The CA 25/30 family of vibratory rollers consists of the CA 251 Standard, Drum Drive (D) and Pads+Drum Drive (PD) together with CA 301 Std., D and PD.

These rollers are designed for the compaction of roads, airfields, dams and similar constructions.

The CA 251A compacts asphalt, concrete, base courses and subbase courses efficiently and at a high rate.

MAINTENANCE

CA 251/301

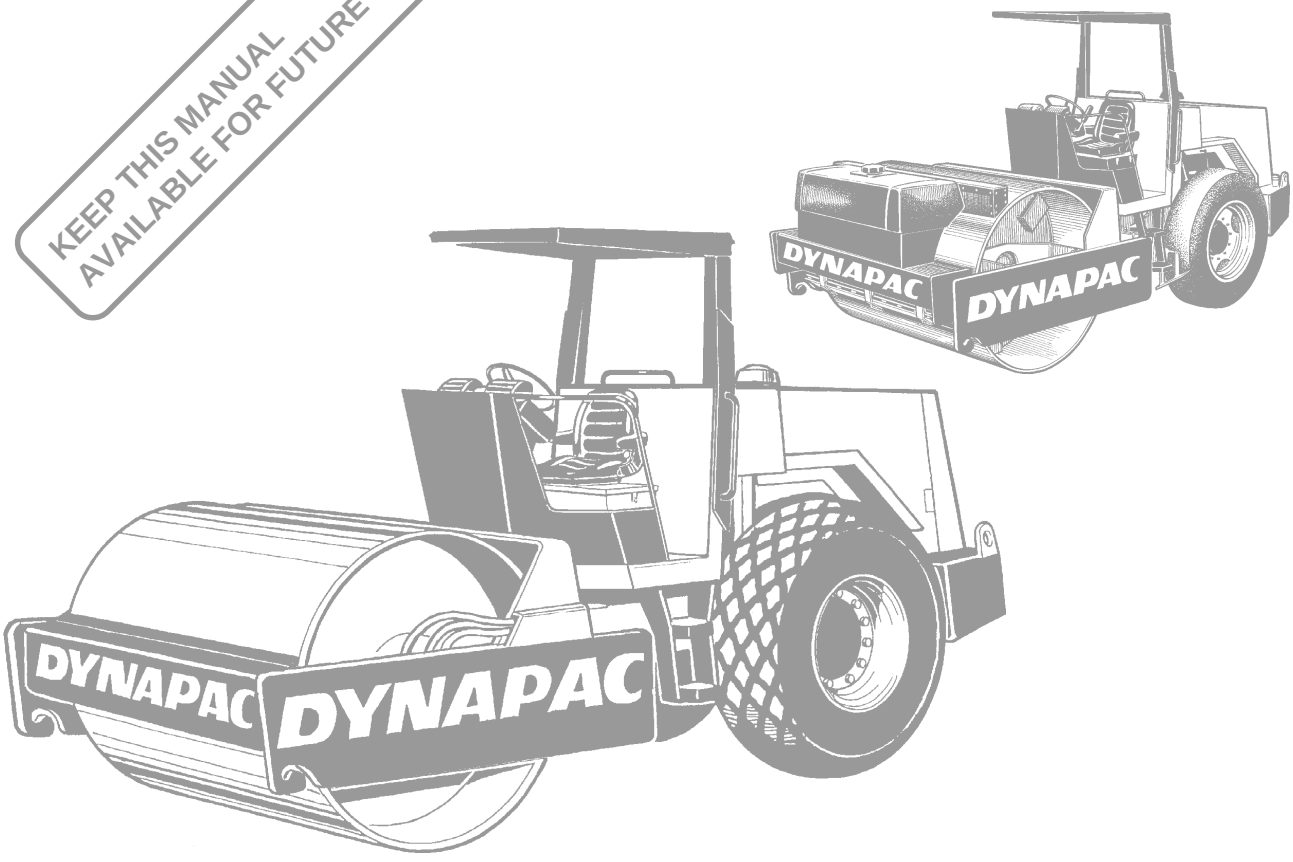
VIBRATION ROLLER

M251EN2, December 1996

Diesel engine:
Deutz F6L 912
Cummins 6BT 5.9

The instructions apply from
CA 251: PIN (S/N) *58310256*
CA 301: PIN (S/N) *59010306*
CA 251A: PIN (S/N) *58310414*

KEEP THIS MANUAL AVAILABLE FOR FUTURE USE



SVEDALA DYNAPAC
Svedala Compaction Equipment AB

Printed in Sweden
We reserve the right to change specifications without notice

Box 504 • SE-371 23 KARLSKRONA • Sweden
Tel. +46 455 627 00 • Telex 43041 dynkar s
Telecopier +46 455 627 30

CONTENTS

WARNING SYMBOLS

WARNING

Warning - Personal safety may be involved.

CAUTION

Caution - Machine or component damage

GENERAL

WARNING

Read all the instructions thoroughly before carrying out any servicing operations.

WARNING

Ensure that ventilation (evacuation) is adequate if the engine is run indoors.

Proper care of the roller is essential to ensure satisfactory operation. Keep the machine clean so that any leakage, loose bolts or loose connections can be easily detected.

TAKE CARE OF THE ENVIRONMENT. Do not spill oil or fuel, or leave anything else that could be detrimental to the environment.

This manual includes instructions for periodic maintenance which should normally be carried out by the operator.

CAUTION

Instructions in the engine manufacturer's manual also apply. The manual is included in the product folder supplied with the roller.

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

CAUTION

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

ENGINE OIL, ambient temp. -10°C to +50°C (14°F to 122°F)	Shell Rimula SAE 15W/40 or equivalent. API Service CD/SE, CD/SF
HYDRAULIC FLUID, ambient temp. -10°C to +40°C (14°F to 104°F) **above +40°C (+104°F)**	Shell Tellus Oil TX68 or equivalent **Shell Tellus Oil T100 or equivalent**
TRANSMISSION OIL, ambient temp. -15°C to +40°C (5°F to 104°F) **above +40°C (+104°F)**	Shell Spirax SAE 80W/90, HD API, GL-5 **Shell Spirax HD85W/140 or equivalent**
DRUM OIL/CASSETTE OIL All temperatures	Synthetic oil, MOBIL SHC 629 or equivalent
GREASE	Shell Calithia EPT2 or equivalent
FUEL	See engine manual
COOLANT 50/50 mixture with water	Shell Anti Freeze 402 or equivalent. Freeze safe down to about -35°C (-31°F).

CAUTION

Other lubricants are required for operation in extremely high or extremely low ambient temperature. See, chapter ”Special instructions”, or get in touch with Dynapac.

Engine oil level	Air cleaner
Engine oil filter	Battery
Hydraulic reservoir level	Tyre pressure
Hydraulic fluid filter	Sprinkler
Transmission oil level	Sprinkler water
Lubricating oil	Coolant level
Fuel filter	Recyclable

SPECIFICATIONS

Weight and sizes	CA 251				CA 301		
	Std	D	PD	A	Std	D	PD
Weight CECE, standard equipped roller, kg (lbs)	9550 (21,060)	9750 (21,500)	11150 (24,590)	10000 (22,050)	11350 (25,030)	12050 (26,570)	11900 (26,240)
Length, std. equipped roller, mm (in)	5380 (212)	5380 (212)	5450 (215)	5532 (218)	5380 (212)	5430 (214)	5450 (215)
Width, std. equipped roller, mm (in)	2373 (93)	2373 (93)	2373 (93)	2373 (93)	2373 (93)	2373 (93)	2373 (93)
Height, std. equipped roller, mm (in)	2175 (86)	2175 (86)	2230 (88)	2175 (86)	2180 (86)	2180 (86)	2230 (88)
Height, " with ROPS, mm (in)	2895 (114)	2895 (114)	2945 (116)	2895 (114)	2900 (114)	2900 (114)	2945 (116)
Height, " with cab, mm (in)	2800 (110)	2800 (110)	2850 (112)	2800 (110)	2800 (110)	2800 (110)	2850 (112)

Fluid volumes **Litres (gal or qts)**

Rear axle:
- Differential ..... 12 (12.7 qts)
- Planetary gears ..... 3,1 (3.3 qts)/each side

Pump drive/Transfer gearing ..... 1,5 (1.6 qts)
Drum drive/Torque hubs (D,PD) .... 2,8 (3.0 qts)
Drum, vibrator ..... (A) 27 (7.1 gal)/each side, 2,7 (2.85 qts)/each side (cassette)
Hydraulic reservoir ..... 90 (24 gal)
Hydraulic system ..... (Std, A) 26 (6.9 gal), (D, PD) 25 (6.6 gal)
Diesel engine ..... (Deutz) 14 (14.8 qts), (Cummins) 16 (16.9 qts)
Coolant (Cummins) ..... 27 (7.1 gal)
Fuel tank ..... 265 (70 gal)
Water tank (A) ..... 480 (127 gal)
Emulsion tank (A) ..... 10 (10.6 qts)

Electrical system

Battery ..... 12 V, 160/170 Ah
Alternator ..... 12 V, 95/105 A
Fuses ..... 8 A

Vibration data		CA 251				CA 301		
		Std	D	PD	A	Std	D	PD
Static linear load	kg/cm	23,8	24,7	-	26,1	31,5	35,3	-
	(pli)	(133)	(138)	-	(146)	(176)	(198)	-
Amplitude (High)	mm	1,75	1,75	1,63	0,8	1,72	1,72	1,63
	(in)	(0.069)	(0.069)	(0.064)	(0.031)	(0.068)	(0.068)	(0.064)
Amplitude (Low)	mm	0,85	0,85	0,79	0,4	0,84	0,84	0,79
	(in)	(0.033)	(0.033)	(0.031)	(0.016)	(0.033)	(0.033)	(0.031)
Frequency (High ampl.)	Hz	30	30	30	45	30	30	30
	(vpm)	(1,800)	(1,800)	(1,800)	(2,700)	(1,800)	(1,800)	(1,800)
Frequency (Low ampl.)	Hz	33	33	33	45	33	33	33
	(vpm)	(1,980)	(1,980)	(1,980)	(2,700)	(1,980)	(1,980)	(1,980)
Centrifugal force (High ampl.)	kN	203	203	249	187	249	249	249
	(lb)	(45,675)	(45,675)	(56,025)	(42,075)	(56,025)	(56,025)	(56,025)
Centrifugal force (Low ampl.) .	kN	119	119	146	94	146	146	146
	(lb)	(26,775)	(26,775)	(32,850)	(21,150)	(32,850)	(32,850)	(32,850)

Propulsion data	CA 251/301/251A	CA 251D/301D	CA 251D/301PD
Speed range km/h (mph)	0-23 (0-14.3)	0-10 (0-6.2)	0-10 (0-6.2)
Climbing capacity (theoretical) %	40	62*	62*
(*Deutz: 57% with std. oil sump)			

Tires	CA 251/301	CA 251A
Tire size	23.1x26 8 ply	16.9x30 6 ply
Tire pressure	110-150 kPa (1,1-1,5 kp/cm^2) (16-22 psi)	110 kPa (1,1 kp/cm^2) (16 psi)

WARNING

As an option, the tires can be filled with liquid.
In connection with service, remember the extra weight that this implies.

