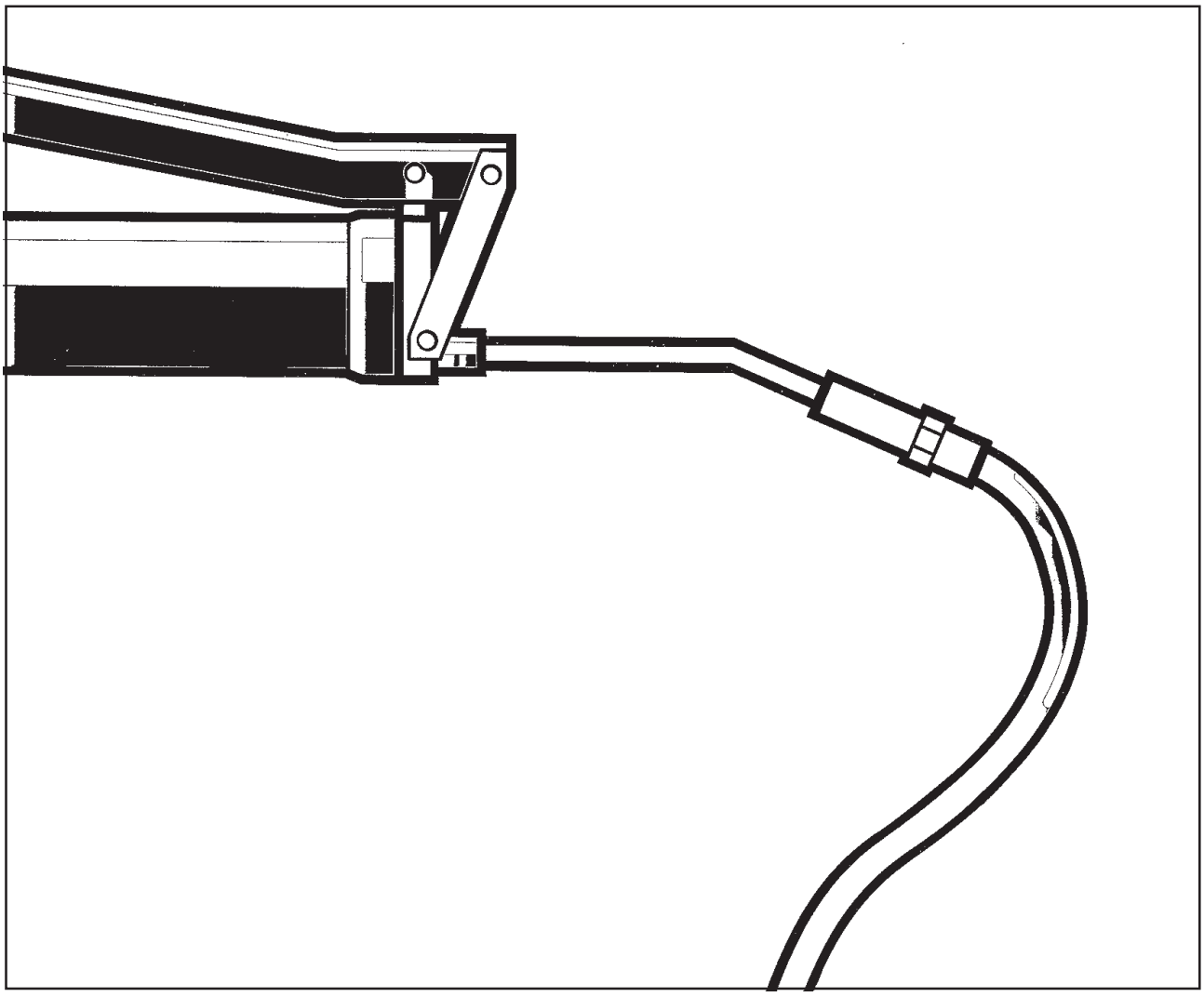
DYNAPAC
CC 222/222C • CC 232/232C
CC 322
MAINTENANCE

M222EN5



SVEDALA DYNAPAC
Svedala Compaction Equipment AB
Box 504, SE-371 23 Karlskrona, Sweden
Telephone +46 455 30 60 00
Telefax +46 455 30 60 30

SVEDALA DYNAPAC

Vibratory roller
CC 222/222C
CC 232/232C
CC 322

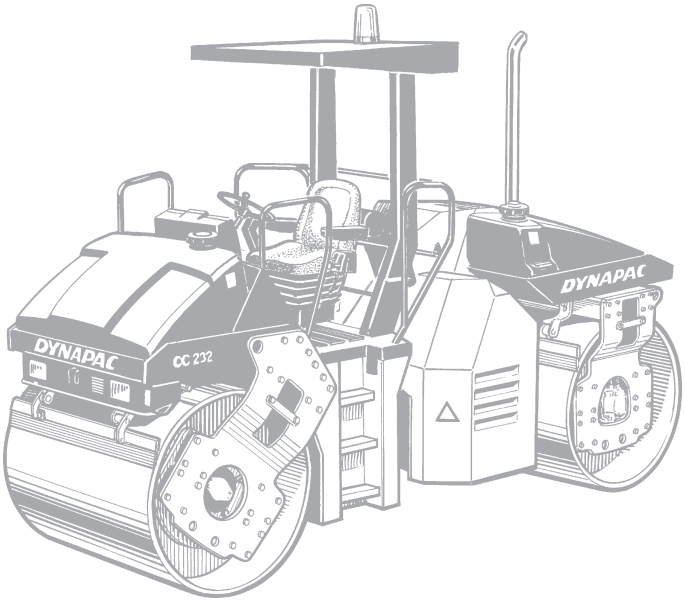
Maintenance
M222EN5, November 2000

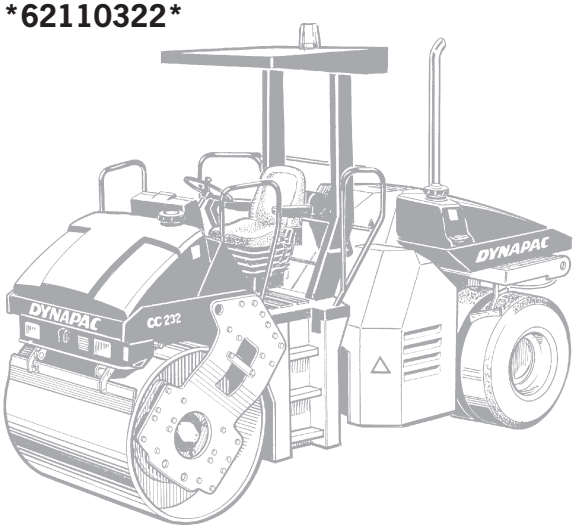
KEEP THIS MANUAL AVAILABLE FOR FUTURE USE

Diesel engine:
Deutz BF4L1011F

These instructions apply from:

CC 222	**PIN (S/N) *61710959***
CC 222C	**PIN (S/N) *61810303***
CC 232	**PIN (S/N) *61910618***
CC 232C	**PIN (S/N) *62010243***
CC 322	**PIN (S/N) *62110322***





Dynapac CC 222 is a vibratory roller in the 7.5-ton class, with articulated steering and featuring drive, brakes and vibration on both drums.

This roller is also available as a combo version, weighing about 7 tons and featuring a vibratory drum at the front and four smooth rubber tires at the rear; all with drive and brakes. Model designation CC 222C.

CC 232 is a vibratory roller in the 8-ton class, with articulated steering and vibration on both drums, but featuring split drums both front and rear. Propulsion and braking on this roller are applied to all four drum halves.

This roller is also available in a combo version, weighing about 7 tons and with model designation CC 232C.

Dynapac CC 322 is a vibratory roller in the 8.5-ton class with articulated steering, and featuring drive, brakes and vibration on both drums.

Reservation for changes.
Printed in Sweden.

CONTENTS

WARNING SYMBOLS

WARNING

Safety instructions - Personal safety

CAUTION

Special caution - Machine or component damage

GENERAL

WARNING

Read the entire manual before starting any service work.

WARNING

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

The machine must be cared for properly 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 performed by the operator.

CAUTION

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.

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 recommended amounts. Too much grease or oil can cause overheating and subsequent increased wear.

ENGINE OIL, ambient temperature -10°C - +40°C (14°F - 104°F)	Shell Rimula TX SAE 15W/40 or equivalent API Service CD/SE, CD/SF
HYDRAULIC FLUID, ambient temperature -10°C - +40°C (14°F - 104°F) ambient temperature higher than +40°C (above 104°F)	Shell Tellus TX68 or equivalent Shell Tellus TX100 or equivalent
BIOLOGICAL HYDRAULIC FLUID	Shell Naturelle HF-E46 When it leaves the factory, the machine may be filled with biologically degradable fluid. The same type of fluid must be used when changing or topping off.
DRUM OIL, ambient temperature -15°C - +40°C (5°F - 104°F)	Mobil SHC 629 or equivalent
GREASE	SKF LGHB2 (NLGI Class 2) or equivalent for the articulated joint Shell Retinax LX2 or equivalent for other grease points
FUEL	See engine manual

CAUTION

Other fuel and lubricants are required for operation in extremely high or extremely low ambient temperature. See the “Special instructions” chapter, or consult Dynapac.

