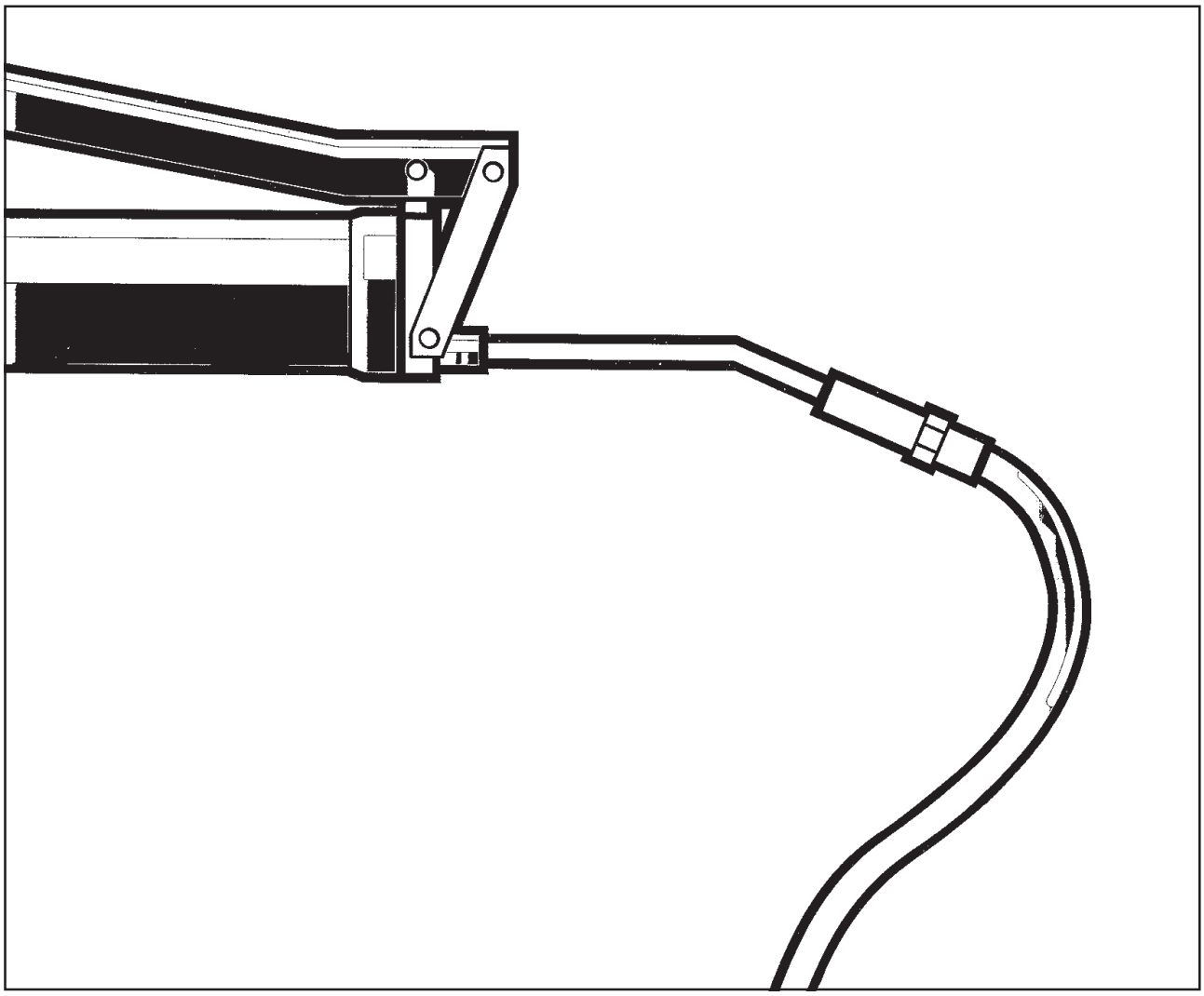
DYNAPAC
CA 251

MAINTENANCE

M251-1EN1



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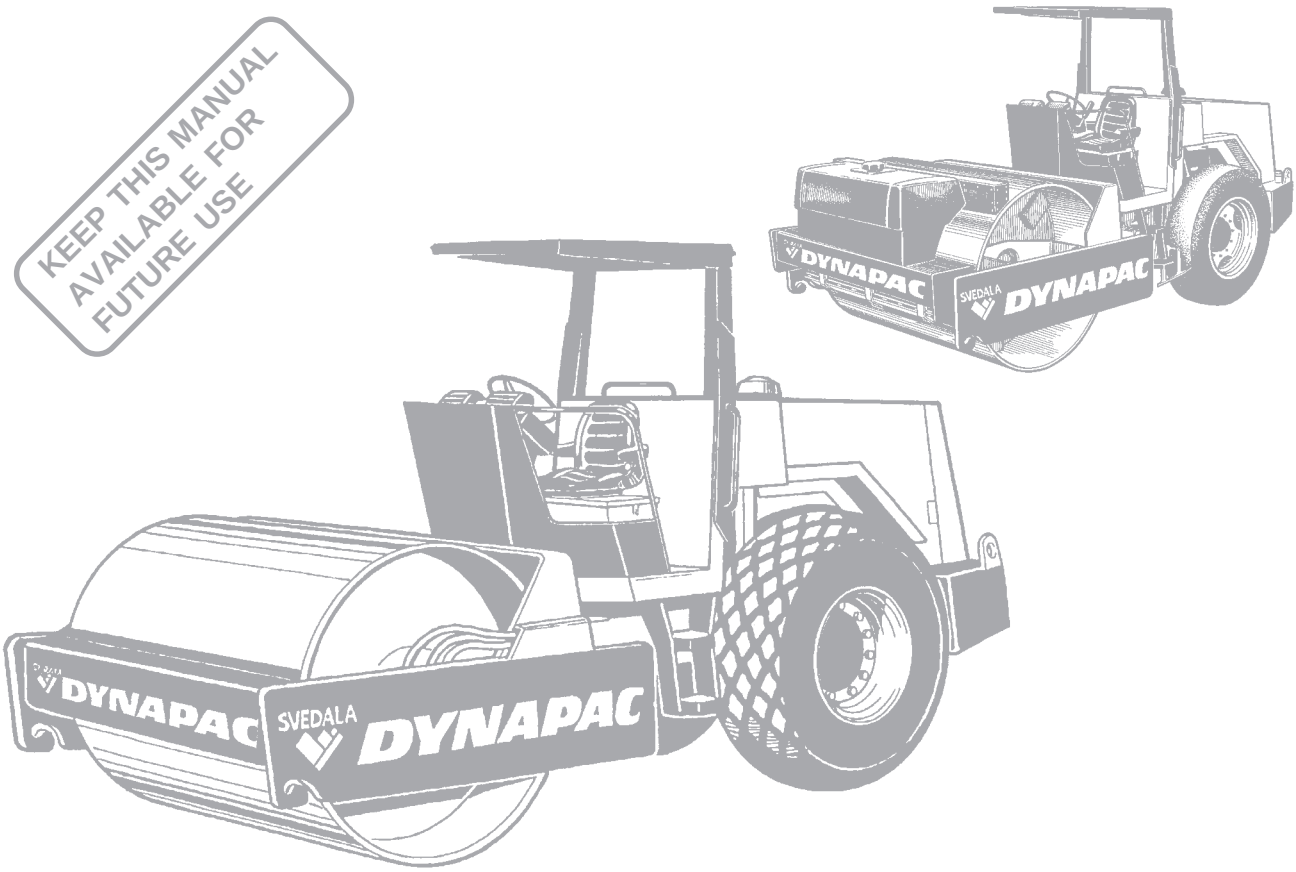
SVEDALA DYNAPAC

Vibratory roller
CA 251

Maintenance
M251-1EN1, November 1999

Diesel engine:
Cummins 6BT 5.9

These instructions apply from:
CA 251 PIN (S/N) *58313611*
CA 251A PIN (S/N) *58313688*



The CA 25-family consists of rollers CA 251, Std, D, PD and CA 251A. These rollers are designed for the compaction of roads, airfields, dams and similar constructions. The CA 251A compacts asphalt, roller concrete, base courses and sub-base courses efficiently and with high capacity.

Separate information is available on request concerning accessories and extra equipment.

Printed in Sweden.

CONTENTS

WARNING SYMBOLS

Safety instructions – Personal safety.

Special caution – Machine or component damage.

GENERAL

Read the entire manual before starting any service work.

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

It is essential that the machine is cared for in a proper manner to ensure satisfactory operation. Keep the machine clean to facilitate quick and timely detection of any leakage, loose bolts and loose connections.

Make a habit each day, before starting up, of checking the roller to detect any leakage or damage. Also check the ground underneath the roller, where it is most often easier to detect any leakage.

TAKE CARE OF THE ENVIRONMENT
Do not leave behind any oil, fuel or other substances that are detrimental to the environment.

This manual contains instructions for periodic measures that should normally be carried out by the operator.

The manufacturer's instructions noted in the engine manual also apply. This is placed under a separate flap in the product folder for the roller.

LUBRICANTS AND SYMBOLS

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

	ENGINE OIL, ambient temperature -10°C - +50°C	Shell Rimula SAE 15W/40 or equivalent. API Service CD/SE, CD/SF
	HYDRAULIC FLUID, ambient temperature -10°C - +40°C **ambient temperature higher than+40°C**	Shell Tellus Oil TX68 or equivalent. **Shell Tellus Oil T100 or equivalent.**
	TRANSMISSION OIL, ambient temperature-15°C - +40°C **ambient temperature higher than+40°C**	Shell Spirax SAE 80W/90, HD API, GL-5 **Shell Spirax HD85W/140 or equivalent.**
	DRUM-CASSETTE OIL, All temperatures	Synthetic oil MOBIL SHC 629.
	DRUM OIL, (CA 251A) All temperatures	Shell Spirax SAE 80W/90, HD API, GL-5
	GREASE	Shell Calithia EPT2 or equivalent. Shell Malleus GL95 or equivalent for the articulation.
D	FUEL	See engine manual.
50/50	COOLANT 50/50 mixture with water	Shell Anti Freeze 402 or equivalent. Anti-freeze down to about -35ºC.

Other lubricants are required for driving in extremely high or low ambient temperatures. See chapter “Special instructions”, or consult Svedala.

