Instruction manual

Operating & Maintenance
4812160001_E.pdf

Vibratory roller
CA2500

Engine
Cummins QSB 3.3 (IIIA/T3)
Cummins QSB 3.3 (IIIB/T4i)

Serial number
10000157xxA014435 -
10000158xxA012422 -



Translation of original instruction

Reservation for changes
Printed in Sweden

EN

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Introduction

The machine

CA2500 are models of Dynapac's soil compaction rollers. They are available in a D (smooth drum) version.

Intended use

All types of base courses and subbase courses can be compacted.

The cab and safety-related accessories are described in this manual. Other accessories, such as tachograph, and "Analyzer" (DCA) 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

Decal and location of decal shown in section Machine description.

WARNING: Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65warnings.ca.gov/diesel.

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 manufactuer'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 the operator is allowed to be 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 ascend and descend 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 ascending or descending the machine. Never jump down from the machine.**
6. **The ROPS (Roll Over Protective Structure) shall be used.**
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

20. **If the machine seems to be responding abnormally during travel, stop and check it.**

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.

Security Warning - machinery

Pad shell, heavy PD scraper or levelling blade must not be used on this machine, either singly or in combination. It will exceed the weight limits as a safety for the machine type.

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 an AC/ACC type (Automatic climate control)

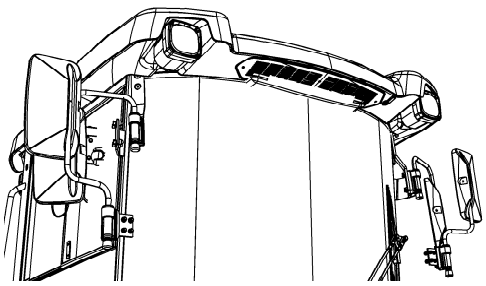


Fig. Cab

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 recharged with approved refrigerant as required by authorized personnel.

The refrigerant contains a tracing agent, enabling leak-tracing to be performed using UV light.

The condenser is located together with other radiators, and the drying filter is located on the right-hand side of the radiator stand.

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 and hydraulic system can be run at this temperature using normal oil, but in other components that use transmission oil, Shell Spirax S3 AX85W/140, API GL-5 or equivalent must be used.

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.

Place a plastic bag over the exhaust pipe and secure with a rubber band to avoid water in the muffler.

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.

Welding

When carrying out welding on the machine, the battery must be disconnected and the electronics disconnected from the electrical system.

If possible, remove the part(s) to be welded from the machine.

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 (24V)

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.

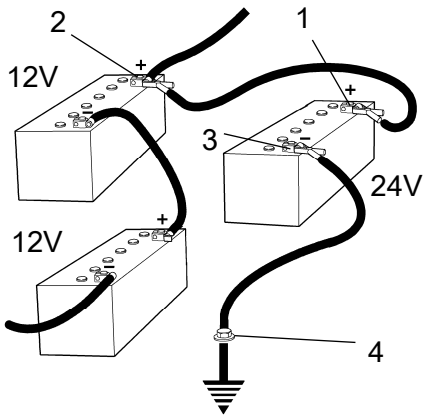


Fig. Jump starting

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

Jump leads must have 24V.

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 lifjting 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/s² as specified in Directive 2002/44/EC. (Limit is 1.15 m/s²)
Measured hand/arm vibrations also were below the action level of 2.5 m/s² specified in the same directive. (Limit is 5 m/s²)

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}	(IIIA/T3)	103 dB (A)
	(IIIB/T4i)	104 dB (A)
Sound pressure level at the driver's ear (platform/ROPS), L_{pA}		XX dB (A)
Sound pressure level at the operator's ear (cab), L_{pA}		72 ±3 dB (A)

Electrical system

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

Slopes



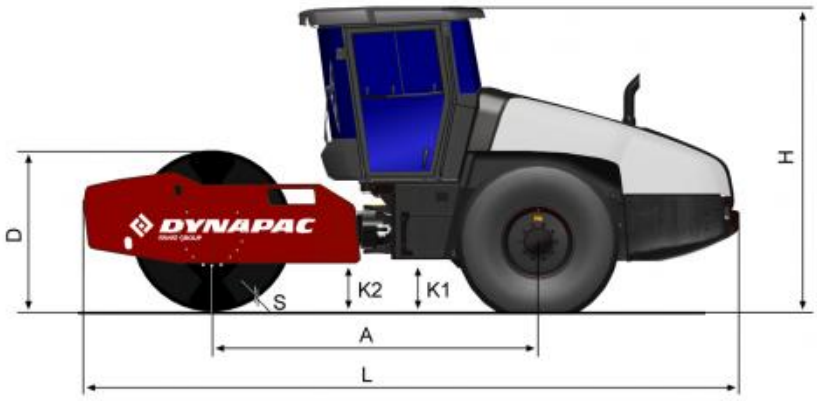
Max 20° or 36%

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.

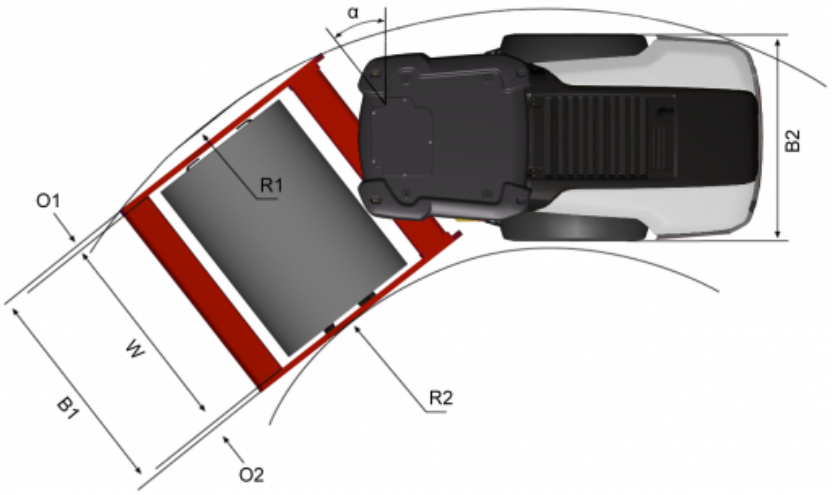
Always take into consideration that loose ground, steering the machine, vibration on, machine speed across the ground and raising the center of gravity can all cause the machine to topple at smaller slope angles than those specified here.

Dimensions, side view



	Dimensions	mm	in
A	Wheelbase, drum and wheel	2840	112
L	Length, standard equipped roller	5560	219
H	Height, with ROPS/cab	2810	111
D	Diameter, drum (D)	1500	59
S	Thickness, drum amplitude, Nominal (D)	25	0.87
K1	Clearance, tractor frame	320	13
K2	Clearance, drum frame	430	17

Dimensions, top view



	Dimensions	mm	in
B1	Width, standard equipped roller	2300	91
B2	Width, tractor section	1707	84
O1	Overhang, right frame side	85	3
O2	Overhang, left frame side	85	3
R1	Turn radius, external	5200	220
R2	Turning radius, inner	3100	130
W	Width, drum	2130	84
α	Steering angle	± 38°	

Weights and volumes

Weights

Service weight		ROPS	Cab
CA2500D	(kg)	10 000	10 200
	(lbs)	22 050	22 500

Fluid volumes

Fuel tank	190 liters	50 gal

Working capacity

Compaction data

Static linear load		
CA2500D	26	(kg/cm)
	146	(pli)

Amplitude	High	Low	
CA2500D	1,8	0,9	(mm)
	0.07	0.035	(in)

Vibration frequency	High amplitude	Low amplitude	
CA2500D	30	30	(Hz)
	1 800	1 800	(vpm)

Centrifugal force	High amplitude	Low amplitude	
CA2500D	205	100	(kN)
	46 125	22 500	(lb)

Propulsion

Speed (max.)		
TC - Limited Slip Rear axle		
1st gear	3 km/h	2 mph
2nd gear	5,5 km/h	3.5 mph
3rd gear	4 km/h	2.5 mph
4th gear	8 km/h	5 mph
Dual speed		
1st gear	3 km/h	2 mph
2nd gear	4 km/h	2.5 mph
Climbing capacity (theoretical) without vibration	55 %	

General

Engine

Manufacturer/Model	Cummins QSB 3.3	Water-cooled turbo diesel
Power output (SAE J1995), 2200 rpm	82kW	(IIIA/T3, IIIB/T4i)
Engine speed		
- idling	900 rpm	
- loading/unloading	1600 rpm	
- work/transport	2 200 rpm	

The new Tier 4i/Stage IIIB Cummins engines require the use of Ultra Low Sulphur Diesel (ULSD) fuel, which has a sulphur content of 15 ppm (parts per million) or less. A higher sulphur content will cause operating problems and put the useful life of components at risk, which can lead to engine trouble.

Tire	Tire dimensions	Tire pressure
Flotation	550/60-22.5 TL- 12 ply	180 kPa (1.8 kp/cm) (26 psi)

The tires are liquid filled (extra weight up to 350 kg/tire, 770 lbs/tire).
During service, be aware of the extra weight that this causes.
(Anti-freeze to -30°C (-22°F))

Electrical system

Battery		24V (2x12V 74Ah)
Alternator	Cummins	24V 60A
Fuses		See the Electrical system section - fuses

Hydraulic system

Opening pressure	MPa
Drive system	42.5
Supply system	2.2
Vibration system	37
Control systems	20
Brake release	1.7
Hydraulic fan system	19

Air Conditioning / Automatic Climate Control (ACC) (Optional)

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

The system contains fluorinated greenhouse gases.

Coolant designation: HFC-134a

Coolant weight when full: 1.350 kg

CO_2-equivalent: 1.930 ton

GWP: 1430

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

Machine description

Diesel engine

The machine is equipped with a water-cooled, straight four cylinder, four-stroke, turbocharged diesel engine with direct injection and a charge air cooler.

(IIIB/T4i)

The engine is also equipped with cooled exhaust gas recirculation (CEGR) and electronically controlled exhaust gas recirculation valves (EGR) together with a Cummins ® diesel oxidation catalysator (DOC) system for exhaust after-treatment.

Electrical system

The machine has the following control units (ECU, Electronic Control Unit) and electronic units.

- Main ECU (for the machine)
- Diesel engine control unit (ECM)
- I/O board (Control board)
- Display

Propulsion system/Transmission

The propulsion system is a hydrostatic system with a hydraulic pump supplying two motors connected in parallel, one for the rear axle and one for the drum.

The speed of the machine is proportional to the angle of the control lever (the deflection of the forward/reverse lever regulates the speed). A speed selector and anti-spin system are available as options.

Brake system

The brake system comprises a service brake, secondary brake and parking brake. The service brake system produces retardation of the propulsion system, i.e. hydrostatic braking.

Secondary/Parking brake

The secondary and parking brake system comprises sprung disc brakes on the rear axle and the drum gear which are disengaged by hydraulic pressure.

Steering system

The steering system is a load-sensing hydrostatic system. The control valve on the steering column distributes the flow to the steering cylinders at the articulated joint. The steering angle is proportional to the amount the steering wheel is turned.

On certain markets, the machine is also equipped with an emergency steering system.

Vibration system

The vibration system is a hydrostatic system in which a hydraulic motor drives the eccentric shaft, which generates the drum's vibrations.

High amplitude or low amplitude are determined by the hydraulic motor's direction of rotation. Optional systems for variable amplitude or variable frequency and Seismic are available.

Cab

The cab has a heating and ventilation system, with defrosters for all windows. Air conditioning is available as an accessory.

Emergency exit

The cab has two emergency exits: the door and the rear cab window, which can be broken with the emergency hammer located in the cab.

FOPS and ROPS

FOPS is the abbreviation for "Falling Object Protective Structure" (roof protection) and ROPS is the abbreviation for "Roll Over Protective Structure".

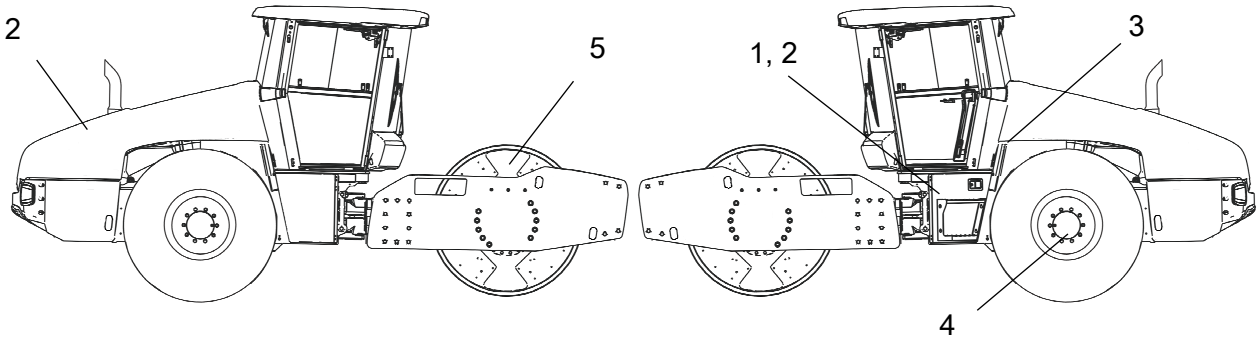
The cab is approved as a protective cab in accordance with the FOPS and ROPS standards.

If any part of the cab's or the FOPS/ROPS structure's protective construction displays plastic deformation or cracks, the cab or the FOPS/ROPS structure must be replaced immediately.

Never perform unauthorized modifications on the cab or FOPS/ROPS structure without first having discussed the modification with Dynapac's production unit. Dynapac determines whether the modification could result in the approval according to the FOPS/ROPS standards becoming invalid.

