil	110.0
Tank	90.0
Fuel tank	140.0

912ES

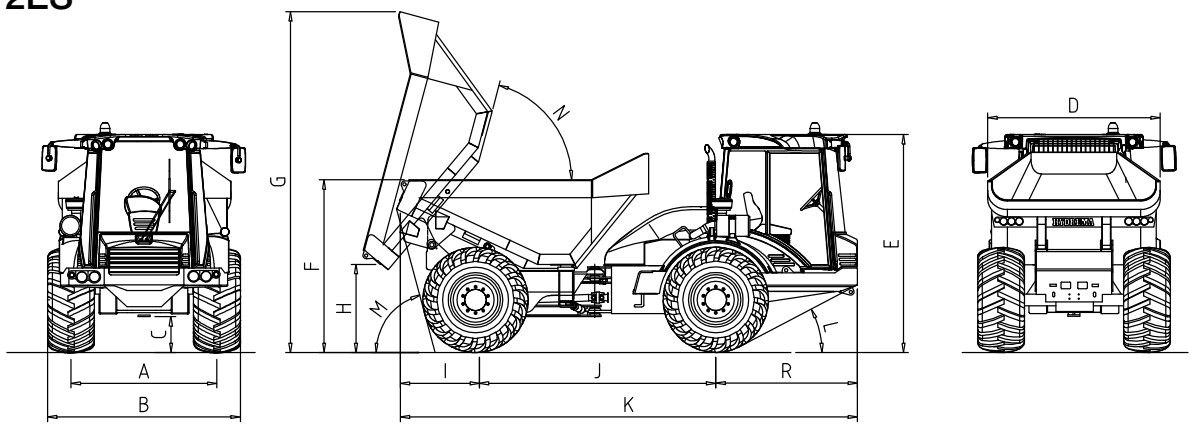


Fig. 8.1

Dimensions mm	Rear tip	MultiTip
A. Track	1860	1860
B. Overall width, std. tyres	2470	2470
Width over optional tyres	2200	2200
C. Ground clearance	450	450
D. Width dumper body	2210	2210
E. Max. height	2790	2790
F. Loading height	2210	2360
G. Total tipping height	4255	4490
H. Tipping clearance	1090	1240
I. Rear overhang	1000	920
J. Wheel base	3080	3080
K. Overall length	5870	5950
L. Front departure angle	28°	28°
M. Rear departure angle	73°	73°
N. Tipping angle	75°	67°
R. Front overhang	1870	1870
Body capacity	5.6 m^3	5.6 m^3
Turning radius	6.1 m	6.1 m

Weight kg	Front	Rear	Total
Rear tip unladen	4660	2880	7540
Rear tip laden	6840	10700	17540
MultiTip unladen	4740	3260	8000
MultiTip laden	7200	10800	18000

Capacities litres

Engine oil	13.0
Transmission oil	24.0
Oil change appr.	18.0
Differential oil (912ES)	2x14.0
Differential oil (912HM)	2x15.8
Hub oil	4x1.3
Coolant	24.0
Hydraulic oil	110.0
Tank	90.0
Fuel tank	140.0

912HM

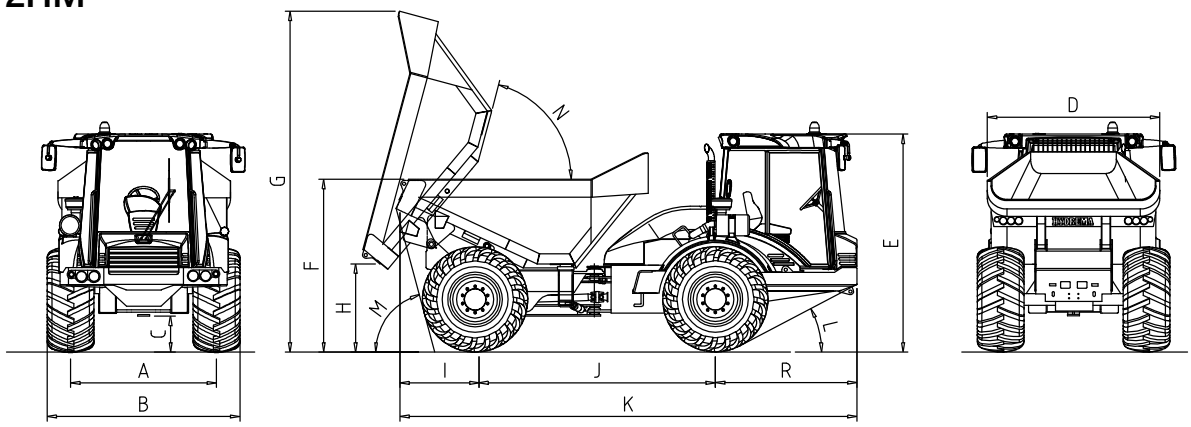


Fig. 8.2

Tyres		*Std. Tip: 800/45x30.5*	*Std. Tip: 600/60x30.5*	*Multi Tip: 800/45x30.5*	*Multi Tip: 600/60x30.5*
Total weight	*kg*	*18.260*	*17.970*	*18.720*	*18.430*
Unladen weight	*kg*	*8.260*	*7.970*	*8.720*	*8.430*
Load capacity	*kg*	*10.000*	*10.000*	*10.000*	*10.000*
Load capacity at registrat.	*kg*	*-*	*10.000*	*-*	*9.570*
Ground pressure	*kg/cm²*	*0,87*	*1,15*	*0,88*	*1,16*
A. Track		2060	1900	2060	1900
B. Total width	mm	2870	2540	2870	2540
C. Ground clearance	mm	520	520	520	520
D. Width, dump body	mm	2210	2210	2210	2210
E. Max. height	mm	2865	2865	2865	2865
F. Loading height	mm	2330	2330	2480	2480
G. Max. height for tipping	mm	4370	4370	4610	4610
H. Tipping clearance	mm	1210	1210	1360	1360
I. Overhang, rear	mm	1000	1000	920	920
J. Wheelbase	mm	3080	3080	3080	3080
K. Overall length	mm	5870	5870	5950	5950
L. Approach angle, front	°	30	30	30	30
M. Departure angle, rear	°	74	74	74	74
N. Tipping angle	°	75	75	67	67
R. Overhang, front	mm	1870	1870	1870	1870
Capacity	*m³*	*5,6*	*5,6*	*5,6*	*5,6*
Turning radius	*m*	*6,3*	*6,1*	*6,3*	*6,1*

Chassis

Articulated chassis consisting of two main parts, the front frame and the rear frame.
The frames are connected in the pivot at the top and in the pendulum bar with two hydraulic stabilizers at the bottom.
Hydraulic tank and fuel tank are integrated in the front frame.
Working pressure of the stabilizers
Max: 50 bar . . . . . (5.0 MPa)
Oscillating angle between
front and rear axle: . . . . . ±12°

Steering system

Hydrostatic pivot steering with two double acting steering cylinder with end brakes.
Priority valve: . . . . Danfoss OLS Load Sensing
Oil pump: . . . . . 36 cm^3, shared with working hydraulics
Steering unit
orbitrol, type: . . . . . Danfoss OSPD 80/395 LS
Steering pressure, max.: . . . 200 bar (20 MPa)
Overload pressure max.: . . . 250 bar (25 MPa)
Steering angle: . . . . . ±35°
The emergency steering system works by means of pump action in the steering unit Orbitrol. In case of loss of oil supply from the steering pump, a red warning lamp is turned on in the instrument display.

Axles

Rigid, heavy duty axles with planetary hub reduction. 100% differential lock on the rear axle and automatic limited slip differential lock on the front axle. Integrated self-adjusting disc brakes. Separate oil chambers for differential and hubs.

Ratio: 20.14:1

Brakes

The service brake is a fully hydraulic dual circuit system. The self-adjusting oil-immersed disc brakes are integrated in the axles.
Oil pump: . . . . . 10 cm^3
Brake pressure of front and back axle:
912E/ES . . . . . 23 bar (2.3 MPa)
912HM . . . . . 28 bar (2.8 MPa)

Parking brake

electric/hydraulic
activation . . Fail-safe integrated in the front axle

WHEELS - 912E AND 912ES

Type	**Tyres** Dimension	**Rim** Dimension	**Load index** Min.	**Speed index** Min.	**Recommended tyre pressure** Front	Rear
Twin	*600/55-26.5*	*20x26.5*	*168*	*A6*	*2.5 bar (250 kPa)*	*2.7 bar* (270 kPa)*
EM	*17.5R25*	*14.00/1.5x25*	*168*	*A6*	*2.75 bar (275 kPa)*	*5.25 bar (525 kPa)*

WHEELS - 912HM

Type	**Tyres** Dimension	**Rim** Dimension	**Load index** Min.	**Speed index** Min.	**Recommended tyre pressure** Front	Rear
T421	*600/60-30.5*	*20x20.5*	*175*	*A8*	*2.6 bar (260 kPa)*	*2.8 bar (280 kPa)*
T404/ T423	*800/45x30.5*	*28x30.5*	*178*	*A8*	*2.2 bar (220 kPa)*	*2.4 bar (240 kPa)*

*3.2 bar when driving for a long time with full tyre load on a hard surface.
Tightening torque of wheel nuts: 500 Nm (50 kpm)

WARNING

Always place yourself beside the wheel when pumping wheels with lock ring. Use of self-locking nozzle is recommended.

Cooling system

The closed cooling system is dimensioned for an ambient temperature of up to + 46° C. The machine is equipped with a combined radiator cooling down the coolant of the engine, the transmission oil and the charging air after the turbo.
The air from the fan cools the radiator.
The machine has a variable fan with a viscose coupling and is regulated by means of a thermostat.

Normal coolant temperatur . . . . . 82-93° C
Acoustic alarm at . . . . . 107° C

Air filter

Dry air filter with safety filter and cyclone type induction cap.

Eletric indicator for clogging. . . . . 5.0 Kpa

Engine

The machine is equipped with a 4.5-litre diesel engine with turbo and intercooler. The engine has four valves per cylinder, a fully electronic commonrail injection system, an EGR radiator, an EGR valve, and meets the requirements for exhaust gas emission in EC97/68 stage 3b and US EPA TIER4.

Type Cummins QSB4.5 FR93461
Power at 2200 rpm . . . . 97 kW (130 HK) ISO/TR 14396
Torque at 1500 o/min . . . . . 622 Nm
No. of cylinders. 4
Cylinder bore/stroke . . . . . 102/137 mm
Compression ratio 17.2:1
Revolution adjustment min. . . . . 750 rpm
Revolution adjustment max. 2300rpm

Transmission

The machine has a powershift transmission with converter and ergo power automatic shifting system. It has 6 forward and 3 reverse gears. The electronic gearshift system is automatically controlled but can also be operated manually.

Type . . . . . ZF 6WG115
Stall torque ratio . . . . . .1.87 : 1
Gears . . . . . 6 forward, 3 reverse

Speed area

		Empty	With max. load
1st gear	*Forward/reverse*	*0-5 kph*	*0-5 kph*
2nd gear	*Forward*	*0-8 kph*	*0-8 kph*
3rd gear	*Forward/reverse*	*0-13 kph*	*0-13 kph*
4th gear	*Forward*	*0-20 kph*	*0-20 kph*
5th gear	*Forward/reverse*	*0-28 kph*	*0-26 kph*
6th gear	*Forward*	*0-33 kph*	*0-33 kph*

The above speeds are valid for tyres 600/55-26.5 on horizontal and plane road.

Hydraulics

The machine is equipped with two hydraulic pumps. One pump supplies the steering mechanisme and the tipping function. The oil is distri-buted between the two functions by means of a priority valve.
The other pump supplies the service and parking brake and the hydraulic stabilizers.

Pump for steering and tipping:	*36 cm^3 gear pump*
	Oil with priority to LS-steering
	Working pressure 200 bar (20 MPa)
Pump for brake and stabilizers:	*10 cm^3 gear pump*
	Working pressure 130 bar (13 MPa)

Electrical system

Type	24V negative frame lead
Battery	2 x 12V 100Ah
Alternator	70A 1680W
Fuses	See page 73 and 74

Lamp bulbs	**Consumption watt**	**Socket**
Headlights H4	75/70	P43t/38
Sidelight in front	3	BA9s
Direction indicator in front	18	S8.5
Indicator, side, fog light and reversing light	21	BA15s
Rear light, brake light, direction indicator	LED	LED
Number plate	5	S8.5
Work light H3	70	PK22s
Cab light	10	BA15s
Cab light, red	10	BA15s
Access light	20	BA15s
Warning beacon H1	70	P14.5s

Cab

The cab is mounted on rubber elements in the front and on shock absorbers in the rear. It is insulated and has a plane floor with rubber mat.
The cab is tested and approved as safety cab: ROPS according to ISO 3471:1994-02, FOPS acc. to ISO 3449:1992-05.

The cab has a windscreen of laminated safety glass. All other windows are made of toughened safety glass.

The machine has air-conditioning as standard, which is fitted under the seat. There are 7 adjustable air nozzles: 4 front, 2 rear and 1 in the footwell. These nozzles can be adjusted to heat/cool the cab and to de-ice the windows. The fan motor has variable speed and the system has electrically regulated recirculation.
The machine is fitted as standard with a mechanically sprung seat, and an air-sprung seat is available as an option. Both seats have a headrest, and have a 2-point automatic seat belt. Both seats are certified in accordance with current vibration requirements concerning seats in dump trucks according to EN ISO 7096:2000 class EM1.

Noise level

The noise level at the operator's position is measured according to ISO 6396

Noise level at the operator's position 73.0 dB(A)

The outside noise level is measured and shown on the machine according to directive 2000/14/EC.

Noise level from the machine
Guaranteed value: . . . . . 104 dB(A)

Vibration level

The whole-body vibration level over an eight-hour workday is determined in accordance with ISO 2631-1 for the three machine typess.
The level of whole-body vibrations depends largely
on the driving speed, the surface, the operator's skills, the planning of the work and the nature of the tasks performed over the course of a workday.

For more information about the declared values, see Hydrema's declaration reports on wholebody vibrations.

Hydrema 912E

Level without the 1.4 multiplier . . . . . <0,5m/s^2
Level with the 1.4 multiplier . . . . . <0,5m/s^2

Hydrema 912ES / Hydrema 912HM

Level without the 1.4 multiplier . . . . . <0,4m/s^2
Level with the 1.4 multiplier . . . . . <0,5m/s^2

The hand-arm vibration level is set not to exceed 2.5 m/s^2, in accordance with ISO 5349-2.

Dumper body

The body is made of high tensile steel for optimum wear resistance. It is fitted with two double acting cylinders.
For MultiTip: two single-acting telescopic cylinders.

Dumper body capacity

Struck body capacity
Rear tip . . . . . 4.2 m^3 (ISO 6483)
MultiTip . . . . . 4.2 m^3 (ISO 6483)

Max. heaped body capacity
Rear tip . . . . . 5.6 m^3 (ISO 6483)
MultiTip . . . . . 5.6 m^3 (ISO 6483))

Carrying capacity
Rear tip . . . . . 10000 kg
MultiTip . . . . . 10000 kg

Tipping angle
Rear tip . . . . . 75°
MultiTip . . . . . 67°

Tipping time
Rear tip . . . . . 6 sec.
MultiTip . . . . . 8 sec.

CAB

WARNING

Getting in and out

Make sure that you always have a firm grip with both hands, or stand on both feet and hold on with one hand. Always keep steps, handles and footwear clean. Always face the machine when getting in and out. Never jump down from the machine.
Never use the steering wheel, joystick or other control devices as handholds when getting in or out of the machine.

Doors

The cab has two lockable doors. The right side door is locked by using handle 1 fig. 9. The left side door is locked with a key in the door handle. The doors have automatic stop in the gas spring.

WARNING

Always drive or work with the doors closed. Open doors will be the widest point on the machine and are thus easily damaged or can cause damage or injury to others.

Side windows

The rearmost side windows can be opened for ventilation by pushing plastic holder 1 fig. 10. The window can be held partly open by locking the plastic holder onto the locking pin as can be seen in fig. 10

WARNING

Never drive with the side windows open unless they are secured.

Fig. 9

Fig. 10

Access lights/Ceiling lights

Above both doors there are exterior lights that illuminate the access area. In the ceiling there are 2 white lights at the front and a red ceiling light on the right-hand side above the side instrument panel.
The white access lights and ceiling lights can either be switched on or off when the doors are opened or closed respectively, or be switched on permanently.
If switch 16 fig. 34 is at position 1 the lights will al-ways be off, at position 2 the lights will be switched on and off by the door switches, whilst in position 3 the lights will be switched on perma-nently.
The red ceiling light is used to provide further light-ing for the control devices in the cab when working in the dark. The red light is switched on and off by means of switch 17 fig. 34.

IMPORTANT!
The red ceiling light must not be switched on when driving on public roads.

Fig. 11

Air-conditioning

The machine has a heating and fresh air system with integrated cooling and automatic temperature control. The fan, heating element and cooling element are located under the seat.
The intake filter is located at the bottom edge of the roof on the right side. For the air distribution there are 4 front nozzles, 2 rear nozzles and one nozzle in the footwell. See figs. 13, 14 and 15.
These nozzles can be used to distribute the flow of air in the cab between front, rear and footwell.

The air-conditioning is operated from the panel at the top of the side instrument panel, fig 12.

1. Temperature adjustment
2. Fan speed (infinitely variable)
3. Cooling on/off
4. Recirculation

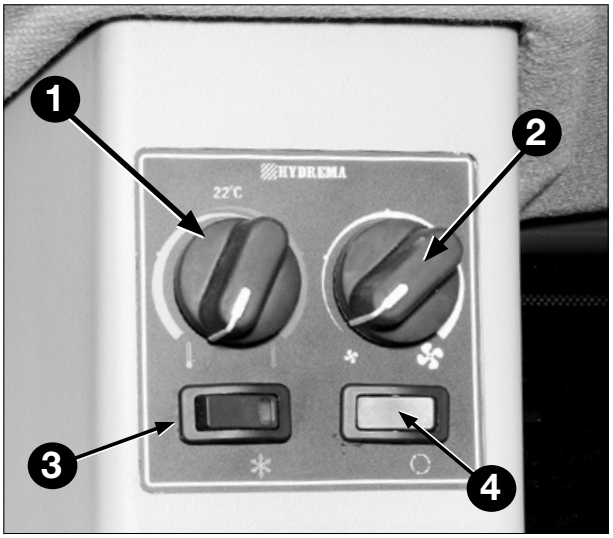


Fig. 12

Fig. 13

Fig. 14

Heating

If heating is required in the cab, adjust temperature adjustment knob 1 fig. 12 to the desired temperature, and the required flow of air can be regulated by means of fan speed knob 2 fig. 12.

Cooling

If the cab is to be made cooler, adjust the desired temperature on the temperature adjustment knob 1 fig. 12, and the cooling system can be switched on with switch 3 fig. 12. The required flow of air can be regulated by means of fan speed knob 2 fig. 12. The air-conditioning will now maintain the chosen temperature in the cab.
The cooling system will only be switched on when the fan is running.

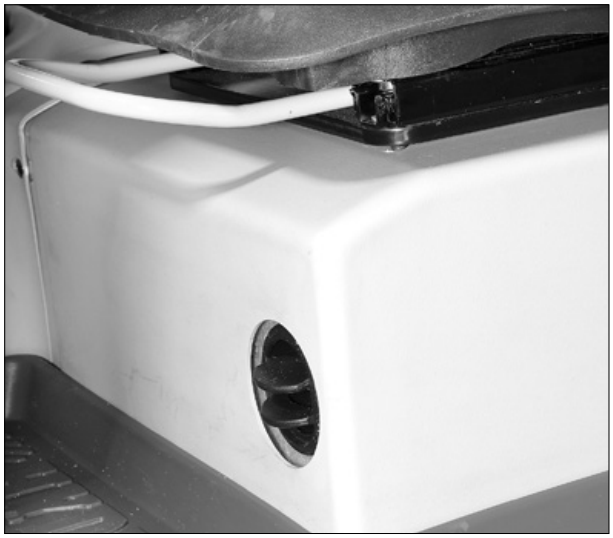


Fig. 15

IMPORTANT!
Both when heating and cooling the cab, it is important that the cab doors and windows remain closed in order for the temperature regulation to function properly.

Even when the weather is very hot, the cab temperature should never be set more than 8-10° below the outside temperature, as doing otherwise will pose a risk to the health of the operator.

Recirculation

By activating button 4 fig. 12 for recirculation, the intake of fresh air from outside will be blocked and the system will simply recirculate the air in the cab.

Recirculation can be used when driving in areas with smoke or unpleasant odours. Recirculation will also heat up the air in the cab more quickly when starting up in cold weather.

IMPORTANT!
When in recirculation mode, no fresh air from outside will enter the cab. The humidity in the cab will therefore quickly increase and condensation may begin to form on the windows, in addition to which the quality of the air in the cab will deteriorate. Recirculation should therefore only be used for short periods.

Demisting the windows

In order to demist the windows as quickly as possible, turn on cooling 3 fig. 12. Set temperature regulation 2 fig. 12 to max. and fan 2 fig 12 to maximum speed.
Close the nozzles in the footwell and rotate the front and rear nozzles as shown in figs. 16 and 17, in order to direct the air to the windscreen, side windows and rear window.

De-icing the windows

For the fastest possible de-icing of the windows, turn off cooling 3 fig. 12. Set temperature regulation 1 fig. 12 to max. and fan 2 fig. 12 to maximum speed.
Close the nozzles in the footwell and rotate the front and rear nozzles as shown in figs. 16 and 17, in order to direct the air to the windscreen, side windows and rear window.
For the fastest possible de-icing, recirculation can be used for a short period.

⚠ WARNING
It is extremely hazardous to drive or operate the machine if the windows are misty or icy.

Fig. 16

Fig. 17

OPERATOR'S SEAT

The operator's seat is equipped with suspension and can be adjusted to the size and weight of the operator. Take your time for this adjustment and you will get an optimum of comfort, so you can operate the machine safely and effectively.

Adjustments:

1. **Distance:**
   Pull up the lever and push the seat forward or backwards.

2. **Backrest inclination:**
   Pull up the lever and adjust to the desired position.

3. **Seat inclination and height:**
   Pull up the levers and lift or lower the front and/or rear of the seat cushion.

4. **Operator's weight:**
   Adjust the spring mechanisme to the operator's weigh.

5. **Armrest: (See fig. 19)**
   The armrest's longitudinal position can be adjusted by turning the knob.

6. **Lower back support:**
   Adjust the lower back support by turning the knob.

7. **Seat heater:**
   On/off switch for hesting the seat.

WARNING

Never lean on the control levers of the machine when adjusting the seat.