	Engine, oil level		Air filter
	Engine, oil filter		Battery
	Hydraulic reservoir, level		Tyre pressure
	Hydraulic fluid, filter		Sprinkler
	Transmission, oil level		Sprinkler water
	Lubricating oil		Coolant, level
D	Fuel filter		Recycling

SPECIFICATIONS

Weight and sizes	CA 251			
	Std	D	PD	A
Weight EN500-1, standard equipped roller, kg (lbs)	9 550 (21,054)	9 750 (21,495)	11 150 (24,581)	10 000 (22,046)
Length, standard equipped roller, mm (in)	5 380 (11,861)	5 380 (11,861)	5 450 (11,861)	5 532 (11,861)
Width, standard equipped roller, mm (in)	2 373 (5,232)	2 373 (5,232)	2 373 (5,232)	2 373 (5,232)
Height, standard equipped roller, mm (in)	2 175 (4,795)	2 175 (4,795)	2 230 (4,916)	2 175 (4,795)
Height, " with ROPS, mm (in)	2 895 (6,382)	2 895 (6,382)	2 945 (6,492)	2 895 (6,382)
Height, " with cab, mm (in)	2 800 (6,173)	2 800 (6,173)	2 850 (6,283)	2 800 (6,173)

Fluid volumes	Litre (gal or qts)
Rear axle:	
• Differential	12 l (12.7 qts)
• Planetary gearing	1,7 l/side (1.8 qts/side)
Pump drive/transfer gearbox	1,5 l (1.6 qts)
Drum drive/Drum gear (D,PD)	2,8 l (3.0 qts)
Cassette, vibration generator	**A** 27 l/side (7.1 gal), 2,7 l/side (2.8 qts) cassette
Hydraulic reservoir	90 l (23.8 gal)
Fluid in hydraulic system	**Std, A** 26 l (6.9 gal), **D, PD** 25 l (6.6 gal)
Lubricating oil, diesel engine	16 l (4.2 gal)
Coolant, diesel engine	27 l (7.1 gal)
Fuel tank	265 l (70 gal)
Water tank(A)	480 l (127 gal)
Emulsion tank(A)	10 l (10.6 qts)

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

Compaction data		CA 251			
		Std	**D**	**PD**	**A**
Static linear load	kg/cm (pli)	23,8 (133.3)	24,7 (138.3)	-	26,1 (146.2)
Amplitude (High)	mm (in)	1,75 (0.07)	1,75 (0.07)	1,63 (0.06)	0,8 (0.031)
Amplitude (Low)	mm (in)	0,85 (0.033)	0,85 (0.033)	0,79 (0.031)	0,4 (0.015)
Frequency (High ampl.)	Hz (vpm)	30 (1,800)	30 (1,800)	30 (1,800)	45 (2,700)
Frequency (Low ampl.)	Hz (vpm)	33 (1,980)	33 (1,980)	33 (1,980)	45 (2,700)
Centrifugal force (High ampl.)	kN (lb)	203 (45,675)	203 (45,675)	249 (56,025)	187 (42,075)
Centrifugal force (Low ampl.)	kN (lb)	119 (26,775)	119 (26,775)	146 (32,850)	94 (21,150)

Tyres	CA 251	CA 251A
Tyre size	23.1x26 8 ply	16.9x30 6 ply
Tyre pressure	110-150 kPa (1,1-1,5 kp/cm^2)	110 kPa (1,1 kp/cm^2)

As extra equipment the tyres can be filled with liquid (extra weight up to 600 kg (1,323 lbs)). In connection with service remember the extra weight that this entails.

Tightening torque

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

M thread	STRENGTH CATEGORY 8.8 (Grade 5)	10.9 (Grade 8)
M4	2,5 (1.8)	3,4 (2.5)
M5	4,9 (3.6)	7,0 (5.2)
M6	8,4 (6.2)	12 (8.9)
M8	21 (15.5)	28 (20.7)
M10	40 (29.5)	56 (41.3)
M12	70 (51.6)	98 (72.3)
M16	169 (124.7)	240 (177)
M20	330 (243.4)	470 (346.7)
M24	570 (420.4)	800 (590.1)
M30	1130 (833.5)	1580 (1165.4)
M36	1960 (1445.7)	2800 (2065.3)

ROPS

The ROPS bolts are *always* to be torque-tightened dry.

Bolt size:	M24
Strength class:	8,8
Tightening torque:	640 Nm

Hydraulic system

Opening pressure	(MPa)
Drive system	35
Supply system	2
Vibration system	35
Steering system	14
Brake release	1,5

Noise level – Operator's station (ISO 6394)

Measured acoustic pressure level, LpA, on hard base and vibration switched OFF:

Cummins:	LpA: 92 dB(A)
Cummins with cab:	LpA: 84 dB(A)

Acoustic power level – Surroundings (SS 4591010)

Measured acoustic power level, LpA, on hard base and vibration switched OFF:

Cummins:	LwA: 112 dB(A)

Whole body vibration – Operator's station (ISO 2631)

(Hand/arm - steering wheel and F/R lever vibration is less than the limit value, 2.5 m/s^2.)

Measurements taken with vibration ON and on foam-rubber mat (Limit value 0.5 m/s^2):

Machine vibration level	Operator's seat (m/s^2)*	Operator's platform floor (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 251A	0,05	0,09
+ ROPS	0,04	0,04

* Sum of acceleration in the operator's seat.
** Maximum acceleration in floor in z-axis.

MAINTENANCE SCHEDULE

Read the entire manual before starting any service work. It is essential that the machine is cared for in a proper manner to ensure satisfactory operation.

Keep the machine clean to facilitate quick and timely detection of any leakage, loose bolts and loose connections. Make a habit each day, before starting up, of checking the roller and on the ground underneath it to detect any leakage or damage.

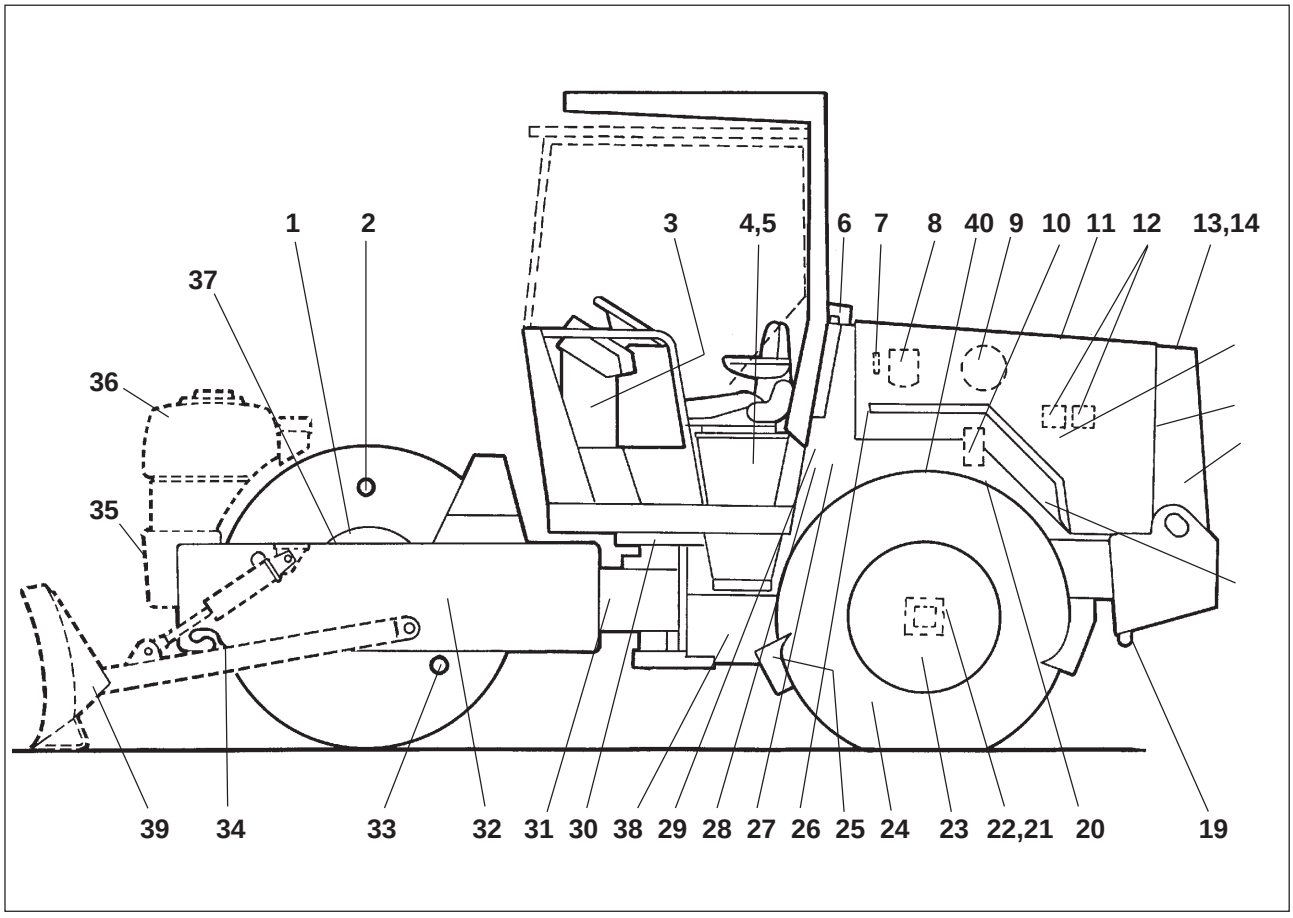


Fig. 1 Service points

1. *Drum gearbox (D and PD only)*
2. *Drum oil, filling (CA 251A)*
3. *Fuse box*
4. *Battery*
5. *Hydraulic fluid, filling*
6. *Breather filter, hydraulic reservoir*
7. *Sight glass, hydraulic fluid*
8. *Hydraulic filter, (3 off)*
9. *Air filter*
10. *Lubricating oil filter, diesel engine*
11. *Engine hood, hinges*
12. *Fuel filter/Water trap, diesel engine*
13. *Coolant*
14. *Hydraulic fluid cooler*
15. *Feed pump, diesel fuel*
16. *-*
17. *Diesel fuel, filling*
18. *Engine suspension*
19. *Fuel tank, drain*
20. *Oil level, diesel engine*
21. *Rear axle suspension*
22. *Rear axle, lubricating oil levels*
23. *Wheel nuts*
24. *Tyre pressure*
25. *Drum scrapers (CA 251A)*
26. *Drain hydraulic reservoir*
27. *Tyre sprinkler (CA 251A)*
28. *-*
29. *Flywheel casing, transfer gear box, hydraulic pumps*
30. *Steering cylinder*
31. *Steering joint*
32. *Rubber element, fastening screws*
33. *Level plug, drum oil (CA 251A)*
34. *Scraper*
35. *Sprinkler system (CA 251A)*
36. *Water tank (CA 251A)*
37. *Drum cassette, oil*
38. *Emulsion tank (CA 251A)*
39. *Strike-off blade (optional equipment)*
40. *Washer fluid (optional equipment)*

MAINTENANCE MEASURES

The periodic measures are to be carried out primarily in conformance with the stated hours of operation, secondarily for the periods daily, weekly, etc.

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

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

Every 10 hours of operation (daily)

Items in fig. 1	Measure	See page	Comments
	Before starting up		
20	Check oil level in the engine		See engine instruction manual.
13	Check coolant level	9	
	Test the brakes	9	
25,34	Check the scraper setting	10	
40	Check/top up with washer fluid	12	
27,35	Inspect the sprinkler system (CA 251A)	13	
	After the day's operation		
7	Check the hydraulic reservoir level	11	
17	Refuel	12	
38	Fill the emulsion tank (CA 251A)	12	
36	Fill the water tank (CA 251A)	13	

Every 50 hours of operation (weekly)

Items in fig. 1	Measure	See page	Comments
9	Clean the filter element in the air cleaner or replace the main filter	14	
	Check that hoses and connections are tight		
24	Check the tyre pressure	14	
4	Check the battery	15	
31	Grease the steering joints	16	
30	Grease the steering cylinder brackets	16	
39	Grease the strike-off blade mechanism	16	

After the **first** 50 hours of operation change all the oil filters and oil, except the hydraulic fluid.

