DYNAPAC

Instruction manual

ICC1000-1EN2.pdf
Operation and maintenance

Vibratory roller
CC1000

Engine
Perkins 403C-11

Serial number
***90130025* -**

Dynapac CC1000 is a 1.5-ton class vibratory roller, with articulated steering and brakes and vibration on both drums.

Subject to changes
Printed in Sweden

Table of Contents

Introduction

Warning symbols

WARNING ! Marks a danger or a hazardous procedure that can result in life threatening or serious injury if the warning is ignored.

CAUTION ! Marks a danger or hazardous procedure that can result in damage to the machine or property if the warning is ignored.

Safety information

The safety manual supplied with the machine must be read by all roller operators. Always follow the safety instructions. Do not remove the manual from the machine.

We recommend that the operator reads the safety instructions in this manual carefully. Always follow the safety instructions. Ensure that this manual is always easily accessible.

Read the entire manual before starting the machine and before carrying out any maintenance.

Ensure good ventilation (extraction of air by fan) where the engine is run indoors.

General

This manual contains instructions for machine operation and maintenance.

The machine must be correctly maintained for maximal performance.

The machine should be kept clean so that any leakages, loose bolts and loose connections are discovered at as early a point in time as possible.

Inspect the machine every day, before starting. Inspect the entire machine so that any leakages or other faults are detected.

Check the ground under the machine. Leakages are more easily detected on the ground than on the

machine itself.

THINK ENVIRONMENT ! Do not release oil, fuel and other environmentally hazardous substances into the environment. Always send used filters, drain oil and fuel remnants to environmentally correct disposal.

This manual contains instructions for periodic maintenance normally carried out by the operator.

Additional instructions for the engine can be found in the manufactuer's engine manual.

Safety - General instructions

(Also read the safety manual)

1. **The operator must be familiar with the contents of the OPERATION section before starting the roller.**
2. **Ensure that all instructions in the MAINTENANCE section are followed.**
3. **Only trained and/or experienced operators are to operate the roller. Passengers are not permitted on the roller. Remain seated at all times when operating the roller.**
4. **Never use the roller if it is in need of adjustment or repair.**
5. **Board and leave the roller only when it is stationary. Use the grips and railings provided. Always use the three-point grip (both feet and one hand or one foot and both hands) when boarding or disembarking the machine.**
6. **The ROPS (Roll Over Protective Structure) should always be used when the machine is operated on unsafe ground.**
7. **Drive slowly in sharp bends.**
8. **Avoid driving across slopes. Drive straight up or straight down the slope.**
9. **When driving close to edges or holes, make sure that at least 2/3 of the drum width is on previously compacted materials.**
10. **Make sure that there are no obstacles in the direction of travel, on the ground, in front of or behind the roller, or overhead.**
11. **Drive particularly carefully on uneven ground.**
12. **Use the safety equipment provided. The seat belt must be worn on machines fitted with ROPS.**
13. **Keep the roller clean. Clean any dirt or grease that accumulates on the operator platform immediately. Keep all signs and decals clean and legible.**
14. **Safety measures before refueling:**
    - Shut off the engine
    - Do not smoke
    - No naked flame in the vicinity of the machine
    - Ground the filling device nozzle to the tank to avoid sparks
15. **Before repairs or service:**
    - Chock the drums/wheels and under the strike-off blade.
    - Lock the articulation if necessary
16. **Hearing protection is recommended if the noise level exceeds 85 dB(A). The noise level can vary depending on what type of material the machine is being used on.**

17. **Do not make any changes or modifications to the roller that could affect safety. Changes are only to be made after written approval has been given by Dynapac.**

18. **Avoid using the roller before the hydraulic fluid has reached its normal working temperature. Braking distances can be longer than normal when the fluid is cold. Refer to the operating instruction in the STOP section.**

Safety - when operating

Driving near edges

When driving near an edge, minimum 2/3 of the drum width must be on solid ground.

Keep in mind that the machine's center of gravity moves outwards when steering. For example, the center of gravity moves to the right when you steer to the left.

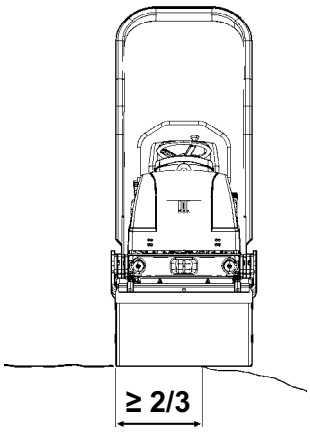


Fig. Position of drum when driving near an edge

Slopes

This angle has been measured on a hard, flat surface with the machine stationary.

The steering angle was zero, the vibration was switched off and all tanks were full.

Always take into consideration that loose ground, steering the machine, vibration on, machine speed across the ground and raising the center of gravity can all cause the machine to topple at smaller slope angles than those specified here.

It is recommended that the ROPS (Roll Over Protective Structure) is always used when driving on slopes or unsafe ground.

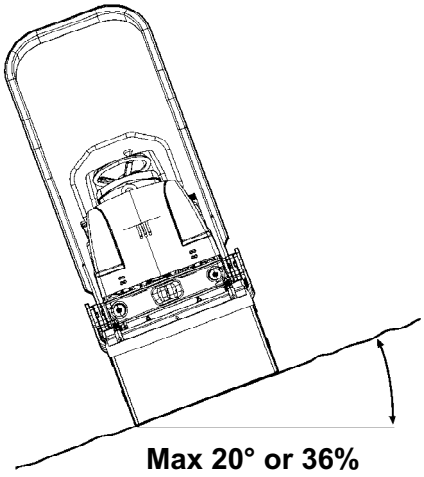


Fig. Operating on slopes

Where possible, avoid driving across slopes. Drive instead straight up and down sloping ground.

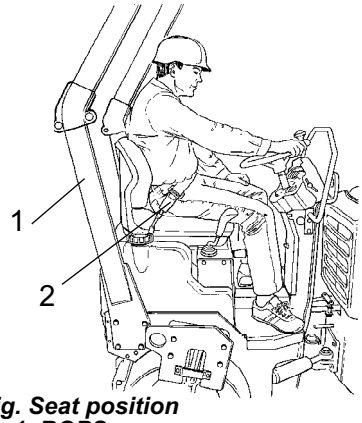


Fig. Seat position
1. ROPS
2. Seat belt

Sitting position

Remain seated at all times when operating the roller. If the operator stands up during operation, a buzzer sounds. After 3 seconds the brakes are activated and the engine stops. Brace yourself for a sudden stop.

Always use the seat belt where fitted. Where the seat belt is not used, there is a great risk that the operator will be thrown off and land under the machine if the machine topples over.

The seat belt is standard equipment on rollers fitted with Roll Over Protective Structure (ROPS) (1).

ROPS should always be in the raised position when machines with foldable ROPS are operated

Special instructions

Standard lubricants and other recommended oils and fluids

Before leaving the factory, the systems and components are filled with the oils and fluids specified in the lubricant specification. These are suitable for ambient temperatures in the range -10°C to +40°C (14°F - 104°F).

The maximum temperature for biological hydraulic fluid is +35°C (95°F).

Higher ambient temperatures, above +40°C (104°F)

For operation of the machine at higher ambient temperatures, however maximum +50°C (122°F), the following recommendations apply:

The diesel engine can be run at this temperature using normal oil. However, the following fluids must be used for other components:

Hydraulic system - mineral oil Shell Tellus TX100 or similar.

Temperatures

The temperature limits apply to standard versions of rollers.

Rollers equipped with additional equipment, such as noise suppression, may need to be more carefully monitored in the higher temperature ranges.

High pressure cleaning

Do not spray water directly onto electrical components or the instrument panels.

Place a plastic bag over the fuel filler cap and secure with a rubber band. This is to avoid high pressure water entering the vent hole in the filler cap. This could cause malfunctions, such as the blocking of filters.

Never aim the water jet directly at the fuel tank cap. This is particularly important when using a high-pressure cleaner.

Fire fighting

If the machine catches fire, use an ABE-class powder fire extinguisher.

A BE-class carbon dioxide fire extinguisher can also be used.

Protective structure (ROPS), protective cab

Never carry out any welding or drilling operations of any kind on the protective structure (ROPS, Roll Over Protective Structure) or the protective cab.

Never attempt to repair a damaged structure or cab. These must be replaced with new structures or cabs.

Battery handling

When removing the battery, always disconnect the negative cable first.

When fitting the battery, always connect the positive cable first.

Dispose of old batteries in an environmentally friendly way. Batteries contain toxic lead.

Do not use a quick-charger for charging the battery. This may shorten battery life.

Jump starting

Do not connect the negative cable to the negative terminal on the dead battery. A spark can ignite the oxy-hydrogen gas formed around the battery.

Check that the battery used for jump starting has the same voltage as the dead battery.

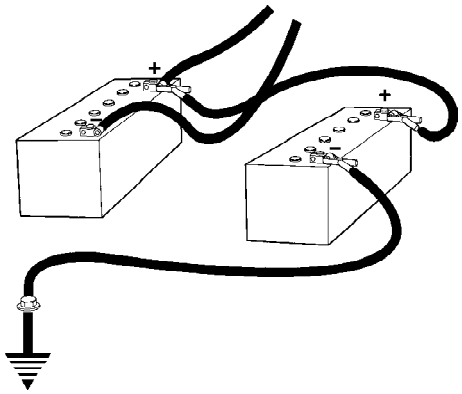


Fig. Jump starting

Turn the ignition and all power consuming equipment off. Switch off the engine on the machine which is providing jump start power.

First connect the jump start battery's positive terminal to the dead battery's positive terminal. Then connect the jump start battery's negative terminal to, for example, a bolt or engine hoisting hook on the machine with the dead battery.

Start the engine on the power providing machine. Let it run for a while. Now try to start the other machine. Disconnect the cables in the reverse order.

Technical specifications - Noise/Vibrations/Electrical

Vibrations - Operator station

(ISO 2631)

The vibration levels are measured in accordance with the operational cycle described in EU directive 2000/14/EC on machines equipped for the EU market, with vibration switched on, on soft polymer material and with the operator's seat in the transport position.
Measured whole-body vibrations are below the action value of 0.5 m/s² as specified in Directive 2002/44/EC. (Limit is 1.15 m/s²)
Measured hand/arm vibrations also were below the action level of 2.5 m/s² specified in the same directive. (Limit is 5 m/s²)

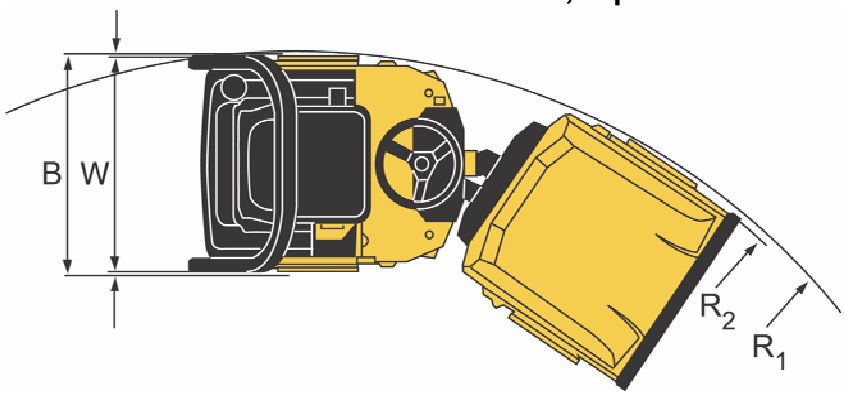
Noise level

The noise level is measured in accordance with the operational cycle described in EU directive 2000/14/EC on machines equipped for the EU market, on soft polymer material with vibration switched on and the operator's seat in the transport position.