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

TECHNICAL SPECIFICATIONS

Weights & dimensions	CC 222	CC 222C	CC 232	CC 232C	CC 322
Service weight with ROPS, EN500 kg (lbs)	7700 (16,979)	7200 (15,876)	8400 (18,522)	7600 (16,758)	8700 (19,183)
Service weight without ROPS kg (lbs)	7300 (16,097)	6800 (14,994)	8000 (17,640)	7200 (15,435)	8300 (18,302)
Service weight with cab kg (lbs)	7750 (17,089)	7250 (15,986)	8450 (18,632)	7650 (16,868)	8750 (19,294)
Length, standard equipped roller, mm (in)	4300 (169)	4300 (169)	4300 (169)	4300 (169)	4300 (169)
Width, standard equipped roller, mm (in)	1575 (62)	1575 (62)	1575 (62)	1575 (62)	1810 (71)
Width, w. cab, mm (in)	1810 (71)	1810 (71)	1810 (71)	1810 (71)	1810 (71)
Height, w/o cab (Shipping height), mm (in)	2120 (83)	2120 (83)	2120 (83)	2120 (83)	2120 (83)
Height, w. cab, mm (in)	2920 (115)	2920 (115)	2920 (115)	2920 (115)	2920 (115)
Height, with AC (mm)	3230 (127)	3230 (127)	3230 (127)	3230 (127)	3230 (127)
Height, with AC and hazard beacon (mm)	3495 (137)	3495 (137)	3495 (137)	3495 (137)	3495 (137)

Fluid volumes, litres (gal/qts)	CC 222 / CC 222C		CC 232 / CC 232C		CC 322
Drum, l (qts)	13	13	13	13	16,5
Hydraulic reservoir, l (qts)	38 (40.2)	38 (40.2)	38 (40.2)	38 (40.2)	38 (40.2)
Fuel tank, l (gal)	120 (31.7)	120 (31.7)	120 (31.7)	120 (31.7)	120 (31.7)
Emulsion tank, l (gal)	–	365 (96.4)	–	365 (96.4)	–
Water tank, l (gal)	365 (96.4)	365 (96.4)	365 (96.4)	365 (96.4)	365 (96.4)
Diesel engine, l (qts)	10,5 (10.6)	10,5 (10.6)	10,5 (10.6)	10,5 (10.6)	10,5 (10.6)

Electrical system	
Battery	12 V 170 Ah
Alternator	12 V 80A
Fuses	See the section entitled Electrical system, fuses

Compaction data	CC 222	CC 222C	CC 232	CC 232C	CC 322
Static linear load, kg/cm (pli)					
Front:	24,8 (138,9)	24,9 (139,4)	27,6 (154,6)	27,3 (152,9)	24,4 (136,6)
Rear:	25,5 (142,8)	–	27,6 (154,6)	–	25 (140)
Amplitude, mm (in)					
High:	0,7 (0.028)	0,7 (0.028)	0,5 (0.020)	0,5 (0.020)	0,7 (0.028)
Low:	0,3 (0.012)	0,3 (0.012)	0,2 (0.008)	0,2 (0.008)	0,3 (0.012)
Frequency, Hz (vpm)					
At high amplitude:	54 (3240)	54 (3240)	54 (3240)	54 (3240)	49 (2940)
At low amplitude:	70 (4200)	70 (4200)	70 (4200)	70 (4200)	49 (2940)
Centrifugal force, kN (lb)					
At high amplitude:	89 (20,025)	89 (20,025)	89 (20,025)	89 (20,025)	104 (23,400)
At low amplitude:	65 (14,625)	65 (14,625)	65 (14,625)	65 (14,625)	43 (9,675)

Propulsion	CC 222	CC 222C	CC 232	CC 232C	CC 322
Speed range, km/h (mph)	0-13 (0-8)	0-11 (0-7)	0-13 (0-8)	0-11 (0-7)	0-13 (0-8)
Climbing capacity (theoretical) %	42	42	42	42	37

Tire	CC 222C/CC 232C
Tire dimension	10,00 R20 Lisse
Tire pressure (kPa)	200 (29 psi)

Tightening torque

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

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

ROPS

CAUTION

Always make sure the ROPS bolts are dry before you torque-tighten them.

Bolt size:	M24 (P/N 90 37 92)
Strength class:	10,9
Tightening torque:	800 Nm (Dacromet treated)

Hydraulic system

Opening pressure MPa	CC 222/322	CC 232
Drive system	42,0	42,0
Supply system	2,0	2,0
Vibration system	35,0	35,0
Control systems	20,0	20,0
Brake release	1,5	1,5

Vibration - Operator's station (ISO 2631)

Measured with vibration switched ON and on a foam-rubber mat, standard roller

Vibration on the operator's seat is 0,4 m/s^2
Vibration on the floor of the operator's station is 0,2 m/s^2
The limit value is 0,5 m/s^2

Noise level - Operator's station (ISO 6394)

Noise levels with vibration switched OFF (dBA) Measured on hard surface, standard roller

Operator's station, (with cab)	LpA: 74 dB(A)
Operator's station, (without cab)	LpA: 84 dB(A)
Seven meters from the machine	LpA: 73 dB(A)

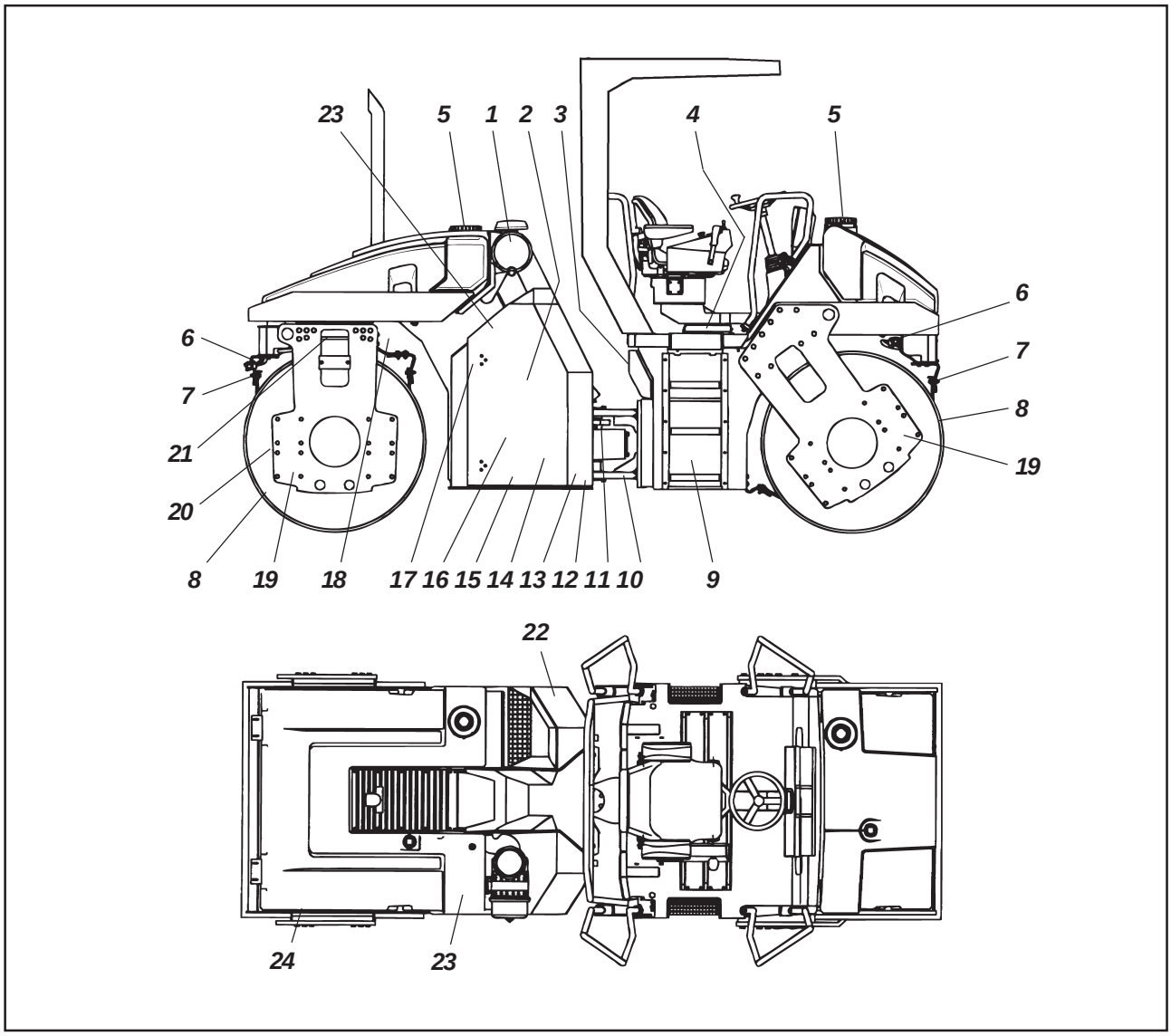


Fig. 1 Service and maintenance points

1. *Air cleaner*
2. *Engine oil*
3. *Refueling*
4. *Seat bearing*
5. *Water tanks, filling*
6. *Watering system*
7. *Scrapers*
8. *Drums*
9. *Fuel tank*
10. *Steering joint*
11. *Steering cylinder*
12. *Hydraulic filter*
13. *Hydraulic fluid level*
14. *Hydraulic fluid, filling*
15. *Hydraulic reservoir*
16. *Diesel engine*
17. *Hinges*
18. *Pivot cylinder*
19. *Rubber element*
20. *Drums, lubrication* □
21. *Pivot bearing*
22. *Battery*
23. *Hydraulic fluid cooler*
24. *Tires (combo)*

□ = *CC 232/232C only*

MAINTENANCE MEASURES

The periodic measures should be performed primarily after the specified hours of operation. Use the daily, weekly, etc. time periods only where this is not possible.