MAINTENANCE MEASURES

Every 250 hours of operation (monthly)

Items in fig. 1	Measure	See page	Comments
20	Change the engine oil		See engine instruction manual.
10	Change the engine oil filter		See engine instruction manual.
22	Check the oil level in the rear axle/planetary gearing	17	
33,37	Check oil level in the drum/cassettes	17, 18	
29	Check the oil level in the transfer gearbox	18	
1	Check the oil level in the drum gearbox (D and PD only)	18	
18,21	Inspect bolted joints	19	
31	Inspect the rubber elements	20	

Every 500 hours of operation (every three months)

Items in fig. 1	Measure	See page	Comments
8	Change the hydraulic filter	20	
	Change the pre-fuel filter	21	
11	Lubricate controls and pivoted joints	21	
14,28	Clean the outside of the hydraulic cooler	21	
	Replace fuel filter		See engine instruction manual.

Every 1000 hours of operation (every six months)

Items in fig. 1	Measure	See page	Comments
26	Drain condensation from the hydraulic reservoir	22	
6	Replace breather filter on the hydraulic reservoir	22	
19	Drain condensation from the fuel tank	22	
9	Replace main filter in the air cleaner	23	
	Check belt tension of the fan and alternator		See engine instruction manual.
	Check engine valve clearance		See engine instruction manual.
22	Change oil in the rear axle planetary gearing	23	
22	Change oil the rear axle differential	24	

Every 2000 hours of operation (yearly)

Items in fig. 1	Measure	See page	Comments
26	Change the hydraulic fluid	25	
29	Change oil in the transfer gearbox	25	
2,37	Change oil in the drum/cassettes	25, 26	
1	Change oil in the drum gearbox (D and PD only)	26	
36	Clean the water tank (CA 251A)	27	
38	Clean the emulsion tank	27	

EVERY 10 HOURS OF OPERATION (DAILY)

Coolant level, check – Filling

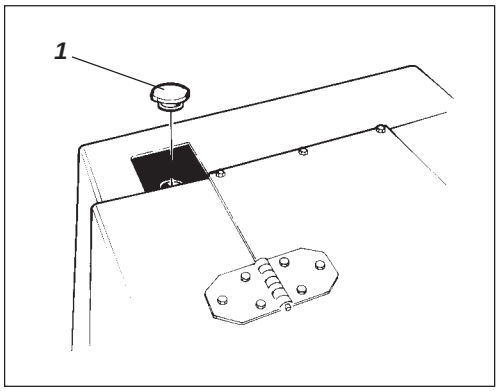


Fig. 2 Radiator
1. Filler cap

Take great care if the radiator cap must be opened while the engine is hot. Danger of being burned.

Steps or equivalent are to be used when checking the radiator.

Fill with coolant comprised of 50% water and 50% anti-freezing agent. See page 3 in these instructions and the engine manual.

Change the coolant and flush the system every other year. Ensure that air has free passage through the radiator.

Air circulation – Check

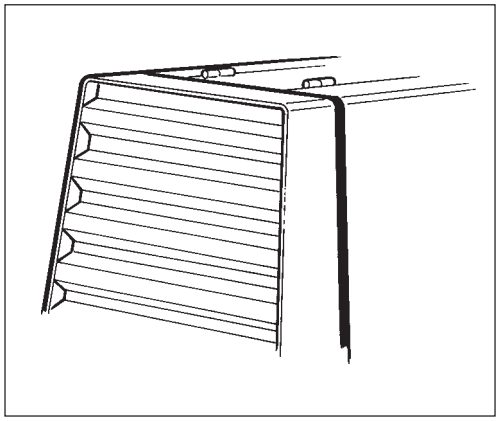


Fig. 3 Cooling air grille

Ensure that the engine has unimpeded circulation of cooling air through the protective grille to the engine.

Brakes – Check

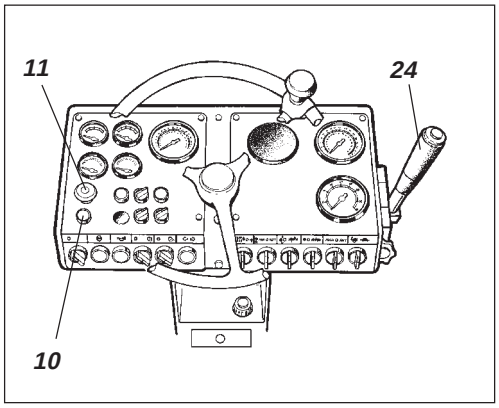


Fig. 4 Instrument panel
10. Brake warning lamp
11. Emergency stop knob
24. Forward/Reverse lever

Check operation of the brakes as follows:

Drive the roller **slowly** forward.

Press down the reserve brake (11). The brake warning lamp (10) shall light and the roller shall stop.

After checking the brakes, put the forward/reverse lever (24) in neutral before resetting the reserve brake.

Pull out the reserve brake knob.

Scrapers (CA 251)
– Checking, adjusting

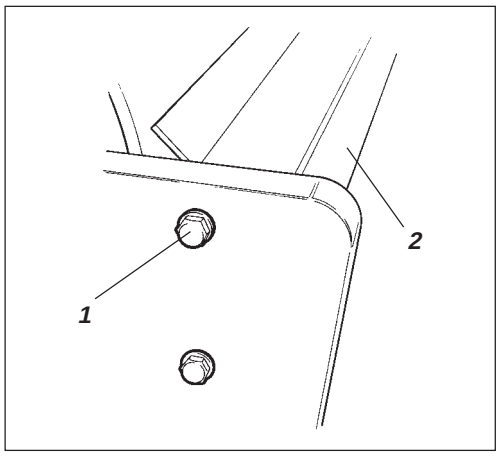


Fig. 5 Scraper
1. Fastening screws
2. Scraper

Adjust the distance as follows:

Loosen all four screws, while holding the nut on the inside.

Set the scraper about 20 mm (0.79 in) from the drum.

Tighten the fastening screws.

Remember that the drum moves when the machine turns. If adjustments are made closer than the recommended value the scrapers may be damaged and cause increased wear of the drum.

Scrapers (CA 251A)
– Checking, adjusting

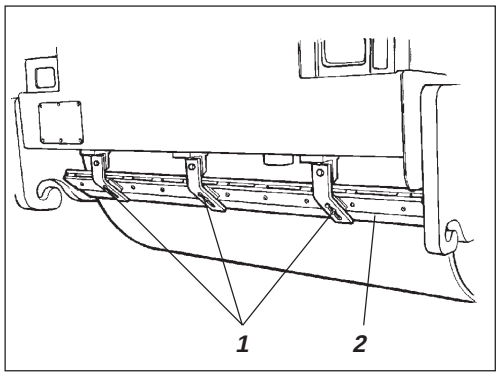


Fig. 6 Scraper
1. Fastening screws
2. Scraper

Drum:

Check that the scrapers are intact, and adjust the distance as follows:

Loosen all the fastening screws.

Set the scraper against the drum.

Tighten the fastening screws.

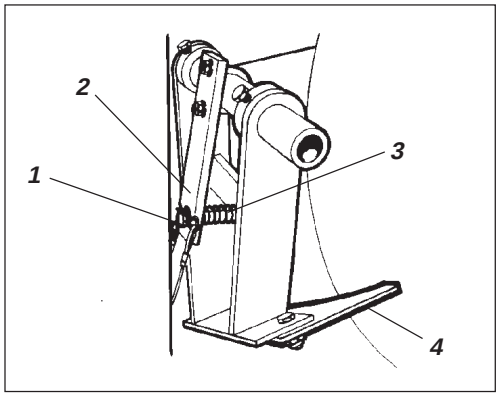


Fig. 7 Tyre scraper
1. Cotter
2. Scraper tensioner
3. Spring
4. Scraper

Tyres:

Check that the scrapers are intact, and adjust the distance as follows:

The scraper blade (4) should lie against the tyre with a 20-mm pre-tensioning of the spring (3). The pre-tensioning is to be set with the scraper tensioner (2).

For transport driving, release the scraper from the tyre and tension with the cotter (1).

Hydraulic reservoir – Checking the fluid level

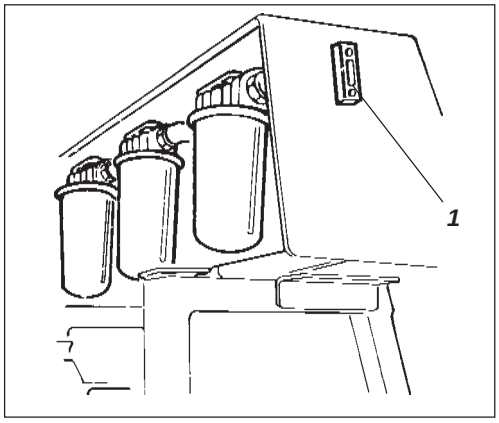


Fig. 8 Hydraulic reservoir
1. Sight glass

Place the roller on level ground and check that the oil level is between the max. and min. marks in the sight glass (1).

Top up with hydraulic fluid according to the lubricant specification if the level is too low.

Hydraulic reservoir – Filling

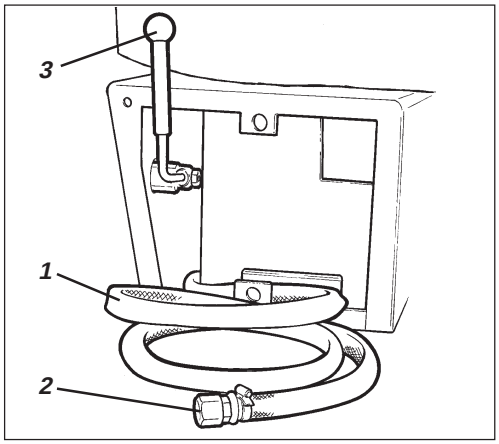


Fig. 9 Battery box
1. Suction hose
2. Protective plug
3. Pump arm

Remove the cover on the right side under the operator's seat.

Take out the suction hose (1).

Clean the hose and screw off the protective plug (2).

Insert the hose into a barrel of fresh hydraulic fluid.

Attach the pump arm (3), and pump until the reservoir is full according to the marks on the sight glass. Hydraulic fluid is pumped to the reservoir through a filter, so always fill with fluid in this way.

