

Instructions manual

ICA152-4EN3.pdf
Driving & Maintenance

Vibratory roller
CA152

Engine
Cummins QSB 3.3

Serial number
***64X22468* -**
10000105x0A000001 -



Translation of original instruction

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Introduction

The machine

The CA152 is one of Dynapac's lightweight soil compaction rollers. It is available as a STD, D version (smooth drum) and P, PD version (padfoot drum).

Intended use

The main range of application for the P and PD version is on cohesive material and weathered stone material.

All types of base courses and subbase courses can be compacted deeper and the interchangeable drums, D to PD, and vice versa, facilitate even greater variety in the range of application.

The cab and safety-related accessories are described in this manual. Other accessories, such as compaction meter, tachograph and field computer, are described in separate instructions.

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



It is recommended to at least train operators in handling and daily maintenance of the machine in accordance with the instruction manual. Passengers are not allowed on the machine, and you must sit in the seat when operating the machine.



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.

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

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 manufacturer's engine manual.

CE marking and Declaration of conformity

(Applies to machines marketed in EU/EEC)

This machine is CE marked. This shows that on delivery it complies with the basic health and safety directives applicable for the machine in accordance with machinery directive 2006/42/EC and that it also complies with other directives applicable for this machine.

A "Declaration of conformity" is supplied with this machine, which specifies the applicable directives and supplements, as well as the harmonized standards and other regulations that are applied.

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. **Only mount and dismount the roller when it is stationary. Use the intended grips and rails. Always use the three-point grip (both feet and one hand, or one foot and both hands) when mounting or dismounting the machine. Never jump down from 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, ditches or holes, make sure that at least 2/3 of the drum width is on previously compacted material (solid surface).**
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/ROPS-cab.**
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:**
 - **Stop the engine**
 - **Do not smoke.**
 - **No naked flames in the vicinity of the roller.**
 - **Earth the filling equipment nozzle to the tank opening 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 the equipment on the machine and the surface 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. See instructions in the STOP section.**
19. **For your own protection always wear:**
 - helmet
 - working boots with steel toecaps
 - ear protectors
 - reflecting clothing/high visibility jacket
 - working gloves

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.

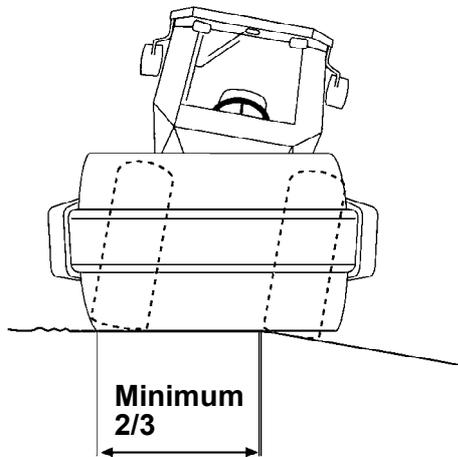


Fig. Position of drum when driving near an edge

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.



To exit the cab in an emergency, release the hammer on the rear right post and break the rear window.



It is recommended that ROPS (Roll Over Protective Structure) or a ROPS-approved cab is always used when driving on slopes or unsafe ground. Always wear a seat belt.

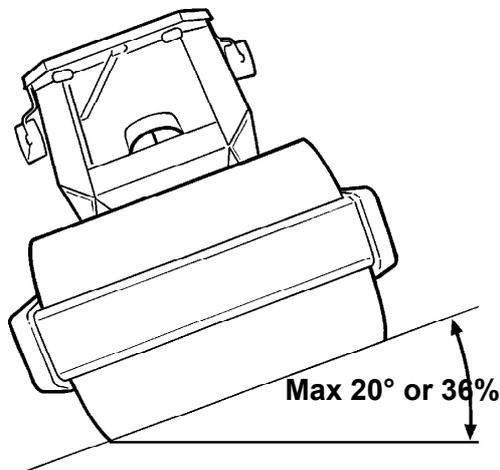


Fig. Operating on slopes



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

Safety (Optional)

Air conditioning

The system described in this manual is type ACC (Automatic Climate Control)

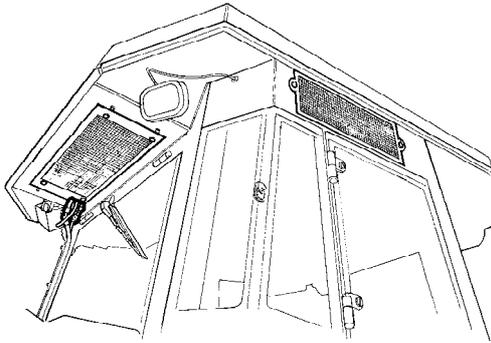


Fig. Cab

 ***The system contains pressurized refrigerant. It is forbidden to release refrigerants into the atmosphere.***

 ***The cooling system is pressurized. Incorrect handling can result in serious personal injury. Do not disconnect or undo the hose couplings.***

 **The system must be refilled with an approved refrigerant by authorized personnel when necessary.**

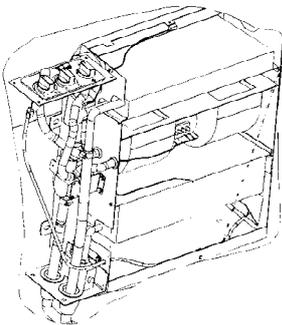


Fig. Air conditioning

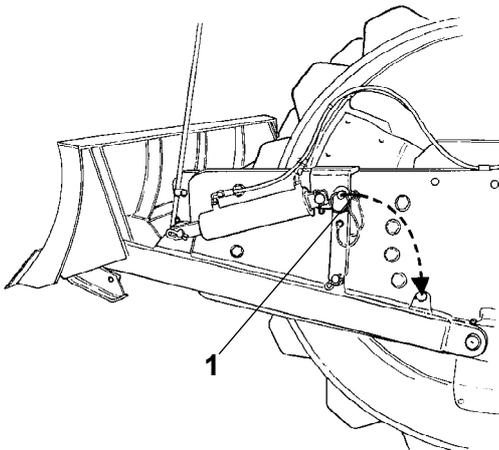


Fig. Strike-off blade
1. Locking pin

Strike-off blade



The operator must make sure that nobody is in the area of operation while the machine is in use.



Ensure always that the strike-off blade is secured by the locking pin (1) when driving with the blade in its raised position. Always lower the blade to the ground before leaving or parking the roller.



The strike-off blade must be retracted to the transport position (1) at the end of each working period.

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 -15°C to +40°C (5°F - 105°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 T100 or similar.

Other components that use transmission oil: Shell Spirax AX 85W/140 or equivalent.

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 directly onto electrical components.



Do not use a high-pressure water jet on the instrument panel/display.



Detergent that can destroy electrical parts, or which is conductive, must not be used.



In certain cases there is an electrical control lever and associated electronic control unit (ECU) in the engine compartment, which must not be washed with a high-pressure jet or with any water at all. It is sufficient to wipe these off. The same applies to the engine electronic control unit (engine ECU).

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 ABC-class powder fire extinguisher.

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

Roll Over Protective Structure (ROPS), ROPS approved cab



If the machine is fitted with a Roll Over Protective Structure (ROPS, or ROPS approved cab) never carry out any welding or drilling in the structure or cab.



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

Battery handling



When removing batteries, always disconnect the negative cable first.



When fitting batteries, 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.

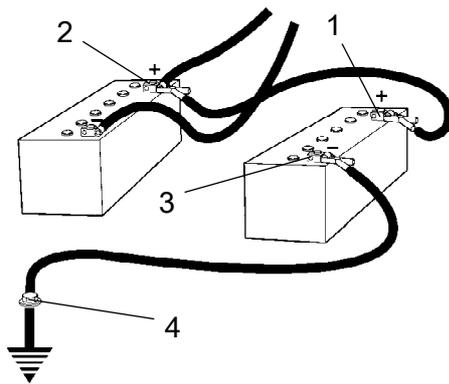


Fig. Jump starting

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 (1) to the flat battery's positive terminal (2). Then connect the jump start battery's negative terminal (3) to, for example, a bolt (4) or the lifting eye on the machine with the flat 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

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/s^2 as specified in Directive 2002/44/EC. (Limit is 1.15 m/s^2)

Measured hand/arm vibrations also were below the action level of 2.5 m/s^2 specified in the same directive. (Limit is 5 m/s^2)

Noise level

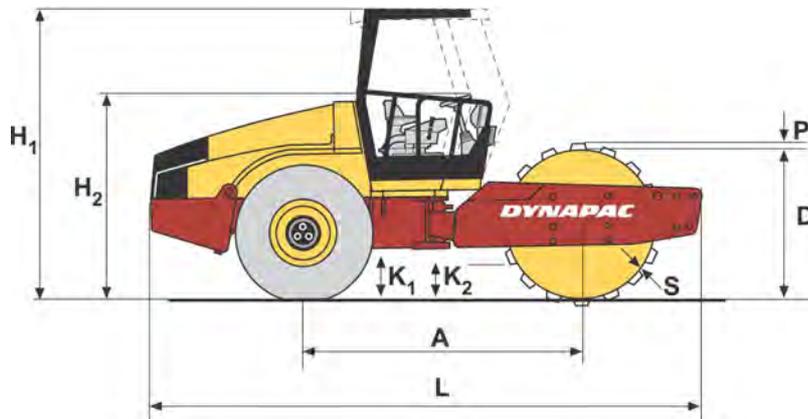
The noise level is measured in accordance with the operational cycle described in EU directive 2000/14/EC on machines equipped for the EU market, on soft polymer material with vibration switched on and the operator's seat in the transport position.

Guaranteed sound power level, L_{WA}	106	dB (A)
Sound pressure level at the operator's ear (platform), L_{pA}	84 ± 3	dB (A)
Sound pressure level at the operator's ear (cab), L_{pA}	80 ± 3	dB (A)

Electrical system

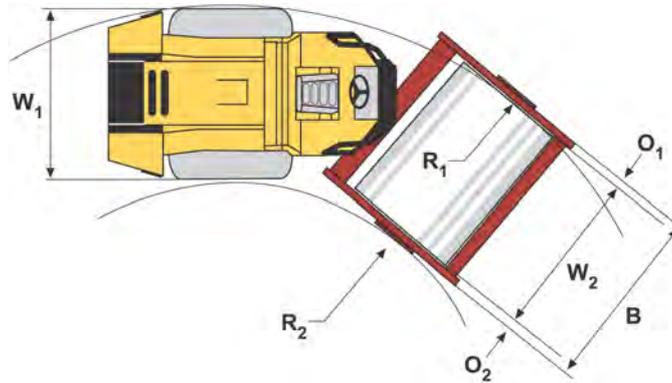
Machines are EMC tested in accordance with EN 13309:2000 'Construction machinery'

Dimensions, side view



	Dimensions	mm	in
A	Wheelbase, drum and wheel	2545	100
L	Length, standard-equipped roller (STD/D)	4776	188
L	Length, standard-equipped roller (P/PD)	4871	192
H ₁	Height, with ROPS (STD/D)	2784	110
H ₁	Height, with ROPS (P/PD)	2825	111
H ₁	Height, with cab (STD/D)	2815	111
H ₁	Height, with cab (P/PD)	2857	112
H ₂	Height, without ROPS (STD/D)	2051	81
H ₂	Height, without ROPS (P/PD)	2066	81
D	Diameter, drum	1219	48
S	Thickness, drum sweep, nominal	22	0,87
P	Height, pads (P/PD)	76	3
K ₁	Clearance, tractor frame (STD/D)	328	12,9
K ₁	Clearance, tractor frame (P/PD)	342	13,5
K ₂	Clearance, drum frame (STD/D)	366	14,4
K ₂	Clearance, drum frame (P/PD)	417	16,4

Dimensions, top view



	Dimensions	mm	in
B	Width, standard equipped roller	1852	73
O ₁	Thickness, left frame side	88	3.5
O ₂	Thickness, right frame side	88	3.5
R ₁	Turn radius, external	4530	178
R ₂	Turn radius, internal	2770	109
W ₁	Width, tractor section	1676	66
W ₂	Width, drum	1676	66

Weights and volumes

Weights

Service weight with ROPS (EN500) (STD)	7180 kg	15,829 lbs
Service weight with ROPS (EN500) (D)	7330 kg	19,639 lbs
Service weight with ROPS (EN500) (P)	7530 kg	16,601 lbs
Service weight with ROPS (EN500) (PD)	7680 kg	16,932 lbs
Service weight without ROPS (STD)	6850 kg	15,102 lbs
Service weight without ROPS (D)	7000 kg	15,432 lbs
Service weight without ROPS (P)	7200 kg	15,873 lbs
Service weight without ROPS (PD)	7350 kg	16,204 lbs
Service weight with cab (STD)	7400 kg	16,314 lbs
Service weight with cab (D)	7550 kg	16,645 lbs
Service weight with cab (P)	7750 kg	17,086 lbs
Service weight with cab (PD)	7900 kg	17,417 lbs

Fluid volumes

Fuel tank	225 liters	59.4 gal
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Working capacity

Compaction data

Static linear load, (STD)	21,5 kg/cm	120.4 pli
Static linear load, (D)	22,4 kg/cm	123.8 pli
Static linear load (P/PD)	- -	- -
Amplitude, high	1,7 mm	0.07 in
Amplitude, low (STD/D)	0,8 mm	0.03 in
Amplitude, low (P/PD)	0,9 mm	0.03 in
Vibration frequency, high amplitude	29 Hz	1740 vpm
Vibration frequency, low amplitude	40 Hz	2400 vpm
Centrifugal force, high amplitude (STD/D)	100 kN	22,500 lb
Centrifugal force, high amplitude (P/PD)	125 kN	28,101 lb
Centrifugal force, low amplitude (STD/D)	94 kN	21,150 lb
Centrifugal force, low amplitude (P/PD)	118 kN	26,550 lb

Note: The frequency is measured at high revs. The

amplitude is measured as the real value and not the nominal.

General

Engine

Manufacturer/Model	Cummins QSB 3.3	Water cooled turbo diesel with after cooler
Power (SAE J1995)	74 kW	99 hp
Engine speed, idling	900 rpm	
Engine speed, loading/unloading	1,500 rpm	
Engine speed, working/transport	2,200 rpm	

Electrical system

Battery	12V 170Ah
Alternator	12V 60A
Fuses	See the Electrical system section - fuses

Tire

Tire dimensions

Tire pressure

Std-type	14,9 X 24 TL	180 kPa (1.8 kp/cm) (26 psi)
Tractor type	14,9 X 24 TL	180 kPa (1.8 kp/cm) (26 psi)



The tires can be optionally filled with fluid, (extra weight up to 350 kg/tire) (770 lbs/tire). When servicing, bear this extra weight in mind.

Tightening torque

Tightening torque in Nm (lbf.ft) for oiled or dry bolts tightened with a torque wrench.

Metric coarse screw thread, bright galvanized (fzb):

STRENGTH CLASS:

M - thread	8.8, Oiled	8.8, Dry	10.9, Oiled	10.9, Dry	12.9, Oiled	12.9, Dry
M6	8,4	9,4	12	13,4	14,6	16,3
M8	21	23	28	32	34	38
M10	40	45	56	62	68	76
M12	70	78	98	110	117	131
M14	110	123	156	174	187	208
M16	169	190	240	270	290	320
M20	330	370	470	520	560	620
M22	446	497	626	699	752	839
M24	570	640	800	900	960	1080
M30	1130	1260	1580	1770	1900	2100

Metric coarse thread, zinc-treated (Dacromet/GEOMET):

STRENGTH CLASS:

M - thread	10.9, Oiled	10.9, Dry	12.9, Oiled	12.9, Dry
M6	12,0	15,0	14,6	18,3
M8	28	36	34	43
M10	56	70	68	86
M12	98	124	117	147
M14	156	196	187	234
M16	240	304	290	360
M20	470	585	560	698
M22	626	786	752	944
M24	800	1010	960	1215
M30	1580	1990	1900	2360



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

ROPS - bolts

Bolt dimensions :	M20 (PN 4700500226)
Strength class :	8.8
Tightening torque :	330 Nm (Dacromet treated)

Hydraulic system

Opening pressure	MPa
Drive system	38,0
Supply system	2.0
Vibration system	33,0
Control systems	18,0
Brake release	1,4

Automatic Climate Control (ACC) (Optional)

The system described in this manual is type ACC (Automatic Climate Control), i.e. a system which maintains the set temperature in the cab provided the windows and doors are kept closed.

Coolant designation: HFC-R134:A

Coolant weight when full: 1600 gram (3.53 lbs)

Machine description

Identification

Product identification number on the frame

The machine PIN (product identification number) (1) is punched on the right edge of the front frame or the upper edge of the right frameside.