Identification

Product and component plates



1. Product plate - Product Identification Number (PIN), model/type designation
2. Engine plate - Type description, product and serial numbers
3. Cab/ROPS plate - Certification, product and serial numbers
4. Component plate, rear axle - Product and serial numbers
5. Component plate, drum - Product and serial numbers

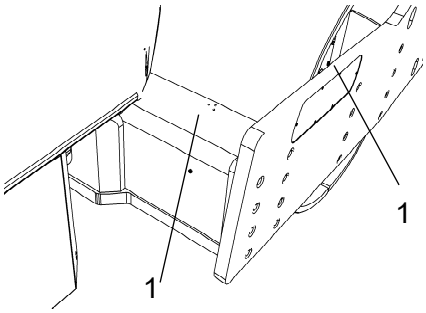


Fig. Front frame
1. PIN

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.

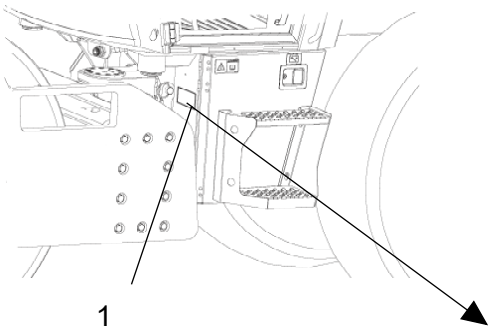


Fig. Operator's platform
1. Machine plate

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.)

optional QR code

DYNAPAC FAYAT GROUP

Dynapac Compaction Equipment AB
Box 504, SE-371 23 Karlskrona Sweden

CE

Product Identification Number	XXXXXXXXXXXXXXXX		
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 0001 33

Please state the machine's PIN when ordering spares.

100	00123	V	x	A	123456
A	B	C	F		

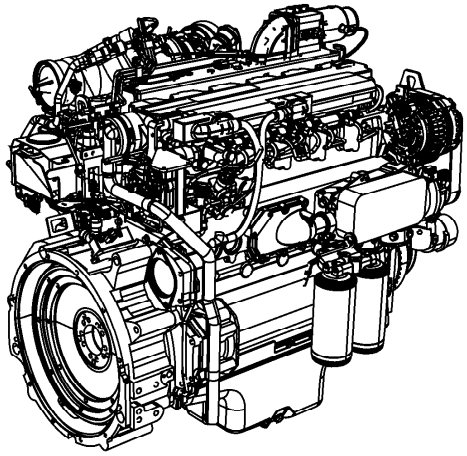
Explanation of 17PIN serial number

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.

On certain machines there may be an engine plate along with the machine plate, if the original plate on the engine is covered with extra equipment/accessories.

Decals

Location - decals

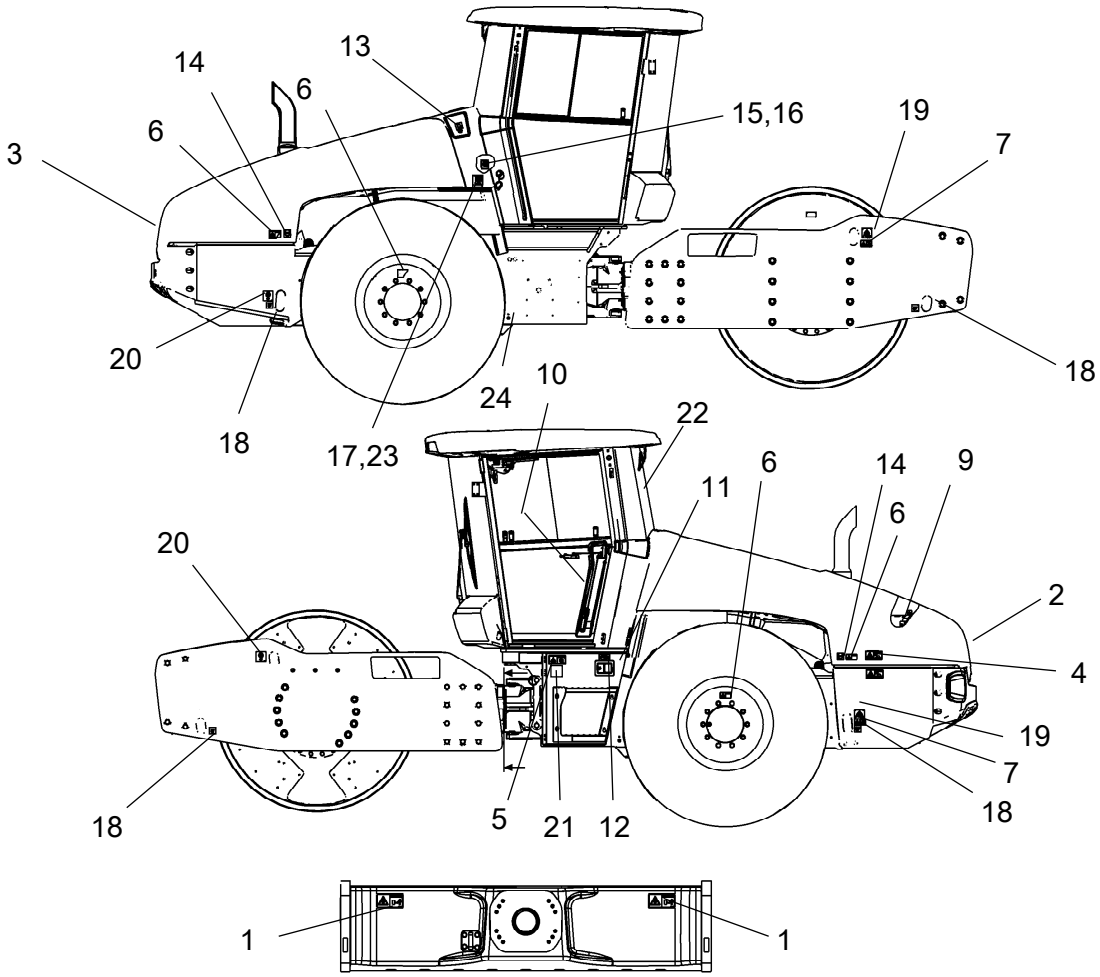


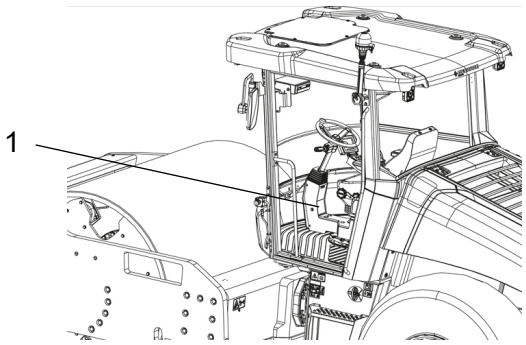
Fig. Location, decals and signs

1.	Warning, Crush zone	4700903422	
2.	Warning, Rotating engine components	4700903423	
3.	Warning, Hot surfaces	4700903424	
4.	Warning, Brake release	4700904895	
5.	Warning, Instruction manual	4700903459	
6.	Warning, Ballasted tires	4700903985	
7.	Warning, Locking	4700908229 4812125363	
9.	Warning, Starting gas	4700791642	
10.	Handbook compartment	4700903425	
11.	Battery voltage	4700393959	
12.	Master switch	4700904835	
13.	Coolant	4700388449	
14.	Air pressure	4700385080	
15.	Hydraulic fluid level	4700272373	
16.	Hydraulic fluid Biological hydraulic fluid	4700272372 4700792772	
17.	Diesel fuel	4700991658* 4811000345**	
18.	Fixing point	4700382751	
19.	Hoisting plate	4700904870	
20.	Lifting point	4700588176	
21.	Sound effect level	4700791273 / 74	
22.	Emergency exit	4700903590	
23.	Fuel with a low sulphur content	4811000344**	
24.	Draining fuel	4811000443	

* (IIIA/T3)
** (IIIB/T4i)

Location - decals, CALIFORNIA

Proposition 65

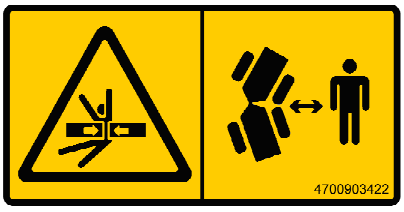


1.	Warning, CALIFORNIA Proposition 65	4812129673

Fig. Location

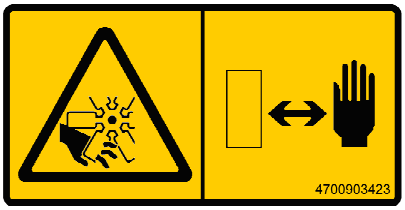
Safety decals

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.



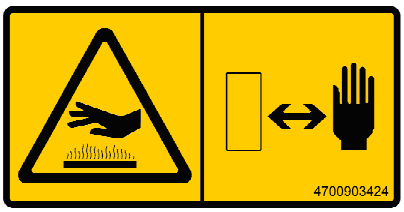
4700903422
Warning - Crush zone, articulation/drum.

Maintain a safe distance from the crush zone.



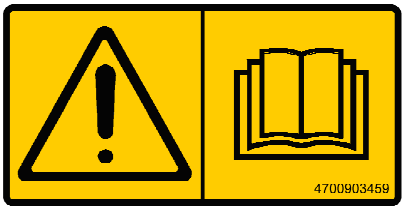
4700903423
Warning - Rotating engine components.

Keep your hands at a safe distance.



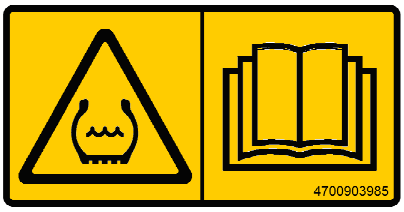
4700903424
Warning - Hot surfaces in the engine compartment.

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.



4700903985
Warning - Ballasted tire.

Read the instruction manual.

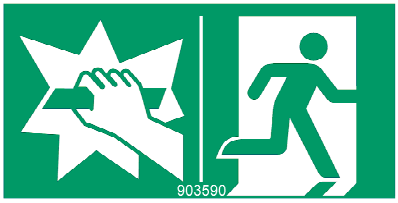
More information in section in Technical specifications.



4700908229
Warning - Risk of crushing

The articulation must be locked when lifting.

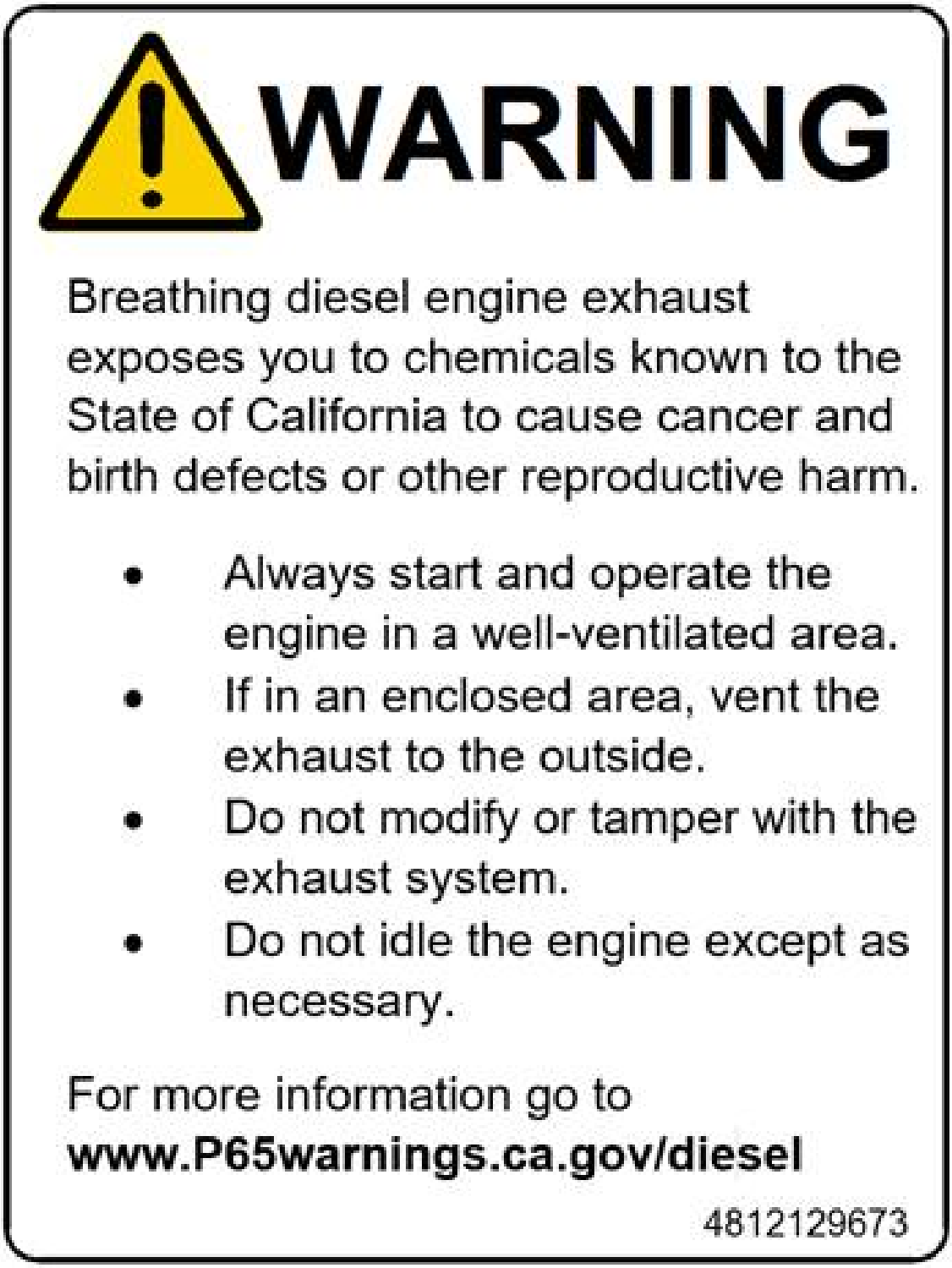
Read the instruction manual.