Diesel engine – Checking the oil level

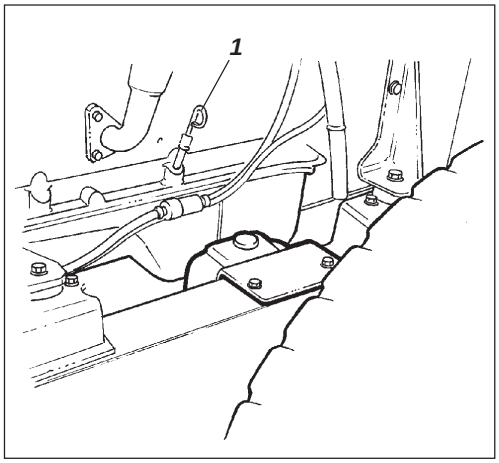


Fig. 10 Engine compartment
1. Oil dipstick

Place the roller on a level base. The engine is to be switched off and the parking brake applied for all checking and adjustments on the roller unless stated otherwise.

Beware of hot parts of the engine and hot radiator when taking out the oil dipstick. Danger of being burned.

The dipstick is on the right-hand side of the engine.

Pull the dipstick (1) up and check that the oil level is between the upper and lower marks. See the engine manual for further details.

EVERY 10 HOURS OF OPERATION (DAILY)

Washing fluid – Checking/Filling (Cab)

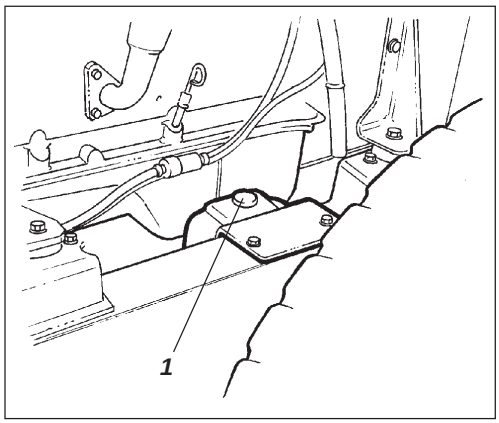


Fig. 11 Engine compartment
1. Washer bottle

Open the right-hand cover of the engine compartment and fill the washer fluid bottle (1).

Remember the risk of freezing during the winter. Empty the tank, pump and leads.

Fuel tank – Refuelling

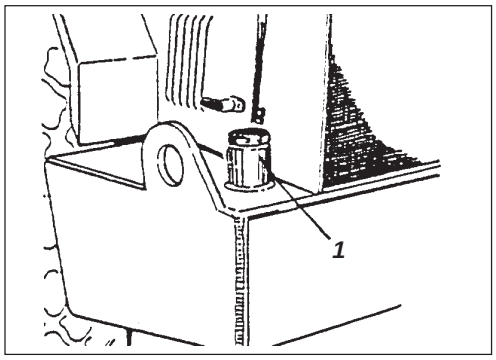


Fig. 12 Fuel tank
1. Filler pipe

Refuel every day at the end of work. Top up to the lower edge of the filler pipe. Use diesel fuel in accordance with the engine manufacturer's specifications.

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

CA 251 holds 265 litre (70 gal) fuel.

Emulsion tank (CA 251A) – Filling

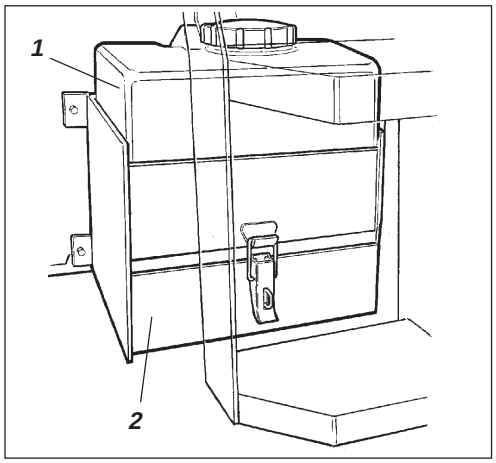


Fig. 13 Left side of frame
1. Emulsion tank
2. Place for pump and filter

Check the level and fill the emulsion tank as required. The emulsion fluid is only for lubricating the tyres. The pump and filter are located inside the cover at the bottom of the tank.

Remember the risk of freezing during the winter. Empty the tank, pump and leads.

Sprinkler system (CA 251A) Checking – Cleaning

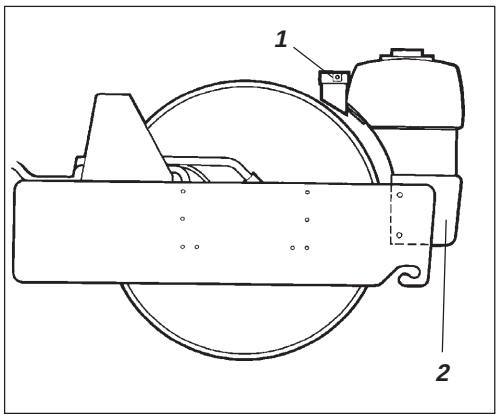


Fig. 14 Water tank
1. Nozzle
2. Pump system

Fill with clean water through the tank filter.

Ensure that the sprinkler nozzles (1) are not clogged. Clean them and the water filter if necessary.

Nozzle (CA 251A) Dismantling – Cleaning

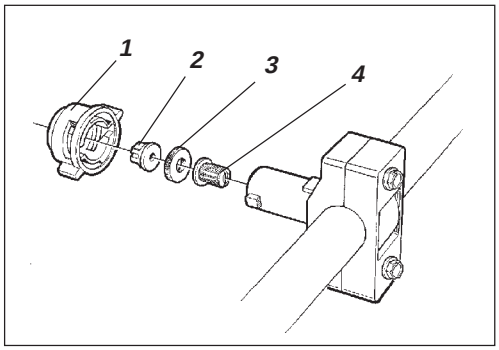


Fig. 15 Nozzle
1. Sleeve
2. Nozzle
3. Seal
4. Strainer

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

Wear protective goggles when working with compressed air.

Pump system (CA 251A) Checking – Cleaning

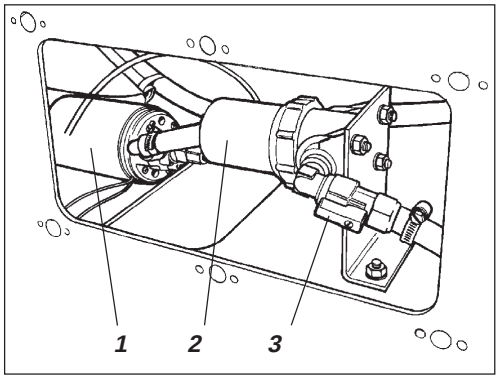


Fig. 16 Pump system
1. Water pump
2. Water filter
3. Stop cock

Take off the cover on the front frame beam and remove the screws.

The sprinkler system has 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.

Listen or put your hand on the water pump to check that it is working.

Air cleaner – Cleaning the main filter element

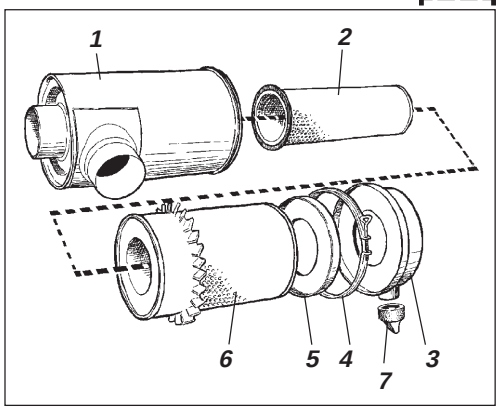


Fig. 17 Air cleaner
1. Filter housing
2. Secondary filter
3. Dust trap
4. Clamp
5. Inner cover
6. Primary filter
7. Emptying slit

Replace or clean the main filter of the air cleaner when the warning lamp on the instrument panel lights at full engine revs.

Loosen the clamp (4) and take out the dust trap (3).

Loosen the wing nut at the centre of the filter and take out the inner cover (5). Clean the dust trap with a clean rag.

Loosen the wing nut and pull out the main filter (6).

Wipe the inside of the filter housing (1) and the input tube with a clean rag.

Ensure that connections and hoses between the filter housing and engine are intact and tight.

Clean the emptying slit (7) of the dust trap.

Replace the secondary filter (2) with a new one after every third replacement or third cleaning of the main filter. The secondary filter cannot be cleaned.

Cleaning with compressed air

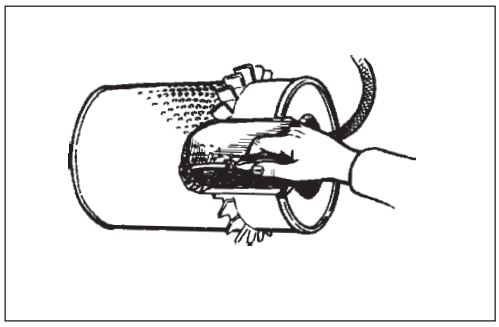


Fig. 18 Main filter

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

Blow up and down the paper pleats on the inside of the filter element. Hold the nozzle at least 10 mm (0.39 in) from the paper pleats so as to avoid tearing the paper.

Change the main filter at the latest after 5 cleanings.

Wear protective goggles when working with compressed air.

Tyres – Tyre pressure
Wheel nuts – Tightening

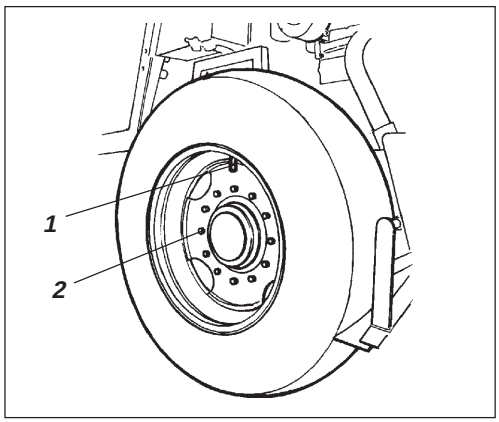


Fig. 19 Wheels
1. Air valve
2. Wheel nuts

When the tyres are filled with liquid the air pressure valve (1) must be set at “12 o’clock” when pumping.
Check the tyre pressure with a pressure gauge.
Min. tyre pressure = 110 kPa (1.1 kp/ cm^2).
Max. tyre pressure = 150 kPa (1.5 kp/cm^2)
Tyre pressure CA 251A: 110 kPa (1.1 kp/cm^2)
Check both tyres.

When changing the tyres it is important that both tyres have the same rolling radius (max. difference about 15 mm (0.59 in)). The no-spin equipment may otherwise be damaged.

Check tightening torque of the wheel nuts (2) at 550 Nm (406 lbf.ft). Check both wheels and all nuts (applies only for a new machine or newly fitted wheel).