Seat belt

The seat is equipped with a two-point self retractable seat belt.

Sit down calmly, pull the belt slowly out of the roll and push it into the lock.
Pull a few times to check that the belt is correctly locked.

WARNING

The safety cab of the machine is constructed to protect the operator in case of an accident. Therefore, always keep your seat belt fastened to avoid to be hurled around or out of the cab.

FASTEN YOUR SEAT BELT BEFORE STARTING THE ENGINE!

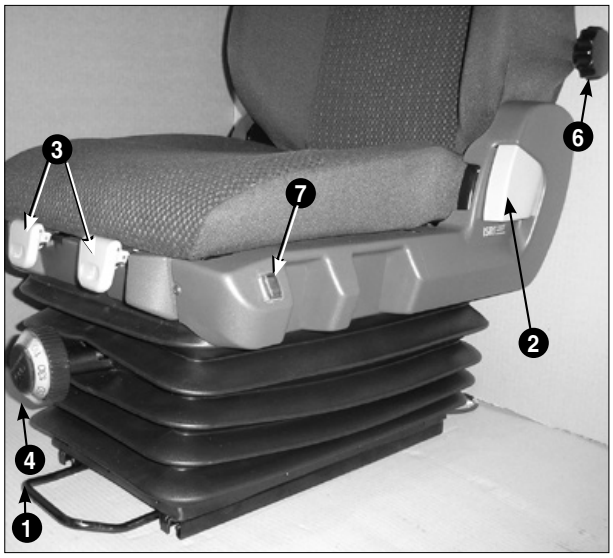


Fig. 18

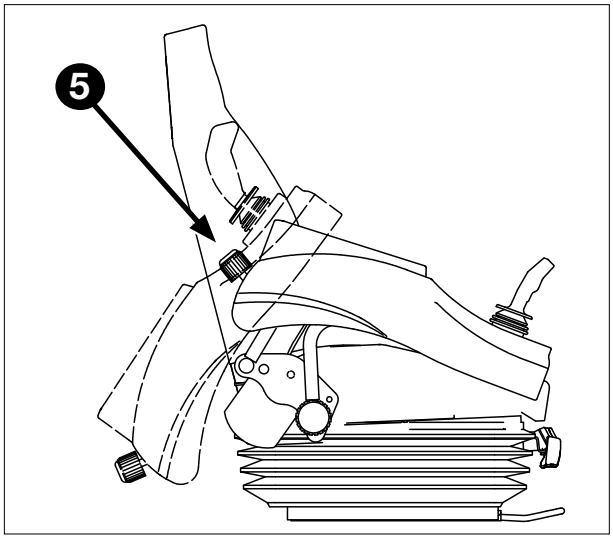


Fig. 19

Seat with air suspension
(Option)

Adjustments: (fig. 20)

1. **Inclination and height of seat**
   Pull the levers up and lift or lower the front or rear of the seat.

2. **Seat cushion:**
   Move the handle upwards and move the seat cushion forward or backward.

3. **Seat heater:**
   Switch for seat heater on/off.

4. **Operator weight/suspension:**
   Adjust the air pressure to the operator's weight.

5. **Armrest: (See fig. 21)**
   Adjust the position of the armrest by turning the knob.

6. **Lumbar support:**
   Set the lumbar support of the backrest.

7. **Side support:**
   Set the appropriate support of the backrest.

8. **Inclination of back rest:**
   Pull the lever up and adjust to the required angle.

9. **Position:**
   Pull the lever up and push the seat forwards or backwards.

10. **Damping coefficient:**
    Move the handle up or down to set the desired damping.

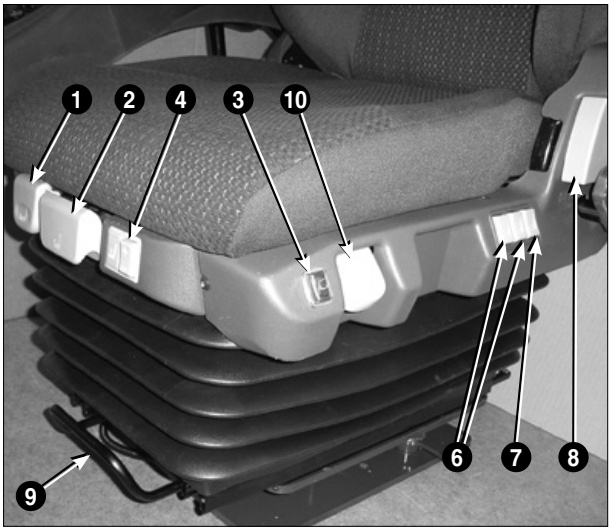


Fig. 20

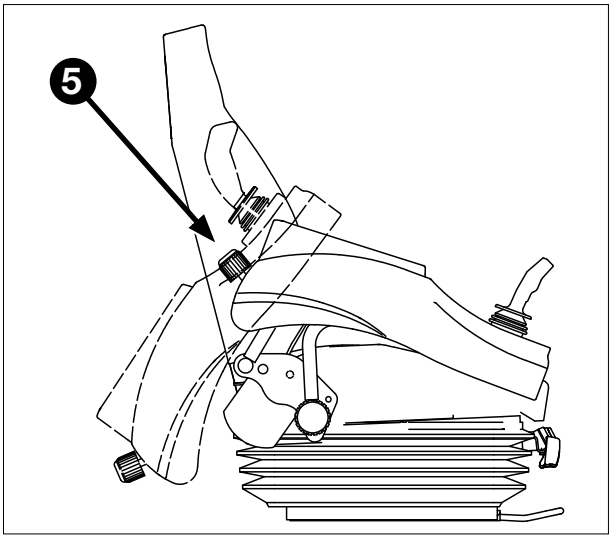


Fig. 21

ADJUSTMENT OF THE STEERING WHEEL

Wheel positioning

The position of the wheel can be adjusted by means of handle 1 fig. 22. Move the handle upwards and you can tip the wheel towards the windscreen or towards the seat.

WARNING

Always spend sufficient time when adjusting the steering wheel to the correct position.
This ensures the highest level of safety when driving the machine.

Length adjustment of the steering wheel

The length of the steering column can be adjusted by loosening hub 2 fig. 22, and pushing the steering wheel up or down. When the correct position has been found, lock the wheel again by tightening the wheel hub.

WARNING

Ensure that the steering wheel is always secured when driving and operating the machine.

Fig. 22

OPERATOR'S STATION

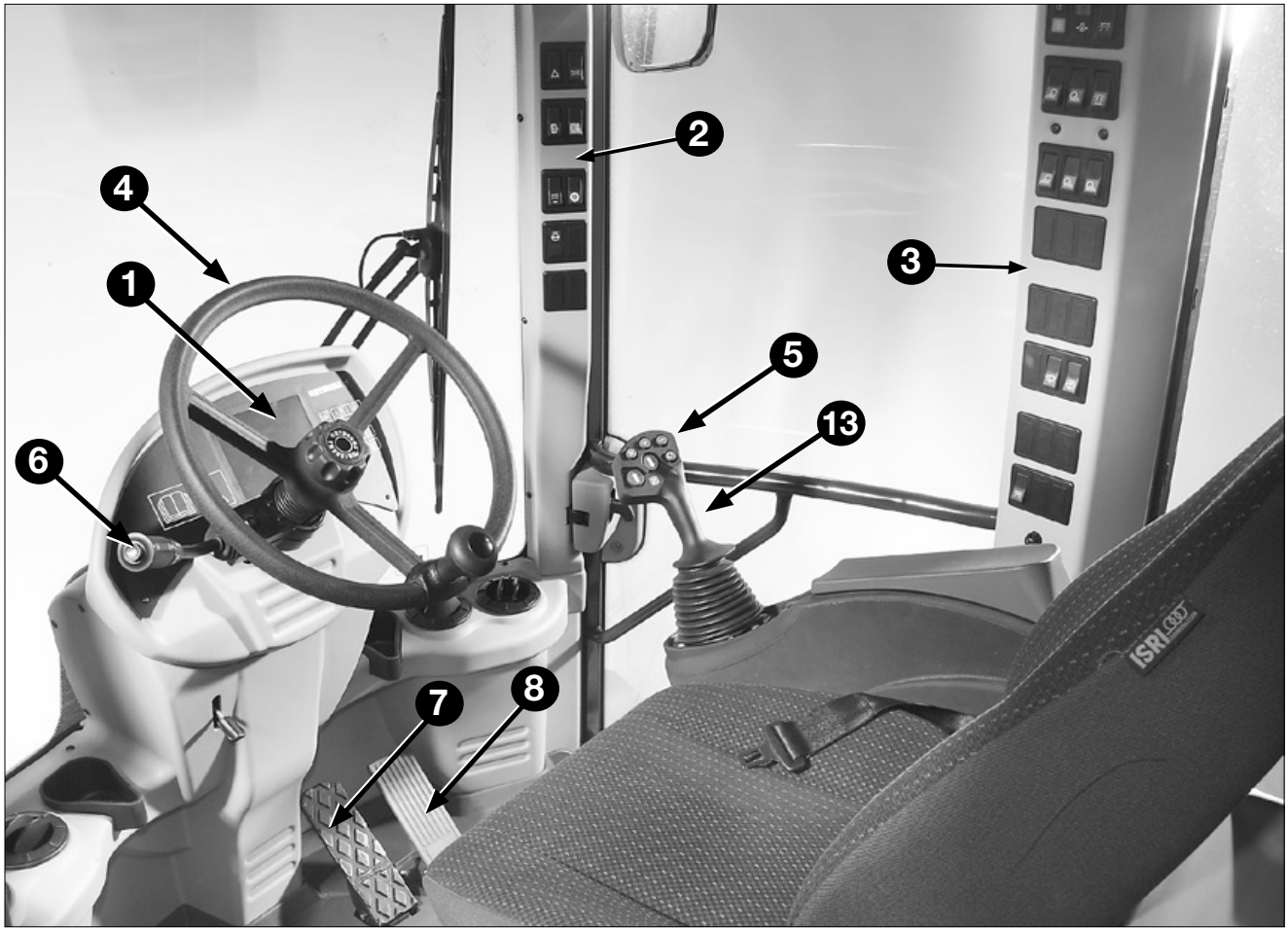


Fig. 23

1. **Instrument display**
   (See description, page 35).

2. **Front instrument panel**
   (See description, page 30).

3. **Side instrument panel**
   (See description, page 32).

4. **Steering wheel**

5. **Gear selector**
   (See description of gearshift, page 46).

6. **Combi switch**
   (See fig. 24 page 29).

7. **Brake pedal**

8. **Accelerator**

9. **Switch for parking brake**
   (See page 34).

10. **Ignition key**
    (See pages 34, 45).

11. **12V socket**
    Used for power supply of 12V equipment with 10A max. consumption.

12. **24V socket**
    Used for power supply of 24V equipment with 10A max. consumption.

13. **Joystick (dumper body)**
    (See page 56).

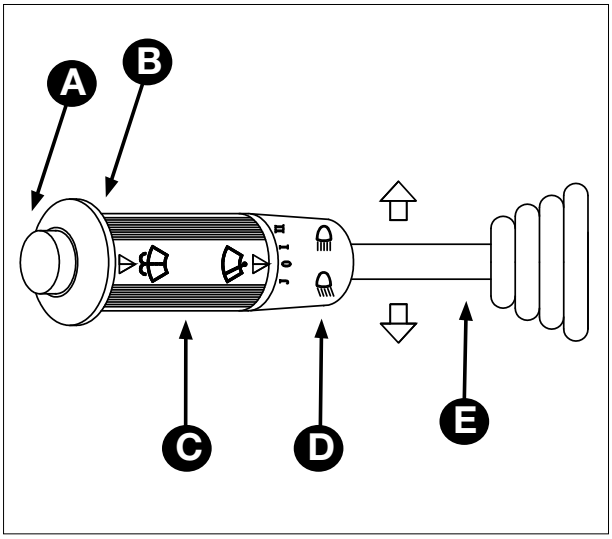


Fig. 24

A Horn

B. Windscreen washer

C. Windscreen wiper switch

J. Interval wiper

I. Low speed

II. High speed

D. Dipped beam/main beam and light signal

E. Direction indicator

FRONT INSTRUMENT PANEL

Light switch

The first position switches on the parking lights. The second position switches on the headlights (dipped beam/main beam).

2. Hazard light

The switch activates the hazard light, whereby all the direction indicators will start to flash. The warning light in the switch will flash simultaneously with the direction indicators.

3. Heated mirrors

The switch turns on the heating element in the side-view mirrors. This heat is used to demist or de-ice the mirrors. It is recommended to switch off the device when the mirrors are clear.

4. Rear fog light

Switch and pilot lamp for rear fog light

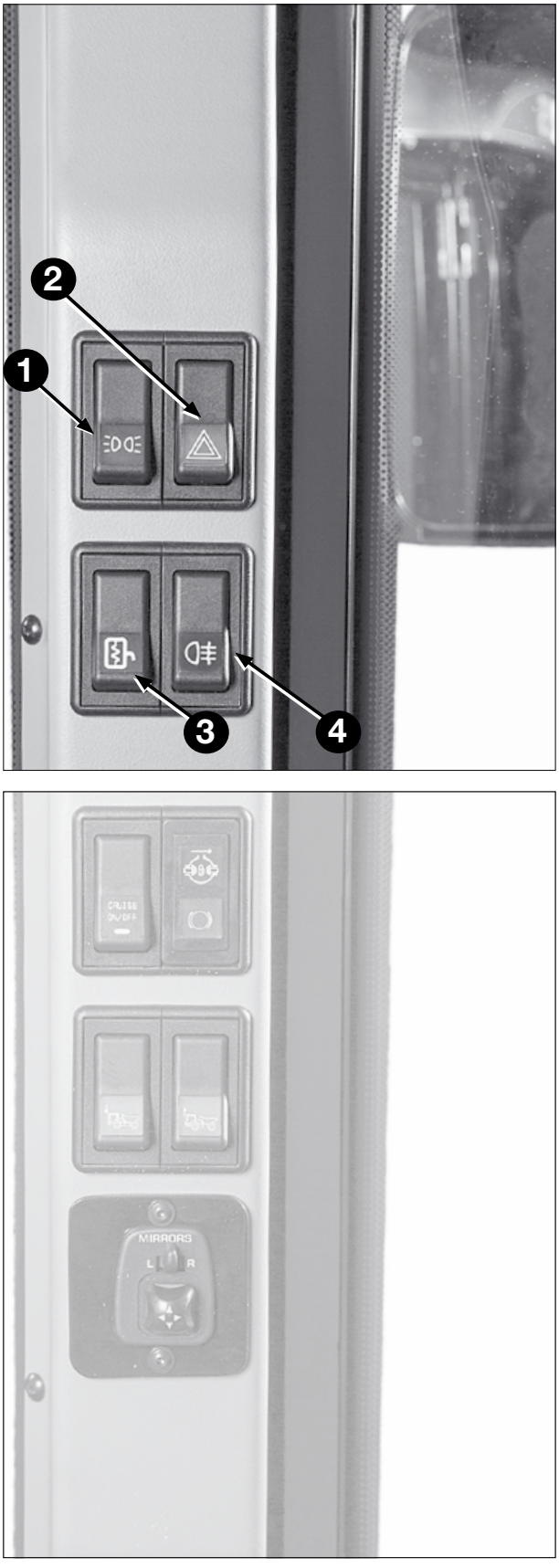


Fig. 25

CRUISE ON / OFF

5. Cruise control on/off

When the switch is activated, the cruise control is activated. For operation of cruise control, see page 44.

6. Differential lock

Pilot lamp for differential lock.
See page 49.

7. Tipping brake

Pilot lamp for the tipping brake.
See page 46.

8. Lower suspension (only ES/HM)

Lowers the vehicle to min. ground clearance. Suspension no longer functions.

9. Raise suspension (only ES/HM)

Raises the vehicle to max. ground clearance. Suspension no longer functions.

DANGER

The vehicle must always be lowered before any maintenance work under the vehicle is carried out.

MIRRORS L R

10. Electric mirror adjustment (Option)

The switch can be used to adjust the side-view mirrors electrically. Button 9 is used to select the mirror to be adjusted:
L= left-hand mirror, R= right-hand mirror.
The adjustment button can be moved sideways and up and down. The mirror will follow this movement.

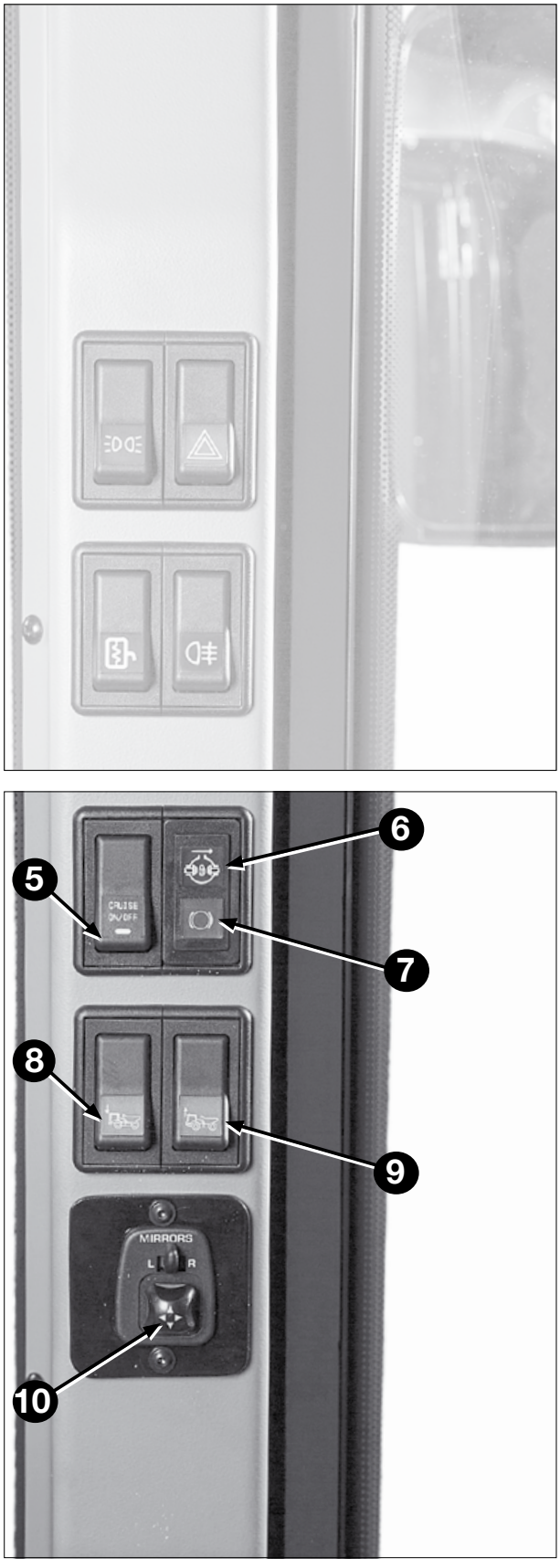


Fig. 26

SIDE INSTRUMENT PANEL

1. Air-conditioning

See page 22.

2. Warning - Stop the engine

When this light comes on, there is a serious fault on the engine, and it must be stopped immediately. Call service in order to remedy the fault.

3. Warning (engine)

When this light comes on, there is a fault on the engine and service must be called as soon as possible.

4. Preheater lamp

The light comes on when trying to start a cold engine. Do not start the engine until the light goes out.

5. Engine oil pressure lamp

The light comes on when the engine oil pressure is too low. Stop the engine immediately and call for service.

6. Engine diagnosis

The switch is used for readouts of error codes from the engine.

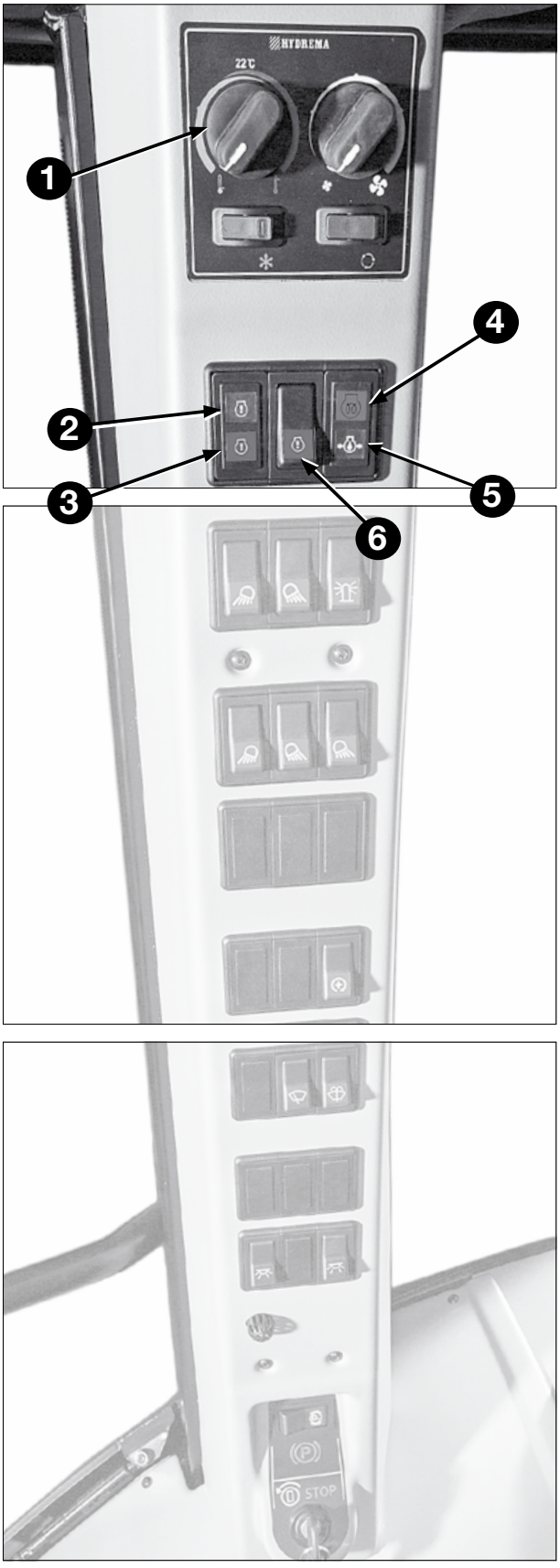


Fig. 27

7. Front work lights

The switch turns on the two work lamps that face straight ahead.

8. Front corner work lights

The switch turns on the two work lights mounted on the front corners of the roof.

9. Warning beacon

The switch activates the warning beacon on the roof of the machine.
IMPORTANT!
Only switch on the warning beacon if the machine poses a hazard to others. Observe the regulations concerning the use of warning beacons at the site at which you are working.

10. Rear work lights

The switch turns on the two work lamps that face straight behind.