Guaranteed sound power level, L_{wA}	103 dB (A)
Sound pressure level at the operator's ear (platform), L_{pA}	88 dB (A)

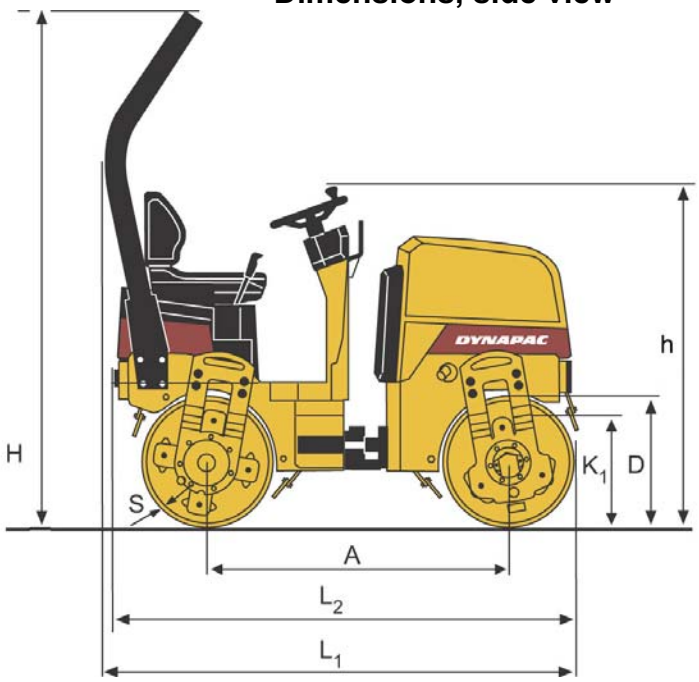
Technical specifications - Dimensions

Dimensions, top view



Dimensions	mm	in
B	1070	42
R2	2750	108
R1	2710	107
W	1000	39

Dimensions, side view



Dimensions	mm	in
A	1350	53
D	584	22
H	2300	91
h	1520	60
K	465	18
L1	2095	82
L2	2040	80
S	13	0.5

Technical specifications - Weights and volumes

Fluid volumes

Drum	3,5	liters	3,7	qts
Hydraulic reservoir	12	liters	3,2	gal
Fuel tank	23	liters	6,0	gal
Emulsion tank	-	liters/tank	-	
Water tank	110	liters/tank	29	gal
Engine	4,7	liters	5,0	qts

Weights

Service weight with ROPS (EN500)	1650	kg	3,63	lbs

Technical specifications - Working capacity

Compaction data

Static linear load, front	8,1	kg/cm	45,4	pli
Static linear load, rear	8,4	kg/cm	47	pli
Amplitude	0,35	mm	0.01	in
Vibration frequency	70	Hz	4200	vpm
Centrifugal force	17	kN	3825	lb

Propulsion

Speed range	0-9	kph	0-6	mph
Climbing capacity (theoretical)	40	%		

Technical specifications - General

Engine

Manufacturer/Model	Perkins 403C-11	
Power	17.3 kW	23.5 HP
Engine speed	2600 rpm	

Electrical system

Battery	12V 60Ah
Alternator	14V 40A
Fuses	See the Electrical system section - fuses

Tightening torque

Tightening torque in Nm for oiled, bright galvanized bolts tightened using a torque wrench.

	STRENGTH CLASS		
M - thread	**8.8**	**10.9**	**12.9**
M6	8,4	12	14,6
M8	21	28	34
M10	40	56	68
M12	70	98	117
M16	169	240	290
M20	330	470	560
M24	570	800	960
M30	1130	1580	1900
M36	1960	2800	-

ROPS - bolts

Bolt dimensions :	M12 (PN 508063)
Strength class :	8.8
Tightening torque :	70 Nm

ROPS-bolts which are to be torque tightened must be dry.

Hydraulic system

Opening pressure	**MPa**
Drive system	37,0
Supply system	2,0
Vibration system	22,0
Control systems	7,0
Brake disengagement	2,0

Machine plate - Identification

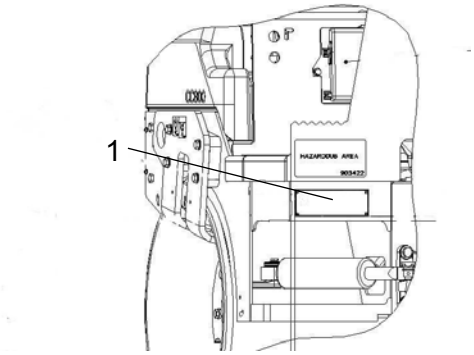
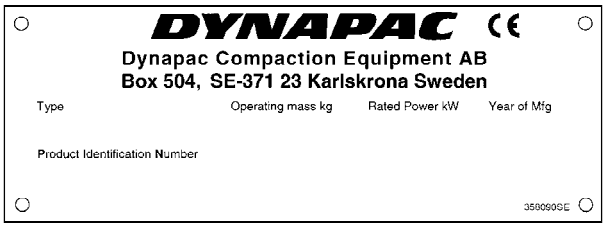


Fig. Operator's platform, right side
1. Machine plate

Machine plate

The machine plate (1) is attached to the rear right side of the frame, beside the steering joint.

The plate specifies the manufacturers name and address, the type of machine, the PIN, Product Identification Number (serial number), operating weight, engine power and year of manufacture. CE markings and the year of manufacture may be omitted on machines supplied to markets outside the EU.



Please state the machine's PIN when ordering spares.

Product identification number on the frame

The machine PIN (Product Identification Number) (1) is punched on the right edge of the front frame.

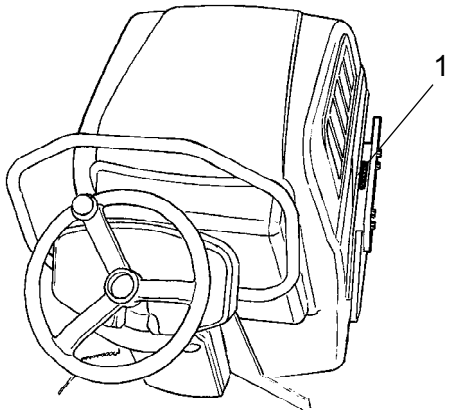


Fig. PIN Front frame

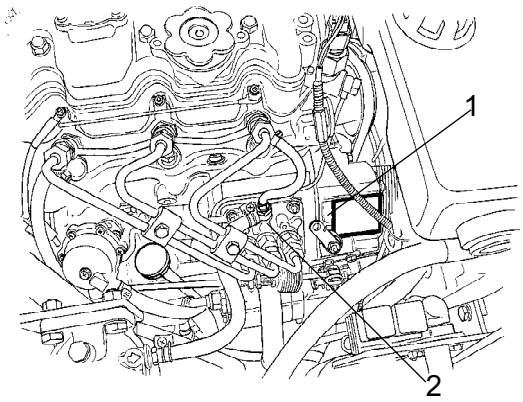


Fig. Engine
1. EPA plate (USA)
2. Type plate

Engine plates

The plate specifies the type of engine, its serial number and the engine specification.

IMPORTANT ENGINE INFORMATION	
Perkins	PERKINS SHIBAURA ENGINE LTD
ENGINE FAMILY	3H3XL1 13SLV
ENGINE TYPE HH25/2800	DISPL 1.131L
ADVERTISED POWER 17.3 kW at 2600 rpm	
THE ENGINE CONFORMS TO 2003 U.S. EPA AND CALIFORNIA REGULATIONS FOR OFF ROAD COMPRESSION IGNITION ENGINES	
DIESEL FUEL ONLY	
INLET/EXH VALVE CLEARENCE 0.2mm COLD	
LOW IDLE 825 - 1400 rpm	
ADJUST IDLE SPEED WITH ENGINE AT NORMAL OPERATING TEMPERATURE, ACCESSORIES OFF AND TRANSMISSION IN NEUTRAL TUNE-UP BY AUTHORIZED SHOP ONLY	
EC NRMM No xxxxxxxxxxxxxxxxxx	
403C-11	190360220

Fig. EPA plate

The engine type plate (2) is attached to the top of the engine.

Perkins	TYPE	
LIST NO	SERIAL NO	TYPE

Fig. Type plate

Please specify the engine serial number when ordering spares. Refer also to the engine manual.

Machine description- Decals

Location - decals

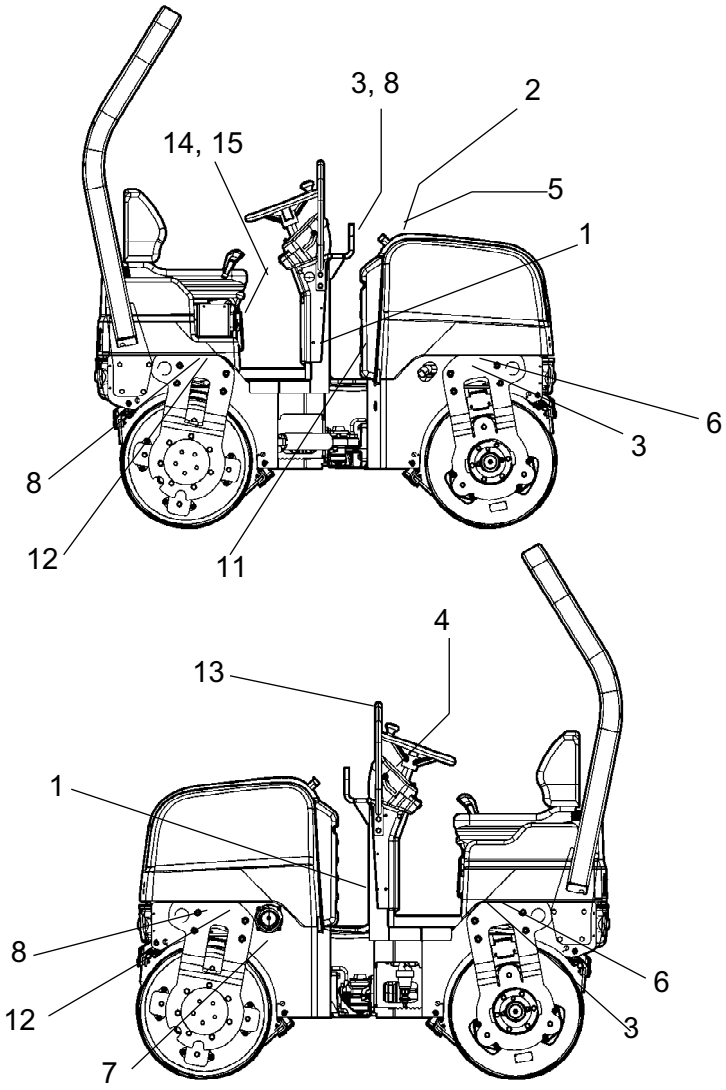


Fig. Location, decals and signs

1. Warning, Risk of being crushed
2. Warning, Rotating engine components
3. Warning, lifting.
4. Safety decal
5. Warning, Hot surfaces
6. Hoisting plate
7. Diesel fuel
8. Lifting point
11. Hydraulic fluid level
12. Securing point
13. Instructions decal
14. Handbook compartment
15. Safety manual

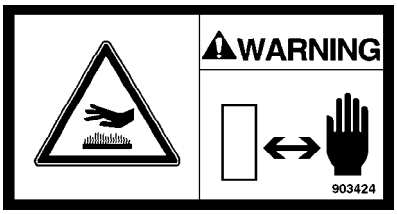
Safety decals

903422
- Crush zone, articulation/drum.

Maintain a safe distance from the crush zone.
(Two crush zones on machines fitted with pivotal steering)

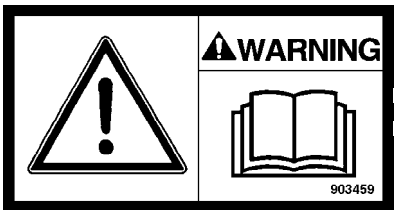
903423
- Warning of rotating engine components.

Keep your hands at a safe distance from the danger zone.



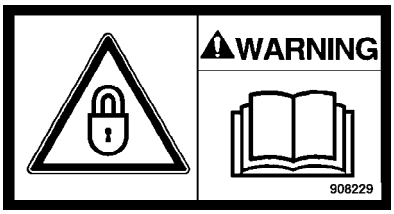
903424
- Warning of hot surfaces in the engine compartment.

Keep your hands at a safe distance from the danger zone.



903459
- Instruction manual

The operator must read the safety, operation and maintenance instructions before operating the machine.



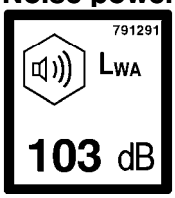
908229
- Locking

The articulation must be locked when lifting.

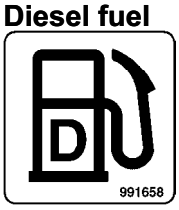
Read the instruction manual.