Battery – Checking the electrolyte level

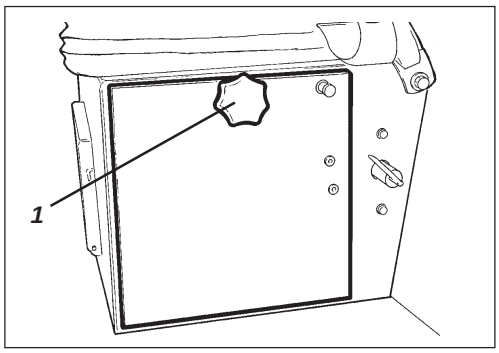


Fig. 20 Battery shelf
1. Knob

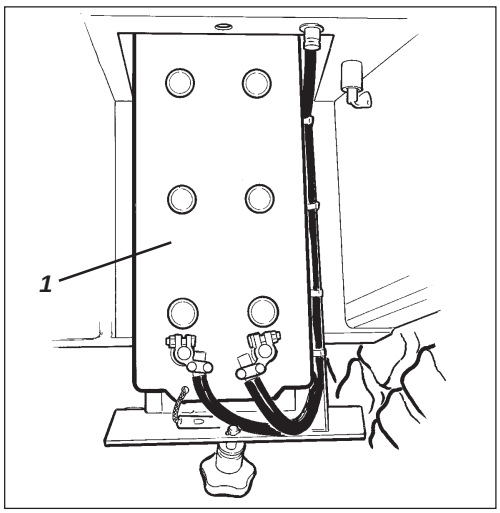


Fig. 21 Battery shelf
1. Battery

Battery cell

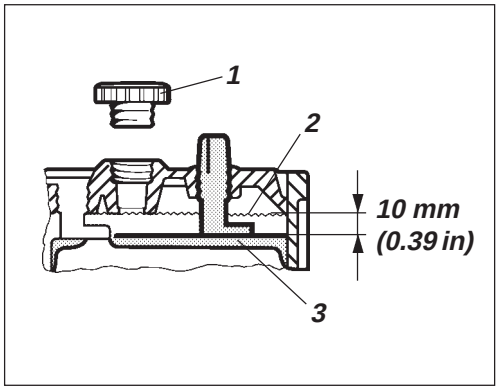


Fig. 22 Electrolyte level in battery
1. Cell cap
2. Electrolyte level
3. Plate

Never use an open flame when checking the electrolyte level. Explosive gas is generated when the alternator is charging.

Turn the knob (1).

Pull out the battery shelf.

Wipe the top of the battery dry.

Wear safety goggles. The battery contains acid. Rinse with water if splashed with electrolyte.

Take off the cell caps and ensure that electrolyte is about 10 mm (0.39 in) above the plates. Check the level of all cells. Top up with distilled water to the right level if the level is low. If the air temperature is below freezing point the engine should be run for a while before topping up with distilled water. There is otherwise a danger that the electrolyte will freeze.

Ensure that the ventilation holes in the cell cover are not clogged. Then put the cover back on.

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

Ensure always that the battery box is closed and locked while driving.

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

Get rid of discarded batteries in a proper way. Batteries contains lead which is detrimental to the environment.

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

Steering joint – Steering cylinders Lubrication

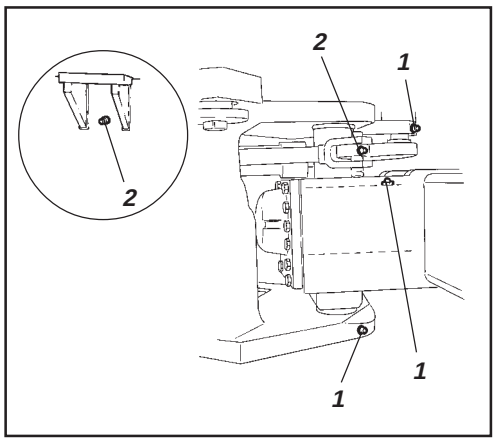


Fig. 23 Steering joint. Right side
1. Grease nipples, steering joint (3 off)
2. Grease nipples, cylinder mount (2 off)

Nobody is to be allowed near the articulation joint when the engine is running. Danger of being crushed.

Turn the steering wheel fully to the left to gain access to all five nipples on the right side of the steering system.

Wipe the nipples clean from grease and dirt.

Grease each nipple with five strokes of the grease gun.

Use grease according to the lubricant specifications.

Steering joint – Lubrication

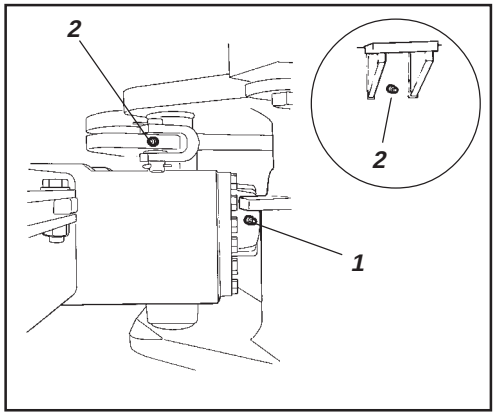


Fig. 24 Steering joint, left side
1. Grease nipples, steering joint
2. Grease nipples, cylinder mount

Turn the steering wheel fully to the right to gain access to the three grease nipples on the left steering cylinder. Allow a little grease to remain on the nipples after greasing. This will prevent contamination from entering the nipples.

Wipe the nipples clean from grease and dirt.

Grease each nipple with five strokes of the grease gun. Ensure that grease penetrates the bearings.

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

Strike-off blade – Lubrication

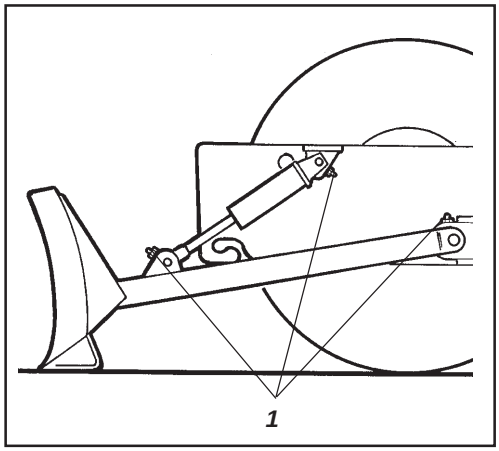


Fig. 25 Strike-off blade
1. Grease nipples

Always lower the blade when leaving/ parking the machine.

Lower the blade.

Wipe the grease nipples on both sides of the machine.

Grease each nipple (1) with four strokes of the grease gun. Ensure that grease penetrates the bearings. Use grease according to the lubricant specification on page 3.

Rear axle differential – Checking the oil level

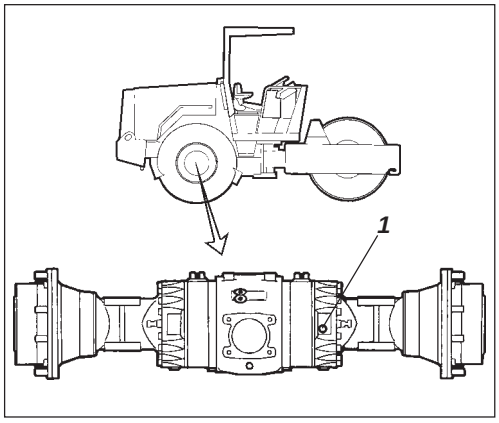


Fig. 26 Level check – differential housing
1 Level/Filler plug

Never work underneath the roller when the engine is running. Park on a level surface. Chock the wheels.

Ensure that the roller is level.

Remove the level plug (1) and check that the oil level reaches the lower edge of the plug hole. Top up to the right level through the plug (1) if the level is low. Use transmission oil according to the lubricant specification.

Rear axle planetary gearing – Checking the oil level

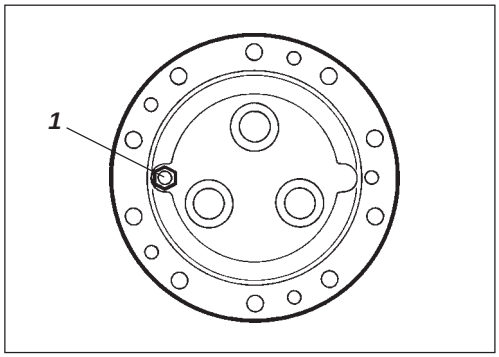


Fig. 27 Level check – differential gearing
1 Level/Filler plug

Run the roller on a level surface until the plug (1) in the planetary gearing is at 9 o'clock.

Remove the level plug and check that the oil level reaches the lower edge of the plug hole. Top up to the right level through the plug (1) if the level is low. Use transmission oil. See lubricant specification on page 3.

Check the oil level in the same way in the other planetary gearing of the rear wheel.

Drum (CA 251A) – Checking the oil level

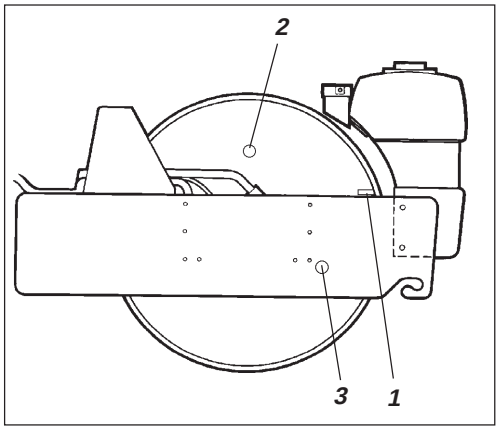


Fig. 28 Right side of drum
1. Dipstick
2. Filler plug
3. Level plug

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

Place the roller on a level surface so that the level pin is at the top of the frame beam.

Unscrew the level plug (3) (small hexagon) a few turns. If the level is correct oil should now flow from the plug.

Top up with transmission oil as required, see the specification. Fill through the filler plug (2) (large hexagon).

EVERY 250 HOURS OF OPERATION (MONTHLY)

Drum cassette – Checking the oil level

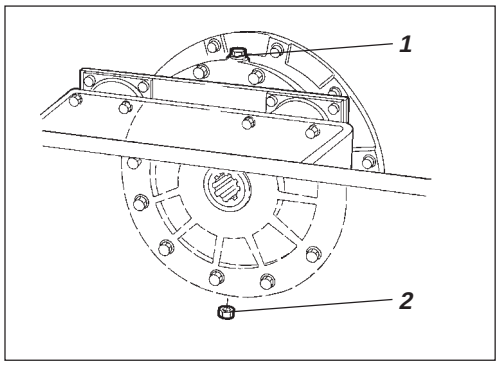


Fig. 29 Right side of drum
1. Filler plug
2. Level/Drain plug

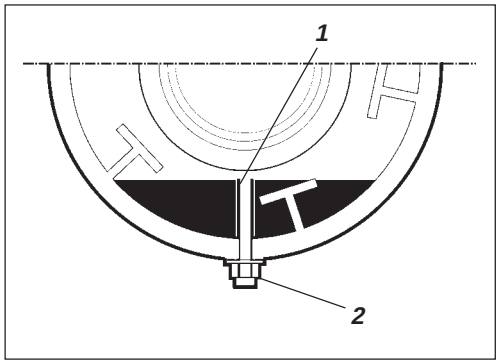


Fig. 30 Drum cassette
1. Level pipe
2. Level/Drain plug

Place the roller on a level surface so that the filler plug (1) (large plug with 24- mm (0.945 in) wrench size) is straight up, screw off the plug.

Screw out the level plug (2) (small plug with 13-mm (0.512 in) wrench size). A small amount of oil may run out as the plug (2) is unscrewed, ie, oil remaining in the level pipe.
Note! Use synthetic oil acc. to the specification on page 3.