11. Side work lights

The switch turns on the two work lights mounted rearmost on the side of the cab.
IMPORTANT!
The work lights must not be switched on when driving on public roads.

12. Work light on the rear of the dumper body

When the switch is activated in 1st position the work lights light together with the reversing light. In 2nd position the light is on permanently.

WARNING
Never drive on public road with the work light on.

13. Automatic throttle control

When the switch is activated, the engine automatically provides throttle for 2,000 rpm when the dumptruck body is tipped up. See page 56.

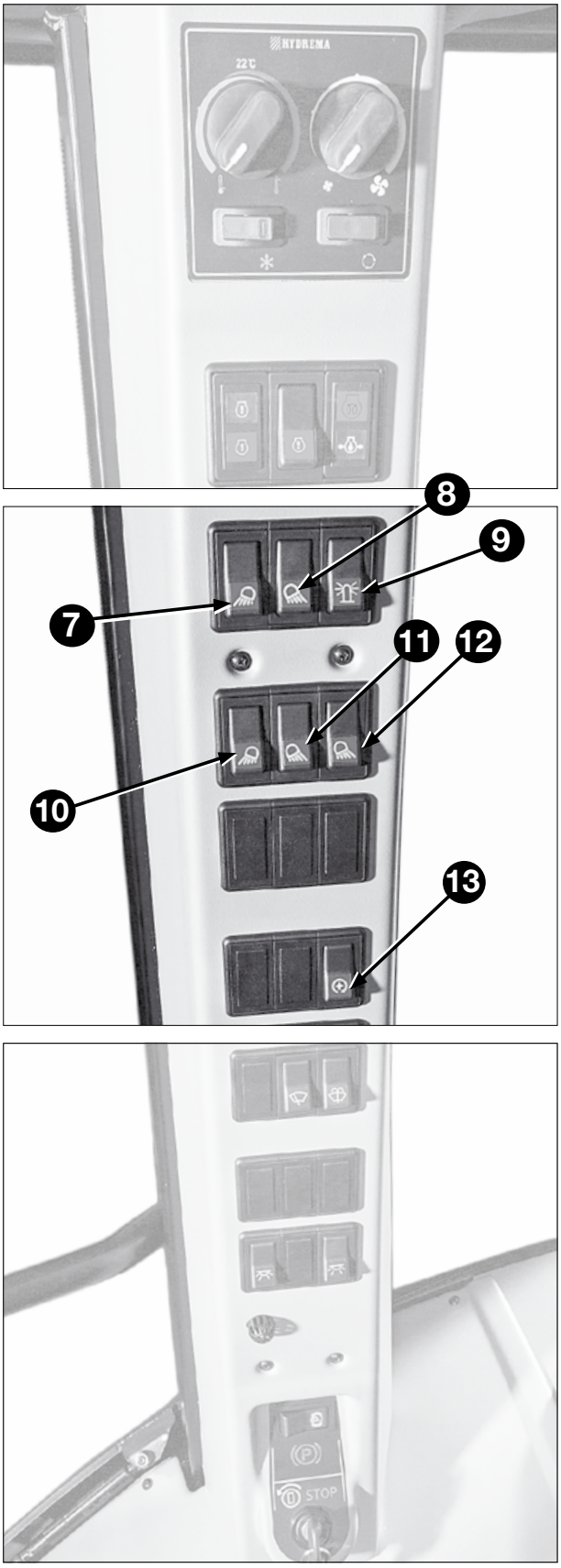


Fig. 28

14. Rear window wiper

The switch has 2 positions. The first position activates the rear window wiper with low speed, whilst in the second position the wiper runs with high speed.

15. Rear window sprinkler

The rear window sprinkler is activated by holding down the switch.

16. Cab lighting and access light

The switch has 2 positions. If the switch is not activated, the light will always be off. At position 1 the interior light and the two exterior access lights will be switched on and off when the doors are opened and closed. With the switch in the second position the light will be switched on permanently.

17. Red interior lighting

The switch turns on the red interior light that is located in the ceiling above the side instrument panel. This light can be used when working with the machine in the dark in order to be able to make it easier to see the interior of the cab.
The red light must not be switched on when driv-ing on public roads.

18. Parking brake

When the switch is activated and the red P symbol is lit up, the parking brake is activated.
IMPORTANT!
Never leave the machine without activating the parking brake.
Never drive the machine with the parking brake activated.

19. Ignition key

For starting the engine and the funktions of the ignition key, see page 45.

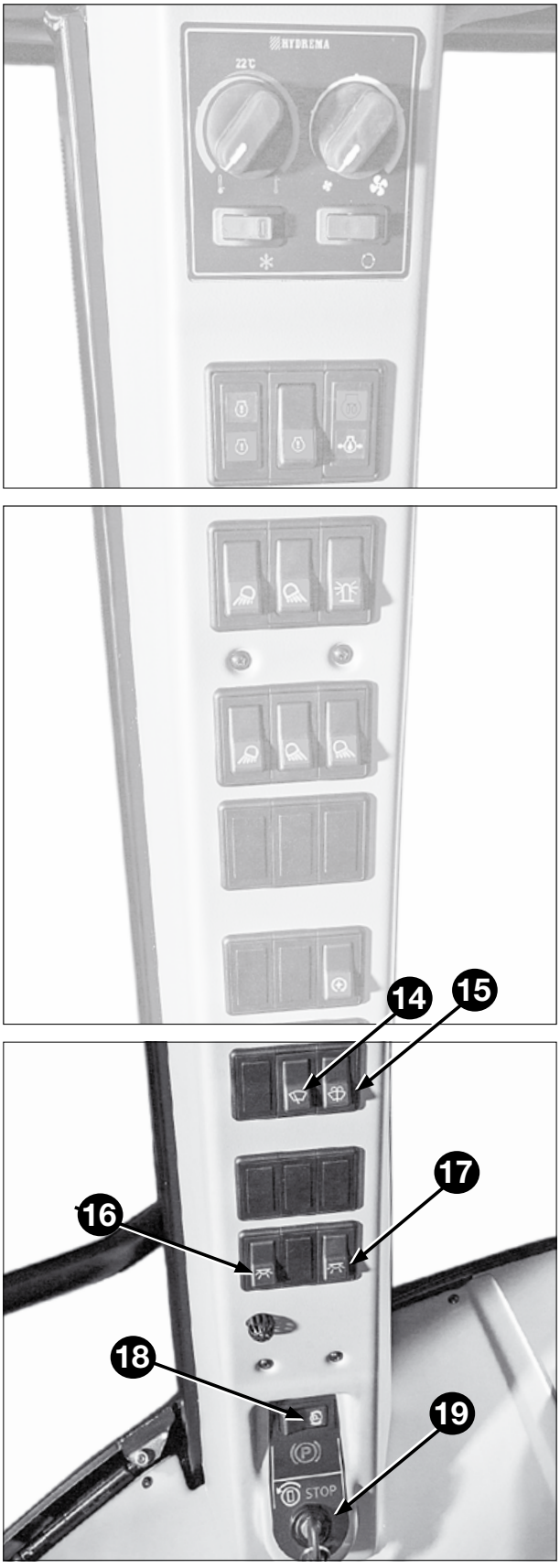


Fig. 29

INSTRUMENT DISPLAY

The machine is equipped with a computerized instrument display, which has the following functions

- Warning lights.
- Driving display.
- Job menu saving data for a particular period, e.g. a hire period.
- Service information with specification of daily checks and maintenance.
- Information about service intervals.
- Menus with data on engine and transmission
- Immobilizer with customer code
- Reversing camera (Option).
- Acoustic and text alarms in the event of the following faults:
  - Fuel level too low
  - Steering pressure too low
  - Transmission oil temperature too high
  - Driving with parking brake activated
  - Insufficient charge
  - Engine oil pressure too low
  - Coolant temperature too high
  - Air filter clogged
  - Water in fuel
  - Transmission fault
  - Battery voltage too low

Display keys

The numerical keys on the instrument display are used to enter data and codes.

Ent.

The *enter* key is used to select menu items and to confirm entries. The main menu is selected by pressing Enter when the display shows the driving display. Menus can also be selected by entering the number required by means of the keys.

Fig. 30

Esc.

The *escape* key is used to return to the previous menu. When pressing *»Esc«* several times, you will always go back to the driving display

Arrow upwards

The *arrow upwards* is used to move the yellow marking upwards in the menus.

Arrow downwards

The arrow downwards is used to move the yellow marking downwards in the menus.

Driving display

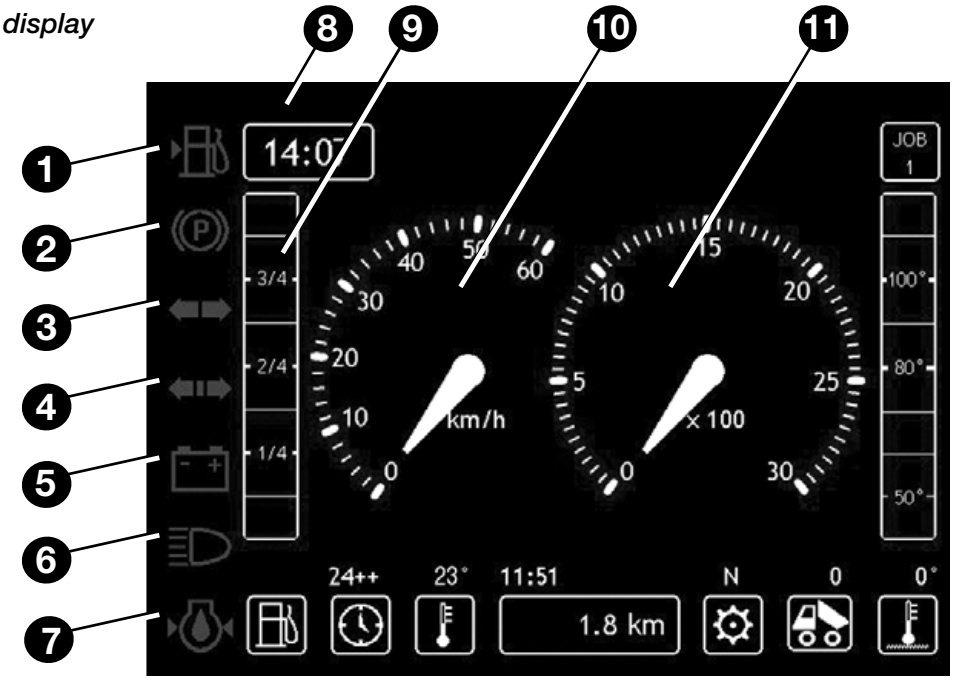


Fig. 31

1. Fuel level warning light

The warning light comes on when the fuel level in the tank is low (approx.15 l.). A text will also appear in the display.

2. Parking brake warning light

The lamp comes on when the parking brake is activated.

3. Direction indicator warning light

The lamp flashes when the direction indicators are activated.

4. Trailer direction indicator warning light

5. Charge warning light

The lamp comes on if the alternator is not charging up the battery properly. Any faults must be remedied immediately as it will not be possible to drive any further with the machine within a short space of time.
When starting, the light should come on when the ignition key is turned and go out when the engine starts.

6. Main beam warning light

The lamp comes on when the headlight main beam is on

7. Engine oil pressure warning light

The lamp comes on if the engine oil pressure is too low. In this case the engine must be stopped immediately as otherwise serious damage may be caused to the engine.
When starting, the lamp should come on when the ignition key is turned and go out when the engine starts.

8. Digital clock

20:53

For setting the clock, see page 43.

9. Fuel gauge

The level of fuel in the fuel tank is shown on the scale. If the fuel level is low, warning light 1 will come on.

10. Speedometer

11. Rev counter

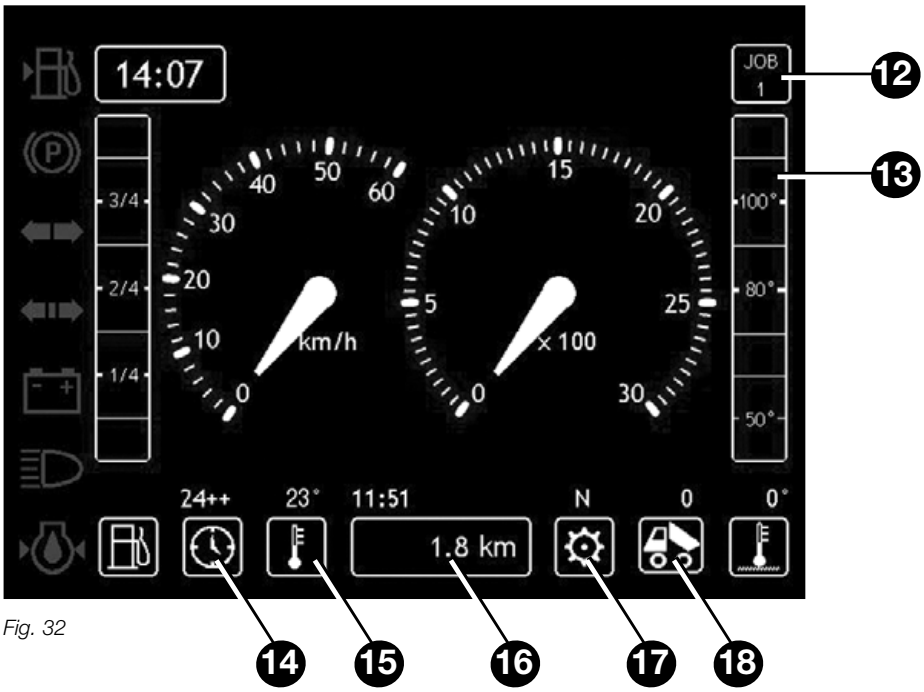


Fig. 32

JOB - ***12. Specification of job number***

If the job menu is used (see page 38), the active job number appears here.

13. Engine coolant temperature

When the engine has reached normal operating temperature, the temperature gauge should show 79-105º C. Any deviation from this range for a prolonged period indicates that there is a fault in the cooling system. If the temperature is too high, a text and acoustic alarm will be triggered at 107º C.

02:56 ***14. Remaining time before refuelling***

If the menu in the instrument panel for refuelling is used (see page 40) the average remaining time that can be driven until refuelling is required will appear here.

22° ***15. Outside temperature***

The display shows the outside temperature in ºC.

06:33 999.9 km ***16. Trip counter***

Displays the time and the number of km driven since the trip counter was reset. For resetting of the trip counter, see page 43.

F3 ***17. Gear display***

Displays the current gear selected. F6 indicates 6th gear forward and 1R indicators 1st gear in reverse.

18. Tipping counter

The tipping counter registers every lifting of the body (the body indicator is deactivated for 4 seconds) and gives an indication of how many loads there may have been carried out on a day.

The tipping counter runs to 999.

To reset the counter see page 43.

Codes

In order to use the panel, a customer code must be used for some of the menus. Up to 5 codes can be entered per machine. In order to enter customer codes, please contact Hydrema service. When carrying out service on the machine, Hydrema service uses a special service code.

Alarms

In the event of faults on the most important functions, an alarm text will appear at the top of the driving display accompanied by an acoustic alarm.
The alarm text will indicate the nature of the fault.

WARNING

Always follow the instructions on the display. It can be extremely hazardous or result in potentially serious damage to the machine if a STOP message is ignored.The alarm will automatically disappear once the fault has been remedied and the machine restarted.

Fig. 33

Menus

By pressing »*Ent*«, the instrument panel's main menu is opened. From here the required submenus can be opened. All menu screens in the instrument panel are indexed with a number that appears in the top right corner.

The main menu contains the following:

1. Job
This menu with submenus contains the option of commencing a job, whereby all data within a particular period is acquired, e.g. a hire period.

2. Fuel filling
This menu is used when refuelling the machine to enter the number of litres or to specify a full tank. When this menu is used, the remaining period before refuelling must take place appears on the display.

3. Service
This menu contains information about service intervals and what is to be performed at the various service intervals.

4. Info
In this menu you can find information about the machine, including chassis number, operating hours and kilometres driven.

5. Machine
This menu contains information about service, engine data, transmission faults and data, data display, alarms and machine set-up.

6. Reset counters to zero
This menu is used to reset both the trip and the tipping counter.

Jobmenu

Fig. 34

Start new job

Select menu item: »*Create new job*« Press »*enter*«.
Enter customer code.
Press »*enter*«.

The screen of the active menu appears. Press »*Esc*« to return to the main menu.
5 jobs can be created.
When a job has been created, data is acquired and saved with regard to starting up, engine hours, fuel consumption, kilometres driven and any alarms.

Restart job

If a job has been interrupted, this menu can be used to resume the data acquisition for the same job.
Press *»enter«.*
Use the arrow keys to select the job to be resumed.
Press *»enter«.*
Press *»customer code* og *»enter«.*
Press »Esc« to return to the main menu.

Details

In this menu you can see the details of the job concerned.
Select the job you wish to see details of.
Press *»enter«.*
Press *»customer code* og *»enter«.*
The screen below appears with information about date, hours, distance driven and fuel consumption.

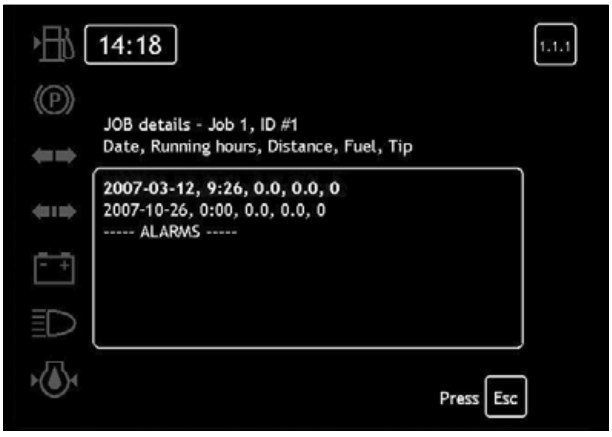


Fig. 35

Copy to USB

The data that is shown under details can be exported to a USB memory stick. Insert a memory stick into the socket shown on fig. 36.
Select *»Copy to USB«.*
Select *the job to be copied.*
Press *»enter«.*
When *»OK«* appears at the far right, job data has been copied to the memory stick.
Data can be read in Windows WordPad or imported into a Microsoft Excel spreadsheet.

Fig. 36

Delete

In this menu item you can delete a job with all data.
Select *»enter«.*
Select *the job to be deleted.*
Press *»enter«.*
Press *»customer code* og *»enter«.*
The selected job and all the data for this job are deleted.

Fuel filling

Fig. 37

In order to display the fuel consumption and remaining running time, it must be specified either that the tank is full or the number of litres that have been refuelled must be specified.

In the case of a completely full tank:
Select *Tank full.*
Press *»enter«.*
Press *»Esc«.*

In the case of partial filling:
Select: *Litres added.*
Press *»enter«.*
Enter no. of litres.
Press *»enter«.*
Press *»Esc«.*

If this is done every time fuel is replenished, the remaining period before refuelling can be read off on the driving display

Service

When checks or service are carried out in accordance with the maintenance form, a message concerning service will appear in the driving display. The menu is used to obtain information about what is due to be carried out.

Fig. 38

Select the item(s) for which the next service is due in 0 hours. Press *»enter«* on each interval and carry out the procedure indicated. Each item can be acknowledged by entering the number of the item or by selecting the item and Pressing *»enter«*. For a 10-hour service a combined reset can be effected by *pressing 5*.

If an authorised service inspection is due, the text *»Call service technician«* will appear at the top of the driving display. In the service menu you can see which service is due by finding which service has 0 hours left.

Call authorised service to have service work carried out on the machine.

The *»Call service«* message can only be deleted by means of an authorised service code.

Info

By selecting the INFO menu you can obtain information about the machine data. This data is stored in the instrument panel's permanent memory and cannot be modified.

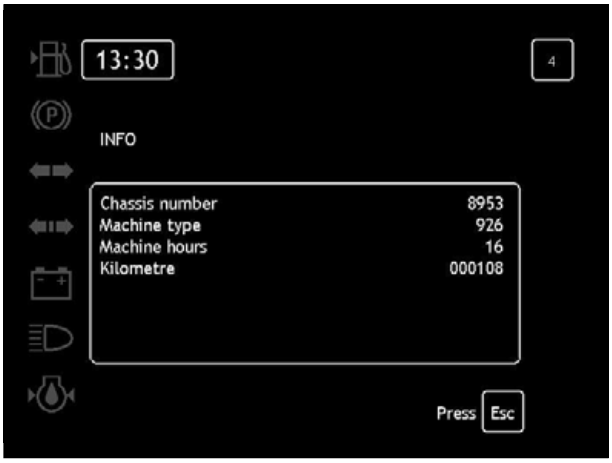


Fig. 39

Machine

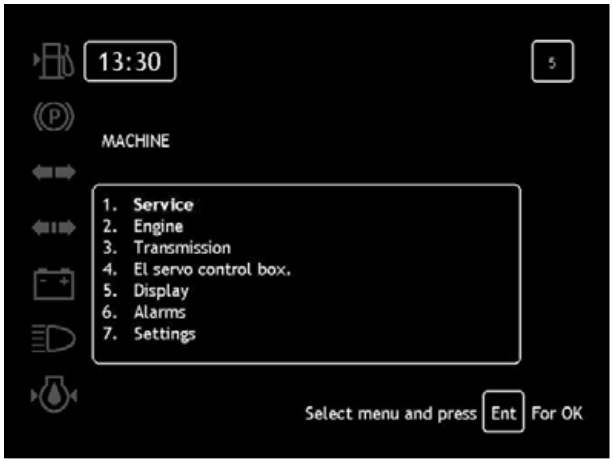


Fig. 40

Service

Fig. 41

For each acknowledgement given for 250, 500 and 1000 hours, date, time, user, service interval, period and time for authorisation are given here.

1. Date.
2. Time.
3. User no. that has acknowledged service
4. Service interval.
5. No. of hours at which the interval occurs
6. No. of hours at which acknowledgement is made.

The user number that is specified is the user that has entered his number to the immobiliser. If the immobiliser is inactive, user 0 will appear.

Engine

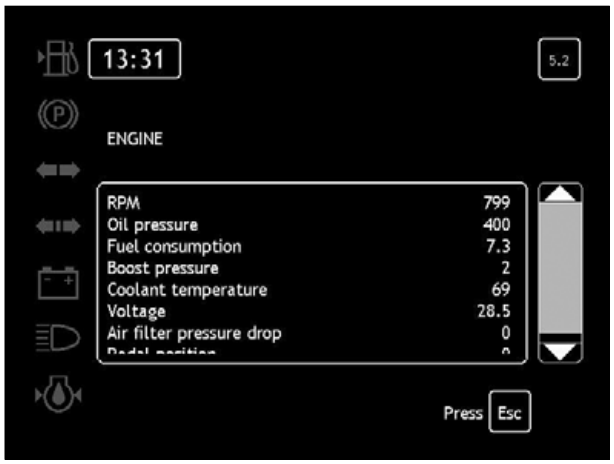


Fig. 42

Under this menu item a list of current engine data appears that shows the state of the engine.
Current data is shown for engine revs, oil pressure, diesel consumption, boost pressure, coolant temperature, battery voltage, pressure drop across the air filter and the position of the accelerator.
This data is used for service.