Tightening torque

Tightening torque in Nm (ftlbs) for oiled bolts tightened with a torque wrench.

M	STRENGTH CLASS					
thread	8.8		10.9		12.9	
M6	10	(7)	14	(10)	17	(12)
M8	24	(18)	33	(24)	40	(29)
M10	47	(35)	65	(48)	79	(58)
M12	81	(60)	114	(84)	136	(100)
M14	128	(94)	181	(133)	217	(160)
M16	197	(145)	277	(204)	333	(245)
M18	275	(202)	386	(284)	463	(340)
M20	385	(283)	541	(398)	649	(477)
M22	518	(381)	728	(535)	874	(643)
M24	665	(489)	935	(688)	1120	(824)
M27	961	(707)	1350	(993)	1620	(1191)
M30	1310	(963)	1840	(1353)	2210	(1625)

ROPS

Bolt size:	M24
Strength class:	8.8
Tightening torque:	640 Nm (472 ftlbs)

SPECIFICATIONS

Hydraulic system

Relief pressure	MPa	P.S.I
Traction system	35	5,100
Charge relief	2	290
Vibration system	35	5,100
Steering system	14	2,050
Brake release	1.5	220

Noise level — Operator's position (ISO 6394)

Measured sound pressure level, LpA, on hard supporting surface and with vibration switched off:

Deutz:	LpA: 86 dB(A)
Deutz and cab:	LpA: 89 dB(A)
Cummins:	LpA: 92 dB(A)
Cummins and cab:	LpA: 84 dB(A)

Sound effect level — Surroundings (SS 4591010)

Measured sound effect level, LwA, on hard supporting surface and with vibration switched off:

Deutz:	LwA: 108 dB(A)
Deutz and cab:	LwA: 108 dB(A)
Cummins:	LwA: 112 dB(A)

Whole body vibration — Operator's position (ISO 2631)

Measured with vibration switched on and on a foam rubber mat (Limit value 0,5 m/s^2):

Vibration level for machine	Operator's seat (m/s^2)*	Floor of operator's platform (m/s^2)**
CA 251Std./D	0,39	0,31
+ ROPS	0,29	0,33
+ cab	0,21	0,17
+ ROPS and cab	0,16	0,21
CA 301Std./D	0,30	0,10
+ ROPS	0,23	0,38
+ cab	0,32	0,24
+ ROPS and cab	0,35	0,32
CA 251A	0,05	0,09
+ ROPS	0,04	0,04

* Aggregate acceleration on operator's seat
** Maximum acceleration in z-axis of floor.

MAINTENANCE SCHEDULE

Read through the manual before carrying out any maintenance operations. Proper care of the roller is essential to ensure satisfactory operation.

Keep the machine clean so that any leakage, loose bolts or loose connections can be easily detected. Make a habit of checking around the roller and also on the ground. This is usually the easiest way to detect any leakage at an early stage.

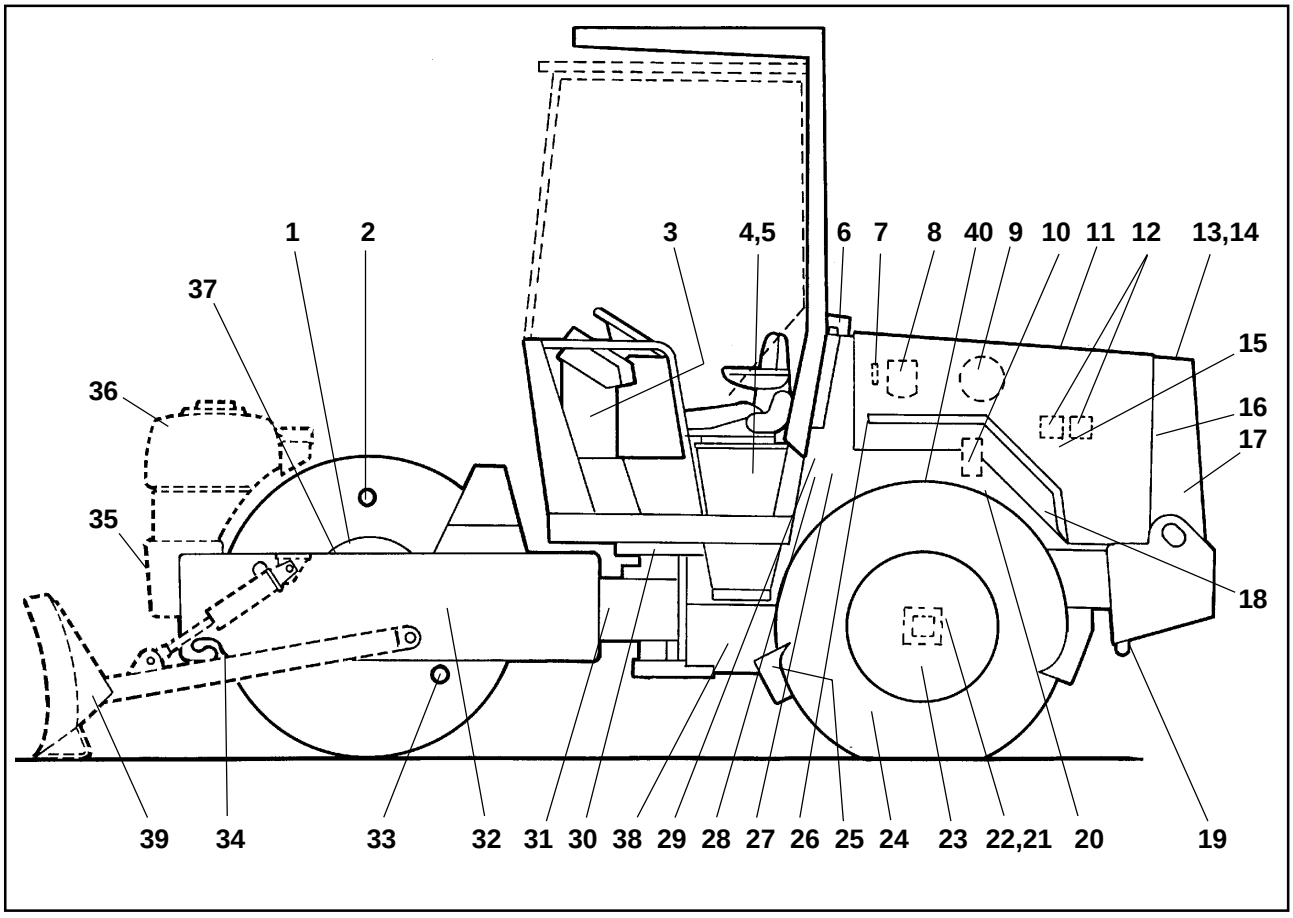


Fig. 1 Service points

1. *Torque hubs (D and PD only)*
2. *Drum oil, filling*
3. *Fuse box*
4. *Battery*
5. *Hydraulic fluid, filling*
6. *Venting filter, hydraulic reservoir*
7. *Sight glass, hydraulic reservoir*
8. *Hydraulic fluid filter (3 off)*
9. *Air cleaner*
10. *Lubricating oil filter, engine*
11. *Engine hood, hinge*
12. *Fuel filter/Water separator, engine*
13. *Coolant, Cummins*
14. *Hydraulic fluid cooler, Cummins*
15. *Feed pump, diesel fuel*
16. *V-belt*
17. *Diesel fuel, filling*
18. *Engine suspension*
19. *Fuel tank, drain*
20. *Oil level, engine*
21. *Rear axle suspension*
22. *Rear axle, lubricating oil levels*
23. *Wheel nuts*
24. *Tire pressure*
25. *Scrapers (CA 251A)*
26. *Drain, hydraulic reservoir*
27. *Tyre sprinkler (CA 251A)*
28. *Hydraulic fluid cooler, Deutz*
29. *Flyweel cover, hydraulic pumps*
30. *Steering cylinder*
31. *Steering articulation*
32. *Rubber element, fastening bolts*
33. *Level plug, drum oil*
34. *Scraper*
35. *Sprinkler system (CA 251A)*
36. *Water tank (CA 251A)*
37. *Drum cassette, oil*
38. *Emulsion tank (CA 251A)*
39. *Levelling blade (optional equipment)*
40. *Wind shield wash, cab (optional equipment)*

MAINTENANCE MEASURES

The periodic measures shall be performed in the first case at the number of operating hours stated, in the second case for the period stated, ie, daily, weekly, etc.

CAUTION

Always clean away dirt before filling or checking any oil, hydraulic fluid or fuel, and before lubricating with grease or oil.

CAUTION

Instructions in the engine manufacturer's manual also apply.

Every 10 hours of operation (Daily)

Item in fig. 1	Procedure	See page	Comments
	Before starting each day		
20	Check level of engine oil		See engine manual
13	Check coolant level, Cummins	10	
	Check the brakes	10	
25,34	Check scraper setting	11, 12	
40	Check/top up wind shield liquid	12	
27,35	Check sprinkler system (CA 251A)	14	
	On completion of day´s work		
7	Check level of hydraulic reservoir	12	
17	Refuel	13	
38	Fill the emulsion tank (CA 251A)	13	
36	Fill water tank (CA 251A)	14	

Every 50 hours of operation (Weekly)

Item in fig. 1	Procedure	See page	Comments
10	Change engine oil and oil filter		See engine manual
9	Clean air cleaner insert or change main filter	15	
	Ensure that hoses and connections are tight		
24	Check tire pressure	15	
4	Check the battery	16	
31	Lubricate steering joint	17	
30	Lubricate the steering cylinder brackets	17	
39	Lubricate the levelling blade mechanism	18	
1	Change oil in torque hubs (D and PD only)	27	

CAUTION

After the **first** 50 hours of operation, change all oil and hydraulic fluid filters and lubricating oil, but not the hydraulic fluid.

