

Instruction manual

Operating & Maintenance

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Vibratory roller
CA702

Engine
Cummins QSB 6.7C

Serial number
10000125xxA013326 -



Translation of original instruction

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Introduction

The machine

CA702 is one of Dynapac's heavy soil compaction rollers. It is available in D (smooth drum) and PD (padfoot drum) versions.

Intended use

The D version is intended for the compaction of rockfill. The main area of application for the PD version is on cohesive material and weathered stone material.

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

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

Warning symbols



WARNING ! Marks a danger or a hazardous procedure that can result in life threatening or serious injury if the warning is ignored.



CAUTION ! Marks a danger or hazardous procedure that can result in damage to the machine or property if the warning is ignored.

Safety information



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



The safety manual supplied with the machine must be read by all roller operators. Always follow the safety instructions. Do not remove the manual from the machine.



We recommend that the operator reads the safety instructions in this manual carefully. Always follow the safety instructions. Ensure that this manual is always easily accessible.



Read the entire manual before starting the machine and before carrying out any maintenance.



Ensure good ventilation (extraction of air by fan) where the engine is run indoors.

CALIFORNIA

Proposition 65 Warning

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

General

This manual contains instructions for machine operation and maintenance.

The machine must be correctly maintained for maximal performance.

The machine should be kept clean so that any leakages, loose bolts and loose connections are discovered at as early a point in time as possible.

Inspect the machine every day, before starting. Inspect the entire machine so that any leakages or other faults are detected.

Check the ground under the machine. Leakages are more easily detected on the ground than on the machine itself.



THINK ENVIRONMENT ! Do not release oil, fuel and other environmentally hazardous substances into the environment. Always send used filters, drain oil and fuel remnants to environmentally correct disposal.

This manual contains instructions for periodic maintenance, where maintenance after every 10 and 50 hours of operation can be performed by the machine operator. Other maintenance intervals must be carried out by accredited (Dynapac) service

personnel.



Additional instructions for the engine can be found in the manufacturer's engine manual.

Specific maintenance and checks on diesel engines must be carried out by the engine supplier's certified personnel.

CE marking and Declaration of conformity

(Applies to machines marketed in EU/EEC)

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

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

Safety - General instructions

(Also read the safety manual)



1. The operator must be familiar with the contents of the OPERATION section before starting the roller.
2. Ensure that all instructions in the MAINTENANCE section are followed.
3. Only trained and/or experienced operators are to operate the roller. Passengers are not permitted on the roller. Remain seated at all times when operating the roller.
4. Never use the roller if it is in need of adjustment or repair.
5. Only mount and dismount the roller when it is stationary. Use the intended footsteps, grips and rails. Always use the three-point grip (both feet and one hand, or one foot and both hands) when mounting or dismounting the machine. Never jump down from the machine.
6. The ROPS (Roll Over Protective Structure) should always be used when the machine is operated on unsafe ground.
7. Drive slowly in sharp bends.
8. Avoid driving across slopes. Drive straight up or straight down the slope.
9. Never operate with roller outside the edge, if the substrate does not have full bearing strength or is close to a slope. Avoid operating close to edges and ditches and the like as well as on poor ground conditions that influence the bearing strength and capacity to support the roller.
10. Make sure that there are no obstacles in the direction of travel, on the ground, in front of or behind the roller, or overhead.
11. Drive particularly carefully on uneven ground.
12. Use the safety equipment provided. The seat belt must be worn on machines fitted with ROPS/ROPS-cab.
13. Keep the roller clean. Clean any dirt or grease that accumulates on the operator platform immediately. Keep all signs and decals clean and legible.
14. Safety measures before refueling:
 - Stop the engine
 - Do not smoke.
 - No naked flames in the vicinity of the roller.
 - Earth the filling equipment nozzle to the tank opening to avoid sparks.
15. Before repairs or service:
 - Chock the drums/wheels.
 - Lock the articulation if necessary.
 - Place blocks under overhanging equipment, such as strike-off blade and chip spreader.

16. Hearing protection is recommended if the noise level exceeds 80 dB(A). The noise level can vary depending on the equipment on the machine and the surface the machine is being used on.
17. Do not make any changes or modifications to the roller that could affect safety. Changes are only to be made after written approval has been given by Dynapac.
18. Avoid using the roller before the hydraulic fluid has reached its normal working temperature. Braking distances can be longer than normal when the fluid is cold. See instructions in the STOP section.
19. For your own protection always wear:
 - helmet
 - working boots with steel toecaps
 - ear protectors
 - reflecting clothing/high visibility jacket
 - working gloves

Safety - when operating



Prevent persons from entering or remaining in the danger area, i.e. a distance of at least 7 m (23 ft) in all directions from operating machines. The operator may allow a person to remain in the risk zone, however he/she must be attentive and operate the machine only when the person is fully visible or has given a clear indication of where he or she is.



Avoid driving across a slope. Drive straight up and down sloping ground.

Driving near edges



Never operate with roller outside the edge, if the substrate does not have full bearing strength or is close to a slope.



Keep in mind that the machine's center of gravity moves outwards when steering. For example, the center of gravity moves to the right when you steer to the left.

Work driving

Avoid operating close to edges and ditches and the like as well as on poor ground conditions that influence the bearing strength and capacity to support the roller. Pay attention to potential obstacles above the machine, such as overhead cables and the branches of trees etc.

Pay particular attention to the stability of the substrate when compacting close to edges and holes. Do not compact with a large overlap from the previous track in order to maintain roller stability. Consider other compaction methods such as remote-control or a walk-behind roller close to steep slopes or where the bearing strength of the substrate is unknown.



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



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

Safety (Optional)**Air conditioning**

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

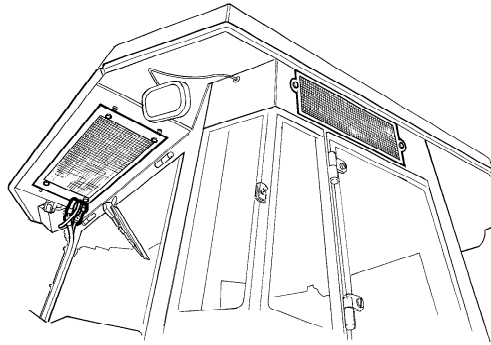


Fig. Cab



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



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



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

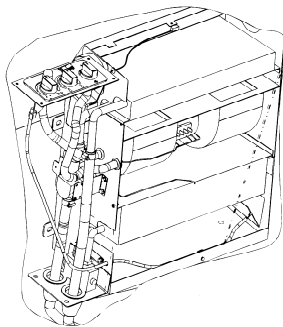


Fig. Air conditioning

Special instructions

Standard lubricants and other recommended oils and fluids

Before leaving the factory, the systems and components are filled with the oils and fluids specified in the lubricant specification. These are suitable for ambient temperatures in the range -15°C to +40°C (5°F - 105°F).



The maximum ambient temperature for biological hydraulic fluid is +35°C (95°F).

Higher ambient temperatures, above +40°C (104°F)

For operation of the machine at higher ambient temperatures, however maximum +50°C (122°F), the following recommendations apply:

The diesel engine can be run at this temperature using normal oil. However, the following fluids must be used for other components:

Hydraulic system - mineral oil Shell Tellus S2V100 or similar.

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

Temperatures

The temperature limits apply to standard versions of rollers.

Rollers equipped with additional equipment, such as noise suppression, may need to be more carefully monitored in the higher temperature ranges.

High pressure cleaning

Do not spray directly onto electrical components.



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



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



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

Place a plastic bag over the fuel filler cap and secure with a rubber band. This is to avoid high pressure water entering the vent hole in the filler cap. This could cause malfunctions, such as the blocking of filters.



Never aim the water jet directly at the fuel tank cap, or into exhaust pipe. This is particularly important when using a high-pressure cleaner.

Fire fighting

If the machine catches fire, use an ABC-class powder fire extinguisher.

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

Roll Over Protective Structure (ROPS), ROPS approved cab



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



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

Battery handling



When removing batteries, always disconnect the negative cable first.



When fitting batteries, always connect the positive cable first.



Dispose of old batteries in an environmentally friendly way. Batteries contain toxic lead.



Do not use a quick-charger for charging the battery. This may shorten battery life.

Jump starting



Do not connect the negative cable to the negative terminal on the dead battery. A spark can ignite the oxy-hydrogen gas formed around the battery.



Check that the battery used for jump starting has the same voltage as the dead battery.

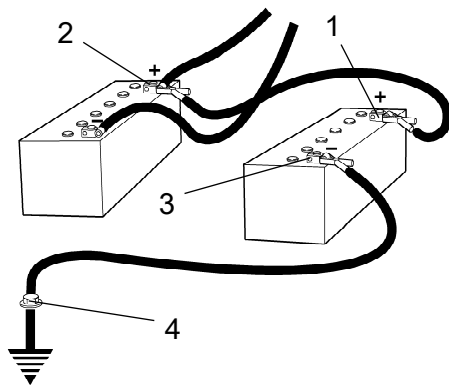


Fig. Jump starting

Turn the ignition and all power consuming equipment off. Switch off the engine on the machine which is providing jump start power.

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

Start the engine on the power providing machine. Let it run for a while. Now try to start the other machine. Disconnect the cables in the reverse order.

Technical specifications

Vibrations - Operator station (ISO 2631)

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

Measured whole-body vibrations are below the action value of 0.5 m/s^2 as specified in Directive 2002/44/EC. (Limit is 1.15 m/s^2)

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

Noise level

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

Guaranteed sound power level, L_{WA} 109 dB (A)

Sound pressure level at the operator's ear (platform), L_{pA} 86 dB (A)

Sound pressure level at the operator's ear (cab), L_{pA} 76 ± 3 dB (A)

Electrical system

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

Slopes

This angle has been measured on a hard, flat surface with the machine stationary.

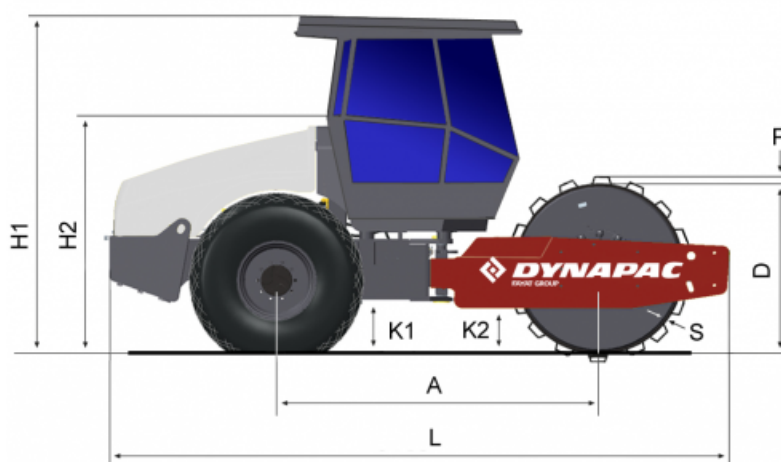
The steering angle was zero, the vibration was switched OFF and all tanks were full.

Always take into consideration that loose ground, steering the machine, vibration on, machine speed across the ground and raising the center of gravity can all cause the machine to topple at smaller slope angles than those specified here.



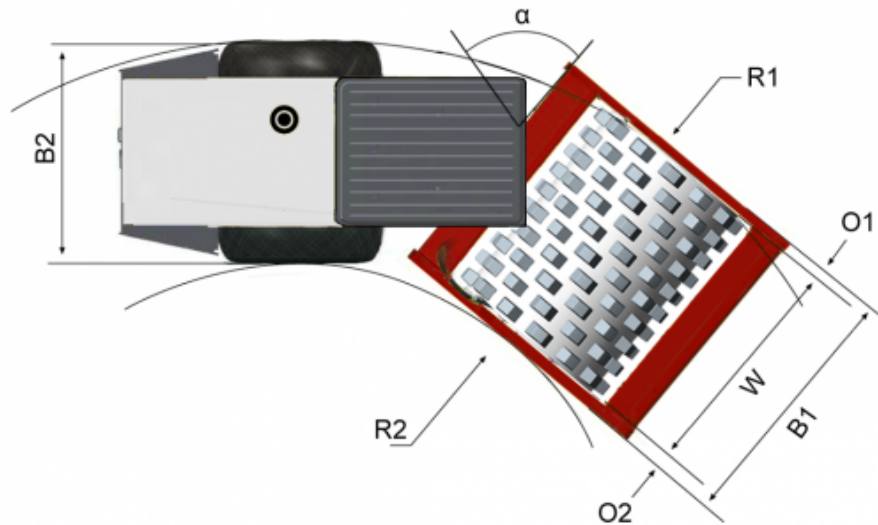
Max 20° or 36%

Dimensions, side view



	Dimensions	mm	in
A	Wheelbase, drum and wheel	3341	131,5
L	Length, standard equipped roller (D/PD)	6535 / 6535	257,28 / 257,28
H ₁	Height with cab (D/PD)	2982 / 3043	117,4 / 119,8
H ₂	Height without cab (D/PD)	2206 / 2270	86,85 / 89,37
D	Diameter, drum (D/PD)	1700 / 1680	66,9 / 66,1
S	Thickness, drum shell, Nominal (D/PD)	40 / 30	1,57 / 1,18
P	Height, pads (PD)	100	3,94
K ₁	Clearance, tractor frame (D/PD)	458 / 458	18 / 18
K ₂	Clearance, drum frame (D/PD)	483 / 483	19 / 19

Dimensions, top view



	Dimensions	mm	in
B	Width, standard equipped roller	2420	95,27
O ₁	Overhang, left frame side	135	5,31
O ₂	Overhang, right frame side	155	6,1
R ₁	Turn radius, external	6000	236,2
R ₂	Turn radius, internal	3700	145,66
W ₁	Width, tractor section	2280	89,76
W ₂	Width, drum	2130	83,86
α		±38°	±38°

Weights and volumes

Weights

Service weight without cab (D/PD)	26350 / 26500 kg	58091 / 58422 lbs
Service weight with cab (D/PD)	26900 / 27050 kg	59304 / 59635 lbs

Fluid volumes

Fuel tank	320 liters	84,54 gal
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Working capacity

Compaction data

Static linear load (D/PD)	80,0 / - kg/cm	448,0 / - pli
Static linear load with cab (D/PD)	80,8 / - kg/cm	452,5 / - pli
Amplitude, high (D/PD)	2,0 / 2,0 mm	0,078 / 0,078 in
Amplitude, low (D/PD)	1,3 / 1,3 mm	0,039 / 0,039 in
Vibration frequency, high/low amplitude	28 / 30 Hz	1680 / 1800 vpm
Centrifugal force, high amplitude (D/PD)	330 / 330 kN	74186 / 74186 lb
Centrifugal force, low amplitude (D/PD)	254 / 254 kN	57101 / 57101 lb

Note: The frequency is measured at high revs. The amplitude is measured as the real value and not the nominal.

General

Engine

Manufacturer/Model	Cummins QSB 6.7C	Water cooled turbo diesel with after cooler
Power (SAE J1995)	164 kW	220 hp
Engine speed, idling	900 rpm	
Engine speed, loading/unloading	1,500 rpm	
Engine speed, working/transport	2,200 rpm	

Tire**Tire dimensions****Tire pressure**

Std type	23.1 x 26.0 12 ply	220 kPa (2,2 kp/cm) (32 psi)
Tractor type	23.1 x 26.0 12 ply	220 kPa (2,2 kp/cm) (32 psi)

Electrical system

Battery	12V 170Ah
Alternator	12V 95A
Fuses	See the Electrical system section - fuses

Tightening torque

Tightening torque in Nm for oiled or dry bolts tightened with a torque wrench.

Metric coarse screw thread, bright galvanized (fzb):

STRENGTH CLASS:

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

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

STRENGTH CLASS:

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

Hydraulic system

Opening pressure	MPa
Drive system	42,0
Supply system	3,0
Vibration system	42,0
Control systems	17,5
Brake release	2,2

Automatic Climate Control (ACC) (Optional)

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

Coolant designation: HFC-R134:A

Coolant weight when full: 1600 gram (3.53 lbs)

Machine description

Identification

Product identification number on the frame

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

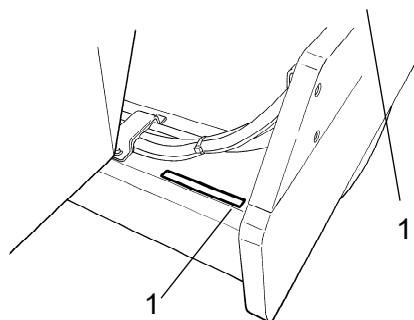


Fig. Front frame
1. PIN

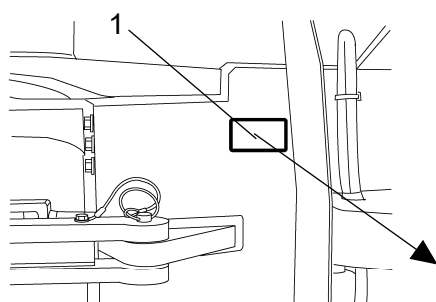




Fig. Operator platform
1. Machine plate

Machine plate

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

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

		DYNAPAC Dynapac Compaction Equipment AB Box 504, SE-371 23 Karlskrona Sweden		
Product Identification Number		XXXXXXXXXXXXXXXXXX		
Designation	Type	Rated Power	Max axle load front / rear	
XXXXXX	XXXXXX	XXX kW	XXXX/XXXX kg	
Gross machinery mass		Operating mass	Max ballast	(Date of Mfg)
XXXX kg		XXXX kg	XXXX kg	XXXX
Made in Sweden				
4811 (08/13)				

Please state the machine's PIN when ordering spares.

100	00123	V	x	A	123456
A	B	C	F		

Explanation of 17PIN serial number

A= Manufacturer

B= Family/Model

C= Check letter

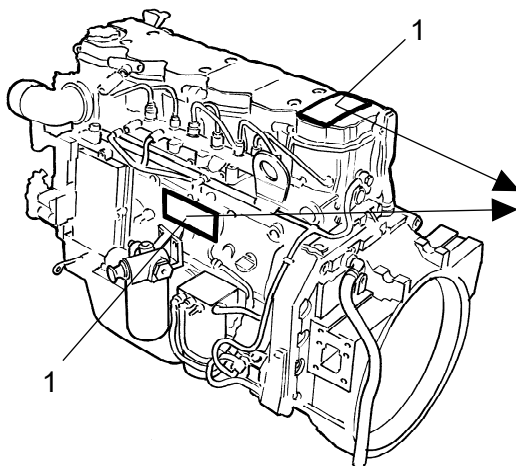
F= Serial number

Engine plates

The engine type plates (1) are affixed to the top and on the right side of the engine.

The plates specify the type of engine, serial number and the engine specification.