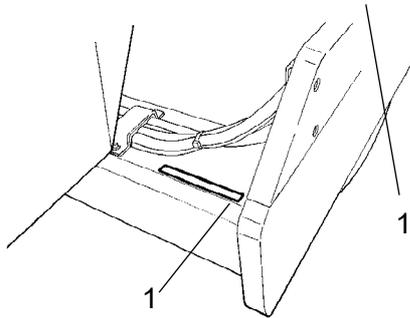


Fig. Front frame
1. PIN

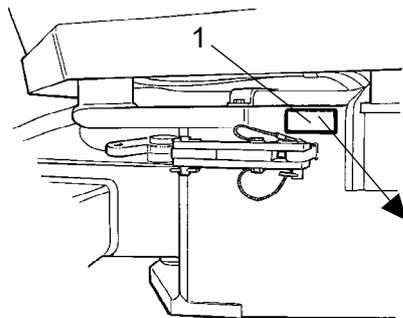


Fig. Operator platform
1. Machine plate

Machine plate

The machine type plate (1) is attached to the front left side of the frame, beside the steering joint.

The plate specifies the manufacturer's name and address, the type of machine, the PIN product identification number (serial number), service weight, engine power and year of manufacture. (If the machine is delivered outside the EU there are no CE markings, and on some machines the year of manufacture may not be specified.)

DYNAPAC  Dynapac Compaction Equipment AB Box 504, SE-371 23 Kartakrona Sweden				
Product Identification Number				
Designation	Type	Rated Power	Max axle load front / rear	
			kg	
Gross machinery mass	Operating mass	Max ballast	Year of Mfg	
			kg	
Made in Sweden 				

Please state the machine's PIN when ordering spares.

100	00123	V	0	A	123456
A	B	C	D	E	F

Explanation of 17PIN serial number

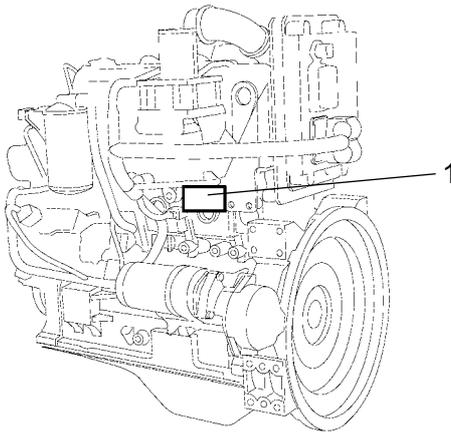
- A= Manufacturer
- B= Family/Model
- C= Check letter
- D= No coding
- E= Production unit
- F= Serial number

Engine plates

The engine type plate (1) is attached on the right side of the engine.

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

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

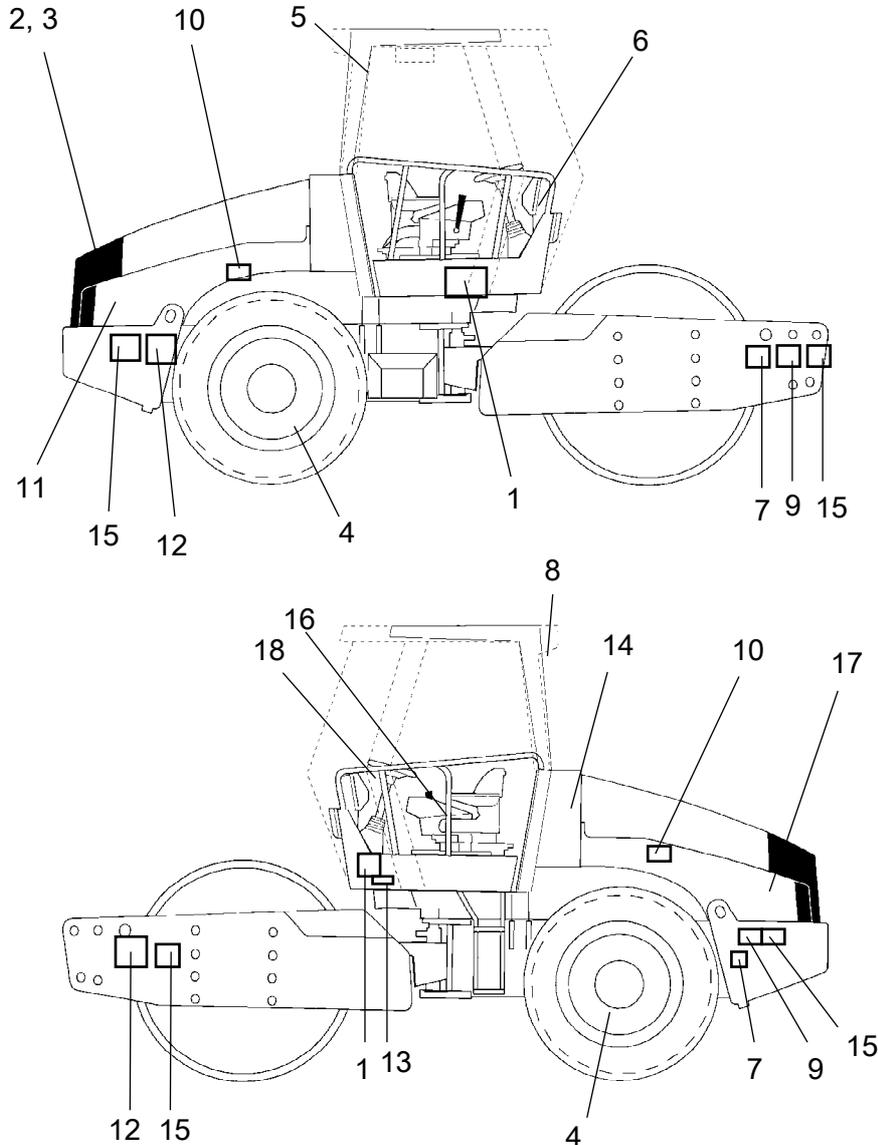


 Cummins Engine Company Inc. Columbus, Indiana USA 47202-3005 www.Cummins.com	Important engine information	
	Model QSB3.3 ISN68300044 Gross rated hp/kW 99/74 at 2200 rpm	Low idle RPM 800 rpm Fuel rating FR 30232 CFI XXXX
Warning: injury may result and warranty is voided if fuel rate, rpm or altitudes exceed published maximum values for this model and application.	Displacement: 3.261 L/199 in ³	
This engine conforms to 20xx U.S. EPA and California regulations for large non-road compression ignition engines as applicable. This engine is certified to operate on diesel fuel.	FEI EPA NOx: 4.7g/kWh PM: 0.32g/kWh	
Timing-BTDC X degrees	EPA Cert. Family: 7CEXL03.3ACB	
Valve lash Intake 0.014in/0.35 mm (cold engine) Exhaust 0.020in/0.50 mm	European Approval Number: e11*91/68JA*2004/26*0631*00	
Fuel rate at rated hp/kW 74mm ³ /st	Date of Manufacture yyyy-mm-dd	
S.O. S094405	Made in Japan 6271-81-2420	

Fig. Engine
1. Type plate/EPA plate

Decals

Location - decals



1. Warning, Crush zone	4700903422	7. Warning, Locking	4700908229	13. Sound power level	4700791277
2. Warning, Rotating engine components	4700903423	8. Warning, Toxic gas	4700904165	14. Hydraulic fluid/ Biohydraulic fluid	4700272372 / 4700904601
3. Warning, Hot surfaces	4700903424	9. Hoisting plate	4700904870	15. Tie down point	
4. Warning, Ballasted tire.	4700903985	10. Tire pressure	4700991990	16. Handbook compartment	4700903425
5. Emergency exit	4700903590	11. Diesel fuel	4700991658	17. Battery master switch	4700904835
6. Warning, Read instructions manual	4700903459	12. Lift point	4700357587	18. Warning sign	4700386084xx

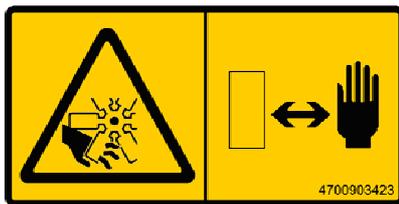
Safety decals

Always make sure that all safety decals are completely legible, and remove dirt or order new decals if they have become illegible. Use the part number specified on each decal.



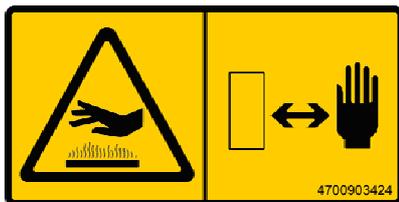
4700903422
Warning - Crush zone, articulation/drum.

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



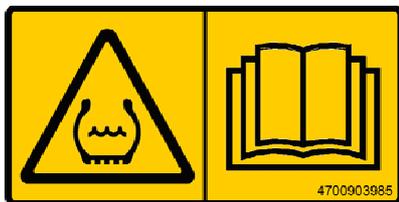
4700903423
Warning - Rotating engine components.

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



4700903424
Warning - Hot surfaces in the engine compartment.

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



4700903985
Warning - Ballasted tire.

Read the instruction manual.

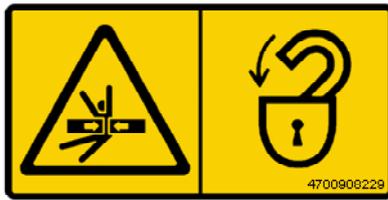


4700903590
-Emergency exit



4700903459
Warning - Instruction manual

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

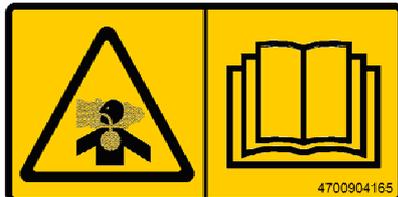


4700908229

Warning - Risk of crushing

The articulation must be locked when lifting.

Read the instruction manual.



4700904165

Warning - Toxic gas (option, ACC)

Read the instruction manual.

Info decals

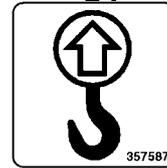
Noise power level



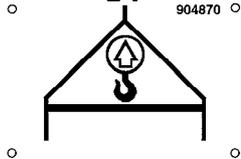
Diesel fuel



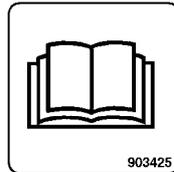
Lifting point



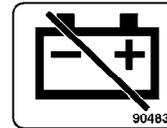
Hoisting plate



Handbook compartment



Master switch



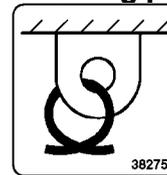
Hydraulic fluid



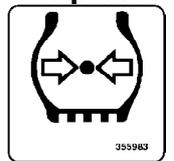
Biological hydraulic fluid



Securing point



Tire pressure



Instruments/Controls

Locations - Instruments and controls

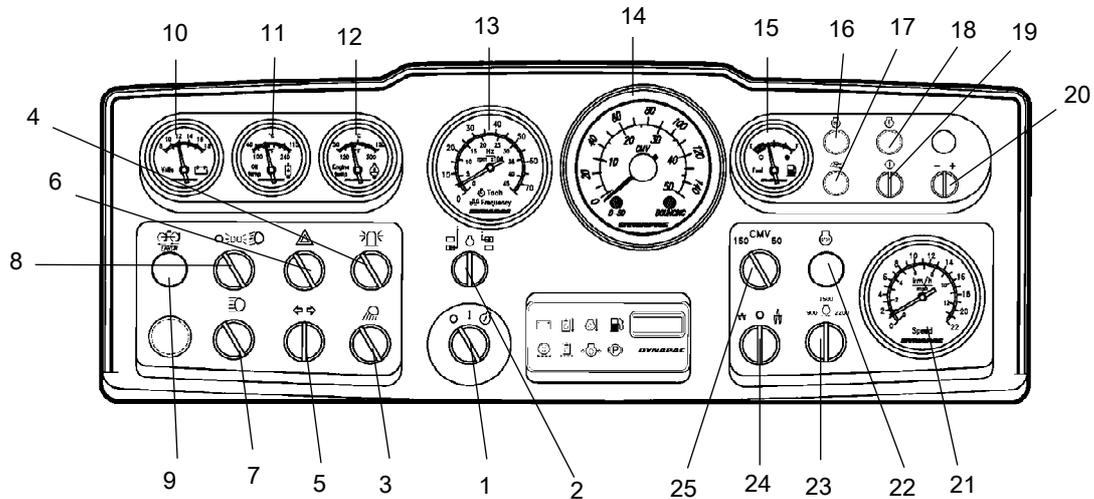


Fig. Instruments and control panel

1. Starter switch
2. * Rpm/Frequency selector
3. * Working lights
4. * Hazard beacon
5. * Direction indicator switch
6. * Hazard warning lights
7. * Main beam switch
8. * Parking/dipped beam switch
9. * Anti-spin, fault indication
10. * Voltmeter
11. * Hydraulic temperature
12. * Engine temperature
13. * Engine revs/Vibration frequency
14. * Compaction meter/Speedometer (see pos. 21)
15. Fuel gauge
16. Preheating lamp
17. Reserve
18. Fault indicating lamp
19. Diagnostics "ON"
20. Browse in error codes
21. * Speedometer (if compaction meter is located in pos. 14)
22. Fault indicating lamp
23. Engine speed control
24. Amplitude selector, High/0/Low
25. * CMV väljare

* = Optional equipment

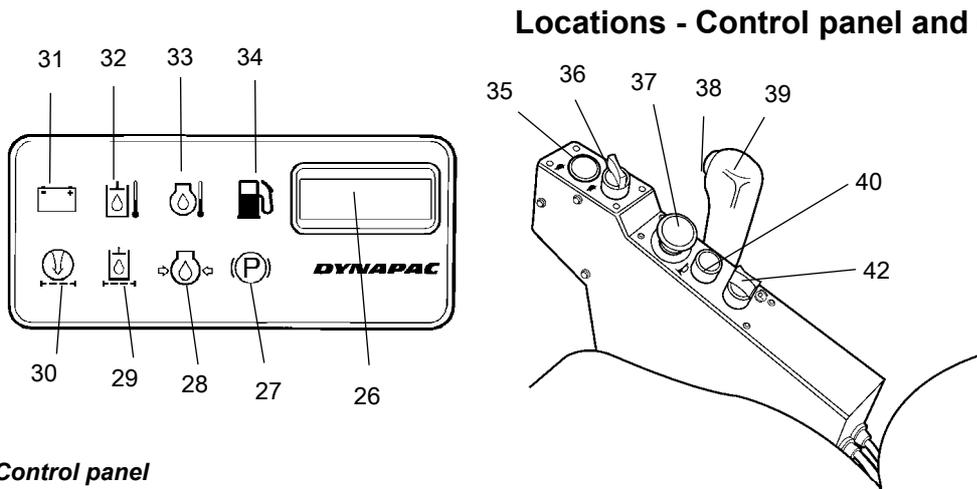


Fig. Control panel

- | | | | |
|-----|---|-----|--------------------------|
| 26. | Hourmeter | 34. | Warning lamp, fuel level |
| 27. | Brake warning lamp | 35. | Reserve |
| 28. | Warning lamp, engine oil pressure | 36. | Speed selector, wheels |
| 29. | Warning lamp, hydraulic fluid filter | 37. | Emergency stop |
| 30. | Warning lamp, air filter | 38. | Vibration ON/OFF |
| 31. | Warning lamp, charging | 39. | Forward/Reverse lever |
| 32. | Warning lamp, hydraulic fluid temperature | 40. | Horn |
| 33. | Warning lamp, engine temperature | 42. | Parking brake On/Off |

Function descriptions

No	Designation	Symbol	Function
1	Starter switch		The electric circuit is broken.
			All instruments and electric controls are supplied with power.
			Starter motor activation.
2	Engine revs/Frequency selector (Optional)		The current rpm is shown in this position
			The vibration frequency is shown in this position (Left position has no function).
3	Rear working lights switch (Optional).		Turn right to switch on the working lights.
4	Hazard beacon, switch (Optional).		Turn right to switch on the hazard beacon.
5	Direction indicator, switch (Optional).		Turn to the left to switch on the left direction indicators etc. The direction indicators are off in the middle position.
6	Hazard flashers, switch (Optional).		Turn to the right to switch on the hazard flashers.
7	Main/dipped beam, switch with control lamp (Optional).		In the right position, the switch lights and the main beam is on. In the left position, the dipped beam is on.
8	Driving lighting, switch (Optional).		Lights off.
			Parking lights on.
			Front working lights on.
9	Warning lamp, malfunctioning anti-spin function (Optional)		The hydraulic propulsion system is not working satisfactorily if the lamp flashes. Locate and remedy the fault.
10	Voltmeter (Optional).		Shows electrical system voltage. Normal range is 12-15 volts.
11	Temperature gauge, hydraulic fluid (Optional).		Shows hydraulic fluid temperature. Normal temperature range is 65°-80°C (149°-176°F). Stop the engine if the gauge shows a temperature of more than 85°C (185°F). Locate the fault.
12	Temperature gauge, water (Optional).		Shows the water temperature. Normal temperature is around 90°C (194°F). Stop the engine if the gauge shows a temperature of more than 103°C (217°F). Locate the fault.
13	Engine revs/Frequency meter (Optional).		The inner scale indicates the current engine speed.
			The outer scale shows the vibration frequency.
14	Compaction meter (Optional)		See separate instructions

No	Designation	Symbol	Function
15	Fuel gauge		Shows level in the fuel tank.
16	Preheating lamp		Lights up when the diesel engine is being preheated and the switch is in position I.
17			Reserve
18	Fault indicating lamp, "Minor fault"		Indicates fault and shows error code together with knob 19. See error codes under tab X in machine folder.
19	Diagnostics "ON"		Check error code together with lamp 18 and 20.
20	Browse in error codes		Turning to right (+): Stepping forward. Turning to left (-): Stepping backwards.
21	Speedometer (Optional).		The outer scale shows speed in km/h. The inner scale shows speed in mph.
22	Fault indicating lamp, "Serious fault"		Stop the engine.
23	Engine speed control for Diesel engine		900 = Idling speed 1,500 = Speed for loading/unloading 2,200 = Working and transport speed
24	Amplitude selector.		Left mode gives low amplitude. In the 0 position, the vibration system is switched off. Right mode gives high amplitude.
25	CMV selector (Optional).		Mode 150 gives reading on outer scale. Mode 50 gives reading on inner scale.
26	Hourmeter		Engine running time is shown in hours.
27	Brake warning lamp		The lamp come on when the parking or emergency brake knob is depressed and the brakes are applied.
28	Warning lamp, oil pressure		The lamp comes on if the engine oil pressure is too low. Stop the engine immediately and locate the fault.
29	Warning lamp, hydraulic filter		If the lamp comes on while the engine is running at full speed, the hydraulic filter must be changed.
30	Warning lamp, air filter		If the lamp comes on while the engine is running at full speed, the air filter must be cleaned or replaced.
31	Warning lamp, battery charging		If the lamp comes on while the engine is running, the alternator is not charging. Stop the engine and locate the fault.
32	Warning lamp, hydraulic fluid temperature		If the lamp comes on, the hydraulic fluid is too hot. Do not drive the roller. Cool the fluid by allowing the engine to idle and locate the fault.