CAUTION

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

CAUTION

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		
2	Check oil level in the engine		See engine manual
13	Check the hydraulic reservoir level	9	
3	Refuel	9	
5	Fill the water tanks	9	
6	Emergency watering	10	
6	Nödbevattning	11	
7	Inspect the scraper setting/drum	11	Optional
	Inspect spring-action scrapers	11	
24	Inspect the sprinkler system/tires	12	
24	Inspect the scraper setting/tires	12	
	Test the brakes	13	

Every 50 hours of operation (Weekly)

Items in fig. 1	Measure	See page	Comments
10	Grease the steering joints	14	
11	Grease the steering cylinder brackets	14	
18	Grease the operating cylinder for pivotal steering	14	Optional
1	Inspect/clean the filter element in the air cleaner	15	Replace as required
24	Check the tire pressure (combo)	16	
	Inspect the air conditioning	16	Optional
	Inspect/lubricate the edge cutter	17	Optional
22	Check electrolyte level in battery	17	

CAUTION

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

Every 250 hours of operation (Monthly)

Items in fig. 1	Measure	See page	Comments
16	Clean the engine cooling flanges		See engine manual
23	Clean the hydraulic fluid cooler	18	Or when required
	Inspect the air conditioning	18	Optional

Every 500 hours of operation (Every three months)

Items in fig. 1	Measure	See page	Comments
8	Check the oil level in the drums	19	
20	Lubricate the drum bearings	19	CC 232 only (split drums)
4	Lubricate the seat bearing	19	
	Grease the steering chain	19	
21	Lubricate the pivot bearings	19	Optional
19	Check rubber elements and bolted joints	20	
14	Check the hydraulic reservoir cover/breather	20	
17	Lubricate hinges and controls	20	
2	Change the engine oil and oil filter	21	See engine manual
16	Inspect engine V belt tension		See engine manual
16	Change the engine pre-filter	22	

Every 1000 hours of operation (Every six months)

Items in fig. 1	Measure	See page	Comments
16	Check engine valve clearance		See engine manual
16	Inspect engine toothed belt		See engine manual
16	Replace the engine fuel filter and clean the fuel pump		See engine manual
12	Change the hydraulic filter	22	
1	Replace main filter in the air cleaner	22	
	Replace air cleaner filter in cab	23	

Every 2000 hours of operation (Yearly)

Items in fig. 1	Measure	See page	Comments
15	Change the hydraulic fluid	24	
8	Change oil in the drums/drum	24	
9	Empty and clean the fuel tank	24	
5	Empty and clean the water tanks	25	
10	Check the condition of the articulation	26	
	Overhaul air conditioning	27	Optional

Hydraulic reservoir Level check - Filling

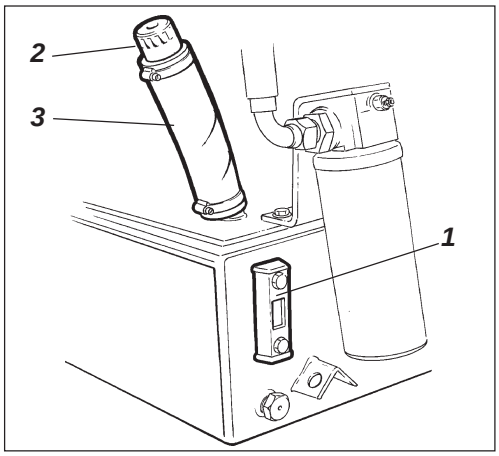


Fig. 2 Hydraulic reservoir
1. Oil sight glass
2. Filler cap
3. Filler hose

WARNING

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

Open the right door of the engine compartment.

Make sure that the oil level is between the max/min marks. Top off with hydraulic fluid according to the lubricant specification if the level is too low.

Fuel tank - Refueling

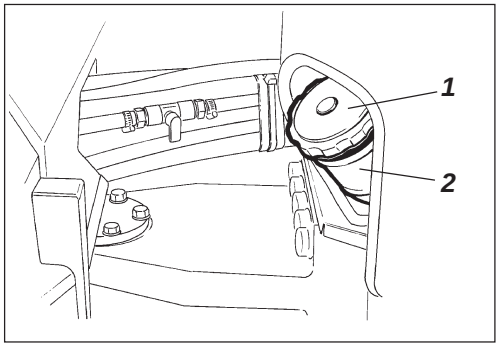


Fig. 3 Fuel tank
1. Tank cap
2. Filler pipe

Refuel every day before starting to work. Screw off the lockable tank cap (1) and fill diesel fuel to the lower edge of the filler pipe.

WARNING

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

See the engine handbook for the grade of diesel fuel.

The tank holds 120 liters (31.7 gal) of fuel.

Water tanks - Filling

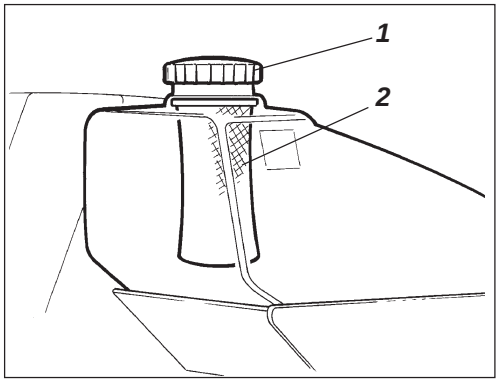


Fig. 4 Rear water tank
1. Tank cap
2. Strainer

CAUTION

Screw off the tank cap (1) and fill with pure water. Do not remove the strainer (2).

Fill both water tanks; they hold 365 liters (96.4 gal) each.

A step is located above the battery behind the left door of the engine compartment to facilitate access to the tank cap, and also a retractable step on the left front drum fork.

Sole additive: A small amount of environment friendly antifreeze, and for combo-models possibly cutting fluid.

Sprinkler system/Drum Checking - Cleaning

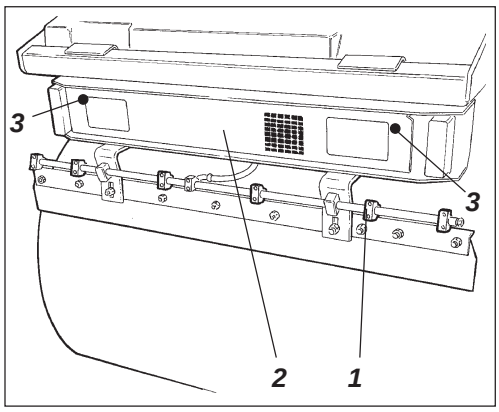


Fig. 5 Rear drum
1. Nozzle
2. Pump system/cover
3. Quick-screws

Start the sprinkler system and make sure that no nozzle (1) is clogged. If necessary, clean clogged nozzles and the coarse filter located adjacent to the water pump (2); see figures below.

A pump system is located underneath each water tank behind the cover (2), which is opened by turning the quick-screws (3) a 1/4 turn counter-clockwise. To lock the cover, place the screws with the slot vertical and push straight in.

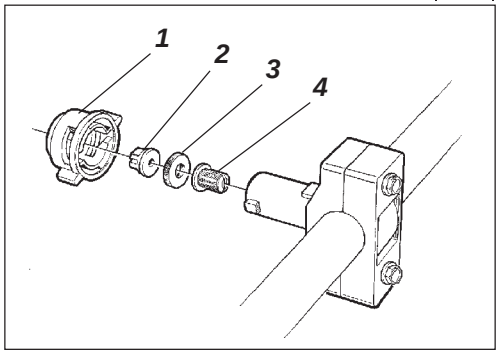


Fig. 6 Nozzle
1. Sleeve
2. Nozzle
3. Seal
4. Fine filter

Dismantle the clogged nozzle by hand. Blow the nozzle (2) and fine filter (4) clean with compressed air, or install replacement parts and clean the clogged parts at a later opportunity.

WARNING

Wear protective goggles when working with compressed air.

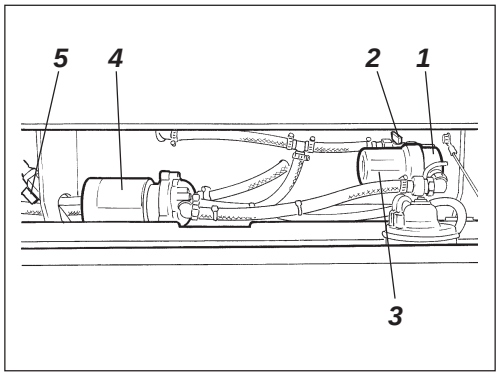


Fig. 7 Pump system
1. Coarse filter
2. Stop cock
3. Filter housing
4. Water pump
5. Drain cock

When cleaning the coarse filter (1), close the stop cock (2) and loosen the filter housing (3).

Clean the filter and filter housing, make sure that the rubber gasket in the filter housing is intact.

After inspection and any necessary cleaning, start the system and check that it works.

A drain cock (5) is located in the left part of the pump system area. This facilitates draining both the tank and the pump system.

Emergency watering

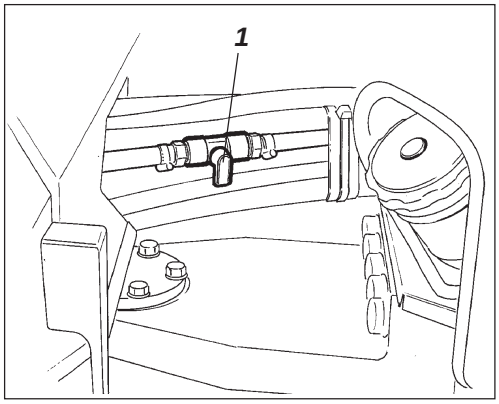


Fig. 8 Articulation
1. Stop cock

If one of the water pumps stops, the remaining pump will be able to keep the sprinkler system operating - however, at reduced capacity.

To operate with only one pump, open the stop cock (1) in the water hose by the articulation, and also the stop cock (2) on the coarse filter by the pump that has stopped, see pump system.

Scrapers, fixed Checking - Setting

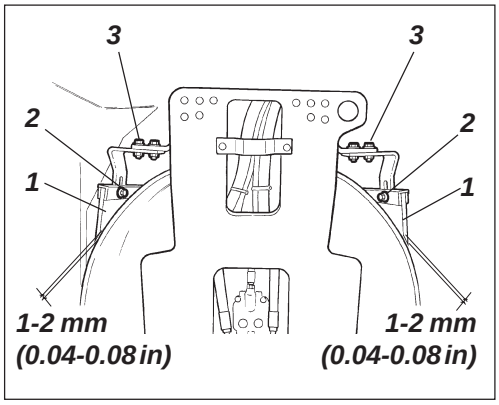


Fig. 9 Rear drum scrapers
1. Scraper blade
2. Adjusting screws
3. Adjusting screws

Make sure that the scrapers are undamaged. Adjust the scrapers so that they lie 1–2 mm (0.04-0.08 in) from the drum. For special asphalt compounds, it may be better if the scraper blades (1) lie lightly against the drums.

Asphalt remnants can accumulate on the scraper and affect the contact force.

Loosen the screws (2) to adjust the scraper blade up or down.

Loosen the screws (3) to adjust the contact pressure of the scraper blade against the drum.

Remember to tighten all the screws after any adjustment.

Scrapers, spring-action (Optional) - Checking

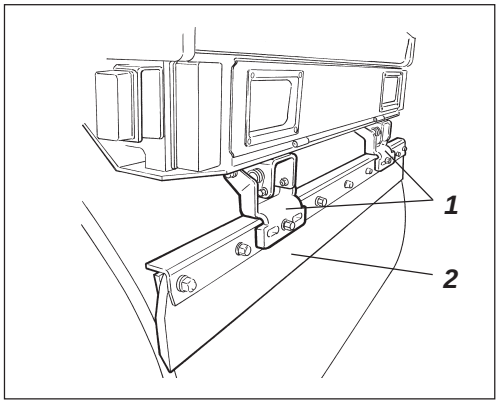


Fig. 10 Spring-action scrapers
1. Spring mechanism
2. Scraper blade

Make sure that the scrapers are undamaged. The spring-action scrapers require no adjustment because the spring force provides the correct contact force. Asphalt remnants can accumulate on the scraper and affect the contact force. Clean as needed.