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





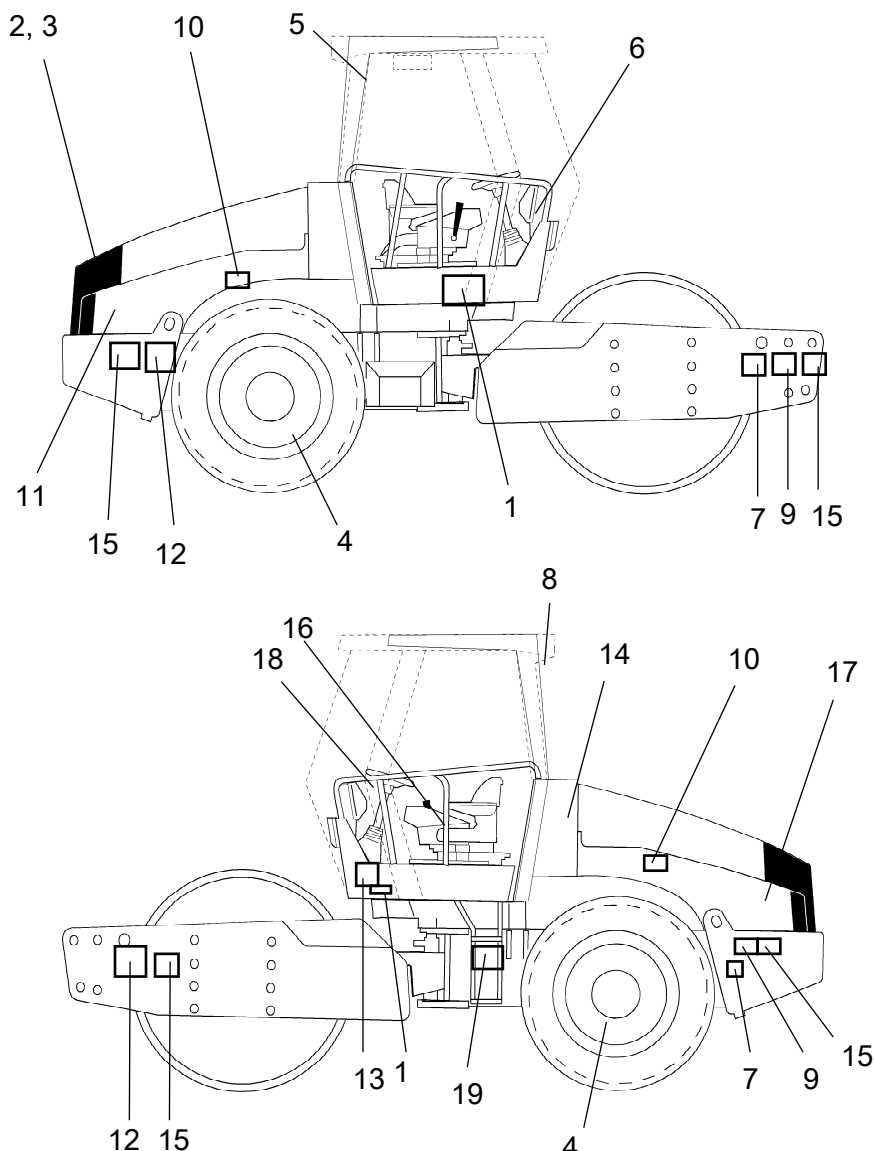
 CUMMINS INC. Made in Great Britain www.cummins.com		Engine No. XXXXXXXX Family 6CEXL0409AAB Date of MFG DD-MM-YY	
Ad. HP/kW 220/164*2200 rpm efft-97/68HA-2004/26-0368-00 Valve lash Inch .010 Int .020 Ex Cold mm .254 Int .524 Ex Ref. No. 391608	Model QSB6.7 CPL 8466 FR 91434 C.I.D./L 409/6.7 Catalyst No. N/A	Fuel Rate at adv. HP 98.0 mm ³ /st Timing - TDC ELECTRONIC Firing order 1-5-3-6-2-4 Idle speed 750 rpm ECS	
IMPORTANT ENGINE INFORMATION : This Engine Conforms To 2006 U.S. EPA And California Regulations Heavy Duty Non-road Compression Ignition Diesel Cycle Engines As Applicable. WARNING: Injury May Result And Warranty Is Voided If Fuel Rate RPM Or Altitudes Exceed Published Maximum Values For This Model And Application. This Engine Is Certified To Operate On Diesel Fuel.		FEL EPA NOx* 4.0 NMHC PM 0.20 4935699	

Fig. Engine
1. Type plate/EPA plate

Decals

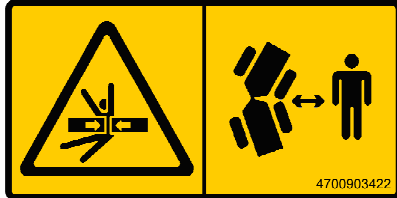
Location - decals



1. Warning, Crush zone	4700903422	7. Warning, Locking	4700908229	13. Sound power level	4700791279
2. Warning, Rotating engine components	4700903423	8. Warning, Toxic gas	4700904165	14. Hydraulic fluid/Biohydraulic fluid	4700272372 / 4700904601
3. Warning, Hot surfaces	4700903424	9. Hoisting plate		15. Tie down point	4700382751
4. Warning, Ballasted tire.	4700903985	10. Tire pressure	4700392012	16. Handbook compartment	4700903425
5. Emergency exit	4700903590	11. Diesel fuel	4700991658	17. Battery isolation switch	4700904835
6. Warning, Read instructions manual	4700903459	12. Lift point	4700357587	18. Warning sign	
				19. Warning, Brake release	4700904895

Safety decals

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

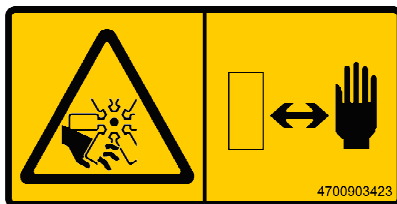


4700903422

Warning - Crush zone, articulation/drum.

Maintain a safe distance from the crush zone.

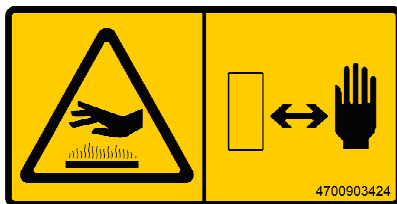
(Two crush zones on machines fitted with pivotal steering)



4700903423

Warning - Rotating engine components.

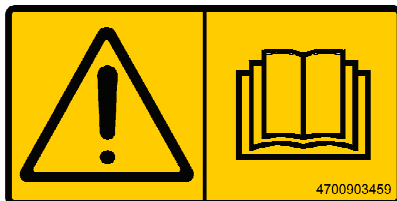
Keep your hands at a safe distance.



4700903424

Warning - Hot surfaces in the engine compartment.

Keep your hands at a safe distance.



4700903459

Warning - Instruction manual

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

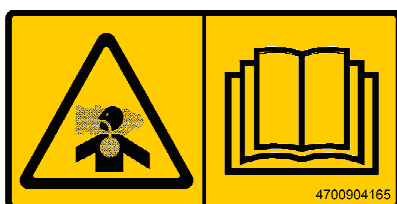


4700908229

Warning - Risk of crushing

The articulation must be locked when lifting.

Read the instruction manual.



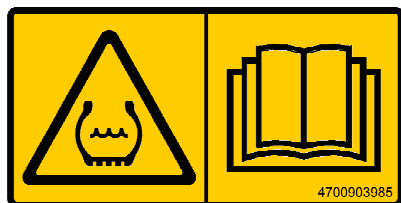
4700904165

Warning - Toxic gas (option, ACC)

Read the instruction manual.



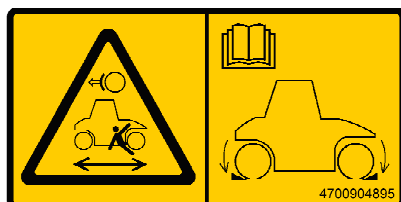
4700903590
-Emergency exit



4700903985
Warning - Ballasted tire.

Read the instruction manual.

More information in section in Technical specifications.



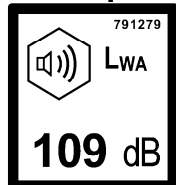
4700904895
Warning - Brake disengagement

Study the towing chapter before disengaging the brakes.

Danger of being crushed.

Info decals

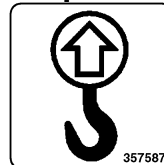
Sound power level



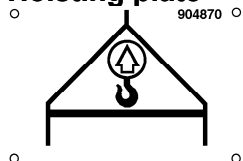
Diesel fuel



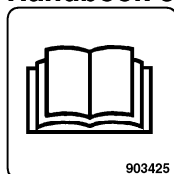
Lift point



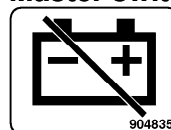
Hoisting plate



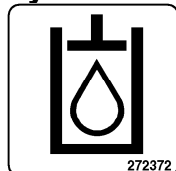
Handbook compartment



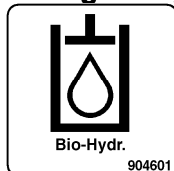
Master switch



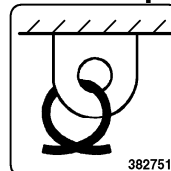
Hydraulic fluid



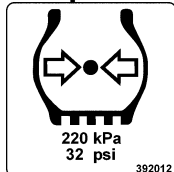
Biological hydraulic fluid



Tie down point



Tire pressure



Instruments/Controls

Locations - Instruments and controls

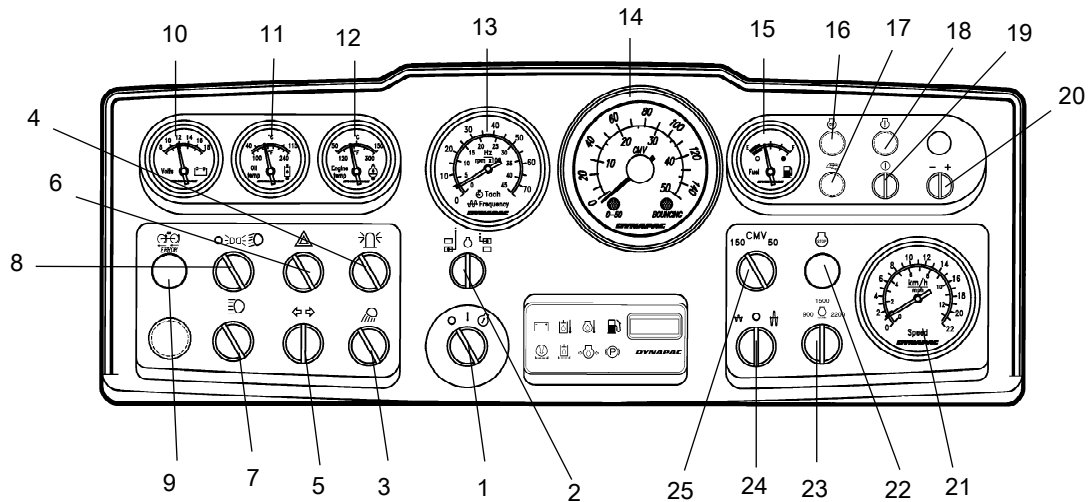


Fig. Instruments and control panel

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

* = Optional equipment

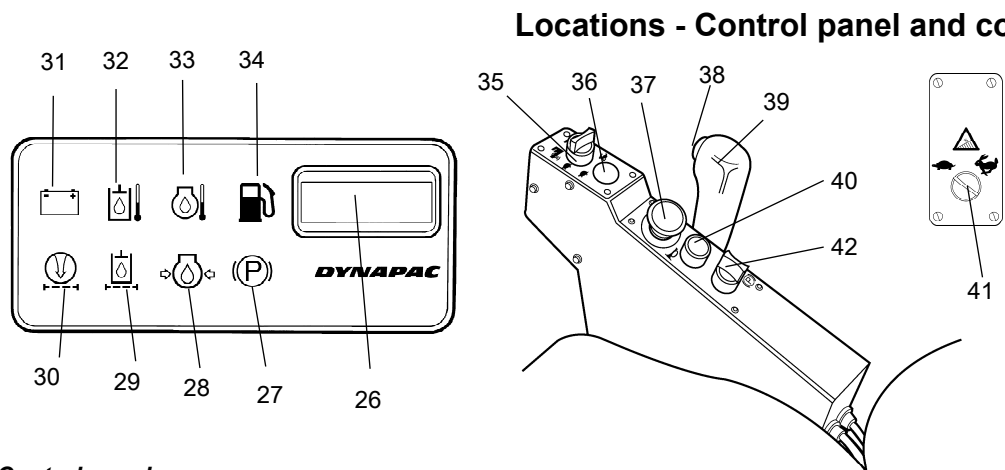


















































Fig. Control panel

- | | | | |
|-----|---|-----|------------------------------|
| 26. | Hourmeter | 34. | Warning lamp, fuel level |
| 27. | Brake warning lamp | 35. | Speed selector, drum/wheel |
| 28. | Warning lamp, engine oil pressure | 36. | Reserve |
| 29. | Warning lamp, hydraulic fluid filter | 37. | Emergency stop |
| 30. | Warning lamp, air filter | 38. | Vibration ON/OFF |
| 31. | Warning lamp, charging | 39. | Forward/Reverse lever |
| 32. | Warning lamp, hydraulic fluid temperature | 40. | Horn |
| 33. | Warning lamp, engine temperature | 41. | Antispin function (Optional) |
| | | 42. | Parking brake On/Off |

Function descriptions

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

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

No	Designation	Symbol	Function
33	Warning light, engine coolant temperature		If the lamp comes on, the engine is too hot. Stop the engine immediately and locate the fault. Refer also to the engine manual.
34	Warning lamp, low fuel level		When the lamp comes on, there is only a small amount of fuel left. Refuel as soon as possible.
35	Speed selector		Position 1: Working mode
			Position 2: Used if the drum spins.
			Position 3: Used if the rear tires spin.
			Position 4: Transport mode
37	Emergency stopp		When pressed, the emergency stop is activated. The brake is applied and the engine stops. Brace yourself for a sudden stop.
38	Vibration On/Off, switch		Press once and release to switch the vibration on, press again to switch the vibration off. The above only applies when the amplitude selector 17 is in the High or Low position.
			
39	Forward/Reverse lever		The lever must be in neutral to start the engine. The engine cannot be started if the forward/reverse lever is in any other position. The forward/reverse lever controls both the roller's driving direction and speed. When the lever is moved forward, the roller moves forward. The roller's speed is proportional to the distance the lever is from the neutral position. The further the lever is from the neutral position, the higher the speed.
40	Horn, switch		Press to sound the horn.
41	Antispin function (Optional)		Optimized antispin function forwards is obtained with the knob in the left position. Optimized antispin function backwards is obtained with the knob in the middle position. Set the knob in the right position during transport.
42	Parking brake On/Off		Turn to activate the parking brake, the machine stops with the engine running. Always use the parking brake when the machine is stationary on a sloping surface.

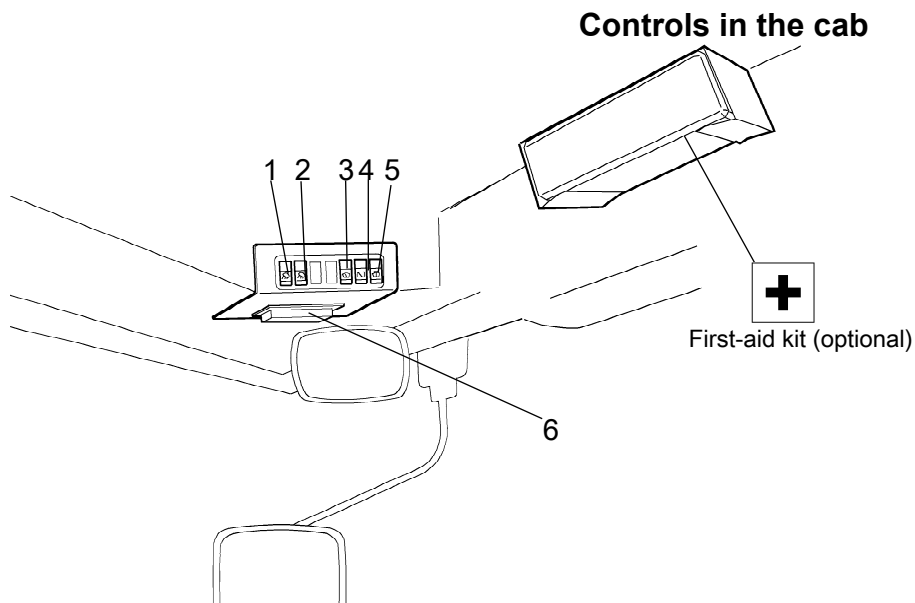


Fig. Cab roof, front

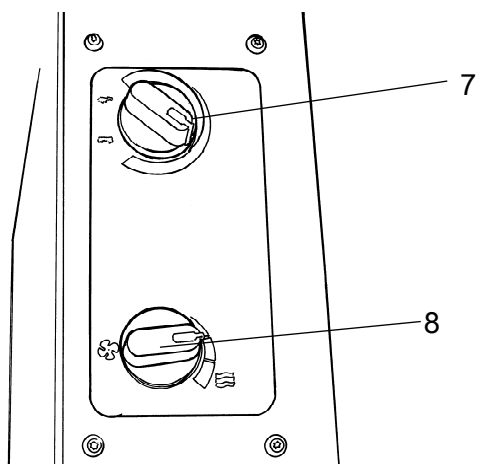


Fig. Cab, right side

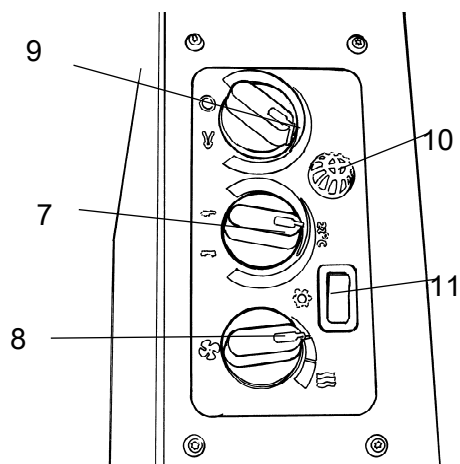


Fig. Cab right side (AC optional)

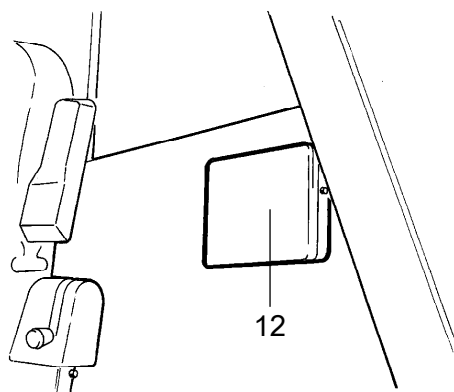


Fig. Cab, rear

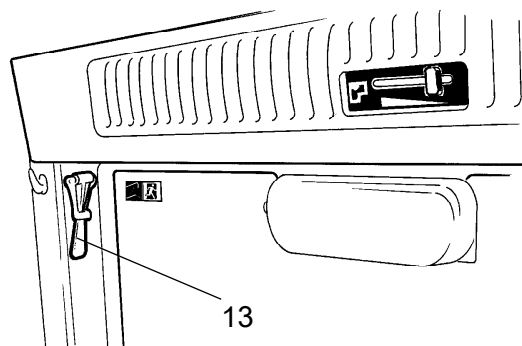













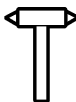


Fig. Cab roof, rear

Function description of instruments and controls in the cab

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

Electrical system

Fuses

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

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

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

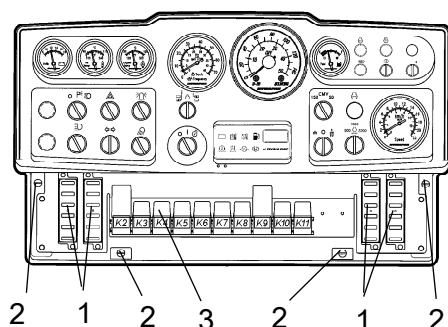
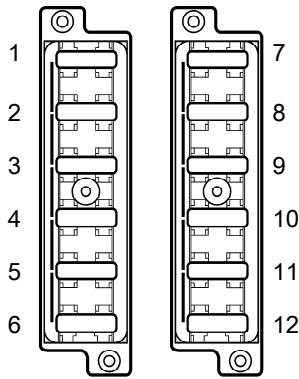


Fig. Instrument panel
 1. Fuse boxes (4)
 2. Quick-screws
 3. Relays

Fuses



**Fig. Fuse box,
left and right side.**

The figure shows the position of the fuses.

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

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

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

** When driving lights are fitted

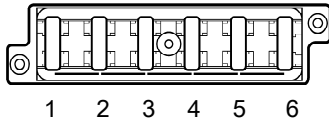


Fig. Cab roof fuse box

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

Fuses in cab

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

The figure shows fuse amperage and function.

All fuses are flat pin fuses.

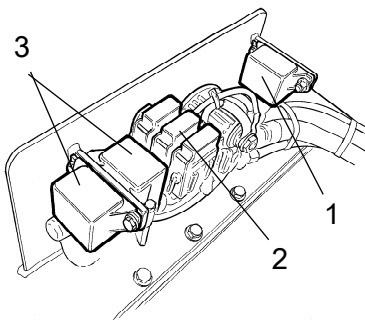


Fig. Engine compartment
 1. Starter relay
 2. Main fuses
 3. Preheating relays

Main fuses

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

The fuses are of flat pin type.