Info decals

Noise power level

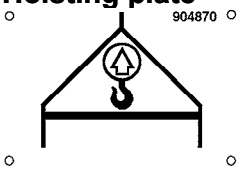


Diesel fuel

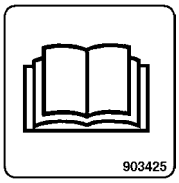


Lifting point

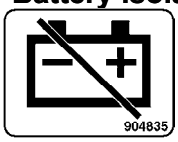
Hoisting plate



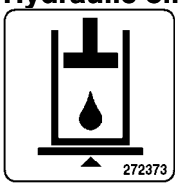
Handbook compartment



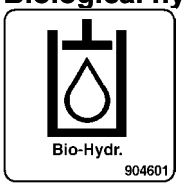
Battery isolation switch



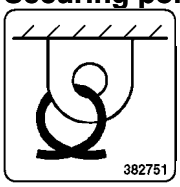
Hydraulic oil level



Biological hydraulic fluid



Securing point



Machine description - Instruments/Controls

Locations - Instruments and controls

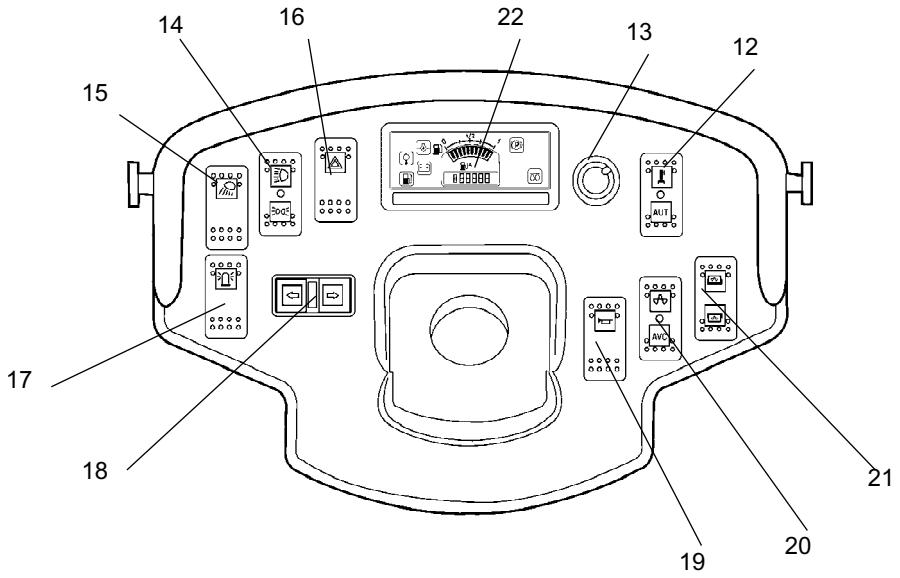


Fig. Instruments and control panel

12.	Manual/automatic sprinkler	17.	Hazard beacon
13.	Sprinkler timer	18.	Direction indicators
14.	Road lights	19.	Horn
15.	Working lights	20.	Vibration manual/automatic
16.	Hazard warning lights	21.	Vibration selector Front/rear drum
		22.	Control panel

Locations - Control panel and controls

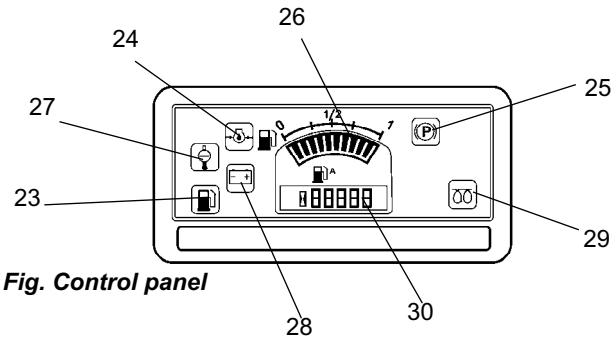


Fig. Control panel

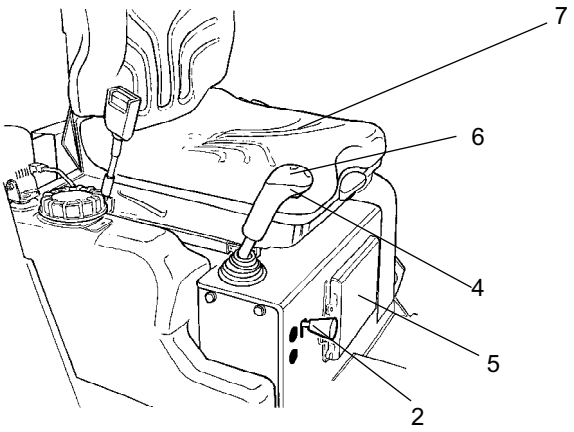


Fig. Operator position

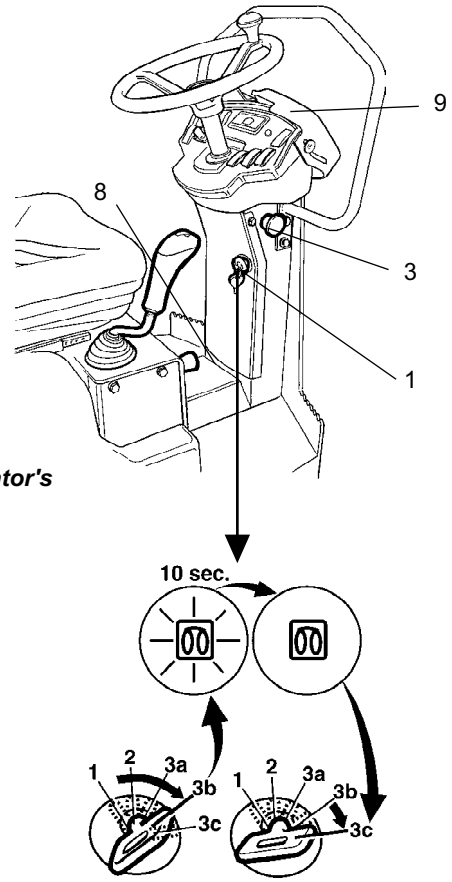


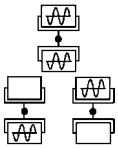
Fig. Operator's station

1	Starter switch	23	Low fuel level
2	Engine speed control	24	Oil pressure, engine
3	Emergency brake	25	Parking brake
4	Vibration On/Off	26	Fuel level
5	Handbook compartment	27	Water temperature, engine
6	Forward/reverse lever	28	Battery/charging
7	Seat switch	29	Glow plug
8	Fuse box	30	Hourmeter
9	Instrument cover		

Function description

No	Designation	Symbol	Function
1.	Starter switch		Positions 1-2: Shut off position, key can be removed. Position 3a: All instruments and electric controls are supplied with power. Position 3b: Glowing. Hold the starter switch in this position until the lamp goes out. The starter motor is activated in the next position. Position 3c: Starter motor activation.

No	Designation	Symbol	Function
2.	Engine speed control		Raise the lever and release it into the groove to the left to set engine speed to operating speed. To select idling speed, move the lever to the right and downwards.
3.	Emergency stop		When pressed, the emergency brake is activated. The brake is applied and the engine stops. Brace yourself for a sudden stop.
4.	Vibration On/Off. Switch		Press once and release to switch vibration on. Press again to switch the vibration off.
5.	Handbook compartment		Pull up and open the top of the compartment for access to handbooks.
6.	Forward/Reverse lever		The engine can only be started when the lever is in neutral. The engine will not start if the forward/reverse lever is not in the neutral position. Direction of travel and speed of the roller is regulated with the forward/reverse lever. Move the lever forward to drive the roller forwards, etc. The speed of the roller is proportional to the distance of the lever from the neutral position. The further the lever is from the neutral position, the higher the speed.
7.	Seat switch		Remain seated at all times when operating the roller. If the operator stands up during operation, a buzzer sounds. After 3 seconds the brakes are activated and the engine stops.
8.	Fuse box (on control column)		Contains fuses for the electrical system. See under the heading 'Electrical system' for a description of fuse functions.
9.	Instrument cover		Lowered over the instrument plate to protect the instruments from the weather and sabotage. Lockable
12.	Sprinkler, switch		In the depressed position, the supply of water to the drum is activated.
			Watering off
		AUTO	In the depressed position, the supply of water to the drum is activated by the forward/reverse lever. The water flow is regulated using the sprinkler timer (13)
13.	Sprinkler timer (Optional)		Stepless regulation of the water flow from 0-100%. Only functions where AUTO (12.) is depressed.
14.	Road lights, switch (Optional)		Where the upper position is depressed, the road lights are on. Where the lower position is, depressed the parking lights are on.
			
15.	Working lights switch (Optional)		When depressed, the working lights are on
16.	Hazard warning lights, switch (Optional)		Where depressed, the hazard warning lights are on
17.	Hazard beacon, switch		Where depressed, the hazard beacon is on

No	Designation	Symbol	Function
18.	Direction indicators, switch (Optional)		When depressed to the left, the left direction indicators are on etc. In the middle position the function is shut off.
19.	Horn, switch		Press to sound the horn.
20.	Vibration MAN/AUTO switch		In the upper position, the vibration is switched on/off with the switch on the forward/reverse lever. The function is activated with the switch.
			In the middle position, the vibration system is switched off.
		AVC	In the lower position, vibration is automatically switched on or off via the forward/reverse lever.
21.	Vibration selector front/rear drum, switch (Optional)		In the depressed forward position, vibration is activated on the front drum. In the middle position, vibration is activated on both drums. In the depressed rear position, vibration is activated on the rear drum.
22.	Control panel		
23.	Warning lamp, low fuel level		The lamp comes on when the fuel level in the tank is low.
24.	Warning lamp, oil pressure		This lamp lights if the lubricating pressure in the engine is too low. Stop the engine immediately and locate the fault.
25.	Warning lamp, parking brake		The lamp lights when the parking brake is activated.
26.	Fuel level		Shows the fuel level in the diesel tank.
27.	Warning lamp, water temperature		The light comes on if the water temperature is too high.
28.	Warning lamp, battery charging		If the lamp lights while the engine is running the alternator is not charging. Stop the engine and locate the fault.
29.	Warning lamp, glow plug		The lamp must go out before the starter switch is moved to position 3c for activation of the starter motor.
30.	Hourmeter		Shows the number of hours the engine has run.

Machine description - Electrical system

Fuses

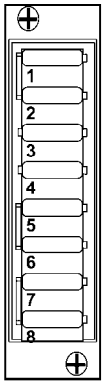


Fig. Fuse box

The figure shows the position of the fuses.

The table below gives fuse amperage and function. All fuses are flat pin fuses.

Fuses in the fusebox

1.	ECU Instrument panel, sprinkler	20A	5.	Hazard beacon	10A
2.	Horn, alternator	15A	6.	Direction indicators	10A
3.	Right direction indicators, side repeaters	5A	7.	Driving lights, working lights main headlight front	15A
4.	Left direction indicators, side repeaters	5A	8.	Driving lights, position lights, brake lights, working lights rear, number sign lighting	15A

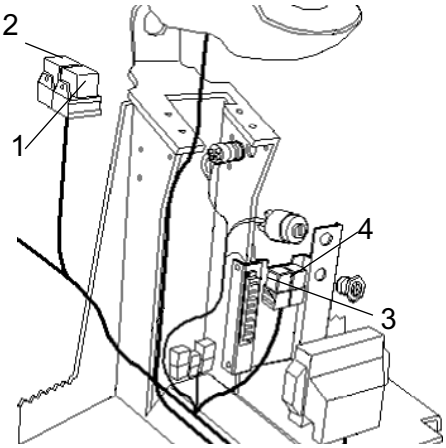


Fig. Control column

Relays

1.	*K1*	*Starting*
2.	*K5*	*Glow plug*
3.	*K9*	*Direction indicators*
4.	*K10*	*Brake lights*

Operation - Starting

Before starting

Battery isolation switch - On - Optional

Remember to carry out daily maintenance. Refer to the maintenance instructions.

The battery isolation switch is located in the engine compartment. Turn the key (1) to the on position. The entire roller is now supplied with power.

The engine cover must be unlocked when operating, so that the battery can be quickly disconnected if necessary.

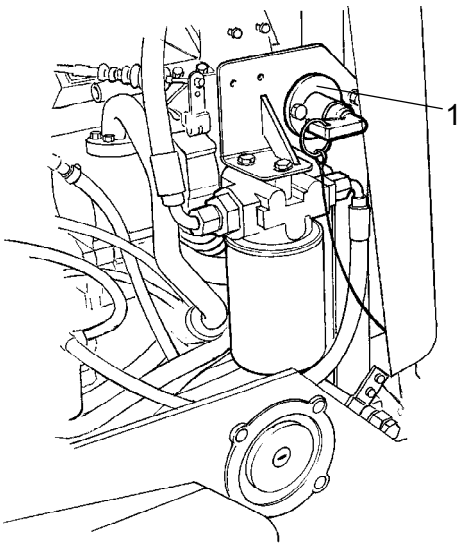


Fig. Left side of the engine
1. Battery isolation switch

Operator's seat - Adjusting

Adjust the operator's seat so that the position is comfortable and so that the controls are within easy reach.

The seat can be adjusted as follows :
- Backrest inclination (1)
- Length adjustment (2)
- Weight adjustment (3)

To adjust weight. Weight is increased by pushing the lever down until the required weight is achieved. To lower weight, push the lever down to its lowest position and release. The seat is now set for the minimum weight.