CAUTION

The scrapers must be retracted from the drum during transport driving.

Sprinkler system/Wheels
Checking - Cleaning

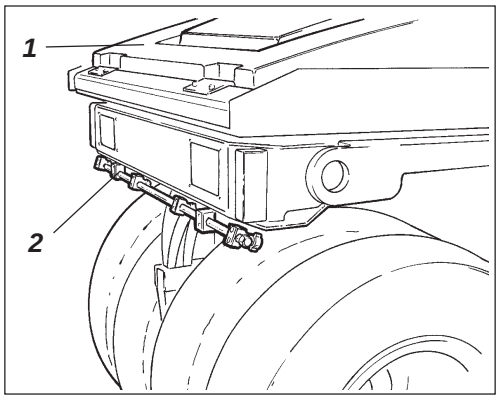


Fig. 11 Wheel rack
1. Rear water tank
2. Sprinkler nozzle

Fill the rear tank with emulsion fluid; for example, water mixed with 2% cutting fluid. Make sure that the sprinkler nozzles (2) are not clogged. Clean them and the filter if necessary. See under Sprinkler system/Drum; Check - Cleaning, for detailed instructions.

WARNING

Fluids that are flammable or detrimental to the environment may not be used in the emulsion tank.

CAUTION

Inspect the tire tread now and then to detect asphalt compound that has fastened. This is likely until the tires are sufficiently warm.

Scrapers
Checking - Setting

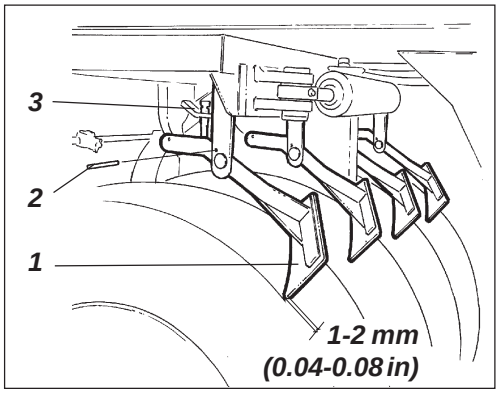


Fig. 12 Tire scrapers
1. Scraper blade
2. Cotter pin
3. Limit stop

Make sure that the scrapers are undamaged. Adjust the scrapers so that they lie 1–2 mm (0.04-0.08 in) from the tires. For special asphalt compounds, it may be better if the scraper blades (1) lie lightly against the tires.

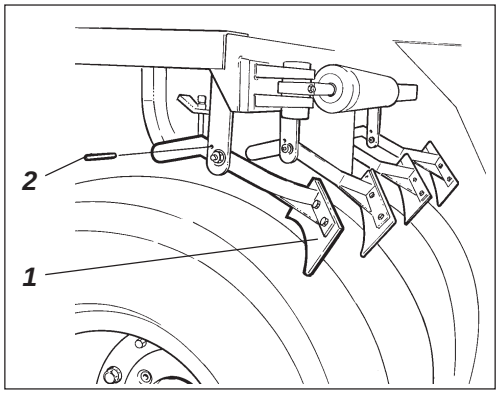


Fig. 13 Tire scrapers
1. Scraper blade
2. Cotter pin

The scrapers must hang freely from the tires during transport driving. Lift up the scraper blades (1) and latch them in the raised position with the cotter (2).

Brakes - Check

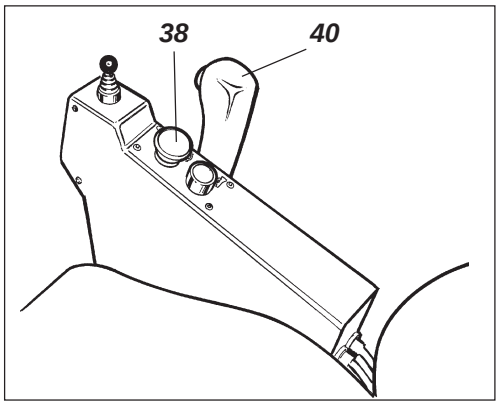


Fig. 14 Control panel
38. Reserve/parking brake knob
40. Forward/reverse lever

WARNING

Check operation of the brakes as follows:

Drive the roller **slowly** forward.

Push the reserve/parking brake knob (38); the warning lamp on the instrument panel should light and the roller should stop.

After testing the brakes, set the forward/reverse lever (40) in neutral.

Pull up the reserve/parking brake knob.

The roller is now ready for operation.

Steering joint - Lubrication

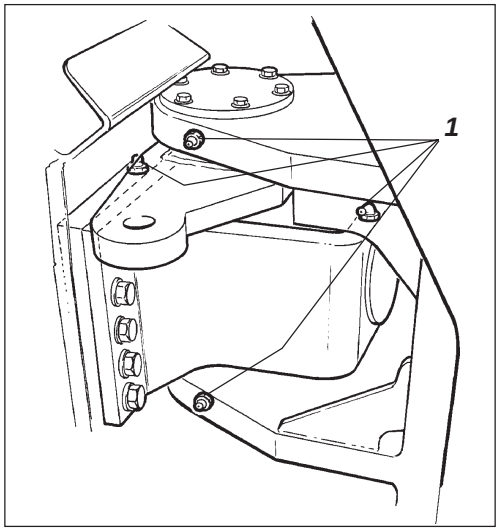


Fig. 15 Right side of articulation
1. Grease nipples

WARNING

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

WARNING

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

Turn the steering wheel fully to the left to gain access to all four grease nipples (1) from the right side of the machine.

Wipe the grease nipples (1). Grease each nipple with five strokes of the hand-operated grease gun. Make sure 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.

Steering cylinder - Lubrication

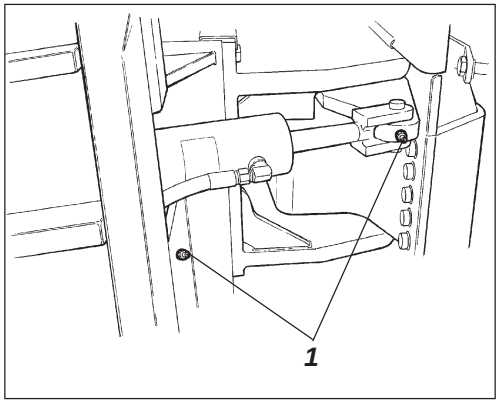


Fig. 16 Left side of articulation
1. Grease nipples

Turn the machine back for driving straight ahead. This makes the two grease nipples of the steering cylinder accessible from the left side of the machine.

Wipe the nipples (1) and grease each one with three strokes of the hand-operated grease gun.

Pivot cylinder (Optional) - Lubrication

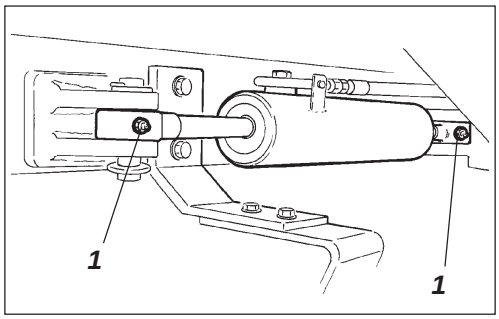


Fig. 17 Pivot cylinder
1. Grease nipples

WARNING

Allow no one near the rear drum while the engine is running. Danger of being crushed when the drum is operated.

Turn the rear drum for turning left to make the two grease nipples (1) accessible from the right side of the machine.

Wipe the nipples and lubricate in the same way as for the steering cylinder above.

Air cleaner Checking - Cleaning

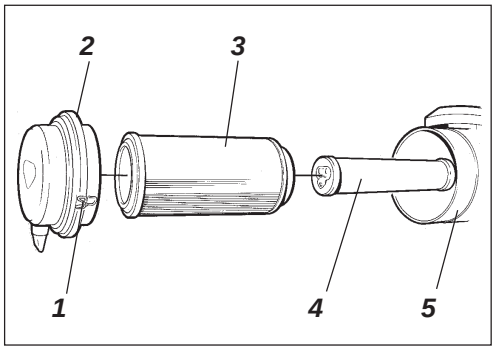


Fig. 18 Air cleaner
1. Locking flaps
2. Cover
3. Main filter
4. Backup filter
5. Filter housing

CAUTION

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

Release the three locking catches (1), pull off the cover (2), and take out the main filter (3).

Do not remove the backup filter (4).

Main filter - Cleaning with compressed air

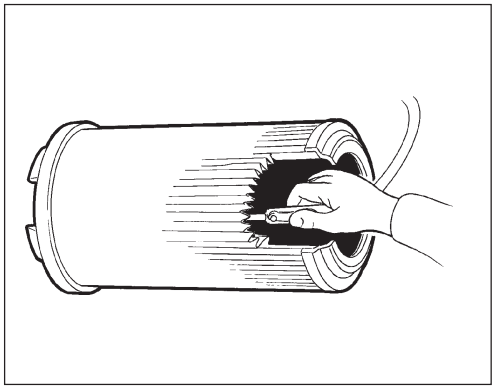


Fig. 19 Main filter

To clean the main filter, blow up and down along the paper pleats with compressed air at maximum 5 bar (72.5 psi) pressure.

Hold the nozzle at least 2–3 cm (0.8-1.2 in) from the paper pleats so as to avoid tearing the paper.

WARNING

Wear protective goggles when working with compressed air.

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

CAUTION

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

CAUTION

Change the main filter at the latest after 5 cleanings.

Backup filter - Replacement

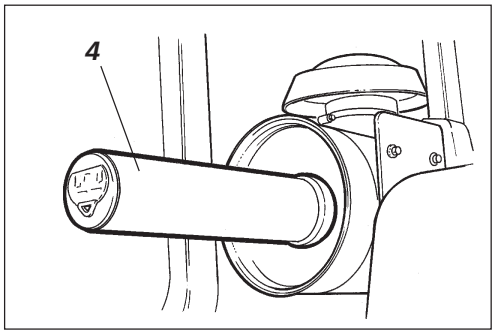


Fig. 20 Air filter
4. Backup filter

Replace the backup filter with a new one after every fifth replacement or cleaning of the main filter. The secondary filter cannot be cleaned.