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

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

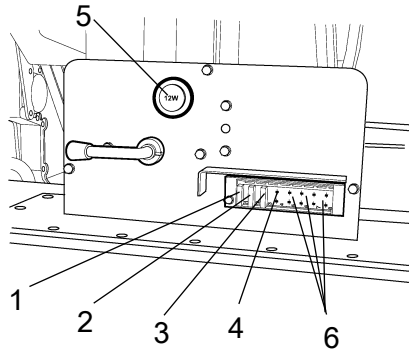


Fig. Engine compartment
 1. QSB engine (ignition)
 2. Diagnostic lamps engine
 3. ECM electronics
 4. Fuse, Power socket 12V
 5. Power socket 12V
 6. Reserve

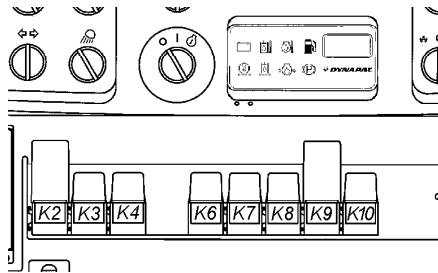


Fig. Instrument panel

Fuses at battery master disconnect switch

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

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

Relays

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

Relays in cab

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

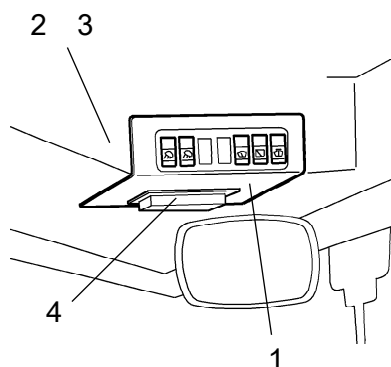


Fig. Cab roof, front

- 1. Instrument plate**
- 2. K30 Relay for air conditioning fan**
- 3. K31 Relay for air con fans + radio**
- 4. Fuse box**

Operation

Before starting

Master switch - Switching on

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

The master switch is located in the engine compartment. Turn the key (1) to the on position. The entire roller is now supplied with power.



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

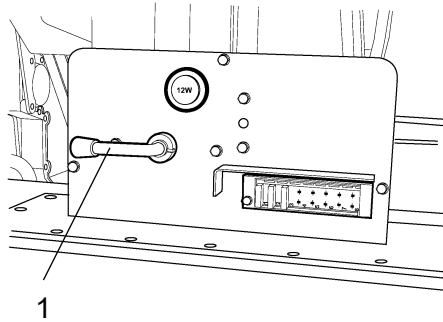


Fig. Engine compartment
1. Master switch

Operator's seat - Adjusting

Adjust the operator's seat so that the position is comfortable and so that the controls are within easy reach.

The seat can be adjusted as follows.

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

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



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

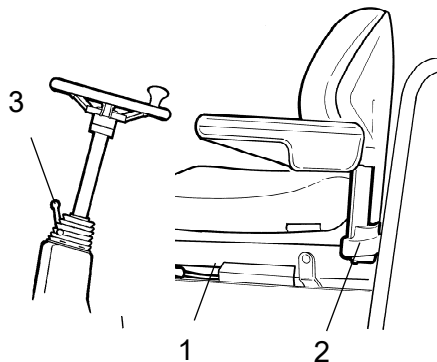


Fig. Operator's seat
1. Locking lever - Length adjustment
2. Lever - Weight adjustment
3. Locking lever - Steering column angle

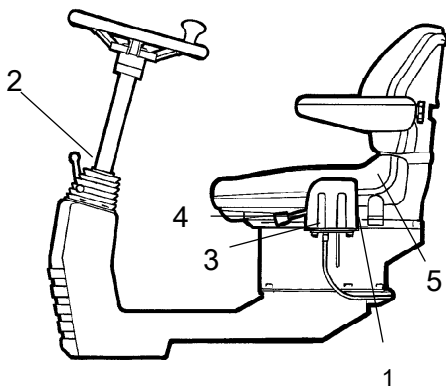


Fig. Operator's station
 1. Locking lever - rotation (Optional)
 2. Locking lever - steering column angle
 3. Locking lever - length adjustment
 4. Lever - backrest slope
 5. Lever - weight adjustment

Control unit - Setting

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

Pull the lever (1) upwards to allow rotation.

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

The seat can be adjusted as follows:

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



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

Operator's seat in cab - Adjusting

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

Adjust the operator's seat so that the position is comfortable and so that the controls are within easy reach.

The seat can be adjusted as follows:

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



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

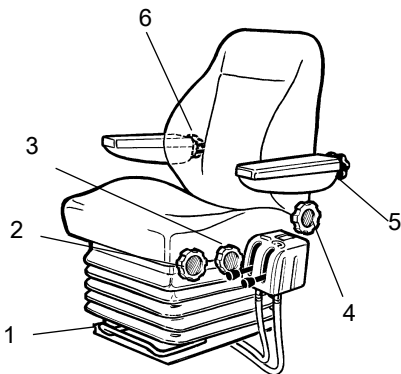


Fig. Operator's seat
 1. Lever - length adjustment
 2. Wheel - height adjustment
 3. Wheel - seat cushion inclination
 4. Wheel - backrest inclination
 5. Wheel - armrest inclination
 6. Wheel - lumbar support adjustment

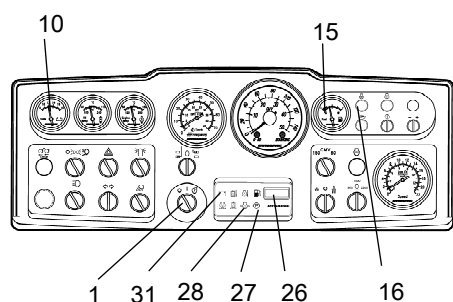


Fig. Instrument panel
1. Starter switch
10. Voltmeter (Optional)
15. Fuel gauge
16. Preheating lamp
26. Hourmeter
27. Brake lamp
28. Oil pressure lamp
31. Charging lamp

Instruments and lamps - Checking

Turn the switch (1) to the mid-position. All warning lamps should light for about 5 seconds and the beeper should sound.

During this time check that the warning lamps light up.

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

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

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

The preheating lamp (16) must go on.

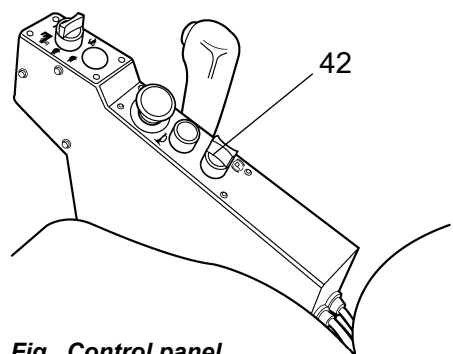


Fig. Control panel
42. Parking brake knob

Parking brake - Check



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

Interlock

The roller is equipped with Interlock.

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

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

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



Sit down for all operations!

Operator position

If cab is fitted to the roller, always wear the seat belt (1) provided and wear a protective helmet.



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



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



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



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

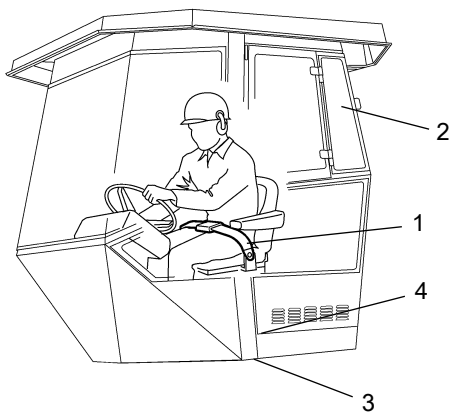


Fig. Operator's station

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

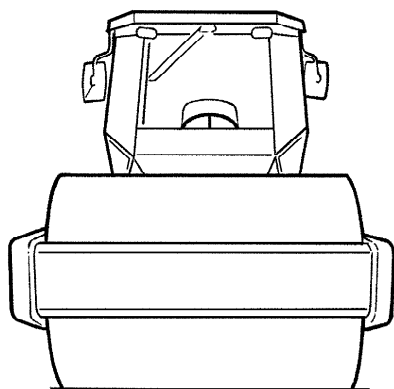


Fig. view

View

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

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

Starting

Starting the engine

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

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

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

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

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



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

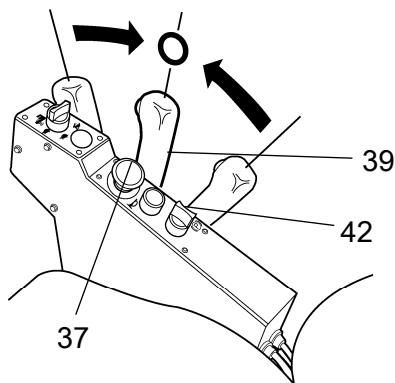


Fig. Control panel
 37. Emergency stop
 39. Forward/Reverse lever
 42. Parking brake knob

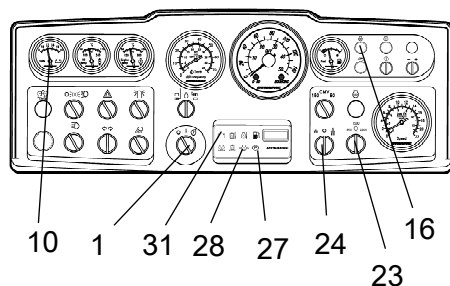


Fig. Instrument panel
 1. Starter switch
 10. Voltmeter (Optional)
 16. Preheating lamp
 23. Engine speed control
 24. Amplitude selector
 27. Brake lamp
 28. Oil pressure lamp
 31. Charging lamp

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

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



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



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

Operating

Operating the roller



Under no circumstances is the machine to be operated from the ground. The operator must be seated inside the machine during all operation.

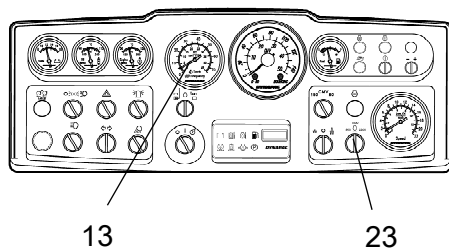


Fig. Instrument panel
13. Tachometer (Optional)
23. Engine speed control

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

Deactivate the parking brake and check that the steering is working correctly by turning the steering wheel once to the right and once to the left while the roller is stationary.



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

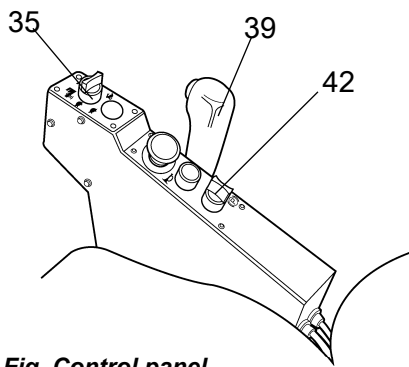


Fig. Control panel
 35. Speed selector
 39. Forward/Reverse lever
 42. Parking brake knob



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

Set the speed selector (35) to the required mode, see decal on the control panel.

Maximum speed

Low drum/Low rear axle	3 km/h
High drum/Low rear axle	5 km/h
Low drum/High rear axle	4 km/h
High drum/High rear axle	8 km/h



The High/High mode may only be used for transport runs on an even surface.

Carefully move the forward/reverse lever (39) forwards or backwards, depending on which direction of travel is required. The speed increases as the lever is moved away from the neutral position.



The speed should always be controlled using the forward/reverse lever and never by changing the engine speed.



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

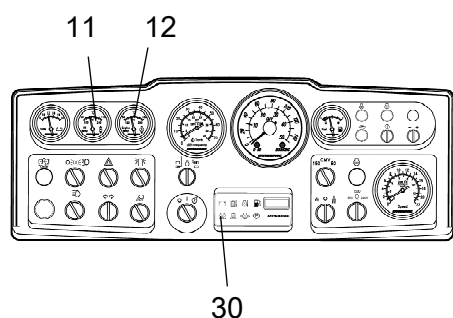


Fig. Instrument panel
11. Hydraulic oil temperature (Optional)
12. Engine temperature (Optional)
30. Warning lamp, air filter

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



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

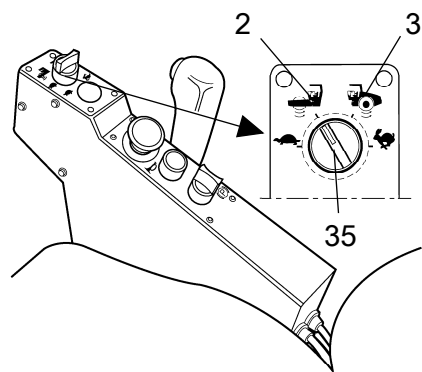


Fig. Control panel
35. Speed selector
2. Position 2
3. Position 3

Operating on difficult surfaces

If the machine should get stuck, turn the knob as shown below.

If the drum spins: Turn the knob (35) to Position 2
 If the rear tires spin: Turn the knob (35) to Position 3.

When the machine has regained its grip set the knobs in their original positions.

Vibration

Amplitude/frequency - Changeover

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

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



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

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

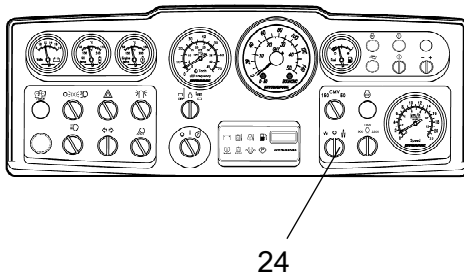


Fig. Instrument panel
24. Amplitude selector Low/0/High

Manual vibration - Switching on



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

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

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

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

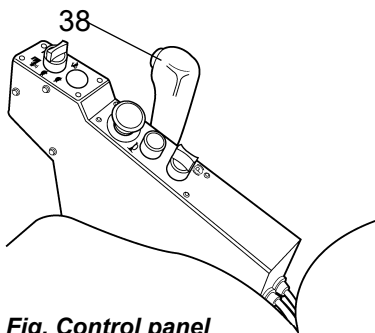


Fig. Control panel
38. Switch, vibration On/Off

Braking

Emergency braking

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

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



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

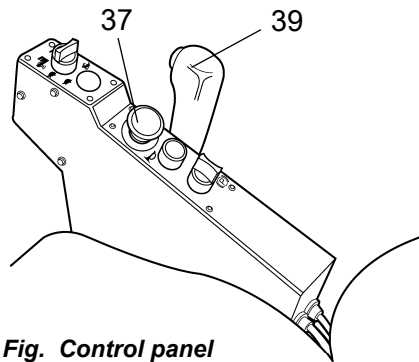


Fig. Control panel
37. Emergency stop
39. Forward/Reverse lever

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

Normal braking

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

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

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



When starting and driving a machine that is cold, remember that the hydraulic fluid is also cold and that braking distances can be longer than normal until the machine reaches the working temperature.

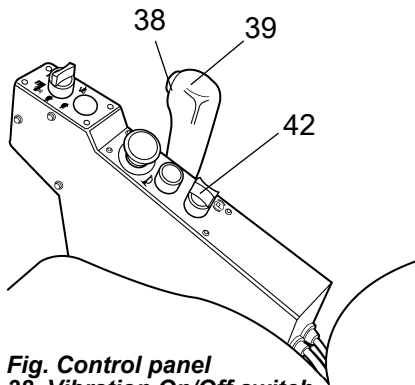


Fig. Control panel
38. Vibration On/Off switch
39. Forward/Reverse lever
42. Parking brake knob



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

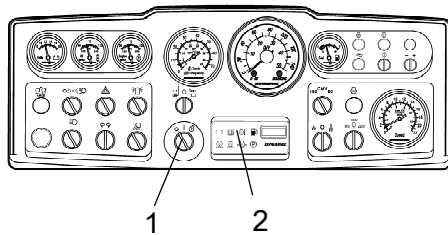


Fig. Instrument panel
 1. Starter switch
 2. Panel for warning lamps

Switching off

Check instruments and warning lamps to see if any faults are indicated. Switch off all lights and other electrical functions.

Turn the starter switch (1) to the left to the shut off position. On rollers without a cab, lower and lock the instrument cover.

Parking

Master switch

Before leaving the roller for the day, switch the master switch (1) to the disconnected position and remove the handle.

This will prevent battery discharging and will also make it difficult for unauthorized persons to start and operate the machine. Lock the engine compartment doors.

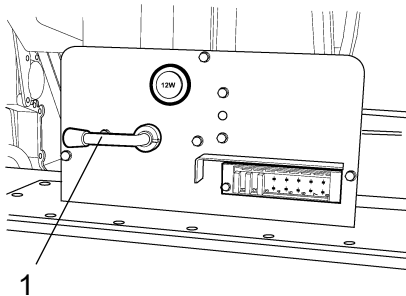


Fig. Tractor frame, rear left
 1. Master switch

Chocking the drums



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



Make sure that the roller is parked in a safe place with respect to other road users. Chock the drums if the roller is parked on sloping ground.

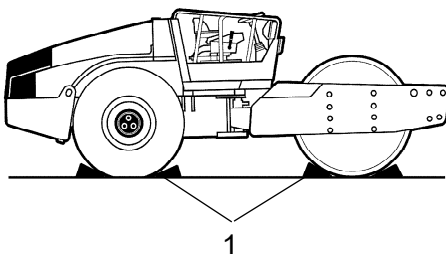


Fig. Arrangement
 1. Chock



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

Long-term parking



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

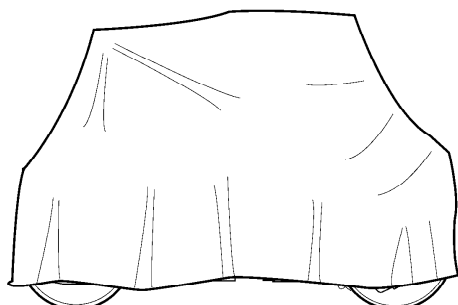


Fig. Roller weather protection

These measures apply when parking for a period of up to 6 months.

Before re-commissioning the roller, the points marked with an asterisk * must be returned to the pre-storage state.

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

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

Engine

* Refer to the manufacturer's instructions in the engine manual that is supplied with the roller.

Battery

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

Air cleaner, exhaust pipe

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

Fuel tank

Fill the fuel tank completely full to prevent condensation.

Hydraulic reservoir

Fill the hydraulic reservoir to the uppermost level mark (see under the heading 'Every 10 hours of operation.')

Tires (All-weather)

Check that tire pressure is 220 kPa (2,2 kp/cm²).

Steering cylinder, hinges, etc.

Grease the steering cylinder piston with conservation grease.

Grease the hinges on the doors to the engine compartment and the cab. Grease both ends of the forward/reverse control (bright parts) (see under the heading 'Every 500 hours of operation').

Hoods, tarpaulin

* Lower the instrument cover over the instrument panel.

* Cover the entire roller with a tarpaulin. A gap must be left between the tarpaulin and the ground.

* If possible, store the roller indoors and ideally in a building where the temperature is constant.

Miscellaneous

Lifting

Weight: refer to the hoisting plate on the roller

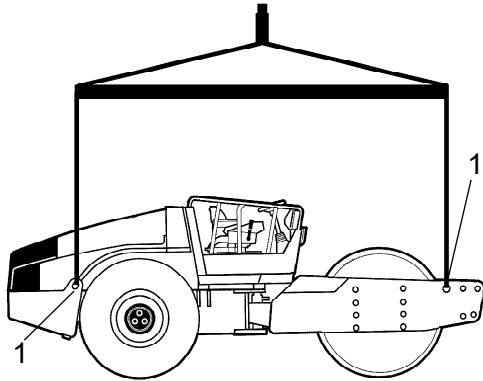


Fig. Roller prepared for lifting
 1. Hoisting plate

Lifting the roller



The machine's gross weight is specified on the hoisting plate (1). Refer also to the Technical specifications.



Lifting equipment such as chains, steel wires, straps and lifting hooks must be dimensioned in accordance with the relevant safety regulations for the lifting equipment.



Stand well clear of the hoisted machine! Make sure that the lifting hooks are properly secured.

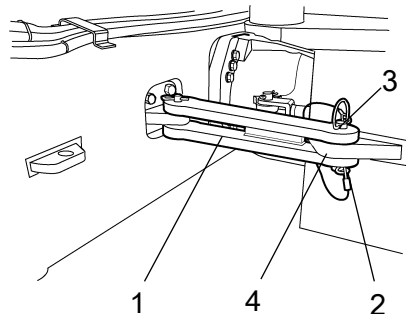


Fig. Articulation in the locked position
 1. Locking arm
 2. Locking pin
 3. Locking stud
 4. Locking lug

Locking the articulation



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

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

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

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

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

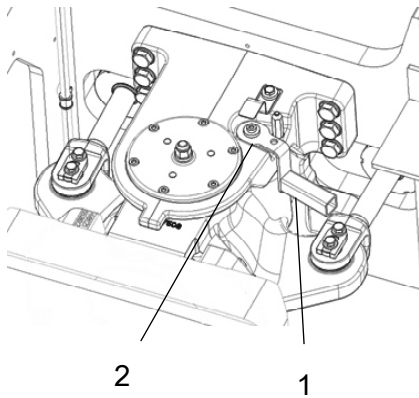


Fig. Steering joint lock, locked
 1. Lock handle
 2. Locking dowel

Locking the articulation



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

Turn the steering wheel to the straight ahead position.
 Activate the parking brake.

