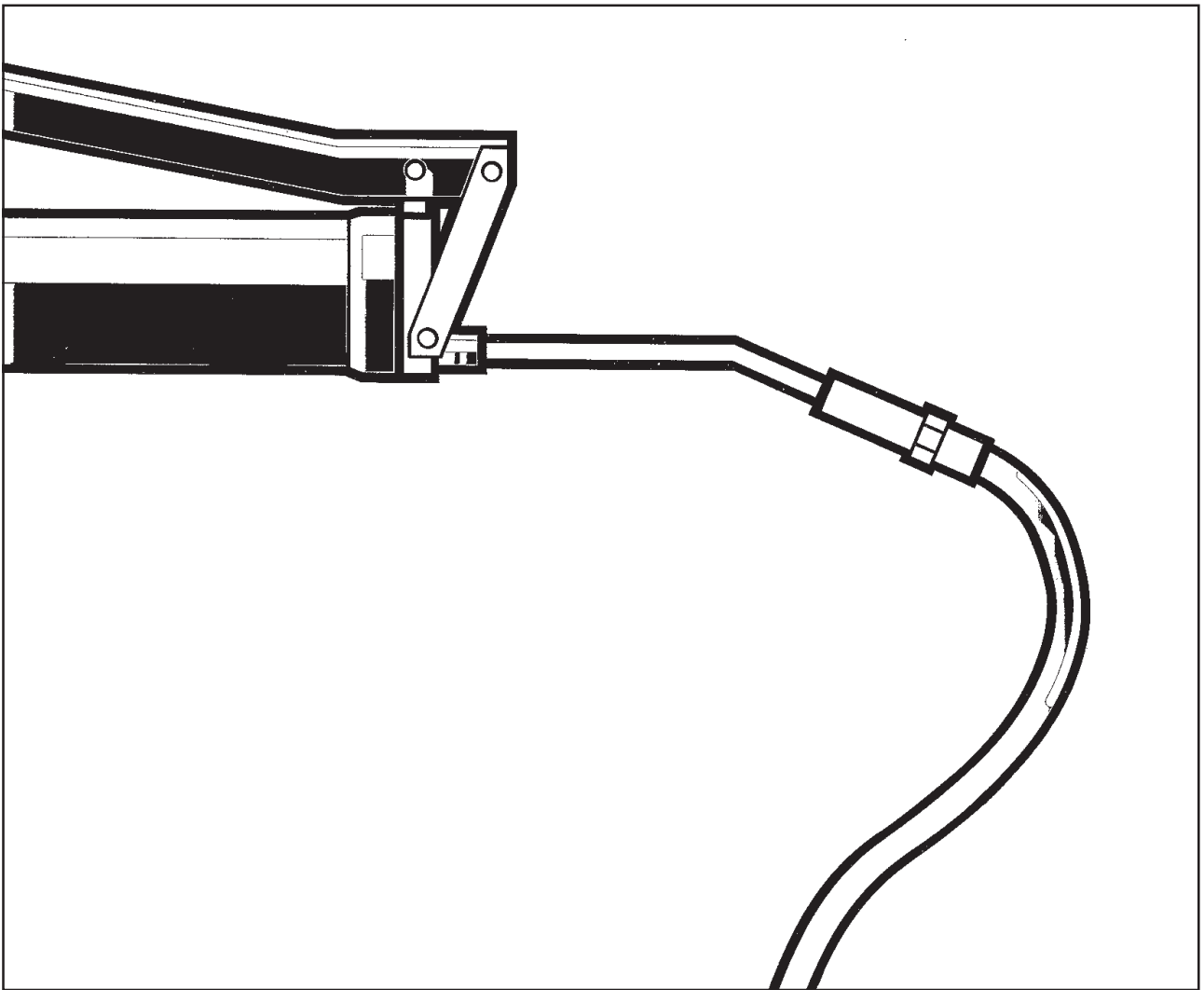


DYNAPAC CA152 MAINTENANCE

M152EN3



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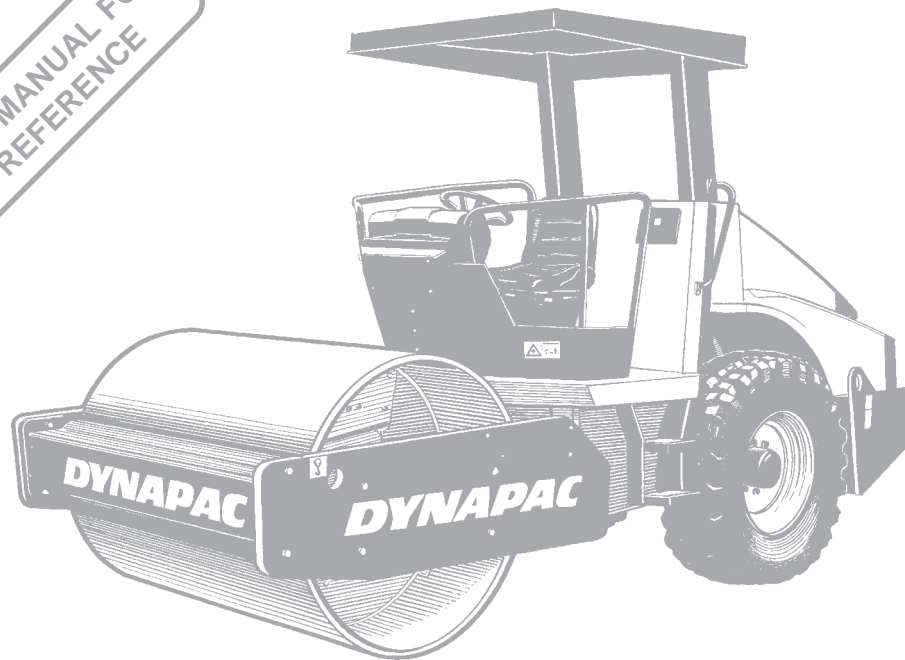
Vibratory Roller CA152

Maintenance M152EN3, December 2003

**Diesel engine:
CA152: Cummins 4B 4.5**

**These instructions apply from:
CA152 PIN (S/N) *64X21600***

**KEEP THIS MANUAL FOR
FUTURE REFERENCE**



The CA152 is one of Dynapac's light vibratory rollers. It is available in STD, D (smooth drum) and P, PD (padfoot) versions respectively. The P, PD version has its greatest range of application on cohesive material and disintegrated rock.

All types of base courses and sub-bases can be compacted, and the interchangeable drums, from D to PD and vice versa, provide even greater versatility in the choice of application.

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

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WARNING SYMBOLS

WARNING



Safety instruction – Personal Safety

CAUTION



Special caution – Machine or component damage

GENERAL

WARNING



Read through the entire manual before starting any maintenance operations.

WARNING



Ensure good ventilation (air extraction) if the diesel engine is run indoors.

WARNING



If the engine cover's gas struts are disengaged and the cover is raised to its upper position, block the cover so that it cannot fall down accidentally.

It is important that the roller is maintained correctly to ensure proper function. It should be kept clean so that any leakage, loose bolts and loose connections can be discovered in time.

Make a habit of walking round the roller to check it every day before starting the first shift – including under the machine. This is often the easiest way of discovering any leakage.



SPARE A THOUGHT FOR THE ENVIRONMENT! Do not let oil, fuel and other environmentally hazardous substances contaminate the environment.

This manual contains instructions for periodic attention which should normally be carried out by the roller operator.

CAUTION



There are additional instructions relating to the diesel engine, for which the manufacturer's instructions are detailed in the engine manual. This is found under a separate flap in the roller's product binder.

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.

LUBRICANTS AND SYMBOLS
















Always use high-quality lubricants, in the quantities specified. Excess grease or oil can promote overheating, resulting in premature wear.

	ENGINE OIL ambient air temperature -10°C – +50°C (14°F - 122°F)	Shell Rimula SAE 15W/40 or equivalent API Service CH-4 (CG-4)
	HYDRAULIC FLUID ambient air temperature -10°C – +40°C (14°F - 104°F) ambient air temperature above +40°C (above 104°F)	Shell Tellus Oil TX68 or equivalent Shell Tellus Oil T100 or equivalent
	BIODEGRADABLE HYDRAULIC FLUID	Shell Naturelle HF-E46 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 off.
	TRANSMISSION OIL ambient air temperature -15°C – +40°C (5°F - 104°F) ambient air temperature above +40°C (above 104°F)	Shell Spirax SAE 80W/90, HD API, GL-5 Shell Spirax HD85W/140 or equivalent
	DRUM OIL ambient air temperature -15°C – +40°C (5°F - 104°F) ambient air temperature above +40°C (above 104°F)	Shell Spirax SAE 80W/90, HD API, GL-5 Shell Spirax HD85W/140 or equivalent
	GREASE	SKF LGHB2 (NLGI Class 2) or equivalent for articulated joint. Shell Retinax LX2 or equivalent for other lubrication points.
	FUEL	See the engine manual
	COOLANT mixed 50/50 with water	GlycoShell or equivalent Anti-freeze protection down to about -41°C (-42°F).



When driving in extremely high or low ambient temperatures, other lubricants are needed. Refer to the chapter entitled "Special Instructions" or contact Dynapac.

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

TECHNICAL SPECIFICATIONS

Weights & dimensions	CA152STD	CA152D	CA152P	CA152PD
Operating mass with ROPS, EN500, kg (lbs)	7180 (15,829)	7330 (19,639)	7530 (16,601)	7680 (16,932)
Operating mass without ROPS, kg (lbs)	6850 (15,102)	7000 (15,432)	7200 (15,873)	7350 (16,204)
Operating mass with cab, kg (lbs)	7400 (16,314)	7550 (16,645)	7750 (17,086)	7900 (17,417)
Length, standard-equipped roller, mm (in)	4776 (188)	4776 (188)	4871 (192)	4871 (192)
Width, standard-equipped roller, mm (in)	1852 (73)	1852 (73)	1852 (73)	1852 (73)
Height, with ROPS, mm (in)	2784 (110)	2784 (1110)	2825 (111)	2825 (111)
Height, without ROPS, mm (in)	2051 (81)	2051 (81)	2066 (81)	2066 (81)
Height, with cab, mm (in)	2815 (111)	2815 (111)	2857 (112)	2857 (112)

Fluid volumes Litres (gal or qts)

Rear axle:		
- Differential	7 l	(7.4 qts)
- Planetary gears	0,8 l	(0.8 qts) /each side
Drum	10,5 l	(11.1 qts)
Hydraulic reservoir	52 l	(13.7 gal)
Oil in hydraulic system	18 l	(4.8 gal)
Lubrication oil, diesel engine	10 l	(10.6 qts)
Coolant, diesel engine	20 l	(21.1 qts)
Fuel tank	225 l	(59.4 gal)

Electrical system

Battery	12 V, 170 Ah
Alternator	14 V, 95 A
Fuses	See under heading "Electrical System"

Tires (all-weather)

Tire dimensions	420/70 B24 (Std type)	14,9-24T461 8 ply (Tractor type)
Tire pressure	110 kPa (1,1 kp/cm ²) (16 psi)	180 kPa (1,8 kp/cm ²) (26 psi)

WARNING



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.