Transmission

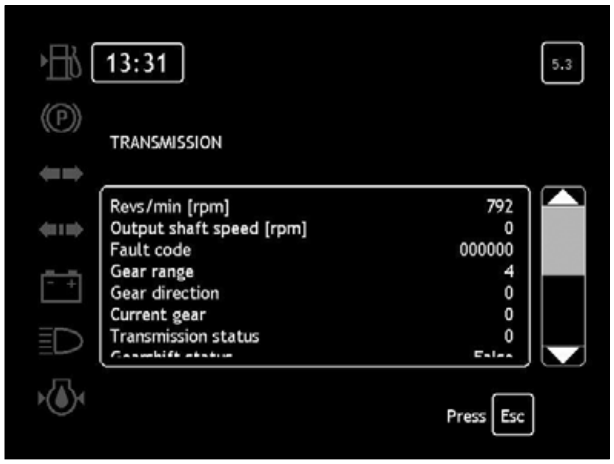


Fig. 43

Under this item a list of data for the transmission appears that is primarily used in connection with service.
In the event of an alarm in the driving display indicating *»Transmission fault«* the code for the alarm can be read off in the menu item *»Fault code«*
See page 47 for specification of fault codes.

Display

This item is used for troubleshooting and information about the instrument display.

Alarms

This item specifies which alarms are active and the alarms that have been stored can be seen.
On page 35 there is a list of the alarms that can be stored.
The last 10 cases of a particular alarm are stored.
If you wish to see »Active alarms«, select this item and press *»enter«.*
If you wish to see »logged alarms«, select this item and press *»enter«.*
A list will then appear of the alarms that are registered.
For each alarm you can now *select said alarm and* press *»enter«*, whereby a list with the times of registration of the alarm in question appears.

Fig. 44

Delete logged alarms

Once a fault that has triggered an alarm has been remedied, the registered alarms can be deleted.
Registered alarms can only be deleted with an authorised service code.

Settings

Fig. 45

Machine settings

This menu contains the data that was used when setting up the machine when it was new, e.g. the language is selected in this menu. An authorised service code is required to see and change items in this menu.

Clock setting

Select »clock setting« and press *»enter«.*
Enter the time as hours and minutes. 14.25 is thus entered as 1425.
Press *»enter«* and the new time will appear.

Date setting

Select *»date setting«* and, press *»enter«.*
Enter *the date as year, month and day*. 2-3-2007 is thus entered as 20070302.
Press *»enter«* and the new date will appear.

Immobilizer on/off

The machine is equipped with an electronic immobiliser with code. This menu can be used to choose whether the immobiliser is active.
Select *»immobiliser on/off«* and press *»enter«*.
Enter *user code* and press *»enter«*.
Use the arrow keys to choose whether the *start alarm should be on or off*. Press *»enter«*.
When starting up next time, the new setting will apply.

When the start alarm is active, you have to wait until you are *asked to enter the code* after the ignition key has been turned. See code display, fig. 46. Once the code has been entered, press *»enter«* and the machine can be started.
If you attempt to start the machine before the code has been entered, it will start but will stop again as soon as the code screen appears.

Fig.46

Tip counter on/off

In this menu you can choose the tipping counter to be shown in the driving image.
Choose tipping counter on/off, press »enter«.
Use the arrow keys to choose whether you want the tipping counter to be on or off. Press »enter«.

Fig. 47

Reset counters

Under this menu both the tip and trip counter can be reset. *Select »Trip or Tip counter«* and press *»enter«*. The trip/tip counter will then be reset.

Switches in armrest
see fig. 48.

1. Locking the tipping lever

As long as switch 1 is activated, the function of the tipping lever is activated.
The yellow pilot lamp must never be on when driving on public roads.

2. Differential lock

Activating the differential lock.
See page 49.

3. Gear automatics

When the switch is activated, gear shifting takes place automatically. When the switch is not activated, gear changes must be performed manually. See page 46-47.

4. Cruise control

By pressing the switch at the symbol whilst driving, the current engine speed is maintained. These
engine revs are maintained until the brake is activa-ted, after which the engine rpm are controlled by
the accelerator alone. If you wish to increase the engine revs whilst driving, keep the button depres-sed opposite the to symbol.
If you wish to reduce the engine revs, keep the button depressed at the symbol.

This function does not ensure a constant speed, but maintains constant engine revs.
For the function to be active, button 5 fig. 26, on the front instrument panel must be activated.

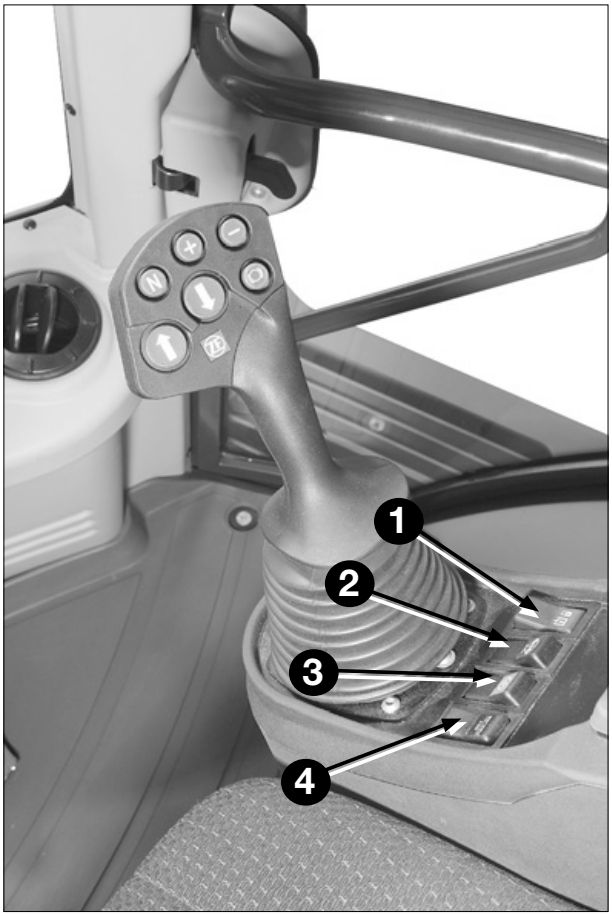


Fig. 48

Starting the engine:

Always check that the parkingbrake is activated before starting the engine. Read the »Before driving the machine« section on page 8 before you start.

Ignition key function:

0 = Stop
1 = Drive and preheating position
2 = Start

Start a cold engine

- Turn the ignition key to position 1.
- Let the key remain in position 1 until the light for preheating goes out.
- Turn the key to position 2 and start the engine. . Release the key as soon as the engine starts.

IMPORTANT!
Never increase the revs while starting the engine; this is controlled automatically by the engine control unit.
If the engine does not start within 30 seconds, wait a further 2 minutes before attempting to start again in order to let the starter motor cool down.

Starting a hot engine

- Turn the ignition key to position 2 and start the engine. An attempt to start the engine must not last for more than 30 seconds before the key must be released

Starting in cold weather

WARNING

Never use cold start aids such as ether or similar agents, as there may be a risk of explosion.
Use the normal start procedure for starting a cold engine.
Let the engine idle or run up to 1200 rpm for 3 to 5 minutes until the coolant temperature begins to rise.

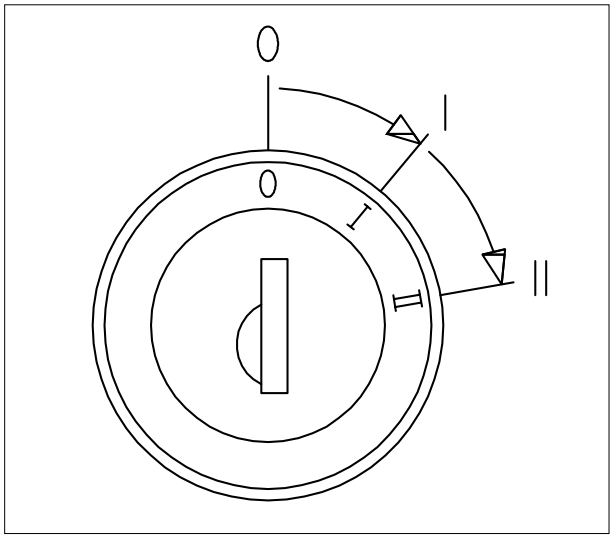


Fig. 49

Let the engine run at low load until the machine reaches operating temperature.
As long as the engine is cold (less than 60° C) or the hydraulic oil temperature is less than 10° C, the engine should not run at more than 1500 rpm.

When the engine stops

Never stop the engine immediately after being exposed to a high load or running at high revs. This will reduce the service life of the engine and the turbocharger.
Let the engine idle for up to 5 minutes before switching it off.

Starting with an auxiliary battery

See »Special conditions« page 54.

Gearshift

The machine can be driven with manual or fully automatic gearshift. This can be selected using the switch for automatic gear 3 fig. 48.

WARNING

Do not drive the machine until the brake system pilot lamp for the brake pressure is out.
Always fasten your seat belt before starting.
Take care that no one is near the machine.

Gear selector

1 Forward

2 Reverse

N 3 Neutral

+ 4 + key

– 5 – key

6 Tipping brake – works below 1 km/h N must be activated before the tipping brake.

In general

When starting the engine the display shows NN. That means the transmission is waiting for a neutral signal in order to test whether the neutral button is working correctly.
The transmission can only be put into forward gear or reverse when the key N is engaged. Shifting into a lower gear should be avoided as long as the speed is exceeding the maximum speed of the next lower gear.

WARNING

Shifting from forward direction into reverse should be made only when the machine has come to a standstill.

Manual gearshift

If the switch for automatic 6 fig. 26 is not activated, the machine drives with manual gearshift. Shifting up and down is made with the keys (+) and (–). When using the manual gearshift, choose the right gear for the speed in order to adapt the engine revolutions to the transmission.

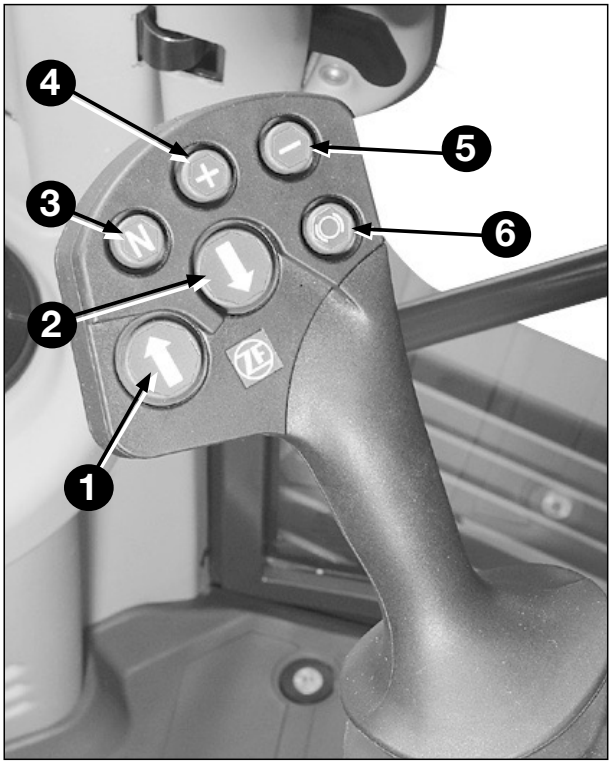


Fig. 50

Automatic gearshift

If the switch for automatic 3 fig. 48 is activated, the machine drives with automatic gearshift.
The automatics shift from the first gear up to the sixth gear and from the first reverse gear up to the third reverse gear. When starting, the machine drives in the second gear and then chooses the optimum gear. This is based on the actual speed, load and revolutions.

It is recommended always to use the automatic mode – for both, transport driving and driving in terrain.
In this way it is guaranteed that the machine always drives in the optimum gear which saves fuel and spares the machine.

The display 17 fig. 32, always indicates the current gear.

Change of range (kickdown)

When driving with automatics you can choose kickdown by pressing the (–) key.
At the same time, the gear range is limited which means the automatics now shift only up to the gear that was choosen with the kickdown.
For example: when pushing the (–) key while driving in the fifth gear, the automatics shift down to the fourth gear and the transmission works automatically in the first up to the fourth gear. If you push the (–) key again, the automatic shift down to third gear and the machine drives automatically in the first up to the third gear. When pushing the (+) key the automatics shift again into the full gear range.

⚠ WARNING

Never let the machine drive downhill with the transmission in neutral, as this can damage the transmission.

⚠ WARNING

Always start with low engine revolutions. High engine revolutions cause starting with a jerk which can be dangerous.

Gear chart

Gear	Speed range	Display forward	Display backw.
1st	0 - 5 km/h	1 F	1 R
2nd	0 - 8 km/h	2 F	-
3rd	0 - 13 km/h	3 F	2 R
4th	0 - 20 km/h	4 F	-
5th	0 - 29 km/h	5 F	3 R
6th	0 - 33 km/h	6 F	-

Display

The current gear is displayed in the instrument display (see 17 fig. 32)
F6 indicates 6th gear forward, and 1R indicates 1st gear reverse

Fault messages

In the event of any faults in the transmission, an alarm will appear at the top of the instrument display with the text:

FAULT IN TRANSMISSION

A more specific indication of the fault can be seen in the instrument display:
Press *»enter«* and *select* the *Machine menu.*
Press *»enter«* and *select* the *Transmission menu.*
Press *»enter«* and *select* the *Fault Code menu.*
Press *»enter«* and the type of fault can be seen.

In the event of a fault, please contact Hydrema service.

DRIVING

Marking of the machine

When driving on public roads the warning triangle must be mounted. (obligatory in some countries only).

Fig. 51

Running-in the engine

Being new the machine should be driven carefully for the first 50 hours. Drive slowly until you have made yourself familiar with the machine. However, the new engine is capable of full performance from the beginning, provided that it has reached a working temperature of min. 60° C.

IMPORTANT!
Check frequently oil level and temperatures.

SAFETY WHEN DRIVING

WARNING

Before driving check that the machine is clean so lamps and signal equipment can function.

Always adapt the speed to the conditions and never drive at a higher speed downhill than the normal driving speed of the machine.

DANGER

It is deadly dangerous to stop the engine during driving as the steering capability is considerably reduced.

WARNING

Never drive with the machine, while the dumper body is tipped. It reduces the stability and view.

DANGER

If the acoustic alarm sounds during driving stop the machine at once. it is for example deadly dangerous to drive with insufficient brake pressure.

Driving in general

Keep an eye on other persons being near the machine. Avoid sudden application of the brakes.
Always adapt the speed to conditions.
Always select a gear suitable for the job.

LOADING OF MATERIAL

WARNING

Never drive with excessive loads.
The operator is responsible for the machine being properly loaded.

The max. carrying capacity is 10 tons.
This capacity results from materials with a density of 1800 kg per m^3 loaded to the upper edge of the dumper body, and a heaped gradient of 2:1.
If the material is heavier, the dumper body must not be completely filled.

For your guidance see the density chart on page 51 for various materials.

Driving in terrain

Before driving in terrain check that driving is safe and where the conditions are best.

Driving in soft terrain

The machine is equipped with a 100% differential lock on the rear axle. It is activated by pushing the button 2 fig. 48 and works as long as you press the button down. It can be activated under all conditions. It is, however, recommended not to engage/disengage it, while the tractive force of the machine is high.
The differential lock should be activated only when it is needed, as the machine is harder on the ground surface when it is operated with the differential lock being activated.

⚠ WARNING

Never drive on roads with the differential lock on the rear axle being activated, as it can reduce the steering capability of the machine and destroy its rear axle.

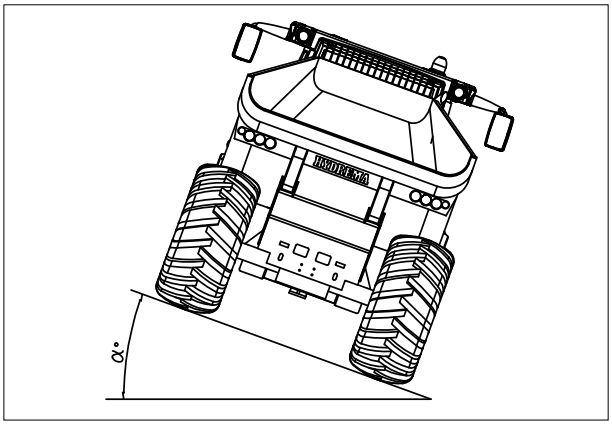


Fig. 52

⚠ DANGER

Never drive on slopes as large as the rollover angle. Pay special attention to this when the terrain is uneven.

Driving on slopes

Speed km/h with max. load:

Gear \ Gradient	10%	20%	30%	40%
1st	5.5	5	4	4
2nd	8	5.5	3	
3rd	10	3.5		
4th	8			

Driving should as far as possible always take place parallel to the slopes.

Unloading of material

⚠ WARNING

Do not reverse near slopes. Pay attention to the fact that the rear axle load is increasing when the load is tipped, especially when the material does not slip easily, or if there is the risk that the material is frozen up.

Place the machine in non-articulated position before the tipping is started.

Make sure there is enough room upwards when the dumper body is tipping. The max. height when raised is 4.22 m. MultiTip 4,45 m.

Driving on slopes					
α = angle of gradients where the machine is rolling over					
		912E	**912ES**	**912HM Standard**	**912HM Option**
Unloaded	Driving straight ahead	40°	39°	39°	42°
	Turning uphill	39°	38°	38°	41°
	Turning downhill	41°	40°	40°	43°
Loaded	Driving straight ahead	32°	31°	31°	34°
	Turning uphill	29°	28°	28°	31°
	Turning downhill	34°	33°	33°	36°

Driving on public roads

Make sure that rules and regulations for driving the machine are observed.

Make sure that the machine fulfills the safety regulations and the lamp glasses are clean.

Always pay attention to other road users, especially those coming from behind. When driving with loads make sure that the material is loaded in a way that spill is avoided.

STOPPING THE MACHINE

- *reduce the engine revolutions*
- *activate the brake*
- *put the transmission in neutral*
- *activiate the parking brake*
- *when stopping the engine turn the key counter-clockwise into position 0*

MATERIAL DENSITY CHART:

Material		Kg/m³ in bulk	Kg/m³ compact
Basalt		1960	2970
Granite - broken		1660	2730
Gravel	Dry 6-50 mm Wet 6-50 mm	1690 2020	1900 2260
Earth	Dry, packed Wet, excavated	1510 1600	1900 2020
Coal	Raw	1190	1600
Stone, crushed	*75% stone, 25% earth* *50% stone, 50% earth* *25% stone, 75% earth*	1960 1720 1570	2790 2280 1960
Lime		1540	2610
Clay	Dry Wet	1480 1660	1840 2080
Clay & gravel	Dry Wet	1420 1540	1660 1840
Humus		950	1370
Sand	Dry Wet	1420 1840	1600 2080
Sand & clay	Dry Wet	1600	2020 2400
Sand & gravel	Dry Wet	1720 2020	1930 2230
Slag, broken		1750	2940
Stone, crushed		1600	2670

TOWING

Towing must only take place in exceptional cases.
A towing bar mounted in the towing eye at the front of the machine must be used, fig. 53.
Never tow on public roads or with loads.
The machine must be properly marked.

Fig. 53

Towing with dead engine

Before towing can be started, the parking brake must be deactivated, as there is no hydraulic pressure to keep the brake deactivated.
To deactivate, the six screws in the front axle have to be tightened (3 on each side), see fig. 54 and 55, until the bottom position is reached. Use an 8 mm Allen key from the tool box.

When towing the speed must not exceed 10 km/h,
and the distance must not be longer than 10 km.
Towing at longer distance may damage the transmission because its oil pump is not running.

When towing at a longer distance or at a speed higher than 10 km/h, both front and rear cardan shaft must be demounted.

⚠ DANGER

Service brake and steering mechanism do not work when towing with a dead engine.

⚠ WARNING

After end towage the machine the parking brake must be activated again. Turn the 6 screws out again.

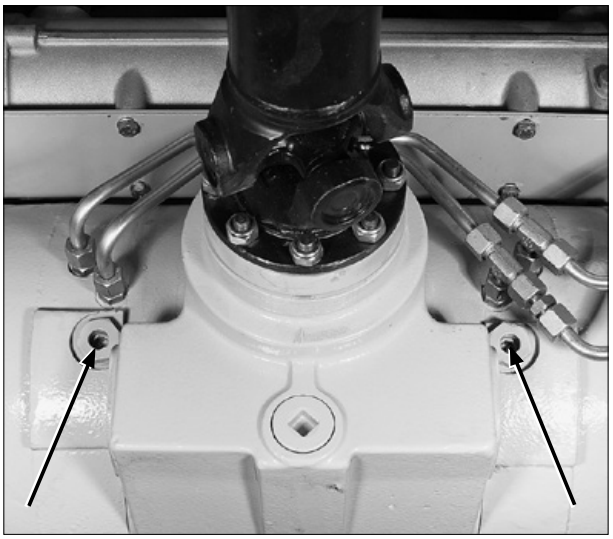


Fig. 54

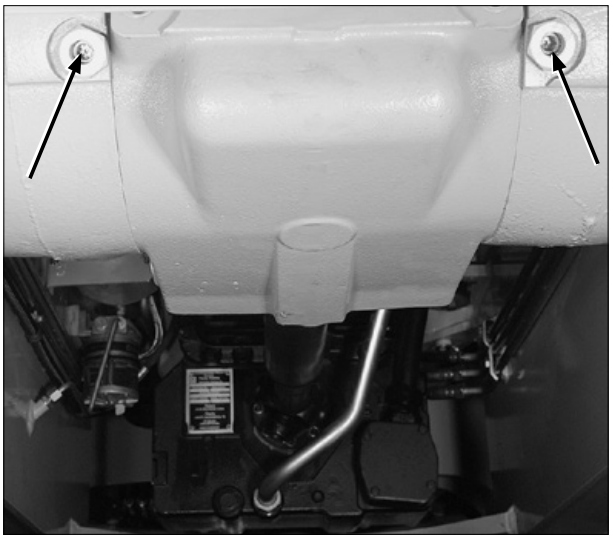


Fig. 55

TRANSPORT

Transport on a trailer. Check the type and dimensions of the trailer in relation to the machine which is to be transported.