Front frame shall be in line with the rear frame.

Lift lock in the handle (1) while it is turned clockwise.

Make sure dowel (2) gets in position as illustrated.
 Arm must be in contact with the surface of the molded holder.

If this is not done, it's likely that the machine halves are out of line, steer then the machine so this is happening.

Unlocking the articulation



Remember to unlock the articulation before operating.

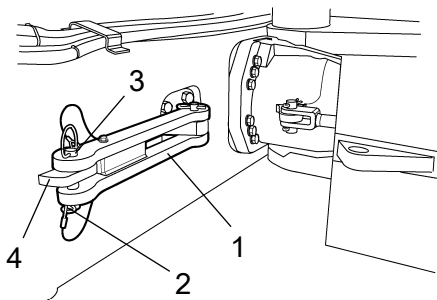


Fig. Articulation in the open position
 1. Locking arm
 2. Locking pin
 3. Locking stud
 4. Locking lug

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

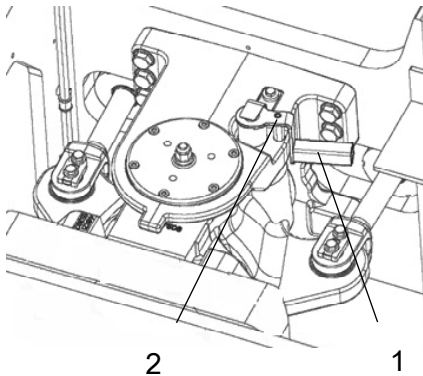


Fig. Steering joint lock, open
1. Lock handle
2. Locking dowel

Unlocking the articulation



Remember to restore the steering joint lock on the steering joint to open before operating.

Lift lock in the handle while turning it counterclockwise.

Make sure lock gets in position on the dowel by trying to turn the handle clockwise or counterclockwise without lifting the lock.

Towing/Recovering

The roller can be moved up to 300 meters (330 yards) using the instructions below.

Alternative 1

Short distance towing with the engine running



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

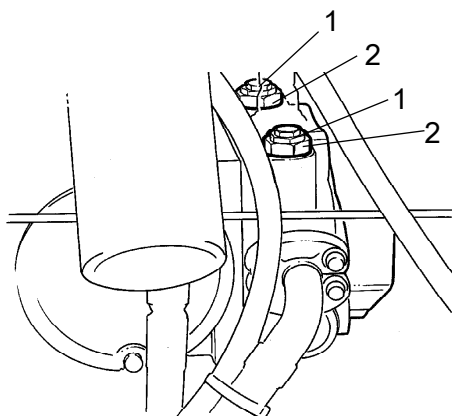


Fig. Propulsion pump
1. Towing valve
2. Locknut

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

Start the engine and allow it to idle.

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

Alternative 2

Towing short distances when the engine is inoperative



Chock the drum and tires to prevent the roller moving when the brakes are mechanically disengaged.

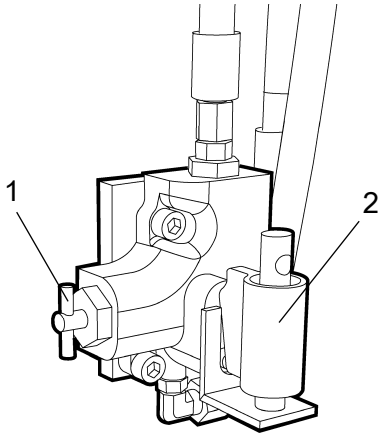


Fig. Pump for releasing the brake
1. Handle for activating the brake
2. Pump lever



After towing. Pull the lever (1) to activate the brake.



Always lock the pump with a padlock when it is not in use.

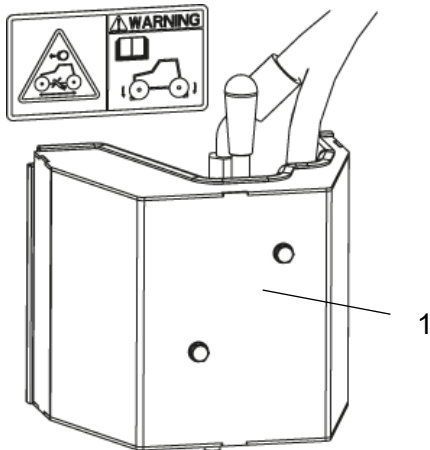


Fig. Brake release pump with protection

1. Protection

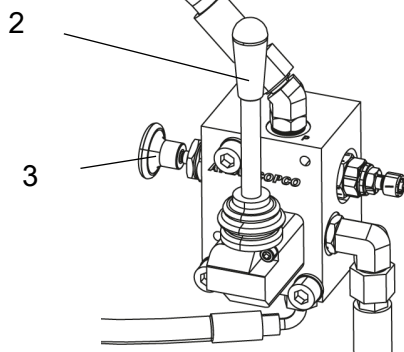


Fig. Brake disengagement pump

2. Pump arm

3. Brake release button

Brake release pump



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

The brake release pump has a protection (1) mounted which has to be removed before brake release.

For towing:

Press in the brake release button (3).

Pump with the arm (2) until the brakes are released.

The roller can now be towed.



After towing, pull the brake release button (3) out to apply the brakes.



If the diesel engine is once again in working order and starts, the brakes are reactivated if the supply pressure is reached.



The machine must not be moved at a speed higher than 3 km/h (2 mph), and no more than 300 meters (330 yards). Otherwise there is a risk of damaging the drives.

Towing the roller



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



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

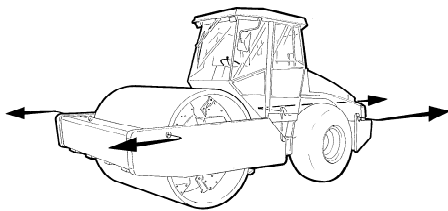


Fig. Towing

When towing/retrieving a machine, the towing device must be connected to both lifting holes. The pulling force must act longitudinally on the machine as shown in the figure. Maximum gross pulling force 401 kN (90148 lbf).



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

Roller prepared for transport



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

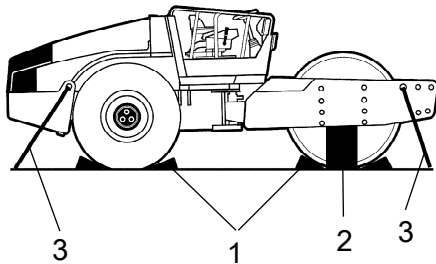


Fig. Transport
 1. Chock
 2. Block up
 3. Lashing wire

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

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

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



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

Operating instructions - Summary



1. Follow the **SAFETY INSTRUCTIONS** specified in the **Safety Manual**.
2. Make sure that all instructions in the **MAINTENANCE** section are followed.
3. Turn the master switch to the **ON** position.
4. Move the forward/reverse lever to the **NEUTRAL** position.
5. Set the switch for Manual/Automatic vibration to the **0** position.
6. Set the engine speed control to idle (900 rpm).
7. Start the engine and allow it to warm up.
8. Set the engine speed control to the operating position (2,200 rpm).
9. Set the emergency/parking brake knob in the pulled-out position.



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



11. **Test the brakes. Remember that the braking distance will be longer if the roller is cold.**
12. Use vibration only when the roller is in motion.



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

Preventive maintenance

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

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

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

Acceptance and delivery inspection

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

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

Any transport damage must be reported immediately to the transport company, as this is not covered by the product warranty.

Warranty

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

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

Maintenance - Lubricants and symbols

Fluid volumes

Rear axle		
- Differential	12,5 liter	13,2 qts
- Planetary gear	3,6 liters/side	3,17 qts/side
- Drop box	1,9 liter	2,0 qts/side
Drum gearbox	5 liter	5,3 qts
Drum cartridge	2,3 liters/side	2,1 qts
Hydraulic reservoir	52 liters	13,74 gal
Oil in hydraulic system	43 liters	45,4 qts
Lubrication oil, diesel engine	16,5 liter	17,4 qts
Coolant, diesel engine	26 liter	27,4 qts
















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



Other fuel and lubricants are required when operating in areas with extremely high or extremely low ambient temperatures. See the 'Special instructions' chapter, or consult Dynapac.

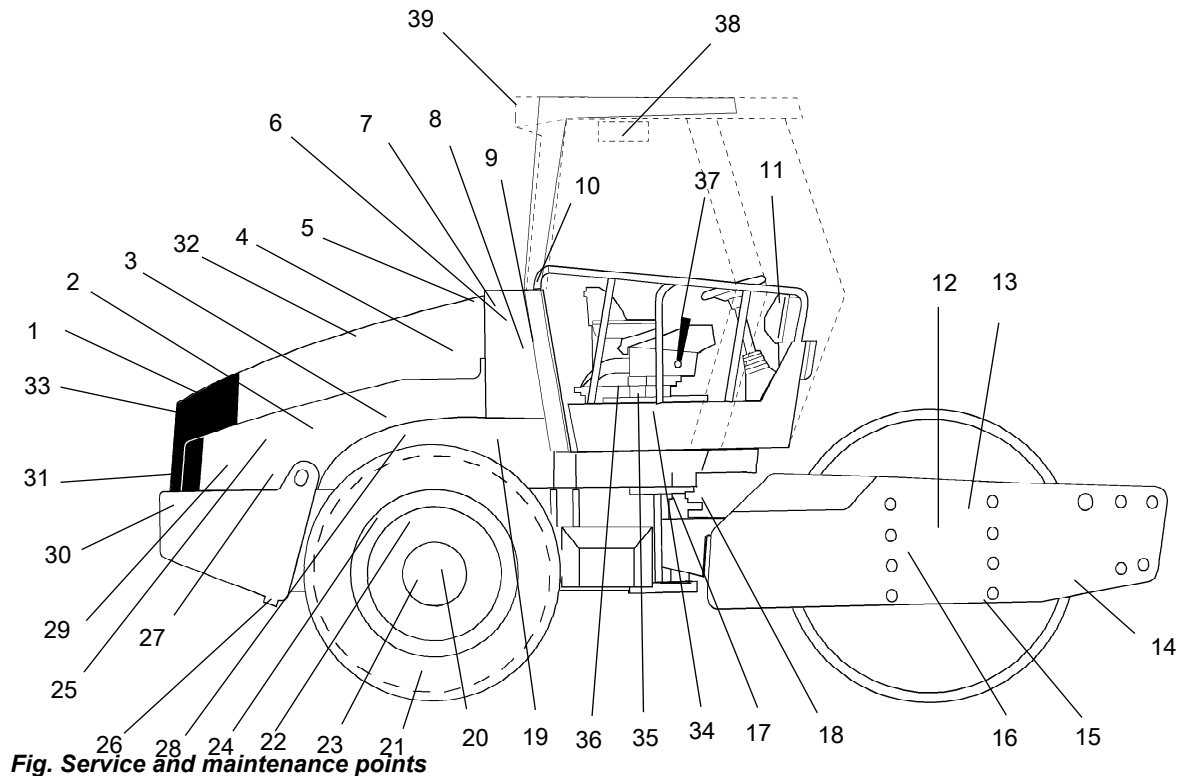
	ENGINE OIL	Air temperature -15°C - +50°C (5°F-122°F)	Dynapac Engine oil 200	P/N 4812161855 (5 liters), P/N 4812161856 (20 liters)
	HYDRAULIC FLUID	Air temperature -15°C - +50°C (5°F-122°F)	Dynapac Hydraulic 300	P/N 4812161868 (20 liters), P/N 4812161869 (209 liters)
	BIOLOGICAL HYDRAULIC FLUID, PANOLIN	Air temperature over +50°C (122°F) When it leaves the factory, the machine may be filled with biologically degradable fluid. The same type of fluid must be used when changing or topping up.	Shell Tellus S2 V100 or equivalent. PANOLIN HLP Synth 46 (www.panolin.com)	
	BIOLOGICAL HYDRAULIC FLUID	When it leaves the factory, the machine may be filled with biologically degradable fluid. The same type of fluid must be used when changing or topping up.	BP Biohyd SE-S46	
	DRUM OIL	Air temp. -15°C - +40°C (5°F-104°F)	Dynapac Drum Oil 1000	P/N 4812161887 (5 liters), P/N 4812161888 (20 liters)
	GREASE		Dynapac Roller Grease (0.4kg) for the articulated joint.	P/N 4812030096
			Shell Retinax LX2 or equivalent for other grease points.	
	FUEL	See engine manual.	-	-
	TRANSMISSION OIL	Air temperature -15°C - +40°C (5°F-104°F)	Dynapac Gear oil 300	P/N 4812161883 (5 liters), P/N 4812161884 (20 liters), P/N 4812161885 (209 liters)
		Air temperature 0°C (32°F) - above +40°C (104°F)	Shell Spirax AX 85W/140, API GL-5 or equivalent.	
	COOLANT	Anti-freeze protection down to about -37°C (-34.6°F)	Dynapac coolant 100 (mixed 50/50 with water)	P/N 4812161854

Maintenance symbols

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

Maintenance - Maintenance schedule

Service and maintenance points



- | | | |
|--|--|--------------------------------------|
| 1. Radiator grille | 14. Scrapers | 27. Engine suspension, 4 pcs. |
| 2. Oil level, diesel engine | 15. Drum oil, level plug, x2 | 28. Feed pump, fuel |
| 3. Fuel filter, fuel pre-filter | 16. Rubber elements and fastening screws | 29. Diesel fuel, filler |
| 4. Air filter | 17. Steering joint | 30. Battery |
| 5. Engine cover, hinges | 18. Steering cylinders, x2 | 31. Radiator |
| 6. Hydraulic reservoir, sight glass | 19. Flywheel casing, hydraulic pumps | 32. Hydraulic fluid cooler |
| 7. Bleeding filter | 20. Wheel nuts | 33. Drive belts, cooling, alternator |
| 8. Hydraulic filter, 2 pcs. | 21. Tires, pressure | 34. Steering chain |
| 9. Drainage, hydraulic fluid reservoir | 22. Rear axle, differential and drop box | 35. Seat bearing |
| 10. Hydraulic fluid, filling | 23. Rear axle, planetary gears, 2 pcs. | 36. Steering chain |
| 11. Fuse box | 24. Rear axle suspension, 2 sides | 37. Forward/reverse lever |
| 12. Drum cartridge, filling, 2 fillers | 25. Oil filter, diesel engine | 38. Fresh air filter * |
| 13. Drum gearbox | 26. Drainage, fuel tank | 39. Air conditioning * |
- * Optional equipment

General

Periodic maintenance should be carried out after the number of hours specified. Use the daily, weekly etc. periods where number of hours cannot be used.

Maintenance - Maintenance schedule



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



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

Specific maintenance and checks on diesel engines must be carried out by the engine supplier's certified personnel.

Every 10 hours of operation (Daily)

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

Pos. in fig	Action	Comment
	Before starting up for the first time on that day	
14	Check the scraper setting	
1	Check for free circulation of cooling air	
31	Check coolant level	Refer to the engine manual
2	Check the engine oil level	Refer to the engine manual
29	Refuel	
6	Check fluid level in hydraulic reservoir	
	Test the brakes	

After the FIRST 50 hours of operation

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

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

Every 50 hours of operation (Weekly)

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

Pos. in fig	Action	Comment
	Check that hoses and couplings are not leaking	
4	Inspect/clean the filter element in the air cleaner	Replace as required
20	Check the wheel-nuts are tightened	
21	Check the tire pressure	
39	Check the AC	Optional

Every 250 / 750 / 1250 / 1750 hours of operation

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

Pos. in fig	Action	Comment
22	Check oil level in rear axle differential and drop box	
23	Check oil level in rear axle planetary gearing	
13	Check oil level in drum gearbox	
15	Check oil level in the drum cartridge	
32	Clean the coolers	
20, 24	Check the bolted joints	The above applies to new or reconditioned components only
16	Check rubber elements and bolted joints	
30	Check battery	
39	Check the AC	Optional

Every 500 / 1500 hours of operation

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

Pos. in fig	Action	Comment
22	Check oil level in rear axle differential and drop box	
23	Check oil level in rear axle planetary gearing	
13	Check oil level in drum gearbox	
15	Check oil level in the drum cartridge	
32	Clean the coolers	
20, 24	Check the bolted joints	The above applies to new or reconditioned components only
16	Check rubber elements and bolted joints	
30	Check battery	
39	Check the AC	Optional
3	Replace the fuel filter	Refer to the engine manual
5	Lubricate controls and joints	
3	Clean the fuel pre-filter.	
25	Change the engine oil and oil filter	Refer to the engine manual
36	Grease the steering chain	Optional
35	Grease the chair bearing	Optional

Every 1000 hours of operation

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

Pos. in fig	Action	Comment
13	Check oil level in drum gearbox	
15	Check oil level in the drum cartridge	
32	Clean the coolers	
20, 24	Check the bolted joints	The above applies to new or reconditioned components only
16	Check rubber elements and bolted joints	
30	Check battery	
39	Check the AC	Optional
3	Replace the fuel filter	Refer to the engine manual
5	Lubricate controls and joints	
3	Clean the fuel pre-filter	
25	Change the engine oil and oil filter	Refer to the engine manual
36	Grease the steering chain	Optional
35	Grease the chair bearing	Optional
7	Check bleeder filter on hydraulic reservoir	
8	Change the hydraulic fluid filter	
9	Drain the condensate from hydraulic reservoir	
26	Drain condensate from fuel tank	
22	Change oil in rear axle differential and drop box	
23	Change oil in the rear axle planetary gearing	
38	Replace the fresh air filter in the cab	Optional
	Check engine valve clearances	Refer to the engine manual
33	Check belt tension in the drive belt system	Refer to the engine manual
	Steering hitch - Tightening	

Maintenance - Maintenance schedule

Every 2000 hours of operation

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

Pos. in fig	Action	Comment
32	Clean the coolers	
20, 24	Check the bolted joints	The above applies to new or reconditioned components only
16	Check rubber elements and bolted joints	
30	Check battery	
39	Check the AC	Optional
3	Replace the fuel filter	Refer to the engine manual
5	Lubricate controls and joints	
3	Clean the fuel pre-filter	
25	Change the engine oil and oil filter	Refer to the engine manual
36	Grease the steering chain	Optional
35	Grease the chair bearing	Optional
7	Check bleeder filter on hydraulic reservoir	
8	Change the hydraulic fluid filter	
9	Drain the condensate from hydraulic reservoir	
26	Drain condensate from fuel tank	
22	Change oil in rear axle differential and drop box	
23	Change oil in the rear axle planetary gearing	
38	Replace the fresh air filter in the cab	Optional
	Check engine valve clearances	Refer to the engine manual
33	Check belt tension in the drive belt system	Refer to the engine manual
	Steering hitch - Tightening	
9	Change the hydraulic fluid	
10	Change the hydraulic fluid	
12	Change the oil in the drum cartridge	
15	Change the oil in the drum cartridge	
13	Change the oil in the drum gearbox	
37	Lubricate the Forward/Reverse lever	
17	Checking the steering hitch	
18	Checking the steering cylinders	
39	Overhaul air conditioning	Optional

Every other year

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

Pos. in fig	Action	Comment
31	Change the coolant (glycol)	

Service - Checklist

Pos	Action	After the first 50 hours of operation (Daily)	Every 10 hours of operation (Daily)	Every 50 hours of operation (Weekly)	Every 250 hours of operation	Every 500 hours of operation	Every 750 hours of operation	Every 1000 hours of operation	Every 1250 hours of operation	Every 1500 hours of operation	Every 1750 hours of operation	Every 2000 hours of operation	Every 24 months	NOTE
1	Check for free circulation of cooling air	○												Refer to the engine manual
30	Check/Change coolant level	○												Refer to the engine manual
2	Check the engine oil level	○												
28	Refuel	○												
6/9	Check/Change fluid level in hydraulic reservoir	○												
	Test the brakes	○												
2/25	Change the engine oil and oil filter	●												Refer to the engine manual
3	Replace the fuel filter	●												Refer to the engine manual
8	Change the hydraulic fluid filter	●												Refer to the engine manual
	Check that hoses and couplings are not leaking													
14	Check the scraper setting													
4	Inspect/clean the filter element in the air cleaner													
20	Check the wheel-nuts are tightened													
21	Check the tire pressure													
	Check the oil level /Change the oil in rear axle/planetary gears													Replace as required
23/22	Check the oil level/Change the oil in the rear axle pinion housing													
22	Check the oil level/Change the oil in the drum													
15/13	Clean the coolers													
30	Adjust the engine drive belt													
	Check the air intake hoses													
16	Check rubber elements and bolted joints													
29	Check battery													
32	Lubricate controls and joints													
7	Check/Change bleeder filter on hydraulic reservoir													
31	Check/Change belt tension/drive belt system													
	Cleaning the water separator													Refer to the engine manual
9	Drain the condensate from hydraulic reservoir													
26	Drain condensate from fuel tank													
22	Change oil in rear axle differential													
	Change drive belt													
	Valve adjustment, engine													
	Change oil separator element													
17	Check the steering joint													

○ Check ● Change

Maintenance, 10h

Every 10 hours of operation (Daily)



***Park the roller on a level surface.
The engine must be switched off and the
parking brake activated when checking or
adjusting the roller, unless otherwise specified.***



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

Scrapers - Check, adjustment



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

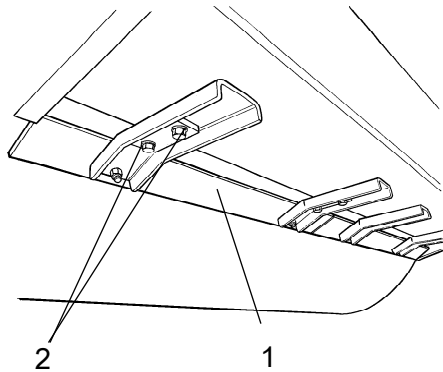


Fig. Scrapers
1. Scraper blades (x4)
2. Screws

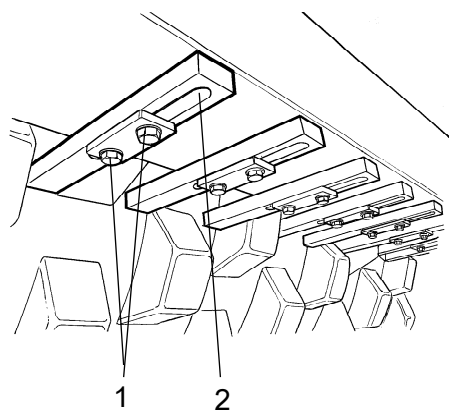
If necessary, adjust distance to the drum as follows:

Loosen the screws (2) on the scraper attachment.