Vibration data CA152STD CA152D CA152P, PD

Static linear load	kg/cm (pli)	21,5 (120.4)	22,4 (123.76)	-
Amplitude (High)	mm (in)	1,7 (0.07)	1,7 (0.07)	1,7 (0.07)
Amplitude (Low)	mm (in)	0,8 (0.03)	0,8 (0.03)	0,9 (0.03)
Frequency (High amplitude)	Hz (vpm)	29 (1740)	29 (1740)	29 (1740)
Frequency (Low amplitude)	Hz (vpm)	40 (2400)	40 (2400)	40 (2400)
Centrifugal force (High amplitude)	kN (lb)	100 (22,500)	100 (22,500)	125 (28,101)
Centrifugal force (Low amplitude)	kN (lb)	94 (21,150)	94 (21,150)	118 (26,550)

TECHNICAL SPECIFICATIONS

Tightening torque

Tightening torque in Nm (lbf.ft) for oiled, bright galvanized bolts tightened with a torque wrench.

M thread	STRENGTH CLASS		
	8.8	10.9	12.9
M6	8,4 (6.2)	12 (8.9)	14,6 (10.8)
M8	21 (15.5)	28 (20.7)	34 (21.1)
M10	40 (15.5)	56 (41.3)	68 (25.1)
M12	70 (51.6)	98 (72.3)	117 (86.3)
M16	169 (124.7)	240 (177)	290 (213.9)
M20	330 (243.4)	470 (346.7)	560 (413.1)
M24	570 (420.4)	800 (590.1)	960 (708.1)
M30	1130 (833.5)	1580 (1165.4)	1900 (1401.4)
M36	1960 (1445.7)	2800 (2065.3)	–

ROPS

CAUTION



ROPS bolts must **always** be tightened dry.

Bolt dimension:	M20 (P/N 50 02 26)
Strength category:	8.8
Tightening torque:	330 Nm (243 lbf.ft) (for Dacromet treated)

Hydraulic system

Opening pressure, MPa (psi)

Drive system	38,0	(5,500)
Charge system	2,0	(290)
Vibration system	33,0	(4,800)
Steering system	18,0	(2,600)
Brake disengagement	1,4	(200)

Air conditioner (Optional)

The system described in this manual is of the ACC type (Automatic Climate Control), ie, a system that maintains the set temperature in the cab, on condition that windows and doors are kept closed.

Refrigerant designation: HFC-R134:A
Weight of refrigerant when newly filled CA152=1600 gram

TECHNICAL SPECIFICATIONS

Vibrations – Drivers seat (ISO 2631)

The vibration values are measured in conformance with the driving mode described in EU directive 2000/14/EC on EU equipped machines, on soft polymer material with vibration switched ON and the operator's seat in transport mode.

Whole-body vibration is measured at less than the action value of 0.5 m/s² specified in EU directive 2002/44/EC. (The limit value is 1.15 m/s².)

Hand/arm vibration is measured at less than the action value of 2.5 m/s² specified in the same directive. (The limit value is 5 m/s².)



Vibration levels may vary when driving on different courses and with different seat positions.

Acoustic values

The acoustic values are measured in conformance with EU directive 2000/14/EC on EU-equipped machines, on soft polymer material with vibration switched ON and the operator's seat in transport mode.

Model	Guaranteed acoustic power level dB(A) LwA	Acoustic pressure level, operator's ear (platform) dB(A) LpA	Acoustic pressure level, operator's ear (cab)dB(A) LpA
CA152	105	84	80
CA152LN	102	–	79



Noise level can vary when driving on different courses and with different seat positions.

MAINTENANCE SCHEDULE

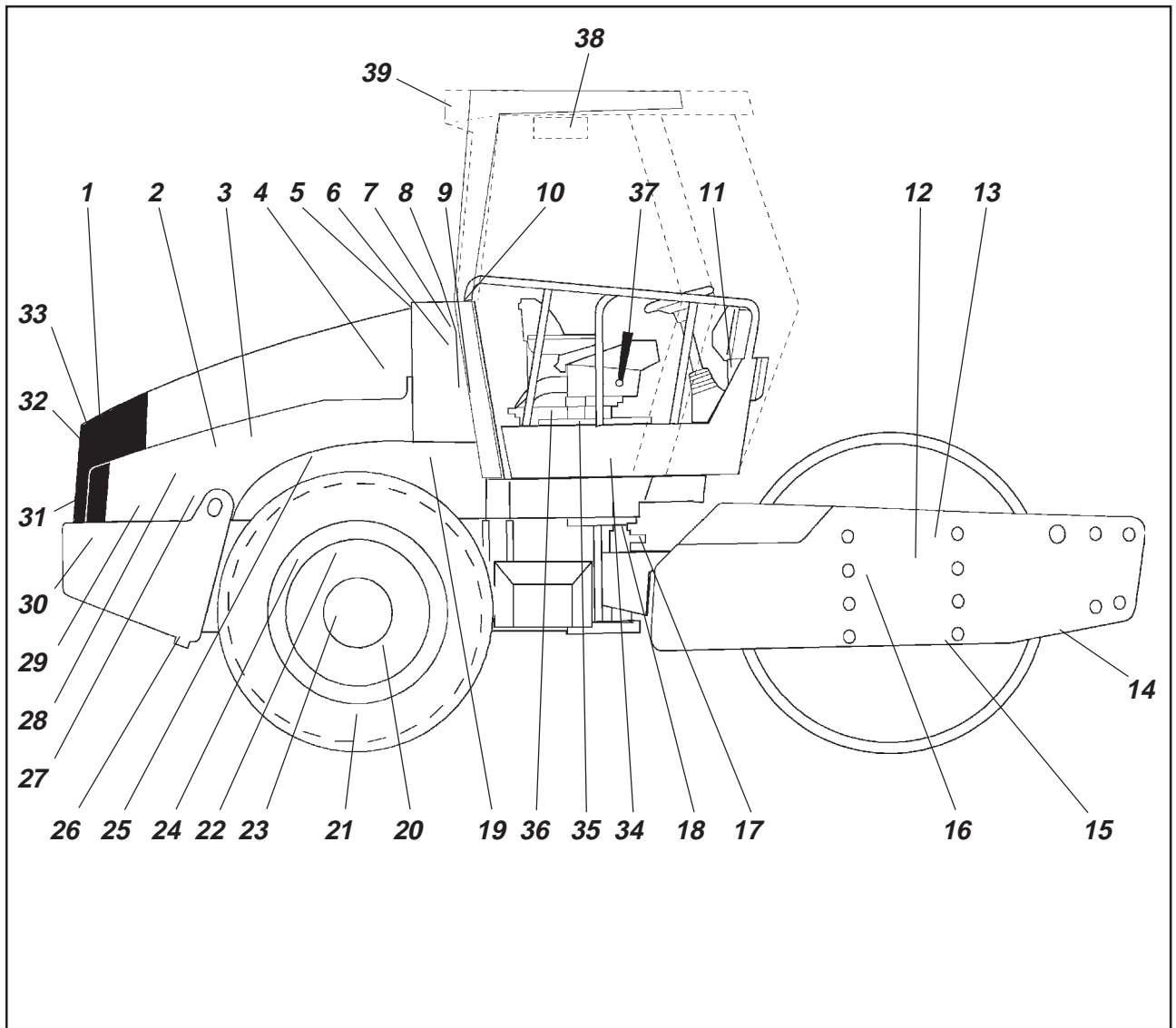


Fig. 1 Service and maintenance points

- | | | |
|----------------------------------------|-------------------------------------------|-----------------------------------------------|
| 1. Radiator grille | 15. Drum oil, level plugs, 2 pcs. | 28. Feed pump, fuel |
| 2. Oil level, diesel engine | 16. Rubber elements and attachment screws | 29. Diesel fuel, filler |
| 3. Fuel filter | 17. Steering joint | 30. Battery |
| 4. Air filter | 18. Steering cylinder | 31. Radiator |
| 5. Engine cover, hinges | 19. Flywheel casing, hydraulic pumps | 32. Hydraulic fluid cooler |
| 6. Hydraulic fluid tank, sightglass | 20. Wheel nuts | 33. Drive belts, cooling, alternator |
| 7. Bleeding filter | 21. Tires, pressure | 34. Steering chain |
| 8. Hydraulic fluid filters (2 filters) | 22. Rear axle, differential | 35. Seat bearing |
| 9. Drainage, hydraulic fluid reservoir | 23. Rear axle, planetary gears, 2 pcs. | 36. Steering chain |
| 10. Hydraulic fluid, filler | 24. Rear axle suspension, 2 sides | 37. Forward/Reverse lever |
| 11. Fuse-box | 25. Oil filter, diesel engine | 38. Fresh air filter <input type="checkbox"/> |
| 12. Drum oil, filling, 2 fillers | 26. Drainage, fuel tank | 39. Air conditioner <input type="checkbox"/> |
| 13. Drum gearbox | 27. Diesel engine mountings, 4 pcs. | |
| 14. Scrapers | | <input type="checkbox"/> = Optional |

MAINTENANCE MEASURE

Periodic maintenance shall be carried out at the specified intervals, that is to say either every day, every week etc., or after the specified number of operating hours, whichever comes first.



Always first remove all exterior dirt before filling up fluids etc., and before checking oil and fuel levels, and also when lubricating with grease or oil.



The engine manual specifies additional service/maintenance instructions which relate to the diesel engine.

Every 10 operating hours (daily)

Item. in fig. 1	Measure	See page	Comments
	Before the day's first start		
14	Check scraper setting	10	
1	Check for free circulation of cooling air	11	
31	Check coolant level	11	See engine manual
2	Check diesel engine oil level	11	See engine manual
29	Top up fuel tank	12	
6	Check fluid level in hydraulic tank	12	
	Check brakes	12	

Every 50 operating hours (weekly)

Item. in fig. 1	Measure	See page	Comments
	Check that hoses and couplings are not leaking		
7	Clean the filter element of the air cleaner	13	Replace as required
17	Lubricate steering joint	14	
18	Lubricate the steering cylinder brackets	14	
20	Check the wheel-nuts are tightened	15	
21	Check tire pressure	15	
39	Inspect the air conditioning	15	Optional
-	Lubricate the strike-off blade bearings.	16	Optional

CAUTION

After the **first** 50 hours of operation change only the drum oil and all the oil filters.