Dimensions of the machine:

Length	5.87 m
Height	2.75 m (912E) / 2.79 m (912ES) 2.87 m (912HM)
Width	2.50 m *(over tyres 600/55-26.5)* 2.90 m *(HM: over tyres 800/45-30.5)*
Unloadeh weight	912E: 7270 kg / 7730 kg *(for MultiTip)* 912ES: 7540 kg / 8000 kg *(for MultiTip)* 912HM *(600/60-30.5)*: 7970 kg / 8430 kg *(for MultiTip)* 912HM *(800/45-30.5)*: 8260 kg / 8720 kg *(for MultiTip)*

1. Drive carefully the machine up on the trailer. Stop the engine and activate the parking brake.

2. Mount the pivot lock (fig. 65) and safety bolt (fig. 62).

3. Place choks in front of the front weels and behind the rear wheels.

4. Tighten the machine to the trailer with chains fixed to the towing eyes in front (fig. 53) and the axle plates at the rear (fig. 56).

5. Check that the distance from the ground to the max. height of the machine does not exceed the permissible transport height.

DANGER

It might be deadly dangerous to transport the machine if it is not properly fastened to the trailer.

Lifting the machine

If the machine is lifted by a crane, 4 lifting belts must be used, each with a length of min. 4 meters. Mount them in the lifting eyes with clevises.

The machine's nett weight: 8720 kg.

Provided that the lifting belts are four meters, the specifications are as follows:

Load of front lifting belt:
2700 kg each.

Load of rear lifting belt:
3000 kg each.

Lifting point: approx. 4.6 m above ground.

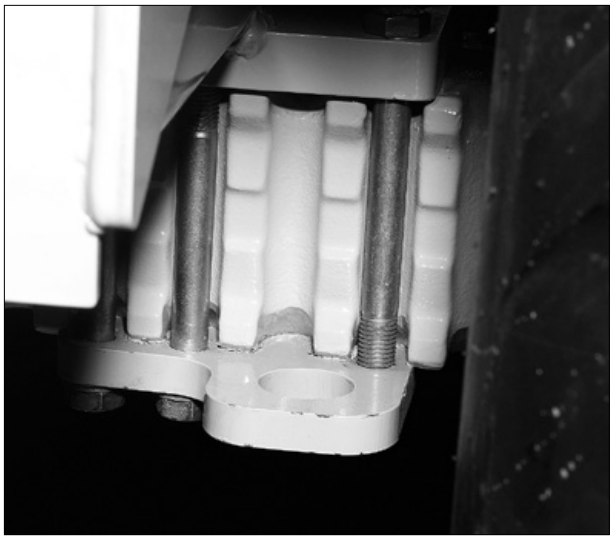


Fig. 56

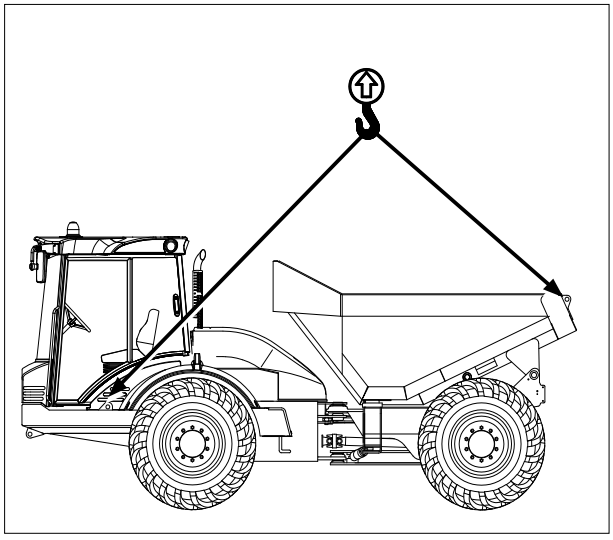


Fig. 57

SPECIAL CONDITIONS

In cold weather

In winter or when the temperature falls below the freezing point do not forget the following:

- Fill anti-freeze into the cooling system.
- Use thinner lubricating oil. (see page 80)
- Fill up the fuel tank when having finished work in order to avoid condensed water in the tank.
- Having started the engine, run the machine at low speed and small load until the oil in engine, transmission, hydraulic system and axles is warmed so much that it is thin enough to lubricate correctly.

Do not use the machine for tough work right after the start, when it is freezing hard.

Start in cold weather

If the machine cannot be started due to lack of battery capacity, an auxiliary battery can be connected.

Starting with auxiliary battery

- Dismount the cover of the battery box.
- Check that the battery has a voltage of 24V.
- Connect one end of the jump leads to the posi tive pole on the battery of the machine. Take care that the jump lead battery terminal does not touch the frame.
- Connect the other end of the jump leads to the positive pole of the auxiliary battery.
- Connect one end of the other jump lead to the negative pole of the auxiliary battery, and the other end to the chassis of the machine - away from the battery. It may for example be connected to the step or direct to the engine block at the mounting bolt of the starter motor.

IMPORTANT!
Reverse polarity may damage the voltage relay and the alternator.
Repeat the procedure »Starting a cold engine«.

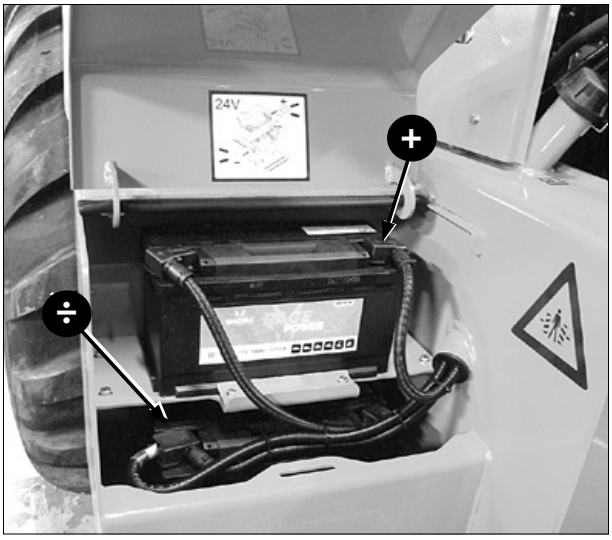


Fig. 58

DANGER

The engine must only be started from the operator's seat. Attempts to start the machine by short-circuiting puts the start lock of the machine out of action which may cause accidents.

WARNING

The machine must never be started with a voltage of more than 24V as the electronic components of the machine would be damaged.

Danger of explosion!

Due to voltage drop the battery may explode if a fully charged battery is connected to an entirely or partly discharged battery.
Avoid sparks and open fire close to the battery.

Danger of corrosion!

The battery electrolyte contains corrosive sulphuric acid!
Avoid direct contact!

IMPORTANT!
When the machine is starting:

- Check that the pilot lamps are out.
- Take away the jump leads between chassis and negative pole of the auxiliary battery.
- Take away the jump leads between the positive poles.Never take away the fastened cables for the standard battery. It may damage the alternator.

Start-up with ether

⚠ WARNING

The ether start-up or start pilot must not be used at the same time as the electric preheater.

In warm weather

Even when it is warm, it is important to drive with the correct oil, see lubrication chart (page 80).

Clean the engine air filter more often (page 64) and keep the radiator clean (page 66).

Also make sure that the engine and transmission are kept clean, as dirt has en insulating effect.

Water and mud

Driving in water and mud must only take place in short periods if the wading depth does not exceed 600 mm. After driving in water and mud clean the machine. If the mud is left to dry it may cause damage to components like cardan shafts. Lubricate the machine after cleaning.

OUT OF SERVICE - STORAGE

If the machine should be out of use for up to three months take care of the following:

1. Park the machine indoor. If this is not possible, park the machine on boards in a dry, covered place.
2. Wash the machine.
3. Release the pressure from the hydraulic system by operating the lever forwards and backwards a couple of times, and by activating the brake pedal 20 to 30 times.
   Loosen the filler cap of the hydraulic tank to release the pressure in the tank.
4. Apply paint where the surface is not intact.
5. Grease all nipples.
6. Refill the fuel tank.
7. Apply anti-rust composition, for instance Tectyl, to all visible piston rods.
8. Drain coolant or apply anti-rust composition. Check coolant freezing point.
9. The battery must be fully charged – and switch off the main switch of the battery.

After max. 3 months start the machine in the following way:

1. Drain fuel tank and water separator.
2. Drain hydraulic oil tank.
3. Clean piston rods with kerosine for instance.
4. Fill with coolant or check coolant level.
5. Check engine and transmission oil level.
6. Check alternator belt.
7. Activate main switch.
8. Start engine as described on page 45.
9. Run the engine until working temperature is reached.

If the machine has to be stored for more than three months, please contact HYDREMA service department for further information as to long-term storage.

OPTIONS

MultiTip function

For machines with MultiTip function it is possible to place the unloaded material direct behind the machine or anywhere between 90° to the right or left side.

Unloading to one side

WARNING

See »Unloading of material« page 49.

Before you lift the dumper body the machine should be placed in straight position on a horizontal even surface.

Before the dumper body can be turned, the body must be lifted until the instrument display indicates DUMPER BODY LIFTED so that it can be turned free of stopper and wheels.

Move the lever to the side where the material is to be unloaded.

When you lower the dumper body again, it must be turned to center position before it can be lowered completely. If it is lowered before it is turned, it may be necessary to raise it slightly so that it can be turned and lowered again.

WARNING

The dumper body must not be raised or turned during transport on public roads. Driving in terrain with a turned dumper body must only take place with a speed of max. 5 km/h.

Make sure there is free space around the machine and no persons near by before turning the dumper body.

	912E	912ES	912HM
Loading height	2320	2360	2480
Total height when tipping	4450	4490	4610
Unloading over tyres	500	500	465

Measurements in mm

Fig. 59

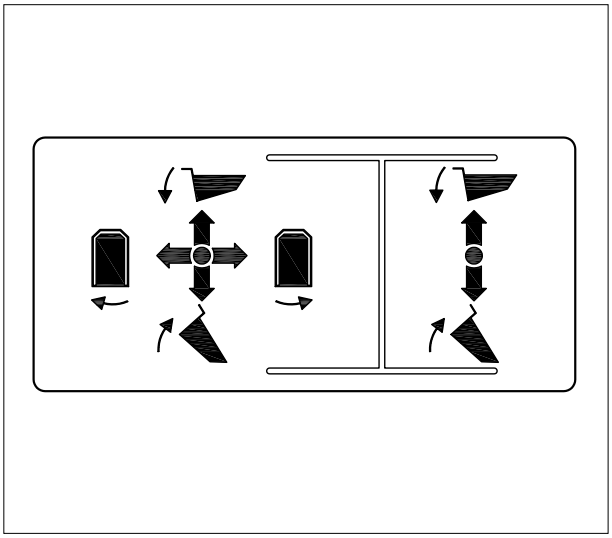


Fig. 60

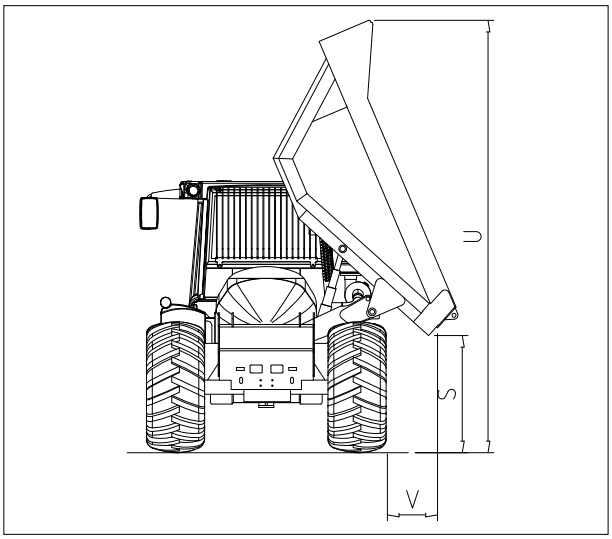


Fig. 61

If you do not want to use the MultiTip function, fitt the safety bolt 1 fig. 62

Aways mount the safety bolt when driving on public roads or for transport on a trailer.

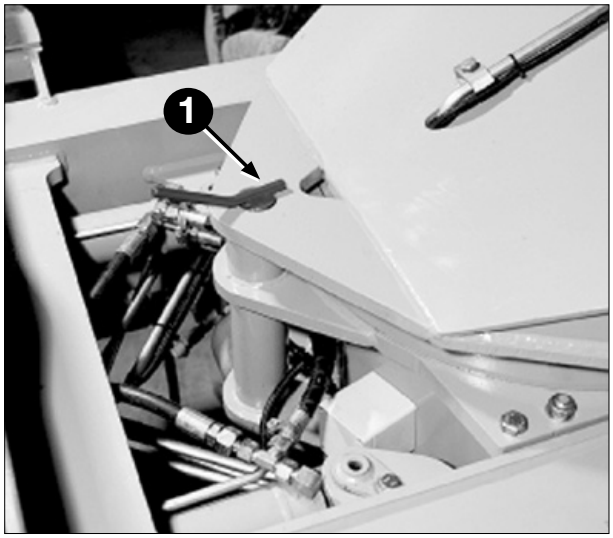


Fig. 62

Auto-body-return (option)

Machines with MultiTip can be equipped with automatic body-return for the dump truck body. When the material has been tipped, the body can automatically move into center position and then lower down to its position stop.

To activate the automatic function turn the body slowly back to the middle by means of the control lever. Push button 1 fig. 63 on the control lever and the body will turn into middle position and then automatically lower down into its initial position.

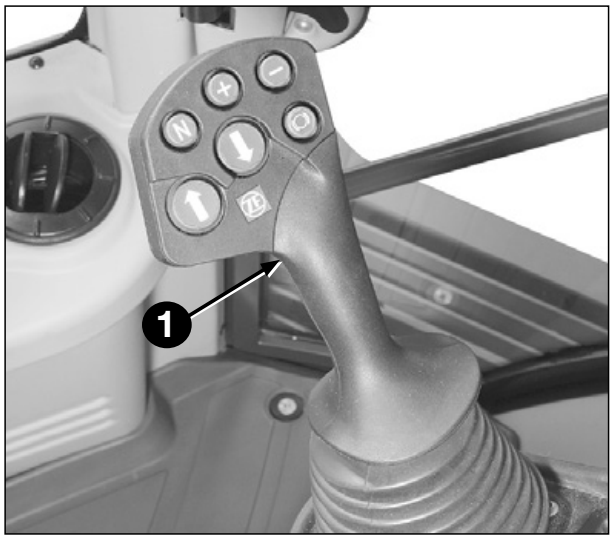


Fig. 63

Towing device

The fork type towing hook is not standard fitted and is not approved for trailers but intended to be used for towing and shunting.

The towing device is placed 675 mm above ground.

The diameter of the towing bolt is 31 mm.

The towing device may be loaded op to the max. tractive effort of the machine, but must not be loaded vertically.
If the towing device is used for recovering the machine, it may be loaded with a max. tractive effort of 10 tons.

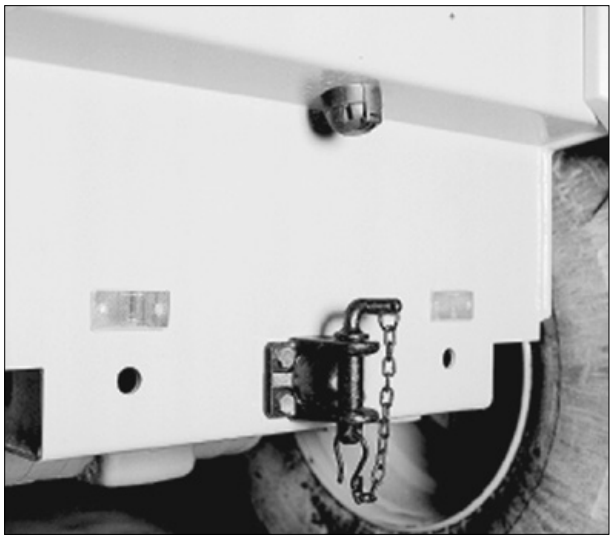


Fig. 64

NOTE

Other types of towing hooks may be mounted. When mounting other types, their specifications must be observed.

LUBRICATION IN GENERAL

Safety

Before lubrication and maintenance start take care that:

- The machine is placed on a plane surface
- The parking brake is activated
- The ignition key is removed - unless the transmission oil level has to be checked.
- The pivot safety lock is mounted fig. 65.
- The support device fig. 66 is mounted or, if MultiTip, the safety bolts on both sides fig. 67 and the safety bolt fig. 62 for turning are mounted.

WARNING

Never go under a lifted dumper body until the support device is mounted.

WARNING

Hot oil may cause scalds. Avoid direct contact.

WARNING

Never use open fire near the fuel tank.

WARNING

Wear safety mask or goggles when cleaning with compressed air or high pressure cleaner.

Greasing in general

Grease until the old grease appears.

IMPORTANT!
Observe the lubrication intervals as stated in the instrument display and the lubrication chart (page 80).

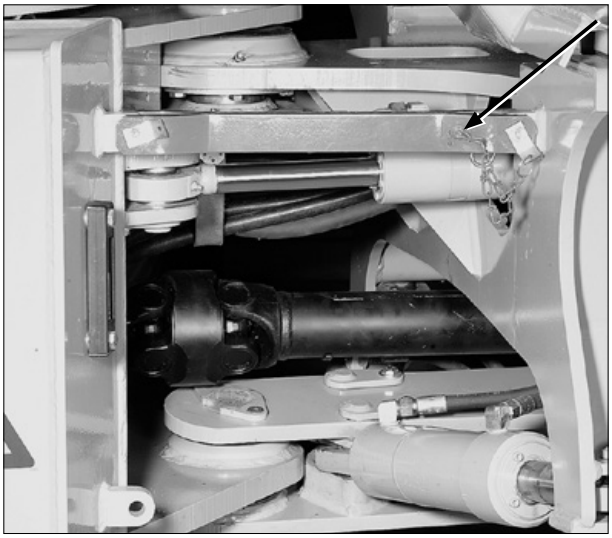


Fig. 65

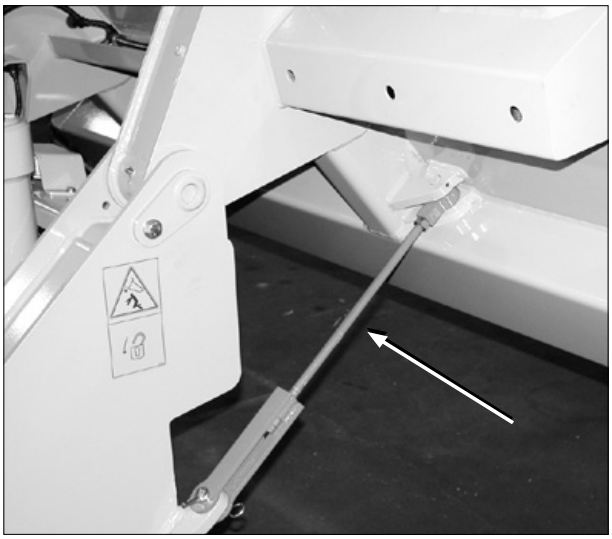


Fig. 66

Fig. 67

Bonnet

Daily inspection, e.g. checks of fluid level, can be done through the open bonnet fig. 68.

To open the bonnet, the dumptruck body must be raised and the locking rod or locking bolts described on page 58 must be mounted.

The bonnet is opened by turning the handle fig. 69.

WARNING

Never walk under a raised dumptruck body unless the locking rod/locking bolts are mounted.

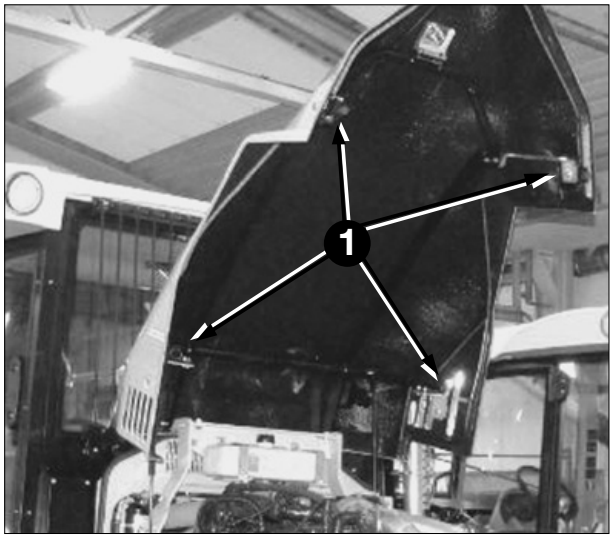


Fig. 68

Removing the bonnet

The bonnet can be removed from the bonnet frame by removing the four screws 1 fig. 68.

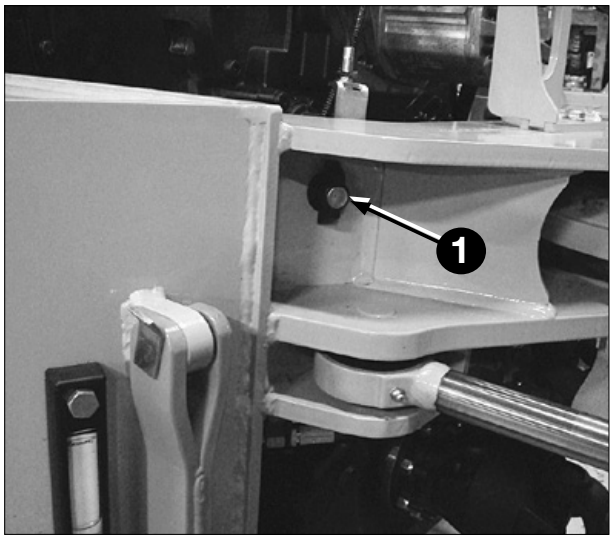


Fig. 69

ENGINE

Diagnostic system

The engine has a built-in diagnostic system that is able to indicate any faults in the engine via the two warning lights 1 and 2, fig. 70.
In the table below the possible fault conditions are shown. Some faults require service assistance, others can be due to a fault in the intake system to the engine being too hot or lacking oil.
These faults will also be registered by the instrument display, and as such the majority of faults will appear on the display at the same time as faults are discovered on the engine diagnostic system.