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

Tighten the screws (2).

Repeat the procedure for the other scraper blades (x4).



Scrapers, Pad-drum

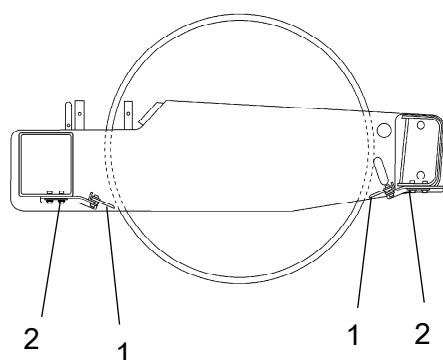
Undo the screws (1), then adjust each scraper tooth (2) to 25 mm (1.0 in) between scraper tooth and drum.

Center each scraper tooth (2) between the pads.

Tighten the screws (1).

Fig. Scrapers

- 1. Screws
- 2. Scraper teeth (x18)



Flexible scrapers (Optional)

Loosen the screws (2).

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

Tighten the screws (2).

Fig. Scrapers

- 1. Scraper blade
- 2. Screws

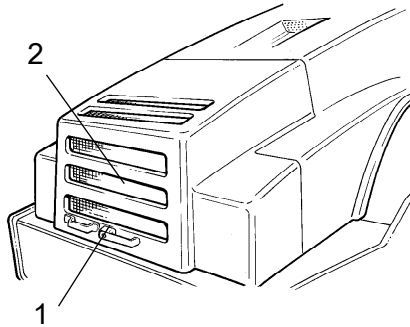


Fig. Engine hood
1. Hood lock
2. Protective grille

Air circulation - Check

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

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



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



Coolant level - Check

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



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

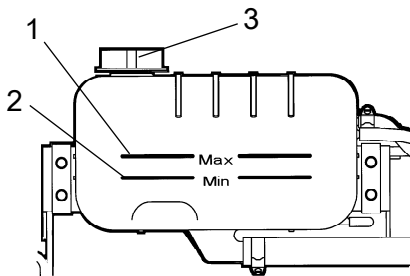


Fig. Water tank
1. Max. level
2. Min. level
3. Filler cap

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



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



Diesel engine Check oil level



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

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

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

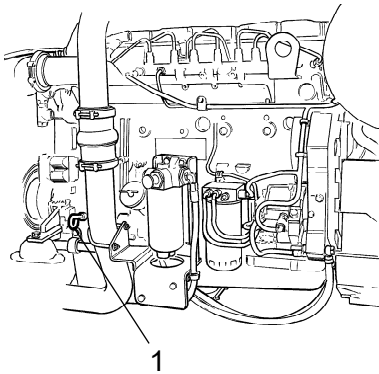


Fig. Engine compartment
1. Dipstick



Hydraulic reservoir - Check fluid level

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

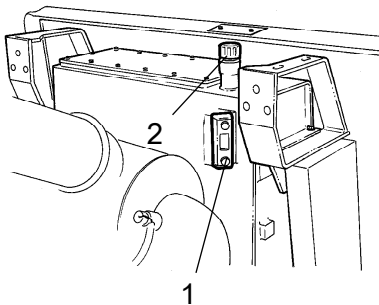


Fig. Hydraulic reservoir
1. Sight glass
2. Filler pipe

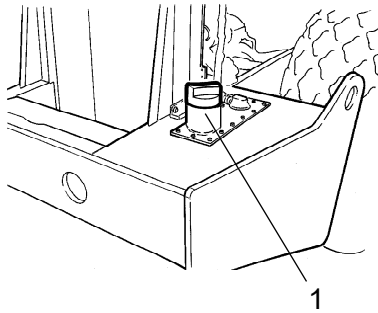
**Fuel tank - Filling**

Fig. Fuel tank
1. Filler pipe

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



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



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

The tank holds 320 liters (84.5 gal) of fuel.

Brakes - Check



Check the brakes by carrying out the following :

Checking the emergency stop

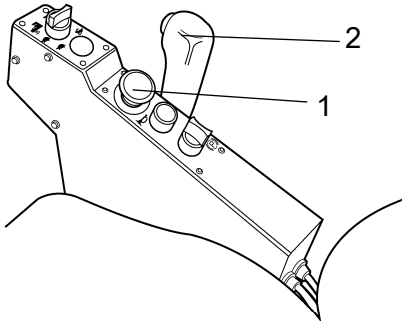


Fig. Control panel
 1. Emergency stop
 2. Forward/Reverse lever

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

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

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

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

The roller is now ready for operation.

Checking the parking brake

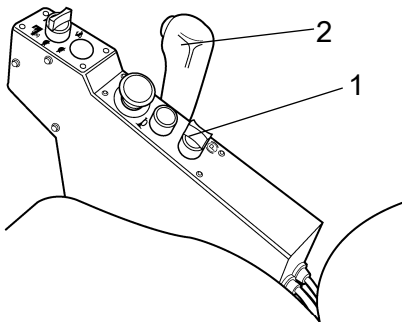


Fig. Control panel
 1. Parking brake knob
 2. Forward/Reverse lever

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

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

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

Reset the parking brake knob (1).

The roller is now ready for operation.

See also Operating section in the manual.

Maintenance - 50h

Every 50 hours of operation (Weekly)



**Park the roller on a level surface.
The engine must be switched off and the parking brake activated when checking or adjusting the roller, unless otherwise specified.**



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



Air cleaner

Checking - Change the main air filter



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

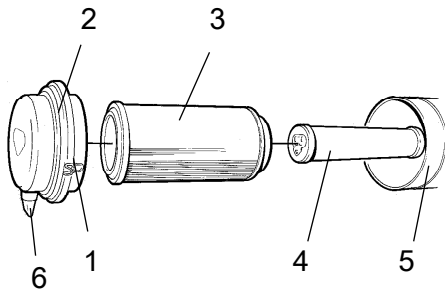


Fig. Air cleaner

- 1. Clips**
- 2. Cover**
- 3. Main filter**
- 4. Backup filter**
- 5. Filter housing**
- 6. Dust valve**

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

Do not remove the backup filter (4).

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

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

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

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



Backup filter - Change

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

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

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

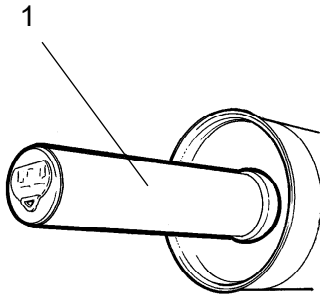


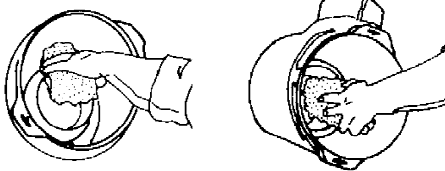
Fig. Air filter
1. Backup filter



Air cleaner - Cleaning

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

Wipe clean on both sides of the outlet pipe.



Inner edge of outlet pipe.

Outer edge of outlet pipe.

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



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



Tires - Air pressure - Wheel nuts - Tightening

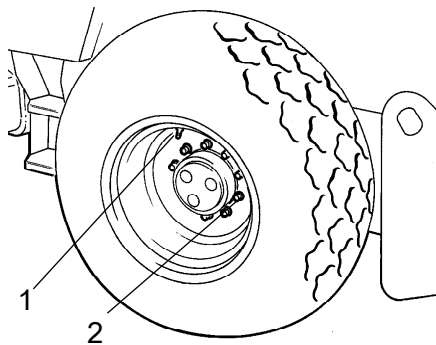


Fig. Wheels
1. Air valve
2. Wheel nut

Check the tire pressures using a pressure gauge.

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

Recommended pressure: See Technical Specifications.

Check the tire pressure.



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

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

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



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



Automatic Climate Control (Optional) - Inspection

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



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

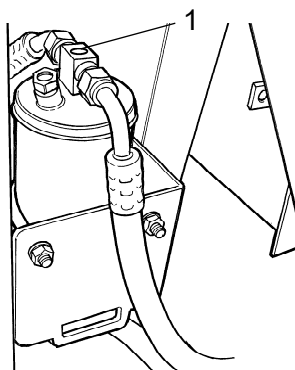
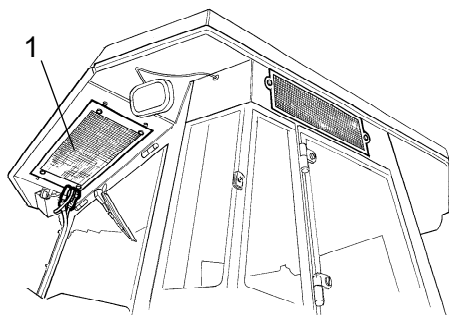


Fig. Drying filter
1. Sight glass

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

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



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

Fig. Cab
1. Condensor element

Maintenance measures - 250 h

Every 250/750/1250/1750..... hours of operation (every 3 months)



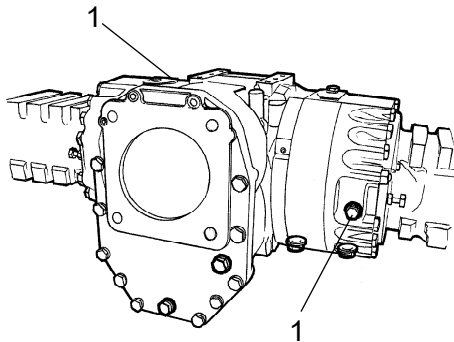
***Park the roller on a level surface.
The engine must be switched off and the
parking brake activated when checking or
adjusting the roller, unless otherwise specified.***



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

**Rear axle differential - Check oil level**

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



***Fig. Level check - differential housing
1. Level/Filler plugs (2 pcs)***

Wipe clean and remove the level/filler plugs (1) and check that the oil level reaches the lower edge of the plug hole. The plugs are located on the front- and rear side of the axle. Top off with oil to the right level if the level is low. Use transmission oil according to the lubricant specification.

Clean and refit the plug.



Rear axle drop box - Check oil level



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

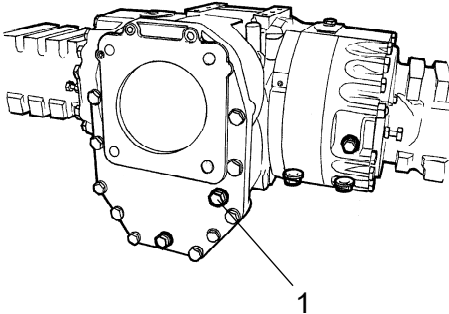


Fig. Level check - drop box
1. Level/Filler plug

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

Clean and refit the plug.



Rear axle planetary gears - Check oil level

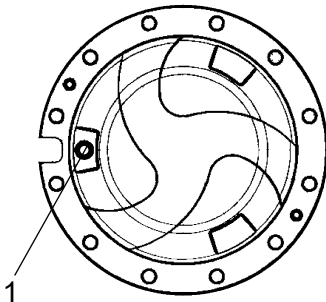


Fig. Level check - planetary gear
1. Level/Filler plug

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

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

Clean and refit the plug.

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



Drum gearbox - Checking the oil level

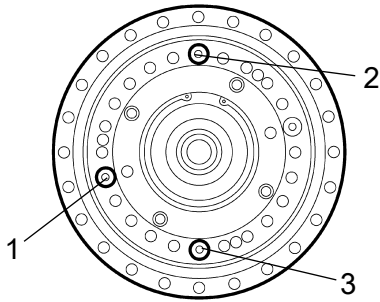


Fig. Oil level check - drum gearbox

1. Level plug
2. Filler plug
3. Drain plug

Wipe clean the area around the level plug (1) and then undo the plug.

Ensure that the oil level reaches up to the lower edge of the plug hole.

Top off with oil to the right level if the level is low. Use transmission oil according to the lubricant specification.

Position the drum so that the filler plug (2) is straight up.

Clean and refit the plugs.



Drum cartridge - Checking the oil level

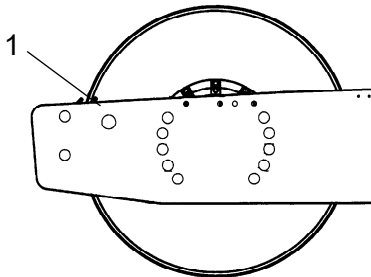


Fig. Left drum side

1. Indicator pin

Position the machine level so that the indicator pin (1) on the inside of the drum is aligned with the top of the drum frame.

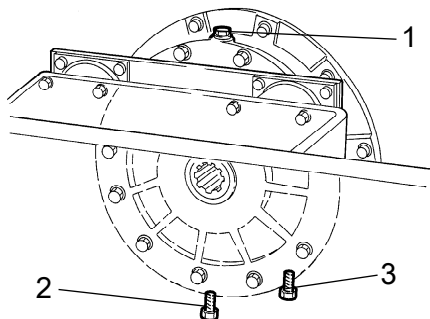


Fig. Right drum side

1. Filler plug
2. Drain plug
3. Level plug

Wipe clean the filler plug (1) and level plug (3).

Unscrew the filler plug (1).

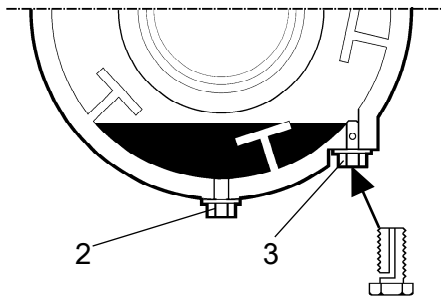


Fig. Drum cartridge
 2. Drain plug
 3. Level plug

Then loosen the level plug (3) on the underside of the cartridge and unscrew it until the hole in the middle of the plug becomes visible.

Top off with oil through the filler plug (1), until oil begins to run out from the level plug's (3) hole. The level is correct when it stops running.



Ensure that only Dynapac Drum oil 1000 is used in the cartridges..



Do not overfill with oil - risk for overheating.

Clean and refit the plugs. Now repeat the procedure on the opposite side.

Drum cartridge - Cleaning the ventilation screw

Clean the drum's ventilation hole and ventilation screw (1). The hole is required to eliminate excess pressure inside the drum.

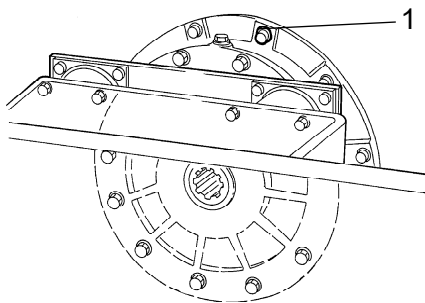


Fig. Drum
 1. Ventilation screw

Radiator - Check/Cleaning

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

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

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



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

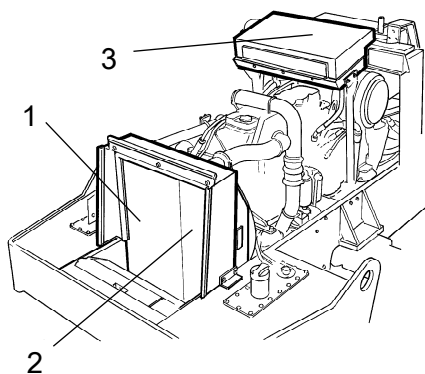


Fig. Engine compartment
 1. Water cooler
 2. Charge air cooler
 3. Hydraulic fluid cooler



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

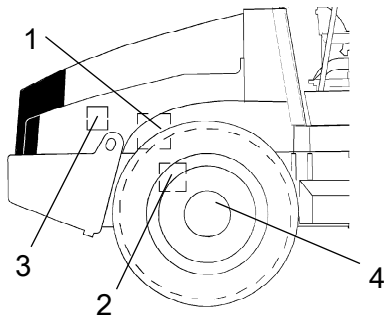


Fig. Right side of machine

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

Bolted joints - Checking tightening torque

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

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

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

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

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

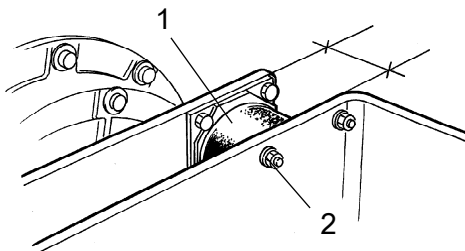


Fig. Drum, vibration side

1. Rubber element
2. Fastening screws

Rubber elements and fastening screws - Check

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

Check using a knife blade or pointed object.

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



Battery - Check electrolyte level



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

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

Raise the battery cover (2).

Wipe the top of the battery.



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

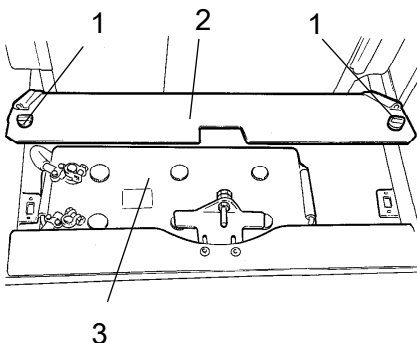


Fig. Battery shelf

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



Battery cell

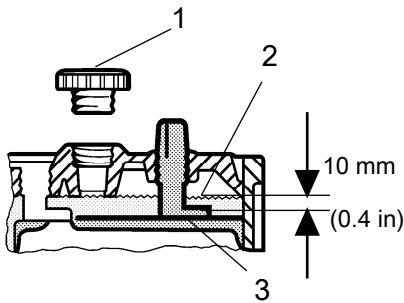


Fig. Electrolyte level in battery

1. Cell cap
2. Electrolyte level
3. Plate

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

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

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

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



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



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



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

Air conditioning (Optional)

- Inspection

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

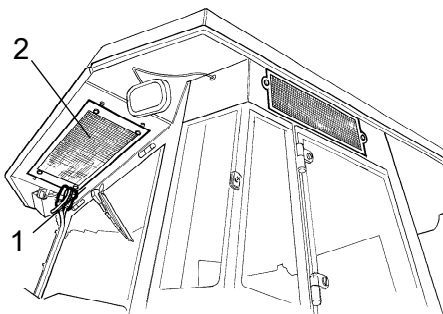


Fig. Air conditioning

1. Refrigerant hoses
2. Condensor element

Maintenance measures - 500 h

Every 500/1500..... hours of operation (every six months)



***Park the roller on a level surface.
The engine must be switched off and the parking brake activated when checking or adjusting the roller, unless otherwise specified.***



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

**Replacing the fuel filter**

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

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



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

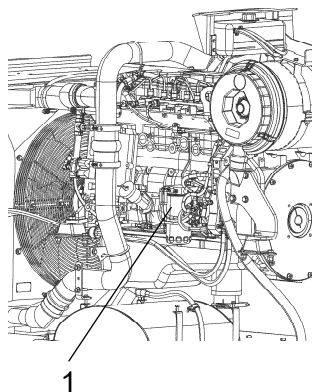


Fig. Engine compartment
1. Fuel filter

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



Rear axle differential - Check oil level



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

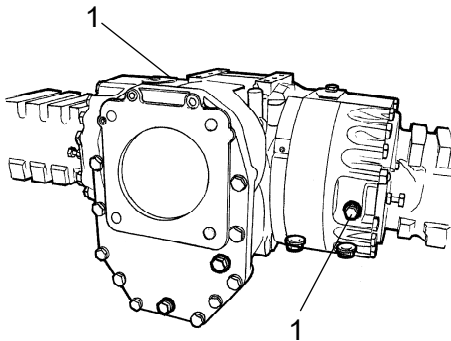


Fig. Level check - differential housing
1. Level/Filler plugs (2 pcs)

Wipe clean and remove the level/filler plugs (1) and check that the oil level reaches the lower edge of the plug hole. The plugs are located on the front- and rear side of the axle. Top off with oil to the right level if the level is low. Use transmission oil according to the lubricant specification.