MAINTENANCE MEASURE

Every 250 operating hours (monthly)

Item. in fig. 1	Measure	See page	Comments
23	Check the oil level in rear axle/planetary gearing	17	
15	Check the oil level in drum	17	
32	Clean the radiators	18	
20, 24	Inspect and tighten bolted joints	18	Applies only to new and repaired components
16	Inspect rubber elements and bolted joints	18	
30	Inspect the battery	19	
	Inspect the air conditioning	19	Optional

Every 500 operating hours (every three months)

Item. in fig. 1	Measure	See page	Comments
3	Replace fuel filter		See engine manual
5	Lubricate controls and joints	20	
3	Replace fuel pre-filter	20	
25	Change engine oil and oil filter	20	See engine manual
36	Lubricate the steering chain	21	Optional
35	Lubricate the seat bearing	21	Optional
7	Check bleeder filter on hydraulic tank	22	

Every 1000 operating hours (every six months)

Item. in fig. 1	Measure	See page	Comments
8	Change the hydraulic fluid filters	22	
9	Drain condensate from hydraulic tank	22	
26	Drain condensate from fuel tank	23	
4	Replace air cleaner main filter	23	
22	Change oil in rear axle differential	23	
23	Change oil in rear axle planetary gears	24	
38	Replace the fresh air filter in the cab	24	Optional
	Check diesel engine valve clearance		See engine manual
33	Check belt tension for drive belt system		See engine manual

Every 2000 operating hours (every year)

Item. in fig. 1	Measure	See page	Comments
9, 10	Change fluid in hydraulic tank	25	
12, 15	Change oil in roller	25	
37	Lubricate Forward/Reverse control	26	
	Overhaul air conditioning	27	Optional

EVERY 10 OPERATING HOURS (DAILY)

Scrapers – Check/Adjust

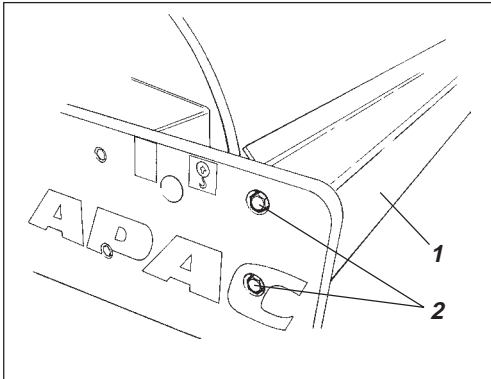


Fig. 2 Scrapers
1. Scraper beam
2. Screws



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



It is important to consider movement of the drum when the machine turns, ie, the scrapers can be damaged or wear of the drum may increase if adjustment is made closer than the values stated.

If necessary, adjust distance to the drum as follows: the scraper is integrated with the beam. Loosen the four screws (2) on the frame side, then adjust the beam to about 20 mm (0.8 in) from the drum. Tighten the screws.

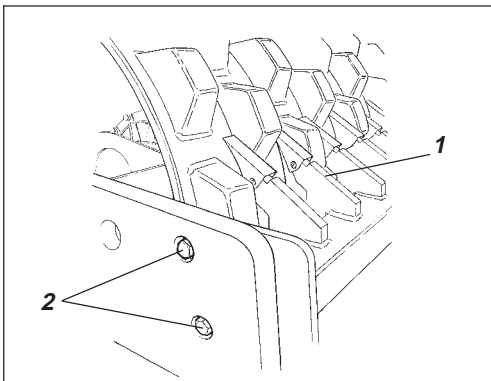


Fig. 3 Scrapers
1. Scraper blade
2. Screws

CA 152 P, PD

Loosen the four screws (2) on the frame side, then adjust the beam to about 25 mm (1 in) between the teeth and the drum. Tighten the screws.

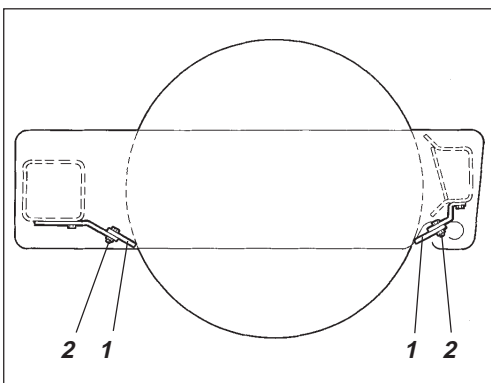


Fig. 4 Scrapers
1. Scraper blade
2. Screws

Soft scrapers (Optional)

Loosen the screws (2) and adjust to light contact against the drum. Tighten the screws.

EVERY 10 OPERATING HOURS (DAILY)

Air circulation – Check

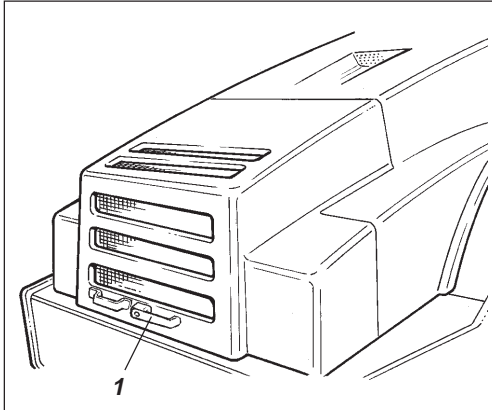


Fig. 5 Grille
1. Hood lock

Check that the diesel engine has free circulation of cooling air through the grille in the engine compartment.

Press the button on the hood lock (1) to open, and raise the engine hood to its fully open position. Ensure that the red safety catch on the left gas-spring is engaged.

WARNING



If the engine cover's gas struts are disengaged and the cover is raised to its upper position, block the cover so that it cannot fall down accidentally.

Coolant level – Check

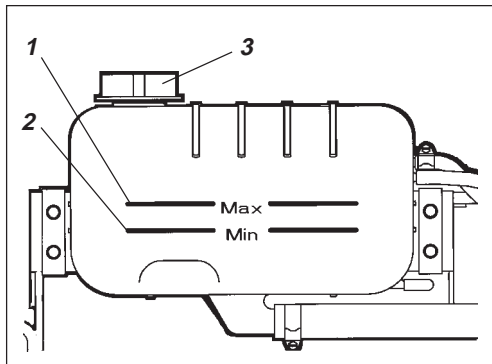


Fig. 6 Radiator
1. Max. level
2. Min. level
3. Filler cap

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

WARNING



Danger of scalding. 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 lubricant specification and in the engine manual.

CAUTION



Flush the system every other year and change the coolant. Ensure also that air can flow unrestricted through the radiator.

Diesel engine – Check oil level

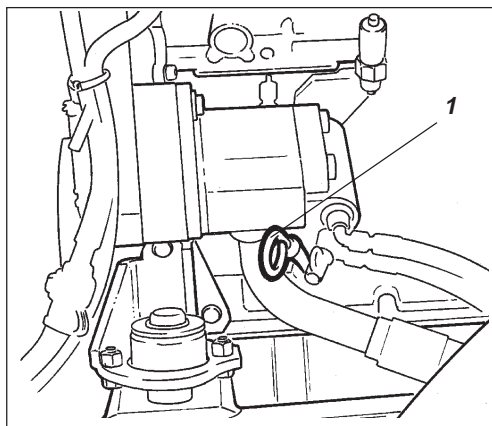


Fig. 7 Engine compartment
1. Oil dipstick

WARNING



Park the machine on a level surface. The engine should be switched off and the parking brake engaged during all inspection and adjustment operations on the machine, unless otherwise stated.

WARNING



Watch out for contact with hot engine parts and the hot radiator when the oil dipstick is being removed. There is a risk of burn injuries.

The dipstick is located on the engine's right 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 manual.

EVERY 10 OPERATING HOURS (DAILY)

Fuel tank – Filling

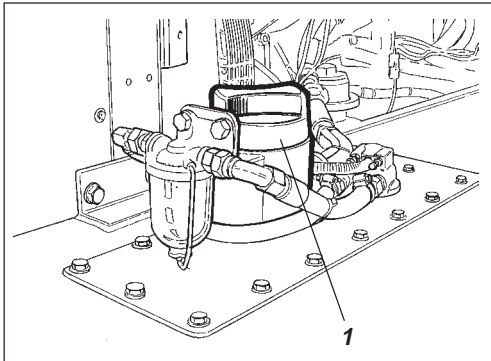


Fig. 8 Fuel tank
1. Tank cap

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.

WARNING



Switch off the diesel 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.

WARNING



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

See the engine manual with regard to quality of diesel fuel.

The tank holds 225 litres (59.4 gal).

Hydraulic reservoir – Check fluid level

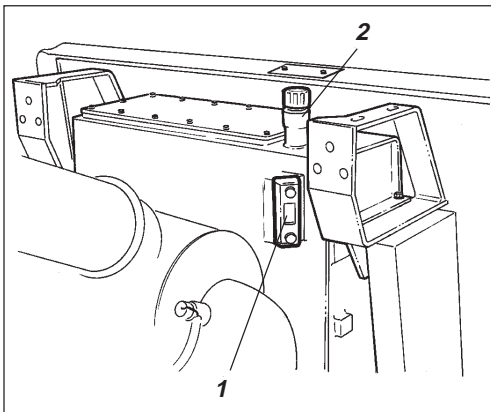


Fig. 9 Hydraulic fluid reservoir
1. Sight glass
2. Filler pipe

Position the roller on a level surface and check that the sight glass reading (1) is between the max. – min. marks. Top off with hydraulic fluid according to the lubricant specification if the level is too low.

Brake function – Check

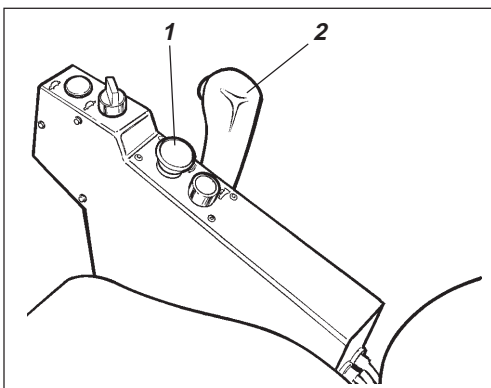


Fig. 10 Control panel
1. Reserve-/parking brake knob
2. Forward/reverse lever

WARNING



Check operation of the brakes as follows:

Drive the roller **slowly** forward.

Push the reserve/parking brake knob (1); the warning lamp on the instrument panel should light and the roller should stop.

After testing the brakes, set the forward/reverse lever (2) in neutral.

Pull up the reserve-/parking brake knob.

The roller is now ready for operation.

EVERY 50 OPERATING HOURS (WEEKLY)

Air cleaner – Check/clean

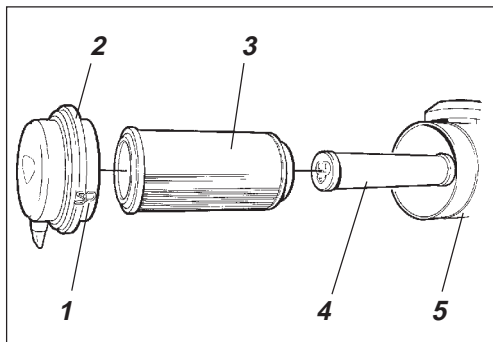


Fig. 11 Air cleaner

1. Locking braces
2. Cover
3. Main filter
4. Safety filter
5. Filter housing

CAUTION



Replace or clean the air cleaner's main filter if the warning lamp on the instrument panel lights up when the diesel engine is operating at full speed.

Undo the three locking braces (1). Then pull off the cover (2) and pull out the main filter (3).

Do not remove the safety filter (4).

Main filter – Cleaning with compressed air

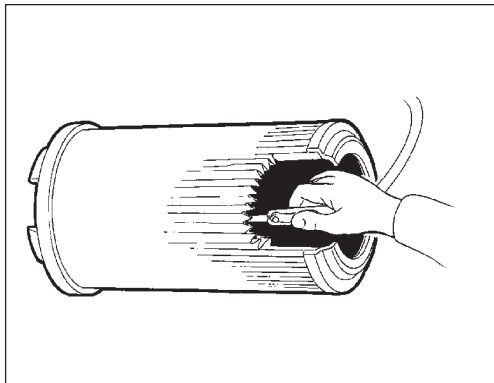


Fig. 12 Main filter

If the main filter is to be cleaned, compressed air at max. 5 bar (72 lbs/sq in) pressure should be used. Blow up and down along the paper creases on the inside of the filter.