To change the backup filter (4), pull the old filter out of its holder, insert a new one and reassemble the air cleaner in the reverse order.

Tires - Tire pressure

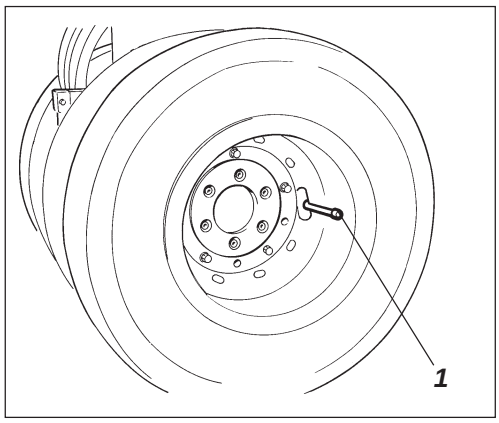


Fig. 21 Outer wheel
1. Air valve

1. Check the tire pressure with a pressure gauge.

2. Make sure that the tires have equal pressure.

Recommended pressure: See Technical Specifications.

The figure shows the position of the air valve on the outer tires.

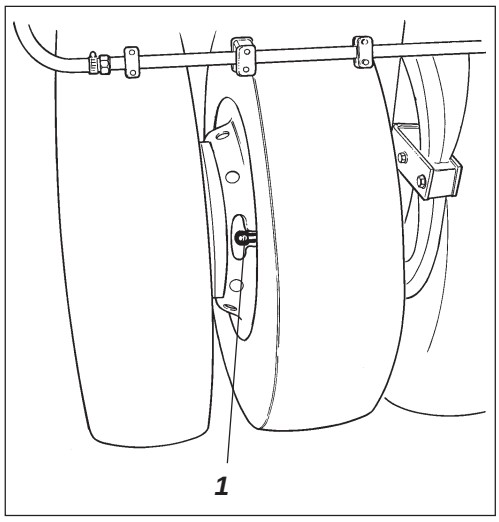


Fig. 22 Inner wheel
1. Air valve

The figure shows the position of the air valve on the inner tires.

WARNING

When pumping the tires, see the safety manual that accompanies the roller.

Air conditioning (Optional) - Inspection

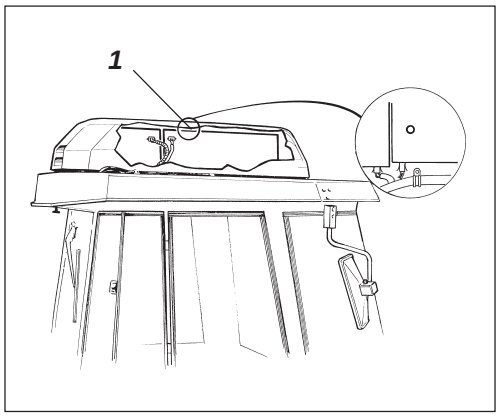


Fig. 23 Air conditioning
1. Sight glass

Remove the rubber plug in the condenser hood while the unit is operating and make sure through the sight glass (1) that no bubbles are visible on the dryer filter. If bubbles are visible through the sight glass, it is a sign that the refrigerant level is too low. If so, stop the unit. The unit may be damaged if it is run with insufficient refrigerant.

Clean the condenser element free from dust as required.

Edge cutter (Optional) - Lubrication

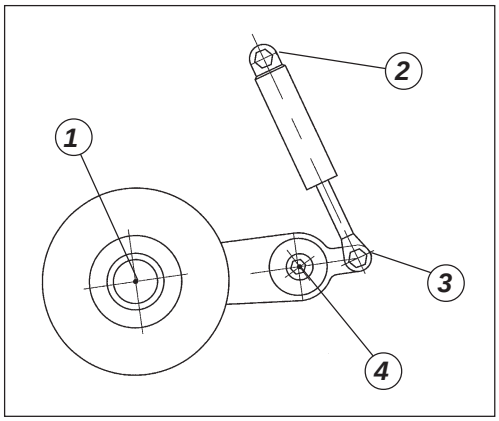


Fig. 24 Four lubrication points

WARNING

See the Operation manual for how to operate the edge cutter.

Grease the four points indicated in the figure.

Additional lubrication should also be with grease, see Lubricant specifications.

Grease all bearing points with five strokes of a hand-operated grease gun.

Battery - Checking the electrolyte level

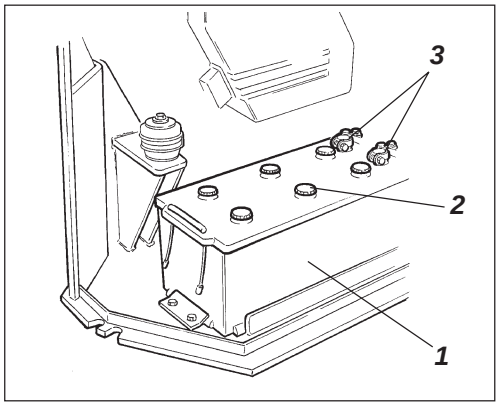


Fig. 25 Battery space
1. Battery
2. Cell cap
3. Cable shoes

WARNING

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

Open the left door of the engine compartment.

Turn both quick-screws in the plate over the battery 1/4 turn counter-clockwise and fold out the plate.

WARNING

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

Take off the cell caps and make sure that electrolyte is about 10 mm (0.4 in) above the plates. Check the level of all cells. Top off with distilled water to the right level if the level is low. The engine should be run for a while before topping off with distilled water if the ambient temperature is below freezing. Otherwise, the electrolyte might freeze.

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

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

Battery cell

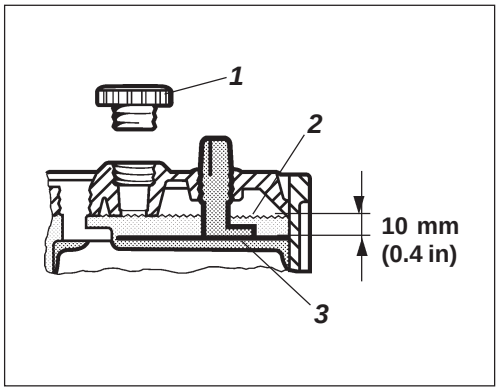


Fig. 26 Electrolyte level in battery
1. Cell cap
2. Electrolyte level
3. Plate

CAUTION

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

Discard used batteries properly. Batteries contain lead, which is detrimental to the environment.

WARNING

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

Hydraulic fluid cooler Checking - cleaning

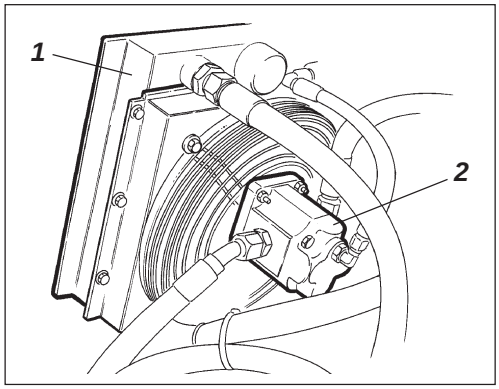


Fig. 27 Hydraulic cooler
1. Radiator
2. Fan motor

WARNING

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

Open the right door of the engine compartment to gain access to the hydraulic fluid cooler.

Make sure that the flow of air through the cooler is unobstructed.

Clean a dirty cooler with compressed air or high-pressure water cleaning.

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

CAUTION

Take care when using a high-pressure water jet; do not hold the nozzle too near the cooler.

WARNING

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

Air conditioning (Optional) - Inspection

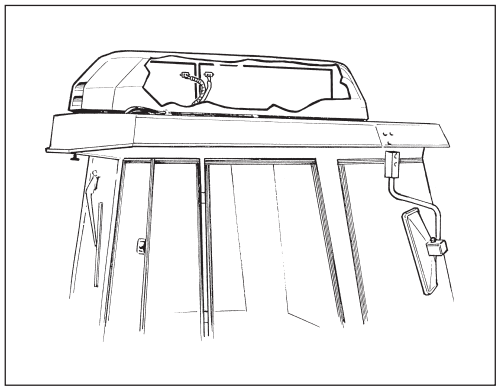


Fig. 28 Air conditioning

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

Drum - oil level Inspection - filling

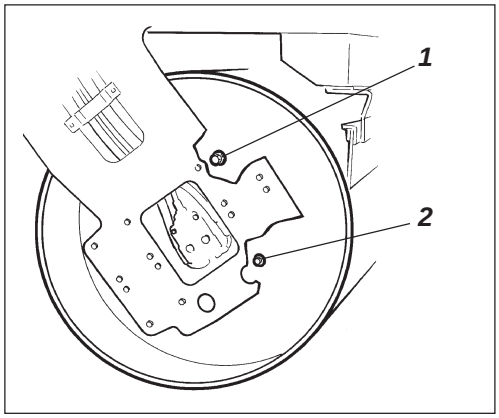


Fig. 29 Drum, vibration side
1. Filler plug
2. Level plug

WARNING

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

Position the roller with the filler plug (1) - the large plug - straight up.
Wipe clean around the level plug (2 - the small plug -and unscrew it.
Make sure that the oil level reaches up to the lower edge of the hole, top off with fresh oil as required. See Lubricant specification.
When removing the filler plug, wipe it clean from any metal on its magnet.
Make sure that plug seals are intact and replace with new seals as required.
Refit the plugs.
Check both drums.
Drive a distance and make sure that the plugs are tight.

Split drums - Lubrication (CC 232 only)

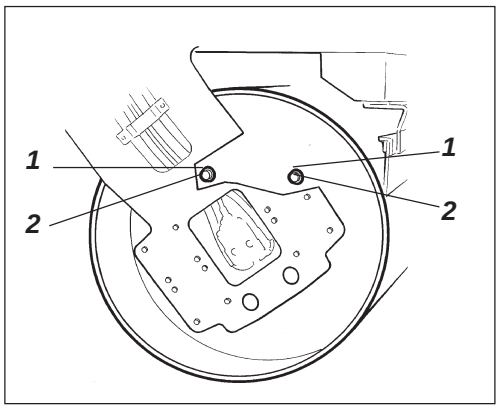


Fig. 30 Drum, drive side
1. Protective plugs
2. Grease nipples

Position one drum at a time so that two protective plugs (1) are accessible near the top of the drum.