No	Designation	Symbol	Function
33	Warning light, engine coolant temperature		If the lamp comes on, the engine is too hot. Stop the engine immediately and locate the fault. Refer also to the engine manual.
34	Warning lamp, low fuel level		When the lamp comes on, there is only a small amount of fuel left. Refuel as soon as possible.
36	Speed selector, wheels		Transport speed (Low)
			Transport speed (High)
37	Emergency stop		When pressed, the emergency stop is activated. The brake is applied and the engine stops. Brace yourself for a sudden stop.
38	Vibration On/Off, switch		Press once and release to switch the vibration on, press again to switch the vibration off. The above only applies when the amplitude selector 17 is in the High or Low position.
			
39	Forward/Reverse lever		
			The lever must be in neutral to start the engine. The engine cannot be started if the forward/reverse lever is in any other position. The forward/reverse lever controls both the roller's driving direction and speed. When the lever is moved forward, the roller moves forward. The roller's speed is proportional to the distance the lever is from the neutral position. The further the lever is from the neutral position, the higher the speed.
40	Horn, switch		Press to sound the horn.
42	Parking brake On/Off		Turn to activate the parking brake, the machine stops with the engine running. Always use the parking brake when the machine is stationary on a sloping surface.

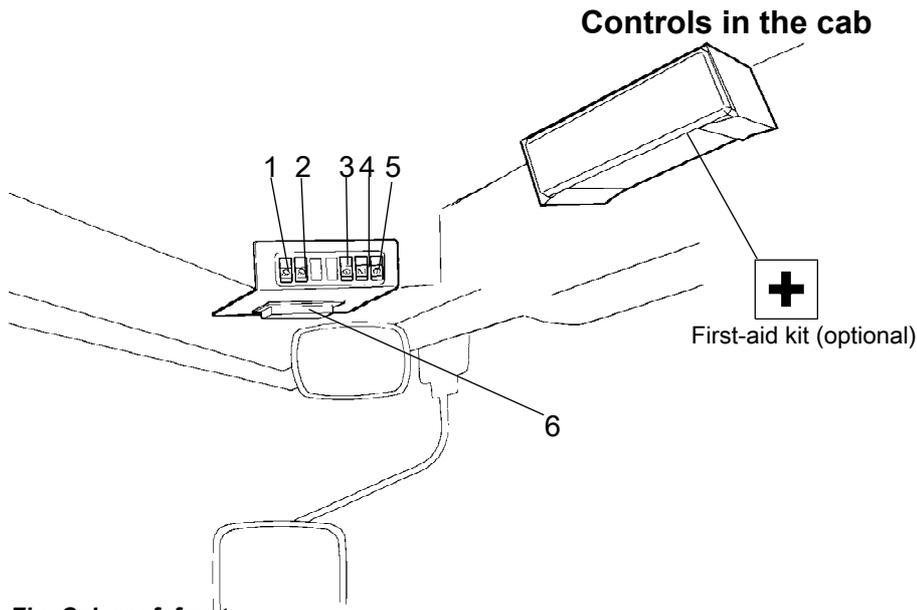


Fig. Cab roof, front

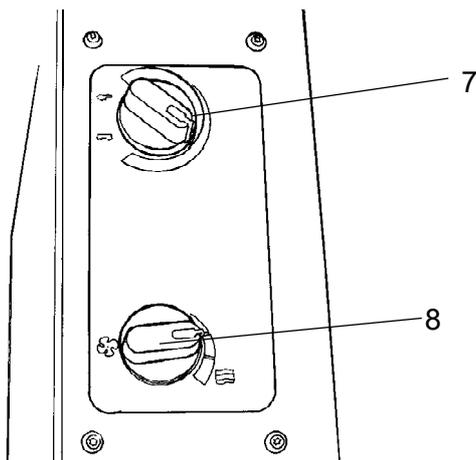


Fig. Cab, right side

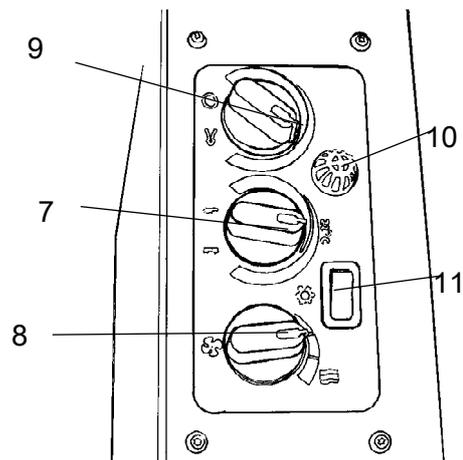


Fig. Cab right side (AC optional)

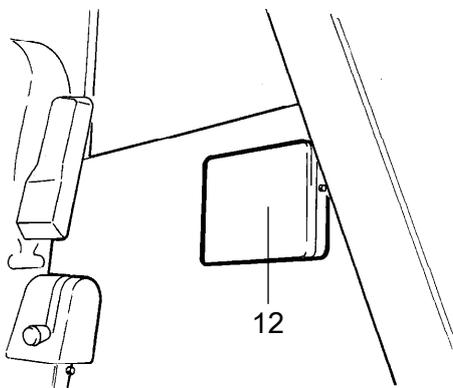


Fig. Cab, rear

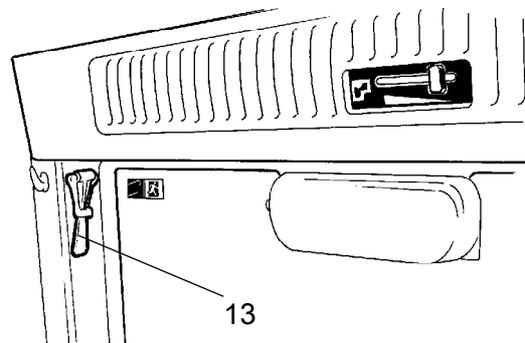
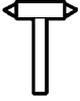


Fig. Cab roof, rear

Function description of instruments and controls in the cab

No	Designation	Symbol	Function
1	Front working lights, switch		Press to switch on the front working lights.
2	Rear working lights, switch		Press to switch on the rear working lights.
3	Front wiper, switch		Press to operate the front screen wiper.
4	Rear wiper, switch		Press to operate the rear screen wiper.
5	Front and rear window screen washers, switch		Press the upper edge to activate the front screen washers. Press the lower edge to activate the rear screen washers.
6	Fuse box (cab)		Contains fuses for the electrical system. See the "Electrical system" section in the operation manual for functional descriptions of the fuses.
7	Heater control		Right mode, maximum heating. In the left position, the heating is off.
8	Ventilation fan, switch		In the left position, the fan is OFF. To the right, the fan has three levels.
9	Cab air recirculation, switch		In the left position, the maximum volume of air is recirculated. In the right position, the volume recirculated is minimal.
10	Temperature sensor		Registers the temperature in the cab. Do not cover.
11	Air conditioning, switch		Starts and stops the air conditioning.
12	Handbook compartment		Stowage space for safety manual and instruction manuals.
13	Hammer for emergency exit		To escape from the cab in an emergency, release the hammer and break the REAR window.

Electrical system

Fuses

The electrical regulating and control system is protected against overload by 27 fuses and 12 relays. The quantity depends on how much extra equipment the machine has.

The four fuse boxes (1) and relays (3) are located behind the lower instrument plate, which is opened by turning the four quick-fit screws (2) a 1/4 turn counter-clockwise.

The machine is equipped with a 12V electrical system and an AC alternator.

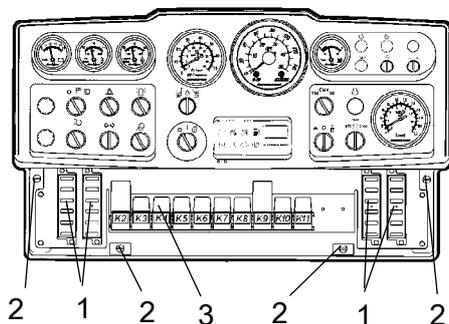


Fig. Instrument panel
1. Fuse boxes (4)
2. Quick-screws
3. Relays

Fuses

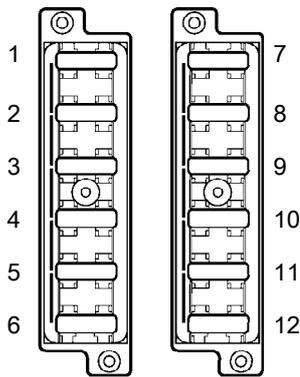


Fig. Fuse box, left and right side.

The figure shows the position of the fuses.

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

The tachograph and memory for the radio are protected at the battery master disconnect switch by a 0.5 A and 3 A fuse, respectively.

Fuse boxes, left side			Fuse boxes, right side		
1.	Brake valve, starter relay, hourmeter	7.5A	1.	* Left working lights	20A
2.	VBS relay	7.5A	2.	* Working lights, right, instrument illumination	20A
3.	Indicator panel	7.5A	3.	* Headlight, left	7.5A
4.	Horn	7.5A	4.	* Headlight, right, instrument illumination	7.5A
5.	* Low/High speed/Strike-off blade	7.5A	5.	* Flow divider	7.5A
6.	* Reverse warning	3A	6.	Reserve	
7.	Instrumentation	7.5A	7.	* Hazard beacon	10A
8.	* Compaction meter	3A	8.	* Direction indicators, main fuse	10A
9.	* Hazard beacon	7.5A	9.	* Position light, left, front and rear	7.5A
10.	Reserv		10.	* Position light, right, front and rear	5A
11.	* Wiper motor Front, simple cab	20A	11.	* Direction indicator, left, front, rear and side	5A
12.	* 12-volt socket cab/Interior lighting, simple cab	20A	12.	* Direction indicator, right, front, rear and side	5A
	* Optional			* Optional	

** When driving lights are fitted

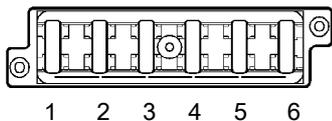


Fig. Cab roof fuse box

- | | | |
|----|----------------------------------|-----|
| 1. | Air conditioning, condensor fans | 20A |
| 2. | Front cab headlight, Radio | 10A |
| 3. | Cab interior lighting | 5A |
| 4. | Air-Conditioning fan | 25A |
| 5. | Rear screen wiper/washer | 10A |
| 6. | Front screen wiper/washers | 10A |

Fuses in cab

The electrical system in the cab has a separate fuse box located on the front right side of the cab roof.

The figure shows fuse amperage and function.

All fuses are flat pin fuses.

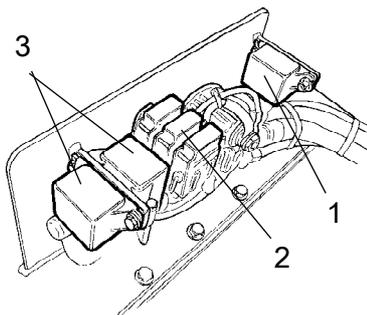


Fig. Engine compartment
1. Starter relay
2. Main fuses
3. Preheating relays

Main fuses

There are four main fuses (2). They are located behind the battery master disconnect switch. The three screws need to be unscrewed to remove the plastic cover.

The fuses are of flat pin type.

The starter relay (1) and preheating relays (3) for the diesel engine are also fitted here.

- | | | |
|---------------------------|-----|----------|
| Supply standard | 30A | (Green) |
| Supply cab * | 50A | (Red) |
| Supply lighting * | 40A | (Orange) |
| Supply, Air conditioning* | 30A | (Green) |
- * Optional equipment

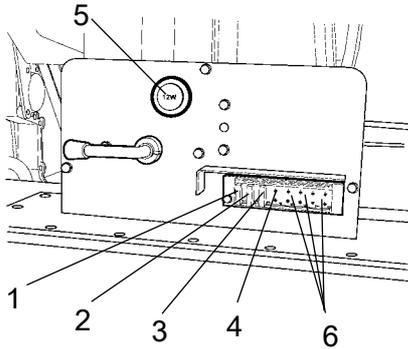


Fig. Engine compartment
1. QSB engine (ignition)
2. Diagnostic lamps engine
3. ECM electronics
4. Fuse, Power socket 12V
5. Power socket 12V
6. Reserve

Fuses at battery master disconnect switch

Positioning of fuses at battery master disconnect switch in the engine compartment.

QSB engine (ignition)	5A
Diagnostics lamps, engine	5A
ECM electronics	30A
Power socket, 12V	10A

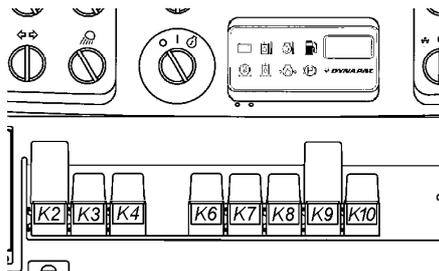
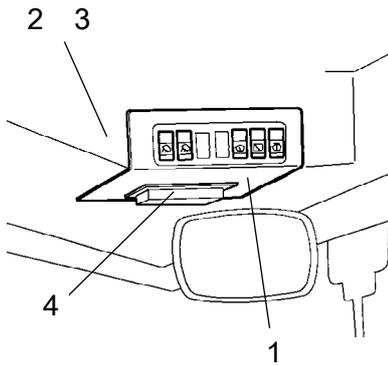


Fig. Instrument panel

Relays

K2	VBS relay
K3	Main relay
K4	Horn relay
K6	Fuel gauge relay
K7	* Reversing alarm relay
K8	* Light relay
K9	* Indicator relay
K10	Brake relay
	* Optional



Relays in cab

To replace the relays for the air conditioning fan, the condenser fan on the cab roof and the radio, remove instrumentpanel (1).

Fig. Cab roof, front
1. Instrument plate
2. K30 Relay for air conditioning fan
3. K31 Relay for air con fans + radio
4. Fuse box

Operation

Before starting

Master switch - Switching on

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

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

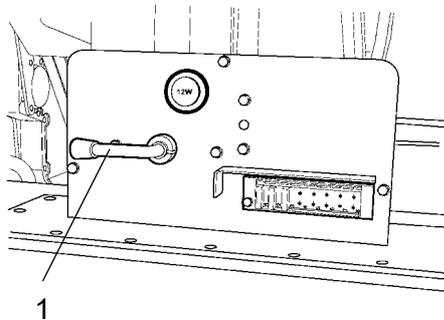


Fig. Engine compartment
1. Master switch

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.

- Length adjustment (1)
- Weight adjustment (2)

Release locking lever (3) to adjust the steering column. Lock in the new position.



Always make sure that the seat is secure before beginning operation.

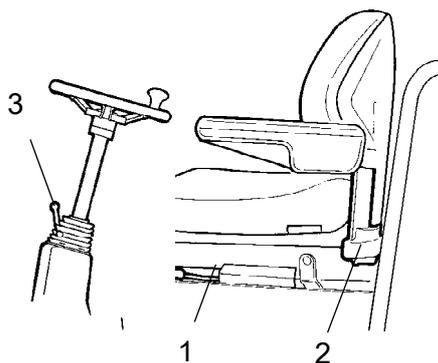


Fig. Operator's seat
1. Locking lever - Length adjustment
2. Lever - Weight adjustment
3. Locking lever - Steering column angle

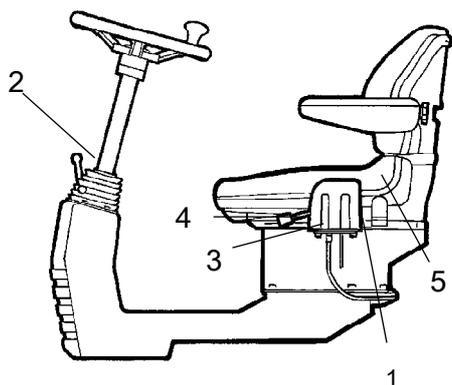


Fig. Operator's station
 1. Locking lever - rotation (Optional)
 2. Locking lever - steering column angle
 3. Locking lever - length adjustment
 4. Lever - backrest slope
 5. Lever - weight adjustment

Control unit - Setting

The control unit has two adjustment options, rotation and steering column angle.