MAINTENANCE MEASURES

Every 250 hours of operation (Monthly)

Item in fig. 1	Procedure	See page	Comments
20	Change engine oil, Cummins		See engine manual
10	Change engine oil filter, Cummins		See engine manual
20	Clean engine cooling fins, DEUTZ		See engine manual
20,16	Check V-belt monitoring, DEUTZ		See engine manual
	Check belt tension on fan and alternator		See engine manual
22	Check oil level in rear axle/planetary gear	19	
33,37	Check oil level in drum/cassettes	19, 20	
1	Check oil level in torque hubs (D and PD only)	20	
18,21	Check bolted joints	21	
29	Check oil level in transfer gearbox	21	
31	Check rubber elements	21	

Every 500 hours of operation (Every three months)

Item in fig. 1	Procedure	See page	Comments
8	Change the hydraulic fluid filters	22	
11	Lubricate controls and pivots	23	
14,28	Clean outside of hydraulic fluid cooler	23	
20	Change engine oil, DEUTZ		See engine manual
10	Change engine oil filter, DEUTZ		See engine manual
	Check engine valve clearance		See engine manual

Every 1000 hours of operation (Every six months)

Item in fig. 1	Procedure	See page	Comments
26	Drain condense water from hydraulic reservoir	24	
19	Drain condense water from fuel tank	24	
6	Change venting filter on hydraulic reservoir	24	
9	Change main filter of air cleaner	25	
15	Clean strainer of feed pump, DEUTZ		See engine manual

Every 2000 hours of operation (Yearly)

Item in fig. 1	Procedure	See page	Comments
26	Change fluid in hydraulic reservoir	26	
29	Change oil in transfer gearbox	26	
2,37	Change oil in drum/cassettes	26, 27	
1	Change oil in the torque hubs (D and PD only)	27	
22	Change oil in rear axle planetary gears	28	
22	Change oil in rear axle differential	28	
36	Clean the water tank (CA 251A)	29	
38	Clean the emulsion tank (CA 251A)	29	

EVERY 10 HOURS OF OPERATION (Daily)

Coolant level, checking - filling

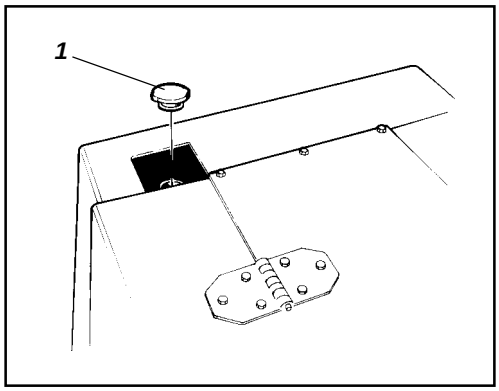


Fig. 2 Radiator
1. Filler cap

CUMMINS:

WARNING

At operating temperature the coolant is under pressure. If the cap is opened too quickly, steam will escape with the risk of severe scalding. Wear protective gloves and goggles.

CAUTION

Use steps or other suitable aid when checking the radiator.

See the engine manual. See specification for filling with coolant.

CAUTION

Change the coolant and flush out the system every other year. Check also that air can flow freely through the radiator.

Air circulation - Checking

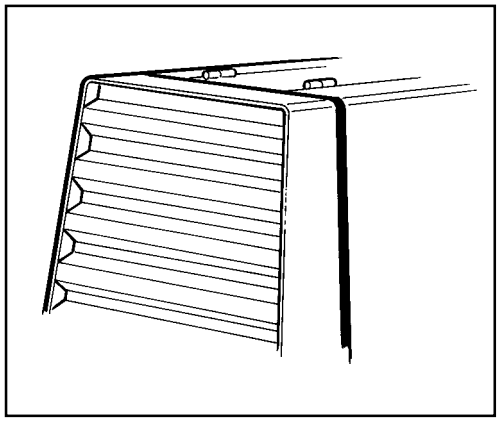


Fig. 3 Cooling grille

Ensure that circulation to the engine through the grille is not obstructed.

Brakes - Test

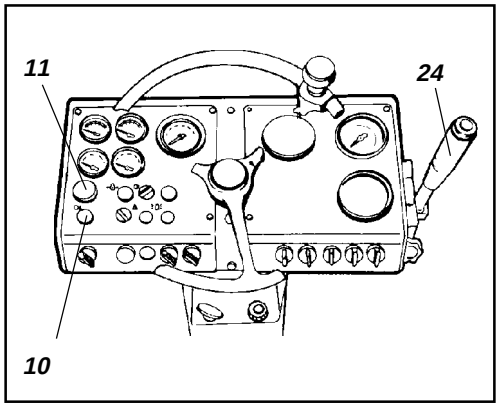


Fig. 4 Instrument panel
10. Brake warning lamp
11. Emergency stop
24. Forward/reverse lever

WARNING

Check operation of the brakes as follows:

1. Drive the roller **slowly** forward.
2. Press the emergency stop knob (11). The brake warning lamp (10) should light and the roller should stop.
3. On completion of the test, put the forward/reverse control (24) in neutral before resetting the emergency stop.
4. Pull the emergency knob out.

Scrapers (CA 251)
- checking, adjustment

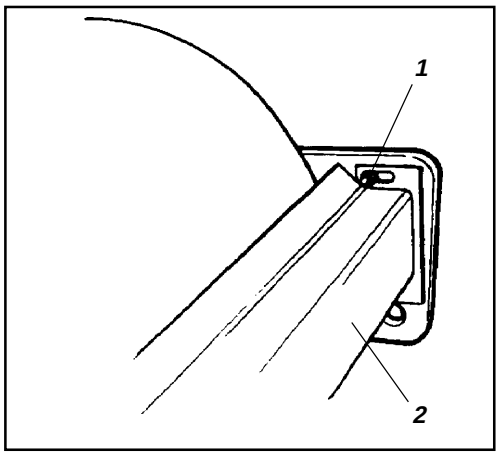


Fig. 5 Scraper
1. Fastening bolts
2. Scraper blade

Adjust distance to the drum as follows:

1. Loosen the four fastening bolts.
2. Adjust the scraper blade about 10 mm (0.4") from the drum.
3. Tighten the fastening bolts.

Scrapers (CA 251A)
- checking, adjustment

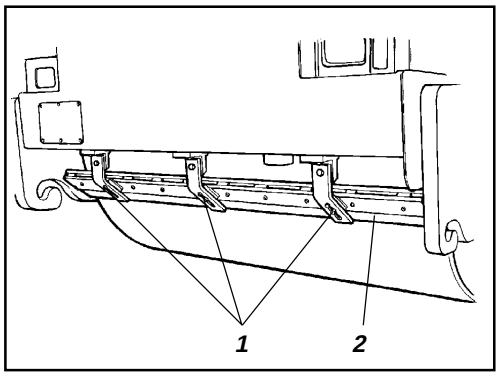


Fig. 6 Scraper
1. Fastening bolts
2. Scraper blade

Drum:

Ensure that the scrapers are intact and adjust the distance as follows:

1. Loosen all the fastening bolts.
2. Adjust the scraper to the drum.
3. Tighten the fastening bolts.

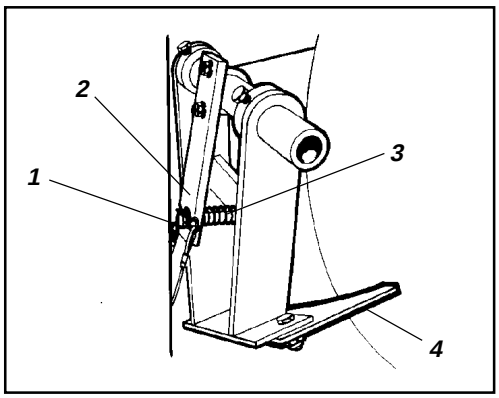


Fig. 7 Tyre scraper
1. Cotter pin
2. Scraper stretcher
3. Spring
4. Scraper

Tire:

1. The scraper blade (4) shall make contact with the tire with a 20 mm (0.8") pre-tensioning of the spring (3). The pre-tensioning is adjusted with the scraper stretcher (2).
2. For transport runs, retract the scraper from the tire and secure with the cotter pin (1).

EVERY 10 HOURS OF OPERATION (Daily)

Scrapers (CA 301)
- checking, adjustment

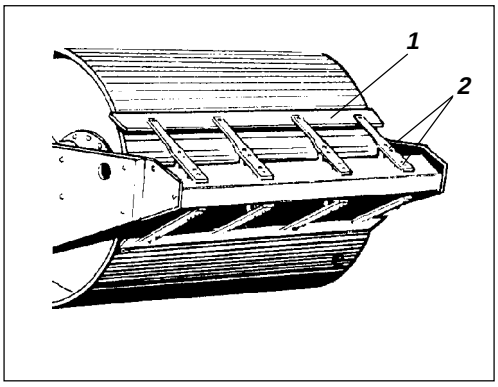


Fig. 8 Front scraper
1. Scraper blade
2. Fastening bolts

1. Loosen the four fastening bolts on half of the scraper blade.

2. Set the scraper blade about 20 mm (0.8") from the drum. Tighten the bolts.

3. Adjust the other three scraper blade sections to the same gap.

Hydraulic reservoir - Checking the level

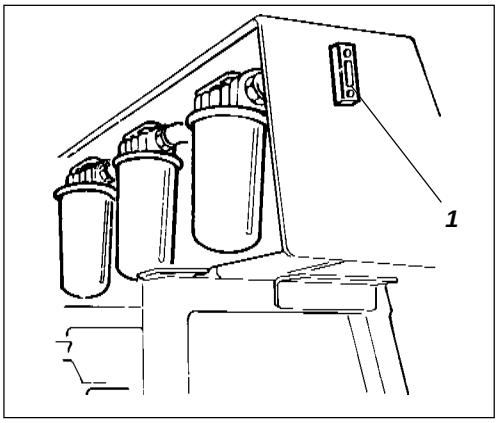


Fig. 9 Hydraulic reservoir
1. Sight glass

1. Position the roller on a level surface and check the sight glass reading (1).

2. Top off with hydraulic fluid, see Lubricant Specification on page 3, if the level is 20 mm (0.8") or more below the upper edge of the glass, or if oil is not visible in the sight glass.

Wind shield liquid
- Check/Top up (Cab)

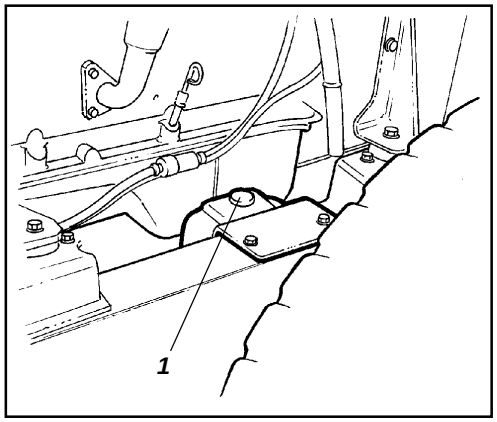


Fig. 10 Engine compartment
1. Wind shield liquid bottle

Open the right cover of the engine compartment and top up the wind shield liquid bottle (1).

CAUTION

Remember the danger of freezing in the winter. Empty the tank, pump and piping.

EVERY 10 HOURS OF OPERATION (Daily)

Hydraulic reservoir, filling

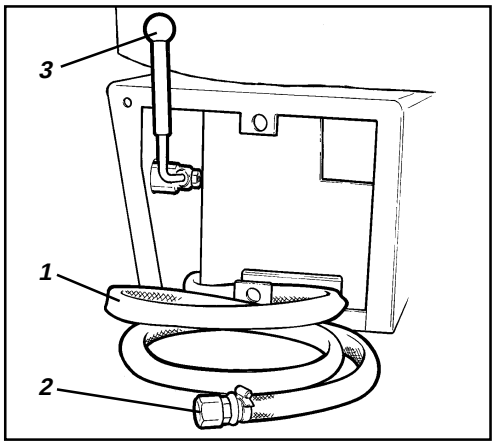


Fig. 11 Battery box
1. Suction hose
2. Protective plug
3. Pump lever

1. Take off the cover on the right side underneath the operator's seat.
2. Take out the suction hose (1).
3. Clean the hose and screw off the protective plug (2).
4. Insert the hose in a drum of fresh hydraulic fluid.
5. Fit the pump lever (3), and pump with the lever and fill the reservoir to the level on the sight glass. The fluid is pumped via a filter to the reservoir so always follow this procedure when filling.