Top up with oil through the filler plug (1) until it starts to run out from the level plug hole. The level is correct when it stops running.

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

Repeat the procedure on the opposite side.

Do not overfill with oil, danger of overheating.

Drum gearbox (D, PD) – Checking the oil level

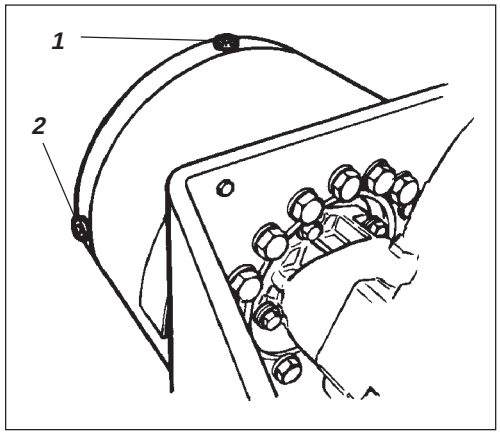


Fig. 31 Drum gearbox
1. Filler plug
2. Level/drain plug

Applies to D & PD only:

Place the roller on a level surface with the filler plug (1) at its highest point.

Wipe clean round the plugs.

Remove the plugs and ensure that the oil level reaches the level plug.

Top up with transmission oil as required, see the lubricant specification.

Diesel engine – Oil and filter change

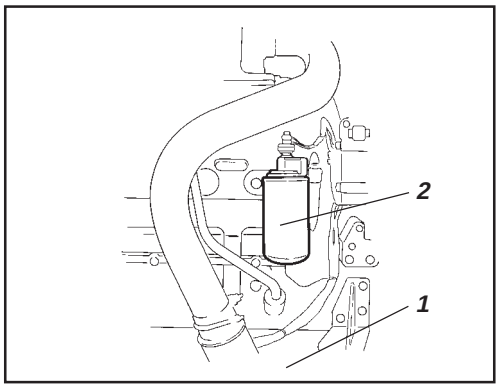


Fig. 32 Engine, left side
1. Drain plug
2. Engine oil filter

Place the roller on a level surface. Switch off the engine and apply the parking brake/ Reserve brake.

The oil drain plug (1) is most easily accessible from underneath the engine. Drain off the oil while the engine is warm. Place a receptacle that holds at least 15 litre (15.9 qts) under the drain plug.

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

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

Transfer gearbox – Checking the oil level

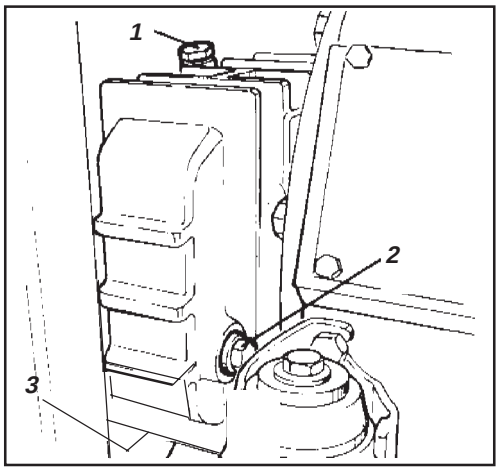


Fig. 33 Transfer gearbox, left side
1. Filler plug
2. Level plug
3. Drain plug

Ensure that the roller is level.

Wipe clean round the level plug (2) and unscrew it a few turns. Ensure that the oil level reaches up to the lower edge of the plug hole.

Top up as required through the filler plug (1) to the lower edge of the level plug (2). Wipe clean round the filler plug before unscrewing it. Use transmission oil, see the lubricant specification.

There is a level plug on each side of the transfer gearbox. It is only necessary to make a level check on one side.

Inspect tightening of bolted joints

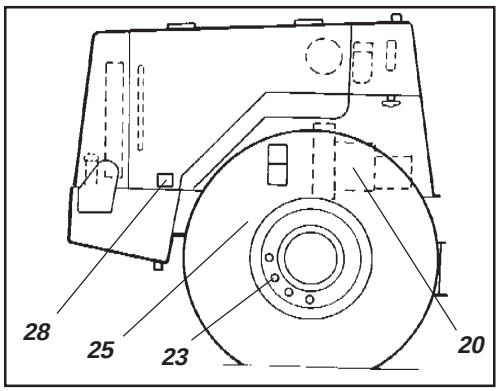


Fig. 34 Drive unit

Rear axle suspension (25) 434 Nm (320 lbf.ft).

Steering pump against propulsion pump (20) 38 Nm (28 lbf.ft).

Engine suspension (28). Check that all bolts are tightened, 90 Nm (66.4 lbf.ft).

Wheel nuts (23). Check that all bolts are tightened, 550 Nm (405.7 lbf.ft).

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

EVERY 250 HOURS OF OPERATION (MONTHLY)

Rubber elements and fastening screws – Check

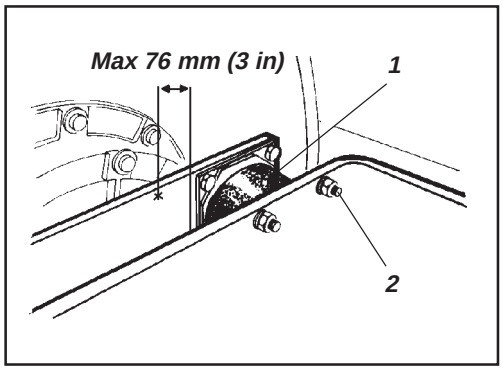


Fig. 35 Drum, vibration side
1. Rubber element
2. Fastening screws

Check all rubber elements (1), replace all of the elements if more than 25% of them on one side of the drum are cracked deeper than 10–15 mm (0.39–0.59 in).

Use the blade of a knife or pointed object to assist when checking.

Ensure that the fastening screws (2) are tightened.

With a calliper gauge, measure the length of the rubber element including the mounting plates. See separate workshop instructions if the size is more than 76 mm (3 in).

EVERY 500 HOURS OF OPERATION (EVERY THREE MONTHS)

Hydraulic filter – Replacement

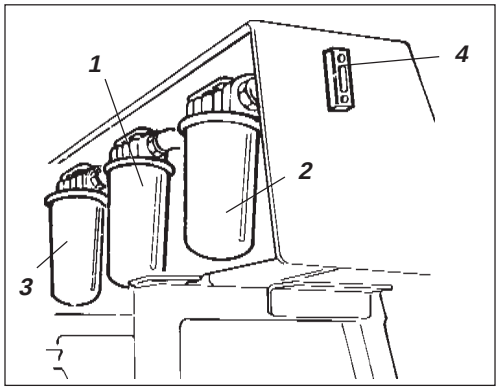


Fig. 36 Hydraulic reservoir
1. Suction filter, propulsion
2. Suction filter, vibr.
3. Return filter, cooling circuit
4. Sight glass

Loosen the breather filter on top of the reservoir so that pressure inside is eliminated.

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

Ensure that the old gaskets do not remain on the filter holders. Leakage may otherwise occur between the new and the old gaskets.

Thoroughly clean the sealing surfaces of the filter holders.

Apply a thin coat of fresh hydraulic fluid on the new filter gaskets.

Tighten the filters by hand.

First screw on until the filter seal lies against the filter holder. Then screw a further half turn. Do not tighten the filter too hard, it could otherwise damage the gasket.

Start the engine and ensure that there is no leakage of hydraulic fluid from the filters.

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

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

Pre-fuel filter – Replacement

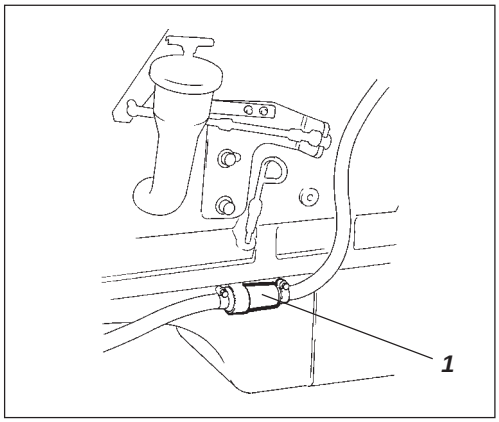


Fig. 37 Engine, left side
1. Pre-fuel filter

Release the hose clips and remove the filter. Fit the new fuel filter and make certain the direction of flow is correct. The arrow should point from the tank.

Controls and pivoted joints Lubrication

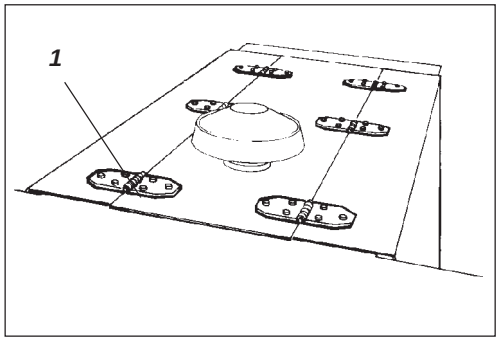


Fig. 38 Engine hood
2. Hinges

Lubricate the engine hood hinges (1), F/R lever and slide rails of the operator's seat with grease, other moving parts and controls with oil. Grease the cab door hinges. See lubricant specification.

Hydraulic fluid cooler Checking – Cleaning

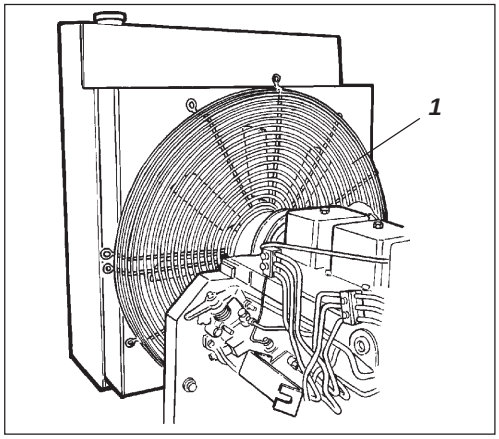


Fig. 39 Engine compartment
1. Hydraulic fluid cooler

Ensure that the flow of air through the radiator is unobstructed. Clean a dirty radiator with water or compressed air.

Wear protective goggles when working with compressed air.

If possible, blow or flush in the opposite direction to the flow of air. Cover electric components.

Check after cleaning that seals and noise absorbents are undamaged.

EVERY 1000 HOURS OF OPERATION (EVERY SIX MONTHS)

Hydraulic reservoir – Draining

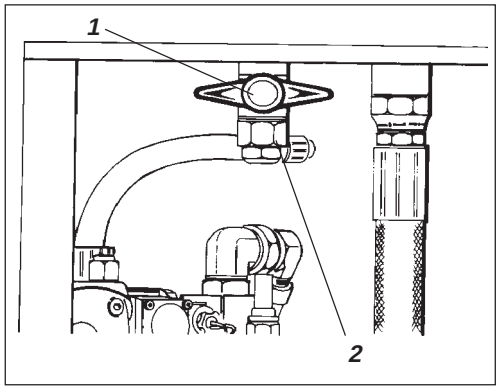


Fig. 40 Hydraulic reservoir, underneath
1. Drain cock
2. Plug

Condensation in the hydraulic reservoir is drained via the drain plug (1). Draining is to be done after the roller has stood still during a long period – eg, after standing still overnight.