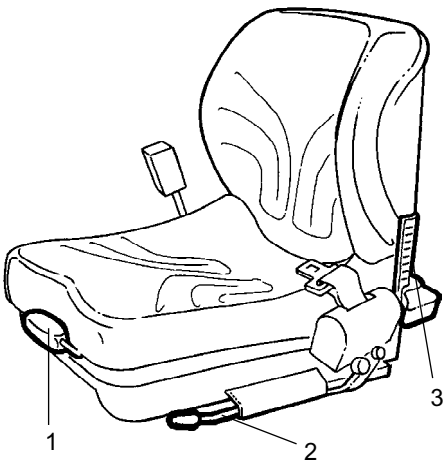


Fig. Operator position
1. Backrest inclination
2. Length adjustment
3. Weight adjustment

Instruments and lamps - Checking

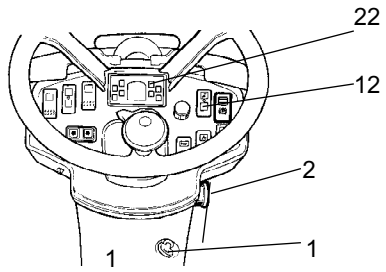


Fig. Instrument panel
1. Starter switch
2. Emergency brake
12. Switch, watering
22. Warning panel

Make sure that the emergency brake is definitely pulled out in neutral position. When the roller is in neutral or there is no load on the operator's seat, the automatic brake function is engaged.

Turn the switch (1) to position 3a.

Check that the warning lamps in the warning panel (22) come on.

Set the sprinkler switch (12) to the operating position and check that the system is functioning.

Parking brake - Check

Make sure that the emergency brake button (1) is definitely pulled out. The roller cannot start if the emergency brake button is pressed in.

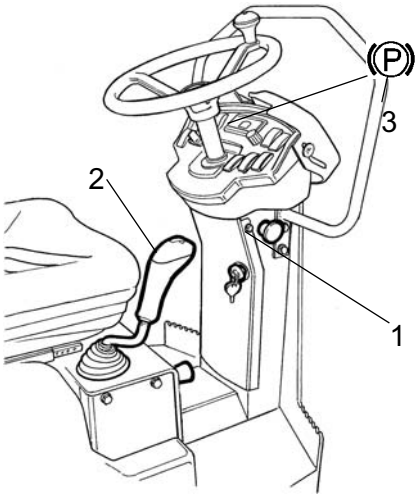


Fig. Control panel
1. Emergency brake
2. Forward/reverse lever
3. Parking brake lamp

Start the roller. Check that the parking brake lamp (3) lights. Drive the roller slowly forward and check that the parking brake lamp goes out. When the forward/reverse lever is in neutral and the operator stands up, the parking brake lamp should light.

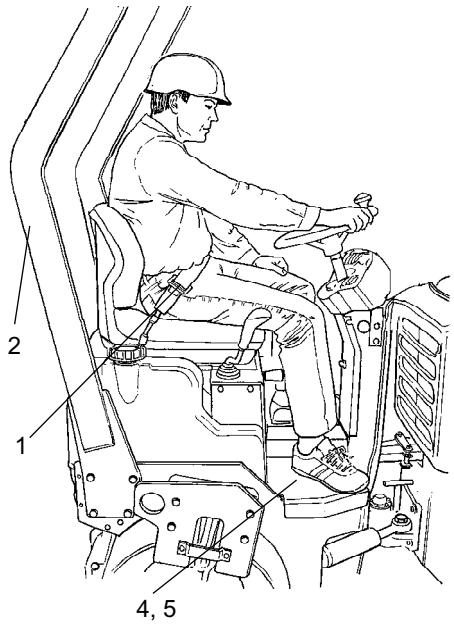


Fig. Operator's seat
1. Seatbelt
2. ROPS
4. Rubber element
5. Anti-slip

Operator position

Replace the seat belt (1) if it shows signs of wear or has been subjected to high levels of force.

Never use the forward/reverse levers as a handle when mounting or disembarking from the roller.

Check that the rubber elements (4) on the platform are intact. Worn elements will reduce comfort.

Ensure that the anti-slip (5) on the platform is in good condition. Replace where anti-slip friction is poor.

Machines with folding ROPS must always be operated with the ROPS raised and locked in position.

Always check the interlock before operation. The operator does this by rising from the seat according to the instructions in the Interlock section. See below.

If ROPS (Roll Over Protective Structure) is fitted to the roller, always wear the seat belt (1) provided and wear a protective helmet.

Interlock

The roller is equipped with Interlock.

If you stand up from the operator's seat when the forward/reverse lever is in the drive position, the machine stops and the diesel engine is switched off after 3 seconds. Brace yourself for a sudden stop.

Interlock is not activated if the forward/reverse lever is in neutral.

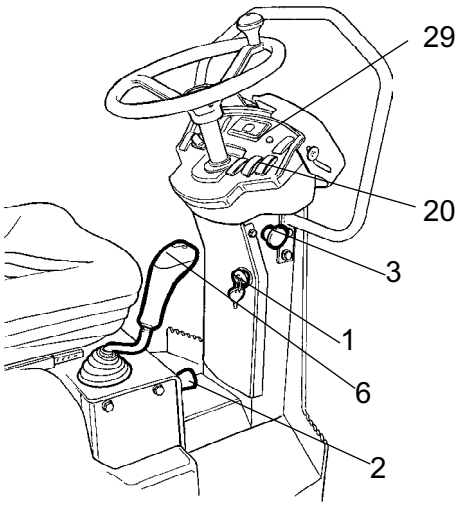


Fig. Control panel
1. Starter switch
2. Engine speed control
3. Emergency brake
6. Forward/Reverse lever
20. Vibration switch man/auto
29. Glow lamp

Starting

Starting the engine

Make sure that the emergency brake (3) is pulled out.

Set the forward/reverse lever (6) in neutral. The engine can only be started when the lever is in neutral.

Set the vibration switch (20) for manual/automatic vibration in (position O).

In warm ambient temperatures, set the engine speed control (2) to idling (furthest to the left).

When starting from cold, set the engine speed control at full revs. Preheating: Turn the key to position II. When the lamp (29) has gone out, after approximately 10 seconds. Turn the starter switch (1) to the right. As soon as the engine has started, release the starter switch.

Do not run the starter motor for too long. If the engine does not start, wait a minute or so before trying again.

Idle the engine for a few minutes until it is warm, longer if the ambient temperature is below +10 C (50 F)

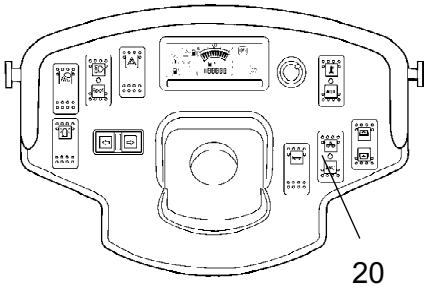


Fig. Instrument panel
20. Vibration switch

Check while warming the engine that the warning lamps for the oil pressure (24) and charging (28) go out.

The warning lamp (25) should remain on.

When starting and driving a machine that is cold, remember that the hydraulic fluid is also cold and that braking distances can be longer than normal until the machine reaches the working temperature.

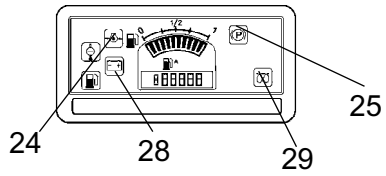


Fig. Control panel
28. Charging lamp
24. Oil pressure lamp
25. Brake lamp
29. Glow plug lamp

Ensure that there is good ventilation (air extraction) if the engine is run indoors. Risk of carbon monoxide poisoning.

Operation - Driving

Operating the roller

Under no circumstances is the machine to be operated from the ground. The operator must be seated inside the machine during all operation.

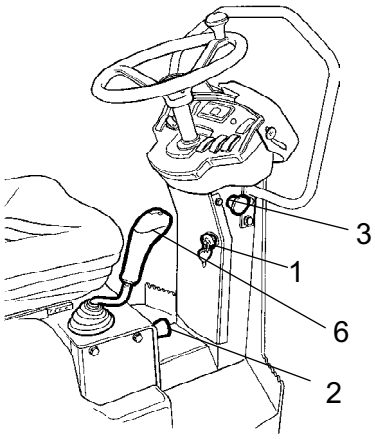


Fig. Instrument panel
1. Starter switch
2. Engine speed control
3. Emergency brake
6. Forward/reverse lever

Turn the engine speed control upwards (2) and lock it in the working position.

Check that the steering is working correctly by turning the steering wheel once to the right and once to the left while the roller is stationary.

When compacting asphalt, remember to turn on the sprinkler system (5).

Make sure that the area in front of and behind the roller is clear.

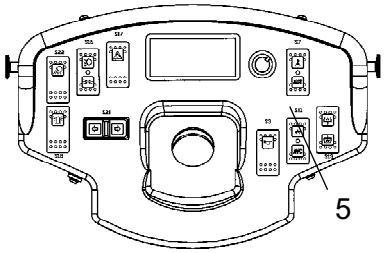


Fig. Instrument panel
5. Switch for sprinkler.

Carefully move the forward/reverse lever (6) forwards or backwards, depending on which direction of travel is required.

Speed increases as the lever is moved away from the neutral position.

The speed should always be controlled using the forward/reverse lever and never by changing the engine speed.

Test the emergency brake by pressing the emergency brake button (3) while the roller is running slowly forward. Brace yourself for a sudden stop. The engine will be switched off and the brakes activated.

Check when operating that the warning lamps do not come on.

Interlock

The roller is equipped with Interlock.

If you stand up from the operator's seat when the forward/reverse lever is in the drive position, the machine stops and the diesel engine is switched off after 3 seconds. Brace yourself for a sudden stop.

Interlock is not activated if the forward/reverse lever is in neutral.

Operation - Vibration

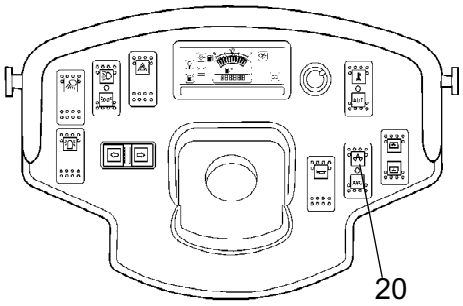


Fig. Instrument panel
20. Switch Man/Aut.

Manual/Automatic vibration

Manual or automatic vibration activation/deactivation is selected using switch (20).

In the manual position, the operator must activate the vibration using the switch(4) on underside of the forward/reverse lever (6) grip.

In the automatic position, vibration is activated when the pre-set speed is reached. Vibration is automatically deactivated when the lowest pre-set speed is reached.

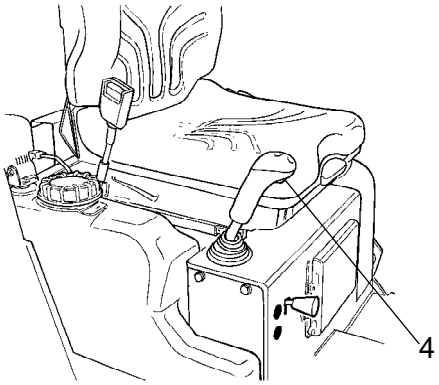


Fig. Forward/Reverse lever
4. Switch, vibration On/Off

Manual vibration - Switching on

Vibration should not be active when the roller is stationary. This can damage both the surface and the machine.

Engage and disengage vibration using the switch (4) on the underside of the forward/reverse lever.

Always switch off vibration before the roller comes to a standstill.

Operating - Stopping

Braking

Emergency braking

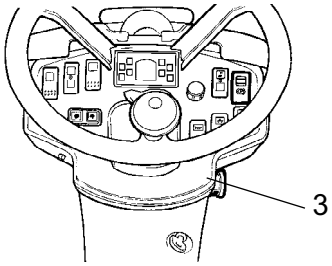


Fig. Control panel
3. Emergency brake button

Braking is normally activated using the forward/reverse lever. The hydrostatic transmission brakes the roller when the lever is moved towards the neutral position.

There is also a brake in each drum motor that acts as an emergency brake during operation.

To brake, press the emergency brake button (3), hold the steering wheel firmly and brace yourself for a sudden stop. The engine stops.

After braking, return the forward/reverse lever to the neutral position and pull out the emergency brake button. Restart the engine.

Normal braking

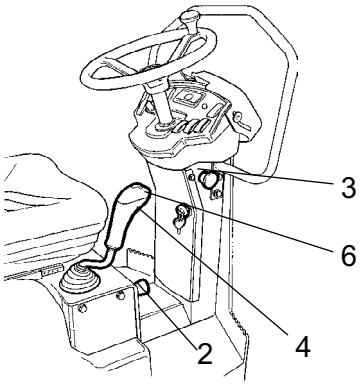


Fig. Control panel
2. Engine speed control
3. Emergency brake
4. Vibration On/off
6. Forward/reverse lever

Press the switch (4) to switch off the vibration.

Move the forward/reverse lever (6) to the neutral position to stop the roller.

Turn the engine speed control (2) back to idling. Allow the engine to idle for a few minutes to cool. Switch off the machine using the key.

When starting and driving a machine that is cold, remember that the hydraulic fluid is also cold and that braking distances can be longer than normal until the machine reaches the working temperature.