Fuel tank, refuelling

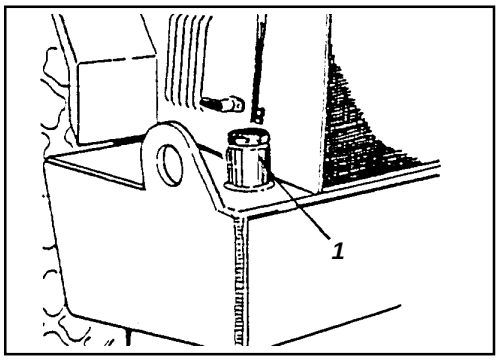


Fig. 12 Fuel tank
1. Filler pipe

Refuel with diesel fuel up to the lower edge of the filler pipe daily at the end of operations.

WARNING

Stop the engine. Ground the refuelling nozzle by touching it against a non-insulated part of the roller before refuelling, and keep the nozzle against the inside of the filler pipe (1) while filling the tank.

(See the engine manufacturer's instructions with regard to quality of diesel fuel.)

Emulsion Tank (CA 251A) - Filling

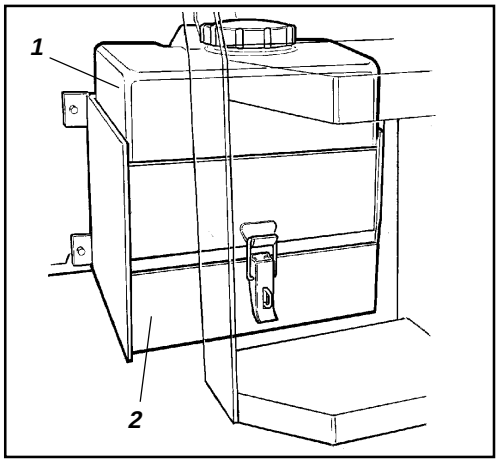


Fig. 13 Left side of frame
1. Emulsion tank
2. Space for pump and filter

Check the level and fill the emulsion tank as required. The emulsion is used only to lubricate the tires. The pump and filter are located behind the cover adjacent to the bottom of the tank.

CAUTION

Remember the danger of freezing in the winter. Empty the tank, pump and leads.

EVERY 10 HOURS OF OPERATION (Daily)

Sprinkler system (CA 251A) Checking - Cleaning

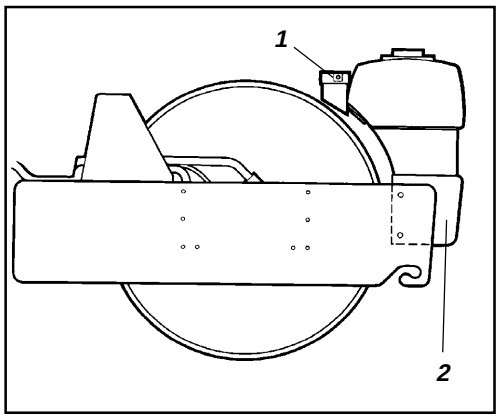


Fig. 14 Water tank
1. Nozzle
2. Pump system

CAUTION

Fill with clean water through the tank filter.

Make sure that the strainer nozzles (1) are not clogged. If necessary, clean the nozzles and strainer.

Nozzle (CA 251A) Dismantling - Cleaning

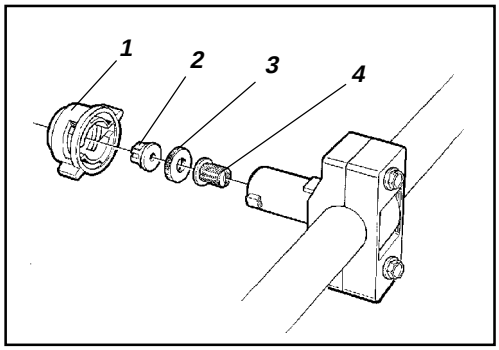


Fig. 15 Nozzle
1. Sleeve
2. Nozzle
3. Seal
4. Strainer

Dismantle a clogged nozzle. Blow the nozzle and strainer clean with compressed air, or fit replacements, and clean the clogged items at a later opportunity.

WARNING

Wear protective goggles when working with compressed air.

Pump System (CA 251A) Checking - Cleaning

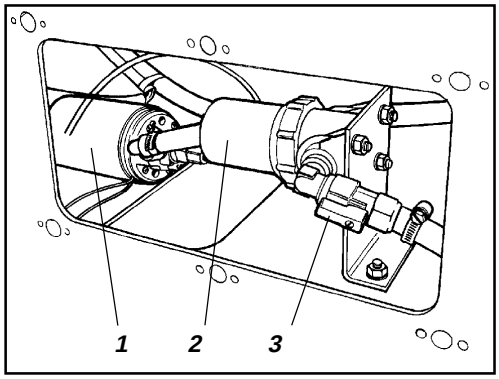


Fig. 16 Pump system
1. Water pump
2. Water filter
3. Stop cock

1. Remove the screws and take off the cover from the forward frame beam.

2. The sprinkler system includes two water pumps and filter. When cleaning, close the stop cock (3) and loosen the filter housing (2). Clean the insert and the filter housing with water.

3. Listen, or place your hand on the water pump to ensure that it is working.

EVERY 50 HOURS OF OPERATION (Weekly)

Air Cleaner - cleaning the Primary filter

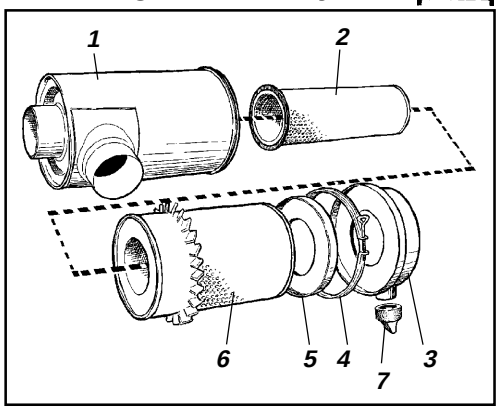


Fig. 17 Air cleaner
1. Filter housing
2. Secondary filter
3. Dust trap
4. Clamp
5. Inner cover
6. Primary filter
7. Emptying slit

CAUTION

Change or clean the Primary filter of the air cleaner when the warning lamp on the instrument panel lights at full revs of the diesel engine.

1. Loosen the clamp (4) and remove the dust trap (3).
2. Screw off the wing-nut at the center of the filter and take off the inner cover (5). Clean inside the dust trap with a clean rag.
3. Screw off the wing-nut and pull out the Primary filter (6).
4. Wipe the inside of the filter housing (1) and intake pipes with a clean rag.
5. Check that hoses and connections between the filter housing and engine are intact and tight.
6. Clean the emptying slits (7) of the dust trap.

CAUTION

Replace the Secondary filter (2) with a new one every third time the Primary filter is changed or cleaned. The Secondary filter cannot be cleaned and reused.

Cleaning with compressed air

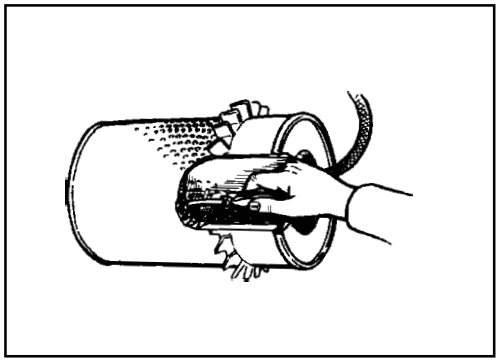


Fig. 18 Primary filter

Use compressed air at a maximum pressure of 0.7 MPa (7 kp/cm^2) (100 psi)

Blow up and down along the paper pleats on the inside of the filter element. Hold the nozzle at least 10 mm (0.4") from the pleats to avoid tearing the paper.

CAUTION

Change the Primary filter after cleaning it five times.

WARNING

Wear protective goggles when working with compressed air.

Tire pressure Wheel nuts - tightening

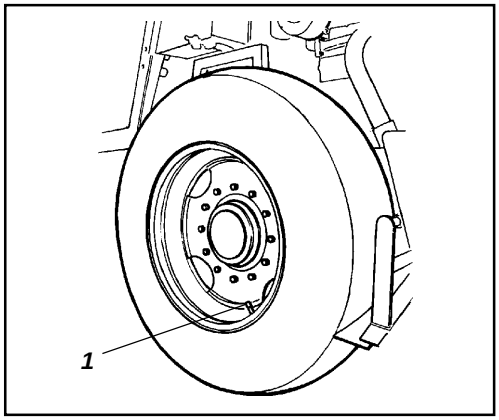


Fig. 19 Wheel
1. Air valve

Check the tires with a pressure gauge.
Minimum tyre pressure = 110 kPa (1,1 kp/cm^2) (16 psi).
Maximum tyre pressure = 150 kPa (1,5 kp/cm^2) (22 psi).
Tyre pressure CA 251A: 110 kPa (1,1 kp/cm^2) (16 psi).
Check both tyres.

CAUTION

When changing tires it is essential that both tires have the same rolling radius (max. difference about 15 mm or 0.6"). No-spin equipment may otherwise be damaged.

Battery - Checking the electrolyte level

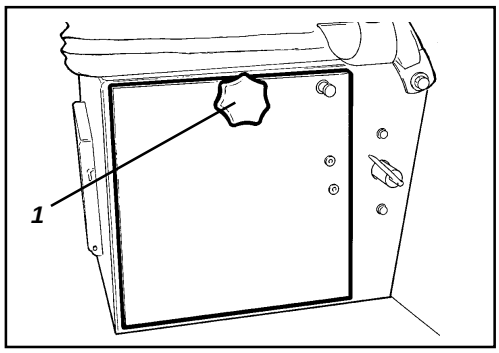


Fig. 20 Battery shelf
1. Knob

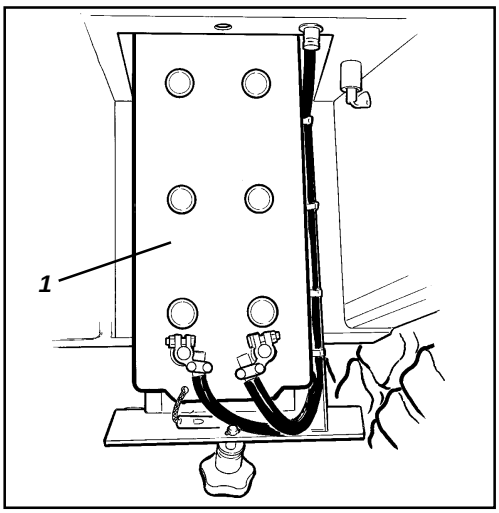


Fig. 21 Battery shelf
1. Knob

Battery cell

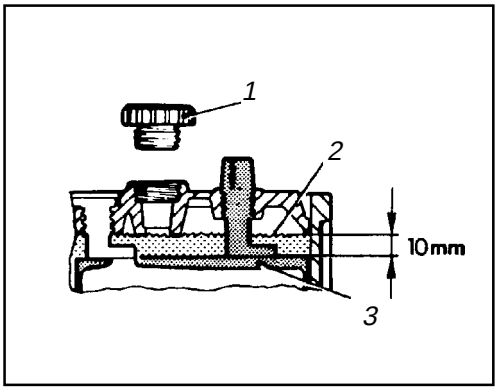


Fig. 22 Electrolyte level in battery
1. Cell cap
2. Electrolyte level
3. Plate

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

1. Turn the knob (1).

2. Pull out the battery shelf.

3. Wipe the top of the battery.

WARNING **Wear protective goggles. The battery contains corrosive acid. Flush with water in the event of contact with the skin.**

3. Take off the cell caps and check that electrolyte level is about 10 mm (0.4") above the plates. Check the level of all cells, and top up with distilled water as required to the correct level. If ambient temperature is below zero, the engine should be run for a while after topping up with distilled water, ie, there is otherwise a risk that the battery fluid will freeze.