Clean and refit the plug.



Rear axle drop box - Check oil level



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

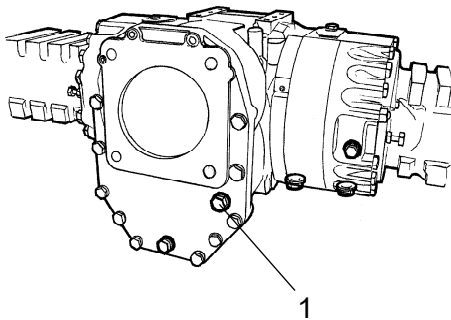


Fig. Level check - drop box
1. Level/Filler plug

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

Clean and refit the plug.



Rear axle planetary gears - Check oil level

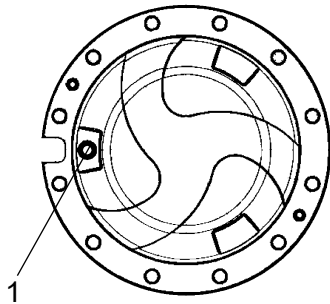


Fig. Level check - planetary gear
1. Level/Filler plug

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

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

Clean and refit the plug.

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



Drum gearbox - Checking the oil level

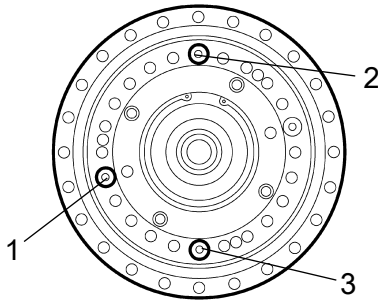


Fig. Oil level check - drum gearbox
1. Level plug
2. Filler plug
3. Drain plug

Wipe clean the area around the level plug (1) and then undo the plug.

Ensure that the oil level reaches up to the lower edge of the plug hole.

Top off with oil to the right level if the level is low. Use transmission oil according to the lubricant specification.

Position the drum so that the filler plug (2) is straight up.

Clean and refit the plugs.



Drum cartridge - Checking the oil level

Position the machine level so that the indicator pin (1) on the inside of the drum is aligned with the top of the drum frame.

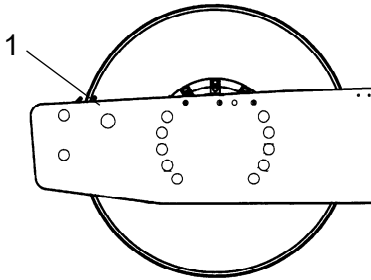


Fig. Left drum side
 1. Indicator pin

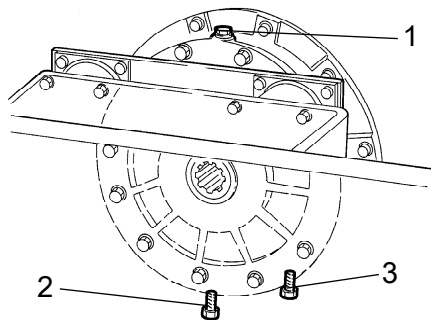


Fig. Right drum side
 1. Filler plug
 2. Drain plug
 3. Level plug

Wipe clean the filler plug (1) and level plug (3).

Unscrew the filler plug (1).

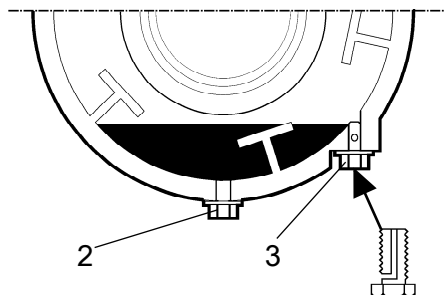


Fig. Drum cartridge
 2. Drain plug
 3. Level plug

Then loosen the level plug (3) on the underside of the cartridge and unscrew it until the hole in the middle of the plug becomes visible.

Top off with oil through the filler plug (1), until oil begins to run out from the level plug's (3) hole. The level is correct when it stops running.



Ensure that only Dynapac Drum oil 1000 is used in the cartridges..



Do not overfill with oil - risk for overheating.

Clean and refit the plugs. Now repeat the procedure on the opposite side.

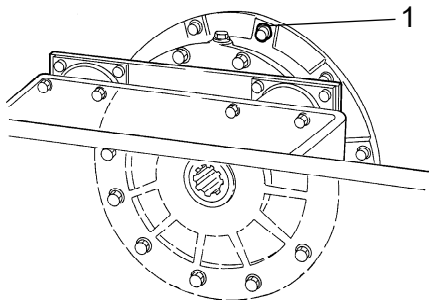


Fig. Drum
1. Ventilation screw

Drum cartridge - Cleaning the ventilation screw

Clean the drum's ventilation hole and ventilation screw (1). The hole is required to eliminate excess pressure inside the drum.

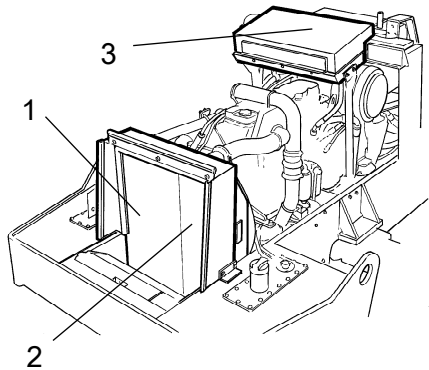


Fig. Engine compartment
1. Water cooler
2. Charge air cooler
3. Hydraulic fluid cooler

Radiator - Check/Cleaning

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

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

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



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



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

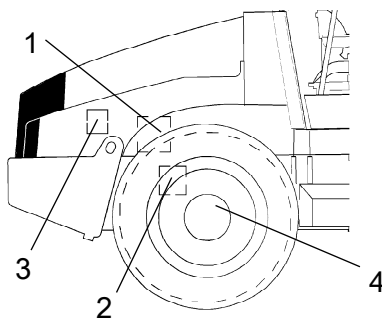


Fig. Right side of machine
1. Steering pump
2. Rear axle
3. Engine suspension
4. Wheel nuts

Bolted joints - Checking tightening torque

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

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

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

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

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

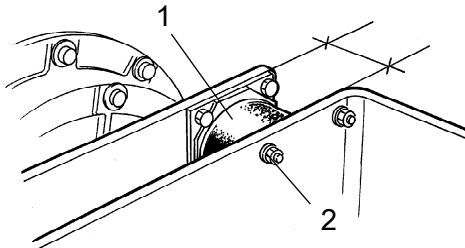


Fig. Drum, vibration side
 1. Rubber element
 2. Fastening screws

Rubber elements and fastening screws - Check

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

Check using a knife blade or pointed object.

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

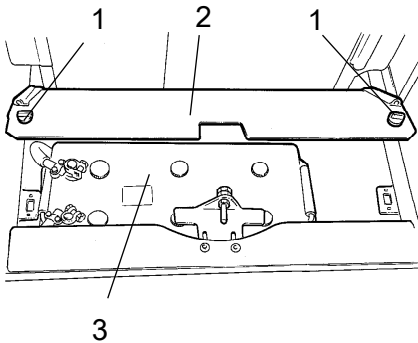


Fig. Battery shelf
 1. Quick-screws
 2. Battery cover
 3. Battery

Battery - Check electrolyte level



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

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

Raise the battery cover (2).

Wipe the top of the battery.



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



Battery cell

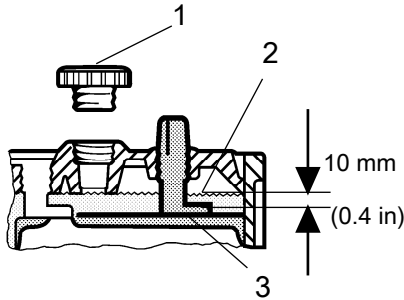


Fig. Electrolyte level in battery

- 1. Cell cap
- 2. Electrolyte level
- 3. Plate

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

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

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

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



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



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



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

Air conditioning (Optional)

- Inspection

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

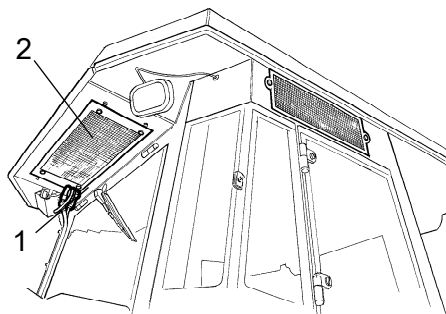


Fig. Air conditioning

- 1. Refrigerant hoses
- 2. Condenser element



Controls and moving joints - Lubrication

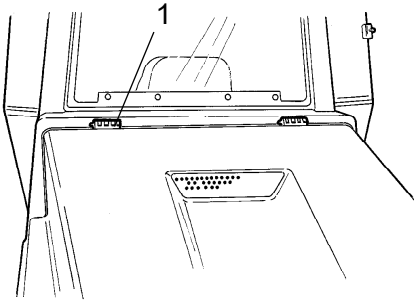


Fig. Engine hood
1. Hinge

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



Fuel pre-filter - Cleaning



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

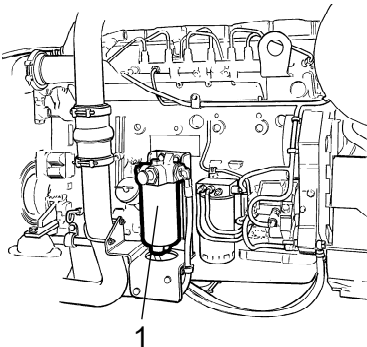


Fig. Engine compartment
1. Fuel prefilter

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



Diesel engine - Oil and Filter change



Take great care when draining warm fluid and oil. Wear protective gloves and goggles.

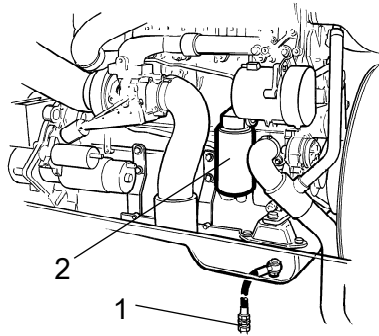


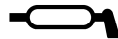
Fig. Left side of engine
1. Drain plug
2. Oil filter

The oil drain plug (1) is most easily accessible from the bottom of the engine and is located attached to a hose on the rear axle.. Drain the oil when the engine is warm. Place a receptacle that holds at least 19 liters (5 gal) under the drain plug.

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



Deliver the drained oil and filter to environmentally correct handling.



Steering chain and seat bearing - Lubrication

Optional on rollers without cab



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

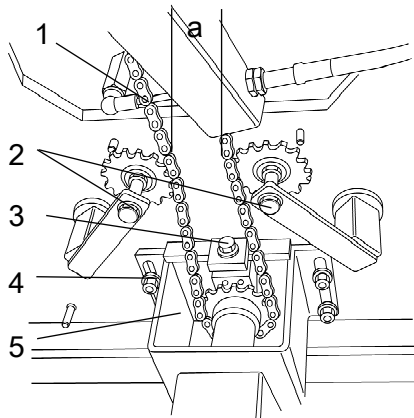
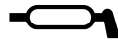


Fig. Underneath operator's position
1. Steering chain
2. Chain-tightening device
3. Adjusting nut
4. Nuts
5. Control valve mount

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

It is not necessary to remove the chain.

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



Seat bearing - Lubrication

Optional on rollers without cab



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

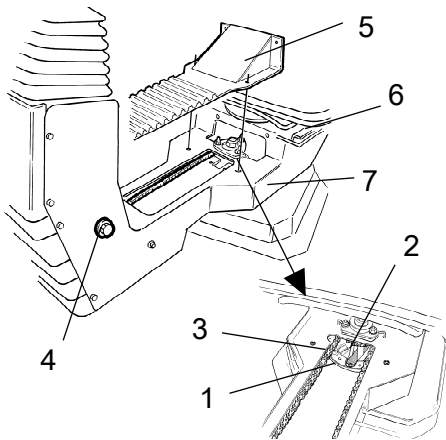


Fig. Seat bearing
 1. Grease nipple
 2. Cogwheel
 3. Steering chain
 4. Adjusting screw
 5. Cover
 6. Slide rails
 7. Slew interlock

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

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

Also grease the seat slide rails (6).



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

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

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

Maintenance - 1000h

Performed after 1000 operating hours (each year)



***Park the roller on a level surface.
The engine must be switched off and the
parking brake activated when checking or
adjusting the roller, unless otherwise specified.***



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

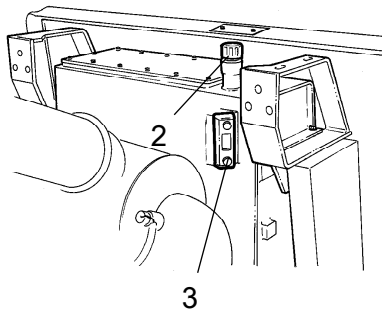
**Hydraulic filter - Replacement**

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

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

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

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



***Wear protective goggles when working with
compressed air.***



Rear axle differential - Check oil level



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

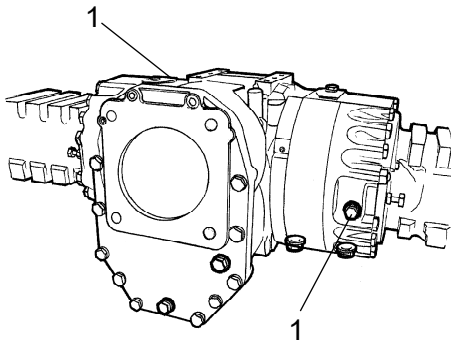


Fig. Level check - differential housing
1. Level/Filler plugs (2 pcs)

Wipe clean and remove the level/filler plugs (1) and check that the oil level reaches the lower edge of the plug hole. The plugs are located on the front- and rear side of the axle. Top off with oil to the right level if the level is low. Use transmission oil according to the lubricant specification.

Clean and refit the plug.



Rear axle drop box - Check oil level



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

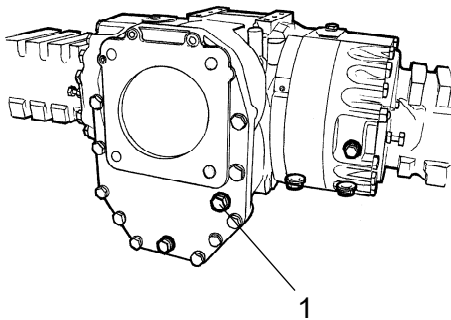


Fig. Level check - drop box
1. Level/Filler plug

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

Clean and refit the plug.



Rear axle planetary gears - Check oil level

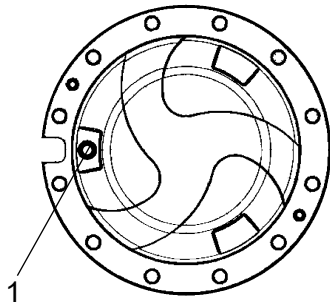


Fig. Level check - planetary gear
1. Level/Filler plug

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

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

Clean and refit the plug.

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



Drum gearbox - Checking the oil level

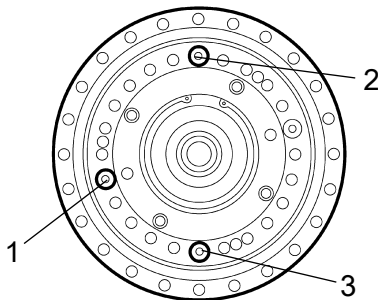


Fig. Oil level check - drum gearbox
1. Level plug
2. Filler plug
3. Drain plug

Wipe clean the area around the level plug (1) and then undo the plug.

Ensure that the oil level reaches up to the lower edge of the plug hole.

Top off with oil to the right level if the level is low. Use transmission oil according to the lubricant specification.

Position the drum so that the filler plug (2) is straight up.

Clean and refit the plugs.



Drum cartridge - Checking the oil level

Position the machine level so that the indicator pin (1) on the inside of the drum is aligned with the top of the drum frame.

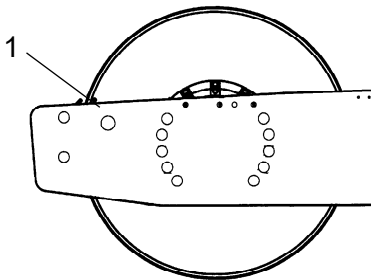


Fig. Left drum side
 1. Indicator pin

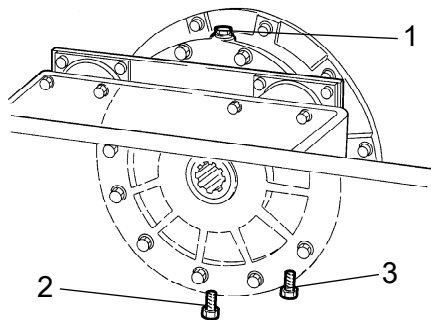


Fig. Right drum side
 1. Filler plug
 2. Drain plug
 3. Level plug

Wipe clean the filler plug (1) and level plug (3).

Unscrew the filler plug (1).

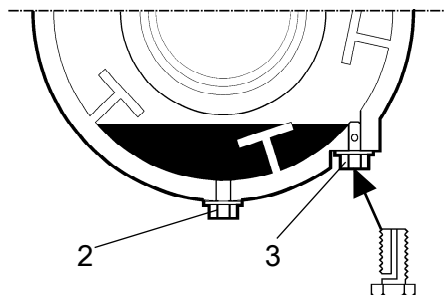


Fig. Drum cartridge
 2. Drain plug
 3. Level plug

Then loosen the level plug (3) on the underside of the cartridge and unscrew it until the hole in the middle of the plug becomes visible.

Top off with oil through the filler plug (1), until oil begins to run out from the level plug's (3) hole. The level is correct when it stops running.



Ensure that only Dynapac Drum oil 1000 is used in the cartridges..



Do not overfill with oil - risk for overheating.

Clean and refit the plugs. Now repeat the procedure on the opposite side.

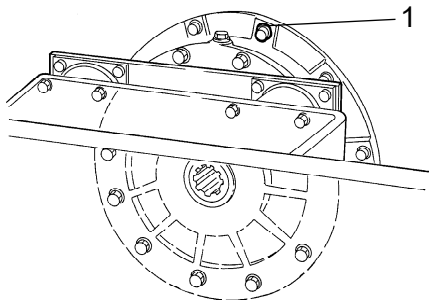


Fig. Drum
1. Ventilation screw

Drum cartridge - Cleaning the ventilation screw

Clean the drum's ventilation hole and ventilation screw (1). The hole is required to eliminate excess pressure inside the drum.

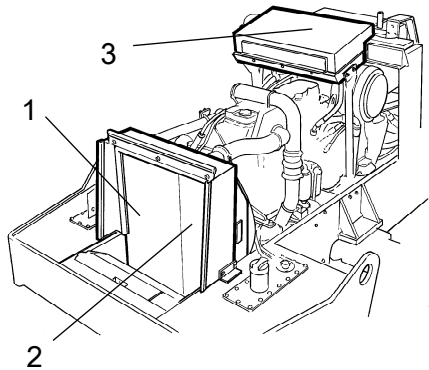


Fig. Engine compartment
1. Water cooler
2. Charge air cooler
3. Hydraulic fluid cooler

Radiator - Check/Cleaning

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

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

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



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



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

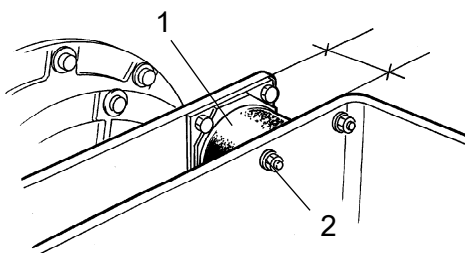


Fig. Drum, vibration side
1. Rubber element
2. Fastening screws

Rubber elements and fastening screws - Check

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

Check using a knife blade or pointed object.