Pull the lever (1) upwards to allow rotation.

Release the locking lever (2) to adjust the steering column to the desired slope and then lock the steering column in its new position.

The seat can be adjusted as follows:

- Length adjustment (3)
- Back slope (4)
- Weight adjustment (5)



Always make sure that the seat is secure before beginning operation.

Operator's seat in cab - Adjusting

The control unit has three adjustment options, transverse travel, rotation and steering column angle.

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:

- Length adjustment (1)
- Height adjustment (2)
- Seat-cushion inclination (3)
- Backrest inclination (4)
- Armrest inclination (5)
- Lumbar support adjustment (6)

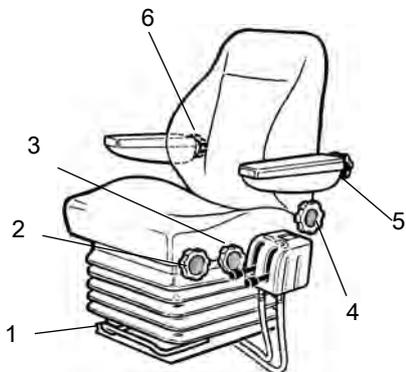


Fig. Operator's seat
 1. Lever - length adjustment
 2. Wheel - height adjustment
 3. Wheel - seat cushion inclination
 4. Wheel - backrest inclination
 5. Wheel - armrest inclination
 6. Wheel - lumbar support adjustment



Always ensure that the seat is locked in position before operating the roller.

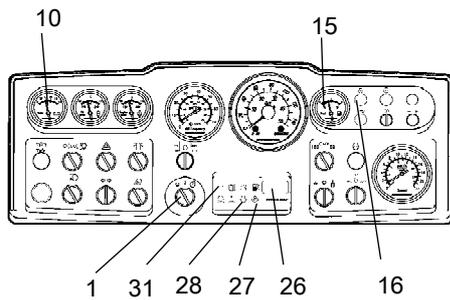


Fig. Instrument panel
1. Starter switch
10. Voltmeter (Optional)
15. Fuel gauge
16. Preheating lamp
26. Hourmeter
27. Brake lamp
28. Oil pressure lamp
31. Charging lamp

Instruments and lamps - Checking

Turn the switch (1) to the mid-position. All warning lamps should light for about 5 seconds and the beeper should sound.
During this time check that the warning lamps light up.

Check that the voltmeter (10) reads at least 12 volts, and that the fuel gauge (15) shows a reading.

Check that the warning lamps for charging (31), oil pressure (28), and the parking brake (27) come on.

The hourmeter (26) registers and shows the number of hours the diesel engine has been running.

The preheating lamp (16) must go on.

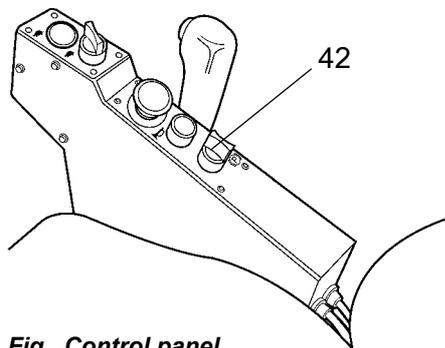


Fig. Control panel
42. Parking brake knob

Parking brake - Check



Make sure that the parking brake knob (42) is in activated position. The roller can start to roll when the engine is started on sloping ground, if the parking brake is not activated.

Interlock

The roller is equipped with Interlock.

The engine switches off 4 seconds after the operator rises from the seat.

The engine stops whether the forward/reverse lever is in the neutral or the drive position.

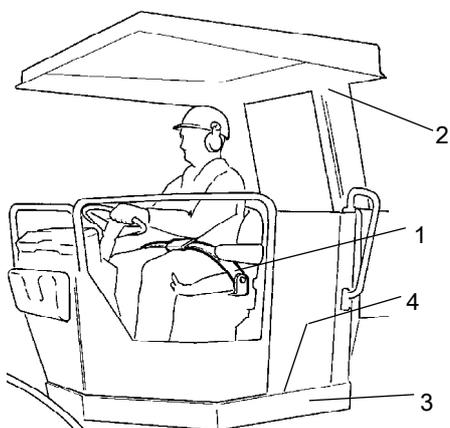
The engine does not stop if the parking brake is activated.



Sit down for all operations!

Operator position

If a ROPS (2) (Roll Over Protective Structure) or a cab is fitted to the roller, always wear the seat belt (1) provided and wear a protective helmet.



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



Check that rubber elements (3) on the platform are intact. Worn elements will impair comfort.



Ensure that the anti-slip (4) on the platform is in good condition. Replace where anti-slip friction is poor.



If the machine is fitted with a cab, make sure that the door is closed when in motion.

Fig. Operator's station

- 1. Seat belt**
- 2. ROPS**
- 3. Rubber element**
- 4. Anti-slip**

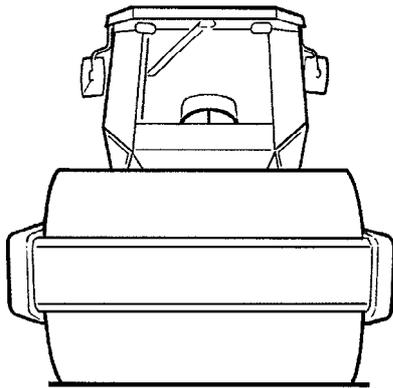


Fig. view

View

Before starting, make sure that the view forwards and backwards is unobstructed.

All cab windows should be clean and the rear view mirrors should be correctly adjusted.

Strike-off blade (Optional)



Always ensure that the strike-off blade is secured by the locking pin (1) when driving with the blade in its raised position. Always lower the blade to the ground before leaving/parking the roller.

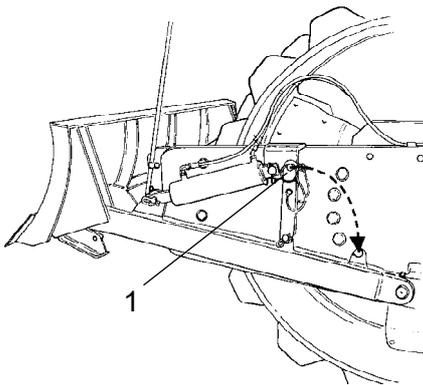


Fig. Strike-off blade
1. Cotter pin

Starting

Starting the engine

Pull up the emergency stop (37) and activate the parking brake (42).

Set the forward/reverse lever (39) in neutral. The diesel engine cannot be started in any other position on the control.

Set the amplitude selector (24) for Low/High vibration in position O.

Set the engine speed control (23) in the idling position.

Turn the starter switch (1) to the right to the first position. The preheating lamp (16) now comes on. When the lamp goes off, turn the control to the start position and release as soon as the engine starts. This particularly important when starting a cold machine.

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

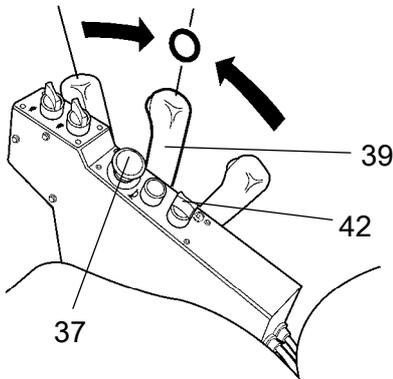


Fig. Control panel
37. Emergency stop
39. Forward/Reverse lever
42. Parking brake knob

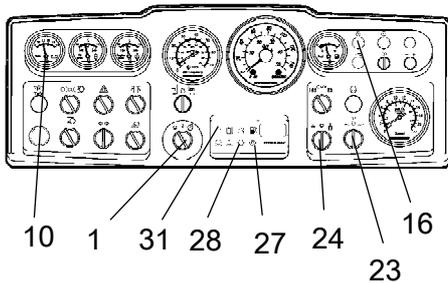


Fig. Instrument panel
1. Starter switch
10. Voltmeter (Optional)
16. Preheating lamp
23. Engine speed control
24. Amplitude selector
27. Brake lamp
28. Oil pressure lamp
31. Charging lamp

Let the engine idle for a few minutes to warm, longer if the ambient temperature is below +10°C (50°F).

While the engine is warming up, check that the warning lamps for oil pressure (28) and charging (31) are not on, and also that the voltmeter (10) shows 13-14 volts. The warning lamp (27) for the parking brake must still be on.

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

! **When starting up and driving a cold machine, which implies cold hydraulic fluid, the braking distance will be longer than normal until the machine reaches working temperature.**

Operating

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.

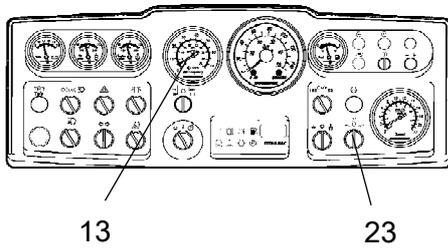


Fig. Instrument panel
13. Tachometer (Optional)
23. Engine speed control

Turn the engine speed control (23) to the position for 2,200 rpm.

Deactivate the parking brake and 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.



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

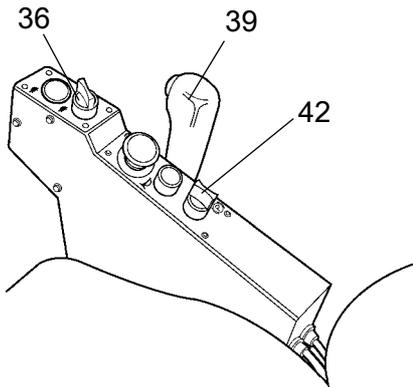


Fig. Control panel
36. Speed selector, wheels
39. Forward/Reverse lever
42. Parking brake knob



Deactivate the parking brake knob (42) and check that the parking brake warning lamp is off. Remember that the roller can start rolling, if it is on a slope.

Set the High/Low speed selector (36) to the desired mode, see decal on the control panel.

Maximum speed

	Std, P	D	PD
	7 km/h	5 km/h	5 km/h
	19 km/h	9 km/h	7 km/h



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.

Carefully move the forward/reverse lever (39) 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.



Check the parking brake by activating the parking brake knob (42) while the roller is slowly moving forward.

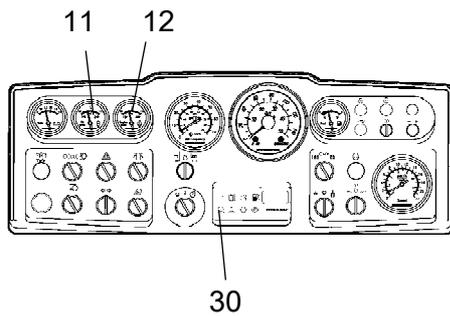


Fig. Instrument panel
11. Hydraulic oil temperature (Optional)
12. Engine temperature (Optional)
30. Warning lamp, air filter

Check while driving that the gauges show normal readings. In the event of abnormal values or if the buzzer sounds, immediately stop the roller and the diesel engine. Check and remedy any fault; see also the chapter on maintenance and the engine manual.



If the warning lamp for the air filter (30) comes on during operation (when the diesel engine is running at full speed), the main filter must be cleaned or replaced. See the Maintenance Manual.

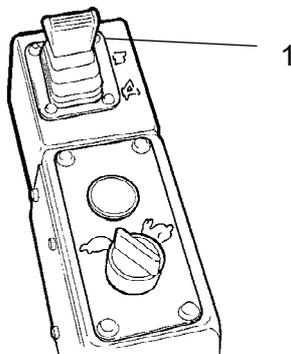


Fig. Controls
1. Lever

Operating the strike-off blade (Optional)



Before driving, make certain that the blade is in its uppermost position (raised). Inspect the condition of the ground before using the blade.

The lever (1) has three positions.
Backward - Raising the blade.
Forward - Lowering the blade.
Forward locked - Float mode, only its own weight presses the blade down.

Lower the blade to the ground before leaving or parking the roller.



Use the blade only when driving FORWARD.

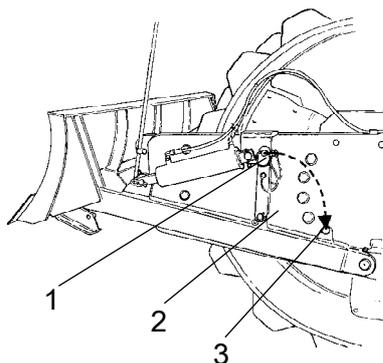


Fig. Strike-off blade
1. Locking pin
2. Safety link
3. Parking catch

When using the strike-off blade, the safety link (2) must be secured with its locking pin in the parking catch (3).

Vibration

Amplitude/frequency - Changeover

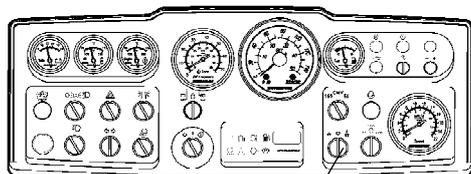
There are two drum vibration settings. Use the switch (24) to adjust.

Turn the knob to the left for low amplitude/high frequency and to the right for high amplitude/low frequency.



Setting the amplitude may not be performed when vibration is in operation.

Switch the vibration off first and wait until vibration stops before setting amplitude.



24

Fig. Instrument panel
24. Amplitude selector Low/0/High

Manual vibration - Switching on



Never activate vibration when the roller is stationary. This can damage both the surface and the machine.

Engage and disengage vibration using the switch (38) on the front of the forward/reverse lever.

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

The engine does not stop if the parking brake is activated.

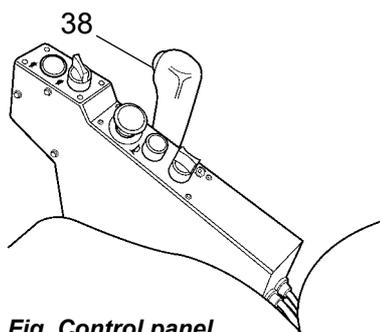


Fig. Control panel
38. Switch, vibration On/Off

Braking

Emergency braking

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

A disc brake in the drum motor and rear axle acts as an emergency brake when in motion and as a parking brake when stationary.



For emergency braking, press the emergency stop (37), hold the steering wheel firmly and be prepared for a sudden stop. The brakes are applied and the engine stops.

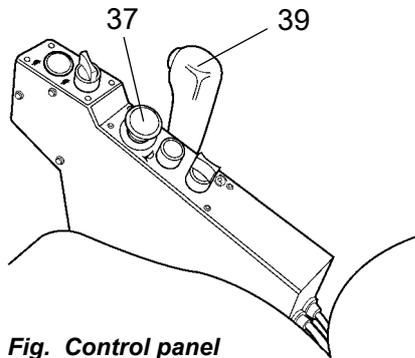


Fig. Control panel
37. Emergency stop
39. Forward/Reverse lever

After emergency braking, return the forward/reverse lever to the neutral position and pull up the emergency stop (37). The roller is fitted with an Interlock and therefore the operator must sit in the seat to start the engine.

Normal braking

Press the switch (38) to switch off the vibration.

Move the forward/reverse lever (39) to the neutral position to stop the roller.

Turn the engine speed control back to idling. Allow the engine to idle for a few minutes to cool down.



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.

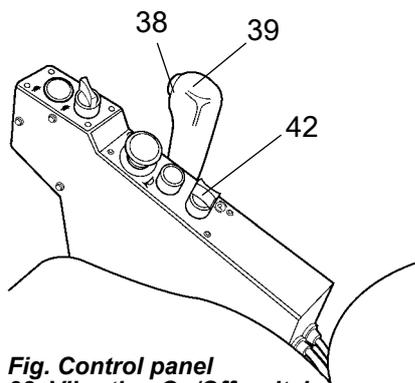


Fig. Control panel
38. Vibration On/Off switch
39. Forward/Reverse lever
42. Parking brake knob



Activate the parking brake knob (42) even for short stops on sloping ground.

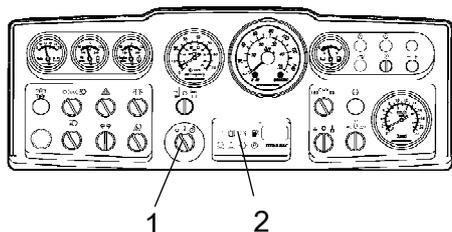


Fig. Instrument panel
1. Starter switch
2. Panel for warning lamps

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. On rollers without a cab, lower and lock the instrument cover.

Parking

Chocking the drums



Never disembark from the machine when the engine is running, unless the emergency/parking brake knob is depressed.



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.