Screw out the protective plugs and grease each nipple (2) with five strokes of a hand-operated grease gun.

Refit the protective plugs and then reposition the drum to grease the two remaining nipples.

Lubricate both drums.

Pivot bearing (Optional) - Lubrication

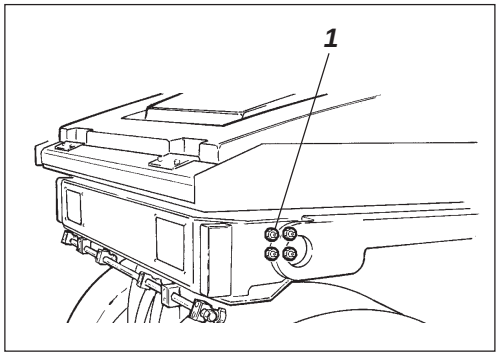


Fig. 31 Rear drum, right side
1. Grease nipples, 4 off

Grease each nipple (1) with five strokes of a hand-operated grease gun.

Use grease according to the lubricant specification.

EVERY 500 HOURS OF OPERATION (Every three months)

Rubber elements and fastening screws - Check

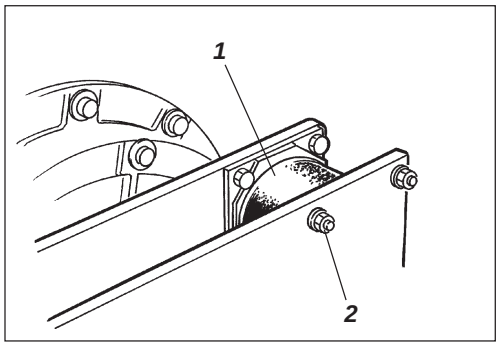


Fig. 32 Drum, vibration side
1. Rubber element
2. Fastening screws

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 (0.4-0.6 in).

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

Make sure that the fastening screws (2) are tightened.

Hydraulic reservoir cap - Check

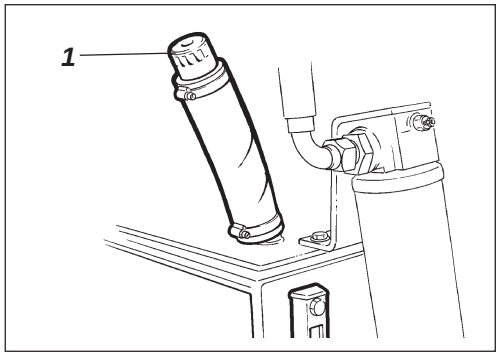


Fig. 33 Engine compartment, right side
1. Tank cap

Open the right door of the engine compartment.

Unscrew and make sure that the reservoir cap is not clogged, air must have unobstructed passage through the cap in both directions.

If clogged in either direction, clean with a little diesel oil and blow with compressed air until free passage is assured or replace the cap with a new one.

WARNING

Wear protective goggles when working with compressed air.

Hinges, controls - Lubrication

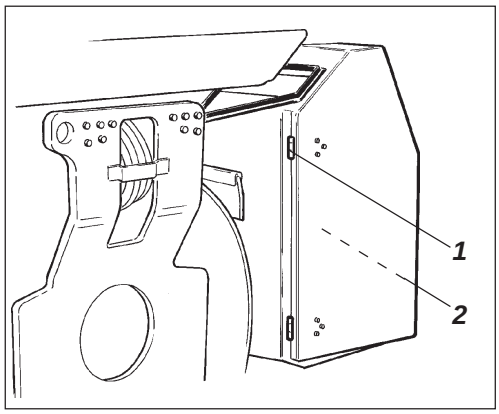


Fig. 34 Engine compartment
1. Hinges
2. Control cables

Lubricate both hinges (1) on the engine compartment doors until grease penetrates.

Lubricate the cab door hinges in the same way.

Lubricate the hinges on the front and rear lamp covers with a few drops of oil.

Lubricate the forward/reverse control cables adjacent to the control arm of the hydraulic pump. Apply a few drops of oil to the control sleeve opening.

Seat bearing - Lubrication

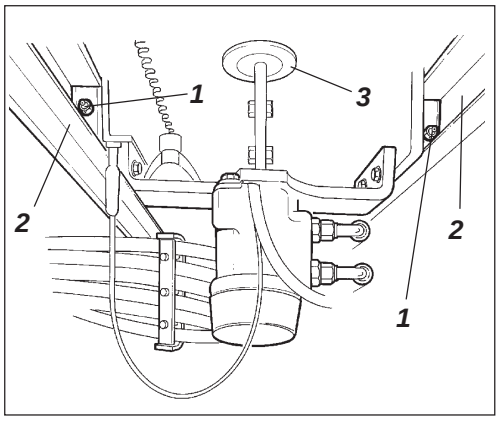


Fig. 35 Seat bearing, underneath
1. Grease nipples
2. Slide rails
3. Lubrication nipple

Remove both steps from under the operator's platform, or one step and cover plate on the other side of the roller if fitted with a cab.

Lubricate the seat sliding rails for transverse travel with five strokes of a hand-operated grease gun. Grease all four nipples, two of which (1) are accessible from each side.

Also grease the slew bearing of the seat with a few strokes of the gun. The lubrication nipple (3) is accessible after the cover on the seat frame underneath the front of the seat is removed.

Also lubricate the seat locking mechanism, both for transverse travel and slewing. Use engine oil or drum oil.

CAUTION

! If the seat begins to bind when resetting, then it should be lubricated more often than specified here.

Seat bearing—Lubrication

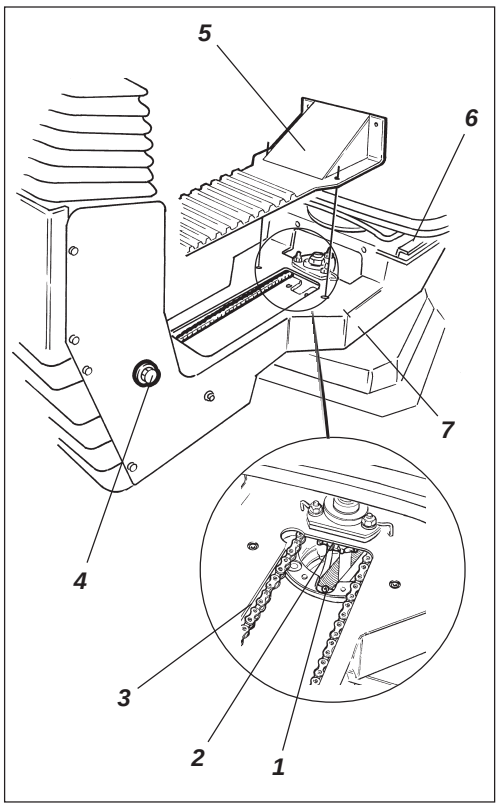


Fig. 36 Seat bearing
1. Lubrication nipple
2. Cogwheel
3. Steering chain
4. Adjusting screw
5. Cover
6. Slide rails
7. Slew interlock

CAUTION

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

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

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

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

CAUTION

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

Clean and grease the chain (3) between the seat and the steering column.
If the chain becomes slack on the cogwheel (2), loosen the screws (4) and move the steering column forward, tighten the screws and check the tension of the chain.

Engine - Oil change

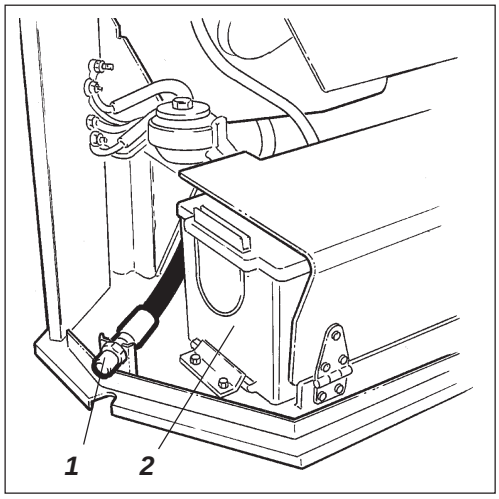


Fig. 37 Engine compartment, left side
1. Oil drain
2. Battery

The engine oil drain plug is located adjacent to the battery behind the left door of the engine compartment.

Run the engine warm before draining the oil.

WARNING

Make sure that ventilation (extraction) is adequate if the engine is run indoors (risk of carbon monoxide poisoning).

WARNING

Switch off the engine and apply the parking brake.

Place a receptacle that holds at least 15 liters of under the drain plug. Save the oil and deposit it in an approved manner.

WARNING

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

Unscrew the oil drain plug (1). Allow all of the oil to drain off and refit the plug.

Fill with fresh engine oil; see Lubricant specification or the engine manual for the correct grade of oil.

Check the dipstick to ensure that the engine oil level is correct; see the engine manual for details.

Engine pre-filter - Change

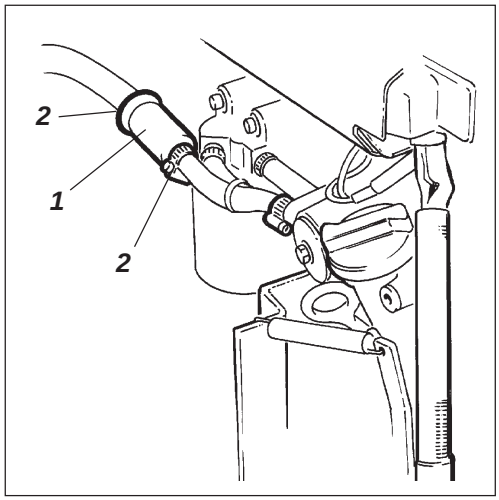


Fig. 38 Diesel engine
1. Pre-filter
2. Hose clamps

Push the parking brake knob.

Switch off the engine and open the left door of the engine compartment.

Release the hose clamps (2) with a screwdriver.

Discard the pre-filter (1) in a safe manner, it is of the expendable type and cannot be cleaned.

Fit a new pre-filter and tighten the hose clamps again.