4700903590
-Emergency exit

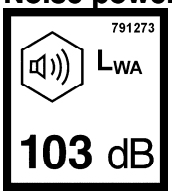
4812129673
Warning

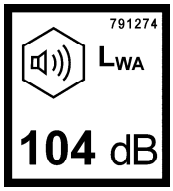
CALIFORNIA - Proposition 65



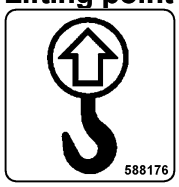
Info decals

Noise power level

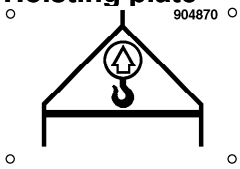




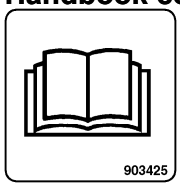
Lifting point



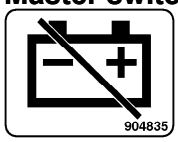
Hoisting plate



Handbook compartment



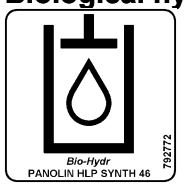
Master switch



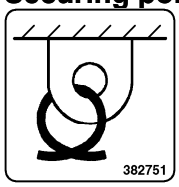
Hydraulic fluid



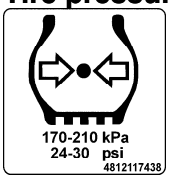
Biological hydraulic fluid



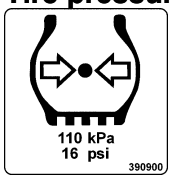
Securing point



Tire pressure



Tire pressure



Battery voltage



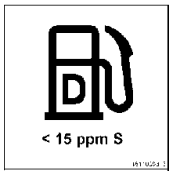
Diesel fuel



Fuel with a low sulphur content



(IIIB/T4i)



Instruments/Controls

Control panel and controls

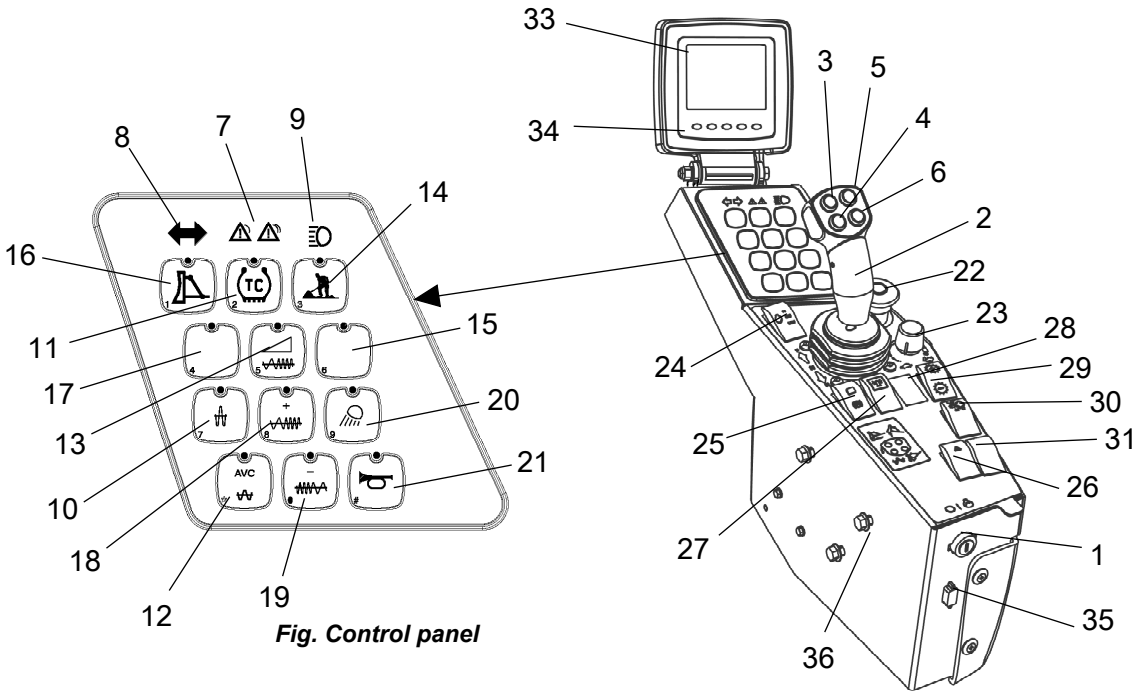
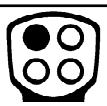


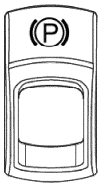
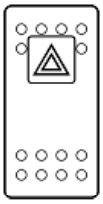
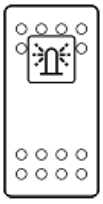
Fig. Control panel

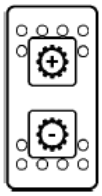
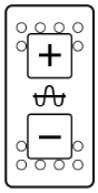
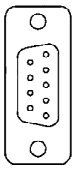
1		Ignition switch	13		N/A	25		Parking brake
2		Forward & Reverse lever	14		Working mode / Transport mode	26	*	Hazard lights
3	*	Strike-off blade, floating position	15		Reserve	27	*	Rotating beacon
4		Vibration on/off	16	*	Strike-off blade, On/Off	28		Reserve
5	*	Strike-off blade, Up	17		Reserve	29		Gear position switch, Dip
6	*	Strike-off blade, Down	18		N/A	30		N/A
7		Central warning indicator	19		N/A	31		N/A
8	*	Direction indicators	20	*	Working light			
9	*	Full beam indicator	21		Horn	33		Display
10		High amplitud	22		Emergency stop	34		Function buttons (5 pcs.)
11		N/A	23	*	Speed limiter	35		Service socket
12		Auto vibration control (AVC)	24		Rpm switch, diesel engine	36		Height adjustment, control panel

* Optional

Function descriptions

No	Designation	Symbol	Function
1	Ignition key		The electric circuit is broken.
			All instruments and electric controls are supplied with power.
			Starter motor activation.
			To start: Turn ignition key to the right until the display LIGHTS UP, and wait until the displayed roller GOES OFF and changes to the status image.
2	Forward/Reverse lever		**NB!** When starting the machine, the lever must be in neutral. 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; when the lever is move backward, the roller moves backward. 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.
3	Strike-off blade, floating position (Optional)		The float mode is activated by pressing and holding the button for 2 seconds while the machine is in Working mode (14) and Strike-off blade (16) is activated.
4	Vibration on/off		First push will start vibrations, second push will stop vibrations.
5	Strike-off blade, up (Optional)		Raises the strike-off blade when Strike-off blade (16) is activated.
6	Strike-off blade, down (Optional)		Lowers the strike-off blade when Working mode (14) and Strike-off blade (16) on the machine are activated.
7	Central warning indication		General fault indication. See the display (33) for description of the fault. For detailed information about the fault indication, see the table "Warning indication - membrane panel".
			Yellow warning light - "less serious fault"
			Warning lights red - "serious fault"
8	Direction indicator (Optional)		Shows direction indicators activated (Activated via the steering column switch).
9	Main beam indicator (Optional)		Shows main beam activated (Activated via the steering column switch).
10	Amplitude selector, high amplitude		Activation produces high amplitude. (Low amplitude is the basic mode if the button is not activated.)
12	Automatic vibration control (AVC)		When activated, the vibration is switched on automatically when the roller's speed is ≥ 1.8 km/h (1.1 mph) and disengaged at a speed of 1.5 km/h (0.9 mph).

No	Designation	Symbol	Function
14	Working mode / Transport mode		Activates working mode, which makes it possible to use vibration and lower the strike-off blade (optional). The roller always starts in transport mode.
15	Reserve		
16	Strike-off blade On/Off (Optional)		Activates the strike-off blade and its functions, also requires working mode (14) to be activated.
17	Reserve		
20	Working lights (Optional)		By activating the working lights will turn ON.
21	Horn		Press to sound the horn.
22	Emergency stop		Brakes the roller and switches off the engine. The power supply goes off. **NB!** When starting the machine, the emergency stop must be inactive.
23	Speed limiter (Optional)		Limitation of the machine's max. speed (max.speed is obtained with full deflection of the F/R lever). Set the knob to the position for the desired max. speed.
24	Rpm switch, diesel engine		Three-position switch for idling (LO), intermediate speed (MID) and working speed (HI). **NOTE:**The lever must be in neutral (LO) when starting the machine. The engine also runs at low speed when stationary, more than approx. 10 seconds if the F&R lever is in neutral. If the F&R lever is moved out of neutral the speed will increase to the set speed again. If the machine has a fuel optimization system (ECO), MID is replaced by ECO (and the switch is green) and the machine can also be started in ECO selection.
25	Parking brake		To activate the brakes, press the top of the switch to change the position of the switch. To release the brakes, press down the red part at the same time as the switch and change the position of the switch. **NOTE:**When starting the machine, the parking brake must be activated.
26	Hazard indicators (Optional)		Activate the hazard warning light by depressing the button.
27	Rotating beacon (Optional)		Activate the rotating beacon by pressing the switch. (If the machine has two rotating beacons, both are activated)
28	Reserve		

No	Designation	Symbol	Function
29	Gear position switch, Dip		Activates the four different gear positions. (1) Hare, (2) Drum spin, (3) Wheelspin and (4) Tortoise. The current gear position is shown in the display by means of the following figures.
			1: Transport mode
			2: Used if the drum is slipping.
			3: Used if the rear tires are slipping.
			4: Working mode.
30	Reserve		
31	Amplitude selector (DCO)		Only for machine equipped with "Compaction Optimizer".
35	Service socket		Diagnostic socket. Gateway is connected here to read the CAN-Open system.

Warning indication - membrane panel (Keypad)

"Yellow" - Warning

(Alarm image shown in the display)

- The engine has an alarm in category yellow
- Communication with the display is interrupted
- The fuel level is below <10%
- Charging absent

"Red" - Warning

Flashes red continuously

(Alarm code shown in the display)

- The engine has an alarm in category red
- Communication with the engine is interrupted
- The engine temperature is too high
- Low oil pressure in the engine
- The air filter is clogged
- The hydraulic fluid temperature is too high
- The hydraulic fluid filter is clogged

Display explanations



Fig. Start screen

When the ignition key is activated to position I, a start screen is visible in display. This is shown for a few seconds and then switches over to the status screen.

Before activating the starter motor, wait until the start image has changed to the status image (the machine is performing a system check while the start image is being displayed).



Fig. Status screen

The status image provides information on the fuel level, machine hours and voltage level. The fuel level is indicated as a percentage (%).

This screen is active until the Diesel engine is started or an active screen choice is made via the function buttons below the display.



Fig. Main screen/Working screen

If the engine is started before any active screen choice is made the display will switch over to main screen.

This screen gives an overview and is kept during work:

- The speed is shown in the middle of the display. (km/h or mph)

- Engine speed, vibration frequency (optional), CMV value for compaction meter (optional) and slope as a % (optional) are shown in the corners.



Fig. Main screen/Working screen with menu selection buttons (1)

A menu field is shown by pressing one of the menu select buttons. The field is visible for a short while, if no selection is made the field fades out. Menu field will appear again upon pressing either one of the selection buttons (1).

Example of menu field.



	Scroll/Selection buttons to choose between available functions.
	Alarm log button to display engine and machine alarms.
	Settings/Button select menu, which opens the main menu. Settings can be changed in the main menu.
	Exit/Return button returns 1 step at once. Pressing the button (approx. 2 sec.) displays the main menu again.



Fig. Temperature screen

The temperature screen shows the temperature of the engine (top of display) and hydraulic fluid (bottom of display). The values are shown in Celsius or Fahrenheit, depending on the choice of unit system.



Fig. Compaction meter display (CMV display)

A display for the compaction value (CMV value) can also be shown when the compaction meter (Option) is installed on the machine. Further information on this accessory is given in the Chapter "Operation".



When an engine alarm is activated, the alarm is shown on the display.

The engine alarm is sent out from the engine ECM, which handles the monitoring of the engine functions.

The message, which consists of an SPN and FMI code, can be interpreted via the engine supplier error code list.

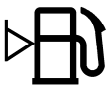
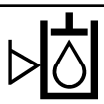
The alarm message shown is acknowledged by pressing the "OK" button on the display.



When a machine alarm is activated the alarm is shown on the display, plus a warning text that describes the alarm.

The alarm message shown is acknowledged by pressing the "OK" button on the display.