Remember the risk of freezing during the winter. Fill the engine cooling system and the screenwash bottle in the cab with suitable anti-freeze mixtures. See also the maintenance instructions.

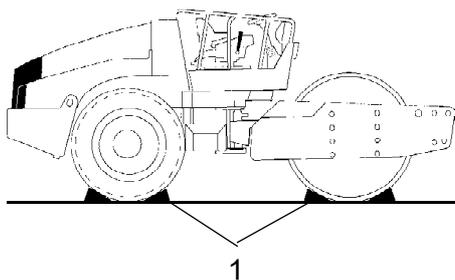


Fig. Arrangement
1. Chock

Master switch

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 the engine compartment doors.

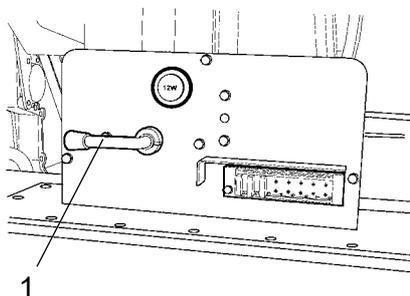


Fig. Tractor frame, rear left
1. Master switch

Long-term parking

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

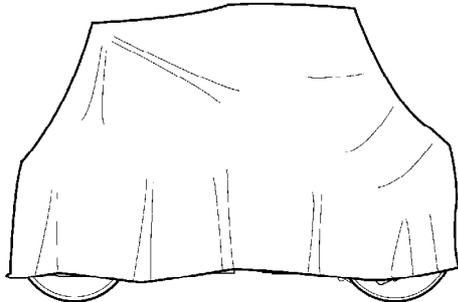


Fig. Roller weather protection

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.

Wash the machine and touch up the paint finish to avoid rusting.

Treat exposed parts with anti-rust agent, lubricate the machine thoroughly and apply grease to unpainted surfaces.

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 the battery, check that the electrolyte level is correct (see under the heading 'Every 50 hours of operation') and trickle-charge the battery once a month.

Air cleaner, exhaust pipe

* Cover the air cleaner (see under the heading 'Every 50 hours of operation' or 'Every 1000 hours of operation') or its opening with plastic or tape. Also cover the exhaust pipe opening. This is to avoid moisture entering the engine.

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.

Lubricate the articulation bearing with grease (see under the heading "Every 50 hours of operation").

Grease the steering cylinder piston with conservation grease.

Grease the hinges on the doors to the engine compartment and the cab. 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.

Tires (All-weather)

Make sure that tire pressure is 180 kPa (1.8 kp/cm²).

Miscellaneous

Lifting

Locking the articulation

 **Articulation must be locked to prevent inadvertent turning before lifting the roller.**

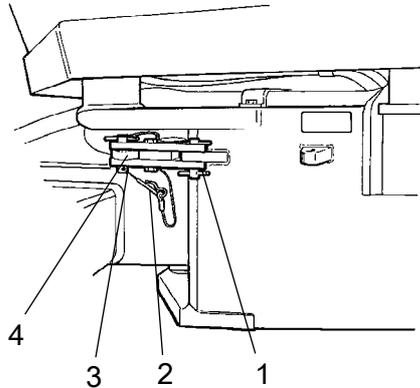


Fig. Articulation in the locked position

- 1. Locking arm
- 2. Locking pin
- 3. Locking stud
- 4. Locking lug

Weight: refer to the hoisting plate on the roller

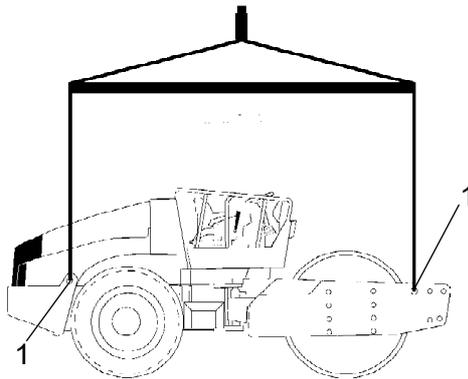


Fig. Roller prepared for lifting
1. Hoisting plate

Turn the steering wheel to the straight ahead position. Push in the emergency/parking brake knob.

Pull out the lowermost locking pin (2), which has a wire attached. Pull up the locking dowel (3) which also has a wire attached.

Fold out the locking arm (1) and secure it to the upper locking lug (4) on steering joint.

Fit the locking stud (3) in the holes through the locking arm (1) and locking lug (4) and secure the stud in position with the locking pin (2).

Lifting the roller

 **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.**

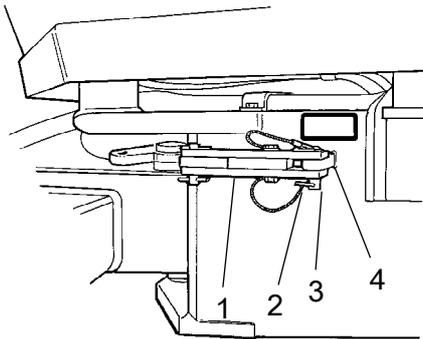


Fig. Articulation in the open position
1. Locking arm
2. Locking pin
3. Locking stud
4. Locking lug

Unlocking the articulation



Remember to unlock the articulation before operating.

Fold the locking arm (1) back and secure it in the locking lug (4) with the locking stud (3). Insert the lowermost locking pin (2) fitted with a wire, to secure the locking stud (3). The locking lug (4) is located on the tractor frame.

Towing/Recovering

The roller can be moved up to 300 meters (1,000 ft) using the instructions below.

Alternative 1

Short distance towing with the engine running



Depress the emergency/parking brake knob and temporarily shut off the engine. Chock the drums to prevent the roller from moving

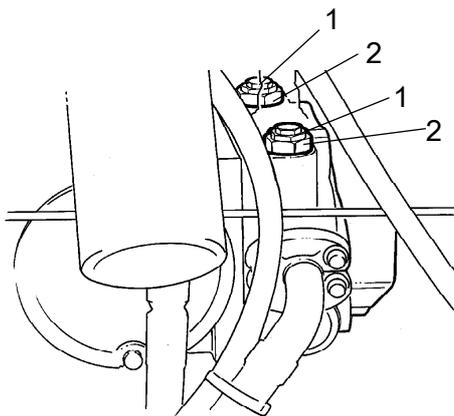


Fig. Propulsion pump
1. Towing valve
2. Locknut

Turn both towing valves (1) (middle hexagonal nut) three turns counter clockwise, while holding the multifunction valve (2) (lowermost hexagonal nut) in place. The valves are placed on the forward drive pump.

Start the engine and allow it to idle.

The roller can now be towed and can also be steered if the steering system is otherwise functioning.

Alternativ 2

Towing short distances where the engine is inoperative

Open both towing valves as described in Alternativ 1.

Rear axle brake

Undo the locknut (3) and adjust the adjustment screws (4) by hand until full resistance is felt, and then one additional turn. The adjustment screws are located on the rear axle, two screws on each side of the differential housing.



Chock the drums to prevent the roller from moving when the brakes are mechanically disengaged.

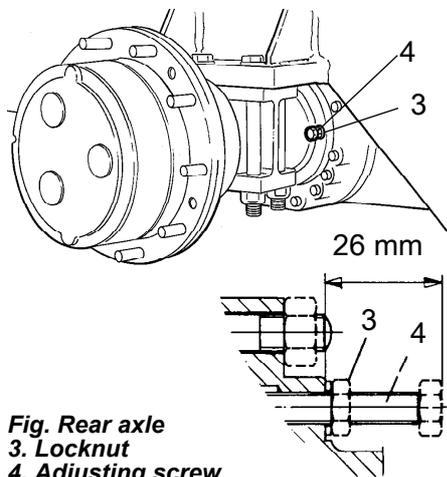


Fig. Rear axle
3. Locknut
4. Adjusting screw

Releasing the drum brake

Drum motor brake

Remove the drum brake's center plug (2) which can be accessed through the center hole (1) in the left frame side.

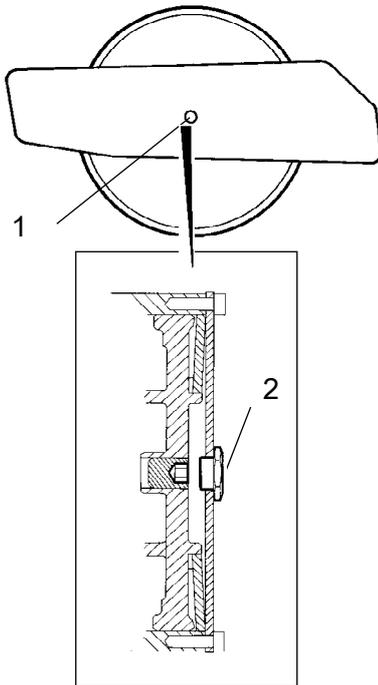


Fig. Left frame side
1. Center hole
2. Center plug

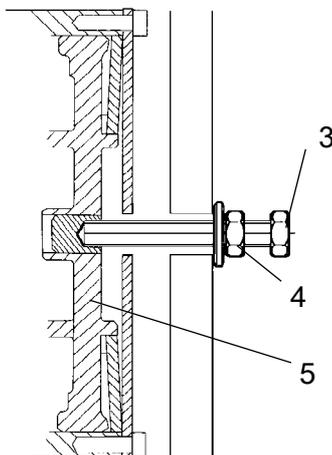


Fig. Cross-section of brake housing
3. Bolt
4. Nut
5. Brake piston

Screw in the bolt (3) as per the figure as far as it goes. Screw in the nut (4) so that it is flush with the washer and then an additional 1 1/2 varv, while holding the screw (3).

The brake is now disengaged and the machine can be towed.



After towing, remember to reset the towing valves (1). Loosen the adjusting screw (4) to its original position 26 mm from the contact surface and tighten the locknuts (3). Reapply the drum motor's brake.

Towing the roller

 **When towing/recovering, the roller must be braked by the towing vehicle. A towing bar must be used as the roller has no brakes.**

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

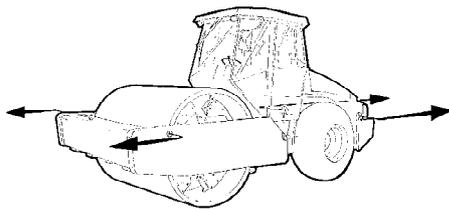


Fig. Towing

When towing/retrieving a machine, the towing device must be connected to both lifting holes. The pulling force must act longitudinally on the machine as illustrated. Maximum gross pulling force 140 kN (31500 lbf).

 Restore the items for towing according to alternative 1 or 2 on the preceding pages.

Roller prepared for transport

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

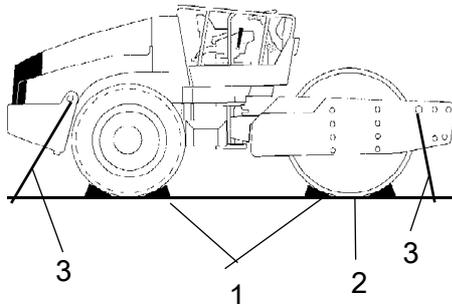


Fig. Transport
1. Chock
2. Block up
3. Lashing wire

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

Block up under the drum frame (2), to avoid overload on the rubber suspension of the drum when lashing.

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

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

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 idle (900 rpm).
7. Start the engine and allow it to warm up.
8. Set the engine speed control to the operating position (2,200 rpm).
9. Set the emergency/parking brake knob in the pulled-out position.



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



11. **Test the brakes. Remember that the braking distance will be longer if the roller is cold.**

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



13. **IN AN EMERGENCY:**
 - **Press the EMERGENCY STOP**
 - **Hold the steering wheel firmly.**
 - **Brace yourself for a sudden stop.**
14. When parking:
 - Activate the parking brake.
 - Stop the engine and chock the drum and wheels.
15. When lifting: - Refer to the relevant section in the Instruction Manual.
16. When towing: - Refer to the relevant section in the Instruction Manual.
17. When transporting: - Refer to the relevant section in the Instruction Manual.
18. When recovering - Refer to the relevant section in the Instruction Manual.

Preventive maintenance

Complete maintenance is necessary for the machine to function satisfactorily and at the lowest possible cost.

The Maintenance section includes the periodic maintenance that must be carried out on the machine.

The recommended maintenance intervals assume that the machine is used in a normal environment and working conditions.

Acceptance and delivery inspection

The machine is tested and adjusted before it leaves the factory.

On arrival, before delivery to the customer, delivery inspection must be conducted as per the check list in the warranty document.

Any transport damage must be immediately reported to the transport company.

Warranty

The warranty is only valid if the stipulated delivery inspection and the separate service inspection have been completed as per the warranty document, and when the machine has been registered for starting under the warranty.

The warranty is not valid if damage has been caused by inadequate service, incorrect use of the machine, the use of lubricants and hydraulic fluids other than those specified in the manual, or if any other adjustments have been made without the requisite authorisation.

Maintenance - Lubricants and symbols

Fluid volumes

Rear axle		
- Differential	7 liters	7.4 qts
- Planetary gear	0,8 liters/side	0.8 qts/side
Drum	10,5 liters	11.1 qts
Hydraulic reservoir	52 liters	13.7 gal
Fluid in hydraulic system	18 liters	4.8 gal
Lubrication oil, diesel engine	7,2 liters	7,4 qts
Coolant, diesel engine	17,5 liters	4,5 gal



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



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.

DYNAPAC

	ENGINE OIL	Air temperature -15°C - +50°C (5°F-122°F)	Shell Rimula R4 L 15W-40, API CH-4 or equivalent.	
	HYDRAULIC FLUID	Air temperature -15°C - +50°C (5°F-122°F)	Shell Tellus S2 V68 or equivalent.	
		Air temperature over +50°C (122°F)	Shell Tellus S2 V100 or equivalent.	
	BIOLOGICAL HYDRAULIC FLUID, Bio-Hydr. PANOLIN	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.	PANOLIN HLP Synth 46 (www.panolin.com)	
	BIOLOGICAL HYDRAULIC FLUID	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.	BP Biohyd SE-S46	
	DRUM OIL	Air temp. -15°C - +40°C (5°F-104°F)	Shell Spirax S3 AX 80W/90, API GL-5 or equivalent.	Dynapac Gear Oil 300 , P/N 4812030756 (5 litres), P/N 4812030117 (20 litres)
		Air temp. 0°C (32°F) - above +40°C (104°F)	Shell Spirax AX 85W/140, API GL-5 or equivalent.	
	GREASE		SKF LGHB2 (NLGI-Klass 2) or equivalent for the articulated joint.	Dynapac Roller Grease (0.4kg), P/N 4812030096
			Shell Retinax LX2 or equivalent for other grease points.	
	FUEL	See engine manual.	-	-
	TRANSMISSION OIL	Air temperature -15°C - +40°C (5°F-104°F)	Shell Spirax S3 AX 80W/90, API GL-5 or equivalent	Dynapac Gear Oil 300 , P/N 4812030756 (5 litres), P/N 4812030117 (20 litres)
		Air temperature 0°C (32°F) - above +40°C (104°F)	Shell Spirax AX 85W/140, API GL-5 or equivalent.	
	COOLANT	Anti-freeze protection down to about -37°C (-34.6°F)	GlycoShell/Carcoolant 774C or equivalent, (mixed 50/50 with water)	

Maintenance symbols

	Engine, oil level		Tyre pressure
	Engine, oil filter		Air filter
	Hydraulic reservoir, level		Battery
	Hydraulic fluid, filter		Recycling
	Transmission, oil level		Fuel filter
	Drum, oil level		Coolant, level
	Oil for lubrication		