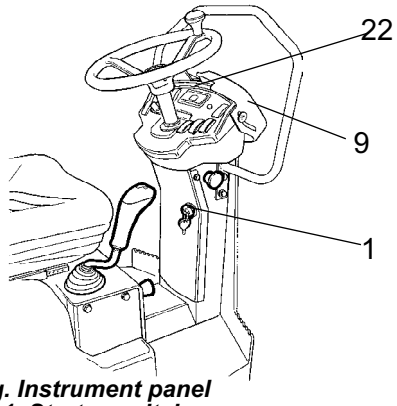


Fig. Instrument panel
1. Starter switch
9. Instrument cover
22. Panel for warning lamps

Switching off

Check instruments and warning lamps to see if any faults are indicated. Switch off all lights and other electrical functions.

Turn the starter switch (1) to the left to the shut off position 1. Before leaving the roller for the day, lower the instrument cover (22) and lock it.

Parking

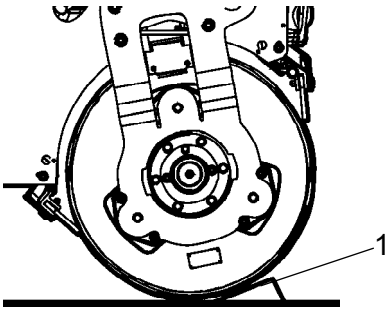


Fig. Set-up
1. Chocks

Chocking the drums

Never leave the machine when the is engine running unless the forward/reverse lever is in neutral, and check that the parking brake lamp is activated when the operator stands up.

Make sure that the roller is parked in a safe place with respect to other road users. Chock the drums if the roller is parked on sloping ground.

Keep in mind that there is a risk of freezing during the winter. Drain the water tanks and water lines.

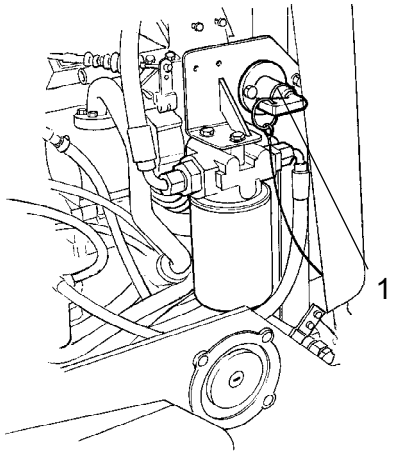


Fig. Battery space
1. Battery isolation switch

Master switch - Optional

Before leaving the roller for the day, switch the master switch (1) to the disconnected position and remove the handle.

This will prevent battery discharging and will also make it difficult for unauthorized persons to start and operate the machine. Lock also the engine cover.

Long-term parking

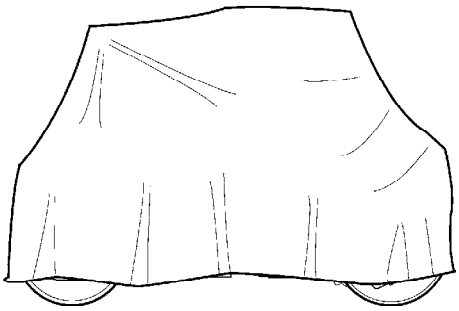


Fig. Roller weather protection

The following instructions should be followed when long term parking (more than one month).

These measures apply when parking for a period of up to 6 months.

Before re-commissioning the roller, the points marked with an asterisk * must be returned to the pre-storage state.

Engine

* Refer to the manufacturer's instructions in the engine manual that is supplied with the roller.

Battery

* Remove the battery from the machine, clean, grease the cable connectors (terminals) and trickle charge the battery once a month. The battery is otherwise maintenance free.

Air cleaner, exhaust pipe

* Cover the air cleaner (see under the heading 'Every 50 hours of operation' or 'Every 500 hours of operation') or its inlet with plastic or tape. Also cover the exhaust pipe opening. This is to avoid moisture entering the engine.

Sprinkler system

* Drain the water tank completely (see under the heading 'Every 2000 hours of operation'). Drain all hoses, filter housings and the water pump. Remove all sprinkler nozzles (see under the heading 'Every 10 hours of operation').

Fuel tank

Fill the fuel tank completely full to prevent condensation.

Hydraulic reservoir

Fill the hydraulic reservoir to the uppermost level mark (see under the heading 'Every 10 hours of operation.')

Steering cylinder, hinges, etc.

Grease the steering cylinder piston with conservation grease.

Grease the hinges on the doors to the engine compartment. Grease both ends of the forward/reverse control (bright parts) (see under the heading ‘Every 500 hours of operation’).

Hoods, tarpaulin

* Lower the instrument cover over the instrument panel.

* Cover the entire roller with a tarpaulin. A gap must be left between the tarpaulin and the ground.

* If possible, store the roller indoors and ideally in a building where the temperature is constant.

Miscellaneous

Lifting

Locking the articulation

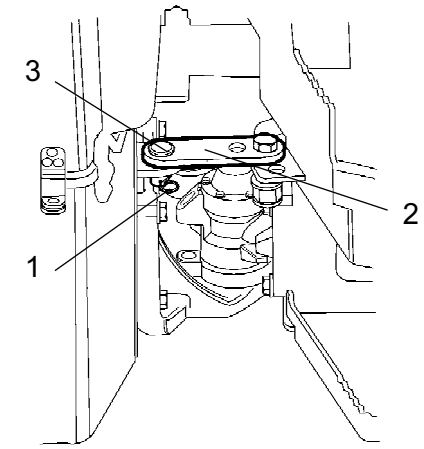


Fig. Steering joint
1. Cotter pin
2. Locking arm
3. Locking bolt

Turn the steering wheel to the straight ahead position.

Switch off the machine. Apply the emergency brake.

Pull out the locking pin (1), turn the locking arm (2) to the front frame, secure the locking arm to the front frame half by inserting the locking bolt (3) through the bracket in the front frame and the locking arm.

Secure the position of the locking arm by refitting the locking pin (1).

Lifting the roller

Weight: refer to the hoisting plate on the roller

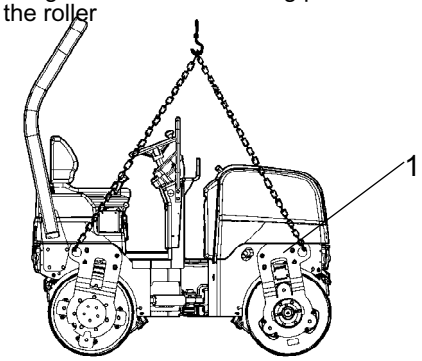


Fig. Roller prepared for lifting
1. Hoisting plate

The machine's gross weight is specified on the hoisting plate (1). Refer also to the Technical specifications.

Lifting equipment such as chains, steel wires, straps and lifting hooks must be dimensioned in accordance with the relevant safety regulations for the lifting equipment.

Stand well clear of the hoisted machine! Make sure that the lifting hooks are properly secured.

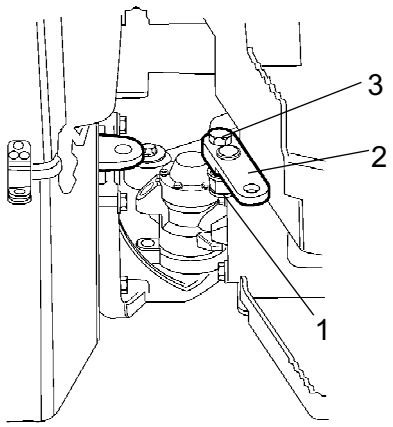


Fig. Articulation
1. Locking pin
2. Locking arm
3. Locking bolt

Unlocking the articulation

Remember to unlock the articulation before operating.

Pull out the locking pin (1), turn the locking arm (2) for the rear frame, secure the locking arm by inserting the locking bolt (3) through the mounting in the rear frame and locking arm. Insert the locking pin.

Transport

Lock the articulation before lifting and transporting. Follow the instructions under the relevant heading.

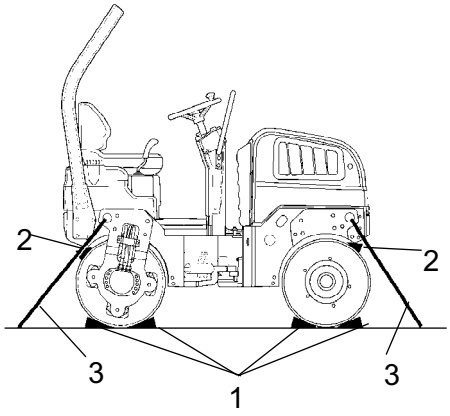


Fig. Arrangement
1. Chocks
2. Wooden wedges
3. Lashing straps

Roller prepared for transport

Chock the drums (1) and secure the chocks to the transport vehicle.

Place the wooden wedges (2) between drum and frame to avoid overloading of the roller's rubber elements when lashing.

Clamp down the roller with lashing strap (3) at all four corners. Decals indicate the fixing points.

Remember to return the articulation to its unlocked position before starting the roller.

Towing/Recovering

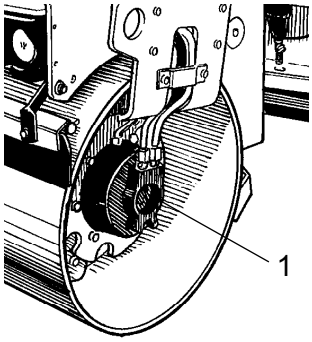


Fig. Drum
1. Propulsion motor, located left front and right rear.

Towing the roller

Switch off the diesel engine. Apply the emergency brake. Chock the drum to prevent the roller from moving when the brakes are disengaged.

The brakes in each propulsion motor must be mechanically disengaged, as described below, before the roller is towed.

Disengaging the mechanical brakes

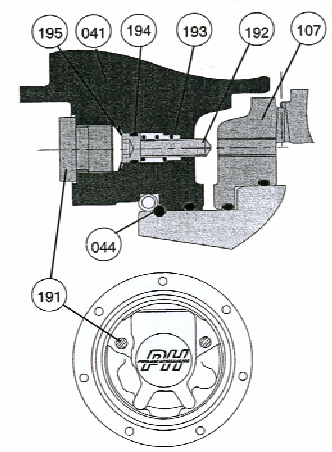


Fig. Disengaging the mechanical brakes

1. Remove the 2 plugs (191).

2. Press the screws (192) by pressing together the springs (193) so that they are forced into the brake piston (107) inner thread until the screw head (192) comes into contact with the valve block (041).

3. Continue tightening the two screws (192) alternately a little at a time so that the brake piston (107) releases (screw around 2 turns).

Tightening the screws (192) too hard can damage the inner mechanism

The machine should be started with the reactivated brakes.

Reactivate the mechanical brakes

Loosen the two screws (192) fully, and then fit the plugs (191).

Tightening torque

Screws (192)	33 Nm max	24.3 lbf.ft max
Plugs (191)	60±6 Nm max	44.2 ± 4.4 lbf.ft

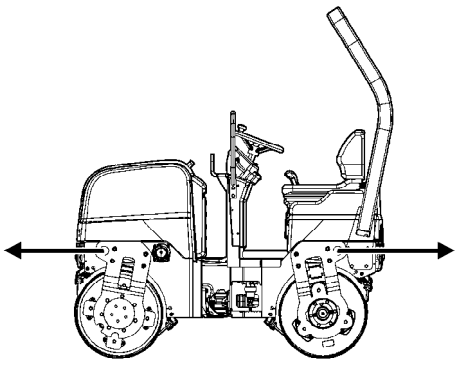


Fig. Towing the roller

Towing/recovering

A towing bar must be used when towing, as the roller has no brakes and can only be slowed and stopped by the vehicle towing the roller.

The roller must be towed slowly, max. 3 km/h (2 mph) and for short distances only, max. 300 m (330 yards).

When towing/recovering a machine, the towing device must be connected to both lifting holes. Pulling forces shall act longitudinally on the machine as illustrated. Max total towing force 50.8 kN, 25.4 kN per fork.

Reset the steps taken for towing as described in the towing instructions on the previous page.

Operating instructions - Summary

1. **Follow the SAFETY INSTRUCTIONS specified in the Safety Manual.**

2. Make sure that all instructions in the MAINTENANCE section are followed.

3. Turn the master switch to the ON position.

4. Move the forward/reverse lever to the NEUTRAL position.

5. Set the switch for Manual/Automatic vibration to the 0 position.

6. Set the engine speed control to full speed.

7. Set the Emergency brake in the pulled out position.

8. Start the engine and allow it to warm up.

9. Set the engine speed control to the operating position.

10. **Drive the roller. Operate the forward/reverse lever with care.**

11. **Check the brakes, drive slowly. Remember that the braking distance will be longer if the roller is cold.**

12. Use vibration only when the roller is in motion.

13. Check that the drums are thoroughly watered when watering is required.

14. **IN AN EMERGENCY:**
    - Press the EMERGENCY BRAKE BUTTON
    - Hold the steering wheel firmly.
    - Brace yourself for a sudden stop. The engine stops.