Machine alarm

Symbol	Designation	Function
	Warning symbol, hydraulic fluid filter	If the symbol is shown when the diesel engine is running at full speed, the hydraulic fluid filter must be changed.
	Warning symbol, clogged air filter	If this symbol is shown when the engine is running at full speed, the air filter must be checked/replaced.
	Warning symbol, battery charging	If the symbol is shown when the engine is running, then the alternator is not charging. Switch off the engine and locate the fault.
	Warning symbol, engine temperature	If this symbol is shown, the engine is too hot. Stop the engine immediately and locate the fault. Refer also to the engine manual.
	Warning symbol, hydraulic fluid temperature	This symbol is shown when the hydraulic fluid is too hot. Do not drive the roller; allow the fluid to cool by running the engine on idle, and then locate the fault.
	Warning symbol, hydraulic fluid temperature (coldl)	If the symbol is displayed, the hydraulic oil is cold and the speed cannot be increased until the oil has reached 0° C (32° F). The maximum speed cannot be used between 0° C (32° F) and + 5° C (41° F). If the machine is moving at the same time as any of the above limitations are exceeded, it may be necessary to first go to neutral before vibration/speed can be activated.
	Warning symbol, low fuel level	If this symbol is shown, there is less than 10% of the fuel left.
	Warning symbol, low oil pressure, diesel engine	If this symbol is shown, the engine's oil pressure is too low. Switch off the engine immediately.
	Warning symbol, low coolant level	If this symbol is shown, fill with coolant/glycol and search for leaks.
	Warning symbol, water in the fuel	If this symbol is shown, the engine must be stopped and the fuel pre-filter drained of water.
	Warning symbol, low hydraulic fluid level	If this symbol is shown, fill with hydraulic fluid to the correct level and search for leaks.

Dynapac Sub System (DSS)

DSS code	Description		Note
1	Speed sensor, front		Optional
2	Speed sensor, rear		
3	Inclination sensor		Optional
4	DCM		Optional
5	IO-Card		
6	Cooling fan speed sensor		
7	Vibration frequency meter	Supervision only active if Adjustable frequency or ECO available.	Optional
8	Power group 1	see Fuse 3	
9	Power group 2	see Fuse 4	
10	Power group 3	see Fuse 5	
11	Power group 4	see Fuse 6	
12	DCO	Com Error	Optional
13	Hydraulic temp sensor	Sensor data out of range	



Alarms received are logged and can be seen by selecting Display alarms.

Inactive faults disappear from the log when you restart the ignition.

 Selection of Display alarms.

"ENGINE ALARM"

Logged engine alarms.

Stored in the engine ECU.





"MACHINE ALARM"

Logged machine alarms. These alarms come from the other systems on the machine.



"MAIN MENU"

In the main menu it is also possible to change some user and machine settings, access the service menu for calibration purposes (special service personnel only, requires pin code), and to see the version of installed software.



"USER SETTINGS"

Users can change the light settings, choose between the Metric or Imperial system, and set warning sounds On/Off.



Adjustment of the light and contrast settings on the display, including brightness of the panel light.





"SERVICE MENU"

The service menu is also accessible via the main menu for adjustments.

"ADJUSTMENTS"



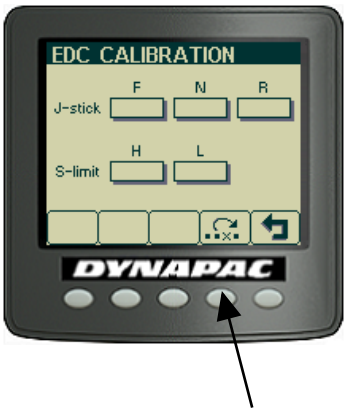
"TESTMODES" - Installation personnel only, requires pin code.



"CALIBRATION" - service personnel only, requires password.

"EDC Calibration" used to calibrate the joystick and speed potentiometer.

"TX Program" only used to change software in the display and requires special equipment and know-how.



"EDC CALIBRATION"

To calibrate, move the joystick fully forward (F) and press in both black buttons on the top of the joystick. (See also manual W3025)

Continue in the same way with the other positions for the joystick (N), (R) and the speed potentiometer.

Press the disk button to save the values.



"ABOUT"

It is also possible to see the version of the installed software.



Operator help when starting

When trying to start the machine without having set one, two or three of the conditions required to start machine, the missing conditions are shown in the display.

The missing conditions must be set before it is possible to start the machine.

Conditions that must be set:

- Activated P-brake

- Selector lever in neutral

- Speed selector for diesel engine in low (Low = idling) (not all models)



Operator help Workmode

When attempting to activate

- Vibration

- Strike-off blade (Optional)

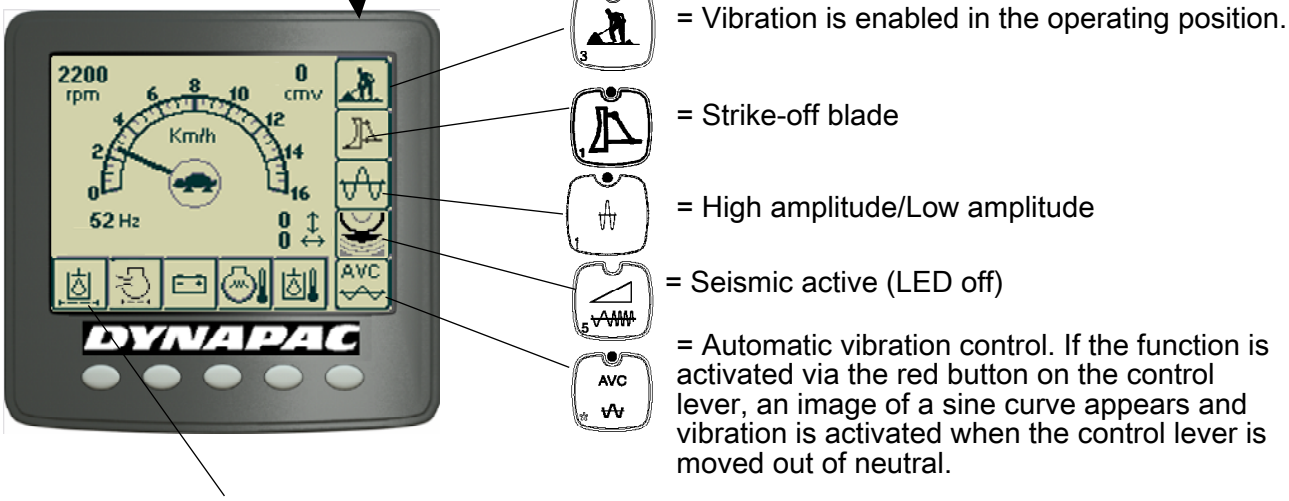
with the machine in Transport mode the display will show "Workmode" for a few seconds.

To activate the above functions it is necessary to make sure that the machine's Workmode is activated.

Display when activating choice via the button set.



The parking symbol is shown when the parking brake is activated.



= Vibration is enabled in the operating position.

= Strike-off blade

= High amplitude/Low amplitude

= Seismic active (LED off)

= Automatic vibration control. If the function is activated via the red button on the control lever, an image of a sine curve appears and vibration is activated when the control lever is moved out of neutral.

= Display of alarm, see table for information.

Instruments and controls, cab

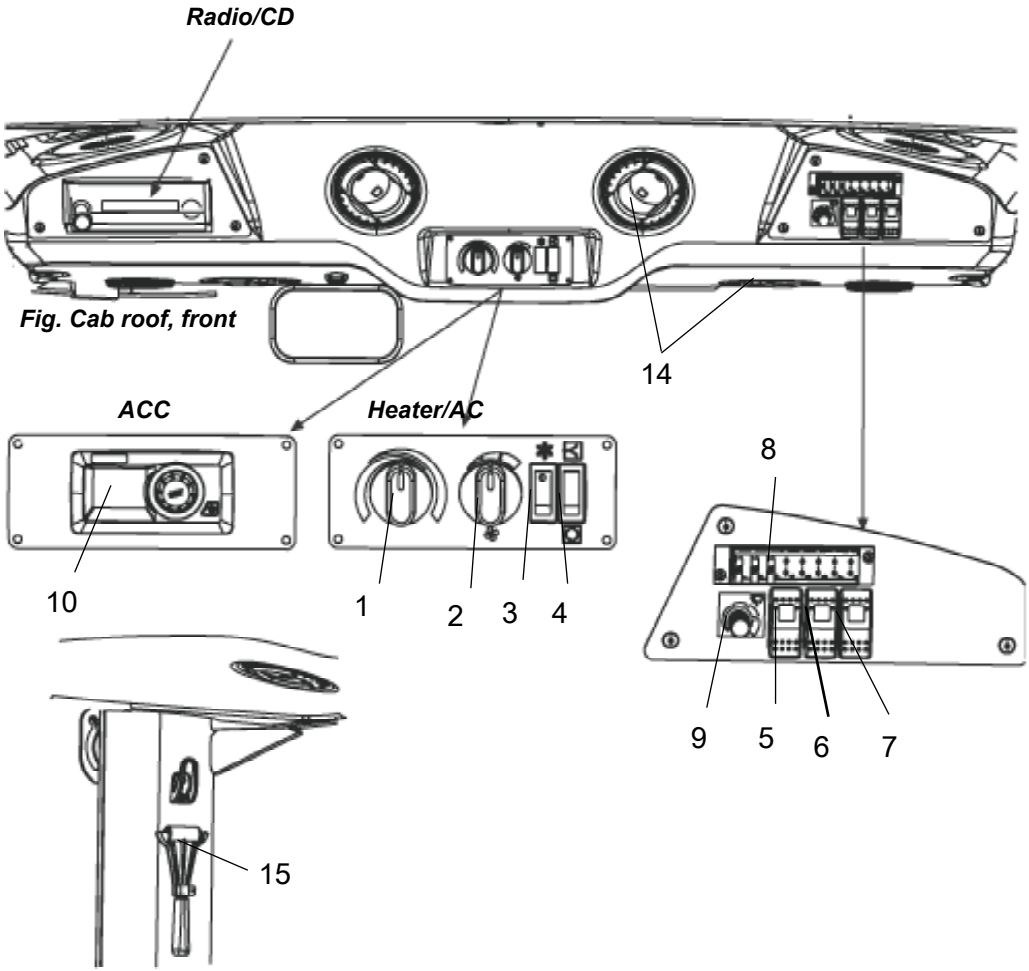
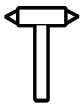


Fig. Cab roof, front

Fig. Right rear cab post
15. Hammer for emergency exit

Function description of instruments and controls in the cab

No	Designation	Symbol	Function
1	Heater control		Turn to the right to increase heating. Turn to the left to reduce heating.
2	Ventilation fan, switch		In the left position, the fan is off. Turning the knob to the right increases the volume of air entering the cab.
3	Air conditioning, switch		Starts and stops the air conditioning.
4	Cab air recirculation, switch	 	Pressing the top opens the air damper so that fresh air comes into the cab. Pressing the bottom closes the damper so that the air recirculates inside the cab.
5	Front wiper, switch		Press to operate the front screen wiper.
6	Rear wiper, switch		Press to operate the rear screen wiper.
7	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.
8	Fuse box		Contains fuses for the electrical system in the cab.
9	Front wiper, intermittent		Intermittent function for front wiper.
10	Automatic Climate Control (ACC) (micro ECC)		Automatic control of the air conditioning.
14	Defroster nozzle		Turn the nozzle to direct the flow of air.
15	Hammer for emergency exit		To escape from the cab in an emergency, release the hammer and break the opening windows on the right-hand side.

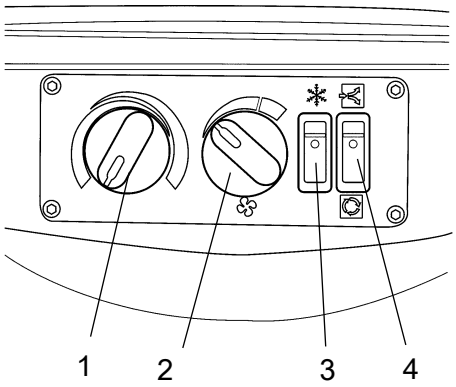
Using the cab controls

Defroster

To quickly remove ice or mist, make sure that only the front and rear air nozzles are open.

Turn the heater and fan dial (1 and 2) to max.

Adjust the nozzle so that it blows on the window to be de-iced, or to remove mist.



AC

Heat

If the cab is cold, open the lower nozzle on the front columns and the middle nozzles just over the controls for the heater and fan.

Turn to max heat and max fan speed.

When the required temperature has been reached, open the other nozzles and if necessary turn down the heat and fan speed.

AC/ACC

NOTE: When using AC/ACC all the windows must be closed for the system to work efficiently.

To quickly reduce the temperature in the cab, adjust the following settings on the control panel.

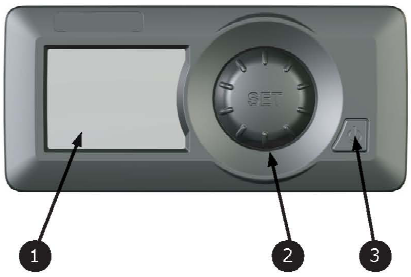
Turn on AC (3) and set the fresh air (4) in the lower position to switch off the fresh air valve.

Set the heater control (1) to minimum and turn up the fan speed (2). Keep only the front middle nozzles in the ceiling open.

When the temperature has dropped to a comfortable level, adjust the required temperature on the heater control (1) and reduce the fan speed (2).

Now open the remaining nozzles in the roof to achieve a comfortable temperature in the cab.

Reset the fresh air button (4) to the upper position for fresh air.



ACC - Control panel

1. LCD Display

During normal operation, the set-point temperature, blower speed, operation mode and fresh/re-circulated air selection are displayed.

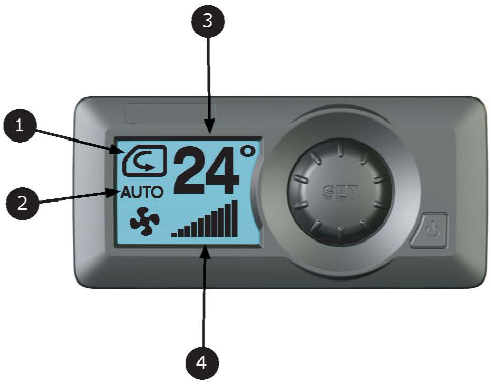
2. SET / SELECT Button

Under normal operation button is used for selecting between modes.