Maintenance - Maintenance schedule

Service and maintenance points

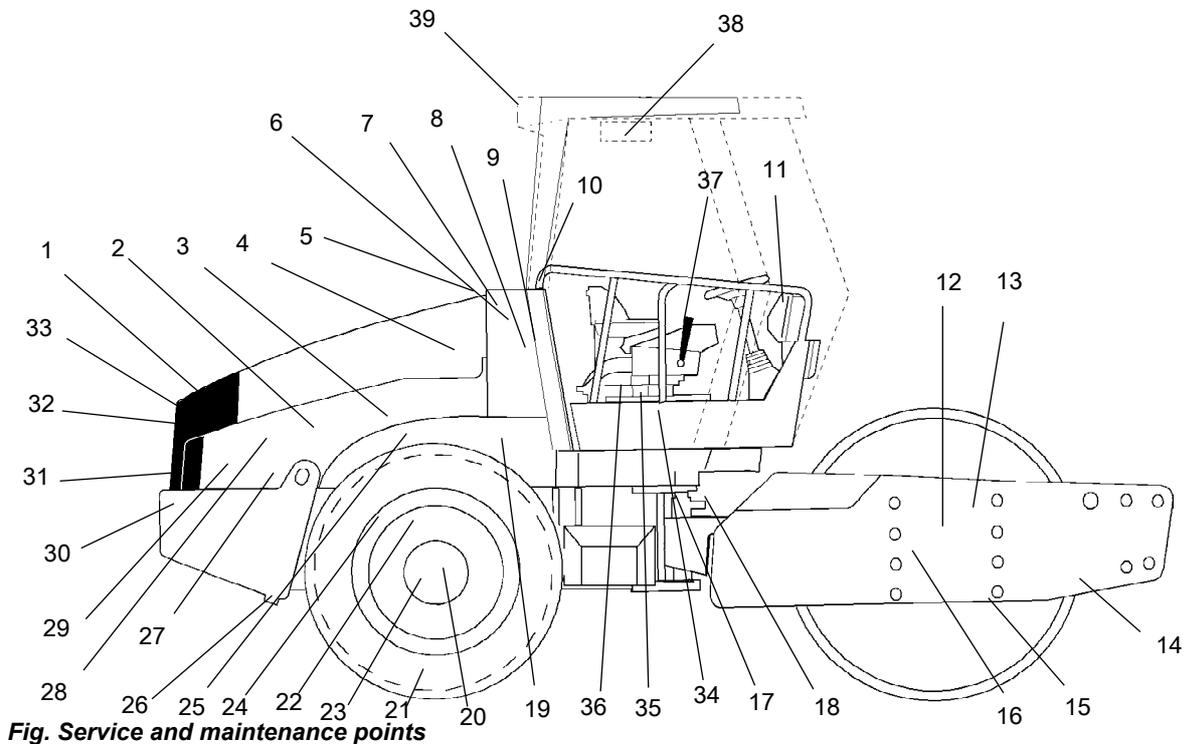


Fig. Service and maintenance points

- | | | |
|--|--|--------------------------------------|
| 1. Radiator grille | 14. Scrapers | 27. Engine suspension, 4 pcs. |
| 2. Oil level, diesel engine | 15. Drum oil, level plug, 1 pc. | 28. Feed pump, fuel |
| 3. Fuel filter, fuel pre-filter | 16. Rubber elements and fastening screws | 29. Diesel fuel, filler |
| 4. Air filter | 17. Steering joint | 30. Battery |
| 5. Engine cover, hinges | 18. Steering cylinder, 1 pc. | 31. Radiator |
| 6. Hydraulic reservoir, sight glass | 19. Flywheel casing, hydraulic pumps | 32. Hydraulic fluid cooler |
| 7. Bleeding filter | 20. Wheel nuts | 33. Drive belts, cooling, alternator |
| 8. Hydraulic filter, 2 pcs. | 21. Tires, pressure | 34. Steering chain |
| 9. Drainage, hydraulic fluid reservoir | 22. Rear axle, differential | 35. Seat bearing |
| 10. Hydraulic fluid, filling | 23. Rear axle, planetary gears, 2 pcs. | 36. Steering chain |
| 11. Fuse box | 24. Rear axle suspension, 2 sides | 37. Forward/reverse lever |
| 12. Drum cartridge, filling, 2 fillers | 25. Oil filter, diesel engine | 38. Fresh air filter * |
| 13. Drum motor | 26. Drainage, fuel tank | 39. Air conditioning * |
- * Optional equipment

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.

Maintenance - Maintenance schedule



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.

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	
14	Check the scraper setting	
1	Check for free circulation of cooling air	
31	Check coolant level	Refer to the engine manual
2	Check the engine oil level	Refer to the engine manual
29	Refuel	
6	Check fluid level in hydraulic reservoir	
	Test the brakes	

After the FIRST 50 hours of operation

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

Pos. in fig	Action	Comment
2	Change the engine oil and oil filter	Refer to the engine manual
3	Change the fuel filter	Refer to the engine manual
8	Change the hydraulic fluid filter	

Maintenance - Maintenance schedule

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
	Check that hoses and couplings are not leaking	
4	Inspect/clean the filter element in the air cleaner	Replace as required
17	Lubricate the articulation	
20	Check the wheel-nuts are tightened	
21	Check the tire pressure	
39	Check the air conditioning	Optional
	Lubricate the strike-off blade bearings.	Optional

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
23	Check oil level in rear axle/planetary gearing	
15	Check the oil level in the drum	
32	Clean the coolers	
20	Check the bolted joints	The above applies to new or reconditioned components only
24	Check the bolted joints	The above applies to new or reconditioned components only
25	Change the engine oil and oil filter	Refer to the engine manual
16	Check rubber elements and bolted joints	
30	Check battery	
39	Check the AC	Optional

Maintenance - Maintenance schedule

Every 500 hours of operation (Every three months)

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

Pos. in fig	Action	Comment
3	Replace the fuel filter	Refer to the engine manual
5	Lubricate controls and joints	
3	Clean the fuel pre-filter.	
36	Grease the steering chain	Optional
35	Grease the chair bearing	Optional

Every 1000 hours of operation (Every six months)

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

Pos. in fig	Action	Comment
7	Check bleeder filter on hydraulic reservoir	
8	Change the hydraulic fluid filter	
9	Drain the condensate from hydraulic reservoir	
26	Drain condensate from fuel tank	
22	Change oil in rear axle differential	
23	Change oil in the rear axle planetary gearing	
38	Replace the fresh air filter in the cab	Optional
	Check engine valve clearances	Refer to the engine manual
33	Check belt tension in the drive belt system	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
9	Change the hydraulic fluid	
10	Change the hydraulic fluid	
12	Change the oil in the drum	
15	Change the oil in the drum	
17	Check the steering joint	
37	Lubricate the Forward/Reverse lever	
39	Overhaul air conditioning	Optional

Maintenance, 10h



Park the roller on a level surface. When checking and making adjustments, the engine should be switched off and the emergency/parking brake should be applied, if not otherwise specified.

Scrapers - Check, adjustment

If necessary, adjust distance to the drum as follows: the scraper is integrated with the beam.

Loosen the frame members' four screws (2).

Then, adjust the scraper beam (1) to 20 mm from the drum.

Tighten the screws (2).

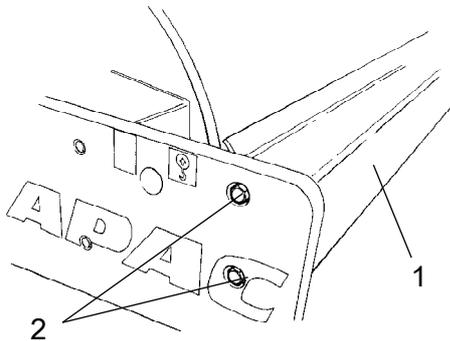


Fig. Scrapers
1. Scraper beam
2. Screws

Scrapers, Pad-drum

Loosen the frame members' four screws (2).

Then, adjust the scraper beam (1) to 25 mm between the teeth and drum.

Tighten the screws (2).

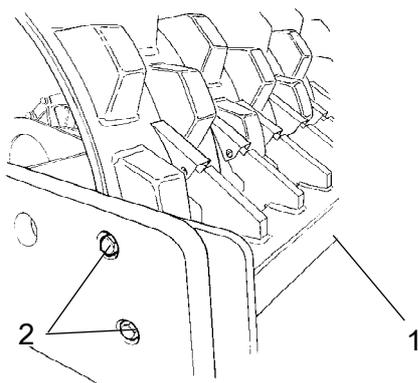


Fig. Scrapers
1. Scraper beam
2. Screws

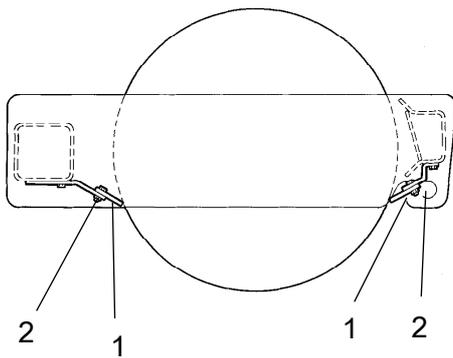


Fig. Scrapers
1. Scraper blade
2. Screws

Soften scrapers (Optional)

Loosen the screws (2).

Then, adjust the scraper blade (1) so that it lightly touches the drum.

Tighten the screws (2).

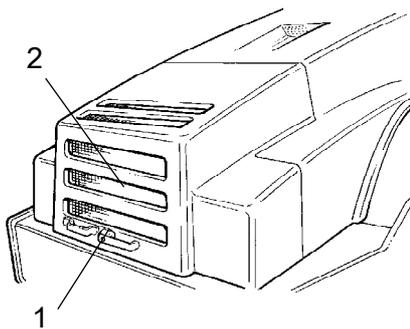


Fig. Engine hood
1. Hood lock
2. Protective grille

Air circulation - Check

Ensure that the engine has free circulation of cooling air through the protective grille in the hood.

To open the engine hood, turn the locking arm (1) upward. Raise the hood to its fully open position, checking that the red safety catch on the left gas spring is latched.



If the engine hood's gas-spring are out of action and the hood is put at its upper position - block the hood so that it cannot fall.



Coolant level - Check

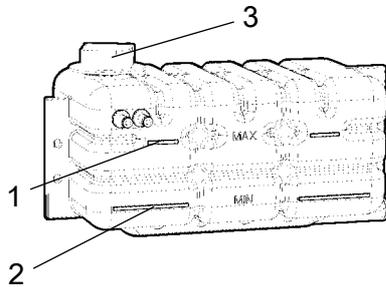


Fig. Water tank
1. Max. level
2. Min. level
3. Filler cap

Check that level of the coolant is between the max. and min. marks.



Take great caution if the radiator cap must be opened while the engine is hot. Wear protective gloves and goggles.

Fill with a mixture of 50% water and 50% anti freeze. See the lubrication specifications in these instructions and in the engine manual.



Flush the system every other year and change the coolant. Make sure also that the air flow through the cooler is unobstructed.



Hydraulic reservoir - Check fluid level

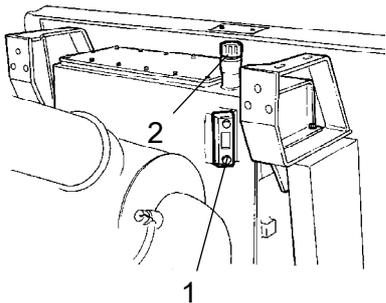


Fig. Hydraulic reservoir
1. Sight glass
2. Filler pipe

Place the roller on a level surface and check that the oil level in the sight glass (1) is between the max and min markings. Top up with the type of hydraulic fluid specified in the lubricant specification, if the level is too low.

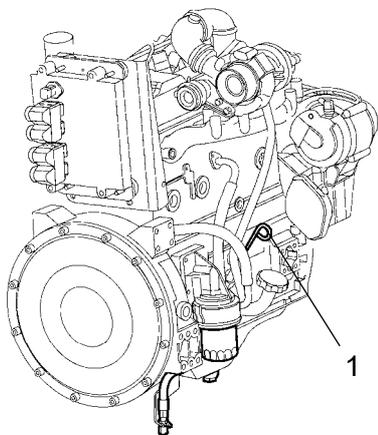


Fig. Engine
1. Dipstick

Diesel engine Check oil level



Take care not to touch any hot parts of the engine or the radiator when removing the dipstick. Risk for burns.

The dipstick is located on the engine's left side.

Pull up the dipstick (1) and check that the oil level is between the upper and lower marks. For further details, refer to the engine's instruction manual.



Fuel tank - Filling

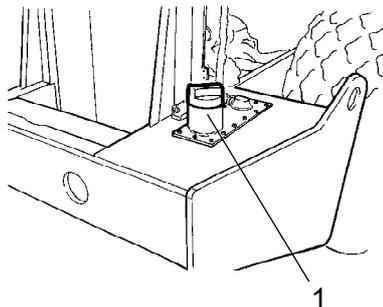


Fig. Fuel tank
1. Filler pipe

Refuel daily with diesel fuel up to the lower edge of the filler pipe (1). Follow the engine manufacturer's specification with regard to the quality of diesel fuel.



Stop the engine. Short-circuit (press) the filler gun against a non-insulated part of the roller before refuelling, and against the filler pipe (1) while refuelling.



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

The tank holds 225 liters (31,7 gal) of fuel.

Brakes - Check



Check the brakes by carrying out the following :

Checking the emergency stop

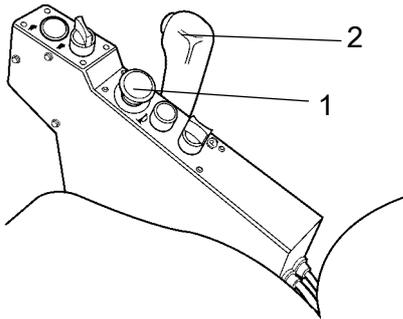


Fig. Control panel
1. Emergency stop
2. Forward/Reverse lever

Operate the roller **slowly** forwards. Hold the steering wheel firmly and brace yourself for a sudden stop.

Push in the emergency stop (1). The roller will stop abruptly and the engine will switch off.

After checking the emergency stop, set the forward/reverse lever (2) in neutral.

Pull up the emergency stop (1). Start the engine.

The roller is now ready for operation.

Checking the parking brake

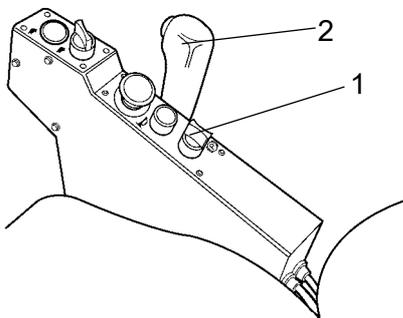


Fig. Control panel
1. Parking brake knob
2. Forward/Reverse lever

Operate the roller **slowly** forwards. Hold the steering wheel firmly and brace yourself for a sudden stop.

Activate the parking brake knob (1). The roller will stop immediately with the engine running.

After checking the parking brake, set the forward/reverse lever (2) in neutral.

Reset the parking brake knob (1).

The roller is now ready for operation.

See also Operating section in the manual.

Maintenance - 50h



Park the roller on a level surface.
When checking and making adjustments, the engine should be switched off and the emergency/parking brake should be applied, if not otherwise specified.



Air cleaner

Checking - Change the main air filter



Change the air cleaner main filter when the warning lamp on the control panel comes on when the engine is running at maximum speed.

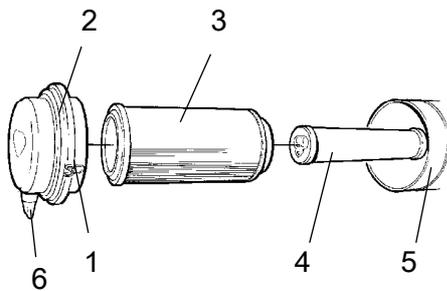


Fig. Air cleaner
1. Clips
2. Cover
3. Main filter
4. Backup filter
5. Filter housing
6. Dust valve

Release the clips (1), pull off the cover (2), and pull out the main filter (3).

Do not remove the backup filter (4).

Clean the air cleaner if necessary, see section Air cleaner - Cleaning.

When replacing the main filter (3), insert a new filter and refit the air cleaner in the reverse order.

Check the condition of the dust valve (6); replace if necessary.

When refitting the cover, make sure that the dust valve is positioned downwards.



Backup filter - Change

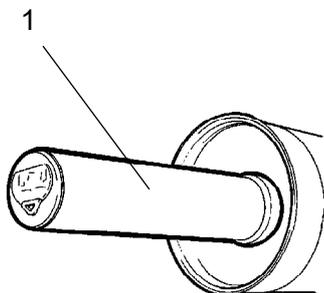


Fig. Air filter
1. Backup filter

Change the backup filter with a new filter after every third replacement of the main filter.

To change the backup filter (1), pull the old filter out of its holder, insert a new filter and reassemble the air cleaner in the reverse order.

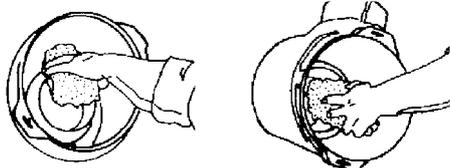
Clean the air cleaner if necessary, see section Air cleaner - Cleaning.



Air cleaner - Cleaning

Wipe clean the inside of the cover (2) and the filter housing (5). See the previous illustration.

Wipe clean on both sides of the outlet pipe.



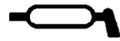
Inner edge of outlet pipe.

Outer edge of outlet pipe.

Wipe also both surfaces for the outlet pipe; see adjacent figure.



Check that the hose clamps between the filter housing and the suction hose are tight and that the hoses are intact. Inspect the entire hose system, all the way to the engine.



Steering joint - Lubrication

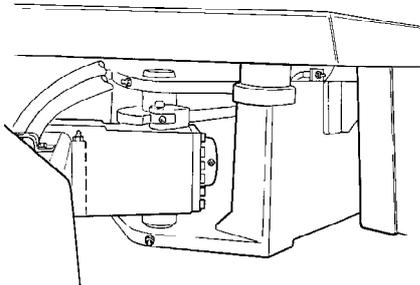


Fig. Steering joint, left side



Do not allow anyone to remain in the vicinity of the steering joint when the engine is running. Risk of being crushed when the steering is operated. Press the emergency/parking brake knob before lubricating.

Turn the steering wheel fully to the right so that all the nipples (4) on the left side of the steering system are accessible.



Use grease as per the lubricant specification.