4. Make sure the venting holes in the cell caps are not clogged. Refit the caps.

5. Battery terminals must be clean and well tightened. Clean the terminals if corroded and grease them with acid-free Vaseline.

WARNING **Always ensure that the battery box is closed and latched when driving.**

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

Take care of the battery after changing. The battery contains lead which contaminates the environment unless it is treated properly.

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

Articulated steering - Steering cylinders Lubrication

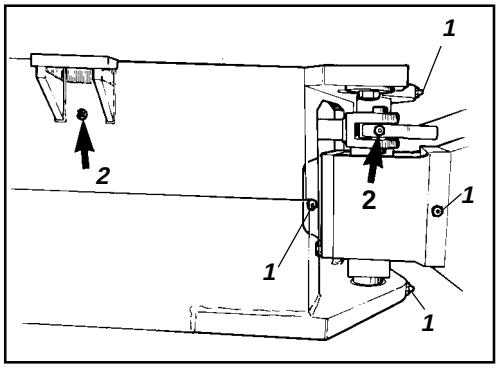


Fig. 23 Steering joint, right side
1. Lubricating nipples, steering joint
2. Lubricating nipples, steering cylinders

WARNING

Risk of injury. Keep everyone clear of the articulated steering mechanism while the engine is running.

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

CAUTION

Use grease recommended in Lubricant Specification.

Articulated steering - Lubrication

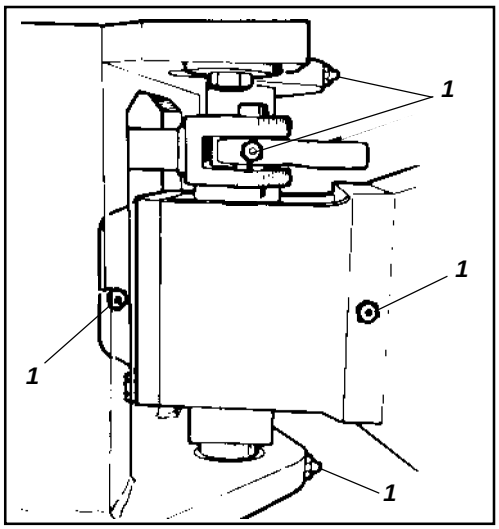


Fig. 24 Steering joint, right side
1. Lubricating nipples

1. Wipe all the nipples clean from dirt and grease.
2. Lubricate each nipple (1) with five strokes of the grease gun. Make sure that grease penetrates the bearings.
3. If grease does not penetrate the bearings it may be necessary to relieve the articulated joint with a jack and repeat the greasing procedure.

Steering cylinders - Lubrication

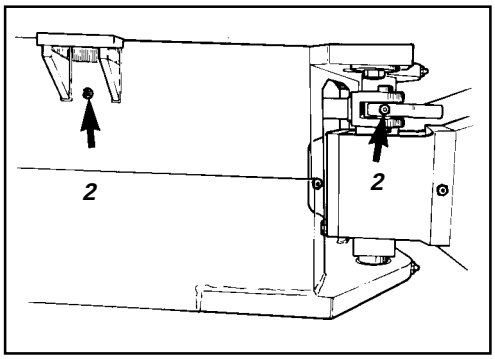


Fig. 25 Steering cylinders, right side
2. Lubricating nipples, cylinder brackets

1. Wipe nipples clean from dirt and grease.
2. Lubricate each nipple (2) with two strokes of the grease gun.
3. Turn the steering wheel fully to the right and grease the nipples on the left steering cylinder that are now accessible. Leave a little grease on the nipples after greasing. This will prevent dirt from entering the nipples.

Levelling blade - Lubrication

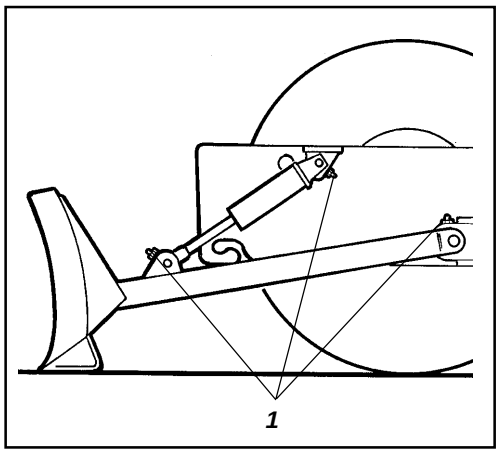


Fig. 26 Levelling blade
1. Lubricating nipples

WARNING

Always lower the blade when the roller is parked or is out of service.

1. Lower the blade.
2. Wipe the lubricating nipples clean on both sides of the machine.
3. Lubricate each nipple (1) with four strokes of the grease gun. Ensure that grease penetrates the bearings. Use grease in accordance with the lubricant specification on page 3.

Rear axle differential - Checking the oil level

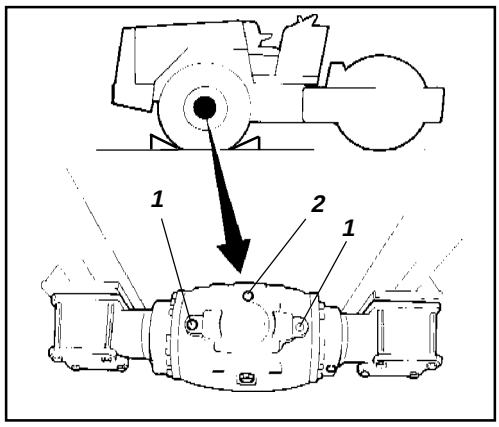


Fig. 27 Level check - differential housing
1. Level plugs
2. Filler plug

WARNING

Never work under the machine while the engine is running. Always park the machine on level ground and chock the wheels.

1. Make sure the roller is level.
2. Unscrew the level plugs (1) and check that oil level is up to the lower edge of the plug hole. Top up with oil through the filler plug (2) as required to the correct level. Use transmission oil. See Lubricant Specification.

Rear axle planetary gear - Checking the oil level

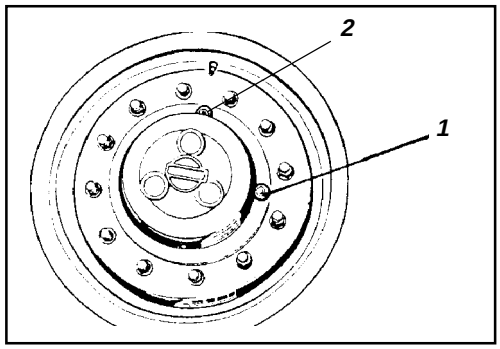


Fig. 28 Level check - planetary gear
1. Level plug
2. Filler plug

1. Position the roller on a level surface with one plug of the planetary gear straight up, the other one will then be horizontal.
2. Unscrew the plugs and check that oil level is up to the lower edge of the plug hole. Top up with oil through the filler plug (2) as required to the correct level. Use transmission oil. See Lubricant Specification.
3. Check oil level of the other planetary gear of the rear axle in the same way.

Drum (CA 251A) - Checking the oil level

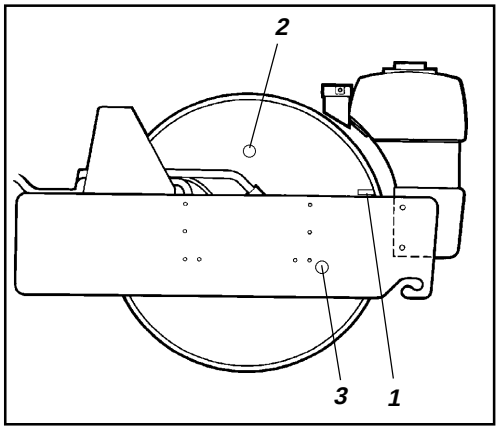


Fig. 29 Right side of drum
1. Level pin
2. Filler plug
3. Level plug

Applies to both sides of the drum, ie, two checks.

1. Position the roller on a level surface, with the level pin aligned with the top of the frame beam.
2. Unscrew the level plug (3) (small hexagon) a few turns. Oil should then run from the plug hole if the level is correct.
3. Top up with transmission oil as required, see Lubricant specification. Fill via the filler plug (2) (large hexagon).

EVERY 250 HOURS OF OPERATION (Monthly)

Drum (cassette) - Checking the Oil Level

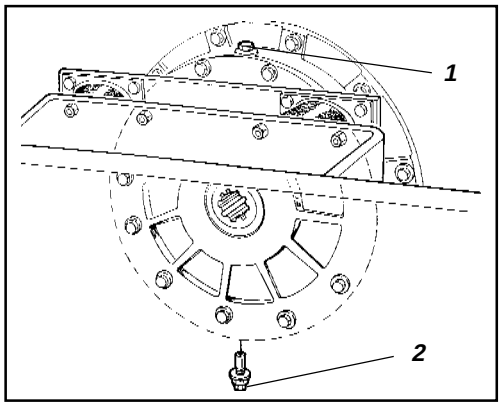


Fig. 30 Right side of drum
1. Filling/drain plug
2. Level plug

1. Position the roller on a flat surface with the filler plug (1) (Large plug width across flats 24 mm) at the top and screw off the plug.

2. Screw out the level plug (2) (Small plug width across flats 13 mm) and oil should flow from the plug hole. Oil level is correct when the flow stops. If oil does not run out, top off through the plug hole (1).

CAUTION

A small amount of oil may run out as the plug (2) is screwed out, this is oil from the level tube and does not necessarily indicate that the level is correct.

3. Fill as required with synthetic oil MOBIL SHC 629 or equivalent.

4. Wipe any metal particles from the magnetic filler plug (1) before refitting.

5. Repeat the above items 1 to 4 on the other side of the drum.

CAUTION

Do not overfill with oil, risk for overheating.

Torque Hub (P, PD) - Checking the Oil Level

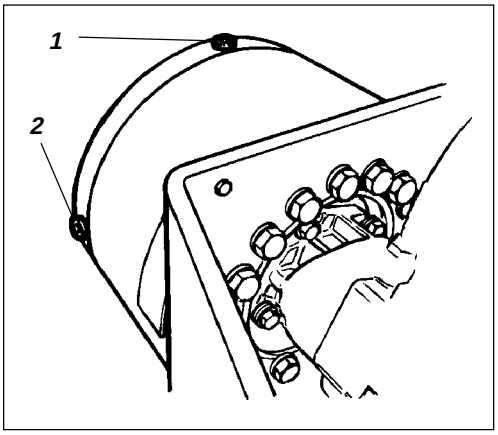


Fig. 31 Torque hub
1. Filler plug
2. Level/Drain plug

Applies to versions P and PD only.