Hold the nozzle at least 2–3 cm (0.8-1.2 in) away from the paper creases so that the paper does not tear under the pressure of air.

WARNING



Use protective goggles when working with compressed air.

Dry the inside of the cover (2) and filter housing (5).

CAUTION



Check that the hose clamps between the filter housing and inlet hose are tightened and that they do not leak. Check the entire length of the hose all the way to the engine.

CAUTION



Once the main filter has been cleaned a maximum of 5 times, it must be replaced.

Safety filter – Replacement

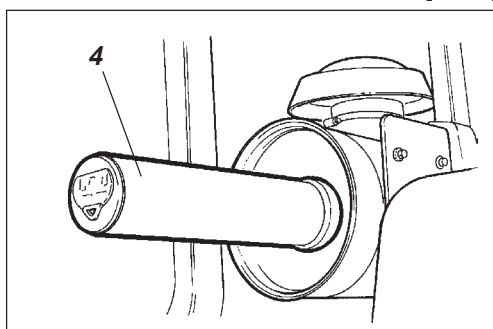


Fig. 13 Air filter

4. Safety filter

Replace the safety filter with a new one at every 5th replacement or cleaning of the main filter. The safety filter cannot be cleaned.

When replacing the safety filter (4), pull out the old filter from its holder, insert a new one and refit the air cleaner in the reverse order to the instructions given in the figure above.

EVERY 50 OPERATING HOURS (Weekly)

Steering joint and steering cylinder – Lubrication

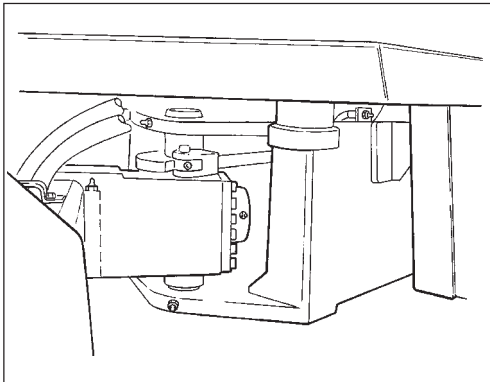


Fig. 14 Steering joint, left side

WARNING



Place the roller on a level surface. Switch the engine off and push in the reserve/parking brake knob for all checking and adjustments on the roller, unless otherwise specified.

WARNING



Allow no one to get near the steering joint when the engine is running. Danger of being crushed when steering is operated. Push the reserve/parking brake knob before lubricating.

Turn the steering wheel fully to the right to gain access to all six lubricating nipples on the left side.

CAUTION



Use grease recommended in Lubricant Specification on page 3.

Steering joint – Lubrication

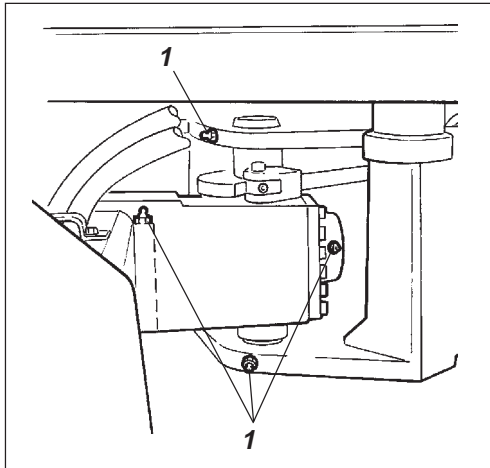


Fig. 15 Steering joint, left side

1. Lubricating nipples, steering joint (x4)

Wipe all the nipples clean from dirt and grease.

Lubricate each nipple (1) with five strokes of the grease gun. Make sure that grease penetrates the bearings.

If grease does not penetrate through the bearings, it may be necessary to relieve the load on the articulated joint with a hydraulic jack and then repeat the greasing process.

Steering cylinder – Lubrication

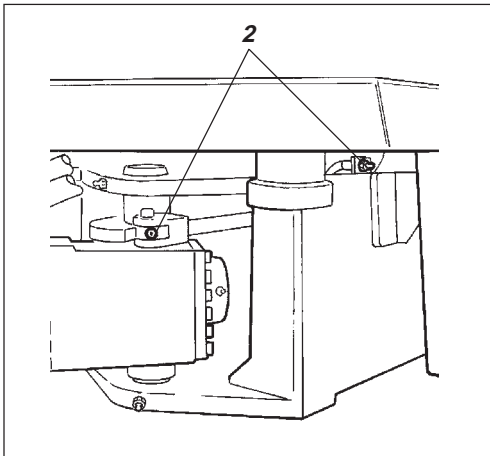


Fig. 16 Steering cylinder, left side

2. Lubricating nipples, cylinder brackets (x2)

Wipe nipples clean from dirt and grease.

Lubricate each nipple (2) with three strokes of the grease gun.

Allow a little grease to remain on the nipples after greasing. This will prevent contaminants from entering the nipples.

EVERY 50 HOURS OF OPERATION (Weekly)

Tires – tire pressure Wheel nuts – tightening

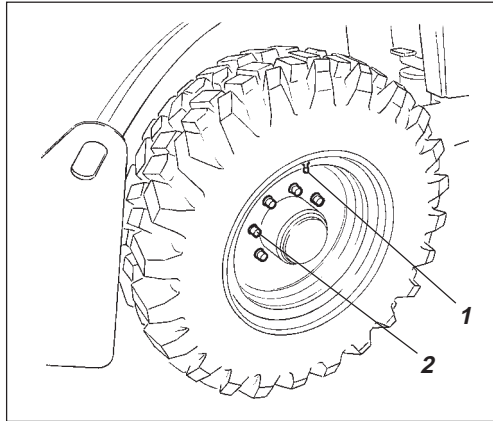


Fig. 17 Wheels

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.

The relevant tire pressures are given under the heading “Specifications”.

Check both tires.

CAUTION



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 470 Nm (350 lbf.ft). Check both wheels and all the nuts. (Applies only to new machine or recently fitted wheels.)

WARNING



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

Air conditioning (Optional) – Inspection

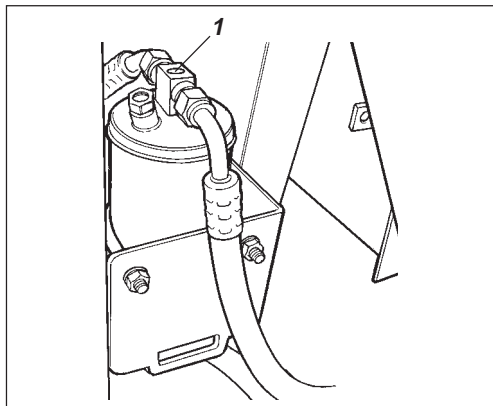


Fig. 18 Drying filter

1. Sight glass

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

WARNING



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

Open the engine hood while the unit is running and look at the sight glass (1) to make sure that no bubbles are visible on the dryer filter.

WARNING



Always push the parking brake knob.

The filter is located on the left side in the front of the engine compartment. If bubbles are visible through the sight glass, it is a sign that the level of refrigerant is too low. If so, stop the unit. There is a risk of damage to the unit if it is run with insufficient refrigerant.

In the event of noticeable deterioration of cooling capacity, clean the condenser element (1), which is located at the rear of the cab roof. Also clean the cooling unit inside the cab.

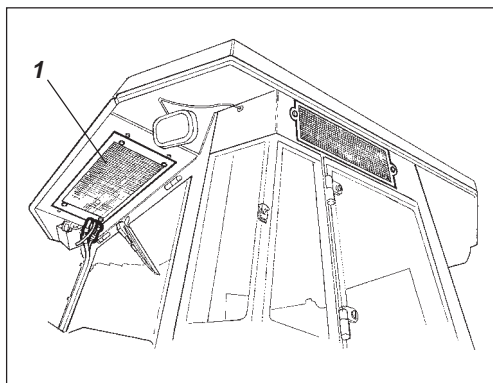


Fig. 19 Cab

1. Condenser element

EVERY 50 HOURS OF OPERATION (Weekly)

Strike-off blade (Optional)

– Lubrication

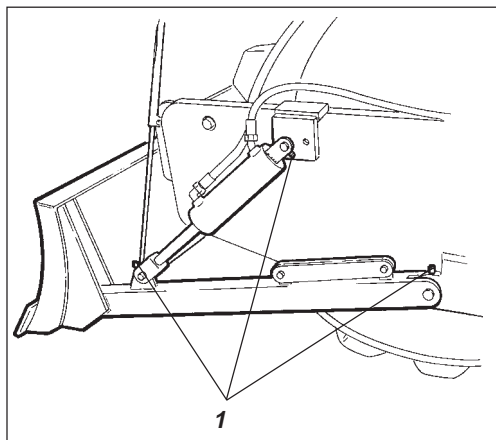


Fig. 20 Strike-off blade
1. Lubricant nipples

WARNING



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

WARNING



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

Lower 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.

EVERY 250 OPERATING HOURS (Monthly)

Rear axle differential – Check oil level

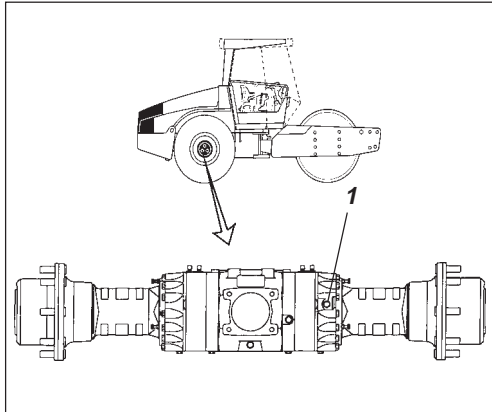


Fig. 21 Oil level check – differential housing
1. Oil level/Filler plug



WARNING
Never work under the roller with the engine 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.

Rear axle planetary gears – Check oil level

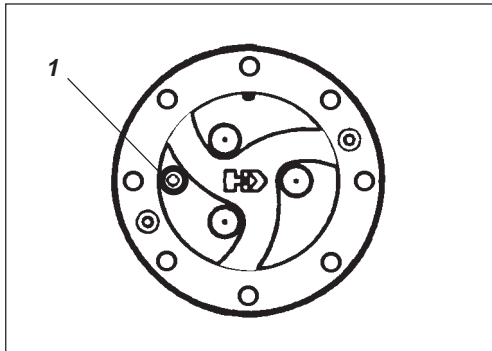


Fig. 22 Oil level check – planetary gear
1. Oil level/Filler plug

Position the roller with the level plug (1) in the planetary gears at 9 o'clock.

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 screw in the plug.

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

Drum – Checking the oil level

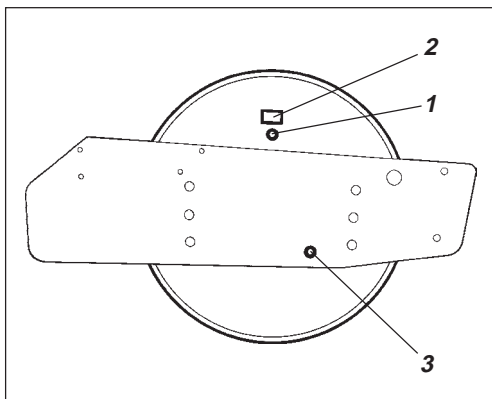


Fig. 23 Right side of drum
1. Filling plug
2. Number plate
3. Sight glass

Position the roller on a flat surface so that the filler plug (1) and number plate (2) on the right side of the drum are straight up.