(Also used in Test / diagnostics mode for different choices)

3. Power Button

Device ON/OFF.



Main display screen

1. Air mix control

The air mix can be set to full fresh air or full re-circulated air.

2. Mode

Displays the mode, "Automatic", "Heat", "Cool" and "Defrost"

3. Temperature Set-point

Displays current inside set-point temperature.

4. Blower speed

Displays current blower speed setting.

ACC - Operation menus



Main screen

When the unit is turned on, the main screen will appear. Current set-point temperature, climat control mode, air-circulation and blower speed are displayed.

A small warning icon appears if there is something wrong with the system.



Blower speed settings:

Press SET / SELECT button until the blower icon appears, then turn clockwise to increase blower speed and counterclockwise to decrease blower speed with 5% increments.

The blower speed can not be adjusted in defrost mode (Defrost).



Climate Control mode settings:

Press SET / SELECT button until the climate control mode icon appears, and then turn the button until the required mode is displayed.

AUTO	The system runs automatically to keep the temperature that is selected (set-point temperature).
Cool	A / C compressor is running to cool the interior temperature. Heating valve is turned off while cooling off ("Cool") is selected.
Heat	Interior temperature warms up with the electronic heater valve. A / C compressor is turned off while warming ("Heat") is selected
Defrost	When defrosting ("Defrost") is activated, the A / C compressor is turned on, the blower is turned on full speed and the heater valve is fully open.



Air circulation setting:

Press the SET button until the air circulation mode icon appears.

Turn the knob clockwise to fully recirculated air

or counterclockwise full fresh air.



Display settings:

To adjust the display settings and the temperature scale, press the SET button until the display settings screen appears, then turn the SET button clockwise or counterclockwise to adjust the settings.



Turning HVAC system OFF:

In the main screen, press the Power button to turn off the HVAC system. When the system is turned off, the backlight will turn off and the interior temperature will be displayed on the screen.

To turn off the HVAC system from Defrost mode, press the Power button until the HVAC system returns to the AUTO mode, then press the Power button again to turn off the HVAC unit.



Diesel Heat mode (if diesel heater is installed):

When a Diesel heat mode signal is received, the backlight will be turned off, the blower will run at 15%, the heater valve will be fully opened and the air circulation will switch to fresh air until the after coil temperature is above 20 º C (78 º F). When the after coil temperature is above 20 º C (78 º F), the blower will run at a preset speed. No other function is allowed.

Electrical system

The machine's main switchbox (1) is located on the rear left of the operator's platform. There is a plastic cover over the distribution box and fuses.

On the plastic cover there is a 24V socket (X96) and a 12V socket (X98)(optional).

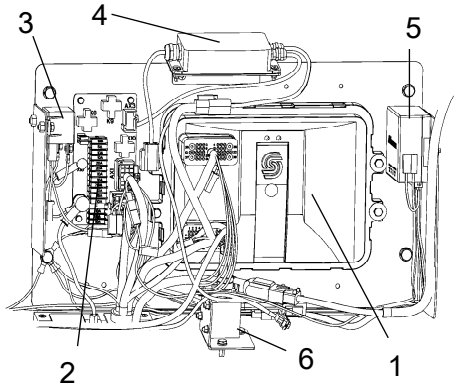
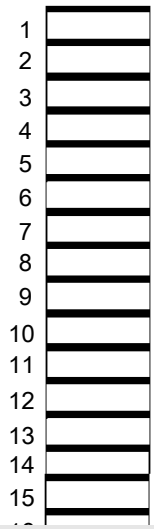


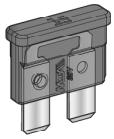
Fig. Main switchbox
1. Control unit (ECU)(A7)
2. Fuse card (A6)
3. Main relay (K2)
4. Power supply (A10), compaction meter(DCM) (Optional)
5. Power converter 24/12V DC (T1)
6. Tilt sensor (B14) (Optional)

Fuses in the main switchbox



The figure shows the position of the fuses.

The table below gives fuse amperage and function. All fuses are flat pin fuses, type C (medium).



F1	Main relay (K2), 24V outlet engine compartment (X97)	10A	F9	Reserve	
F2	ECU (A6), Outlet boot loading (X22), I/O board (A12), display (A13)	5A	F10	Reserve	
F3	ECU PWR1 (A6), Speed sensor (B11)	10A	F11	24V/12V converter (T1)12V power socket (X98), Car stereo (A19)	10A
F4	ECU PWR2 (A6), Forward/Reverse lever (B12)	10A	F12	GPS-receiver (A26), Compaction meter (DCM)(A10,B9), tilt sensor (B14)	10A
F5	ECU PWR 3 (A6)	20A	F13	Reserve	
F6	ECU PWR 4 (A6)	20A	F14	DCA computer (PC)(A25)	10A
F7	24V outlet operator's station (X96), Tachograph (P11)	10A	F15	Indicator relay (K9)	7.5A
F8	Hydraulic/Fuel level sensor	10A	F16	Driving lights relay (pos., low/high beam)(K8)	10A

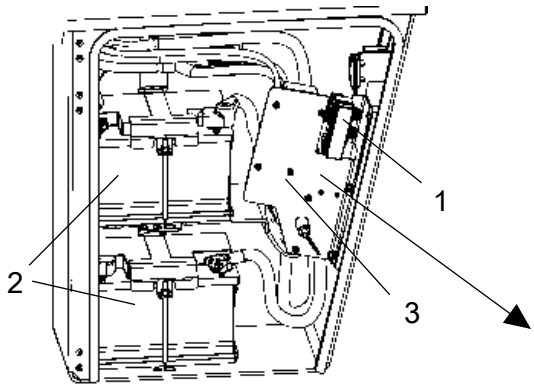
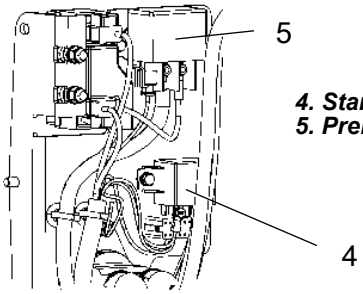


Fig. Cover, left side
1. Fuse box
2. Batteries (x2)
3. Battery disconnector plate

Fuses at master switch (Cummins)

The fuse box (1) is located inside the cover by the steps on the left-hand side of the roller.

This is also where the batteries (2) are, and the starter relay (4) and preheating relay (5) are placed behind the battery disconnector plate (3).



4. Starter relay, 50A
5. Preheating relay, 120A

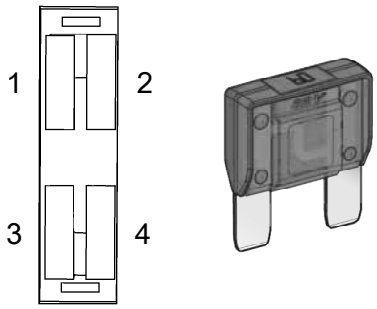


Fig. Fuse box, battery disconnector switch

Fuse box at master switch (Cummins)

The figure shows the position of the fuses.

The amperage and function of the fuses are shown below. All fuses are flat pin fuses.

1.	Main fuse	50A	
2.	Cab	30A	
3.	Diesel engine ECU	30A	(IIIA/T3)
		60A	(IIIB/T4i)
4.	Grid heater	40A	

Fuses in cab

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

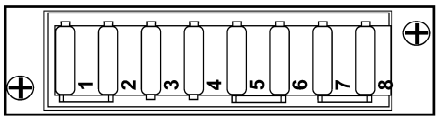


Fig. Cab roof fuse box (F7)

The figure shows fuse amperage and function.

All fuses are flat pin fuses.

1.	Interior lighting	10A
2.	Windscreen wiper/washers	10A
3.	Cab fan	15A
4.	Reserve	
5.	Reserve	
6.	Reserve	
7.	Reserve	
8.	Reserve	

Operation

Before starting

Master switch - Switching on

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

The battery disconnector switch is located inside the cover by the steps on the left-hand side of the roller. Turn the key (1) to the On position. The roller is now supplied with power.

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

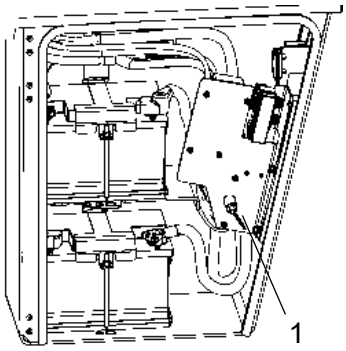


Fig. Cover, left side
1. Battery disconnector switch

Operator's seat - Adjustment

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)
- Back support angle (3)

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

Do not forget to use the seatbelt (4).

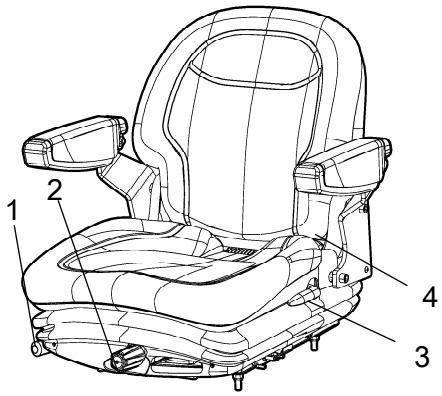


Fig. Operator's seat
1. Lock pack- Length adjustment
2. Weight adjustment
3. Back support angle
4. Seat belt



Belt reminder

The machine can be equipped with seat belt with belt reminder.

Unless the seat belt is used, a warning image appear in the display and a warning buzzer sounds to alert the driver to use the seat belt.

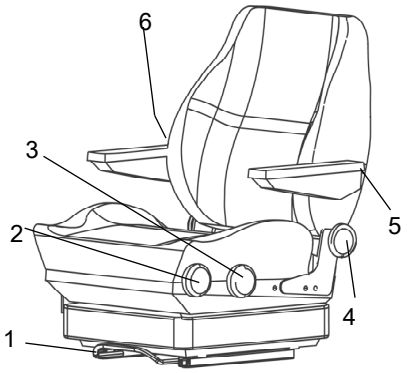


Fig. Operator's seat
1. Lever - length adjustment
2. Wheel - height adjustment
3. Wheel - seat cushion inclination
4. Wheel - backrest inclination
5. Wheel - armrest inclination
6. Wheel - lumbar support adjustment

Operator's seat, comfort - Adjustments

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.

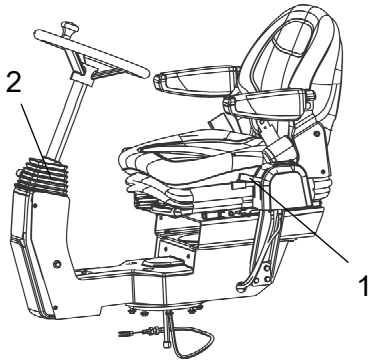


Fig. Operator's station
1. Locking lever - rotation
2. Locking lever - steering column angle

Control panel, adjustments

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

For rotation, lift the lever (1).
Ensure that the control unit locks in position before operating the machine.

Release locking lever (2) to adjust the steering column angle. Lock the steering column in the new position.

To adjust the operator's seat, see the section for basic/comfort seat.

Adjust all settings when the machine is stationary.

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

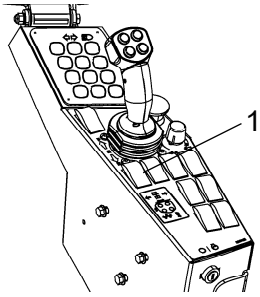


Fig. Control panel
1. Parking brake

Parking brake

Ensure that the parking brake (1) is definitely switched on.

Brake is always activated in Neutral position.
(automatic 1.5 sec.)

The parking brake must be activated to start the machine!

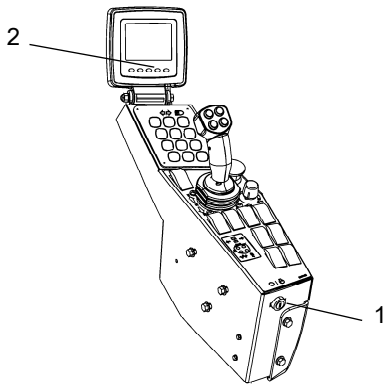


Fig. Control panel
1. Ignition key
2. Status screen

Display - Control

Sit down for all operations.

Turn the ignition key (1) to position I, the start screen will be shown in display.

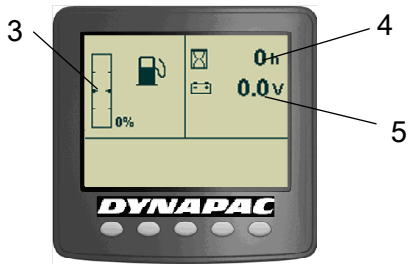


Fig. Status image
3. Fuel level
4. Hourmeter
5. Voltmeter

Check that the voltmeter (5) reads at least 24 volts, and that the fuel gauge (3) show a reading.

The hourmeter (4) registers and shows the total number of hours the engine has run.

Interlock

The roller is equipped with Interlock.

The diesel engine with switch off after 7 seconds if the operator gets off the seat when going forwards/backwards.

If the control is in neutral when the operator stands up a buzzer will go on until the parking brake is activated.

If the parking brake is activated, the diesel engine will not stop if the forward/reverse lever is moved out of neutral.

The diesel engine will switch off immediately if for any reason the forward/reverse lever is moved out of neutral when the operator is not sitting down and the parking brake has not been activated.

Sit down for all operations!

Operator position

If a ROPS (2) (Roll Over Protective Structure) or a cab is fitted to the roller, always wear the seat belt (1) provided and wear a protective helmet.