1. Position the roller on a level surface with the filler plug at the top.

2. Wipe clean around the plugs.

3. Remove the plugs and check that oil reaches up to the level plug.

4. Top off as required with transmission oil. See Lubricant Specification.

Transfer Gearbox - Checking the Oil Level

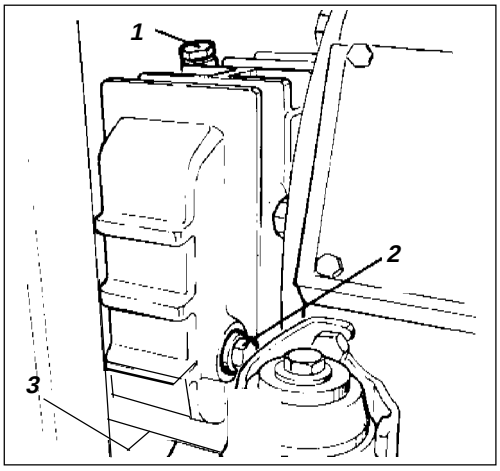


Fig. 32 Level Control
1. Filler plug
2. Level plug
3. Drain plug

1. Make sure the roller is level.
2. Wipe clean around the level plug (2) and loosen it a few turns. Oil should run out from the plug if oil level is correct.
3. If required, top off via the filler plug (1) until oil runs from the level plug (2). Wipe clean around the filler plug before unscrewing it. Use transmission oil. See Lubricant Specification.

CAUTION

A level plug is fitted on both sides of the transfer gearbox. The level need only be checked on one side.

Check tightening torque of bolted joints

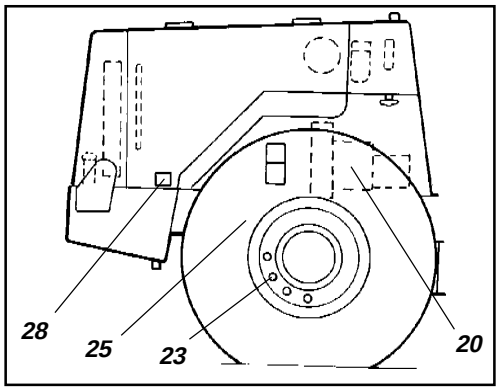


Fig. 33 Drive unit

1. Rear axle suspension (25) 434 Nm (320 ftlbs).
2. Steering pump against propulsion pump (20) 38 Nm (28 ftlbs).
3. Engine suspension (28). Check that all bolts are tightened, 90 Nm (66 ftlbs).
4. Wheel nuts (23). Check that all the nuts are tight, 550 Nm (406 ftlbs) tightening torque.

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

Rubber elements and fastening bolts - Checking

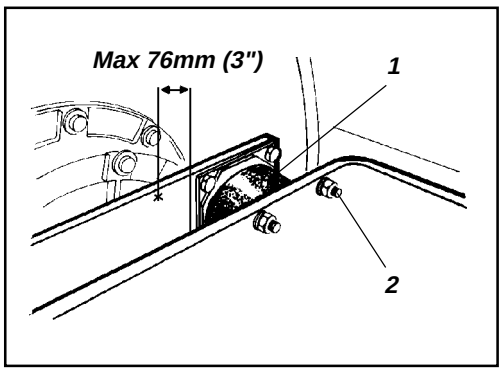


Fig. 34 Drum, vibration side
1. Rubber element
2. Fastening bolts

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

Use a knife, or similar tool, to check depth of cracks.

Check that the fastening bolts (2) are tightened.

CAUTION

Using a vernier gauge, measure the length of the rubber element, including the mounting plates. See separate workshop instructions if the size is greater than 76 mm (3").

Hydraulic fluid filter - changing

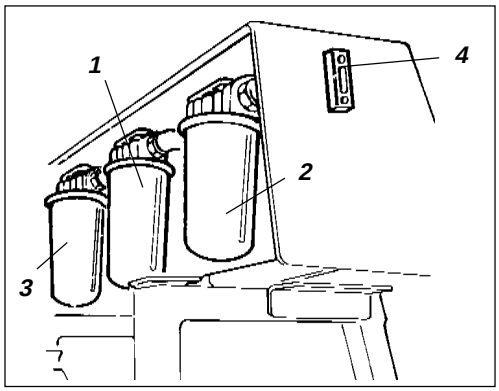


Fig. 35 Hydraulic reservoir
1. Suction filter, drive
2. Suction filter, vibr.
3. Return filter, cooling system
4. Level glass

1. Loosen the venting filter to release any over-pressure in the reservoir.

2. Remove the hydraulic filters (1), (2) and (3) and discard them. They are of the disposable type and cannot be cleaned and reused.

CAUTION

Ensure that the previous sealing rings are removed. Leakage will otherwise occur between the old and new sealing rings.

3. Thoroughly clean the sealing surfaces of the filter holders.

4. Apply a thin coat of fresh hydraulic fluid to the sealing rings of the new filters.

5. Screw on the filters firmly by hand.

CAUTION

Screw on until the seal makes contact with the seating and then screw half a turn further. Do not tighten too hard, the seal may otherwise be damaged.

6. Start the engine and check for any leakage from the filters.

WARNING

Ensure that ventilation (evacuation) is adequate if the engine is run indoors. (Risk of carbon monoxide poisoning).

7. Check fluid level in the sight glass (4) and top off as required.

EVERY 500 HOURS OF OPERATION (Every three months)

Controls and moving joints - Lubrication

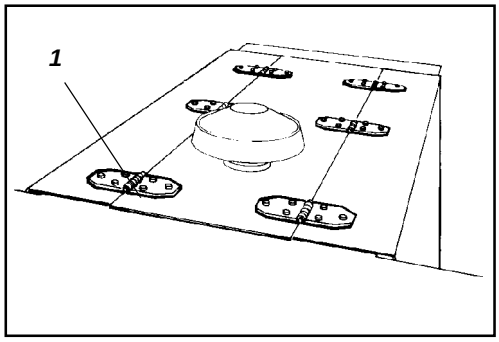


Fig. 36 Engine cover
2. Hinge

Grease the hinges (1) on the engine cover, the F/R controls and the slide rails of the operator's seat. Lubricate other joints and controls with oil. Grease the hinges of the cab doors. See lubricant specification.

Hydraulic fluid cooler Checking - Cleaning

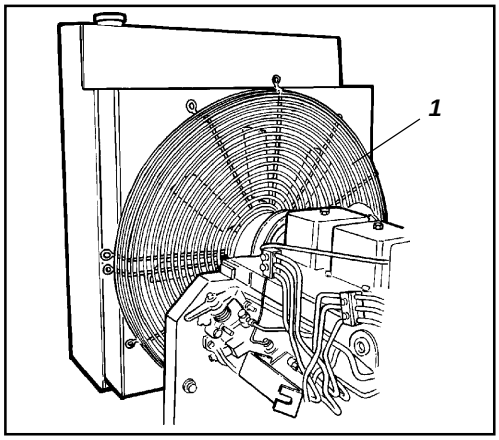


Fig. 37 Engine compartment
1. Hydraulic fluid cooler

CUMMINS:

Ensure that air can flow freely through the cooler without obstruction. A dirty cooler should be cleaned with water or compressed air.

WARNING

Wear protective goggles when working with compressed air or with high pressure washing.

If possible, flush or blow the cooler clean in the opposite direction to the normal flow of air. Cover any electrical components.

Ensure after cleaning that seals and noise absorbers are undamaged.

Hydraulic fluid cooler Checking - Cleaning

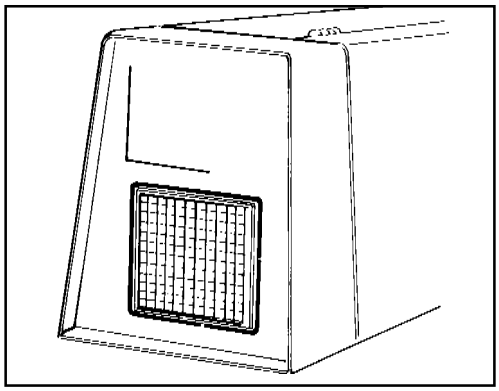


Fig. 38 Engine compartment

DEUTZ:

When cleaning, remove the radiator grille to expose the hydraulic fluid cooler.

EVERY 1000 HOURS OF OPERATION (Every six months)

Hydraulic reservoir - Draining

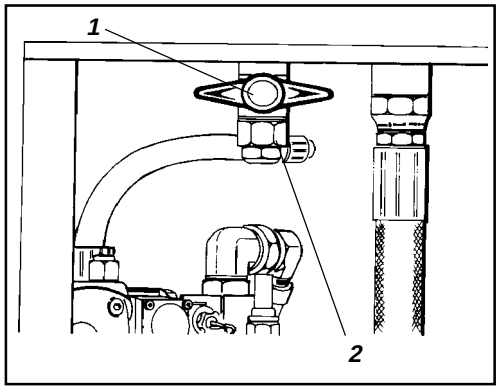


Fig. 39 Hydraulic reservoir, underneath
1. Drain cock
2. Plug

Drain condensed water from the hydraulic reservoir via the drain plug (1). Drain after the roller has stood still for a long period, eg, overnight.

Drain as follows:

1. Hold a can underneath the cock.
2. Remove the plug (2).
3. Open the cock and allow any water to run out.
4. Close the drain cock.
5. Refit the plug.

Hydraulic reservoir - Venting filter

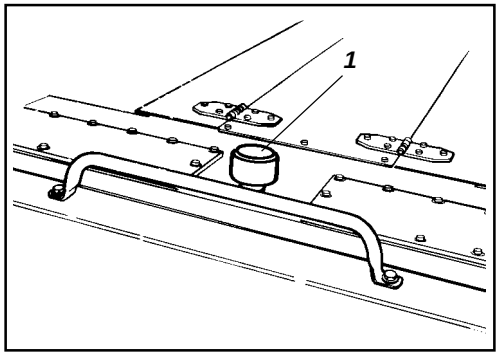


Fig. 40 Hydraulic reservoir
1. Venting filter

Screw off the venting filter (1), discard it and fit a new one.

Fuel tank - draining

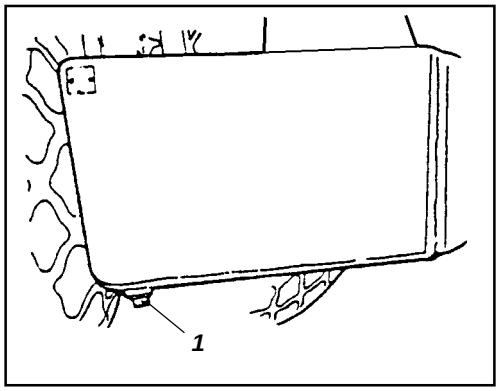


Fig. 41 Fuel tank
1. Drain plug

Drain off sediment and water through the drain plug located underneath the fuel tank.

CAUTION

Be very careful when draining not to drop the plug or allow fuel to run out.