Oil level should reach up to the sight glass (3).

Top off as required through the filler plug (1) halfway on the sight glass.

Clean the magnetic filler plug (1) from any metal particles before refitting it.

See lubricant specification for the right grade of oil.



CAUTION
Do not overfill with oil, risk of overheating.

EVERY 250 OPERATING HOURS (Monthly)

Radiator – Check/clean

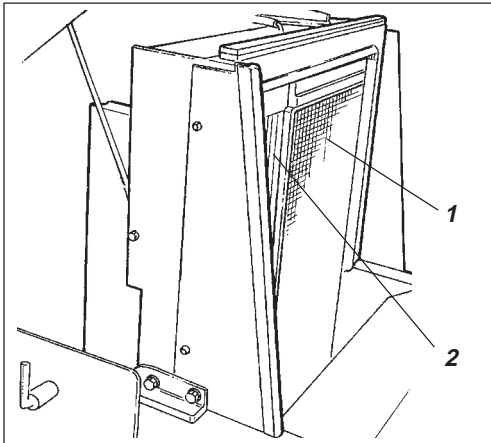


Fig. 24 Radiator

1. Water cooler
2. Hydraulic fluid cooler

WARNING



Place the roller on a level surface. Switch the engine off and push in the reserve/parking brake knob for all checking and adjustments on the roller, unless otherwise specified.

Check that air can flow freely through the radiators (1) and (2).

A dirty radiator should be blown clean with compressed air, or alternatively cleaned with a high-pressure washer.

Blow or wash the cooler in the opposite direction to that of the cooling air.

CAUTION



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

WARNING



Use protective goggles when working with compressed air or a high-pressure washer.

Bolted joints – Checking tightening torque

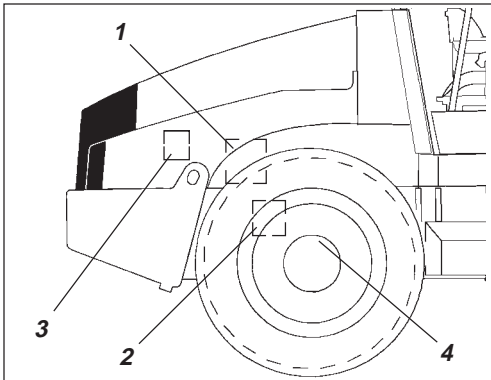


Fig. 25 Right side of machine

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

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

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

Engine suspension (3). Check that all engine bolts are tightened.

Wheel nuts (4). Check that all nuts are tightened, 470 Nm (347 lbf.ft), oiled.

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

Rubber elements and screw fasteners – Check

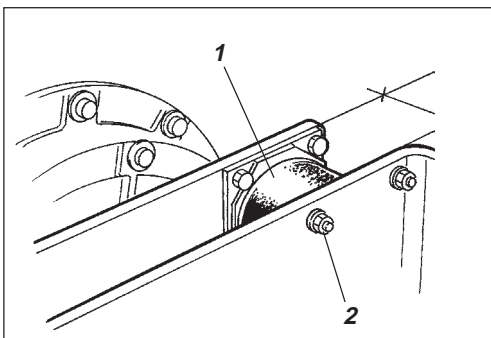


Fig. 26 Roller, vibration side

1. Rubber element
2. Screw fasteners

Check all the rubber elements (1), and replace them all if more than 25% of the elements on the same side of the roller have cracks deeper than 10–15 mm (0.4-0.6 in).

Use a knife blade or other pointed tool when carrying out this check.

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

EVERY 250 OPERATING HOURS (Monthly)

Battery

– Check electrolyte level

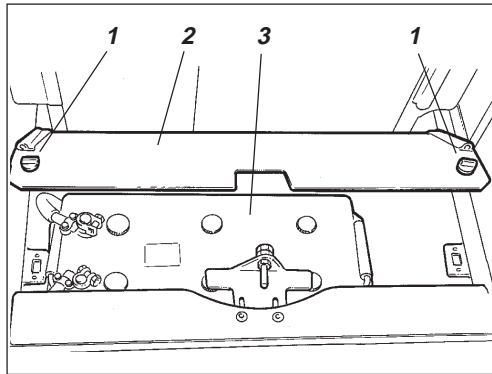


Fig. 27 Battery box

1. Quick-release screws
2. Battery cover
3. Battery



WARNING

Make sure there are no naked flames in the vicinity when checking the electrolyte level. An explosive gas is formed in the battery during the charging process.

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

Raise the battery cover (2).

Dry the upper face of the battery.



WARNING

Use protective goggles. The battery contains corrosive acid. In the event of contact, rinse with water.

Battery cell

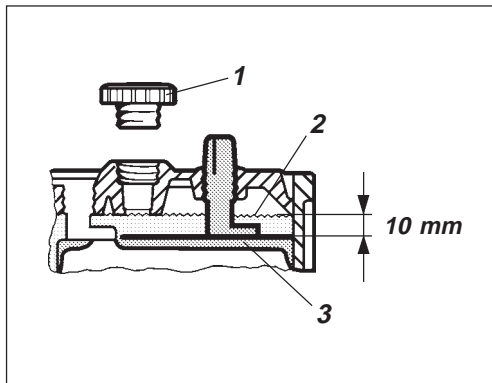


Fig. 28 Electrolyte level in battery

1. Cell cover
2. Electrolyte level
3. Plate

Remove the cell covers and check that the fluid level is about 10 mm (0.4 in) above the plates. Check the level in all the cells. If the level is lower, top up to the correct level with distilled water. If the ambient air temperature is below freezing point, the engine should be run for a while after the distilled water is added, otherwise there is a risk that the water might freeze.

Check that the ventilation holes in the cell covers are not blocked, then refit the covers.

The cable terminals must be properly tightened and clean. Corroded cable connections should be cleaned and greased with alkaline Vaseline.



CAUTION

When removing the battery, always undo the negative cable first. When fitting the battery, always connect the positive cable first.



Dispose of the old battery in the approved environmentally suitable manner – batteries contain toxic lead.

Air conditioning (Optional)

– Inspection

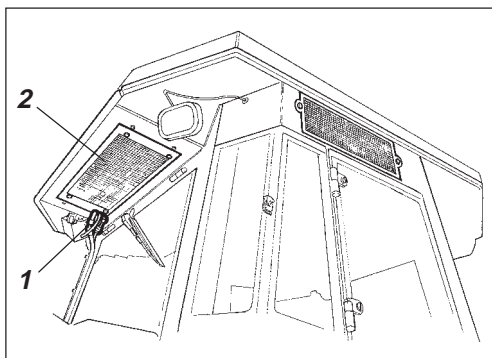


Fig. 29 Air conditioning

1. Refrigerant hoses
2. Condenser element



WARNING

When carrying out electrical welding on the machine, disconnect the battery's negative cable and then all the electrical connections leading to the alternator.

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

EVERY 500 HOURS OF OPERATION (Every three months)

Controls and moving joints – Lubrication

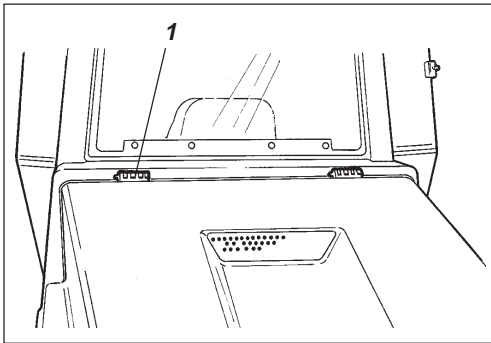


Fig. 30 Engine hood
1. Hinge

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 lubricant specification.

Prefilter – Cleaning

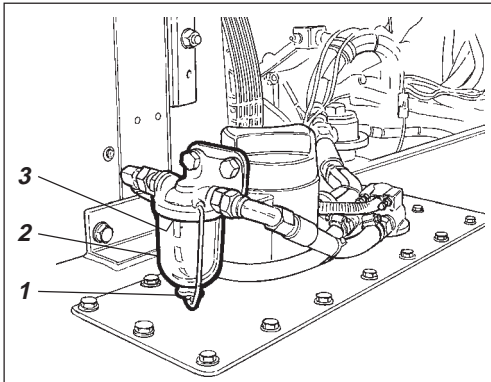


Fig. 31 Engine
1. Screw
2. Glass bowl
3. Strainer

WARNING



Place the roller on a level surface. Switch the engine off and push in the reserve/parking brake knob for all checking and adjustments on the roller, unless otherwise specified.

Loosen the screw (1) and remove the glass bowl (2).

Take out the strainer (3) and clean using a non-flammable fluid. Reinstall the strainer and the bowl.

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

WARNING



Make sure there is adequate ventilation (extraction) if the diesel engine is run indoors. Risk of carbon monoxide poisoning.

Diesel engine – Changing the filter and oil

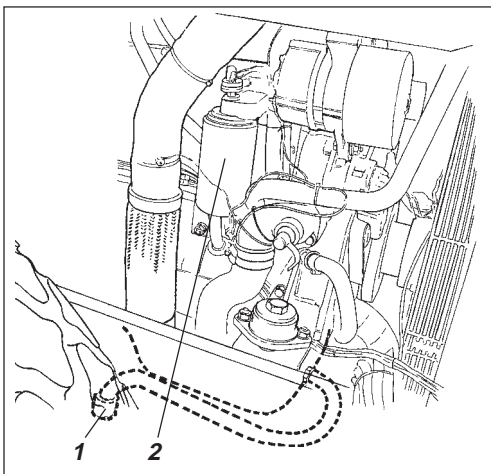


Fig. 32 Left side of engine
1. Drain plug
2. Oil filter

WARNING



Position the roller on a level surface. Stop the engine and apply the parking brake/reserve brake.

The oil drain plug (1) is most easily accessible from underneath the engine. It is fitted on a tube to the rear axle. Drain the oil when the engine is warm. Place a receptacle for at least 15 litres (16 qts) underneath the drain plug.

WARNING



Danger of being scalded when draining off hot oil. Protect your hands.

Change the engine oil filter (2) at the same time. See also the engine manual.



Dispose of the drained oil and filter in an approved manner.

EVERY 500 HOURS OF OPERATION (Every three months)

Steering chain and Seat bearing – Lubrication

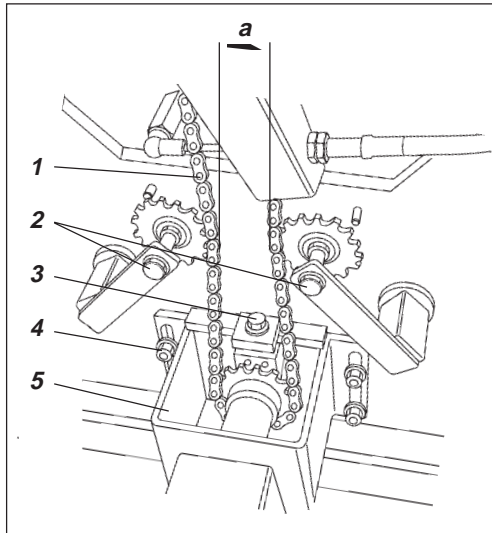


Fig. 33 Underneath operator's position

1. Steering chain
2. Chain-tightening device
3. Adjusting nut
4. Nuts
5. Control valve mount

Optional on rollers without cab



Remember 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 is accessible underneath the platform.