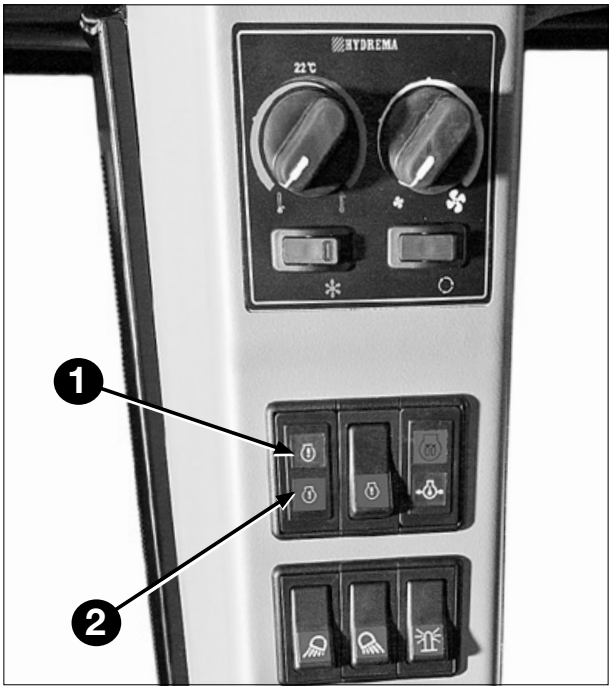


Fig. 70

Yellow light	Red light	Light status	Description of light status	Engine status
ON	ON	Light check	When the engine is started, both lights will be lit for 2 sec.	Engine has not started
OFF	OFF	Normal operation	No fault	Engine running normally
ON	OFF	Fault	No serious engine ault	Engine running normally
ON	ON	Serious fault	Serious fault – engine put in emergency mode	Engine running with reduced power
OFF	ON	Serious fault	Serious fault – engine put in emergency mode	Engine running with reduced power

Engine oil level
(Every 10 hours)

Check the engine oil level with dipstick 1 fig. 71.1. The oil level must be between the max. and min. marks on the dipstick.
After the engine has been running, it must be switched off for at least 10 minutes before the correct oil level can be measured with the dipstick.

Engine oil change
(Every 500 hours)

Stop the engine when it has reached normal work-
ing temperature. Place a drip tray under-neath the engine. Use the draining hose in the tool set for draining the oil. Screw the angled coupling on the hose to the valve in the oil sump, and let the oil run out.
When the oil has run out, remove the hose and replace the plug on the drain valve. Clean the hose before returning it to the tool set.

WARNING
Hot oil can cause serious burns. Be very careful not to get hot oil on your skin when draining the engine oil.

Replacing the engine oil filter
(Every 500 hours, every oil change)

Unscrew filter 1 fig. 71.2, and discard it. Clean the filter head. Lubricate the seal on the new filter with engine oil before fitting it.

Tighten the filter by hand (12 Nm).

Never fill oil in the new filter before fitting it, as this oil is not filtered and may damage the engine if it is contaminated.

Filling with oil

Fill with specified oil (see page 80) in filler plug 1 fig. 72, until the oil reaches the top mark on the dipstick.

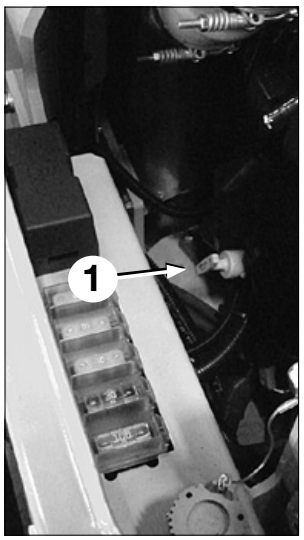


Fig. 71.1

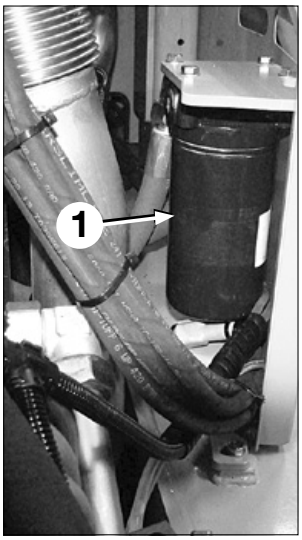


Fig. 71.2

Starting up

Once the oil has been filled, start the engine and let it run at idle for at least 2 minutes in order to ensure that oil pressure is built up in the system. Check that the oil pilot lamp in the instrument display is off.
Stop the engine and let it rest for at least 10 min. before checking the oil level.
Check that the oil level is between the min. and max. marks on the dipstick.

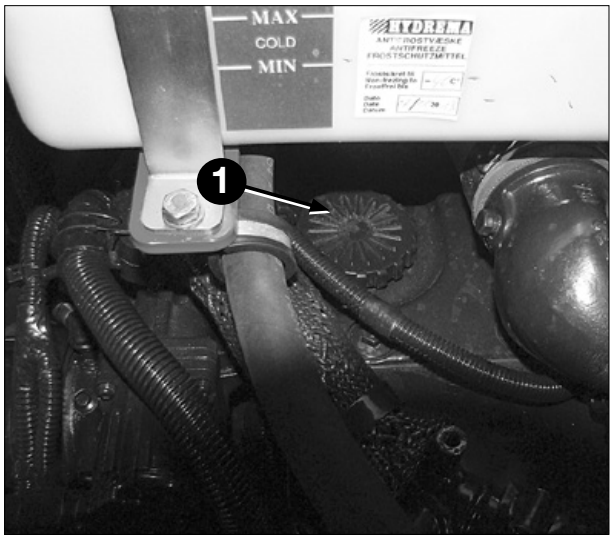


Fig. 72

FUEL SYSTEM

The fuel tank is integrated into the front frame. Only fill with clean diesel oil of good quality. (See specifications for diesel oil, page 81). It is recommended that filler cap 1 fig. 73 is locked between refuelling so that unauthorised third parties are not able to contaminate the tank.

IMPORTANT!
Make sure that the engine has been stopped for at least 1 minute before any type of maintenance is carried out on the fuel system.

Draining of water separator
(Every 250 hours)

Drain the water separator of sediment and water at least every 250 hours through bottom screw 1, fig. 74

Tighten the drain plug by hand once more. Note that a leaking drain plug can result in air in the fuel system.

Draining the fuel tank
(Every 500 hours)

Drain the tank through cap 2 fig. 73. Try to position the machine so that the cap is the lowest point of the tank. The fuel tank should not be full when being drained.

Fuel under pressure can penetrate the skin and cause serious injury. Be extremely careful when working with the fuel system.
The common rail works at very high pressure. Never loosen or tighten components whilst the engine is running.
Diesel fuel is flammable. Keep naked flames away from the machine and do not smoke when work is being carried out on the fuel system.

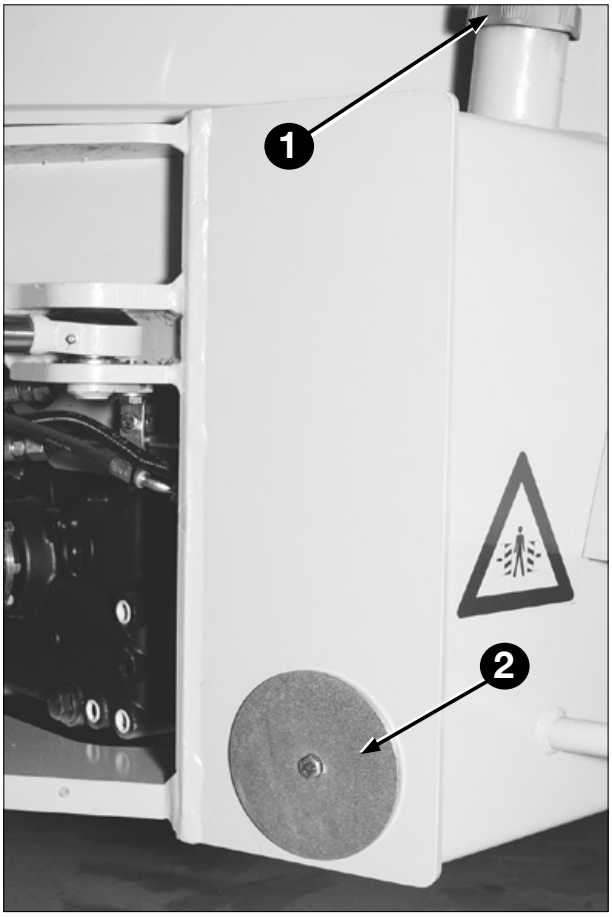


Fig. 73

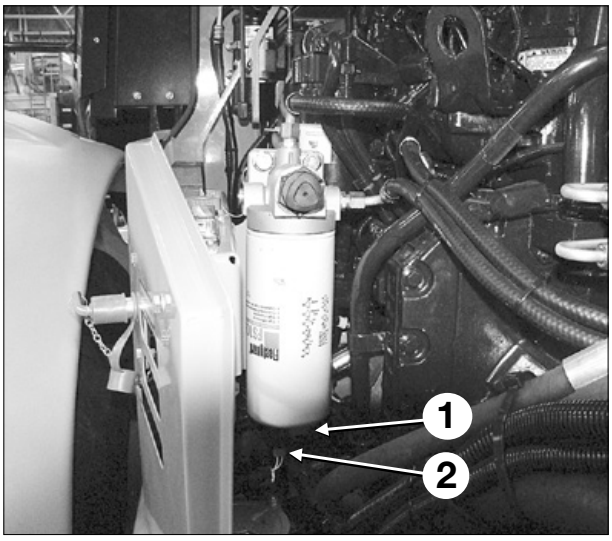


Fig. 74

Replacing the water separator's filter element
(Every 500 hours)

Place a tray under the water separator to collect the water.
Clean the outside of the water separator.
Remove the plug 2 fig. 74 at the bottom of the water separator.
Drain the water separator by loosening the drain screw 1 fig. 74.
Remove the filter element.
Mount the new filter. Screw the filter on until it is almost in place, then turn another half round. (Only screw the filter on by hand.)

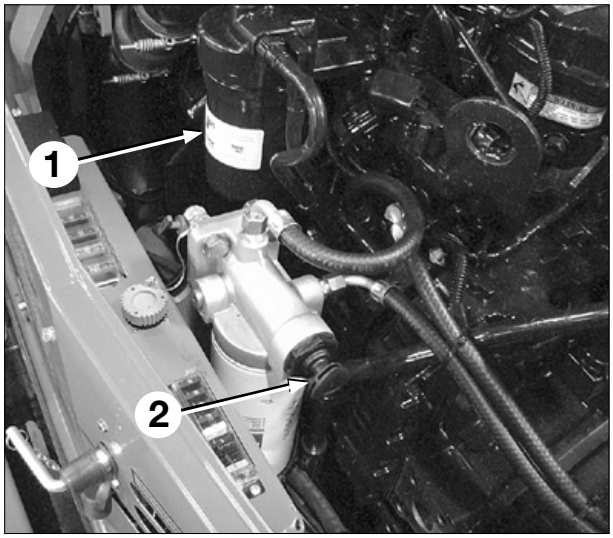


Fig. 75

Replacing the fuel filter
(Every 500 hours)

Place a collector tray underneath the filter.
Clean the outside of the filter.
Unscrew filter cartridge 1 fig. 75, and discard it.
Fit the new filter cartridge. Do not fill the filter cartridge with fuel before installation and ensure that the installation is carried out under very clean conditions.
Tighten the new filter cartridge by hand only.
Bleed the fuel system as described below.

Bleeding the fuel system

When carrying out repairs, replacing the filter or if the machine has run out of fuel, it may be necessary to bleed the fuel system.
Use the hand pump 2 fig. 75, on the water separator.
Count the number of pump strokes until 100 are reached.
The engine will then be able to start. Let the engine run at idle for at least 5 minutes, after which the system will have been bled.

IMPORTANT!
It is not necessary to loosen any pipes in the fuel system to air the system. This will happen automatically when the system has been aired using the hand pump.

AIR FILTER
(every 50 hours)

When the air filter pilot lamp lights, air filter 2 must be cleaned, or if necessary replaced.

The filter element must be replaced every 500 hours.

The working conditions for the machine are an important factor when deciding how frequently it is necessary to check the air filter.

1. Filter housing
2. Filter element
3. Cover
4. Discharge valve

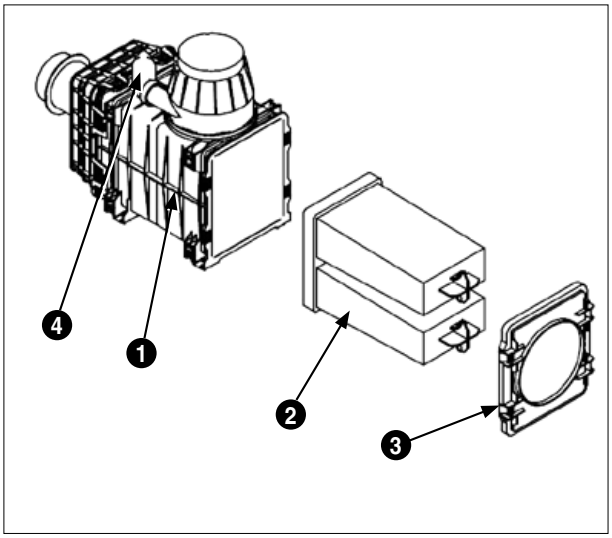


Fig. 76

Main filter

Remove cover 3. Remove the filter element from the filter housing. The element can then be cleaned as follows:

If the filter element is foul by dry dust, clean by using compressed air directed from inside the element.

WARNING

Wear safety mask or goggles when cleaning with compressed air. The pressure must not exceed 205 kPa (2 bar). Higher pressure may damage the filter.

Use a lamp to check for small tears, rips and holes.
If the filter is faultless, it can be used again, but if it is damaged it has to be changed.

Before assembling the filter clean the filter housing thoroughly.

Discharge valve

On the filter housing is mounted a rubber discharge valve, 4, which is automatically emptied when the engine is idling.

Note:
Never clean the filter by hitting it against a hard surface.

Never refit a filter element with damaged folds or joints between the filter and the base.

Never fit a wet filter element!

Always make sure that new or clean filter elements are available.

COOLING SYSTEM

The cooling system is a sealed system with a combined cooler for the engine, the transmission and the charge air and an expansion tank.

WARNING

The cooling system is working under pressure. Therefore it is dangerous to remove the cover 1 fig. 77 while the system is hot. Always turn the cover carefully to allow for release of pressure.
Only remove the cover after excessive fluid has disappeared.

The coolant may cause skin irritation.

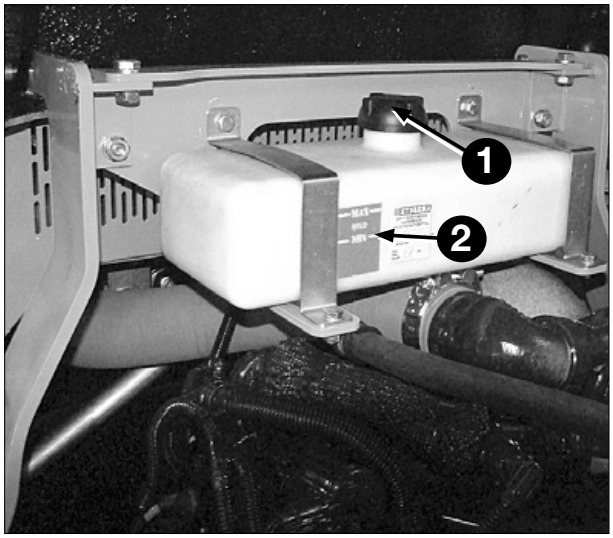


Fig. 77

Coolant level
(Every 10 hours)

Check the coolant level in the expansion tank 2 fig. 77.The fluid level must be in the middle of the chamber when the engine is warm.

Only replenish with original Hydrema coolant or coolant that satisfies the requirements specified on page 81.

When replenishing coolant, the proportion of coolant must always be at least 50% in order to ensure as adequate corrosion protection in the cooling system. At 50% coolant and 50% water, the cooling system will be frost-proof down to a temperature of -35º C. At lower temperatures the proportion of coolant can be increased.
At 60% coolant and 40% water, the frost-proof capacity will be approx. -50º C.

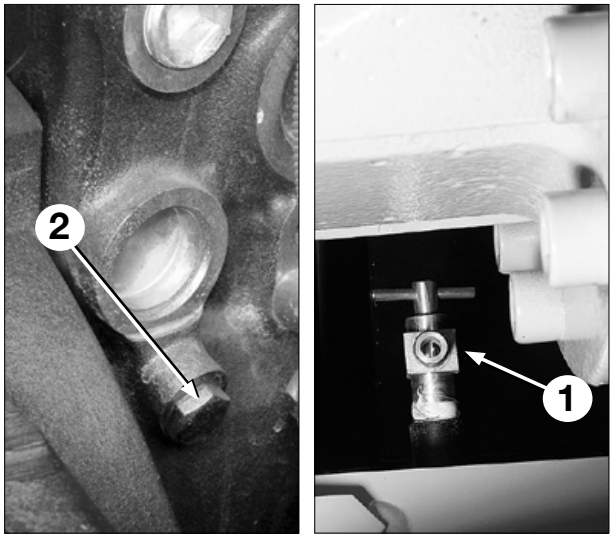


Fig. 78

IMPORTANT!
Only use the specified coolant. The wrong type of coolant can cause serious corrosion within the cooling system and also result in residue in the system, which will mean reduced cooling capacity as a consequence.
Never use concentrated coolant without water, as this will have a negative impact on the cooling capacity.

Coolant draining
(Change every 2 years)

Loosen cover and tap at the bottom of the radiator (1 fig. 78).
Remove also plug (2 fig.78) from the engine block.

Filling of coolant

Make sure that the tap and the plug in the engine block are mounted. Fill mixed coolant through the cover 1 fig. 77 to the max. mark.

1. Start the engine with the tap open to the heat ing system, speed up the engine to 2000 rpm and keep filling with mixed fluid.
   Put on the cover when the system has been filled to the max. mark.

2. Run the engine until warm and check level of the coolant while it is cold.
   Replenish if necessary.
   Capacity: approx. 24 litres

Cleaning of radiator
(Every 50 hours or when required)

WARNING
Stop the engine and remove the ignition key.

The radiator is placed behind the cabin.

The radiator must be cleaned with a soft brush. Open the belly plate and clean from beneath and through the hatch fig. 79.

WARNING
Use dust mask.

When the dry dirt has been brushed off, blast the radiator clean with compressed air from the engine side.
If the radiator is contaminated with soil or mud, water can be used. Rinse the radiator from the engine side out through the radiator.
Only use a standard water hose pipe at normal pressure (max. 3 bar).

Fig. 79

TRANSMISSION

Gear box oil level
(Every 10 hours)

Check the oil level when the oil is hot. When the oil has been heated to working temperature, the engine must idle for approx. 2 min. With the transmission in neutral, check that the oil level is between the two upper marks on the dipstick 1 fig. 80.
The lower mark is used for checking when the oil is cold and is only intended as a guidance.

Change of oil and filter
(Every 1000 hours or at least once a year)

IMPORTANT!
Oil and filter changes must be carried out by authorized service personnel, as the transmission must be optimized with a data programme at every oil change in order to ensure its expected life time and proper functioning.

WARNING
Warm oil may cause servere scalds.
Use gloves when checking warm oil and make sure you can drain safely.

Before you can drain the oil, the machine must have stood still at least for 5 minutes:

1. Unscrew the plug from the drain valve 1 fig. 81 and mount the drain hose from the machine's tool set to drain the oil.
2. Replace filter 2 fig. 82, with a new one. Clean and lubricate sealing surfaces and filter gasket before mounting it. (Use original oil filters only, otherwise the transmission could be damaged.)
3. Replenish with oil (see page 80) through the filler cap 1 fig. 80.
4. Start the motor and add more oil if necessary, until it reaches the lower mark on the dipstick.
5. Run the transmission warm to approx. 80°C and add more oil if necessary, until it reaches the upper mark of the dipstick.

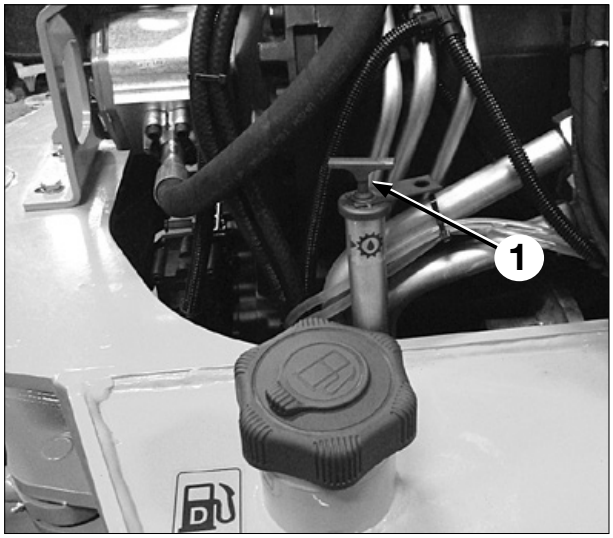


Fig. 80

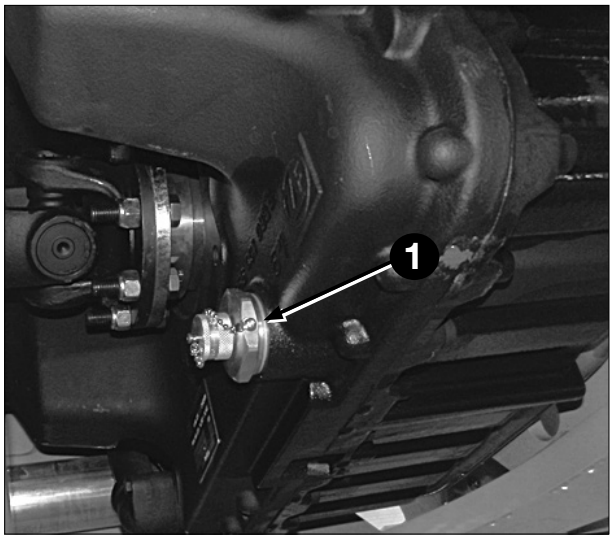


Fig. 81

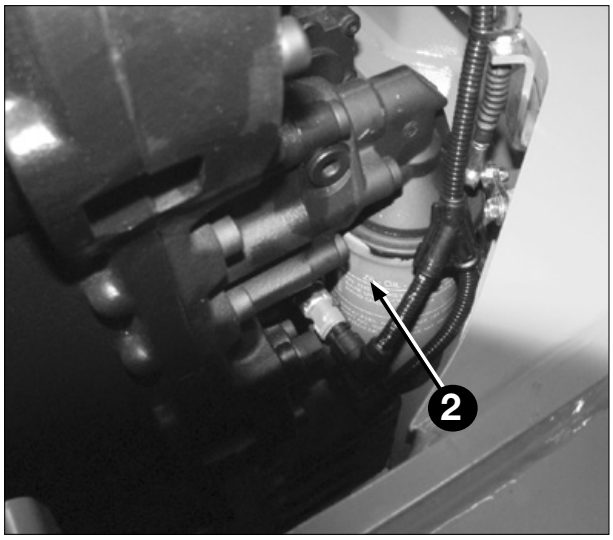


Fig. 82

AXLES

Differential Oil level
(Every 250 hours)
To check the oil level remove level and filler plug 1 fig. 83.