Drain as follows:

Hold a suitable receptacle under tap.

Remove the plug (2).

Open the tap (1) and drain off the condensation.

Close the drain tap.

Refit the plug.

Hydraulic reservoir – Breather filter

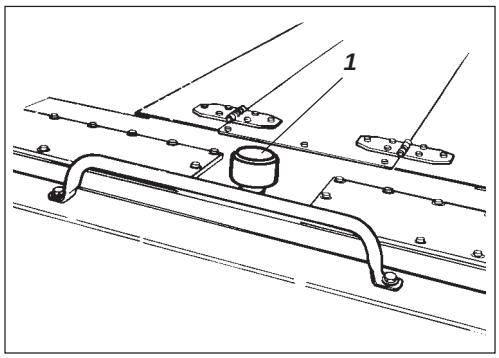


Fig. 41 Hydraulic reservoir
1. Breather filter

Screw off the breather filter (1) and discard it. Fit a new one.

Fuel tank – Draining

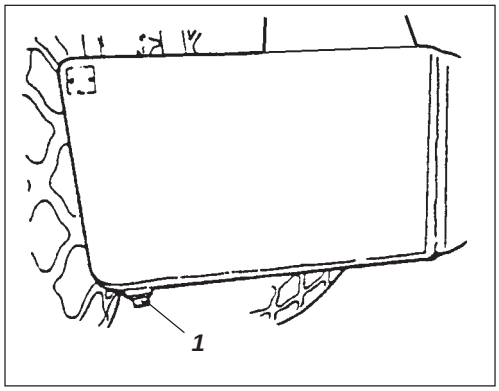


Fig. 42 Fuel tank
1. Drain plug

Water and sediment in the fuel tank is drained via the drain plug in the bottom of the fuel tank.

Take great care when draining. Do not drop the plug so that all the fuel runs out.

Draining is to be done after the roller has stood still during a long period, eg, overnight. The fuel level should be as low as possible.

The roller should preferably have stood sloping so that water and sediment is concentrated over the drain plug.

Drain as follows:

Hold a suitable receptacle under the plug (1).

Loosen the plug and drain off the water and sediment until only pure fuel flows from the plug. Tighten the plug again.

Changing the air cleaner

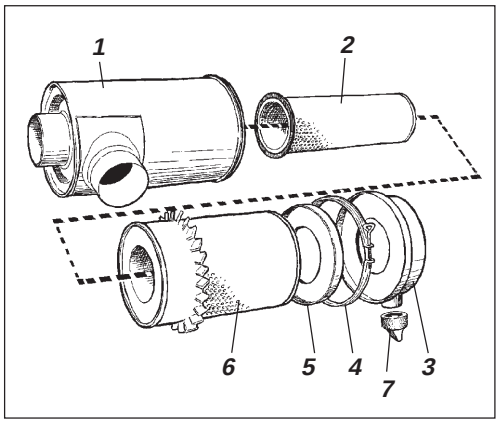


Fig. 43 Air cleaner
1. *Filter housing*
2. *Backup filter*
3. *Dust trap*
4. *Clamp*
5. *Iner cover*
6. *Main filter*
7. *Emptying slit*

Replace the main filter (6) of the air cleaner even if it has not yet been cleaned five times, see every 50 hours of operation for changing the filter.

Rear axle differential – Oil change

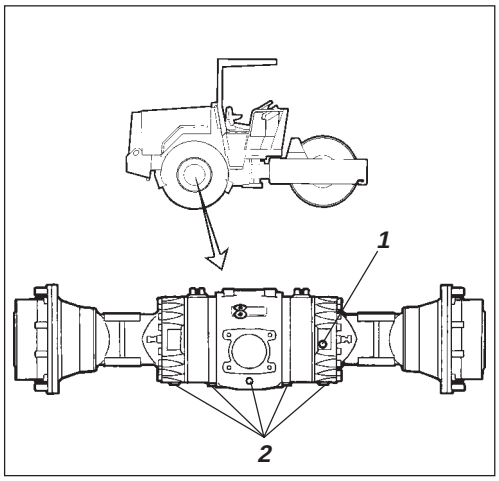


Fig. 44 Rear axle
1. *Level/Filling plug*
2. *Drain plugs*

Never work underneath the roller when the engine is running. Park on a level surface and chock the wheels.

Place the roller on a level base.

Remove the level/filler plug (1) and all five drain plugs (2) and drain the oil into a suitable receptacle. The volume is about 12 litre (12.7 qts).

Screw in the drain plugs (2) and fill with fresh oil to the correct level. Screw in the level/filler plug (1). Use transmission oil, see lubricant specification on page 3.

Rear axle planetary gearing – Oil change

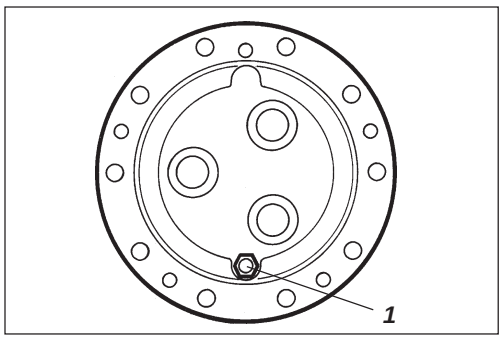


Fig. 45 Planetary gearing /draining position
1. Plug

Place the roller on a level surface with the plug (1) at its lowest position.

Unscrew this plug and drain the oil into a suitable receptacle. The volume is about 2 litre (4.23 qts). Place the roller on a level surface with the plug (1) at its lowest position.

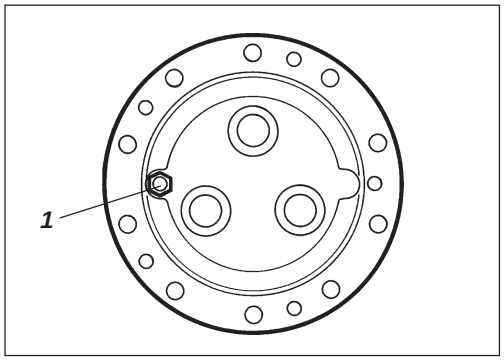


Fig. 46 Planetary gearing/filling position
1. Plug

Run the roller so that the plug is at 9 o'clock.

Fill oil through the plug to the lower edge of the hole.

Screw in the plug and repeat the procedure on the other side. Use transmission oil. See lubricant specification on page 3.

Hydraulic reservoir – Changing the fluid

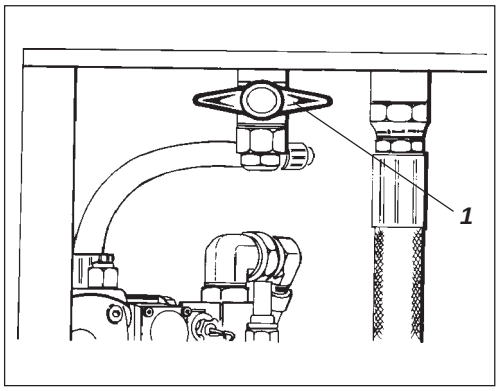


Fig. 47 Hydraulic reservoir, underneath
1. Drain cock

Arrange a receptacle to collect the oil. The receptacle should hold at least 100 litre (26.5 gal).

An empty oil barrel or similar vessel at the side of the roller would be suitable. Allow the fluid to run from the drain tap (1) through a hose to the oil barrel.

Fill with fresh hydraulic fluid according to instructions under the heading “Hydraulic reservoir – checking the level”. Change all the hydraulic filters. See under the heading “Hydraulic system – changing the filters”.

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

Transfer gearbox – Oil change

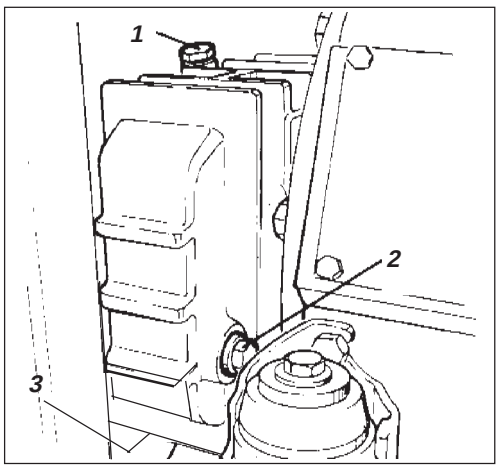


Fig. 48 Transfer gearbox, left side
1. Filler plug
2. Level plug
3. Drain plug

Check the level and top up as required.

Never work underneath the roller when the engine is running. Park on a level surface. Chock the drum and wheels if necessary.

Unscrew the drain plug (3) and drain off the oil.

Refit the plug.

Remove the level plug (2) and fill with fresh gearbox oil through the filler plug (1). Fill slowly so that the oil level has time to even out.

Refit the plugs (1) and (2) when the level is correct.

Drum cassette – Oil change

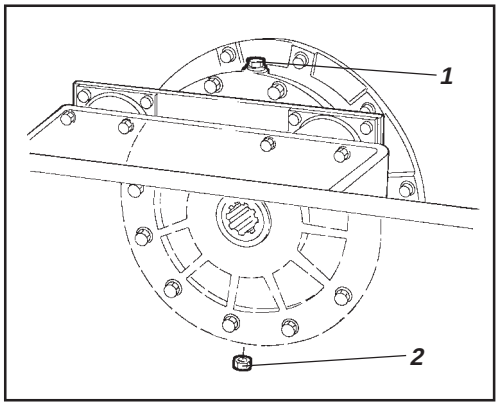


Fig. 49 Right side of drum
1. Filler plug
2. Level/Drain plug

Place the roller on a level surface so that the filler plug (1) (large plug with 24-mm (0.945 in) wrench size) is straight up. Place a receptacle that will hold 5 litre under the level/drain plug (2).

Unscrew the filler plug (1). Unscrew the drain plug (2) (large plug with 24-mm (0.945 in) wrench size).

Allow all the oil to run out. Then unscrew the level plug (13-mm (0.512 in) wrench size) from the drain plug (2). Fit the drain plug with level pipe in the cassette. Fill with fresh synthetic oil according to instructions under the heading “Drum cassette – checking the oil level”.

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

Repeat the procedure on the opposite side.

Drum (CA 251A) – Oil change

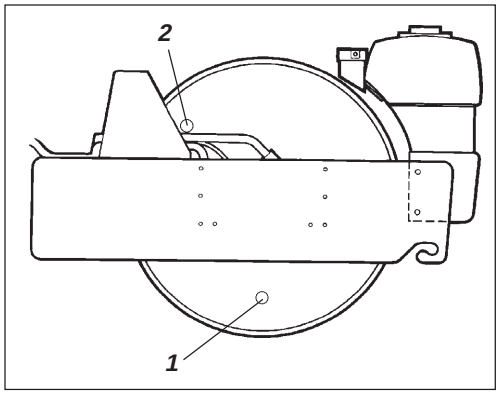


Fig. 50 Drum position when draining
1. Drain plug
2. Level plug

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

Place the roller on a level surface and drive the roller until the drain plug (1) (large hexagon) is straight down.