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).

Seat bearing – Lubrication

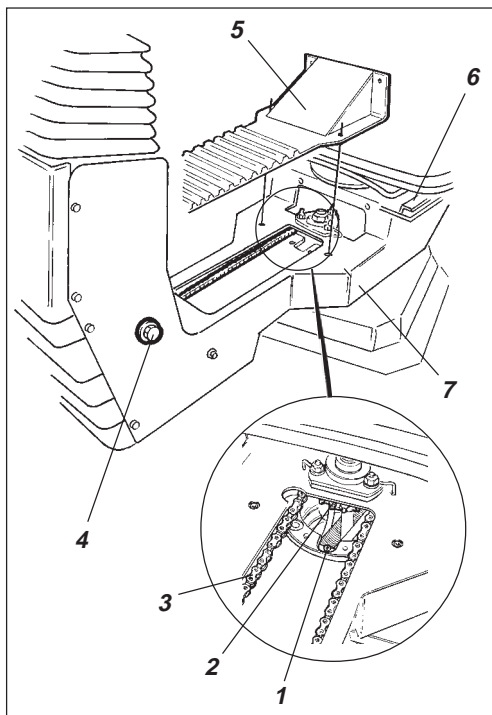


Fig. 34 Seat bearing

1. Lubrication nipple
2. Cogwheel
3. Steering chain
4. Adjusting screw
5. Cover
6. Slide rails
7. Slew interlock

Optional on rollers without cab



Remember that the chain is a vital part of the steering mechanism.

Remove the cover (5) to gain access to the lubrication nipple (1).

Lubricate the slew bearing of the operator's seat with three strokes of a hand-operated grease gun.

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

Also grease the slide rails of the seat (6).



If the seat begins to bind when resetting, it needs to be lubricated more often.

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

If the chain becomes slack on the cogwheel (2), loosen the screws (4) and move the steering column forward, tighten the screws and check the tension of the chain.

EVERY 1000 OPERATING HOURS (Every six months)

Hydraulic fluid filter – Change

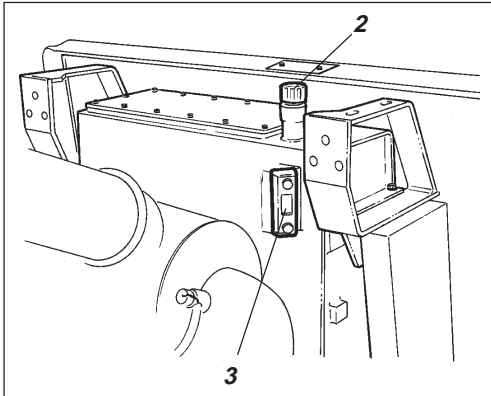


Fig. 35 Hydraulic fluid tank
2. Filler cover/bleeder filter
3. Sight glass

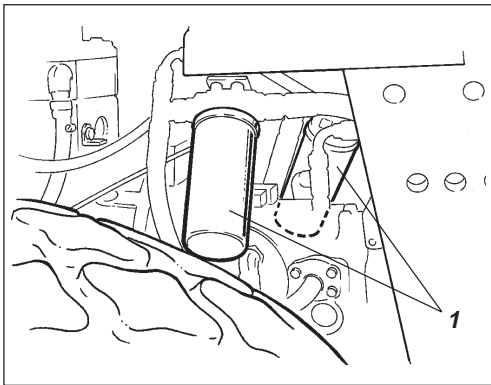


Fig. 36 Engine compartment
1. Hydraulic fluid filters (x2)

Hydraulic tank – Drainage

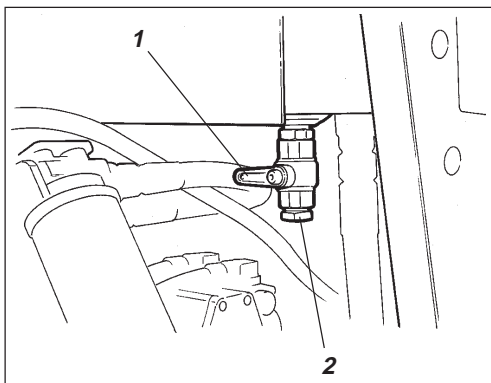


Fig. 37 Hydraulic tank, underside
1. Drainage tap
2. Plug

WARNING



Place the roller on a level surface. Switch the engine off and push in the reserve/parking brake knob for all checking and adjustments on the roller, unless otherwise specified.

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

Check that the bleeder filter (2) is not blocked – air should flow freely through the cover in both directions.

If there is a blockage in either direction, clean the filter with a little diesel oil and blow through with compressed air until the blockage disappears, or replace the cover with a new one.

WARNING



Always use protective goggles when working with compressed air.

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.

CAUTION



Check that the old sealing rings do not remain stuck on the filter holders, otherwise this might give rise to oil leakage between the old and new seals.

Clean the filter holder sealing surfaces thoroughly.

Apply a thin film of hydraulic fluid on the seals of the new filter. Screw on the filter by hand.

CAUTION



First tighten the filter until its seal is in contact with the filter attachment. Then turn an additional half revolution. Do not over-tighten the filter as this might damage the seal.

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.

WARNING



Make sure there is adequate ventilation (extraction) if the diesel engine is run indoors. Risk of carbon monoxide poisoning

Condensate in the hydraulic reservoir is removed via the drainage tap (1).

Drainage should be performed when the roller has been standing for a long period of time, for example 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.

EVERY 1000 HOURS OF OPERATION (Every six months)

Fuel tank – Drainage

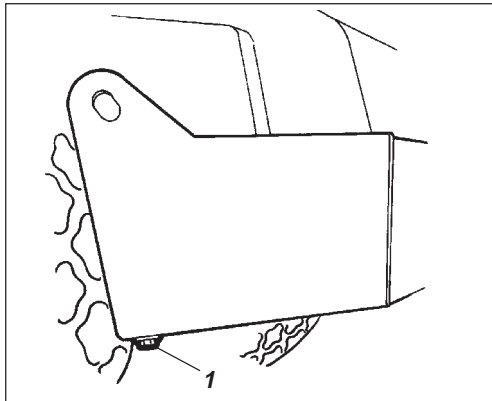


Fig. 38 Fuel tank

1. Drainage plug

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

CAUTION



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

Drainage should be performed when the roller has been standing for a long period of time, for example 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).

Undo the plug and drain off the water and sediment until only clean diesel fuel appears through the plug opening. Refit the plug.

Replace the main filter (3) of the air cleaner even if it has not yet been cleaned five times, see under 50 hours for filter replacement.

Air filter – Replacement

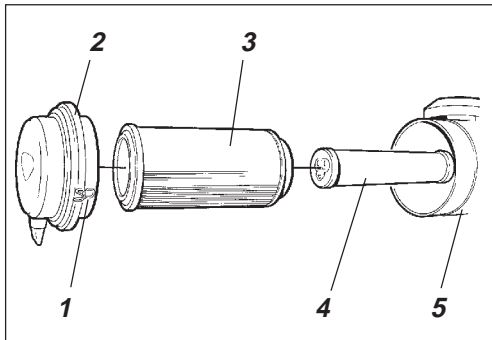


Fig. 39 Air cleaner

1. Locking braces
2. Cover
3. Main filter
4. Backup filter
5. Filter housing

Rear axle differential – Oil change

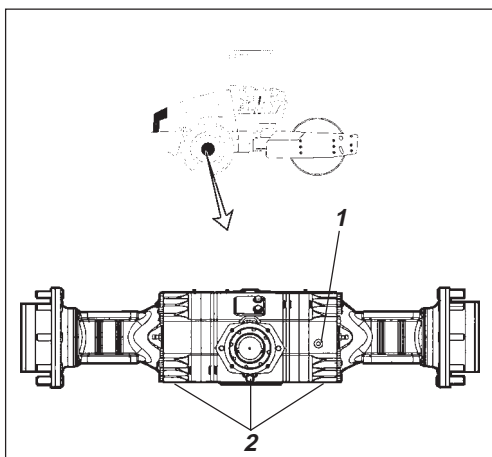


Fig. 40 Rear axle

1. Oil level/Filler plug
2. Drainage plugs

WARNING



Never work under the roller with the engine running. Park on a level surface and block the wheels securely.

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 about 7 l (7.4 qts).



Save the oil and deposit it in an approved manner.

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

EVERY 1000 HOURS OF OPERATION (Every six months)

Rear axle planetary gears – Oil change

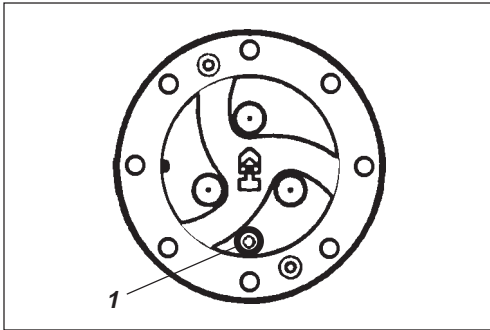


Fig. 41 Planetary gear/drainage position
1. Plug

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 about 2 litres (2.1 qts).



Save the oil and deposit it in an approved manner.

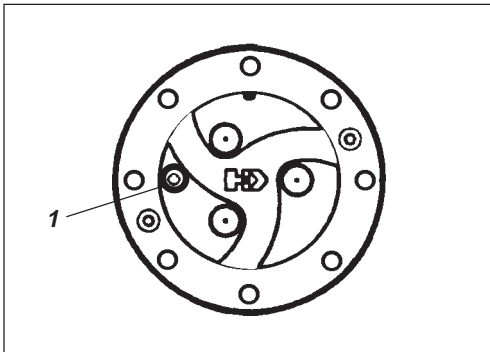


Fig. 42 Planetary gear/filling position
1. Plug

Position the roller with the plug at 9 o'clock.

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

Clean the plug and screw back in.

Change the oil in the same way as the other planetary gears of the rear axle.

Fresh air filter – Replacement

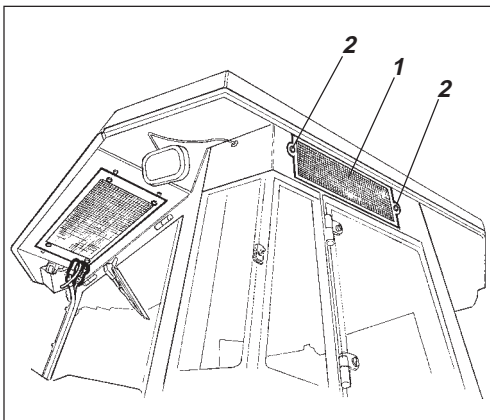


Fig. 43 Cab
1. Fresh air filter
2. Screw (x2)



**Use a stepladder to reach the filter (1).
As an alternative the filter can be reached
via the cab window on the right side.**

Loosen the two screws (2) at the rear of the cab roof. Take down the whole holder and remove the filter insert.