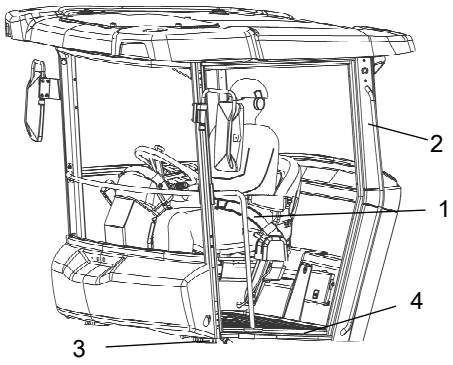


Fig. Operator's station
1. Seat belt
2. ROPS structure
3. Rubber element
4. Anti-slip

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.

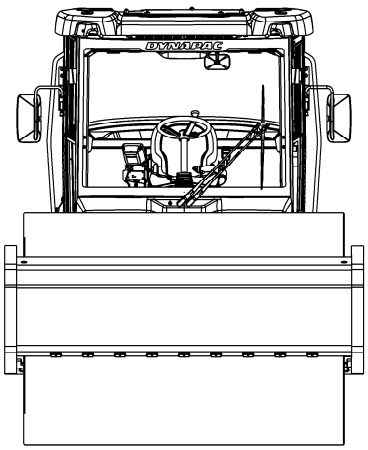


Fig. view

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.

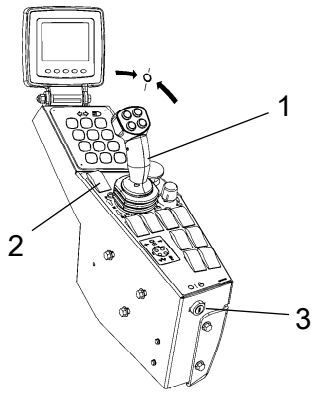


Fig. Control panel
1. F/R lever
2. Rpm switch
3. Ignition key

Starting

Starting the engine

Make sure that the emergency stop is OFF and the parking brake ON.

Set the forward/reverse lever (1) in neutral position, and set the speed selector (2) in the idling position (LO) or (ECO) if that option is installed on the machine.

The diesel engine cannot be started in any other position of the controls.

Turn the ignition key (3) right to position I and then engage the starter by turning it full right. Release back to I as soon as the engine starts.

Do not run the starter motor for too long (max. 30 seconds). If the engine will not start, wait a minute before trying again.

At the start of the diesel engine when the ambient temperature is below +10 ° C (50 ° F), it must be warmed up at idle (low speed) until the hydraulic oil temperature exceeds +10 ° C (50 ° F).

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

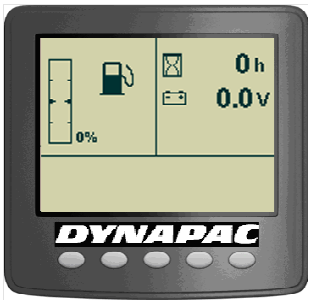


Figure. Display - Status image

While the engine is warming up, check that the fuel indicator shows the level and that the charge shows at least 24V.

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.

The machine always starts in Transport mode and without the option of vibration.

Driving

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.

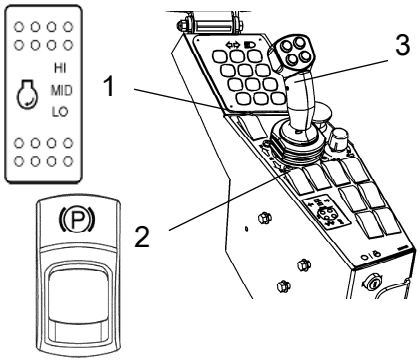


Fig. Control panel
1. Speed selector
2. Parking brake
3. Forward/Reverse lever

Activate working speed (1) = HI or ECO if available.

In ECO, the machine automatically regulates the engine speed according to requirements.

If the machine is only to be transported, MID or ECO should be selected instead.

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.

Release the parking brake (2).

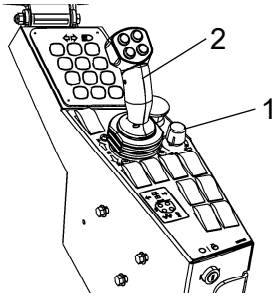


Fig. Control panel
1. Potentiometer (speed limiter)
2. Forward/Reverse lever

Machine with speed limiter (speed potentiometer) - Optional.

Set the potentiometer (1) for variable speed setting in the required mode.

The machine's gear position is shown in the center of the speedometer. Select the gear/speed for the task.



Fig. The display shows the selection in the middle (tortoise, drum spin, wheelspin or hare).

Carefully move the forward/reverse lever (2) forwards or backwards, depending on which direction of travel is required.

Speed increases as the lever is moved away from the neutral position.

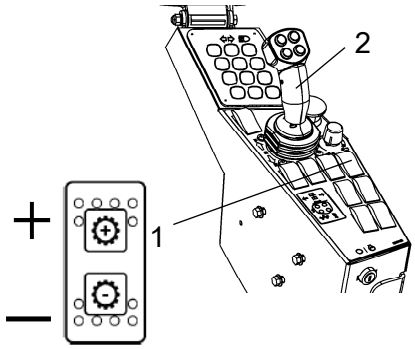


Fig. Control panel
1. Gear position switch
2. Forward/Reverse lever

Machine with gear change in separate spring-return switch (gear position switch)

Switch (1) is a spring-return gear position switch, where gear change is performed by advancing through the four different gear positions: Hare, Drum spin, Wheelspin and Tortoise.

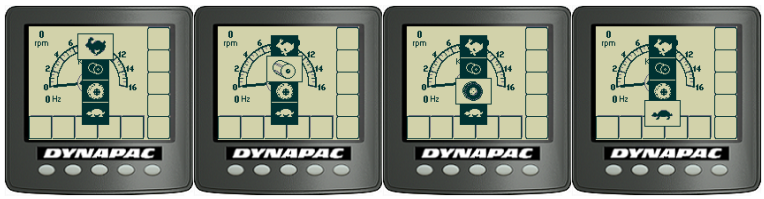




Fig. The display shows the selection in the middle (tortoise, drum spin, wheelspin or hare).

The machine's gear position is shown in the center of the speedometer; select the gear/speed for the task.

The machine does not need to be stopped to change gear position.

		Max. speed	
	= Rabbit (4)	8 km/h	5 mph
	= Drum spin (2)	5,5 km/h	3.5 mph
	= Wheel spin (3)	4 km/h	2.5 mph
	= Turtoise (1)	3 km/h	2 mph

Example is TC - Limited Slip Rear Axle (for other alternatives see table in section for Technical data)

Carefully move the forward/reverse lever (2) forwards or backwards, depending on which direction of travel is required.

The speed increases as the lever is moved away from the neutral position.

Driving on difficult surfaces

If the machine should get stuck, select the gear position that is most suitable for the situation using the gear position switch.

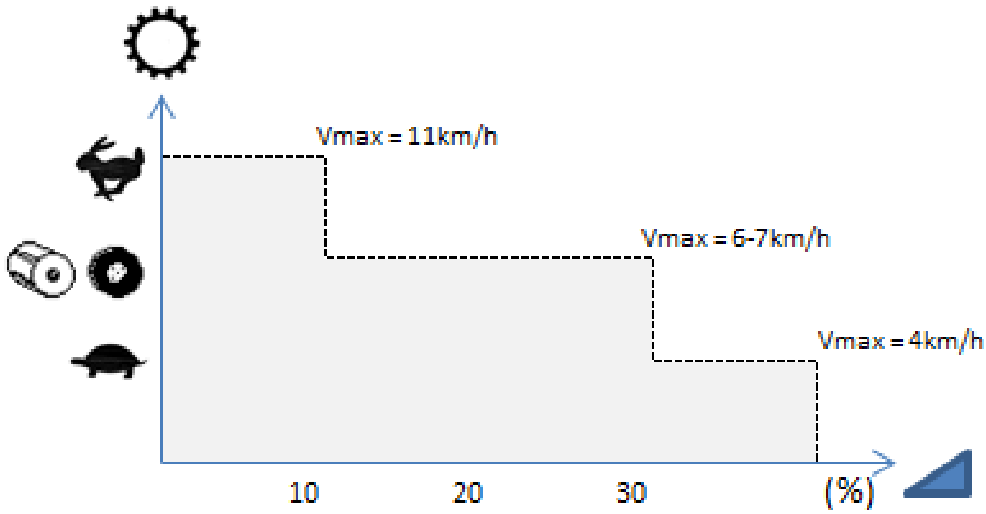
- Drum slipping - select Drum spin mode (gear position 2)
- Rear tires slipping - select Wheelspin mode (gear position 3)

Reset to the original position when the machine has regained traction.

Slopes

To optimize available pulling force and protect the machine's engine against over-revving while working or during transport driving on steep slopes (>10%), you must select **low gear**.

Never drive with a higher gear/at a faster speed that the machine requires to climb up the same slope!



Interlock/Emergency stop/Parking brake - Check

The interlock, emergency stop and parking brake must be checked daily before operating. A function check of the interlock and emergency stop requires a restart.

The interlock function is checked by the operator standing up from the seat when the roller is moving very slowly forwards/backwards. (Check in both directions). Hold the steering wheel firmly and brace yourself for a sudden stop. A buzzer goes on and after 7 seconds the engine switches off and the brakes are activated.

Check the function of the emergency stop by pressing the emergency stop button.

Check the function of the parking brake by activating the parking brake when the roller is moving very slowly forwards/backwards. (Check in both directions). Hold the steering wheel and brace yourself for a sudden stop when the brakes are activated. The engine does not switch off.

Vibration

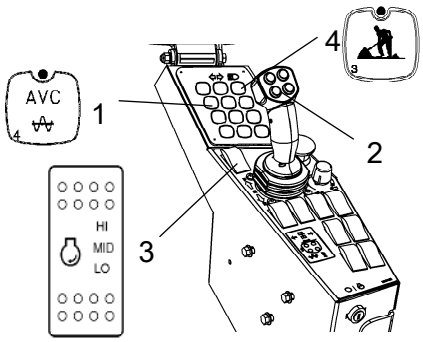


Fig. Control panel
1. Automatic vibration control (AVC)
2. Switch, vibration On/Off
3. Rpm switch
4. Working mode

Manual/Automatic vibration

Activate the button for the Working mode (4).

Manual or automatic vibration activation/deactivation is selected using button (1).

In the manual position, the operator activates vibration using the switch (2) on the forward/reverse lever.

In automatic mode (AVC), vibration is activated when the speed is ≥ 1.5 km/h (0.9 mph) and turns off at a speed of 1.2 km/h (0.75 mph)

Activation of vibration for the first time, as well as disconnection of automatic vibration, are performed with the switch (2) on the forward/reverse lever.

Note that vibration can only be activated when the working mode (4) is activated, and when the speed selector (3) for the engine is in high (HI) or Eco mode (ECO). After 10 seconds in neutral, the vibration is switched off and the machine drops to low speed.

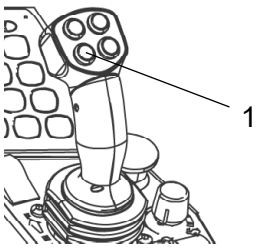


Fig. F/R lever
1. Vibration ON/OFF

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 (1) on the front of the forward/reverse lever.

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

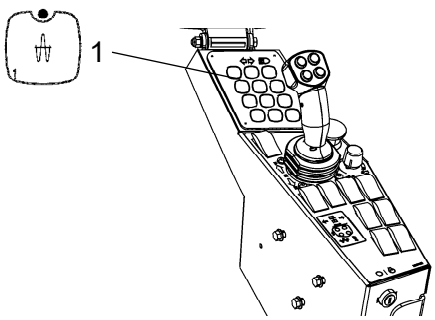


Fig. Control panel
1. High amplitude

Amplitude - Changeover

The amplitude setting must not be change when vibration is in operation
Switch the vibration off and wait until vibration stops before changing amplitude.

By pressing button (1) high amplitude is achieved.

Braking

Normal braking

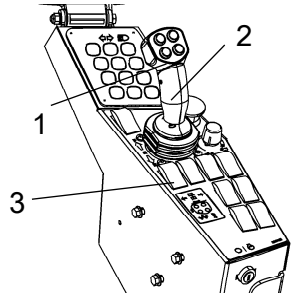


Fig. Control panel
1. Vibration On/Off switch
2. Forward/Reverse lever
3. Parking brake

Press the switch (1) to switch off the vibration.

Move the forward/reverse lever (2) to the neutral position to stop the roller.

Always activate the parking brake (3), before leaving the operator platform.

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.

If the forward/reverse lever is moved quickly (forwards or backwards) toward/past neutral, the system switches to a rapid braking Mode and the machine stops.

Activate normal driving Mode again by moving the forward/reverse lever back to neutral.

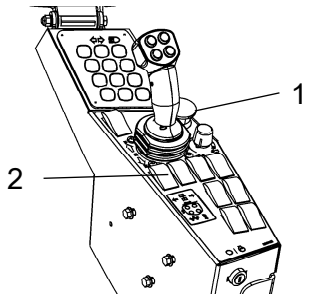


Fig. Control panel
1. Emergency stop
2. Parking brake

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 each drum motor/drum gear and the rear axle also acts a secondary brake when in motion, and as a parking brake when stationary. Activated with the parking brake (2).

For emergency braking, press the emergency stop (1), hold the steering wheel firmly and be prepared for a sudden stop. The engine stops.

The Diesel engine will stop and must be restarted.

After emergency braking, return the forward/reverse lever to neutral and deactivate the emergency stop.