Steering joint - Lubrication

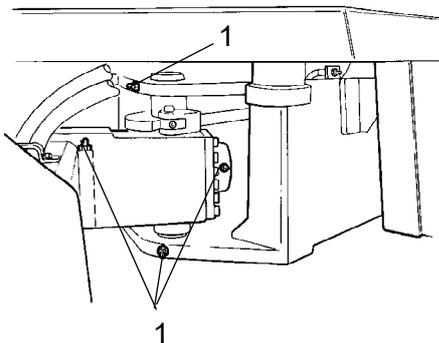


Fig. Steering joint left side
1. Grease nipples steering joint (4 pcs.)

Wipe off any dirt and grease from the nipples.

Grease each nipple (1) with five strokes of a hand-operated grease gun. Make sure that grease penetrates into the bearing.

If grease does not penetrate the bearings, it may be necessary to relieve the articulation joint with a jack while repeating the greasing process.



Automatic Climate Control (Optional) - Inspection

The system described in this manual is type ACC (Automatic Climate Control).



Never work under the roller when the engine is running. Park the roller on a level surface, chock the wheels and depress the parking brake control.

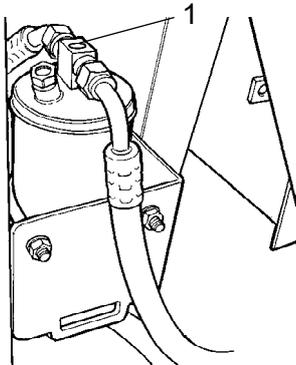


Fig. Drying filter
1. Sight glass

With the unit in operation, open the engine hood and check using the sight glass (1) that bubbles are not visible on the drying filter.

The filter is located on the left side of the engine compartment's front edge. If bubbles are visible through the sight glass, it is a sign that the refrigerant level is too low. If so, stop the unit. The unit may be damaged if it is run with insufficient refrigerant.

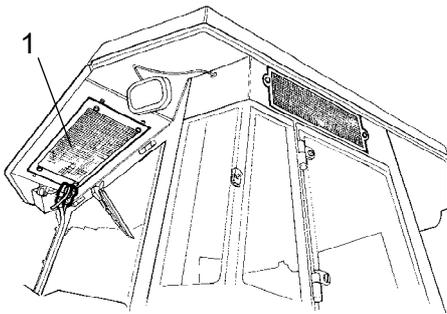


Fig. Cab
1. Condensor element

Where cooling capacity is markedly reduced, clean the condensor element (1) located on the rear edge of the cab. Also clean the cooling unit in the cab. See under the heading 2000 hours, automatic climate control - overhaul.



Tires - Air pressure - Wheel nuts - Tightening

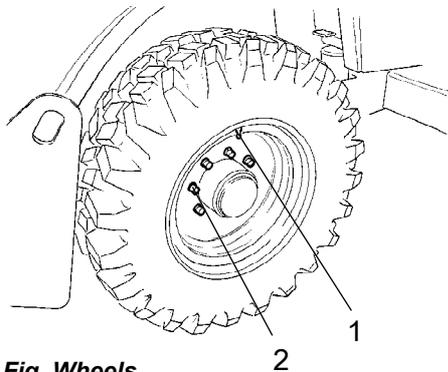


Fig. Wheels
1. Air valve
2. Wheel nut

Check the tire pressures using a pressure gauge.

If the tires are filled with fluid, the air valve (1) must be in the "12 o'clock" position during pumping.

Recommended pressure: See Technical Specifications.

Check the tire pressure.



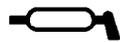
When changing the tires it is important that both of them have the same rolling radius. This is necessary to ensure proper functioning of the anti-slip in the rear axle.

Check the tightening torque of the wheel nuts (2) at 630 Nm (465 lbf.ft).

Check both wheels and all nuts. (This only applies to a new machine or newly fitted wheels).



Check the safety manual that accompanies the roller before filling the tires with air.



Strike-off blade (Optional) - Lubrication

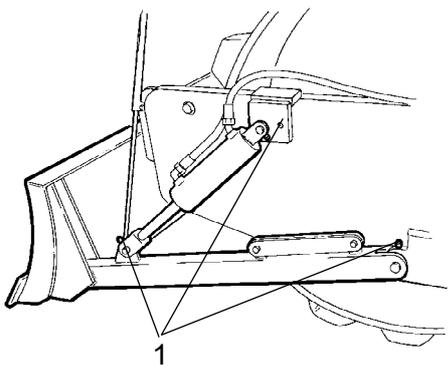


Fig. Strike-off blade
1. Lubrication nipples



Always lower the blade to the ground before leaving or parking the roller.



Make sure that nobody is in the way when operating the blade.

Wipe the nipples clean from grease and dirt, three on each side of the machine.

Grease each nipple (1) with four strokes of the grease gun. Ensure that grease penetrates the bearings.

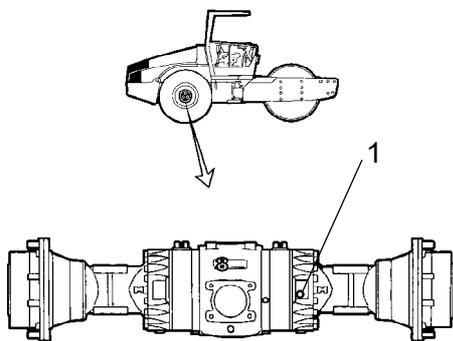
Maintenance - 250h

 **Park the roller on a level surface. When checking and making adjustments, the engine should be switched off and the emergency/parking brake should be applied, if not otherwise specified.**



Rear axle differential - Check oil level

 **Never work under the roller when the engine is running. Park on a level surface. Block the wheels securely.**



Wipe clean and remove the level plug (1) and check that the oil level reaches the lower edge of the plug hole. Top off with oil to the right level if the level is low. Use transmission oil according to the lubricant specification.

Clean and refit the plug.

Fig. Level check - differential housing
1. Level/Filler plug



Rear axle planetary gears - Check oil level

Position the roller with the plug in the planetary gear (1) in the "9 o'clock" position.

Wipe clean and remove the level plug (1) and check that the oil level reaches the lower edge of the plug hole. Top up with oil to the right level if the level is low. Use transmission oil, see lubricant specification.

Clean and refit the plug.

Check the fluid level in the same way on the rear axle's other planetary gear.

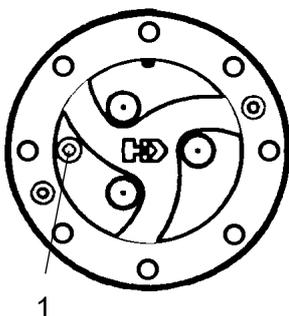


Fig. Level check - planetary gear
1. Level/Filler plug



Drum - Checking the oil level

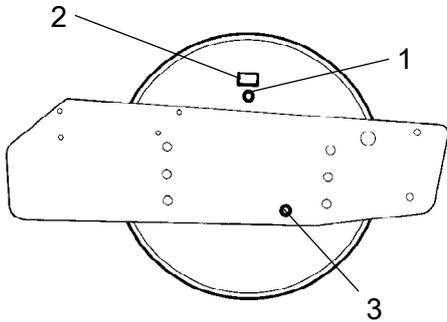


Fig. Roller, right-hand side

- 1. Filler plug
- 2. Number plate
- 3. Sight glass

Place the roller on a level surface so that the filler plug (1) and the drum's number plate (2) are visible on the right side of the drum.

The oil level should now reach the sight glass (3).

If necessary, remove the filler plug (1) and fill to halfway up the sight glass.

Clean any metal residue from the magnetic filler plug (1) before reinstalling it.

See the lubrication specification for the correct oil grade.



Do not overfill with oil - risk for overheating.

Radiator - Check/Cleaning

Check that air can pass unobstructed through the radiators (1), (2) and (3).

Clean a dirty radiator using compressed air or a high-pressure water jet.

Blow air or direct water through the cooler in the opposite direction to that of the cooling air.



Be careful when using a high-pressure washer - do not place the nozzle too close to the radiator.

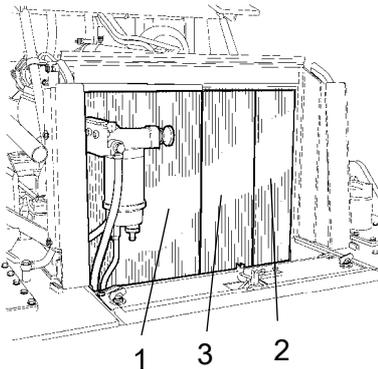


Fig. Engine compartment

- 1. Water cooler
- 2. Charge air cooler
- 3. Hydraulic fluid cooler



Wear protective goggles when working with compressed air or high-pressure water jets.

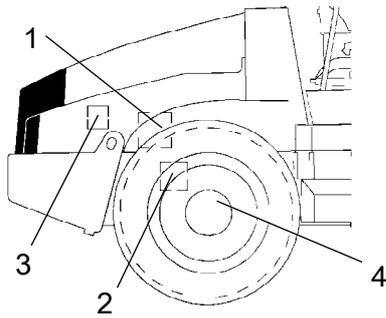


Fig. Right side of machine

1. Steering pump
2. Rear axle
3. Engine suspension
4. Wheel nuts

Bolted joints - Checking tightening torque

Steering pump against engine (1) 38 Nm (28 lbf.ft).

Rear axle suspension (2) 330 Nm (243 lbf.ft), oiled.

Engine mounting (3). Check that all M12 bolts (x20) are tightened, 78 Nm (57 lbf.ft).

Wheel nuts (4). Check that all nuts are tightened, 630 Nm oiled.

(The above applies to new or replaced components only).



Diesel engine - Oil and Filter change



Observe care when draining hot engine oil. Wear protective gloves and goggles.

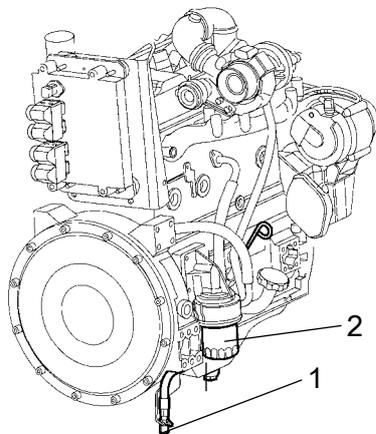


Fig. Left side of engine

1. Drain plug
2. Oil filter

The oil drain plug (1) is most easily accessible from the bottom of the engine and is located attached to a hose on the rear axle.. Drain the oil when the engine is warm. Place a receptacle that holds at least 10 liters (2,7 gal) under the drain plug.

Replace the engine oil filter (2) at the same time. Refer to the engine manual.



Hand in the drained oil to an environment-friendly waste disposal station.

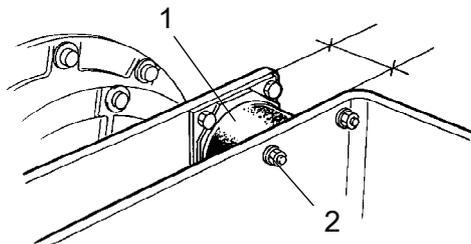


Fig. Drum, vibration side
1. Rubber element
2. Fastening screws

Rubber elements and fastening screws - Check

Check all rubber elements (1), replace all of the elements if more than 25% of them on one side of the drum are cracked deeper than 10-15 mm (0.4-0.6 in).

Check using a knife blade or pointed object.

Check also that the screw fasteners (2) are tightened.



Battery - Check electrolyte level



Never use a naked flame when checking the battery as the electrolyte emits explosive gas while the alternator is charging.

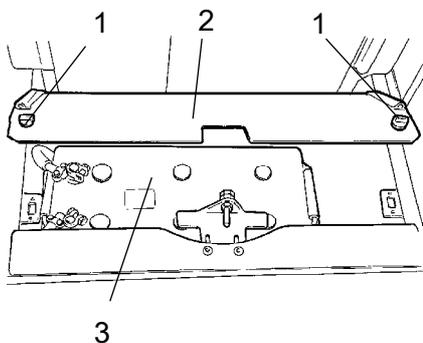


Fig. Battery shelf
1. Quick-screws
2. Battery cover
3. Battery

Lift up the engine compartment cover and undo the quick-release screws (1).

Raise the battery cover (2).

Wipe the top of the battery.



Wear safety goggles. The battery contains corrosive acid. Rinse with water if electrolyte comes into contact with the body.



Battery cell

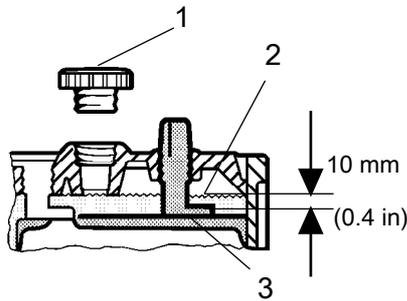


Fig. Electrolyte level in battery

1. Cell cap
2. Electrolyte level
3. Plate

Take off the cell caps (1) and make sure that electrolyte (2) is about 10 mm (0.4 in) above the plates (3). Check the level of all cells. Top off with distilled water to the right level if the level is low.

If the ambient temperature is below freezing, run the engine for a while before topping off with distilled water. Otherwise the electrolyte might freeze.

Make sure that ventilation holes in the cell cover are not clogged, then put the cover back on.

The cable shoes should be clean and well tightened. Clean corroded cable shoes and grease them with acid-free Vaseline.



Always disconnect the negative cable first when disconnecting the battery. When connecting the battery, always connect the positive cable first.



Discard used batteries wisely. Batteries contain lead, which is harmful to the environment.



Before doing any electric welding on the machine, disconnect the battery ground cable and then all electrical connections to the alternator.

Air conditioning (Optional)

- Inspection

Inspect refrigerant hoses and connections and make sure that there are no signs of an oil film that can indicate a refrigerant leakage.

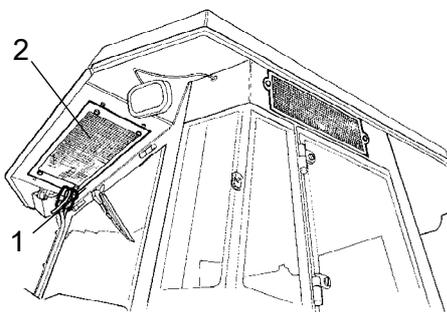


Fig. Air conditioning

1. Refrigerant hoses
2. Condenser element

Maintenance - 500h



Park the roller on a level surface. When checking and making adjustments, the engine should be switched off and the emergency/parking brake should be applied, if not otherwise specified.



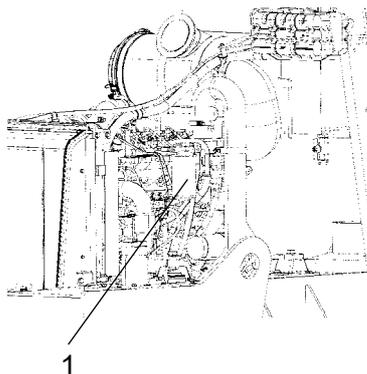
Ensure that there is good ventilation (air extraction) if the engine is run indoors. Risk of carbon monoxide poisoning.



Replacing the fuel filter



Place a container underneath to collect fuel that runs out when the filter is released.



Screw off the fuel filter (1). The filter is of the disposable type and cannot be cleaned. Hand in to environment-friendly station.



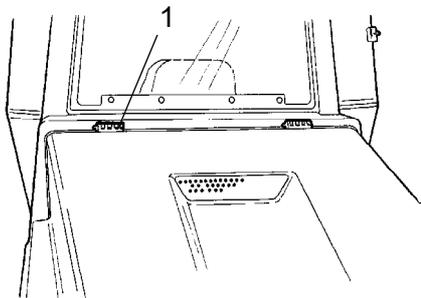
Refer to the engine manual for detailed instructions when replacing the fuel filter.

Fig. Engine compartment
1. Fuel filter

Start the engine and check that the fuel filter is tight.

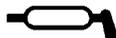


Controls and moving joints - Lubrication

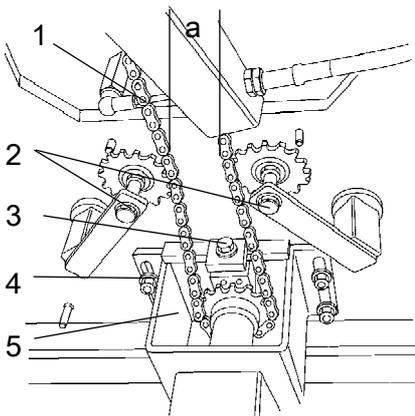


Lubricate engine hood hinges (1) and the slide rails of the operator's seat with grease, other joints and controls with oil. Lubricate the cab hinges with grease. See the lubrication specification.

Fig. Engine hood
1. Hinge



Steering chain and seat bearing - Lubrication



Optional on rollers without cab



Keep in mind that the chain is a vital part of the steering mechanism.

Clean and lubricate the chain (1) between the seat bearing and steering valve with grease. The chain can be accessed from underneath the operator's position.

It is not necessary to remove the chain.

Adjust the chain as follows if it has slackened so that size "a" is less than 30 mm (1.2 in): Loosen the nuts (4) and adjust the mount (5) backwards with the adjusting nut (3) until size "a" is 50 mm (2 in).

Fig. Underneath operator's position
1. Steering chain
2. Chain-tightening device
3. Adjusting nut
4. Nuts
5. Control valve mount



Pre-filter - Cleaning



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

See instruction manual for the engine when cleaning the filter, the chapter on the fuel system.