Replace with a new filter.

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

EVERY 2000 OPERATING HOURS (Every year)

Hydraulic tank – Fluid change

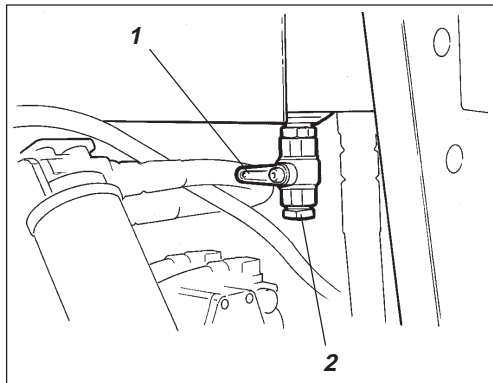


Fig. 44 Hydraulic tank, underside
1. Drainage tap
2. Plug



WARNING

Place the roller on a level surface. Switch the engine off and push in the reserve/parking brake knob for all checking and adjustments on the roller, unless otherwise specified.



WARNING

Danger of being burned when draining hot oil. Protect your hands.

Obtain a container for collecting the used fluid. The container should have a volume of at least 60 litres (16 gal).

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 deposit 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.



WARNING

Make sure there is adequate ventilation (extraction) if the diesel engine is run indoors.
(Risk of carbon monoxide poisoning)

Check the fluid level and top up if necessary.

Drum – Changing the Oil

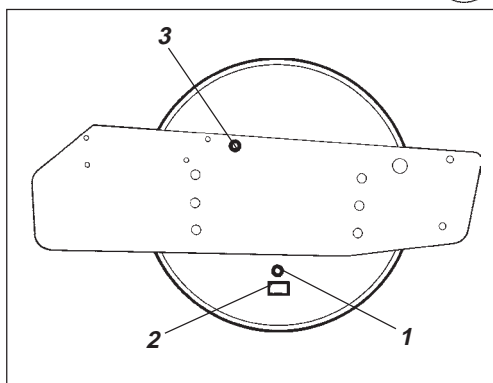


Fig. 45 Drum, right side
1. Drain/Filler plug
2. Number plate
3. Sight glass



Save the oil and deposit it in an approved manner.

Clean and unscrew the plug (1). Allow all of the oil to drain off. Fill with oil according to “Drum—checking the oil level”.



WARNING

There is danger of being scalded when draining hot oil. Protect your hands.

EVERY 2000 OPERATING HOURS (Every year)

Forward/Reverse lever – Lubrication

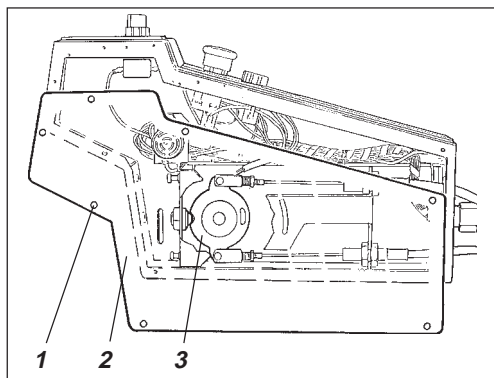


Fig. 46 Forward/Reverse lever

1. Screw
2. Plate
3. Cam disk

Unscrew the screws (1) and remove the plate (2).

Grease the contact surface of the cam disc (3).

Refit the plate (2) with the screws (1).

Steering joint – Check

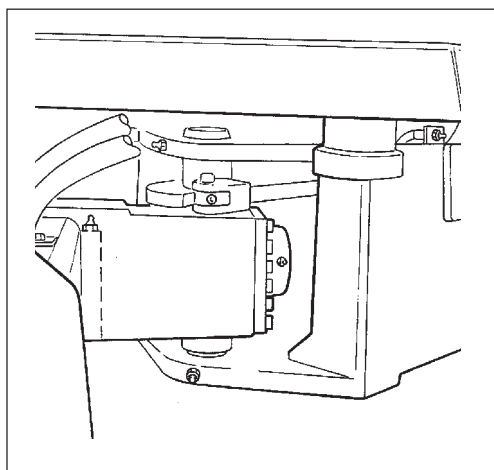


Fig. 47 Steering joint

Inspect the steering joint to detect any damage or cracks.

Check and correct any loose bolts.

Check also for any stiffness and play.

EVERY 2000 OPERATING HOURS (Every year)

Air conditioning (Optional) – Overhaul

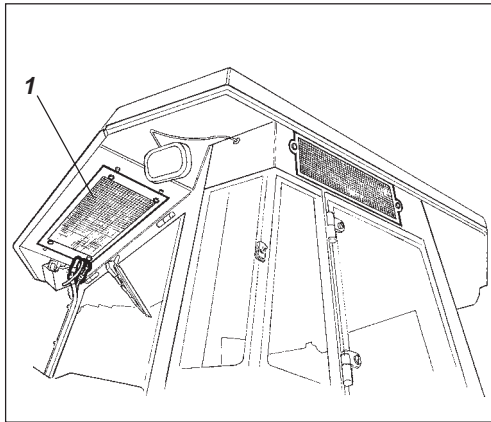


Fig. 48 Cab
1. Condenser element

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

Clean the condenser element (1) free from dust with the aid of compressed air. Blow from above.



The air jet could damage the flanges of the elements if it is too powerful.



Wear protective goggles when working with compressed air.

Inspect the fastening of the condenser element.

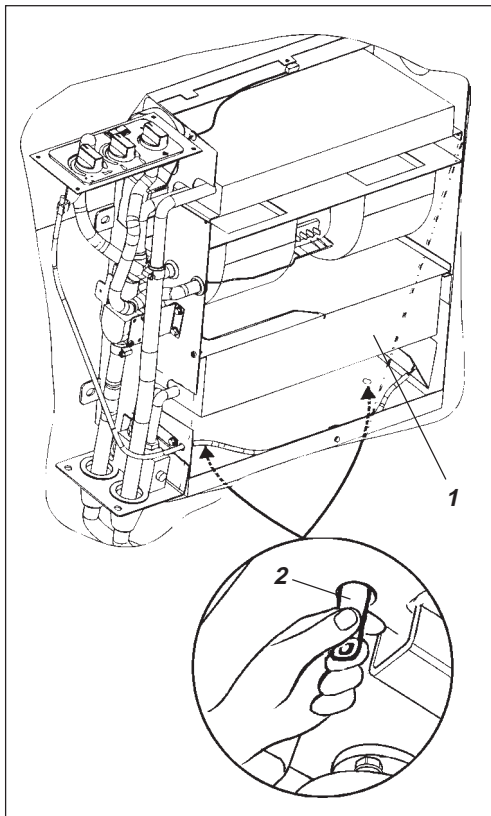


Fig. 49 Aircondition
1. Cooling element
2. Drain valve (x2)

Clean the cooler unit and the cooling elements (1) free from dust with the aid of compressed air.

Inspect the system hoses for chafing. Make sure that drainage from the cooling unit is unobstructed so that condensation does not accumulate inside the unit.

Check the drain by squeezing the valves (2) underneath the cab.

EVERY 2000 OPERATING HOURS (Every year)

Compressor – Inspection (Optional)

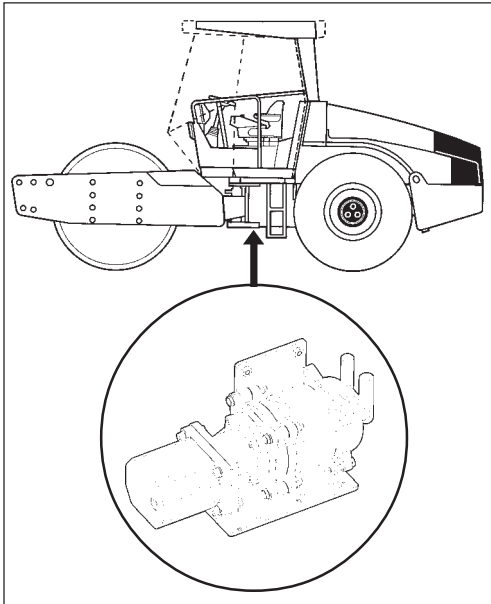


Fig. 50 Compressor

Inspect the compressor and hydraulic motor fastenings.

These are located under the cab between the rear sides of the frame. The components are accessible from below.

The unit should be run at least five minutes every week, if possible, to keep the rubber gaskets and compressor in the system lubricated.



The air conditioning unit should not be run when the outdoor temperature is below 32°F (0°C) other than as specified above.

Drying filter – Inspection

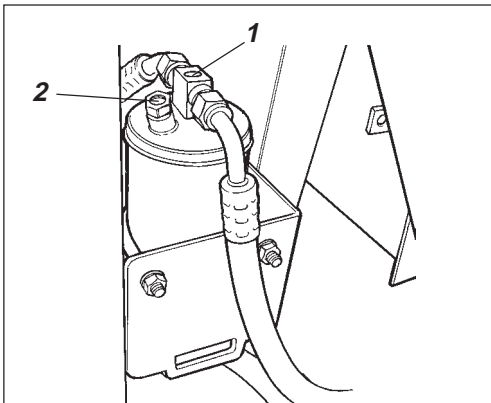


Fig. 51 Drying filter in engine compartment
1. Sight glass
2. Moisture indicator



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

Open the engine hood while the unit is operating and check in the sight glass (1) that no bubbles are visible on the dryer filter. If bubbles are visible through the sight glass, it is a sign that the level of refrigerant is too low. If so, stop the unit. There is a risk of damage to the unit if it is run with insufficient refrigerant.

Check the moisture indicator (2). The color should be blue; if it is beige the dryer cartridge must be replaced by an authorized service company.



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



Do not disconnect the hose coupling.



The cooling system is pressurized. Incorrect handling can result in serious personal injuries.



The system contains pressurized refrigerant. Releasing refrigerants into the air is prohibited. The refrigerant circuit may only be repaired by an authorized company.

LONG-TERM STORAGE

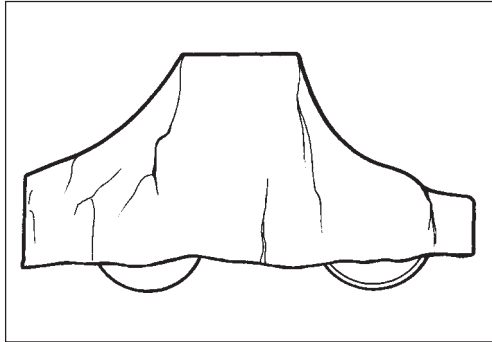


Fig. 52 Protecting the roller from the elements



For long-term storage (longer than one month), the following instructions should be followed.

These instructions apply for storage lasting up to 6 months.

Before re-commissioning the roller, the points marked with an asterisk * must be restored.

Diesel engine

- * See the manufacturer's instructions in the engine instruction manual, which is supplied together with the roller.

Battery

- * Remove the battery from the roller, clean its exterior, check its electrolyte level and recharge it once a month.

Air cleaner, exhaust pipe

- * Cover the air cleaner or its opening with plastic or tape, and cover also the exhaust pipe's opening. This is done so as to prevent moisture from penetrating into the engine.