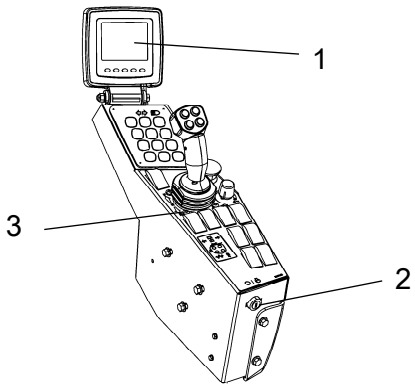


Fig. Control panel
1. Display
2. Ignition lock
3. Parking brake

Switching off

Set the speed control in idling position and allow the engine to idle for a few minutes to cool down.

Check the display to see if any faults are indicated. Switch off all lights and other electrical functions.

Activate the parking brake (3) and then turn the ignition lock (2) to the left to the off position.

Fit the instrument cover on the display and top of the control box (on rollers without cab), and lock it.

Parking

Chocking the drums

Never disembark from the machine when the is engine running, unless the parking brake is activated.

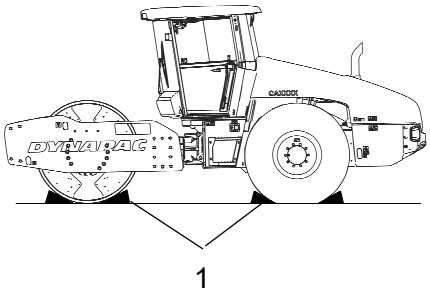


Fig. Positioning
1. Chocks

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.

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.

Master switch

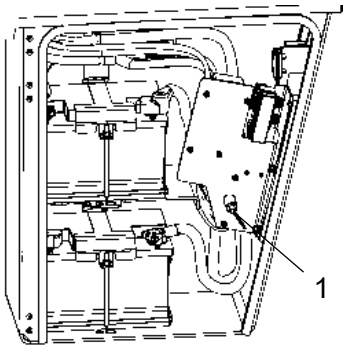


Fig. Cover, left side
1. Master switch

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

Before switching off the battery isolation switch, wait for at least 30 seconds after the ignition lock has been switched off, in order to avoid the engine's electronic control unit (ECU) sustaining damage.

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

Long-term parking

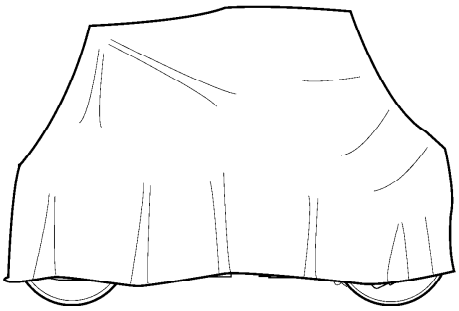


Fig. Roller weather protection

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

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

* Dismantle the battery/batteries from the machine, clean the outside and maintenance charge.

Air cleaner, exhaust pipe

* Cover the air cleaner 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 110 kPa (1.1 kp/cm 2), (16 psi).

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

Locking the articulation

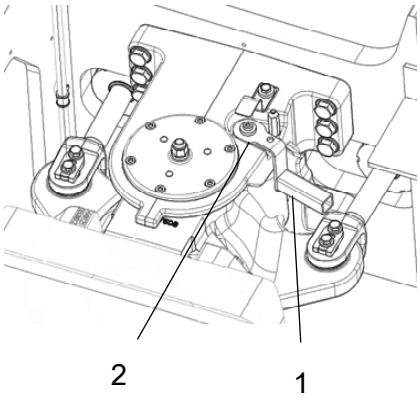


Fig. Steering joint lock, locked
1. Lock handle
2. Locking dowel

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.

Lifting the roller

Weight: refer to the hoisting plate on the roller

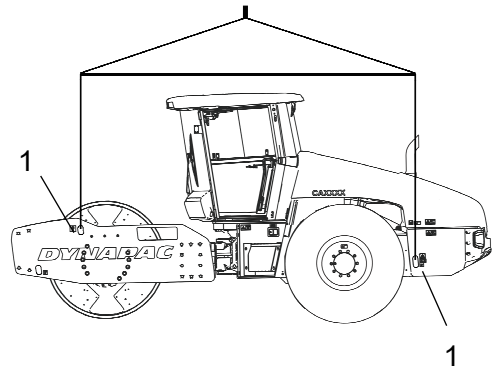


Fig. Roller prepared for lifting
1. Lifting plate

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.

Weight: refer to the hoisting plate on the roller

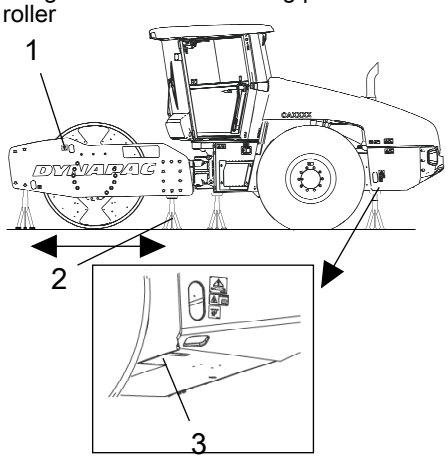


Figure. Roller lifted with jack
1. Lifting plate
2. Jack
3. Marking

Lifting the roller with jack:

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

The lifting device such as a jack (2), or equivalent, must be dimensioned according to the safety regulations for lifting devices.

Do not go under a lifted load! Make sure that the lifting device is secure in its position, and on a level and stable suface.

You are **recommended to lift** the machine with a jack or similar positioned **at the marking** (3) and/or at alternative locations as illustrated. Lifting at any other place can result in damage to the machine or personal injury.

Regarding the drum frame, axle stands can be placed along the entire side plates and cross members if necessary.

Unlocking the articulation

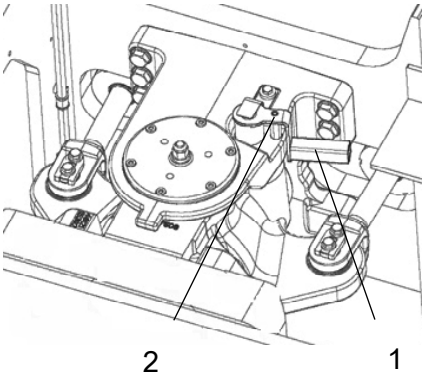


Fig. Steering joint lock, open
1. Lock handle
2. Locking dowel

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.

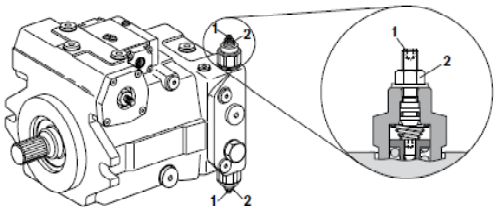


Fig.Propulsion pump - By-pass valves
1. Screw
2. Lock nut

Short distance towing with the engine running

Activate the parking brake, and temporarily stop the engine. Chock the wheels to prevent the roller from moving.

Open the hood and make sure that the propulsion pump is accessible.

On the pump there are two by-pass valves (1) (hex screws), which after loosen the lock nuts (2) half a turn anticlockwise, shall be screwed in clockwise until the screw reaches against the spring washer. Then turn the screw a half turn to put the system in bypass mode and lock the locknut clockwise torque 22 Nm.

This function enables a machine to be moved.

Start the engine and allow it to idle.

Place the Forward/Reverse lever in the forward or reverse position. If the lever is in neutral, the brakes in the hydraulic motors are activated.

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

To disengage the by-pass mode, reset the by-pass valves in reverse order.

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. Be sure to reset the towing valves (by turning them three turns clockwise) after towing.

Short distance towing when the engine is inoperative.

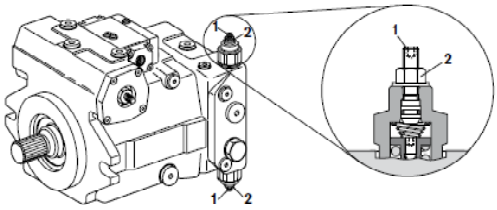


Fig. Propulsion pump - By-pass valves
1. Screw
2. Lock nut

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

Open the hood and make sure that the propulsion pump is accessible.

On the pump there are two by-pass valves (1) (hex screws), which after loosen the lock nuts (2) half a turn anticlockwise, shall be screwed in clockwise until the screw reaches against the spring washer. Then turn the screw a half turn to put the system in bypass mode and lock the locknut clockwise torque 22 Nm.

This function enables a machine to be moved.

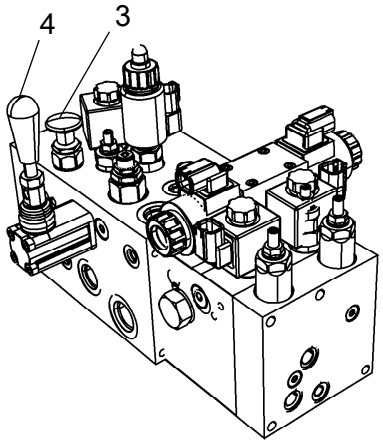


Fig. Valve block, engine compartment
3. Brake release button
4. Pump arm

The release pump for the brakes is located on the valve block, which is positioned in the rear of the engine compartment.

Press the break release button (3).

Pump with the arm (4) until the brakes are released.

The roller can now be towed.

After towing, pull the brake release button (3) up.

To disengage the by-pass mode, reset the by-pass valves in reverse order.

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. Be sure to reset the towing valves (by turning them three turns clockwise) after towing.

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).

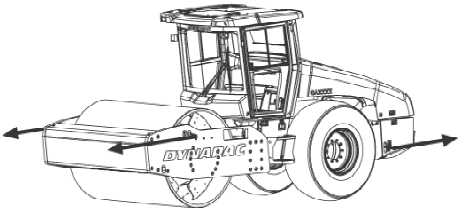


Fig. Towing

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 130 kN (29 250 lbf).

Reverse the towing preparations according to alternative 1 or 2 in the preceding section.

Transport

Tie-down and secure the machine according to the Cargo Securing Certificate for the specific machine if this is avaliable and applicable.

If not, tie down and secure the machine according to the cargo securing rules that are valid for the country where the transport takes place.

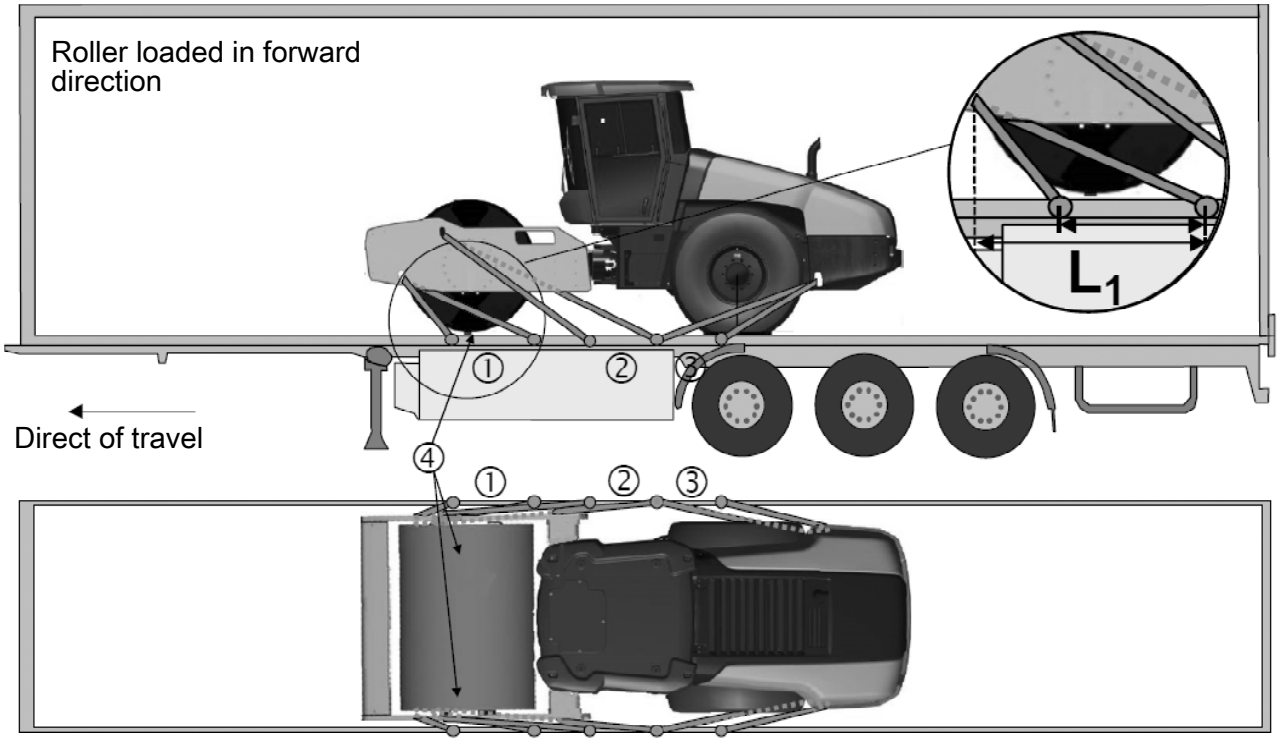
Never lash over the machine's articulated joint, nor over the machine's operator platform.

Before securing the machine ensure that :

- the parking brake is applied and in good working condition
- the articulated joint is in closed position
- the machine is centered laterally on the platform
- the lashings are in good condition and fulfills the corresponding rules for transport securing.

Securing CA2500-CA4600 for loading

Securing the CA2500-4600D/PD vibratory roller from Dynapac for transport.