Oil change
(Every 1000 hours or once a year).

WARNING

Warm oil may cause servere scalds.
Use gloves when checking warm oil and make sure you can drain safely.

Unscrew plug 1 fig. 84 and drain oil. Refit the plug and fill specified oil through filter plug 1 fig. 83.

Oil specification, see page 80.

Wheel hub oil level
(Every 250 hours)

Turn wheel hub so the arrow »Oil level« is horizontal. Dismount the filler plug 1 fig. 85 and check that the oil level reaches the arrow »Oil level«.

Oil change
(Every 1000 hours or once a year).

WARNING

Warm oil may cause servere scalds.
Use gloves when checking warm oil and make sure you can drain safely.

Turn the wheel hub until the plug 1 fig. 85 points downwards. Unscrew the plug and let the oil run out. Turn the wheel hub until the arrow »Oil level« is horizontal. Fill the specified oil (page 80) until the level is reached.

Oil specification, see page 80.

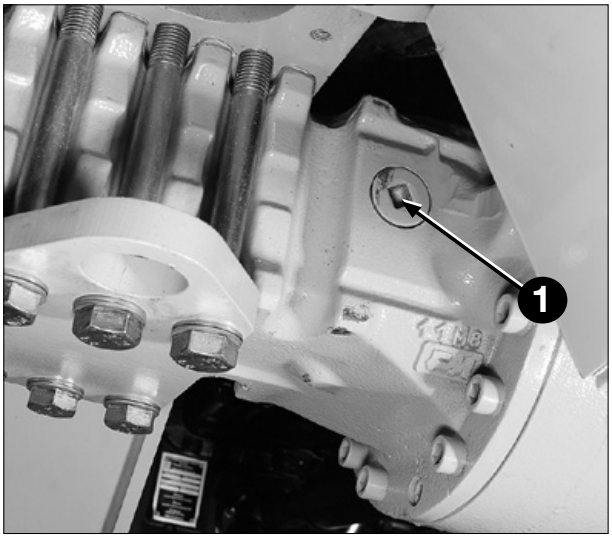


Fig. 83

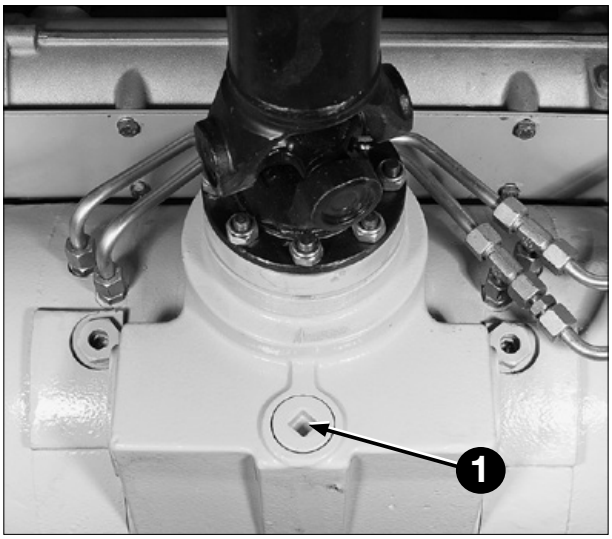


Fig. 84

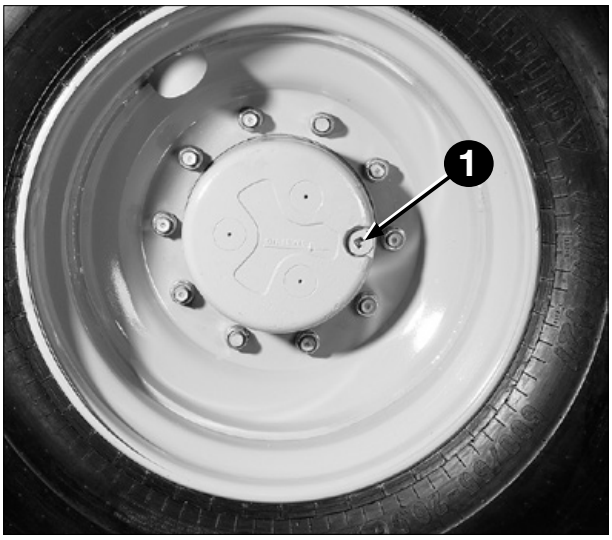


Fig. 85

BRAKES

Brakes

The service brake is a dual-circuit and fully hydraulic self-adjusting brake. If the brake performance is not at optimum, contact immediately Hydrema Service.

The angle of the brake pedal can be adjusted with screw 1 fig 86

Fig. 86

Parking brake

The parking brake functions as a spring loaded system that works on the brake discs of the service brake in the front axle.

If the parking brake 1 fig. 87 is not activated, the hydraulic pressure is let in to keep the spring loaded brake free.

When the switch is activated, the oil locked in is released and the spring loaded brake activated.

If the parking brake is not at optimum, contact immediately Hydrema Service.

For mechanical release see »towing with a dead engine« page 52.

WARNING

Never use the parking brake together with the main brake.

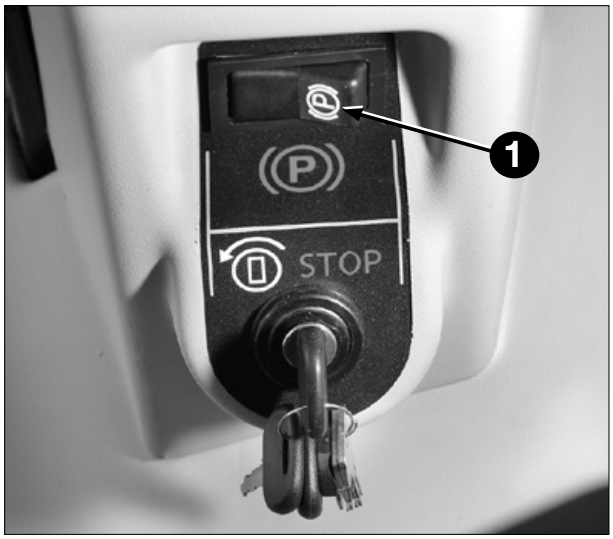


Fig. 87

Tipping brake

The tipping brake 1 fig. 88 affects all 4 wheels.

WARNING

Never use the tipping brake as parking brake.

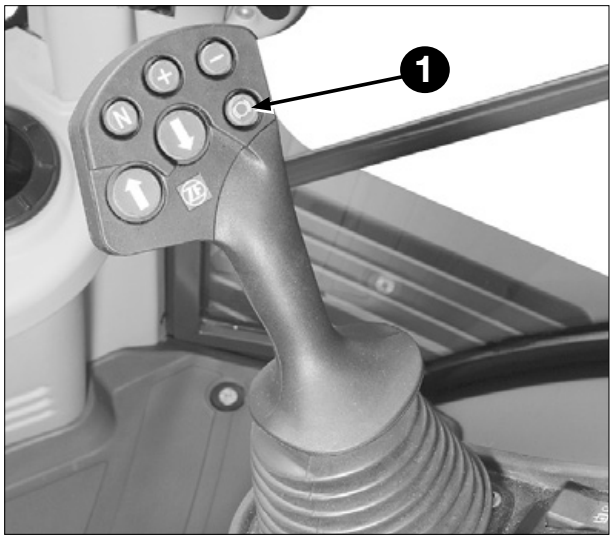


Fig. 88

ELECTRICAL SYSTEM

Alternator
(Every 250 hours)

Check condition and tension of the alternator belt. A correctly adjusted belt can be pressed 10-15 mm down between the pulleys at a pressure of approx. 10 kg.

Battery
(Every 250 hours)

The batteries are located in the battery box behind the left mudguard (fig. 90).

Battery fluid level
Check the electrolyte level which has to be 5-10 mm above the elements. If the level is too low, replenish with distilled water. Do not check the level when the engine is running.

WARNING

The battery electrolyte contains corrosive sulphuric acid. Remove immediately if by accident applied to the skin. Wash with cloths and plenty of water. If the fluid gets into the eyes or other sensitive parts apply plenty of water and call for a doctor.

When the battery is charged, an explosive kind of gas generates. Short-circuit, open fire or sparks close to the battery may cause a heavy explosion. Always cut off the charge current before removing the charge terminals from the battery. Ventilate carefully, especially when charging in a closed room

Maintenance-free batteries
The machine can be fitted with maintenance-free batteries. With these batteries, it is not necessary to check the fluid level, and they cannot be filled up with distilled water. Maintenance-free batteries are often fitted with a charging indicator that shows the state of the battery.

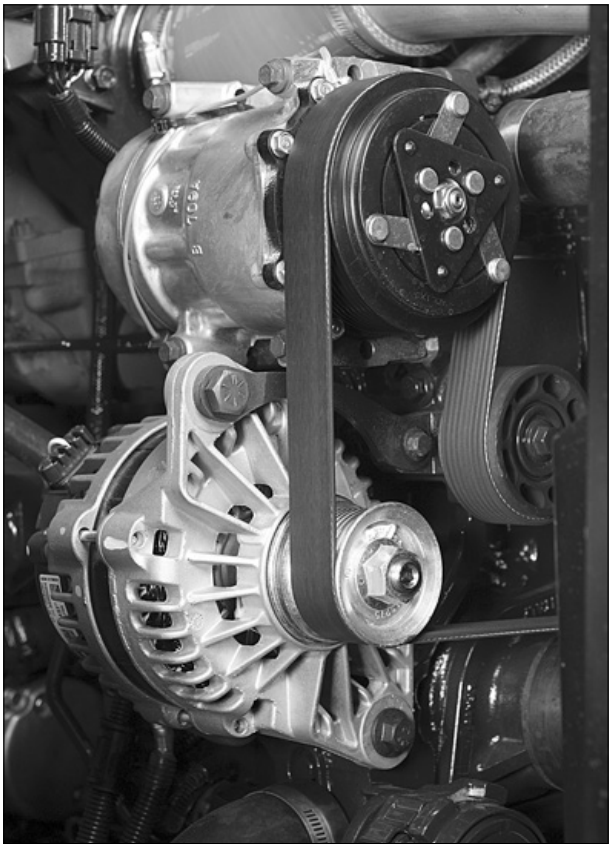


Fig. 89

Fig. 90

Cleaning
(when required)

Clean top and box of the batteries with warm soapy water.
Remove pole shoes and clean them together with the pole tips and clean with acid-free vaseline.

Main switch

The main switch of the battery 1 fig. 91 must be switched off before you begin with any repair work on the electrical system.

The main switch is also used for disconnecting the battery voltage in an emergency, like fire.

IMPORTANT!
When the engine is running, the main switch must only be switched off in an emercency.

IMPORTANT!

1. Battery and alternator cables must not be disconnected, when the engine is running. This may cause defects on alternator and electronics.

2. Do not use a quick-charger system when the alternator is connected to the battery, as the rectifier diodes of the altenator might be damaged.

3. The battery terminals must under no circumstances be confused. The poles are marked with a (+) sign and a (–) sign. A wrong connection will immediately damage the alterator rectifier diodes. When disconnecting the battery always disconnect the frame lead first, and when remounting it attach it last.

4. At electrical welding on the frame or a connected tool, the frame lead must be loosened and insulated. Connect the welding agreate as near as posible to the welding place.

5. Always take off the battery cables before carrying out any work on the electrical system.

6. When starting the machine with auxiliary batteries or a booster, the machine's circuit breaker must be switched on. If it is not, the machine's electronics will be damaged.

Fig. 91

FUSES AND RELAYS

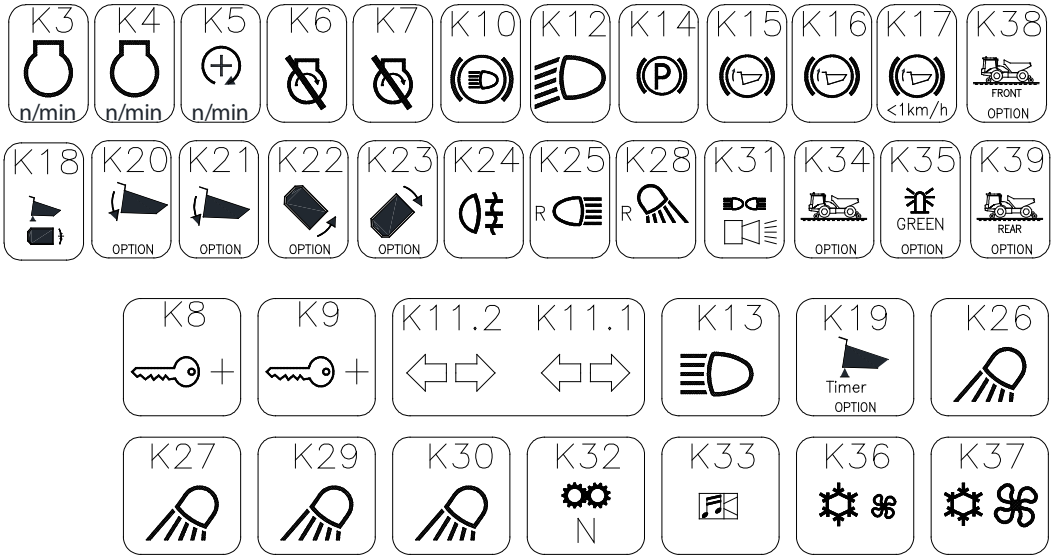
Fuses and relays are situated in the cab under the cover beside the seat. (See fig. 92)

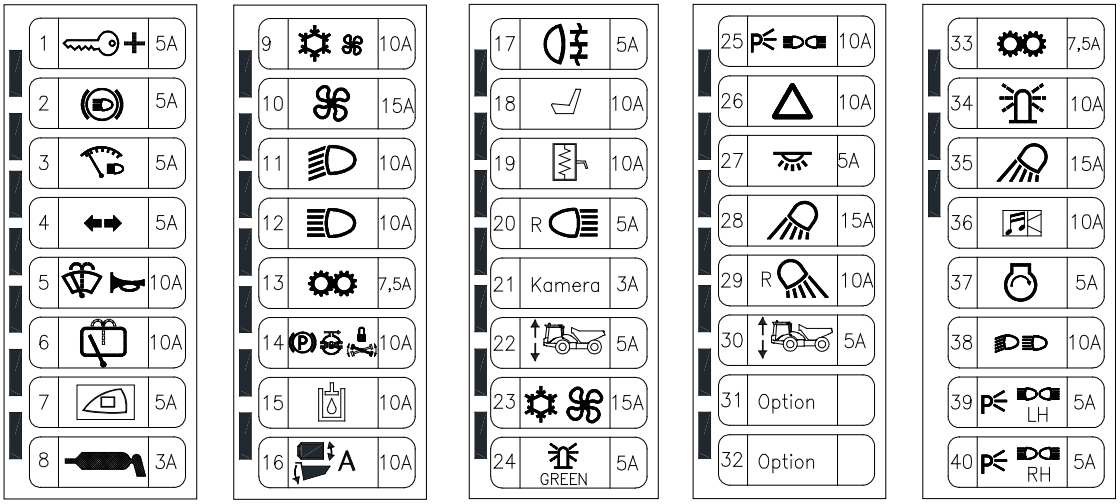
Main fuses and relays are situated in the engine compartment. (See fig. 93)

Fig. 92

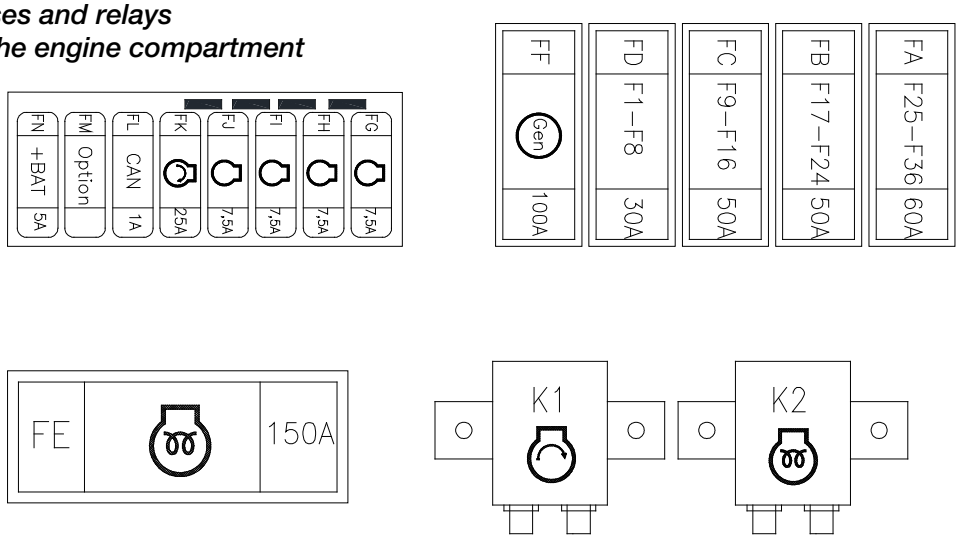
Fig. 93

Fuses and relays in the cab





Fuses and relays
in the engine compartment



Fuses and relays in the cab

K3	Forward relay for cruise control
K4	Brake relay for cruise control
K5	Engine Rpm control
K6	Immobiliser relay from display
K7	Immobiliser relay from ZF
K8	Power relay gr. 2
K9	Power relay gr. 3
K10	Brake lights
K11	Direction indicator relay
K12	Low beam
K13	Main beam
K14	Parking brake
K15	Tipping brake F/R
K16	Tipping brake activation
K17	v > 1 km/h
K18	MultiTip active
K19	MultiTip down time
K20	MultiTip center
K21	MultiTip lower
K22	MultiTip CCW
K23	MultiTip CW
K24	Rear fog light
K25	Reversing alarm – reversing light
K26	Work light, front
K27	Work light, rear
K28	Work light, rear (dumper body)
K29	Work light, front corner
K30	Work light, side
K31	Light alarm

F1 (5A)	Control current
F2 (5A)	Brake lights
F3 (5A)	Instrumentation light
F4 (5A)	Direction indicators
F5 (10A)	Front windscreen wiper and horn
F6 (10A)	Rear windscreen wiper
F7 (5A)	Instrument panel
F8 (3A)	Central greasing (option)
F9 (5A)	Air-conditioning
F10 (15A)	Heater
F11 (10A)	Low beam
F12 (10A)	Main beam
F13 (7.5A)	Transmission
F14 (10A)	P-brake, diff.lock and pendulum lock
F15 (10A)	Hydraulics
F16 (10A)	Auto body return
F17 (5A)	Rear fog light
F18 (10A)	Seat
F19 (10A)	Mirror heating and adjustment
F20 (5A)	Reversing light
F21 (3A)	Reversing camera (option)
F22 (5A)	Spring suspension (912ES/HM)
F23 (15A)	Condenser step2
F24 (5A)	Green warning beacon (Option)
F25 (10A)	Parking light
F26 (10A)	Hazard light
F27 (5A)	Interior light
F28 (15A)	Work light
F29 (10A)	Work light rear
F30 (5A)	Spring suspension (912ES/HM)
F31 (10A)	Option
F32 (5A)	Option
F33 (7.5A)	Transmission
F34 (10A)	Warning beacon
F35 (15A)	Working light, rear
F36 (10A)	Radio and 24/12 Volt socket
F37 (5A)	Start relay
F38 (10A)	Driving lights
F39 (5A)	Parking light, left
F40 (5A)	Parking light, right

Fuses and relays in the engine compartment

FA (60A)	Main fuse F25 – F36
FB (50A)	Main fuse F17 – F24
FC (50A)	Main fuse F9 – F16
FD (30A)	Main fuse F1 – F8
FE (150A)	Pre-heater
FF (100A)	Altenator
FG (7.5A)	Engine ECM
FH (7.5A)	Engine ECM
FI (7.5A)	Engine ECM
FJ (7.5A)	Engine ECM
FK (25A)	Starter reley
FL (1A)	CAN
FM	Option
FN (5A)	+Bat for display

K1	Start relay
K2	Pre-heater relay

HEADLIGHT ADJUSTMENT

The adjustment of the lamps is essential for the sake of security when driving on public roads.

When adjusting, switch on the dipped beam and put the machine in transport position.

The lamps can be adjusted most easily by placing the machine in front of a wall with a 5 metres distance between the lamp and the wall.

For L = 5 m the height measure H to the border between light and dark should be 150 mm lower than the height measure B to the centre of the lamps.(the beam is falling 3%).

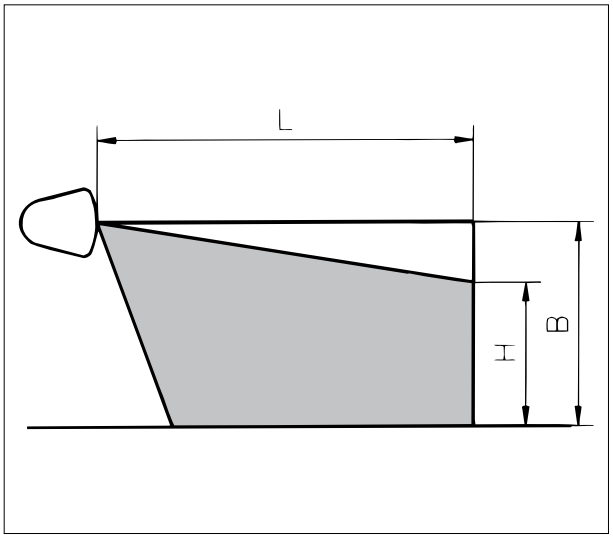


Fig. 94

Adjustment
(See fig. 95)

All four screws contribute to correct lamp adjustment.

To replace bulbs, dismount the plastic covers behind the lamps.

Fig. 95

HYDRAULIC SYSTEM

Release of hydraulic pressure

WARNING

At normal working temperature the hydraulic tank is under pressure. Hot hydraulic oil can cause burns

The filler cap must only be removed when the engine has stopped and the tank has cooled to such an extent that it can be touched without burning your hand. Slowly unscrew the cap so that the pressure in the tank is equalised before removing the cap completely.

Check of hydraulic oil level
(Every 50 hours)

The oil level must be in the middle of oil level gauge 1 fig. 96.