Fuel tank

Fill the fuel tank completely to prevent condensation.

Hydraulic reservoir

Drain off any condensation water and fill the hydraulic reservoir to the upper mark.

Steering cylinder, hinges etc.

Lubricate the steering joint bearings and the steering cylinder's two bearings with grease.

Grease the steering cylinder's piston with conservation grease.

Grease also the engine compartment cover's hinges, the seat slide rails, the engine-speed control and the forward/reverse control mechanism.

Tires (All-weather)

Check that tire pressure is 150-170 kPa (1,5-1,7 kp/cm²), (22-25 psi).

Covers, tarpaulin

- * Place the instrument cover on the steering column. Cover the entire machine with a tarpaulin, which should hang some way off the ground. If possible, store the roller indoors, preferably in a building with a uniform temperature.

SPECIAL INSTRUCTIONS

Standard lubricants and other recommended oils

Upon delivery from the factory, the various systems and components are filled with the oils specified see lubricant specification and they can be used at ambient temperatures from -10°C to +40°C (14°F - 104°F).



A maximum temperature of +35°C (95°F) applies for biological hydraulic fluid.

Higher ambient temperature max. +50°C (122°F)

When operating in hotter ambient temperatures, but up to max. +50°C (122°F), the following instructions apply:

The diesel engine can handle this temperature with the standard oil, but the following oils must be used in the other components:

Hydraulic system with mineral fluid: Shell Tellus TX100 or corresponding.

Other components using transmission oil: Shell Spirax HD 85W/140 or corresponding.

Temperatures

The temperature limits apply for a roller with standard features.

Rollers with extra equipment such as noise suppressers etc. may require additional attention at the upper temperatures.

High-pressure washing



When washing the machine, do not direct the jet of water directly at the fuel or hydraulic fluid tank covers. This is particularly important when using a high-pressure washing unit.

Do not spray water directly on electric components or the instrument panel. Put a plastic bag over the filler cap of the fuel tank and secure with a rubber band. This will prevent water from entering the venting hole in the filler cap. This could otherwise cause operational disturbance, for example, a clogged filter.

Extinguishing fires

If there is a fire in or on the machine, it is best to use an ABE-class fire extinguisher. However, a BE-class CO₂ extinguisher is also suitable.

ROPS, protective cab

If the roller is equipped with a protective structure (ROPS, Roll Over Protective Structure), or protective cab, never subject the structure or cab to welding or drilling. Never attempt to repair a damaged structure or cab; they must be replaced with new ones.

Starting assistance

When an auxiliary starter battery is used, always connect the positive terminal on the auxiliary battery to the positive terminal on the roller's battery, and negative to negative.

ELECTRICAL SYSTEM, FUSES, RELAYS

Fuses and relays

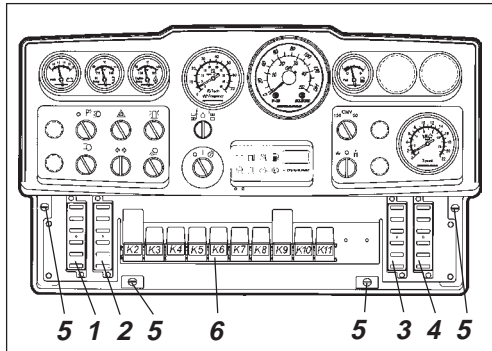


Fig. 53 Instrument panel

- 1,2,3,4. Fuse boxes
- 5. Quick-screws
- 6. Relays

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

The four fuse boxes (1,2,3,4) and the relays are located behind the lower instrument plate, which can be removed by turning the four quick-screws (5) a ¼-turn.

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



Connect the battery to the correct polarity (- to ground). The cable between battery and alternator must not be disconnected when the engine is running.

Fuses on the machine

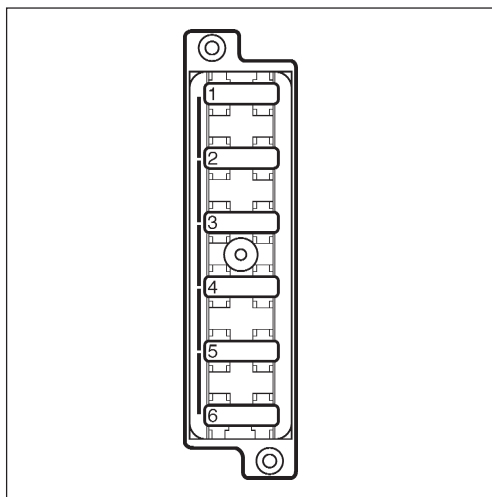


Fig. 54 Fuse box, left side (1)

- 7.5A 1. Brake valve, starter relay, hourmeter
- 7.5A 2. VBS relay
- 7.5A 3. Indicating panel
- 7.5A 4. Horn
- 7.5A 5. Low/High speed/Strike-off blade □
- 3A 6. Reversing alarm □

Fuse box, left side (2)

- 7.5A 1. Instrumentation
- 3A 2. Compaction meter □
- 7.5A 3. Hazard beacon □
- 7.5A 4. Anti-spin □
- 10A 5. Windscreen wiper, utility cab □
- 5A 6. Interior lighting, utility cab □

□ = Optional

The figure shows the rating and function of the different fuses.

All fuses are flat pin fuses.

The tachograph and memory for the radio are protected at the battery master disconnect switch by a 10A fuse.

Fuse box, right side (3)

- 20A 1. Working lights, left □
- 20A 2. Working lights, right, instrument illumination □
- 7.5A 3. Headlight, left □
- 7.5A 4. Headlight, right, instrument illumination* □
- 7.5A 5. Flow manifold
- 6. -

Fuse box, right side (4)

- 10A 1. Hazard beacon □
- 10A 2. Direction indicators, main fuse □
- 7.5A 3. Position light, left, front and rear □
- 5A 4. Position light, right, front and rear □
- 5A 5. Direction indicator, left, front, rear and side □
- 5A 6. Direction indicator, right, front, rear and side □

* When driving lights are fitted

ELECTRICAL SYSTEM, FUSES, RELAYS

Fuses in the cab

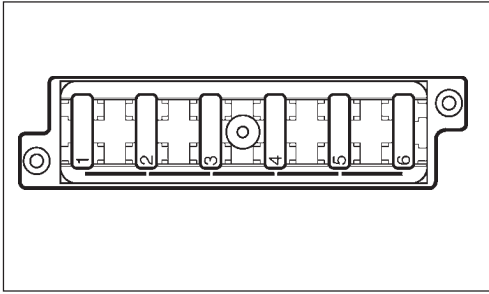


Fig. 55 Fuse box overhead in cab

- | | |
|-----|-----------------------------------|
| 20A | 1. Condenser fans, cab roof |
| 10A | 2. Radio |
| 5A | 3. Cab interior lighting |
| 25A | 4. Air conditioner fan |
| 10A | 5. Rear screen wiper/screen-wash |
| 10A | 6. Front screen wiper/screen-wash |

The electric system in the cab is equipped with its own fuse box, located overhead at the front right part of the cab.

The figure shows the ampere rating and function of the different fuses. All fuses are of the flat pin type.

Main fuses

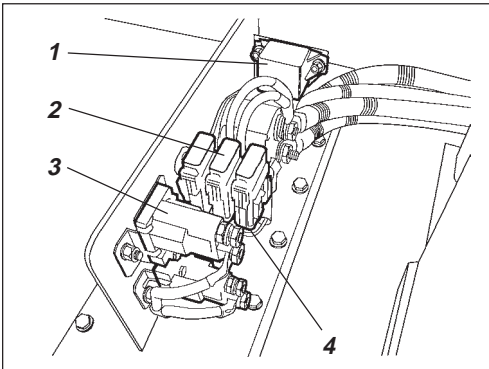


Fig. 56 Engine compartment

1. Starter relay
2. Main fuses
3. Preheater relay
4. Fuses for preheater

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

The fuses are of the flat pin type.

The starter relay (1), preheater relay (3) and fuses for the preheater relays (4) are also fitted here.

Supply, standard	30 A (Green)
Supply, cab	50 A (Red) □
Supply, lighting	40 A (Orange) □
Preheater supply relay	125 A (Orange) □

Relays

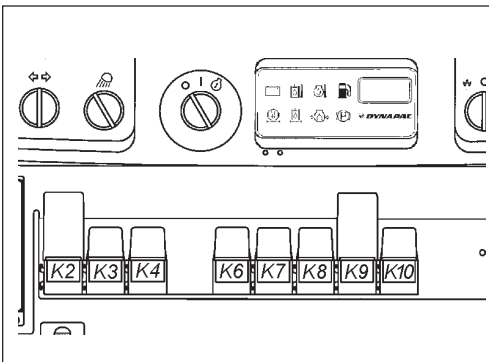


Fig. 57 Instrument panel

- | | |
|-----|-----------------------------|
| K2 | VBS relay |
| K3 | Main relay |
| K4 | Horn relay |
| K6 | Fuel level relay |
| K7 | Reverse alarm relay □ |
| K8 | Lights relay □ |
| K9 | Direction indicator relay □ |
| K10 | Brakes relay |
| K11 | Air cond. relay |

□ = Optional

ELECTRICAL SYSTEM, FUSES, RELAYS

Control box

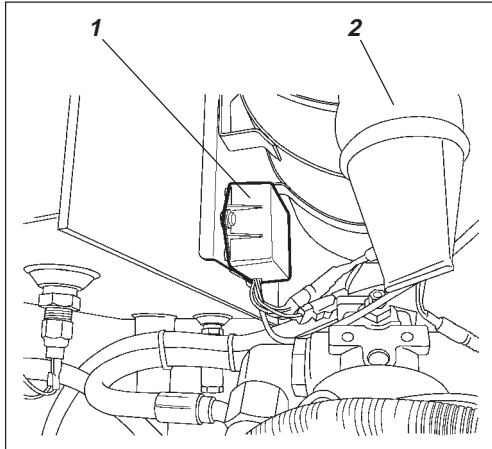


Fig. 58 Engine compartment

1. Control box for engine preheater
2. Air cleaner

The control box (1) automatically regulates preheating of the diesel engine, ie, the box receives its activating signal from a temperature sensor on the engine intake pipe.

Relays in cab

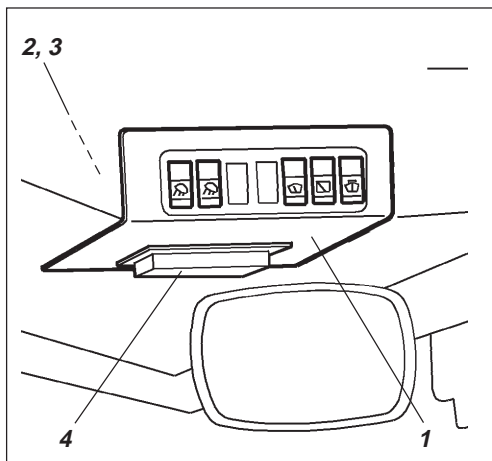


Fig. 59 Cab roof, front

1. Instrument plate
2. K30 Relay for air conditioner fan
3. K31 Relay for condenser fans + radio
4. Fuse box

Unscrew the instrument plate (1) to replace the relays for air conditioner fan and condenser fan on the cab roof, and radio.