15. Parking: - Stop the engine and chock the drums.

16. When lifting: - Refer to the relevant section in the Instruction Manual.

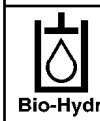
17. When towing: - Refer to the relevant section in the Instruction Manual.

18. When transporting: - Refer to the relevant section in the Instruction Manual.

19. When recovering - Refer to the relevant section in the Instruction Manual.

Maintenance - Lubricants and symbols

Always use high-quality lubricants and the amounts recommended. Too much grease or oil can cause overheating, resulting in rapid wear.

	**ENGINE OIL**	Air temperature -10°C-+40°C (14°F-104°F) Shell Rimula TX SAE 15W/40 or equivalent API CF-4/SG (CD/CE)
	**HYDRAULIC FLUID**	Air temp. -10°C-+40°C (14°F-104°F) Shell Tellus TX68 or equivalent. Air temp. above +40°C (104°F) Shell Tellus TX100 or equivalent
	**BIOLOGICAL HYDRAULIC FLUID**	BP BIOHYD SE-S 46 When it leaves the factory, the machine may be filled with biologically degradable fluid. The same type of fluid must be used when changing or topping up.
	**DRUM OIL**	Air temp. -15°C-+40°C (5°F-104°F) Rear drum: Shell Spirax AX 80W/90, or equivalent Front drum: Shell Spirax AX 80W/90, or equivalent
	**FUEL**	See engine manual.
	**COOLANT**	Glycoshell or equivalent. (mixed 50/50 with water) Prevents freezing to around -41°C. (-106°F)

Other fuel and lubricants are required when operating in areas with extremely high or extremely low ambient temperatures. See the 'Special instructions' chapter, or consult Dynapac.

Maintenance symbols

	Engine, oil level		Air filter
	Engine, oil filter		Battery
	Hydraulic reservoir, level		Sprinkler
	Hydraulic fluid, filter		Sprinkler water
	Drum, oil level		Recycling
	Lubricating oil		Fuel filter
	Coolant level		

Maintenance - Maintenance schedule

Service and maintenance points

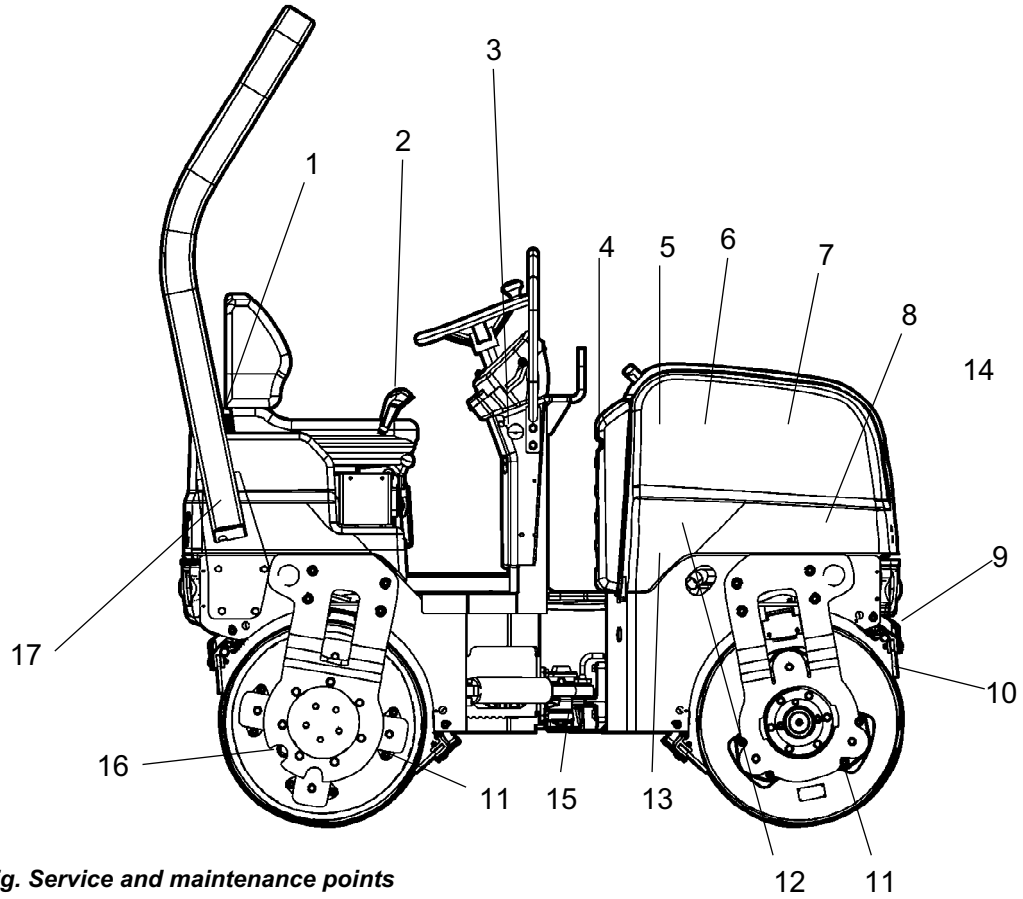


Fig. Service and maintenance points

1. Water tank, filling
2. Forward/Reverse lever
3. Emergency brake
4. Hydraulic fluid cooler/ radiator
5. Alternator belt
6. Engine
7. Air cleaner
8. Battery (maintenance free)
9. Sprinkler
10. Scrapers
11. Rubber element
12. Hydraulic fluid filter
13. Hydraulic fluid, filling
14. Fuel tank, filling
15. Steering joint
16. Drums, oil filling
17. ROPS
17. ROPS

General

Periodic maintenance should be carried out after the number of hours specified. Use the daily, weekly etc. periods where number of hours cannot be used.

Remove all dirt before filling, when checking oils and fuel and when lubricating using oil or grease.

The manufacturer's instructions found in the engine manual also apply.

Where both operational hours and time intervals are specified, maintenance should be carried out at the point in time that occurs first.

Every 10 hours of operation (Daily)

Refer to the contents to find the page number of the sections referred to !

Pos. in fig	Action	Comment
	Before starting up for the first time on that day	
6	Check the engine oil level	Refer to the engine manual
13	Check the hydraulic reservoir level	
4	Check the coolant level	
14	Refuel	
1	Fill the water tanks	
9	Check the sprinkler system	
4	Check for free circulation of cooling air	
10	Check the scraper setting	
	Check the warning lamps	
6	Drain the water separator if necessary	
7	Check the air cleaner indicator	

After the FIRST 50 hours of operation

Refer to the contents to find the page number of the sections referred to !

	Action	Comment
6	Change the fuel filter	Refer to the engine manual
6	Change the engine oil and oil filter	Refer to the engine manual
12	Change the hydraulic fluid filter	

Every 50 hours of operation (Weekly)

Refer to the contents to find the page number of the sections referred to !

Pos. in fig	Action	Comment
3	Test the brakes	
7	Empty the air cleaner dust trap	

Every 250 hours of operation (Monthly)

Refer to the contents to find the page number of the sections referred to !

Pos. in fig	Action	Comment
7	Clean the air cleaner filter element, check that hoses and connectors are tight	
4	Clean the outside of the radiator core.	In dusty environments, as necessary.
2	Check lubrication of controls and pivots	Lubricate as necessary
5	Check fan belt tension and condition	Replace where necessary

Every 500 hours of operation (Yearly)

Refer to the contents to find the page number of the sections referred to !

Pos. in fig	Action	Comment
7	Replace the air cleaner filter element, check that hoses and connectors are tight	
6	Change the fuel filter	Refer to the engine manual
6	Change the engine oil and oil filter	Refer to the engine manual
4	Check coolant freezing point. Change the coolant every other year.	
16	Check the oil level in the drums	
13	Check the hydraulic reservoir cover/breather	

Every 1000 hours of operation (Yearly)

Refer to the contents to find the page number of the sections referred to !

Pos. in fig	Action	Comment
12	Change the hydraulic fluid filter	
6	Check engine valve clearances	Refer to the engine manual
5	Change the fan belt	Refer to the engine manual

Every 2000 hours of operation (Yearly)

Refer to the contents to find the page number of the sections referred to !

Pos. in fig	Action	Comment
13	Change the hydraulic fluid	
6	Change the engine breather valve	Refer to the engine manual.
16	Change the oil in the drums	
1	Drain and clean the water tank	
14	Drain and clean the fuel tank	
15	Check the condition of the articulation	

Maintenance - 10h

Park the roller on a level surface.
When checking and making adjustments to the roller, switch the engine off and ensure the emergency brake button is switched on, unless otherwise specified.

Ensure that the engine cover is fully open when work is carried out under the cover.

Diesel engine Check oil level

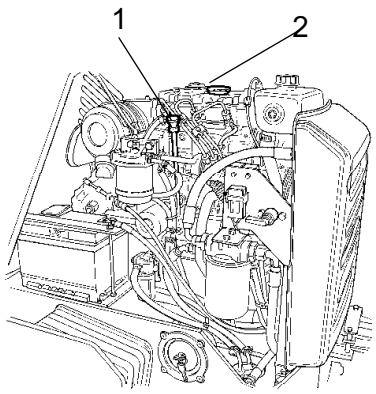


Fig. Engine
1. Dipstick
2. Filler cap

Open the engine cover lock and lower the engine cover forwards.

Check the oil level using the dipstick (1). The level should be between the marks. If the level is near the lower mark, top off with fresh engine oil via the filler cap (2). See under the heading lubricants for the correct oil grade.

Never overfill with oil, as this can damage the engine.

Check - Coolant system

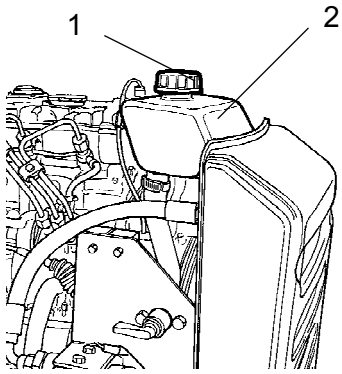


Fig. Coolant system
1. Filler cap
2. Level marks

Check that all hoses/hose connectors are intact and tight. Fill with coolant as specified in the lubricants specification.

Take great care when opening the radiator cap while the engine is hot. Wear protective gloves and goggles.

Also check the freezing point. Change the coolant every other year.

Hydraulic reservoir, Level check - Filling

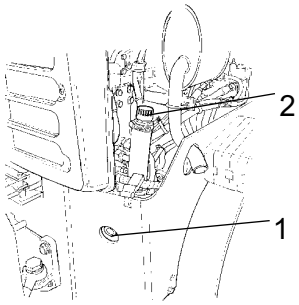


Fig. Hydraulic reservoir
1. Sight glass
2. Filler hose

Wipe the sight glass (1) clean. Check that the fluid level is between the min. and max. markings. Where required, top off with fresh hydraulic fluid through the filler hose (2).

See under the heading ‘Lubricants’ for the correct fluid grade.

Water tank - Filling

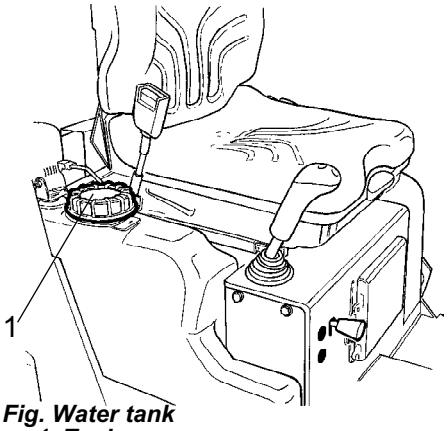


Fig. Water tank
1. Tank cap

Unscrew the tank cap (1), and fill with clean water.

Fill the water tank; it holds 110 liters.

Only additive: A small amount of environmentally friendly antifreeze.

Sprinkler system - Check, cleaning

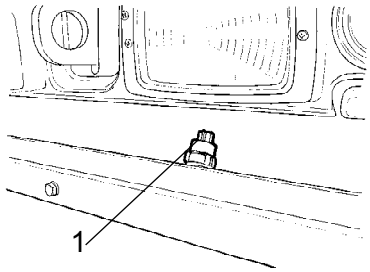


Fig. Sprinkler system
1. Sprinkler nozzles

Check that the holes in the sprinkler nozzles (1) are not blocked. Clean where necessary.

Sprinkler system - Check, cleaning

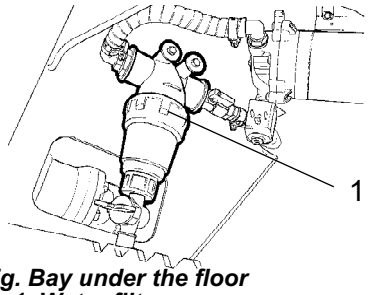


Fig. Bay under the floor
1. Water filter

Check that the water filter (1) is not blocked. Clean where necessary. Clean the water filter by unscrewing the filter's lower section, and clean the strainer and filter housing. Reassemble in the reverse order.