Unscrew the plug (1) and drain off the oil. Observe that the volume of oil is 27 litre (7.1 gal).

Drain off oil from the other side of the roller.

See under every 250 hours of operation, heading "Drum – Checking the oil level", when the drum is to be filled with oil.

Drum gearbox (D, PD) – Oil change

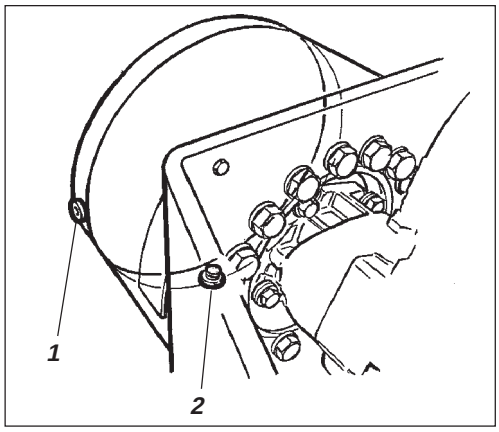


Fig. 51 Drum gearing/Position when draining
1. Filler plug
2. Drain/level plug

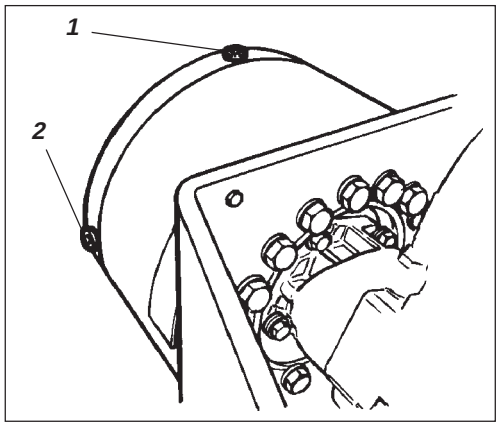


Fig. 52 Filling the oil
1. Filler plug
2. Drain/level plug

Before changing the oil it is important that the roller has been run long enough for the oil to be warm and easy flowing before being drained. Any contamination will thus also flow out with the oil. Observe cleanliness and remember that the roller is to be level.

Applies to D & PD only:

Place the roller on a level surface so that the drain/level plug is straight down.

Wipe clean round the plugs.

Place a receptacle under the drain plug (2) and drain off the oil. The receptacle is to hold about 5 litre (5.3 qts).

Also remove the filler plug (1).

Run the roller back so that the filler plug is at its highest position.

Fill with oil until the level reaches the level plug hole. Use transmission oil according to the lubricant specification.

The plugs are magnetic and any metal particles must be wiped off before refitting.

Water tank (CA 251A) – Draining, cleaning

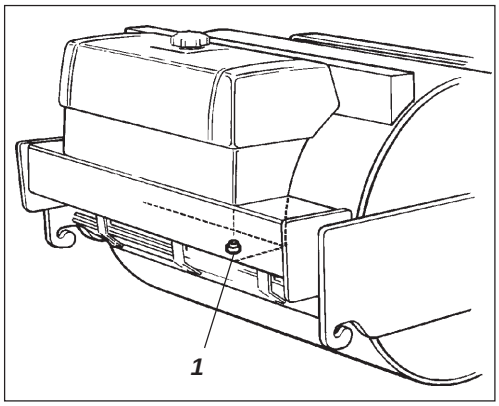


Fig. 53 Water tank, underneath
1. Drain plug

Remember the risk of freezing during the winter. Empty the tank, pump and leads.

1. Remove the drain plug (1) and allow the water to run out.
2. Clean the inside of the tank with water and a suitable detergent for plastic surfaces.
3. Refit the plug and check for tightness.

The water tank is made of plastic (polyethylene) which is recyclable.

Water pump (CA 251A) – Draining

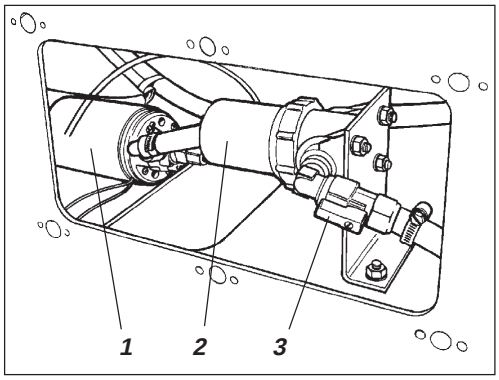


Fig. 54 Pump system
1. Water pump
2. Stop cock

Empty the water tank (1) via the tap (2).

Emulsion tank (CA 251A) – Draining, cleaning

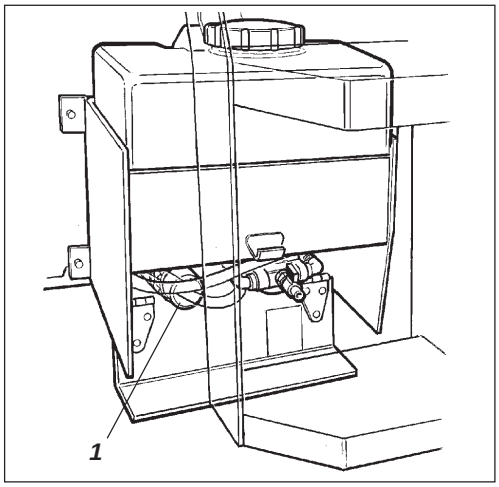


Fig. 55 Left side of frame
1. Water filter

The easiest way to empty the emulsion tank is to screw off the water filter.

The emulsion tank is made of plastic (polyethylene) which is recyclable.

LONG-TERM PARKING

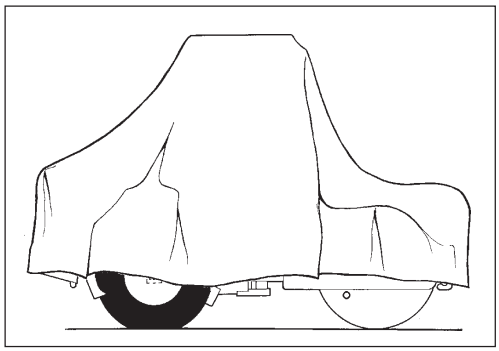


Fig. 56 Roller protected against the weather

The following instructions should be followed for long-term parking:

The measures apply for a period of up to 6 months.

The items marked * must be restored before using the roller.

Diesel engine

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

Battery

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

Air cleaner, exhaust pipe

❊ Cover the air cleaner or its opening with plastic or tape. Cover the exhaust opening. This is necessary to prevent moisture from entering the engine.

Fuel tank

Fill the fuel tank to prevent condensation and consequent corrosion.

Hydraulic reservoir

Drain off any condensation from the hydraulic reservoir.

Sprinkler system (CA 251A)

❊ Empty the water tank completely, also hoses, filter housing and the water pump. Also remove all sprinkler nozzles for the drum and wheels.

Steering cylinder, hinges, etc.

Grease the steering-joint bearings and both bearings of the steering cylinder. Also grease the engine hood hinges, revs control and the forward/reverse mechanism.

Tyres

Ensure that tyre pressure is at least 150 kPa (1.5 kp/cm^2), 110 kPa (1.1 kp/cm^2) on the CA 251A.

Hoods, tarpaulin

❊ Lower the instrument shield on the steering column. Cover the entire roller with a tarpaulin. The tarpaulin must be free from the ground. Store the roller indoors if possible, preferable on premises with an 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 on page 3. These can be used in temperatures from -10 °C to + 40 °C (14°F to (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 diesel engine can be run at this temperature using the normal oil but for other components the following fluids shall be used:
Hydraulic system: Shell Tellus Oil T100, or equivalent.
Other components using transmission oil: Shell Spirax HD 85W/140, or equivalent.

Temperature

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.

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, eg, clogged filter. Do not spray water directly on 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.

Protective structure (ROPS)

If the roller is equipped with a protective structure, ie, Roll Over Protective Structure, (ROPS), it must on no account be subjected to welding and holes must never be drilled in the structure. Never attempt to repair a damaged structure, it must be replaced with a new one.

Starting aid

When using an auxiliary battery 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

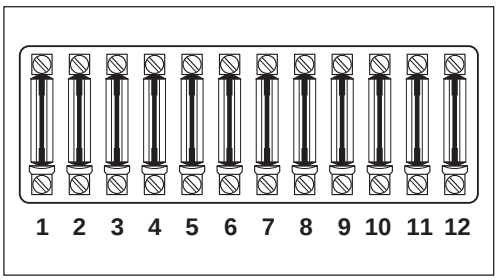


Fig. 57 Fuse boxes

1. Vibration control
2. Instruments
3. Horn
4. Fuse for stop solenoid, Cummins
5. Hazard beacon
6. -
7. Brake valve
8. Gear selector
9. Sprinkler (CA 251A)
10. -
11. -
12. Driving lights (optional equipment)

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

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

Before doing any electric welding on the machine. Disconnect the battery earth cable and then all electric terminals to the alternator.

The electrical regulating and control system has 8 A fuses which are located in fuse boxes on the steering column, see maintenance schedule.

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

Fig. 58 shows the fuse boxes and rated current of fuses in the cab, if fitted. Fuses are of the flat pin type.

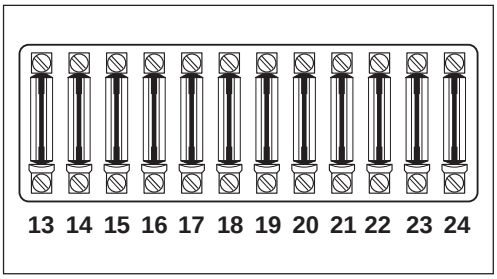


Fig. 58 Lower fuse box (accessories)

13. Working lights, rear
14. Parking lights, left
15. Parking lights, right
16. Direction indicator, left
17. Direction indicator, right
18. Dipped headlight, left
19. Dipped headlight, right
20. Main beam, left
21. Main beam, right
22. Brake lights, left
23. Brake lights, right
24. -

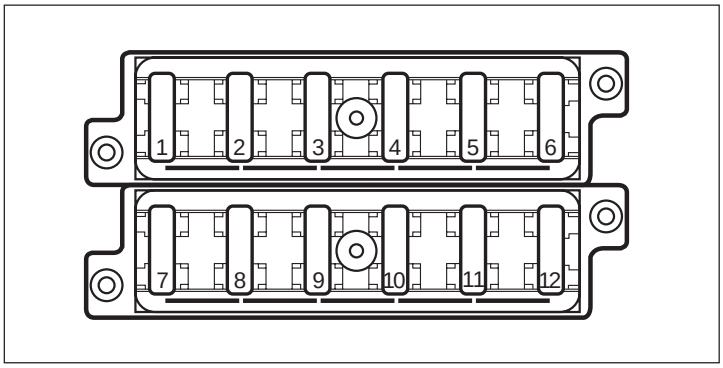


Fig. 59 Fuse box in cab (accessories)

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