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

WARNING

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

Hydraulic filter - Replacement

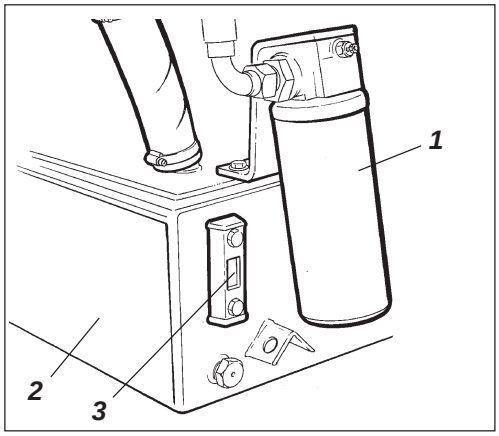


Fig. 39 Hydraulic reservoir
1. Hydraulic filter
2. Reservoir
3. Sight glass

WARNING

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

Open the right door of the engine compartment.

Remove the oil filter (1) and discard it in a safe manner; it is of the expendable type and cannot be cleaned.

Thoroughly clean the sealing surface of the filter holder.

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

Screw on the filter by hand, first until the filter gasket makes contact with the filter base and then a further ½ turn.

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

Check the hydraulic fluid level in the sight glass (3) and top off as required, see under the heading ”Every 10 hours of operation.”

Air filter - Changing

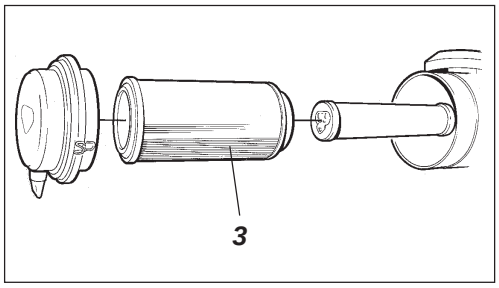


Fig. 40 Air cleaner
3. Main filter

Replace the main filter (3) of the air cleaner even if it has not yet been cleaned five times; see under the heading ”Every 50 hours of operation” for changing the filter.

CAUTION

If the filter is not replaced when clogged, the engine will emit smoke and lose power and there will be serious risk of damage to the engine.

Fresh air filter - Replacement

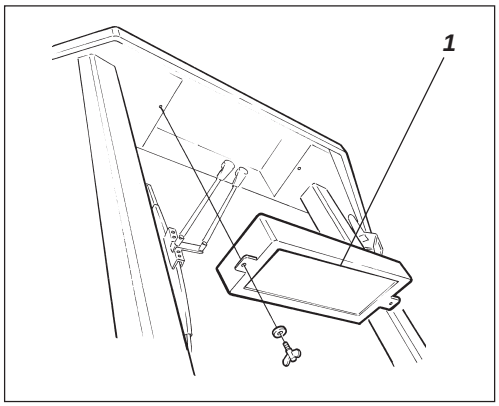


Fig. 41 Cab
1. Fresh air filter

Loosen the two screws at the rear of the cab roof. Lift down the whole holder and remove the filter insert.

Replace with a new filter.

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

Hydraulic reservoir - Changing the fluid

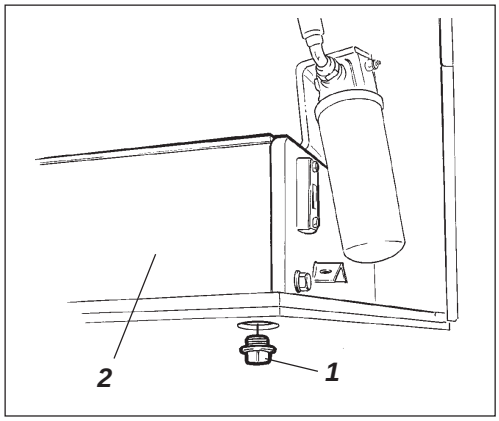


Fig. 42 Engine compartment, right side
1. Drain plug
2. Hydraulic reservoir

Drum - Oil level

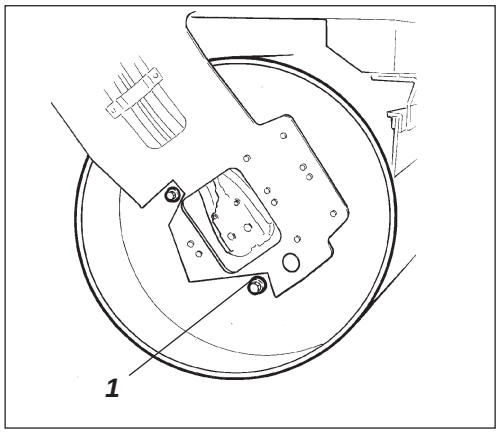


Fig. 43 Drum, vibration side
1. Drain plug

Fuel tank - Cleaning

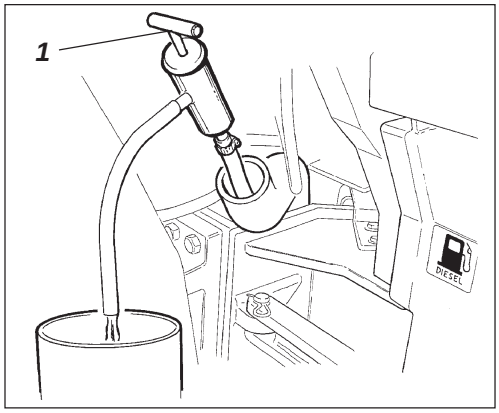


Fig. 44 Fuel tank
1. Oil emptying pump

WARNING

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

WARNING

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

Place a receptacle that will hold at least 50 liters under the plug. Save the oil and dispose of it in an approved manner.

Remove the drain plug (1) and allow all the oil to run out, wipe and refit the drain plug.

CAUTION

Fill with fresh hydraulic fluid of the grade indicated in the Lubricant specification.

Replace the hydraulic filter as described under the heading ”Every 1000 hours of operation.”

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

WARNING

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

Drive the roller until the drain plug (1) - the large plug - is straight down.

WARNING

Switch off the engine and push the parking brake knob.

Place a receptacle that will hold at least 20 liters under the plug. Save the oil and dispose of it in an approved manner.

Remove the plug (1) and allow all the oil to run out. See under the heading ”Every 500 hours of operation” for filling oil.

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

Pump out any bottom sediment with a suitable pump; for example, an oil emptying pump. Save the oil in a can and dispose of it in an approved manner.

WARNING

Remember the danger of fire when handling fuel.

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

Watering system - Draining

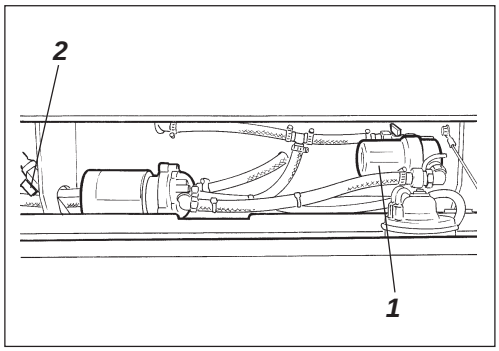


Fig. 45 Pump system
1. Filter housing
2. Drain cock

CAUTION

Remember the danger of freezing during the winter period and drain the tank, pump and leads; or mix the water with a small amount of environmentally friendly antifreeze.

The easiest way to empty the tanks is to screw off the filter housing (1).

There is also a drain cock (red square) under each water tank.

Open the drain cock (2) to empty the water pump.

Water tank - Cleaning

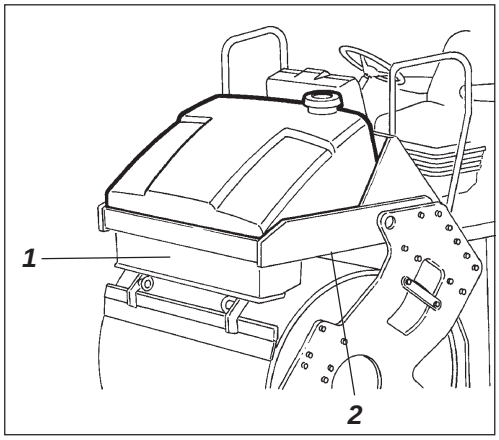


Fig. 46 Water tank
1. Pump system
2. Drain plug

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

Refit the filter housing (1) or the drain plug (2), fill with water and check for tightness.

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

Forward/Reverse lever - Lubrication

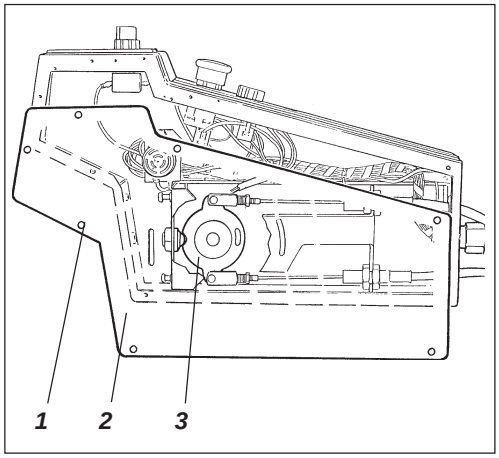


Fig. 47 Forward/Reverse lever
1. Screw
2. Plate
3. Cam disc

Remove the screws (1) and take off the plate (2).

Lubricate the sliding surface of the cam disc (3) with grease.

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

Steering joint - Check

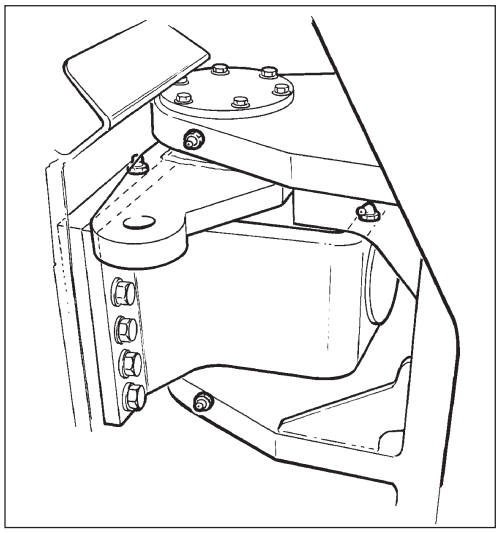


Fig. 48 Steering joint

Inspect the steering joint to detect any damage or cracks.

Check and correct any loose bolts.

Check also for any stiffness and play.