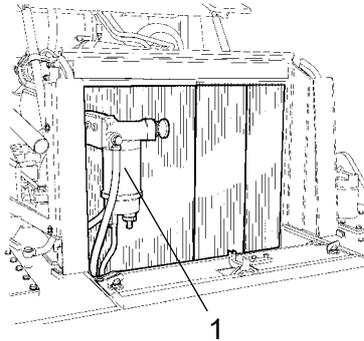


Fig. Engine compartment
1. Fuel prefilter

Seat bearing - Lubrication

Optional on rollers without cab



Keep in mind that the chain is a vital part of the steering mechanism.

Remove the cover (5) to access the lubrication nipple (1). Lubricate the operator seat slew bearing with three strokes of a hand-operated grease gun.

Lubricate the seat locking latch (7) (accessible from below).

Also grease the seat slide rails (6).



If the seat starts to be stiff when adjusting, it should be lubricated more often than specified here.

Clean and grease the chain (3) between the seat and the steering column.

If the chain is slack on the sprocket (2), loosen the screws (4) and move the steering column forward. Tighten the screws and check chain tension.

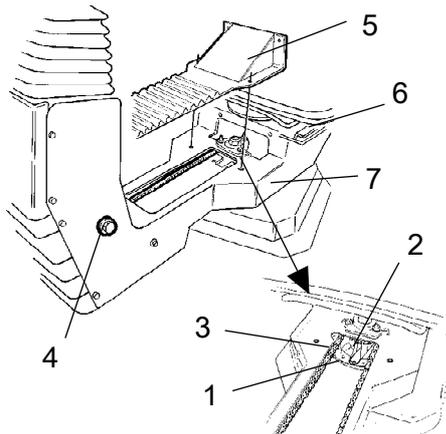


Fig. Seat bearing
1. Grease nipple
2. Cogwheel
3. Steering chain
4. Adjusting screw
5. Cover
6. Slide rails
7. Slew interlock

Maintenance - 1000h



Park the roller on a level surface. When checking and making adjustments, the engine should be switched off and the emergency/parking brake should be applied, if not otherwise specified.



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



Hydraulic filter - Replacement

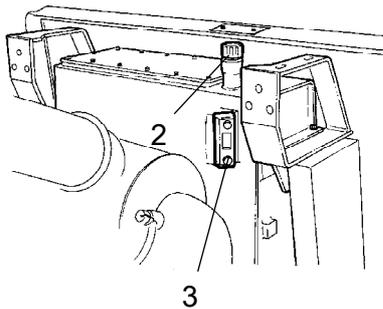


Fig. Hydraulic reservoir
2. Filler cap/Bleeding filter
3. Sight glass

Undo the filler cap/bleeder filter (2) on top of the reservoir so that over-pressure inside the reservoir can be eliminated.

Make sure that the bleeding filter (2) is not clogged, air must have unobstructed passage through the cap in both directions.

If passage in either direction is blocked, clean the filter with a little diesel oil and blow through with compressed air until the block is removed, or replace the cap with a new one.



Wear protective goggles when working with compressed air.

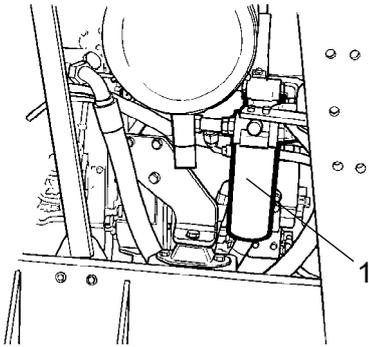


Fig. Engine compartment
1. Hydraulic fluid filter (x2).

Clean thoroughly around the oil filters.



Remove the oil filters (1) and dispose of them in an approved manner. They are single-use filters and cannot be cleaned.



Make sure that the old sealing rings are not left on the filter holders, as this could cause leakage between the new and old gaskets.

Thoroughly clean the sealing surfaces of the filter holders.

Apply a thin coat of fresh hydraulic fluid to the rubber gaskets on the new filters. Screw on the filter by hand.



First tighten the filter until its seal is in contact with the filter attachment. Then turn an additional half revolution. Do not tighten the filter too hard as this could damage the gasket.

Start the engine and ensure that there is no leakage of hydraulic fluid from the filters. Check level of fluid in the sight glass (3) and top up as required.



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



Hydraulic reservoir - Draining

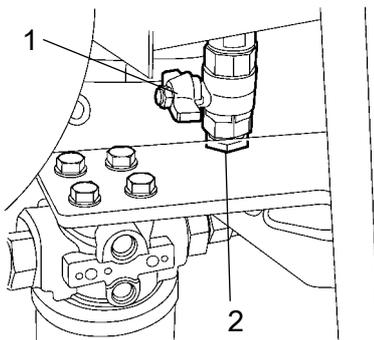


Fig. Underside of hydraulic reservoir
1. Drainage tap
2. Plug

The condensate from the hydraulic reservoir is drained through the drainage tap (1).

Drain the roller after it has been stationary for a long time, e.g. after standing overnight. Drain as follows:

Remove the plug (2).

Place a container under the tap.

Open the tap (1) and let any trapped condensate run out.

Shut the drainage tap.

Refit the plug.



Fuel tank - Drainage

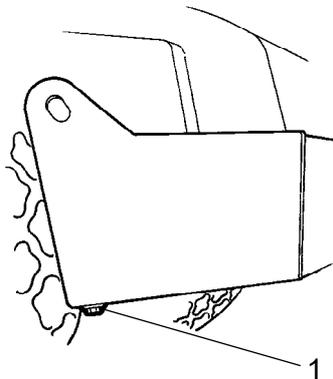


Fig. Fuel tank
1. Drain plug

Water and sediment in the fuel tank are removed via the drainage plug in the bottom of the fuel tank.

! Be very careful during draining. Do not drop the plug or else all the fuel will flow out.

Drain the roller after it has been stationary for a long time, e.g. after standing overnight. The fuel level should be as low as possible.

The roller should preferably have been standing with this side somewhat lower, so that water and sediment will gather near the drainage plug (1). Drain as follows:

Place a container under the plug (1).

Remove the plug and drain the water and sediment until only pure fuel runs from the plug. Refit the plug.



Rear axle differential - Oil change

! **Never work under the roller when the engine is running. Park on a level surface. Block the wheels securely.**

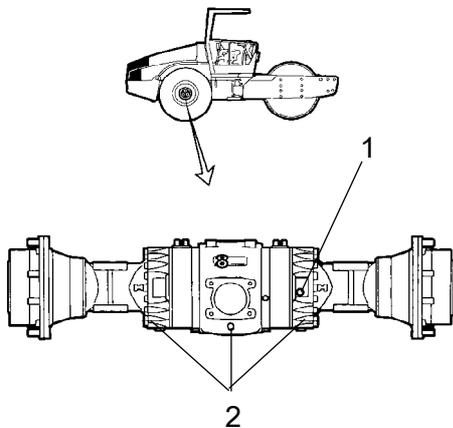


Fig. Rear axle
1. Level/Filler plug
2. Drain plugs

Wipe clean and remove the level/filler plug (1) and all three drain plugs (2) and drain the oil into a suitable receptacle. The volume is approx. 7 liters (7.4 qts).

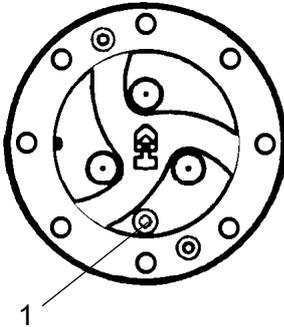
Save the oil and dispose of it in an approved manner.

Refit the drainage plugs and top up with fresh oil until the correct level is reached. Refit the level/filler plug. Use transmission oil, see Lubricant Specification.

Remember to drain the oil from the rear axle's transmission pipe.



Rear axle planetary gear - Oil change



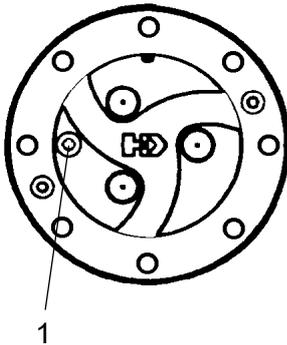
Position the roller with the plug (1) at its lowest position.

Wipe clean, unscrew the plug (1) and drain the oil into a suitable receptacle. The volume is approx. 0.8 liters (0.85 qts).



Save the oil and dispose of it in an approved manner.

Fig. Planetary gear/drainage position
1. Plug



Position the roller with the plug (1) in the planetary gear in the "9 o'clock" position.

Fill with oil to lower edge of level hole. Use transmission oil. See the lubrication specification.

Clean and refit the plug.

Check the fluid level in the same way on the rear axle's other planetary gear.

Fig. Planetary gear/filling position
1. Plug



**Air conditioning (Optional)
Fresh air filter - Change**



Use a step ladder to reach the filter (1). The filter can also be accessed via the right cab window.

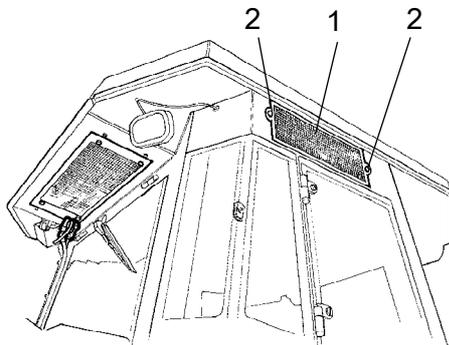


Fig. Cab
1. Fresh air filter
2. Screw (x2)

Loosen the two screws (2) on the cab's right side. Take down the whole holder and remove the filter insert.

Replace with a new filter.

It may be necessary to change the filter more often if the machine is working in a dusty environment.

Maintenance - 2000h



Park the roller on a level surface. When checking and making adjustments, the engine should be switched off and the emergency/parking brake should be applied, if not otherwise specified.



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



Hydraulic reservoir - Oil change

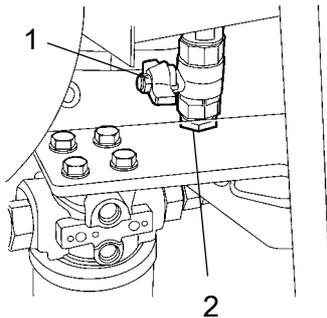


Fig. Underside of hydraulic reservoir
1. Drainage tap
2. Plug

Obtain a container for collecting the used fluid. The container should be able to hold at least 60 liters (16 gal).



Observe care when draining hot hydraulic fluid. Wear protective gloves and goggles.

A suitable container may be an empty oil drum or similar item which is placed beside the roller. The fluid then runs in a hose from the drainage plug (1) to the oil drum, after the plug (2) has been removed and the tap opened.



Save the oil and dispose of it in an approved manner.

Fill up with fresh hydraulic fluid as per the instructions under the heading "Hydraulic reservoir - Check fluid level". Replace the hydraulic fluid filters at the same time.

Start the diesel engine and operate the various hydraulic functions.

Check the fluid level and top up if necessary.



Drum - Oil change

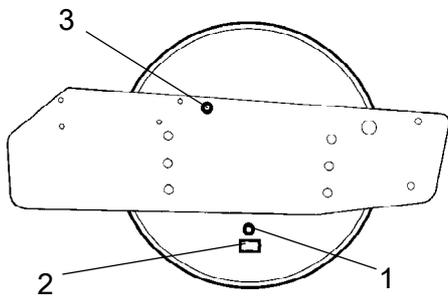


Fig. Roller, right-hand side
1. Drain/Filler plug
2. Number plate
3. Sight glass

Place the roller on a level surface so that the drain plug (1) is straight down. Position a container that holds 15 liters under the plug.



Save the oil and dispose of it in an approved manner.

Clean and remove the drain plug (1). Allow all of the oil to drain off. Fill with oil according to "Drum - Checking the oil level."



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



Forward/Reverse lever - Lubrication

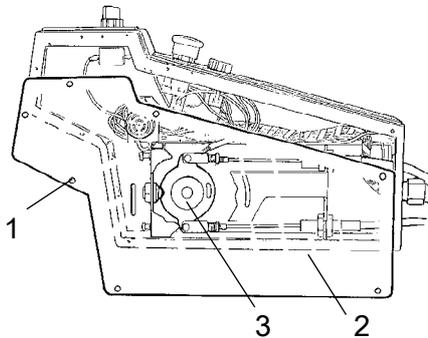


Fig. Forward/Reverse lever
1. Screw
2. Plate
3. Cam disc

Remove the screws (1) and take off the plate (2). Grease the contact surface on the cam disc (3). Refit the plate (2) with the screws (1).

**Automatic Climate Control (Optional)
- Overhaul**

Regular inspection and maintenance are necessary to ensure satisfactory long-term operation.

Clean all dust from the condenser element (1) using compressed air. Blow from above downwards.



The air jet can damage the element flanges if it is too powerful.

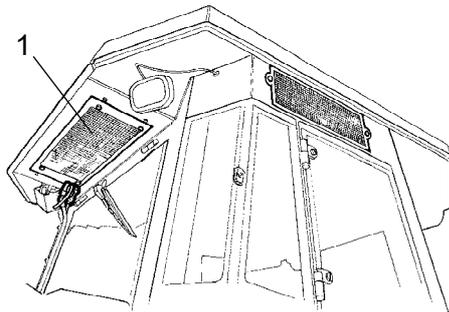


Fig. Cab
1. Condenser element



Wear protective goggles when working with compressed air.

Inspect the condenser element attachment.

Clean all dust from the cooling unit and the cooling element (1) using compressed air.

Check the system hoses for chafing. Make sure that drainage from the cooling unit is unobstructed so that no condensation accumulates inside the unit.

Drain by pinching the valves (2)

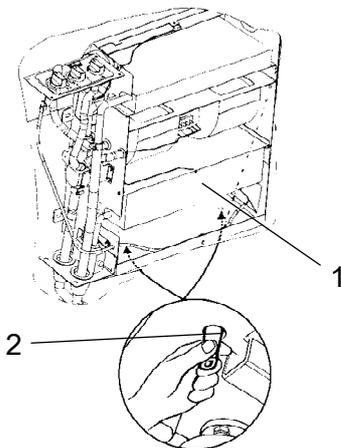


Fig. Automatic climate control
1. Cooling element
2. Drain valve (x2).

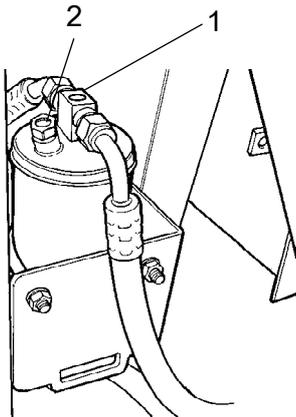


Fig. Drying filter in engine compartment
1. Sight glass
2. Moisture indicator

Drying filter - Check

With the unit in operation, open the engine hood and check using the sight glass (1) that bubbles are not visible on the drying filter. If bubbles are visible through the sight glass, it is a sign that the refrigerant level is too low. If so, stop the unit. The unit may be damaged if it is run with insufficient refrigerant.

Check the moisture indicator (2). It should be blue. If it is beige, the dryer cartridge should be changed by an authorized service company.

! *The compressor will be damaged if the unit is run with too little refrigerant.*

! *Do not disconnect or undo the hose couplings.*

! *The cooling system is pressurized. Incorrect handling can result in serious personal injury.*

! *The system contains pressurized refrigerant. It is forbidden to release refrigerants into the atmosphere. Work on the refrigerant circuit is only to be carried out by authorized companies.*

Compressor - Check (Optional)

Inspect the attachment of the compressor (1).

The compressor is located over the alternator in the engine compartment.

The unit should, if possible, be run at least five minutes every week to ensure the lubrication of the gaskets and compressor in the system.

Check the drive belt (2) for any physical damage or cracks.

! *The air conditioning unit should not be run when the outdoor temperature is below 0 C, other than for the above.*

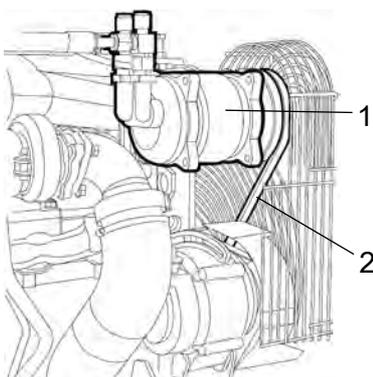


Fig. Engine compartment
1. Compressor
2. Drive belt

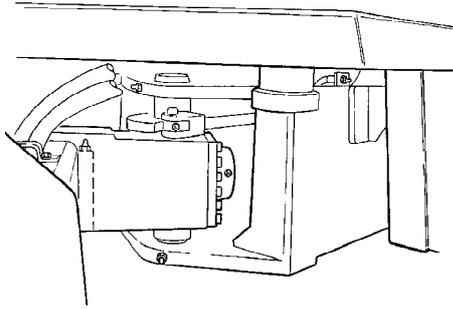


Fig. Steering joint

Steering joint - Check

Inspect the steering joint to detect any damage or cracks.

Check and tighten any loose bolts.

Check also for any stiffness and play.

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