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



Battery - Check electrolyte level



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

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

Raise the battery cover (2).

Wipe the top of the battery.



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

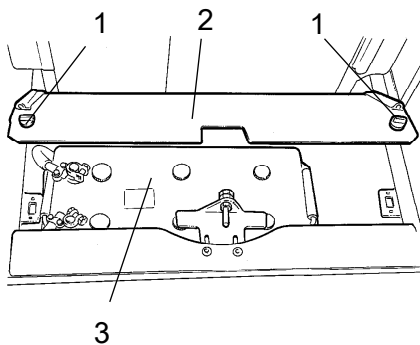


Fig. Battery shelf
 1. Quick-screws
 2. Battery cover
 3. Battery



Battery cell

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

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

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

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



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

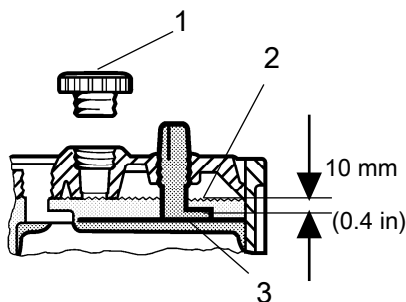


Fig. Electrolyte level in battery
 1. Cell cap
 2. Electrolyte level
 3. Plate



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



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

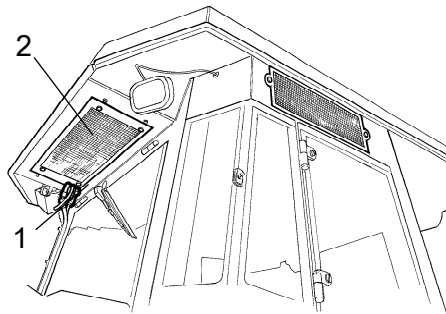


Fig. Air conditioning
1. Refrigerant hoses
2. Condensor element

Air conditioning (Optional) **- Inspection**

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



Replacing the fuel filter



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

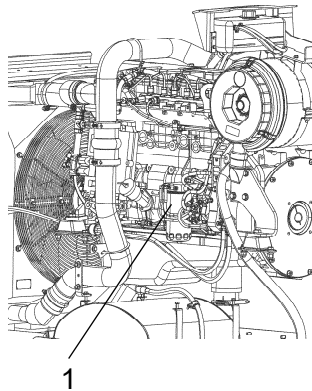


Fig. Engine compartment
1. Fuel filter

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



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

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



Controls and moving joints - Lubrication

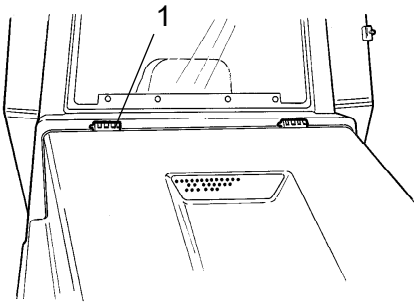


Fig. Engine hood
1. Hinge

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



Fuel pre-filter - Cleaning



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

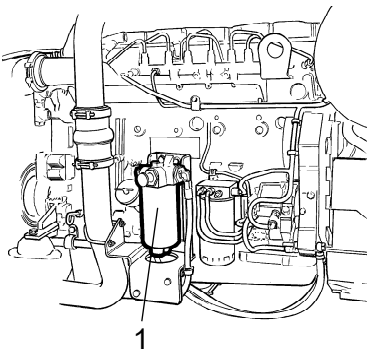


Fig. Engine compartment
1. Fuel prefilter

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



Diesel engine - Oil and Filter change



Take great care when draining warm fluid and oil. Wear protective gloves and goggles.

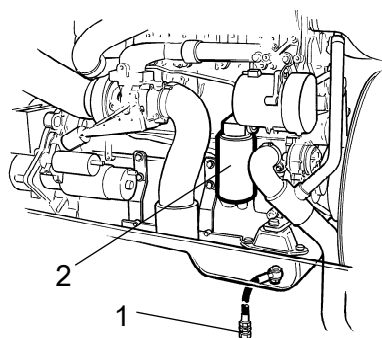


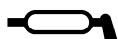
Fig. Left side of engine
1. Drain plug
2. Oil filter

The oil drain plug (1) is most easily accessible from the bottom of the engine and is located attached to a hose on the rear axle.. Drain the oil when the engine is warm. Place a receptacle that holds at least 19 liters (5 gal) under the drain plug.

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



Deliver the drained oil and filter to environmentally correct handling.



Steering chain and seat bearing - Lubrication

Optional on rollers without cab



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

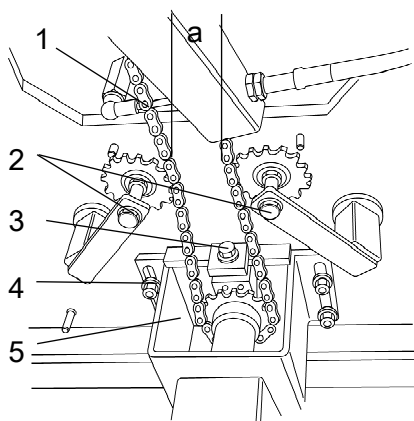
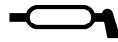


Fig. Underneath operator's position
1. Steering chain
2. Chain-tightening device
3. Adjusting nut
4. Nuts
5. Control valve mount

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

It is not necessary to remove the chain.

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



Seat bearing - Lubrication

Optional on rollers without cab



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

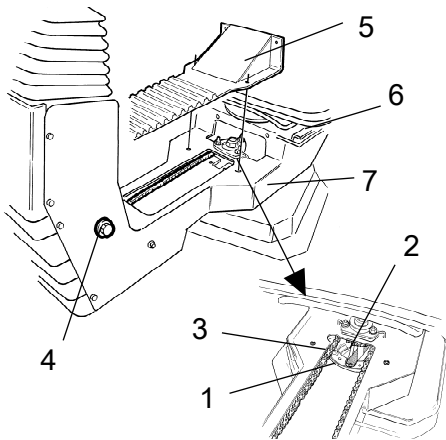


Fig. Seat bearing
 1. Grease nipple
 2. Cogwheel
 3. Steering chain
 4. Adjusting screw
 5. Cover
 6. Slide rails
 7. Slew interlock

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

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

Also grease the seat slide rails (6).



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

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

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

Bolted joints - Checking tightening torque

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

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

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

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

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

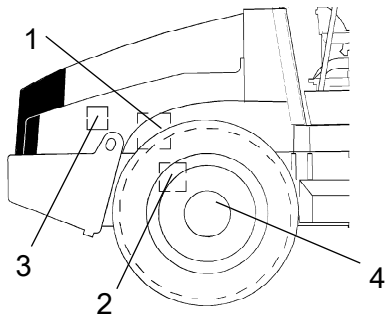


Fig. Right side of machine
 1. Steering pump
 2. Rear axle
 3. Engine suspension
 4. Wheel nuts

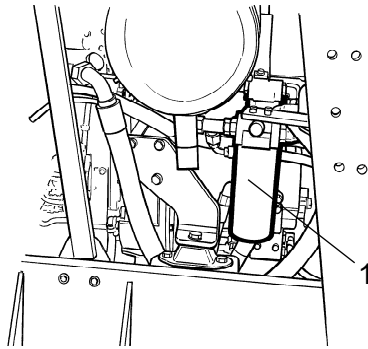


Fig. Engine compartment
1. Hydraulic fluid filter (x2).

Clean thoroughly around the oil filters.



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



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

Thoroughly clean the sealing surfaces of the filter holders.

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



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

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



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



Hydraulic reservoir - Draining

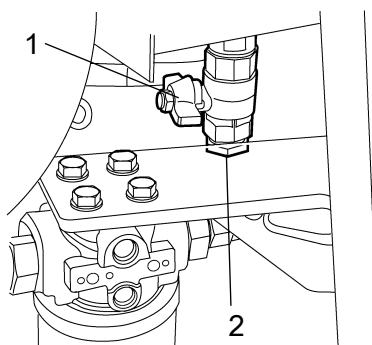


Fig. Underside of hydraulic reservoir
1. Drainage tap
2. Plug

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

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

Remove the plug (2).

Place a container under the tap.

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

Shut the drainage tap.

Refit the plug.



Fuel tank - Drainage

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



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

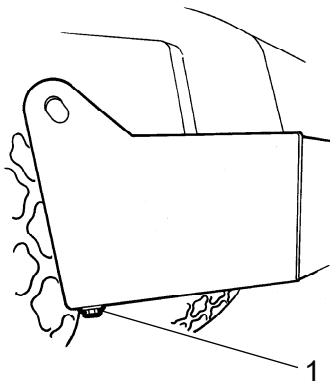


Fig. Fuel tank
1. Drain plug

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

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

Place a container under the plug (1).

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



Rear axle differential - Oil change



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

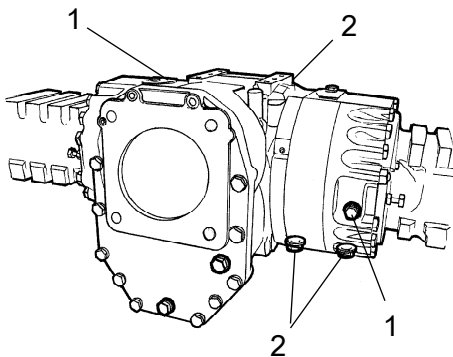


Fig. Rear axle
1. Level/Filler plugs (2 pcs)
2. Drain plugs (3 pcs)

Wipe clean and remove the level/filler plugs (1) and all three drain plugs (2) and drain the oil into a suitable receptacle. The level/filler plugs are located on the front- and rear side of the axle and the drain plugs are located on the underside and rear side of the axle. The volume is approximately 12.5 liters (13.2 qts).



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

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



Rear axle drop box - Oil change



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

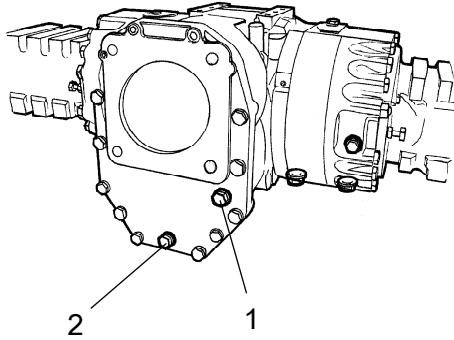


Fig. Drop box
1. Level/Filler plug
2. Drain plug

Wipe clean and remove the level/filler plug (1) and all three drain plugs (2) and drain the oil into a suitable receptacle. The volume is approximately 1,9 liters (2,0 qts).



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

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



Rear axle planetary gear - Oil change

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

Wipe clean, unscrew the plug (1) and drain the oil into a suitable receptacle. The volume is approximately 3,6 liters (3,17 qts).



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

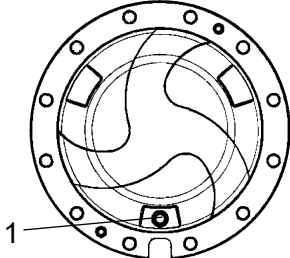


Fig. Planetary gear/drainage position
1. Plug

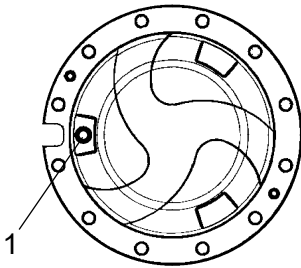


Fig. Planetary gear/filling position
1. Plug

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

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

Clean and refit the plug.

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



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



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

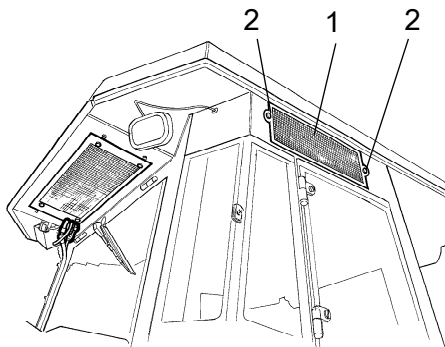


Fig. Cab
1. Fresh air filter
2. Screw (x2)

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

Replace with a new filter.

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

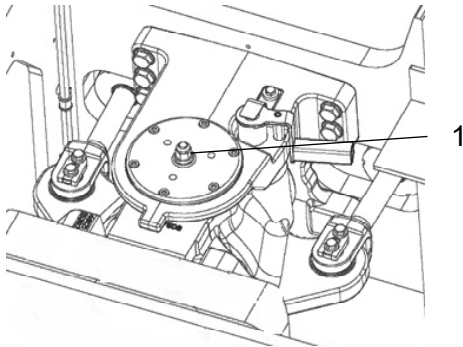


Fig. Steering hitch
1. Nut (24mm)

Steering hitch - Tightening



Nobody must be allowed near the steering joint when the engine is running. Risk of being crushed when the steering is operated. Switch off the engine and activate the parking brake before lubricating.

To do this torque control, you need a torque wrench that can handle at least 300 Nm.

The easiest way to identify if you have this type of steering hitch is that it has a new type of nut (24mm) (1) at the top, as shown.

Actual torque should be 270 Nm when the machine's position is straight ahead.

Maintenance - 2000h

Performed after 2000 operating hours (every two years)



***Park the roller on a level surface.
The engine must be switched off and the parking brake activated when checking or adjusting the roller, unless otherwise specified.***



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

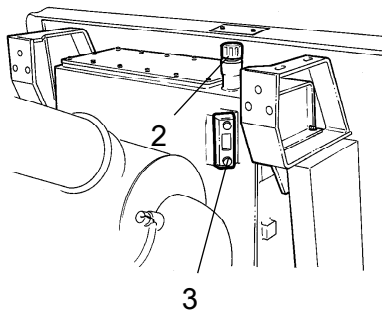
**Hydraulic filter - Replacement**

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

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

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

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



Wear protective goggles when working with compressed air.


Rear axle differential - Check oil level


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

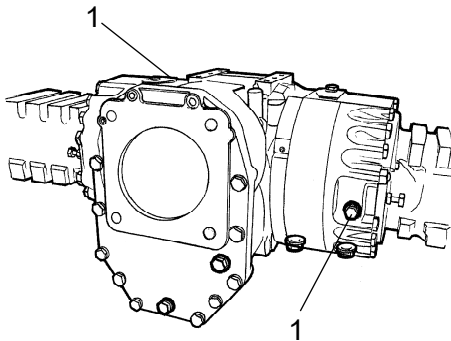


Fig. Level check - differential housing
1. Level/Filler plugs (2 pcs)

Wipe clean and remove the level/filler plugs (1) and check that the oil level reaches the lower edge of the plug hole. The plugs are located on the front- and rear side of the axle. Top off with oil to the right level if the level is low. Use transmission oil according to the lubricant specification.

Clean and refit the plug.


Rear axle drop box - Check oil level


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

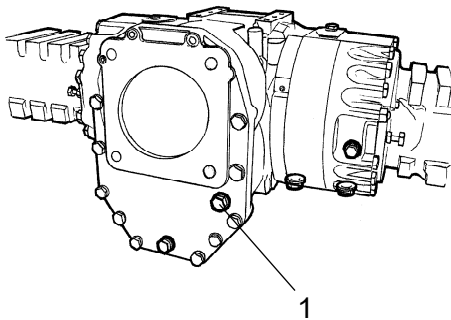


Fig. Level check - drop box
1. Level/Filler plug

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

Clean and refit the plug.



Rear axle planetary gears - Check oil level

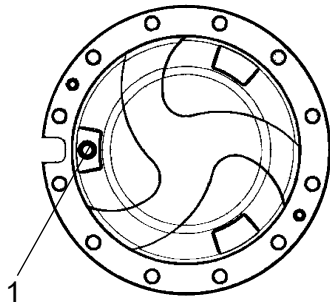


Fig. Level check - planetary gear
1. Level/Filler plug

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

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

Clean and refit the plug.

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



Drum gearbox - Checking the oil level

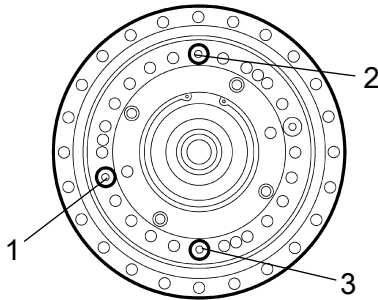


Fig. Oil level check - drum gearbox
1. Level plug
2. Filler plug
3. Drain plug

Wipe clean the area around the level plug (1) and then undo the plug.

Ensure that the oil level reaches up to the lower edge of the plug hole.

Top off with oil to the right level if the level is low. Use transmission oil according to the lubricant specification.

Position the drum so that the filler plug (2) is straight up.

Clean and refit the plugs.



Hydraulic reservoir - Oil change

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



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

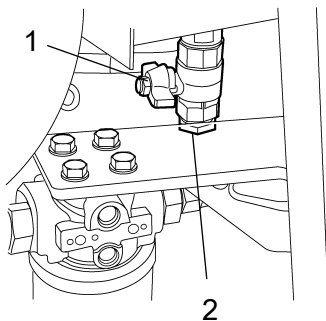


Fig. Underside of hydraulic reservoir
 1. Drainage tap
 2. Plug

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



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

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

Start the diesel engine and operate the various hydraulic functions.

Check the fluid level and top up if necessary.



Drum cartridge - Checking the oil level

Position the machine level so that the indicator pin (1) on the inside of the drum is aligned with the top of the drum frame.

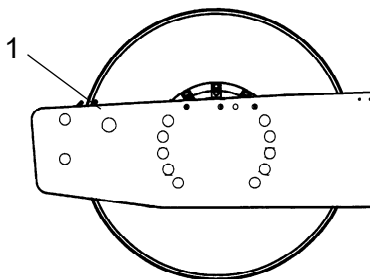


Fig. Left drum side
 1. Indicator pin

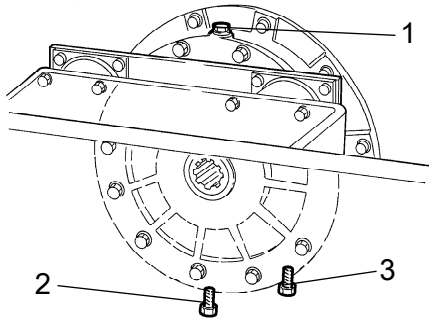


Fig. Right drum side

- 1. Filler plug
- 2. Drain plug
- 3. Level plug

Wipe clean the filler plug (1) and level plug (3).

Unscrew the filler plug (1).

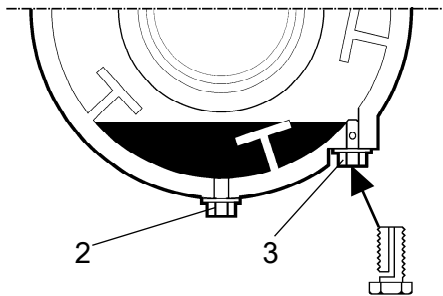


Fig. Drum cartridge

- 2. Drain plug
- 3. Level plug

Then loosen the level plug (3) on the underside of the cartridge and unscrew it until the hole in the middle of the plug becomes visible.

Top off with oil through the filler plug (1), until oil begins to run out from the level plug's (3) hole. The level is correct when it stops running.



Ensure that only Dynapac Drum oil 1000 is used in the cartridges..



Do not overfill with oil - risk for overheating.

Clean and refit the plugs. Now repeat the procedure on the opposite side.

Drum cartridge - Cleaning the ventilation screw

Clean the drum's ventilation hole and ventilation screw (1). The hole is required to eliminate excess pressure inside the drum.

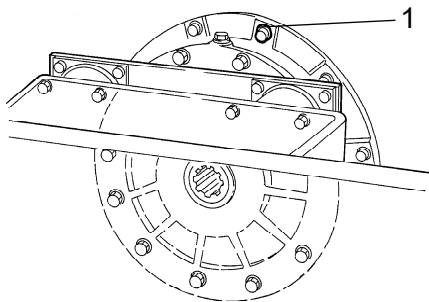


Fig. Drum

- 1. Ventilation screw

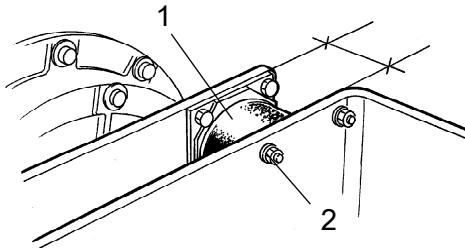


Fig. Drum, vibration side
 1. Rubber element
 2. Fastening screws

Rubber elements and fastening screws - Check

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

Check using a knife blade or pointed object.