Air conditioning (Optional) - Overhaul

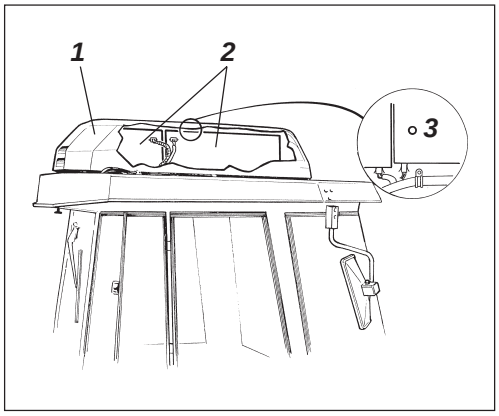


Fig. 49 Air conditioning
1. Fiberglass cover
2. Cover
3. Sight glass

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

Lift off the fiberglass cover (1) and then screw loose the two covers (2) from the unit.

Clean the condenser unit and the condenser elements free from dust using compressed air.

CAUTION

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

WARNING

Wear protective goggles when working with compressed air.

Inspect the fastening of the condenser element.

Clean the cooler unit and the cooling elements free from dust using compressed air.

Inspect and shield the system's hoses against chafing.

Inspect the fastening of the compressor motor and hydraulic motor, and also the clearance of connecting collars between the compressor and the hydraulic motor. The axial clearance should be about 4–5 mm (0.16-0.20 in) and the radial clearance about 1 mm (0.04 in).

Make sure that drainage from the cooling unit is unobstructed so that no condensation accumulates inside the unit.

Inspect suspension of the rubber dampers for the condenser unit. Check that they are not cracked and show no sign of damage.

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

CAUTION

The air unit should not be run when the outdoor temperature is below 0°C (32°F).

Inspect the sight glass on the unit (1), above the dryer filter in the condenser. Bubbles should only be visible on starting and stopping the compressor. An authorized service company should be consulted for service if many bubbles or milky fluid are observed.

WARNING

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

WARNING

Do not disconnect the hose coupling.

WARNING

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

WARNING

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

LONG-TERM PARKING

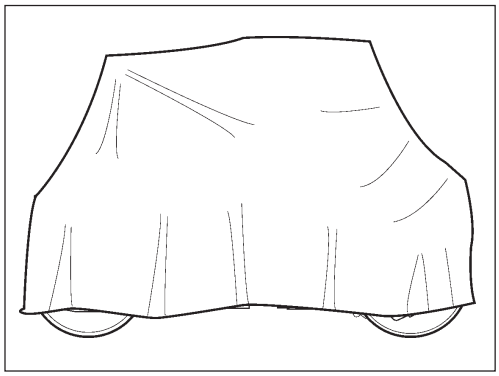


Fig. 50 Roller protected against the weather

CAUTION

The following instructions should be followed for parking longer than one month:

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 (see under the heading "Every 50 hours of operation") and trickle-charge the battery once a month.

Air cleaner, exhaust pipe

* Cover the air cleaner (see under the heading "Every 50 hours of operation") or 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 completely to prevent condensation.

Hydraulic reservoir

Fill the hydraulic reservoir to the uppermost level mark, see under the heading "Every 10 hours of operation."

Sprinkler system

* Empty the water tank completely (see under the heading "Every 10 hours of operation"), also hoses, filter housing and water pump. Remove all the sprinkler nozzles (see under the heading "Every 10 hours of operation").

Steering cylinder, hinges, etc.

Lubricate bearings of the steering joint and both bearings of the steering cylinder with grease (see under the heading "Every 50 hours of operation"). Grease the piston rod of the steering cylinder with inhibitor grease. Grease the hinges on doors to the engine compartment and the cab, and also grease both ends of the forward/reverse control (bright parts) (see under the heading "Every 500 hours of operation").

Tires (Combo)

Make sure that tire pressure is at least 200 kPa (2.0 kp/cm²).

Hoods, tarpaulin

* Lower the instrument shield plate 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, preferably on premises with an even temperature.

Standard oils and other recommended fluids

When they leave the factory, the systems and components are filled with oil or fluid as indicated in the Lubrication specification and are thus suitable for operation in ambient temperatures between -10°C and +40°C (14°F - 104°F).

CAUTION

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

The following recommendations apply for operation in higher ambient temperatures up to a maximum of +50°C (122°F):

Higher ambient temperature above +40°C (104°F)

The diesel engine can be run at this temperature using the normal oil, but for other components, the following fluids must be used: Hydraulic system: mineral fluid Shell Tellus TX100 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

CAUTION

Never aim a water jet directly at the cap of the fuel tank or hydraulic reservoir. This is especially important when using a high-pressure jet.

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

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), protective cab

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

Starting 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

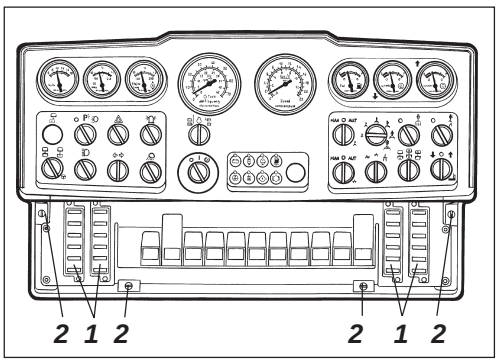


Fig. 51 Instrument panel
1. Fuse boxes
2. Quick-screws

The electrical regulating system and control system are protected by 24 fuses, located in the instrument panel and in the engine compartment.

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

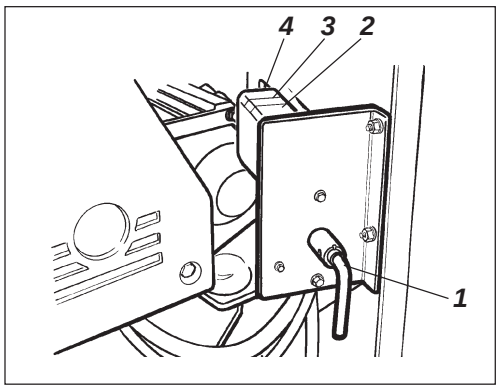


Fig. 52 Battery space
1. Battery disconnector
30A 2. Main fuse, Motor/Instrument panel
40A 3. Main fuse, Working lights □
50A 3. Main fuse, Driving lights □
70A 4. Main fuse, Cab □

□ = *Optional equipment*

Fuses in the engine compartment are located together with the battery disconnector.

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

WARNING

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

Relays

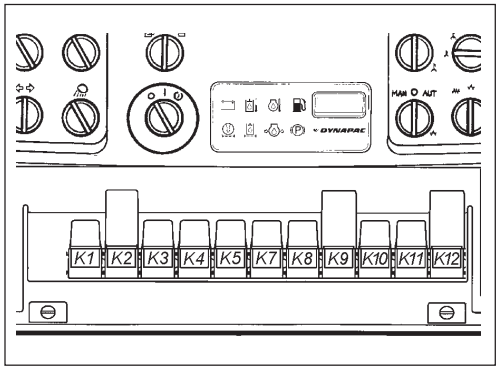
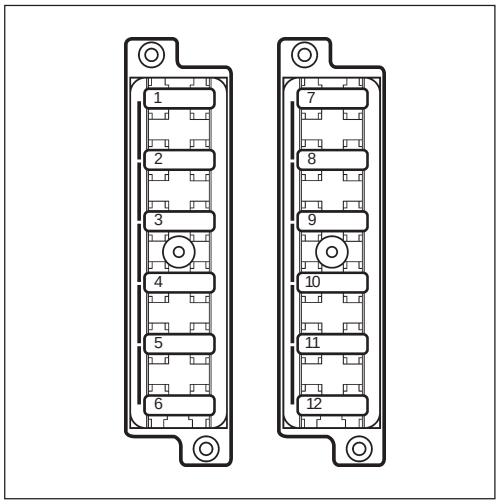


Fig. 53 Instrument panel

K1 Lights relay
K2 Direction indicator relay
K3 Brakes relay
K4 Reverse alarm relay
K5 Fuel level relay
K7 Horn relay
K8 Sprinkler
K9 Main relay
K10 AVC
K11 Neutral switch
K12 VBS relay

Fuses on the machine



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

Fig. 54 Fuse boxes, left side

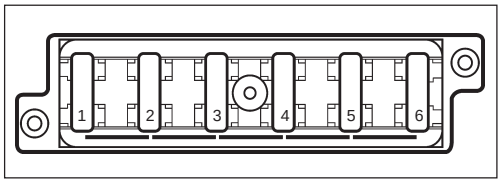
	1.	*Vacant*
10A	2.	*Direction indicators, main fuse*
7,5A	3.	*Left position lights, front and rear, brake lights*
5A	4.	*Right position lights, front and rear*
5A	5.	*Left direction indicator, front and rear, side blinkers*
5A	6.	*Right direction indicator, front and rear, side blinkers*
*/20A	7.	*Right working lights*
*/20A	8.	*Left working lights*
7,5A	9.	*Left front headlight, instrument lighting*
7,5A	10.	*Right front headlight*
7,5A	11.	*Edge cutter, sprinkler Up/Down*
	12.	*Vacant*

**/ If driving lights 10A*

Fuse boxes, right side

7,5A	1.	*Brake valve, start relay, control relay cab*
10A	2.	*Vibration relay, VBS*
3A	3.	*Indicator panel*
7,5A	4.	*Horn*
7,5A	5.	*Vibration Front/Both/Rear, AVC-relay*
10A	6.	*Hazard beacon*
7,5A	7.	*Sprinkler pump front*
7,5A	8.	*Sprinkler pump rear*
15,0A	9.	*Sprinkler system main fuse*
15,0A	10.	*Steering, offset up/down*
7,5A	11.	*Reversing alarm*
7,5A	12.	*Instruments, voltmeter, temperature level, speedometer, tachometer, frequency meter*

Fuses in the cab



The electrical system in the cab has an individual fuse box located in the right front side of the cab roof. The figure shows the rating and function of the different fuses. All fuses are flat pin fuses.

Fig. 55 Fuse box in cab

15A	1.	*Rear cab headlight*
15A	2.	*Front cab headlight, drum headlight*
5A	3.	*Cab interior lighting*
20A	4.	*Heating/fresh-air fan*
15A	5.	*Windshield wiper/washer*
15A	6.	*Front windshield wiper/washer*