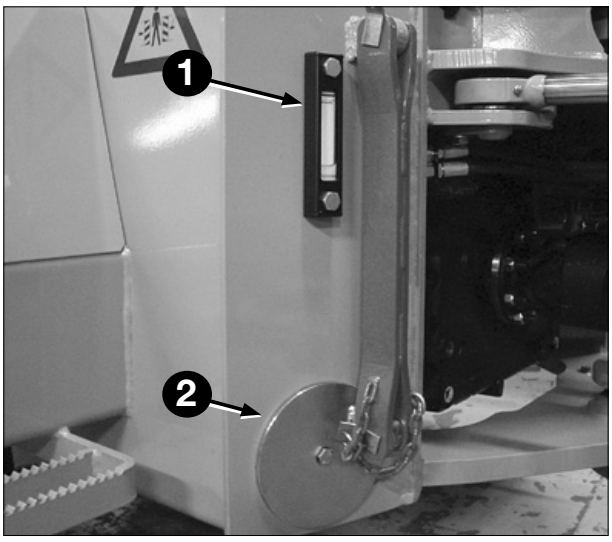


Fig. 96

Replacement of hydraulic oil filters
(Every 500 hours)

Slowly loosen filler cap (2) in order to relieve any excess pressure in the tank. Remove cover 1 and take the filter out. Lift the filter up and remove nut 3 fig. 97. Take off filter cartridge 2 fig. 97, and discard it.

Clean the magnetic rod carefully. Check and replace the O-rings if necessary. Fit the new filter cartridge.

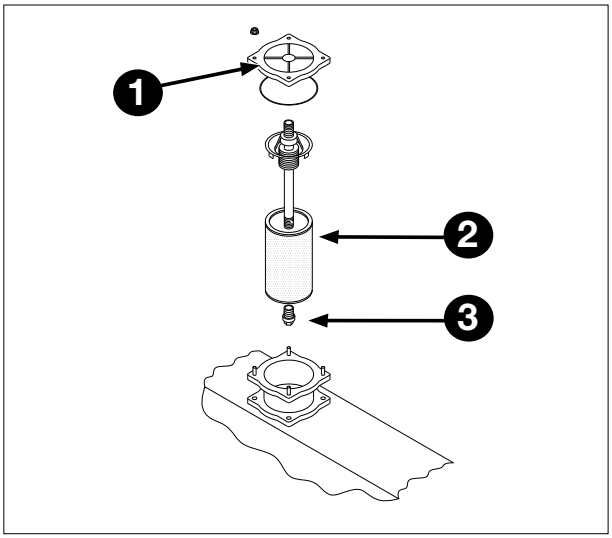


Fig. 97

Fit the filter into the tank. Check and, if necessary, replace the O-ring before placing the cap again.

Replacement of vent filter
(Every 1000 hours)

Inside filler cap 2 fig 98, there is a filter that filters the air that flows into the hydraulic tank as the oil level in the tank varies.
Replace the entire filler cap with integrated vent filter.

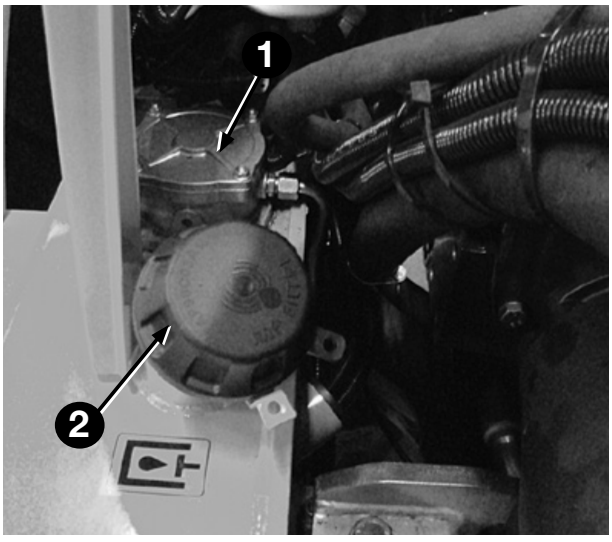


Fig. 98

Draining the hydraulic tank
(Every 1000 hours or once a year)

Drain water and sediment from the hydraulic tank by loosening carefully cap 2 fig. 96 after the machine has stood for 24 hours tilted towards the corner where the plug is situated.

IMPORTANT!
When maintaining the hydraulic system always remember to relieve the excess pressure in the tank by opening the filler slowly. It is imperative that the machine is clean as any impurity may ruin the hy-draulic components and cause a break-down.

Hydraulic oil change
(Every 2000 hours or 2 years)

WARNING

Hot oil may cause scalds.
Avoid direct contact!

Tip the dumper body to max. height and stop the engine. Unscrew the cover 2 fig. 96 and make sure that the draining can take place in a safe way.

When the tank is empty, lower the body to allow for greatest possible amount of oil to drain.

Clean for water and sediment.

Screw the cover on and fill with the specified oil (page 80) to the top edge of the oil level gauge 1 fig. 96.
Capacity: approx. 90 litres.

Start the engine, activate all hydraulic functions by using the control levers until filled with oil and free from air.

Stop the engine and refill until the oil level is in the middle of the oil level gauge.

WARNING

Release of hydraulic pressure

At working temperature the hydraulic tank is under pressure. Warm oil may cause serious scalds. Remove the filler cap only when the engine is stopped and the tank is cooled down so you can hold the cap without being burnt.

The hydraulic system for the tipping function and the brake system of the machine may be under pressure, also when the engine is stopped.

Before any repair work/service can take place, make sure that the systems are completely released of pressure.

Release of tipping function

Lower the body completely or raise to upper position and mount safety bar.
Stop the engine and dismount the cover of the hydraulic tank.
Activate the lever for the tipping function completely several times to both sides and the lifting system is pressure released.

Release of brake hydraulics

Before any repairs of the brake system make sure that the machine is placed on a plane level with activated parking brake and chocks under the wheels.
Stop the engine.
Activate the brake pedal at least 30 times with intervals of 1 sec., and the system is pressure released.

Biodegradable oil

If the machine has been filled with bio-degradable hydraulic oil, it will be marked with the label fig. 99 placed on the front wall near the door of the cab and the hydraulic tank.

IMPORTANT!
The machine is filled with biodegradable oil of high quality. It is very important for the function of the machine and the decomposition of the oil that you use only oil being of the same type.
(See page 80).

Never refill with normal oil that is not biodegradable!

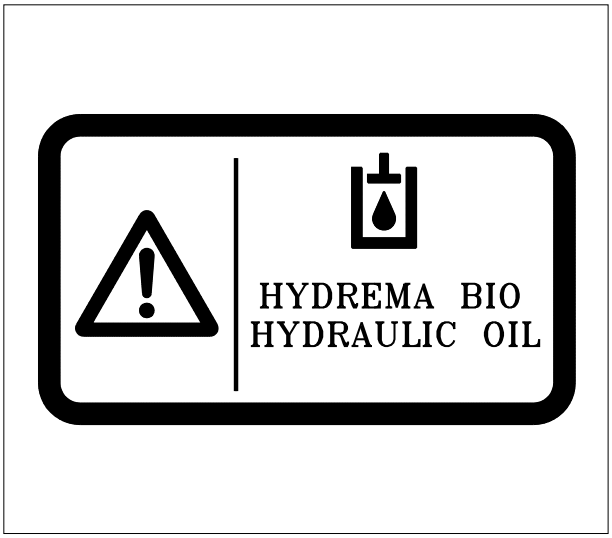


Fig. 99

Cab

The cab ventilation system has an external fresh air filter 1 fig. 100 and an internal recirculation filter.
To remove the internal filter, the plastic cover, fig. 101, must be removed.

Both filters should be replaced or cleaned every 500 hours, or otherwise if there is a noticeable deterioration in air circulation in the cab.

Fig. 100

Cleaning the filter

The dry filter can be cleaned with compressed air from inside.

WARNING

Wear safety mask or goggles when cleaning with compressed air. The pressure must not exceed 205 kPa (2 bar), as a higher pressure can damage the filter.

Check that the filter is intact before mounting it.

Fig. 101

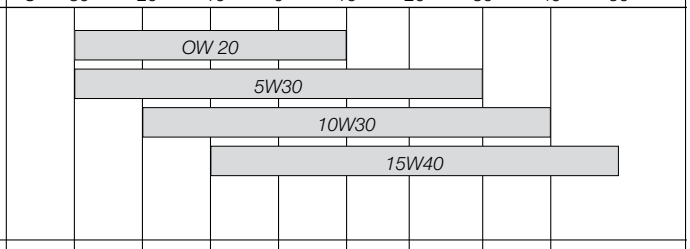
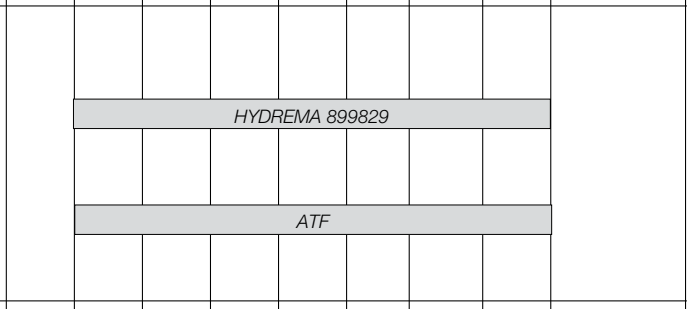
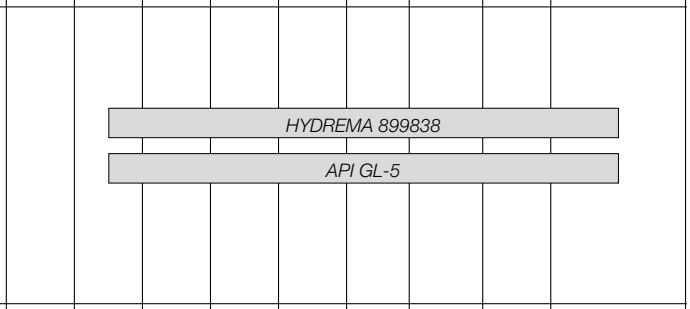
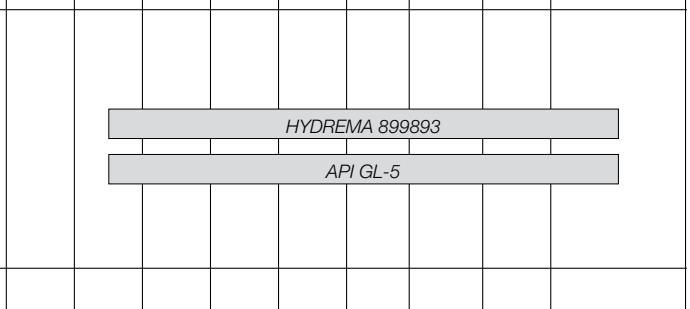
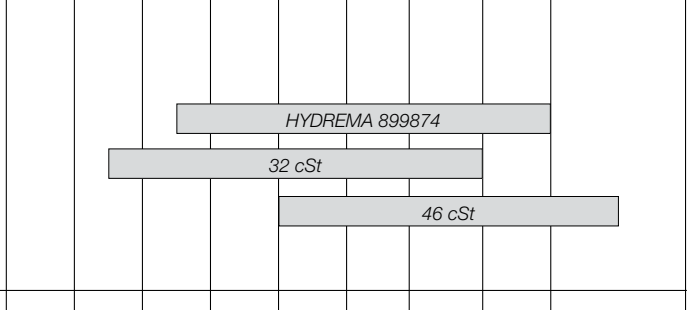
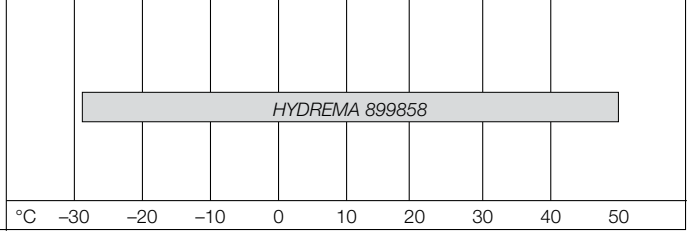
Note!

Never mount a wet filter element.

The rear window guard 1 fig. 102 is fitted with four rubber retainers, so that it can be dismounted without use of tools.

Fig. 102

Lubricants Hydrema 912E / 912ES / 912HM

Component	Oil quality/make	Recommended SAE viscosities at various temperatures
Motor Quantity at change Approx. 11 litres	Engine oil API CI4/CJ4	
Transmission Quantity at change Approx. 18 litres	ATF = Automatic Transmission Fluids DEXRON –IID/–III	
Axles Quantity at change pr. axle 912E/ES: Appr. 14 litres 912HM: Appr. 17 litres	Axle oil Differential API GL-5	
Axles Quantity at change pr. hub 1,5 litres	Axle oil Hubs API GL-5	
Hydraulic system Quantity at change 90 litres	Hydraulic oil Quality: See page 81	
All lubrication nipples for grease	Grease NLGI-2 Lithium based grease with 3% molybdenum disulphide	

GENERAL REQUIREMENTS WITH REGARD TO FUEL AND LUBRICANTS

It is extremely important for the reliability and service life that only fuel and lubricants of good quality from recognised suppliers are used. If the specified quality is not adhered to, then serious damage to the machine may result.

Fuel

Always maintain a high degree of cleanliness when storing and refilling fuel. Pay particular attention to water or other contaminants in containers and storage tanks.
In general, the diesel oil must satisfy the EN 590 standard with the following data:

Cetane number:	min. 51
Viscosity:	2.0 – 4.5 cSt at 40° C
Density:	0.820-0.845 kg/litre
Sulphur Condent:	Max. 10 mg/kg
Distillation:	85% at 350° C
Lubricating capacity:	460 micrometer max. wear according to ISO 12156-1

Biodiesel

The fuel can be mixed with up to 20% biodiesel. The biodiesel must comply with the EN 14214 standard.

Military fuels

JP7 and NATO F63 can be used. For use of NATO aviation fuel, please contact Hydrema.

Engine oil

Engine oil which as a minimum meets API classification CI4 or CJ4 must be used. The viscosity is adapted to the ambient temperatures, see table on page 80.

Transmission oil

If original Hydrema transmission oil no. 899829 is not available, use ATF oil in accordance with the DEXRON IID / III classification. Engine oil 15W/40 according to API classification CF4, CG4, CH4 or CI4 can be used for temperatures above –20 ° C.

Axle oil

If original Hydrema axle oil no. 899838 is not available, oil according to the API GL-5 specification can be used. The oil must be suitable for axles with wet brakes.

Hydraulic oil

If original Hydrema hydraulic oil no. 899874 is not available, hydraulic oil with viscosity 32 cSt or 46 cSt can be used depending on the ambient temperature, as shown on page 80. The hydraulic oil must as a minimum satisfy the requirements in the DIN 51 524 del3-HVLP standard.

Coolant

If original Hydrema coolant no. 899855 is not available, coolants in acc. with standart ASTM D4985 and free from silicate can be used.
This standard is met by the majority of recognised manufacturers' »Long life« or »Extended life« products.

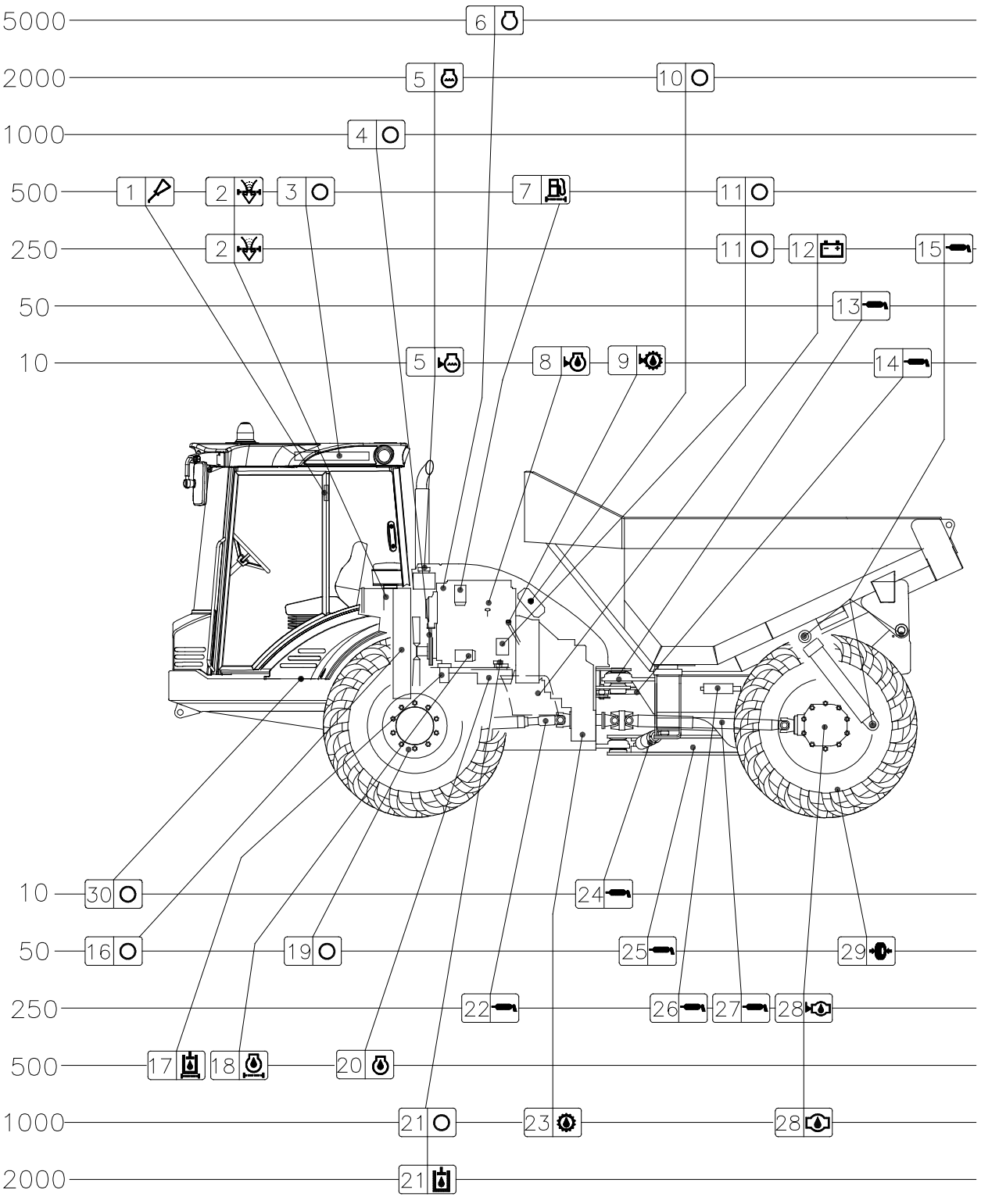
Coolant for air-conditioning

The air-condition unit is filled with the R 134a. It is extremely important that the air-conditioning unit is emptied and refilled by an authorised service mechanic.

Capacity: 912E: 1.6 kg

Lubricating grease

It is recommended that original Hydrema lubricating grease no. 899858 be used. Alternatively grease that satisfies the NLGI-2 requirements with 3% molybdenum sulphide can be used.
Grease without molybdenum sulphide must not be used.


Hour-interval
5000
2000
1000
500
250
50
10
10
50
250
500
1000
2000
Hour-interval

Interval	*Pos. nr.*	*Lubrication and maintenance*	*No. of ubri-cation points*	*Check*	*Clean*	*Lubricate*	*Change*	*Adjust*	*Page*
Every 10 hours or every day	5	Coolant level		○					65
	8	Engine oil level		○					61
	9	Transmission oil level		○					67
	14	Steering cylinders	4			○			
	24	Stabilizer	4			○			
	30	Lubrication point, suspension	1			○			
Every 50 hours or weekly	13	Upper pivot bearing	1			○			
	16	Radiator fins			○				66
	19	Tighten the wheel nuts, torque 500 Nm		○					
	25	Bearings pendulum bar	2			○			
	29	Tyre pressure		○					16
Every 250 hours	2	Ait filter (or whenever indicator lights)			○				64
	12	Battery electrolyte level		○					70
	11	Drain water separator			○				62
	15	Tipping cylinders	6			○			
	22	Front prop shaft	2			○			
	27	Rear prop shaft	3			○			
	28	Differential and wheel hub oil level		○					68
	26	MultiTip cylindersa and bearing	9			○			
Every 500 hours	1	Door hinges	4			○			
	3	Air filter for cab			○				79
	2	Air filter for engine					○		64
	7	Fuel filter					○		63
	11	Drain fuel tank			○				62
	17	Hydraulic oil filter Magnet rod and filler cab			○		○		76
	18	Engine oil filter					○		61
	20	Engine oil					○		100
	11	The water separator's filter element					○		102
Every 1000 hours or every year	21	Drain hudraulic oil tank			○				77
	23	Transmission oil Transmission oil filter					○		67
	28	Differential and wheel hub front/rear					○		109
	4	The generaor belt's tension		○					
Every 2000 hours or every 2 years	5	Coolant					○		65
	21	Hydraulic oil					○		76
	10	Filter for the breathercase					○		
Every 5000 h./ every 5 years	6	The engine's valves						○	

○ = Axle oil ○ = Hydraulic oil ○ = Intake ○ = Lubrication (oil)
○ = Engine oil ○ = Coolant ○ = Battery ○ = Lubrication (grease)
○ = Transmission oil ○ = Fuel ○ = Tyre pressure ○ = Other service

PROBLEM	*CAUSE*	*SOLUTION*
Engine does not start	Battery voltage is too low	Check battery and connections
	Main switch off	Activate main switch
	Defective fuel supply	Check fuel and connections
	Fault in electrical connection on battery or starter	Check connections
	Other defects	Contact HYDREMA
Engine smoke is black	Air filter clogged up	Replace or clean air filter
	Fuel system defective	Contact HYDREMA
	Wrong fuel type	Change fuel and fuel filter
Engine temperature too high	Radiator clogged up	Clean radiator
	Not enough coolant	Fill with coolant
	Defective thermostat or water pump	Contact HYDREMA
	Engine faults	Contact HYDREMA
Engine starts and stops	Dirty fuel filter or air filter	Replace fuel filter or air filter
	Air in the fuel system	Check connections
Alternator charges irregularly	Defective or loose alternator belt	Replace or adjust alternator belt
	Defective alternator	Contact HYDREMA
Transmission overheated	Too much transmission oil	Check oil level while engine is running. Drain excess of oil
	Oil thermostat defective	Contact HYDREMA
	Radiator clogged up	Clean radiator
	Gear selection too high	Select a lower gear.
Suspension malfunction	Lift / lower function activated	Deactivate side panel function
	Suspension unstable	Contact HYDREMA
	Static sag level incorrect	Contact HYDREMA

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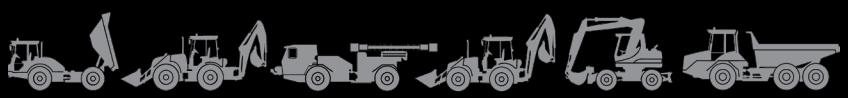

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