Draining should be done after the roller has stood still for a long period, eg, overnight.

The roller should preferably have been standing on a slope with the drain plug down low, which will allow sediment and water to collect near the plug.

Drain as follows:

1. Hold a can underneath the plug (1).
2. Loosen the plug and allow all sediment and water to run out until pure diesel fuel starts to pour. Tighten the plug.

EVERY 1000 HOURS OF OPERATION (Every six months)

Air cleaner
- changing the main filter

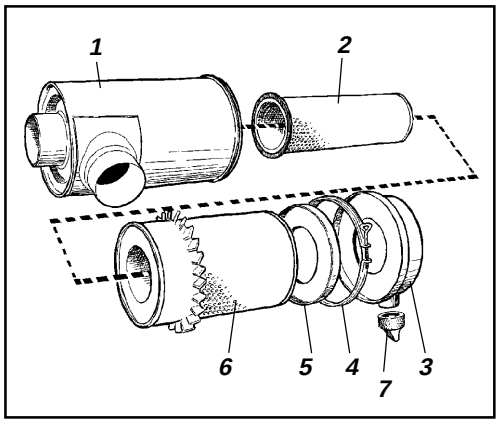


Fig. 42 Air cleaner

1. Filter housing
2. Secondary filter
3. Dust trap
4. Clamp
5. Inner cover
6. Primary filter
7. Emptying slit

Change the Primary filter (6) of the air cleaner even if it has not been cleaned the permitted 5 times, see every 50 hours of operation, Air cleaner.

Hydraulic reservoir - Changing the fluid

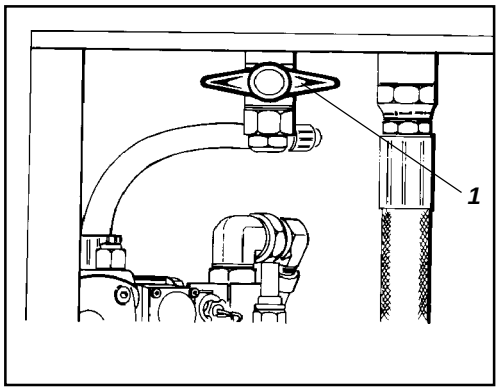


Fig. 43 Hydraulic reservoir, underneath
1. Stop cock

1. Use a suitable receptacle, for at least 100 litres (25 gal), when draining the fluid.

An empty oil drum placed at the side of the roller is suitable. Connect a hose to the drain cock (1) and empty the contents of the reservoir into the oil drum.

2. Fill the reservoir with fresh hydraulic fluid, in accordance with the instructions, Hydraulic reservoir - Checking the level. Change the hydraulic filters at the same time. See, Hydraulic fluid filters - changing.

3. Start the engine and run the various hydraulic functions.

WARNING **Ensure that ventilation (evacuation) is adequate if the engine is run indoors. (Risk of carbon monoxide poisoning).**

4. Check the fluid level and top off if necessary.

Transfer Gearbox - Changing the Oil

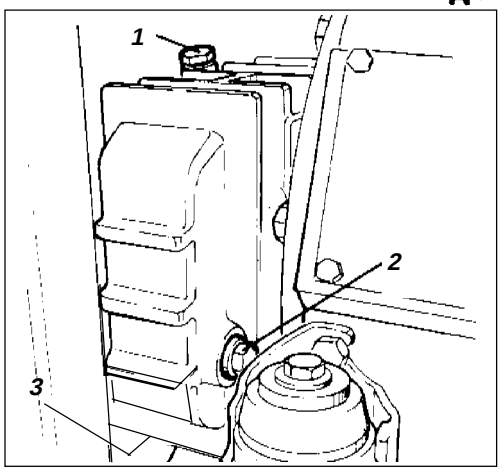


Fig. 44 Transfer gearbox, left side
1. Filler plug
2. Level plug
3. Drain plug

WARNING **Never work under the roller while the engine is running. Park on a level surface. Chock the drum and wheels.**

1. Loosen the drain plug (3) and drain off the oil.

2. Refit the plug.

3. Remove the level plug (2) and fill with fresh gearbox oil through the filler hole (1). Fill slowly to allow the oil to level out.

4. Fit the plugs (1 and 2) back again at the right oil level.

Drum - Changing the Oil

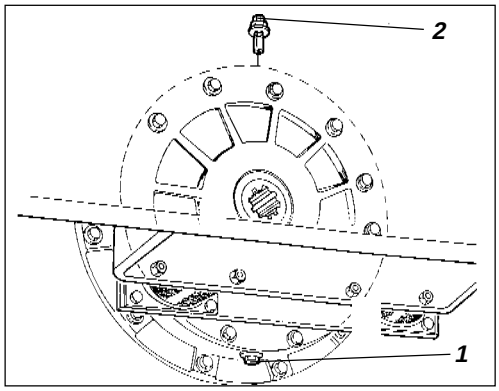


Fig. 45 Drum, right side
1. Drain/Filler plug
2. Level plug

1. Position the roller on a level surface with the drain plug (1) (Large plug width across flats 24 mm) at the bottom. Place a receptacle for about 4 litres (4.3 qts) underneath the plug.

2. Screw out the level plug (2) (Small plug width across flats 13 mm) screw out the drain plug (1).

3. Allow all the oil to run out and repeat the procedure on the other side of the drum.

4. Fill with synthetic oil in accordance with instructions under every 250 hours of operation. See under heading, Drum - Checking the Oil Level.

Drum (CA 251A) - Changing the Oil

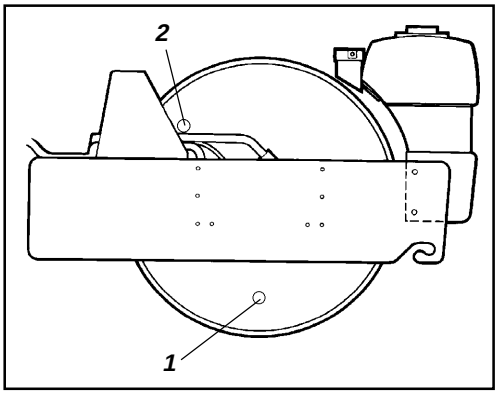


Fig. 46 Setting of drum for draining
1. Drain plug
2. Level plug

Applies to both sides of the drum, ie, two checks.

1. Position the roller on a level surface, with the drain plug (1) (large hexagon) at the lowest position.
2. Loosen the plug (1) and drain off the oil. Remember that the amount of oil is about 27 litres (28 qts).
3. Drain off oil from the other side of the drum.
4. Before filling the drum with oil, see under every 250 hours of operation, heading Drum, Checking the Oil Level.

Torque hub (D, PD) - Changing the oil

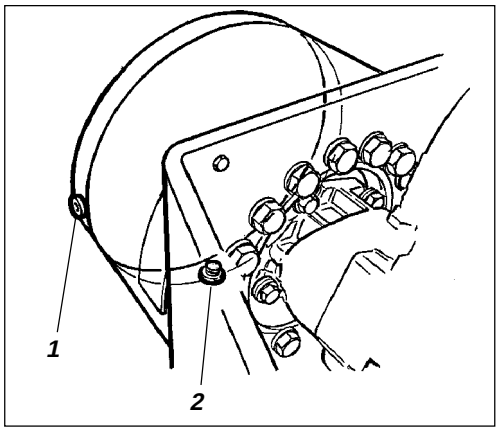


Fig. 47 Draining the oil
1. Filler plug
2. Drain/level plug

CAUTION

Before changing oil it is essential that the machine is run long enough to make the oil warm and easy flowing. Any impurities present will then come out with the oil. Observe cleanliness and make sure the roller is level.

Applies to D and PD only.

The system should be run warm before changing the oil.

1. Position the roller on a level surface with the drain/level plug at the bottom.
2. Wipe clean around the plugs.
3. Place a can under the drain plug and drain off the oil. The can should hold about 5 litres (6 qts). Remove the filler plug also.
4. Reverse the roller until filler plug is at the top.
5. Fill with oil through up to the level plug. Use transmission oil, according to lubricant specification.
6. The plugs are magnetic. Any metal particles must be removed before the plugs are reinserted.

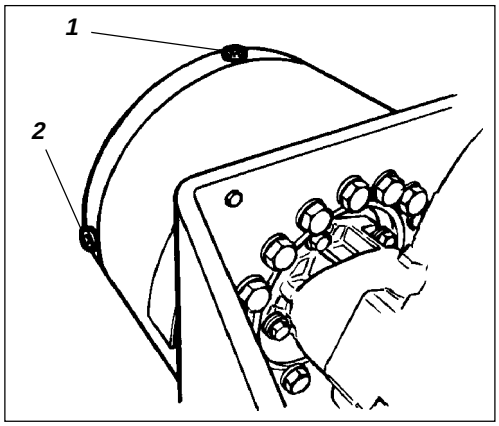


Fig. 48 Filling the oil
1. Filler plug
2. Drain/level plug

Rear axle differential - Changing the oil

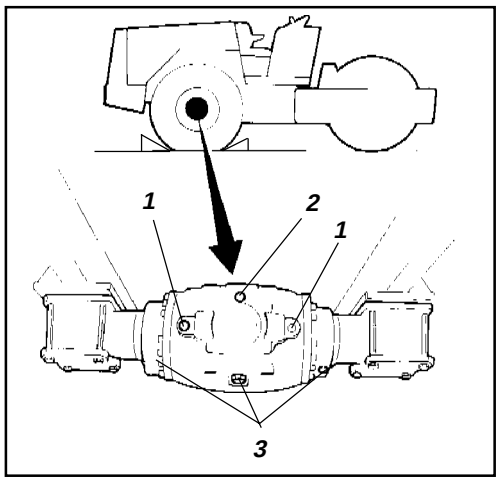


Fig. 49 Rear axle
1. Level plugs
2. Filler plug
3. Drain plugs

WARNING

Never work under the machine while the engine is running. Always park the machine on level ground and chock the wheels.

1. Position the roller level.
2. Remove all three drain plugs (3) and empty the oil into a can, big enough for about 15 litres (4 gal). Also remove the filler plug (2) and the level plugs (1).
3. Refit the drain plugs and fill with fresh oil up to the correct level. Refit the filler plug and level plugs. Use transmission oil, see Lubricant Specification.

Rear axle planetary gear - Changing the oil

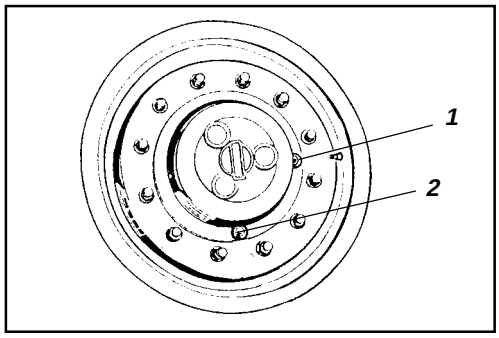


Fig. 50 Planetary gear/position for draining
1. Level plug
2. Drain plug

1. Position the roller on a level surface with one of the plugs straight down.
2. Unscrew this plug and drain off the oil into a can, big enough for about 4 litres (4 qts).
   Loosen the other plug to speed up the flow of oil.
3. Run the roller to position one of the plugs at the top and the other horizontally.
4. Fill with oil through the upper hole (2) until it runs out at the lower hole.
5. Refit the plugs and repeat the procedure in the same way on the other side. Use transmission oil, see Lubricant Specification.