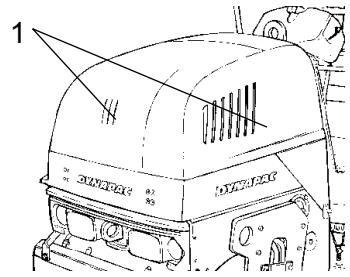


Fig. Engine cover
1. Cooling air grille/engine

Air circulation - Check

Check that the circulation of air to the engine through the grille in the engine cover is unobstructed.

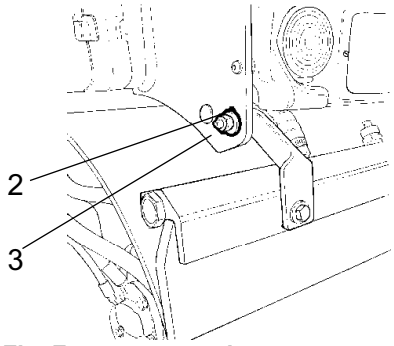


Fig. Front scrapers in transport position
2. Locking nut
3. Mounting plate

Scrapers - Check, adjustment

Make sure that the scrapers are undamaged. Adjust the scrapers if necessary in the following way:

For firmer application of the scraper, undo the locking nut (2) and adjust it until the desired application is achieved.

Lock the setting by tightening the lock nut against the mounting bracket (3).

Adjust the pressure on both scraper brackets.

To set a lower scraper pressure, adjust in the reverse order to the above.

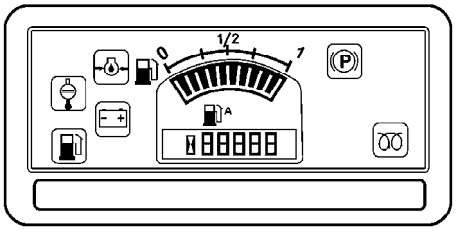


Fig. Control panel.

Warning lamps - Check

Check that the warning lamps on the control panel function.

Check - Drainage - Water separator

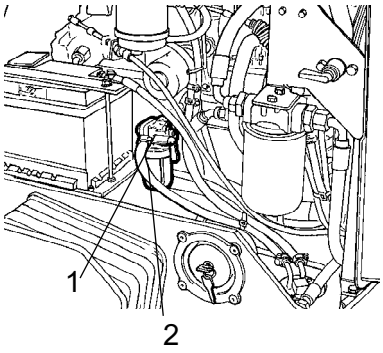


Fig. Water separator
1. Water separator
2. Cup

Unscrew the cup (2) and empty.

Deliver the drained fluid to waste handling.

Air cleaner indicator

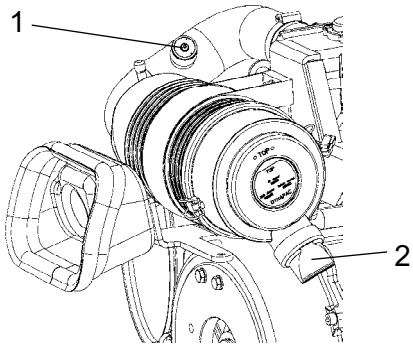


Fig. Air cleaner
1. Indicator
2. Dust pouch

If the indicator (1) on the air cleaner is red, the air cleaner dust trap (2) must be emptied. The dust trap is emptied by pressing the rubber bellows using the fingers. Also check whether the air hoses are intact.

Clean the air cleaner when operated in extremely dusty environments.

Refueling

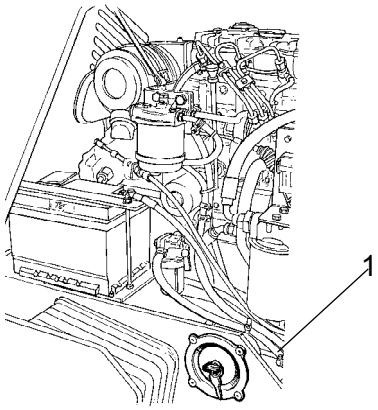


Fig. Left side
1. Filler pipe/cap

Refuel the tank every day before starting work. Open the tank cap and fill through the filler pipe (1).

Never refuel while the engine is running. Do not smoke and avoid spilling fuel.

Stop the engine. Short circuit the fueling nozzle during refueling by pressing it against the filler pipe (1)

The tank holds 23 liters (31.7 gal) of fuel.

Maintenance - 50h

Park the roller on a level surface.
When checking and making adjustments to the roller, switch the engine off and ensure the emergency brake button is switched on, unless otherwise specified.

Ensure that the engine cover is fully open when work is being carried out under it

After the first 50 hours of operation, the oil filters should be changed.

Brakes - Check

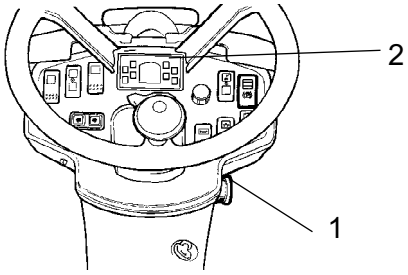


Fig. Instrument panel
1. Emergency brake button
2. Parking brake lamp

Check operation of the brakes as follows:

Drive the roller slowly forward. Hold the steering wheel firmly and brace yourself for a sudden stop.

Press the emergency brake button (1). The roller will stop abruptly and the engine will be switched off.

After testing the brakes, set the forward/reverse lever in neutral.

Pull out the emergency brake button (1). Start the engine.

The roller is now ready for operation.

Refer also to the section in the manual on operation.

Air cleaner - emptying

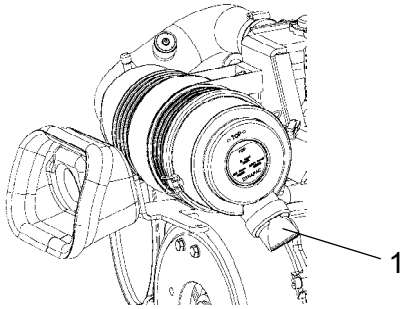


Fig. Air cleaner
1. Dust trap

Empty the air cleaner dust trap (1) through pressing the rubber bellows using the fingers. Check also that the air hoses are intact.

Clean the air cleaner when operated in extremely dusty environments .

Refer also to the section in the manual on operation.

Maintenance - 250h

Park the roller on a level surface.
When checking and making adjustments to the roller, switch the engine off and ensure the emergency brake button is switched on, unless otherwise specified.

Ensure that the engine cover is fully open when work is being carried out under it

Air cleaner - Cleaning - Change

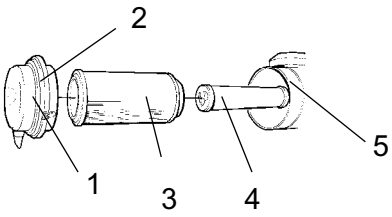


Fig. Air cleaner
1. Catches
2. Cover
3. Main filter
4. Backup filter
5. Filter housing

Clean the air cleaner. Remove the main filter (3) by undoing the catches (1), and then the cover (2).

Check that the filter element is undamaged. Clean the element by banging it against your hand or other soft object.

Then blow clean with compressed air (max 5 bars) from the inside of the filter. Also clean the filter housing (5) and the cover (2).

Replace the filter cartridge after 5 cleanings or more frequently.

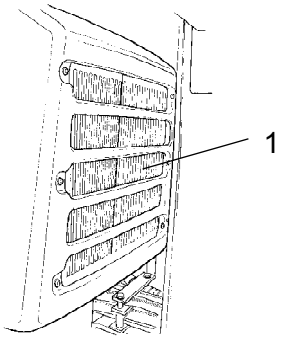


Fig. Engine compartment
1. Hydraulic fluid cooler

Hydraulic fluid cooler - Cleaning

Clean the hydraulic fluid cooler's cooling flanges, ideally with compressed air. Blow the cooler clean by blowing air from the inside outwards.

Wear protective goggles when working with compressed air.

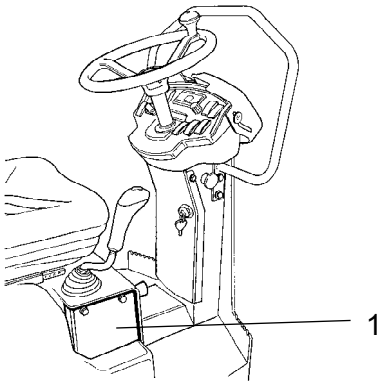


Fig. Forward/Reverse lever
1. Plate

Forward/Reverse controls and joints - Check and lubrication

Remove the plate (1). Check the friction of the forward/reverse controls. The friction screws should be set so that the forward/reverse lever remains in the position in which it is set whilst the machine is operated. The control's '0 position' is determined by a screw which engages with the groove on the shaft between the controls.

If the control begins to be stiff after a longer period of use, lubricate the controls by the bearings and the control cable with a few drops of oil.

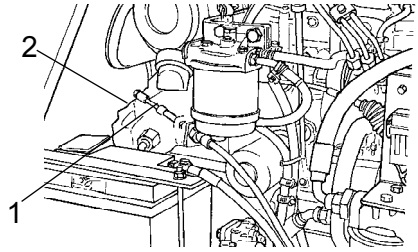


Fig. Engine compartment
1. F/R-control cable
2. Propulsion pump

If the forward/reverse lever still is stiff after the above adjustments, lubricate the other end of the control cable with a few drops of oil. The cable is located on the top of the propulsion pump.

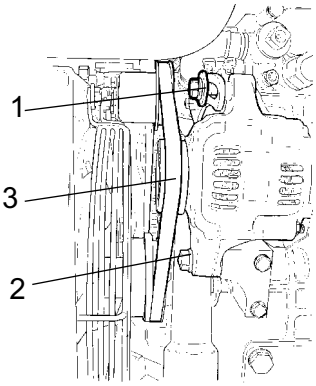


Fig. Alternator viewed from the front
1. Mounting screw
2. Mounting screw
3. Alternator belt

Alternator belt - checking tension - Change

Switch off the engine, disconnect the power and switch on the emergency brake button.

If the alternator belt (3) can be pressed in by hand around 10 mm at a position half way between the pulleys, it is correctly tensioned. If the belt needs to be tightened, carry out the following.

Undo the two hexagonal socket screws (1) and (2).

Press the alternator so that the belt is tensioned correctly, as described above.

Tighten first screw (1) and then screw (2). Check that the belt still has the correct tension after tightening.

Replace the alternator belt as required or at the latest at the 1000h service.

Maintenance - 500h

Park the roller on a level surface.
When checking and making adjustments to the roller, switch the engine off and ensure the emergency brake button is switched on, unless otherwise specified.

Ensure that the engine cover is fully open when work is being carried out under it

External pump - for draining hydraulic fluid/fuel tank

The pump is intended for hydraulic oil and diesel fuel.

The pump is not to run dry. It needs fluid for lubrication.

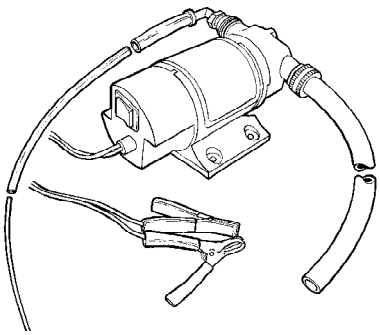


Fig. External drainage pump

The pump can pump fluid to both holes depending on which position the start switch is set in. The hoses can also be switched over using an adapter.

If the pump does not begin to draw within 20 seconds, check that the connections are correct. Faults resulting from running dry are not covered by the guarantee.

Fill the inlet port on the pump with 30 ml of fluid to minimize dry running.

Air cleaner - Cleaning - Change

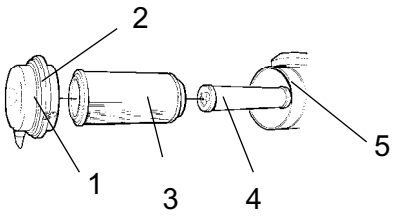


Fig. Air cleaner
1. Catches
2. Cover
3. Main filter
4. Backup filter
5. Filter housing

Clean the air cleaner. Remove the main filter (3) by undoing the catches (1), and then the cover (2).

Check that the filter element is undamaged. Clean the element by banging it against your hand or other soft object.

Then blow clean with compressed air (max 5 bars) from the inside of the filter. Also clean the filter housing (5) and the cover (2).

Replace the filter cartridge after 5 cleanings or more frequently.

Hydraulic reservoir - Check/venting

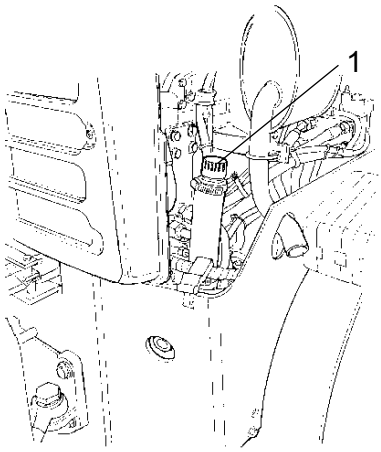


Fig. Engine compartment, right side
1. Hydraulic reservoir-cap

Unscrew and make sure that the reservoir cap is not blocked. Air must have unobstructed passage through the cap in both directions.