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

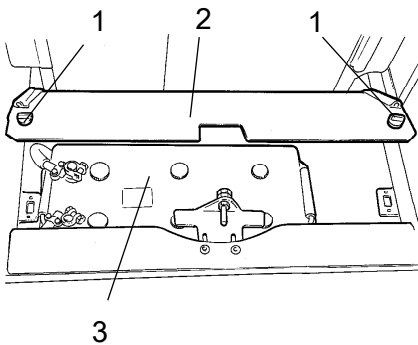


Fig. Battery shelf
 1. Quick-screws
 2. Battery cover
 3. Battery

Battery - Check electrolyte level



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

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

Raise the battery cover (2).

Wipe the top of the battery.



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

Air conditioning (Optional) - Inspection

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

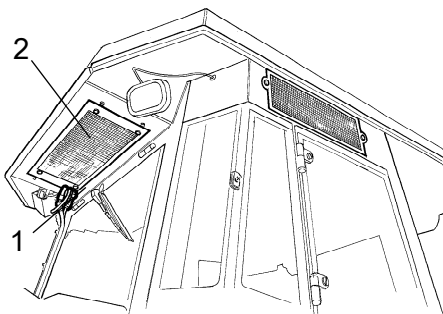


Fig. Air conditioning
 1. Refrigerant hoses
 2. Condensor element



Replacing the fuel filter



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

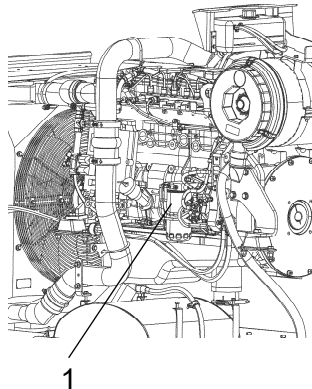


Fig. Engine compartment
1. Fuel filter

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



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

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

Automatic Climate Control (Optional) - Overhaul

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

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



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

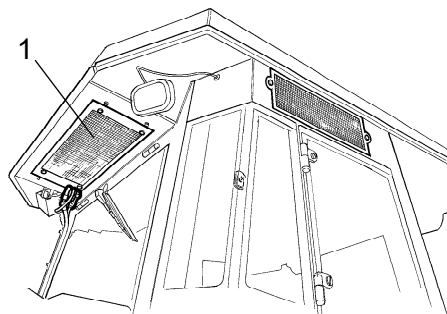


Fig. Cab
1. Condensor element



Wear protective goggles when working with compressed air.

Inspect the condenser element attachment.



Controls and moving joints - Lubrication

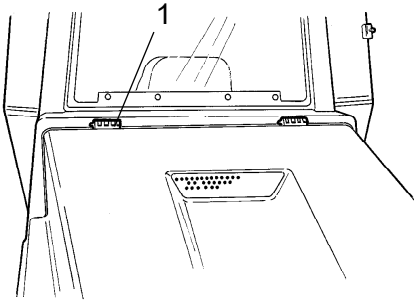


Fig. Engine hood
1. Hinge

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



Fuel pre-filter - Cleaning

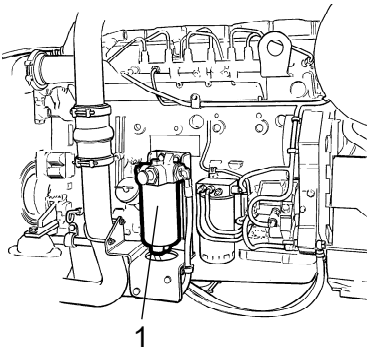


Fig. Engine compartment
1. Fuel prefilter



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

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

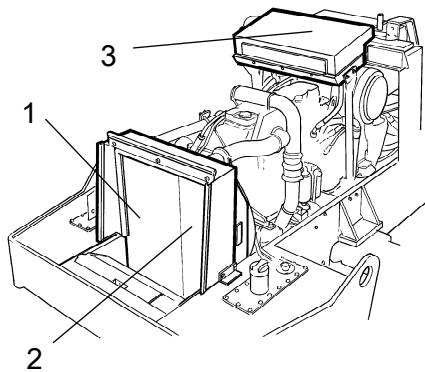


Fig. Engine compartment
 1. Water cooler
 2. Charge air cooler
 3. Hydraulic fluid cooler

Radiator - Check/Cleaning

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

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

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



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



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



Battery cell

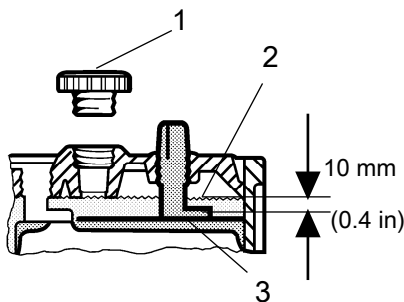


Fig. Electrolyte level in battery
 1. Cell cap
 2. Electrolyte level
 3. Plate

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

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

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

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



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



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



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



Drum cartridge - Oil change

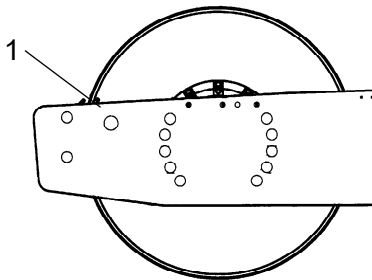


Fig. Left drum side
1. Indicator pin

Position the machine level so that the indicator pin (1) on the inside of the drum is aligned with the top of the drum frame.

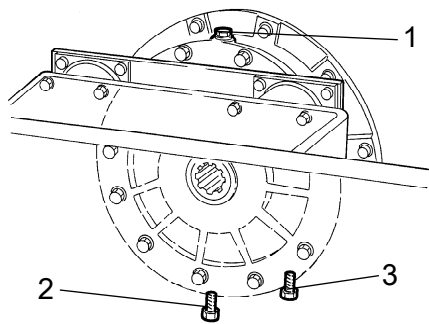


Fig. Right drum side
1. Filler plug
2. Drain plug
3. Level plug

Place a receptacle for about 5 liters (1.32 gal) underneath the drain plug (2).



Save the oil and hand in to an environment-friendly waste disposal station.

Clean and unscrew the filler plug (1) and the drain plug (2).

Allow all the oil to run out. Fit the drain plug and fill with new synthetic oil in accordance with the instructions under "Drum cartridge - checking the oil level".

Repeat the procedure on the opposite side.



Ensure that only Dynapac Drum oil 1000 is used in the cartridges..



Drum gearbox - Oil change

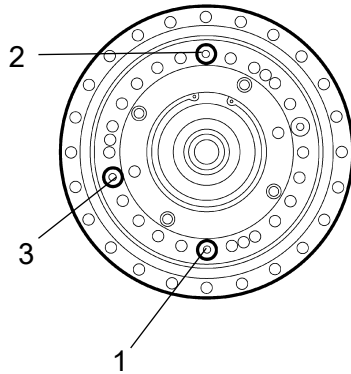


Fig. Drum gearbox
1. Drain plug
2. Filler plug
3. Level plug

Place the roller on a level surface with the plugs (1) and (2) as illustrated.

Wipe clean, unscrew the plugs (1, 2 and 3) and drain the oil into a suitable receptacle, capacity about 5.0 liters (5,3 qts.).

Refit the plug (1) and fill with oil up to the level plug (3), according to "Drum gearbox - Checking the oil level".

Use transmission oil according to the lubricant specification.

Clean and refit the level plug (3) and filler plug (2).

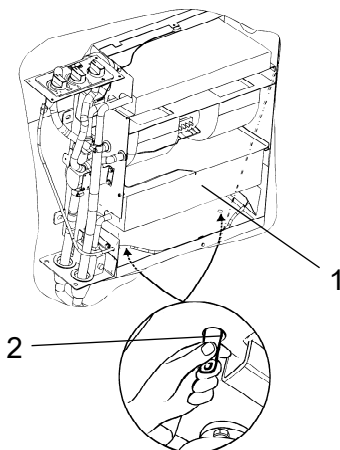


Fig. Automatic climate control
1. Cooling element
2. Drain valve (x2).

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

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

Drain by pinching the valves (2)

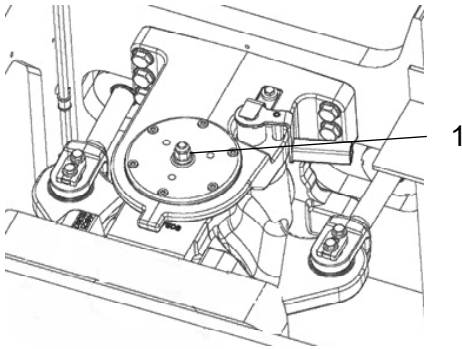


Fig. Steering hitch
1. Nut (24mm)

Steering hitch - Tightening



Nobody must be allowed near the steering joint when the engine is running. Risk of being crushed when the steering is operated. Switch off the engine and activate the parking brake before lubricating.

To do this torque control, you need a torque wrench that can handle at least 300 Nm.

The easiest way to identify if you have this type of steering hitch is that it has a new type of nut (24mm) (1) at the top, as shown.

Actual torque should be 270 Nm when the machine's position is straight ahead.

Drying filter - Check

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

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



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



Do not disconnect or undo the hose couplings.



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



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

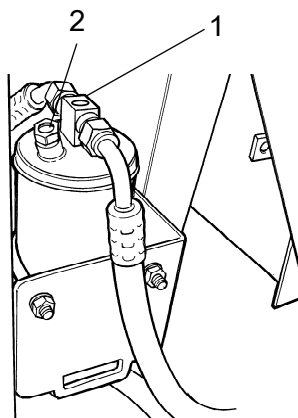


Fig. Drying filter in engine compartment
1. Sight glass
2. Moisture indicator

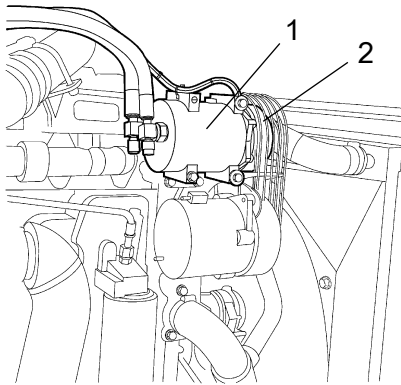


Fig. Engine compartment
1. Compressor
2. Drive belt

Compressor - Check (Optional)

Inspect the attachment of the compressor (1).

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

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

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



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

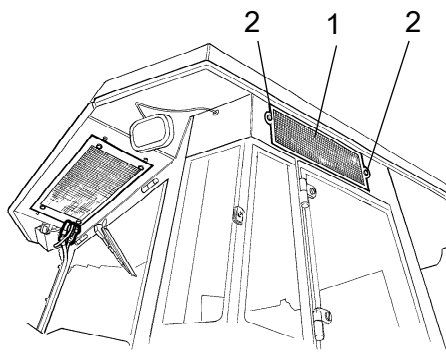


Fig. Cab
1. Fresh air filter
2. Screw (x2)

Air conditioning (Optional)

Fresh air filter - Change



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

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

Replace with a new filter.

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

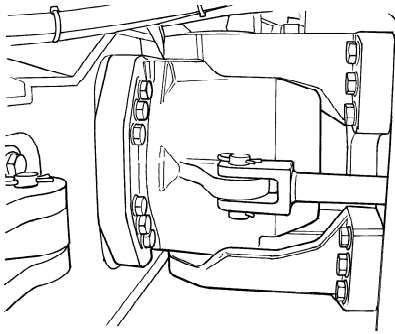


Fig. Steering hitch

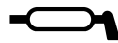
Steering hitch and Steering cylinders - Check

Inspect the steering hitch to detect any damage or cracks.

Inspect the steering cylinders to detect any damage, cracks or leakage.

Check and tighten any loose bolts.

Check also for any stiffness and play.



Forward/Reverse lever - Lubrication

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

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

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

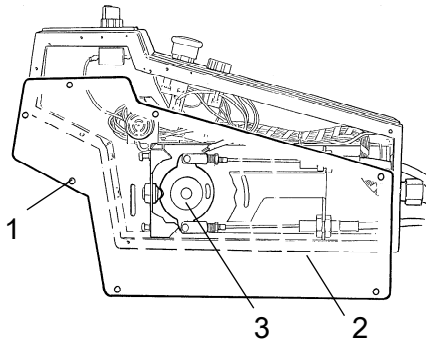


Fig. Forward/Reverse lever

- 1. Screw
- 2. Plate
- 3. Cam disc

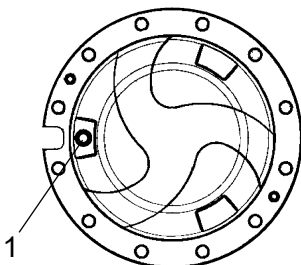


Fig. Planetary gear/filling position

- 1. Plug

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

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

Clean and refit the plug.

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

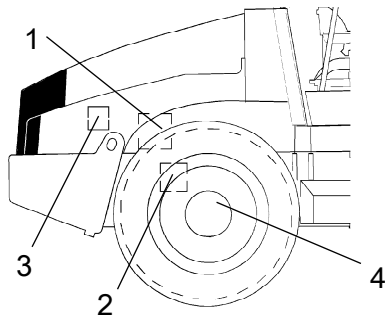


Fig. Right side of machine

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

Bolted joints - Checking tightening torque

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

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

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

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

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



Rear axle planetary gear - Oil change

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

Wipe clean, unscrew the plug (1) and drain the oil into a suitable receptacle. The volume is approximately 3,6 liters (3,17 qts).



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

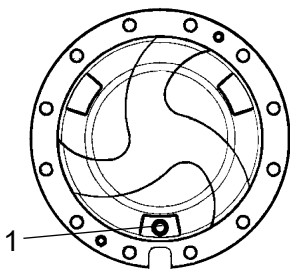


Fig. Planetary gear/drainage position

1. Plug


Rear axle drop box - Oil change


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

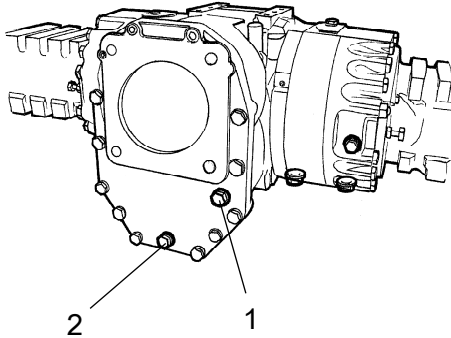


Fig. Drop box
 1. Level/Filler plug
 2. Drain plug

Wipe clean and remove the level/filler plug (1) and all three drain plugs (2) and drain the oil into a suitable receptacle. The volume is approximately 1,9 liters (2,0 qts).



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

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


Rear axle differential - Oil change


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

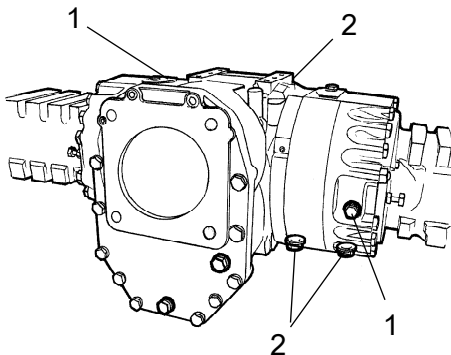


Fig. Rear axle
 1. Level/Filler plugs (2 pcs)
 2. Drain plugs (3 pcs)

Wipe clean and remove the level/filler plugs (1) and all three drain plugs (2) and drain the oil into a suitable receptacle. The level/filler plugs are located on the front- and rear side of the axle and the drain plugs are located on the underside and rear side of the axle. The volume is approximately 12.5 liters (13.2 qts).



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

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



Fuel tank - Drainage

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



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

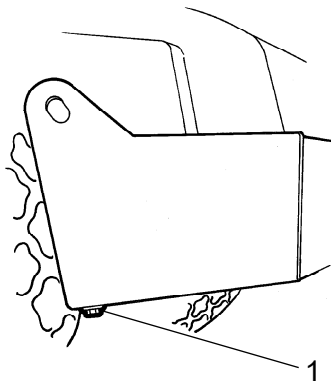


Fig. Fuel tank
1. Drain plug

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

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

Place a container under the plug (1).

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



Hydraulic reservoir - Draining

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

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

Remove the plug (2).

Place a container under the tap.

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

Shut the drainage tap.

Refit the plug.

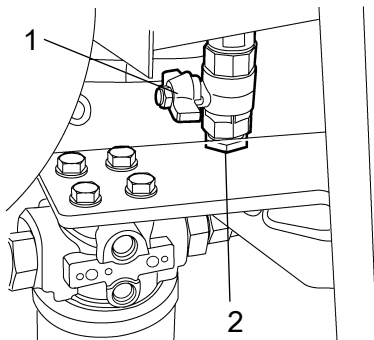


Fig. Underside of hydraulic reservoir
1. Drainage tap
2. Plug

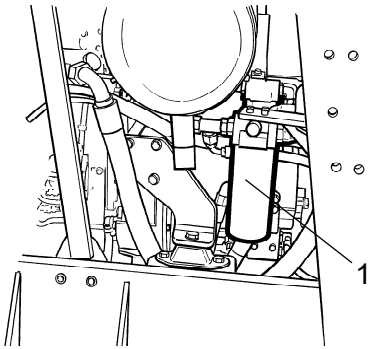


Fig. Engine compartment
1. Hydraulic fluid filter (x2).

Clean thoroughly around the oil filters.



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



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

Thoroughly clean the sealing surfaces of the filter holders.

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

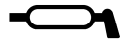


First tighten the filter until its seal is in contact with the filter attachment. Then turn an additional half revolution. Do not tighten the filter too hard as this could damage the gasket.

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



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



Seat bearing - Lubrication

Optional on rollers without cab



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

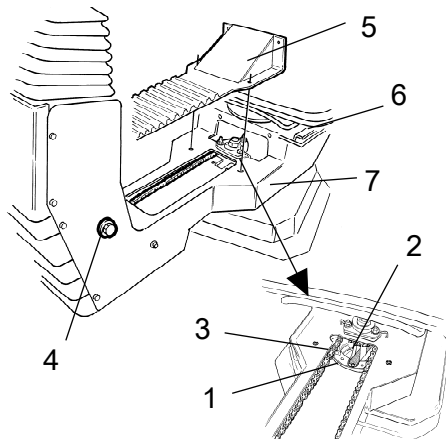


Fig. Seat bearing
 1. Grease nipple
 2. Cogwheel
 3. Steering chain
 4. Adjusting screw
 5. Cover
 6. Slide rails
 7. Slew interlock

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

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

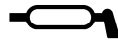
Also grease the seat slide rails (6).



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

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

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



Steering chain and seat bearing - Lubrication

Optional on rollers without cab



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

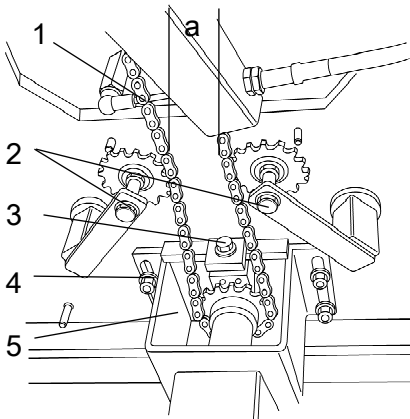


Fig. Underneath operator's position

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

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

It is not necessary to remove the chain.

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



Diesel engine - Oil and Filter change



Take great care when draining warm fluid and oil. Wear protective gloves and goggles.

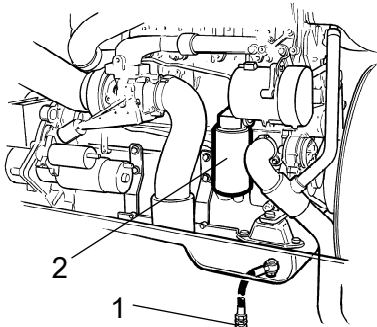


Fig. Left side of engine

1. Drain plug
2. Oil filter

The oil drain plug (1) is most easily accessible from the bottom of the engine and is located attached to a hose on the rear axle. Drain the oil when the engine is warm. Place a receptacle that holds at least 19 liters (5 gal) under the drain plug.

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



Deliver the drained oil and filter to environmentally correct handling.