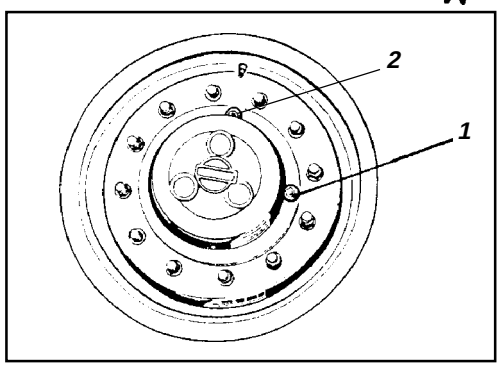


Fig. 51 Planetary gear/position for filling
1. Level plug
2. Filler plug

Water tank (CA 251A) - Draining, Cleaning

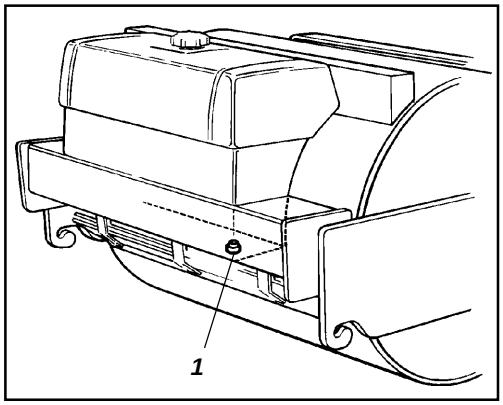


Fig. 52 Water tank
1. Drain plug

CAUTION

Beware of the risk of freezing in the winter. Drain the tank, pump and piping.

1. Remove the drain plug (1) and drain off the water.
2. Clean the inside of the tank with water and a suitable detergent for plastic material.
3. Refit the plug and check tightness.

The water tank is made of plastic (polythene) and is recyclable.

Water pump (CA 251A) - Draining

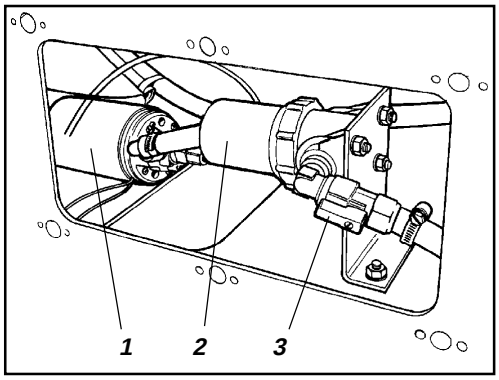


Fig. 53 Pump system
1. Water pump
2. Stop cock

Drain the water pump (1) via the stop cock (2).

Emulsion tank (CA 251A) - Draining, Cleaning

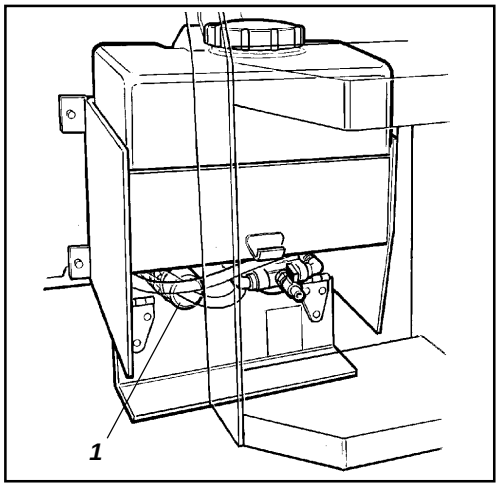


Fig. 54 Pump system
1. Water filter

The emulsion tank is drained most easily by screwing off the water filter (1).

The emulsion tank is made of plastic (polythene) and is recyclable.

LONG-TERM PARKING

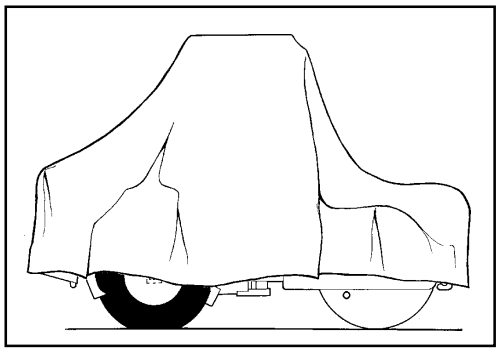


Fig. 55 Weather protection

CAUTION

The following instructions must be complied with when parking or storing the roller longer than one month.

The measures stipulated apply for a standstill up to 6 months.

The measures marked ❊ must be taken before using the roller again.

Diesel engine

❊ See the manufacturer´s instructions in the engine manual that accompanies the roller.

Battery

❊ Remove the battery from the roller, clean it, check that electrolyte level is correct and charge the battery once every month.

Air cleaner, exhaust pipe

❊ Cover the air cleaner or its intake opening with plastic foil or tape. The opening of the exhaust pipe must also be covered. This is necessary to prevent moisture from getting into the engine.

Fuel tank

Fill the fuel tank completely, ie, to prevent condensation and corrosion.

Hydraulic reservoir

Drain off any condensed water from the hydraulic reservoir.

Sprinkler system (CA 251A)

❊ Drain the water tank completely, even hoses, filter housing and the water pump must be emptied. Remove all the sprinkler nozzles over the drum and wheels.

Steering cylinder, hinges, etc.

Lubricate the steering articulation bearings and both bearings of the steering cylinder with grease.
Grease the piston rod of the steering cylinder with rust inhibiting grease.
Grease the engine hood hinges, seat slide rails, revs control, and mechanism of the forward/reverse control.

Tires

Ensure that tire pressure is at least 150 kPa (1.5 kp/cm^2) (22 psi), 110 kPa (1,1 kp/cm^2) (16 psi) for CA 251A.

Covers, tarpaulin

❊ Close the instrument protection cover on the steering column. Cover the entire roller with tarpaulin. The tarpaulin must be kept clear of the ground.
If possible, park the roller indoors, preferably in a building with even temperature.

SPECIAL INSTRUCTIONS

Standard oils and other recommended fluids

On leaving the factory the various systems and components are filled with oil or fluid as indicated in Lubricant Specification, and are thus suitable for operation in ambient temperatures between -10°C (14°F) and +40°C (104°F). The following recommendations apply for operation in higher ambient temperatures up to a maximum of +50°C (122°F):

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

The engine can be used at this temperature using normal oil but for other components the following fluids must be used:
Hydraulic system: Shell Tellus Oil T100, or equivalent.
Other components using transmission oil: Shell Spirax HD 85W/140, or equivalent.

The temperature limits apply to standard versions of the roller.

Rollers that are fitted with additional equipment, such as noise suppression, etc, may require extra observation in the higher temperature ranges.

High pressure washing

A water jet should not be aimed directly at the cap of the fuel tank or hydraulic reservoir. This is especially important when using a high-pressure jet.

Place a plastic bag over the cap and secure it with a rubber band. This will avoid water entering the venting hole in the filler cap, which would otherwise cause operational disturbance and a clogged filter. Do not spray electric components or the instrument panel.

Fire fighting

In the event of fire in the machine, use an ABE-powder fire extinguisher if possible. A BE type carbon dioxide fire extinguisher may also be used.

Roll over protecting structure (ROPS)

Absolutely no welding or drilling of holes is permitted on the roll over protecting structure (ROPS). Never repair a damaged structure, replace it with a new ROPS.

Starting aid

When using an auxiliary battery, ie, in addition to the one installed on the roller, to assist starting, always connect the positive terminal of the auxiliary battery to the positive terminal of the roller battery, and negative to negative.

Fuses

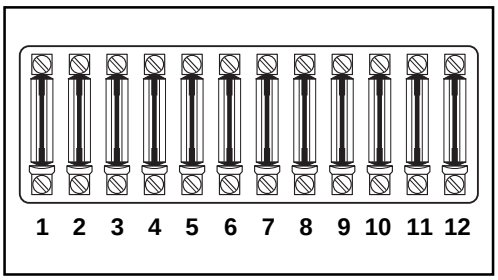


Fig. 56 Fuse boxes
1. Vibration control
2. Instruments
3. Horn/V-belt monitor, Deutz
4. Stop solenoid, Cummins
5. Hazard beacon
6. -
7. Brake valve
8. Gear selector
9. Sprinkler (CA 251A)
10. -
11. -
12. Driving lights (optional equipment)

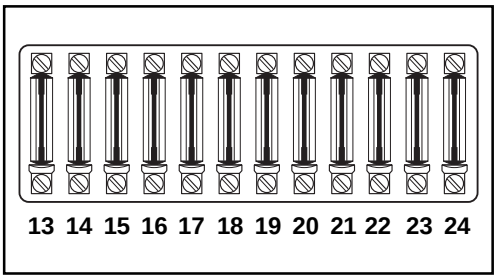


Fig. 57 Lower fuse box (optional)
13. Working lights, rear
14. Parking lights, left
15. Parking lights, right
16. Direction indicator/left
17. Direction indicator/right
18. Low beam, left
19. Low beam, right
20. High beam, left
21. High beam, right
22. Brake lights, right
23. Brake lights, left
24. -

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

CAUTION

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

CAUTION

Before carrying out any electric welding on the machine, disconnect the battery grounding cable and then all terminals to the alternator.

The electrical regulating and control system is protected against overload by 8 A fuses, which are located in fuse boxes on the steering column, see maintenance diagram.

The lower fuse box is only fitted on rollers that are equipped with driving lights, direction indicators and rear working lights.

Fig. 58 illustrates the fuse boxes that are fitted in the cab, ie, in cases where this is relevant (optional).

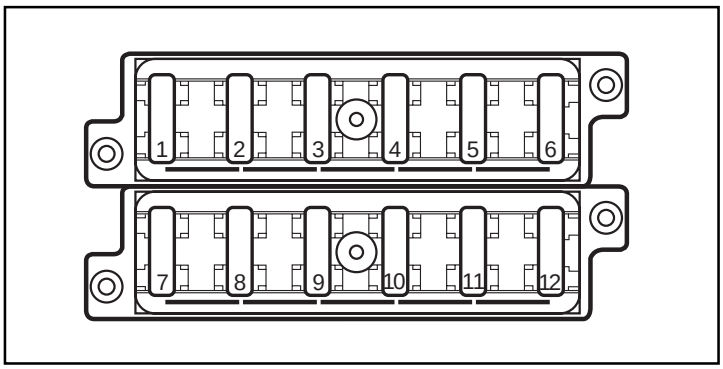


Fig. 58 Fuse box in cab (optional)

10A	*1. Front working lights*
10A	*2. Rear working lights*
3A	*3. Front spraying*
15A	*4. Fan*
15A	*5. Front wiper*
15A	*6. Rear wiper*
3A	*7. Interior lighting, Radio*
7.5A	*8. Air conditioner*
	9. -
	10. -
3A	*11. Hazard beacon*
25A	*12. Cab heater*