If blocked in either direction, clean with a little diesel oil and blow with compressed air until unblocked or replace the cap with a new one.

Wear protective goggles when working with compressed air.

Engine oil and oil filter - Change

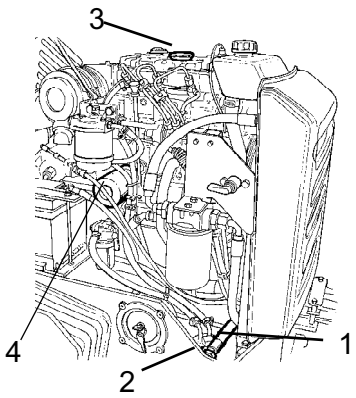


Fig. Engine compartment left side
1. Drain hose
2. Plug
3. Filler cap
4. Oil filter

Run the engine until it is warm before draining the oil .

Switch off the engine and switch on the emergency brake button.

Take great care when draining fluids and oils. Wear protective gloves and goggles.

Set a container which can hold at least 5 liters (1,3 gal) under the drain plug (2).

Undo the oil filler cap (3), and undo the plug (2) in the end of the drain hose (1). Let all the engine oil flow out.

Deliver the drained oil to special waste handling.

Refer to the engine manual for detailed instructions when changing oil and filters.

Remove the oil filter (4) and fit a new filter.

Collect any spillage.

Fit the drain plug (2) to the end of the hose.

Fill with fresh engine oil. See under the heading lubricants, for the correct oil grade. Fit the filler cap (3) and check that the oil level is correct using the dipstick.

Start the engine and allow it to idle for a few minutes. During this time, check around the oil filter for leaks.

Switch off the engine, wait for a minute or so and then check the oil level. Top up with more oil if necessary.

Check - Coolant system

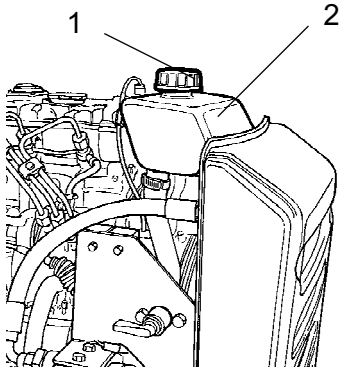


Fig. Coolant system
1. Filler cap
2. Level marks

Check that all hoses/hose connectors are intact and tight. Fill with coolant as specified in the lubricants specification.

Take great care when opening the radiator cap while the engine is hot. Wear protective gloves and goggles.

Also check the freezing point. Change the coolant every other year.

Drum - Checking the oil level

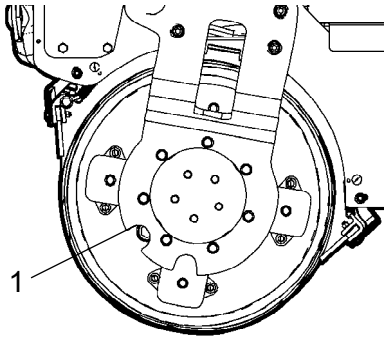


Fig. Drum, drive side
1. Oil plug in position for level check.

Park the roller on a level surface, and drive the roller slowly until the oil plug (1) is in the middle of the semicircle shaped notch in the drum suspension.

Switch off the engine, disconnect the power and switch on the emergency brake button.

Unscrew the plug and check that the oil level reaches the hole's lower edge. If necessary, top off with fresh transmission fluid. See under the heading lubricants for correct fluid grade.

Clean the magnetic plug (1) of any metallic particles, and refit the plug.

Maintenance - 1000h

Park the roller on a level surface.
When checking and making adjustments to the roller, switch the engine off and ensure the emergency brake button is switched on, unless otherwise specified.

Ensure that the engine cover is fully open when work is being carried out under it

Hydraulic fluid filter - Change

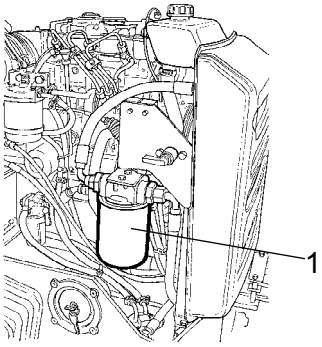


Fig. Engine compartment, left side
1. Hydraulic fluid filter

Remove the filter (1) and deliver to special waste handling. This is a single-use filter and cannot be cleaned.

Thoroughly clean the filter holder sealing surface.

Apply a thin coat of fresh hydraulic fluid to the rubber gasket on the new filter.

Screw the filter on by hand, firstly until the filter gasket makes contact with the filter base. Then rotate a further ½ turn.

Do not over-tighten. The seal can be damaged.

Start the engine and check that the filter does not leak.

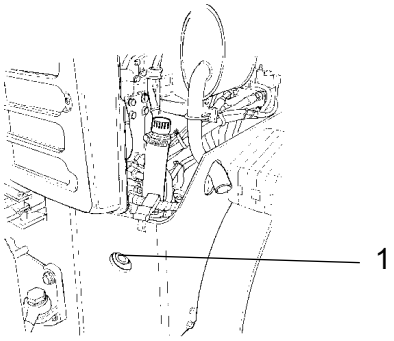


Fig. Engine compartment, right side
1. Sight glass

Check the hydraulic oil level in the sight glass (1) and top off where necessary. See under the heading ‘Every 10 hours of operation’.

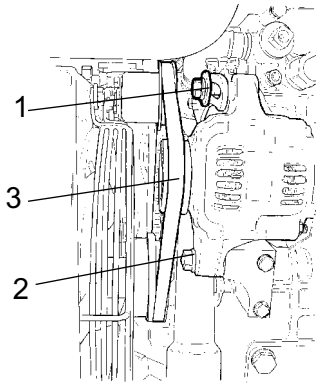


Fig. Alternator viewed from the front
1. Mounting screw
2. Mounting screw
3. Alternator belt

Alternator belt - Checking tension - Change

Switch off the engine, disconnect the power and switch on the emergency brake button.

Undo the two hexagonal socket screws (1) and (2). Bend off the old alternator belt and replace with a new

Press the alternator across so that the alternator belt is tensioned to the measurement given below.

When the alternator belt (3) can be pressed by hand in around 10 mm halfway between the pulleys, it is correctly tensioned.

Tighten first screw (1) and then screw (2). Check that the belt still has the correct tension after tightening.

Maintenance - 2000h

Park the roller on a level surface.
When checking and making adjustments to the roller, switch the engine off and ensure the emergency brake button is switched on, unless otherwise specified.

Ensure that the engine cover is fully open when work is being carried out under it

Drum - Changing the oil

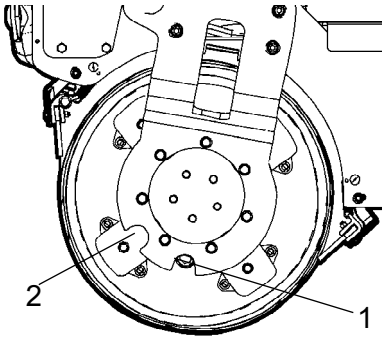


Fig. Drum, vibration side
1. Oil plug (1) in position for draining the oil.
2. The oil plug position for level check and filling.

Park the roller on a level surface, and drive the roller slowly until the plug (1) is in the bottom position.

Switch off the engine, disconnect the power and switch on the emergency brake button.

Place a receptacle that will hold at least 5 liters under the plug.

Remove the plug (1) and let the oil run out.

Deliver the drained oil to special waste handling.

Top up with new oil in position. 2. See 'Every 500 hours of operation' for filling oil.

Water tank - Cleaning

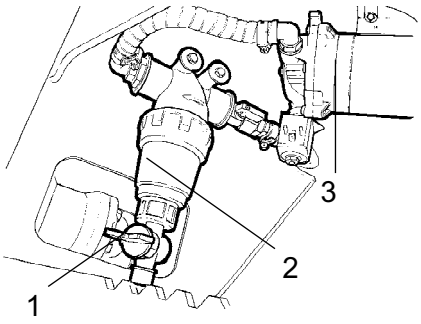


Fig. Bay under the floor
1. Drainage tap
2. Water filter
3. Water pump

Keep in mind that there is a risk of freezing in winter. Drain the tank, pump and lines.

Drain the tank through the drainage tap (1) alongside the filter.

Clean the tanks with water and a suitable detergent for plastic surfaces.

Clean the water filter (2). Fill the tank with water and check that the sprinkler functions.

The water tanks are made of plastic (polyethylene) and are recyclable.

Fuel tank - Cleaning

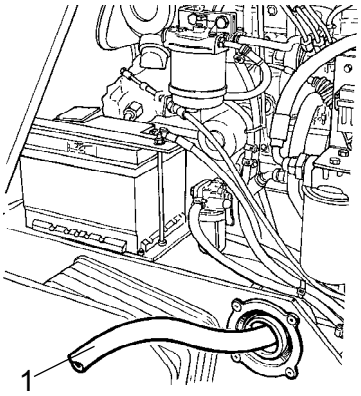


Fig. Fuel tank
1. Hose from external pump

It is easiest to clean the tank when it is almost empty.

Pump out any bottom sediment using an external pump. See the instructions for ‘external pump’.

To remove any additional bottom sediment, fill the tank with two liters of diesel, and then pump it out using the external pump.

Collect in a container which holds at least 28 liters and deliver to special waste handling.

Keep in mind fire risk when handling fuel.

The fuel tank is made of plastic (polyethylene) and is recyclable.

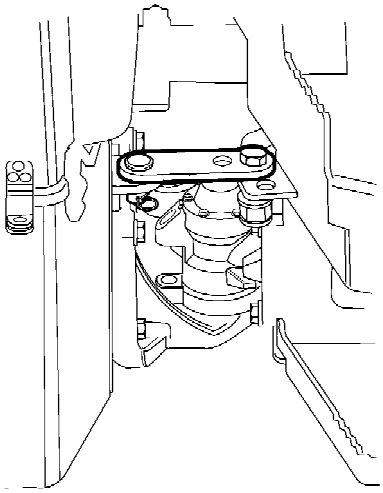


Fig. Steering joint

Steering joint - Check

Inspect the steering joint to detect any damage or cracks.

Check and tighten any loose bolts.

Check also for any stiffness or play in the steering joint.

External pump - for draining hydraulic fluid/fuel tank

The pump is intended for hydraulic oil and diesel fuel.

The pump is not to run dry. It needs fluid for lubrication.

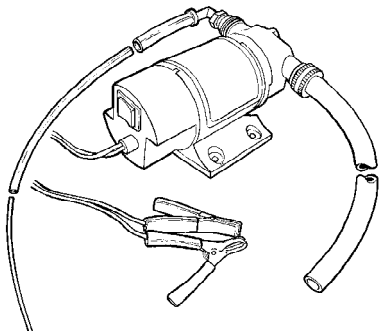


Fig. External drainage pump

The pump can pump fluid to both holes depending on which position the start switch is set in. The hoses can also be switched over using an adapter.

If the pump does not begin to draw within 20 seconds, check that the connections are correct. Faults resulting from running dry are not covered by the guarantee.

Fill the inlet port on the pump with 30 ml of fluid to minimize dry running.

Hydraulic reservoir - fluid change

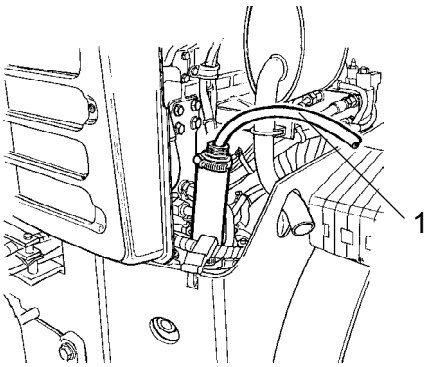


Fig. Hydraulic reservoir
1. Draining

Use an external drainage pump when draining/emptying the hydraulic reservoir.

Danger of being burned when draining hot oil.

Unscrew the reservoir cap. Place the pump's thinner hose in the filler/drainage outlet on the hydraulic reservoir. Place the other hose in a drain container.

Use a container which holds at least 15 liters.

Start the pump so that it draws oil from the reservoir. See the instructions 'external pump'.

Check that the hose to the pump reaches the bottom of the hydraulic reservoir to ensure that as much of the fluid as possible is drained.

Dry off the hydraulic reservoir and fit the reservoir cap.

Collect the oil and deliver to special waste handling.

Change the hydraulic fluid filter as described under the heading 'Every 1000 hours of operation'.

Start the engine and operate the various hydraulic functions. Check the level in the reservoir and top off as required.

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