1 - 3 = double lashings, i.e. one lashing with two parts secured to two different lashing mounts, symmetrically located on the right and left sides.
4 = rubber

The lashings' permitted distance interval in meters		
(1 - 3: Double lashings, LC at least 1.7 tonnes (1700 daN), S_{TF} 300 kg (300daN))		
Double L_1	Double L_2	Double L_3
0,9 - 2,5	0,9 - 2,5	0,1 - 2,5

*For lashing 1 is **L_1** the distance between the lashing point on the edge of the platform and the point directly sideways from the lashing point on the roller perpendicular to the platform edge. The relationship for lashings **L_2 and L_3** is the same.*

Load carrier

- When loaded, the vibratory roller is centered laterally on the platform (± 5 cm).
- The parking brake is applied and in good working condition, and the articulated joint lock is closed.
- The drum is placed on a rubber liner, so that the static friction between the surfaces is at least 0.6.
- The contact surfaces must be clean, wet or dry, and free from frost, ice and snow.
- The lashing mounts on the load carrier have LC/MSL at least 2 tonnes.

Lashings

- The lashings comprise a lashing strap or chain with a permitted load (LC/MSL) of at least 1.7 tonnes (1,700 daN) and a pre-tension S_{TF} of at least 300 kg (300 daN). The lashings are re-tightened as required.
- Each of lashings 1-3 is either a double or two single lashings. A double lashing runs in a sling through a lashing point or around a machine part and down into two different mounts on the platform.
- Lashings in the same direction are placed in different lashing mounts on the trailer. Lashings that are pulled in opposite directions may be placed in the same lashing mount, however.
- The lashings are as short as possible.
- The lashing hooks must not lose grip if the lashings become slack.
- The lashings are protected against sharp edges and corners.
- The lashings are located symmetrically in pairs on the right and left sides.

Operating instructions - Summary



1. **Follow the SAFETY INSTRUCTIONS specified in the Safety Manual.**

2. Ensure that all instructions in the MAINTENANCE section are followed and the steering hitch lock is unlocked.

3. Turn the master switch to the ON position.

4. Move the forward/reverse lever to the NEUTRAL position. Sit down in the seat.

5. Activate the parking brake.

6. Disengage the emergency stop.

7. Set the engine speed switch to idle (LO).

8. Start the engine and allow it to warm up.

9. Set the engine speed switch to Mid/working mode.

10. Deactivate the parking brake.



11. **Drive the roller. Operate the F/R lever with care.**



12. **Test the brakes. Remember that the braking distance will be longer if the hydraulic fluid is cold.**

13. Set the transportation/working mode button in position working mode.

14. Use vibration only when the roller is in motion.



15. **IN AN EMERGENCY:**
    - Press the EMERGENCY STOP.
    - Hold the steering wheel firmly.
    - Brace yourself for a sudden stop.

16. When parking:
    - Activate the parking brake.
    - Switch off the engine and block the drum and wheels if the roller is on an inclined surface.

17. When lifting: - Refer to the relevant section in the Instruction Manual.

18. When towing: - Refer to the relevant section in the Instruction Manual.

19. When transporting: - Refer to the relevant section in the Instruction Manual.

20. 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 stiplulated 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

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

Fluid volumes

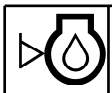
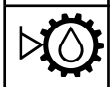
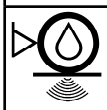
Rear axle (Limited Slip)				
- Differential	3,8	liters	4.0	qts
- Planetary gear	0,7	liters/side	0.74	qts/side
- Pinjong	0,3	liters	0.32	qts
Rear axle (No-Spin), (optional)				
- Differential	8,3	liters	8.8	qts
- Planetary gear	0,65	liters/side	0.69	qts/side
Drum				
- Drum gear	2,5	liters	2.6	qts
- Drum cartridge	2,2	liters/side	2.3	qts/side
Hydraulic reservoir	41	liters	10.8	gal
Oil in hydraulic system	80	liters	21.1	gal
Diesel engine				
- Lubricating oil	7	liters	7.4	qts
- Coolant, without cab (IIIA/T3)	21,5	liters	22.7	qts
- Coolant, without cab (IIIB/T4i)	22	liters	23.3	qts
- Coolant, with cab (IIIA/T3)	23,5	liters	24.8	qts
- Coolant, with cab (IIIB/T4i)	24	liters	25.4	qts

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)
	Ambient air temperature above +40°C (104°F)	Shell Tellus S2 V100	

Bio-Hydr. BIOLOGICAL HYDRAULIC FLUID, PANOLIN	Air temperature -10°C - +35°C (14°F-95°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.	PANOLIN HLP Synth 46 (www.panolin.com)	
DRUM OIL	Air temperature -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)	P/N 4812030096
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)
	Air temperature 0°C (32°F) - above +40°C (104°F)	Shell Spirax S3 AX 85W-140, API GL-5 or equivalent.	
50/50 COOLANT	Anti-freeze protection down to about -37°C (-34.6°F)	**Dynapac coolant 100** (mixed 50/50 with water)	P/N 4812161854 (20 liters)

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

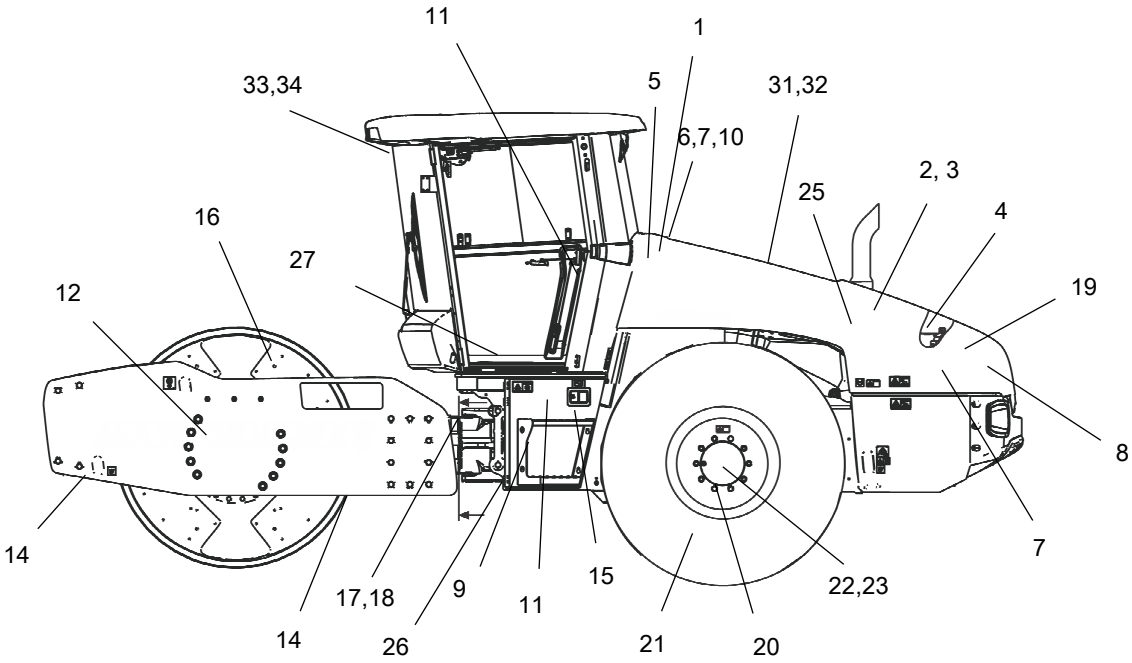


Fig. Service and maintenance points

1. Diesel fuel, filling
2. Oil level, diesel engine
3. Fuel filter, fuel pre-filter
4. Air filter
5. Engine cover, hinges
6. Hydraulic reservoir, sight glass
7. Bleeding filter
8. Hydraulic fluid filter, x1
9. Drainage, hydraulic fluid reservoir
10. Hydraulic fluid, filling
11. Fuse box(es), main fuses
12. Drum cartridge, filling, 2 fillers
14. Scrapers
15. Battery
16. Rubber elements and fastening screws
17. Steering hitch
18. Steering cylinders, x2
19. Drive belts
20. Wheel nuts
21. Tires, pressure
22. Rear axle, differential
23. Rear axle, planetary gears, 2 pcs.
25. Oil filter, diesel engine
26. Draining, fuel tank *
27. Seat bearing *
28. Steering chain *
31. Water cooler
32. Hydraulic fluid cooler
33. Fresh air filter *
34. 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.

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.



Periodic service (service message) - Optional

A Service message (Periodic Service) is shown in the display 15 hours before First Service (50h).

For Periodic Service (250h-1000h) a Service message is shown in the same way but with the difference that it is shown 30 hours before the Periodic service interval.

Service interval	Display start
50h	35h
250h	220h
500h	470h
750h	720h
1000h	970h
The message continues to be displayed for 15 engine starts or until it is reset by the Service tool.	

The alarm message shown is acknowledged by pressing the "OK" button on the display.



A Service symbol is now visible at the bottom of the display screen.

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	
	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
1	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
8	Change the hydraulic fluid filter	
12	Change the drum cartridge oil	
20	Check the wheel-nuts are tightened	
21	Check the tire pressure	
22	Change oil in rear axle differential	
23	Change oil in the rear axle planetary gearing	
13	Change the oil in the drum gearbox	
17	Steering hitch - Tightening	

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	

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
12	Check the oil level in drum cartridges	
23,22	Check the oil level in rear axle/planetary gears	
32,31	Clean the coolers	
16	Check rubber elements and bolted joints	
15	Check batteries	
34	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
4	Inspect the filter element in the air cleaner	Replace as required
32,31	Clean the coolers	
12	Check the oil level in drum cartridges	
23,22	Check the oil level in rear axle/planetary gears	
2,25	Change the engine oil and oil filter. *)	Refer to the engine manual *) 500h or once every 6 months.
3	Replace the fuel filter	Refer to the engine manual
3	Replace the fuel pre-filter	Refer to the engine manual
5	Lubricate controls and joints	
27,28	Lubricate seat bearing/steering chain	Optional
	Check the engine's valve clearance (after the first 500 h)	Refer to the engine manual

Every 1000 hours of operation

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

Pos. in fig	Action	Comment
8	Change the hydraulic fluid filter	
12	Check the oil level in drum cartridges	
4	Inspect the filter element in the air cleaner	Replace as required
22	Change oil in rear axle differential	
23	Change oil in the rear axle planetary gearing	
32,31	Clean the coolers	
3	Replace the fuel filter	Refer to the engine manual
3	Replace the fuel pre-filter	Refer to the engine manual
2,25	Change the engine oil and oil filter. *)	Refer to the engine manual*) 500h or once every 6 months.
7	Check bleeder filter on hydraulic reservoir	
9	Drain the condensate from hydraulic reservoir	
26	Drain condensate from fuel tank	Optional
33	Replace the fresh air filter in the cab	Optional
19	Check belt tension in the drive belt system	Refer to the engine manual
17	Steering hitch - Tightening	

Every 2000 hours of operation

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

Pos. in fig	Action	Comment
6,10	Change the hydraulic fluid	
8	Change the hydraulic fluid filter	
12	Change the oil in the drum cartridges	
4	Inspect the filter element in the air cleaner	Replace as required
22	Change oil in rear axle differential	
23	Change oil in the rear axle planetary gearing	
32,31	Clean the coolers	
3	Replace the fuel filter	Refer to the engine manual
3	Replace the fuel pre-filter	Refer to the engine manual
2,25	Change the engine oil and oil filter. *)	See the engine's instruction manual *) 500 h or once every 6 months.
27,28	Grease the steering bearing / steering chain	Optional
7	Check bleeder filter on hydraulic reservoir	
9	Drain the condensate from hydraulic reservoir	
26	Drain condensate from fuel tank	Optional
34	Overhaul air conditioning	Optional
	Check engine's valve clearances	Refer to the engine manual
19	Check belt tension in the drive belt system	Refer to the engine manual
	Replace the ventilation filter in the crankcase *)	Refer to the engine manual *) only applies to Stage IIIB/Tier 4i
17	Steering hitch - Tightening	

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)	
10	Change the oil in the hydraulic tank	
12	Change the oil in drum cartridges	
4	Inspect the filter element in the air cleaner	Replace as required
22	Check the oil level in the rear axle's differential	
23	Check oil level in rear axle's planetary gearing	
16	Check rubber elements and bolted joints	
9	Drain the condensate from hydraulic reservoir	
26	Drain condensate from fuel tank	Optional
19	Check belt tension in the drive belt system	Refer to the engine manual

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.

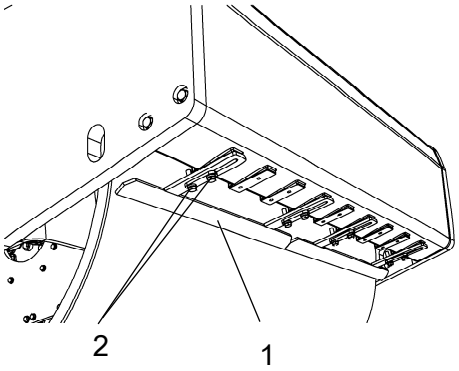


Fig. Scrapers
1. Scraper blade (x 4)
2. Screws

If necessary, adjust distance to the drum as follows:

Loosen the screws (2) on the scraper attachment.

Then adjust the scraper blade (1) to 25 mm (1 in) from the drum.

Tighten the screws (2).

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

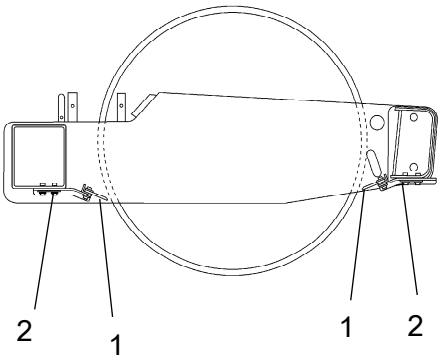


Fig. Scrapers
1. Scraper blade
2. Screws

Flexible scrapers (Optional)

Loosen the screws (2).

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

Tighten the screws (2).

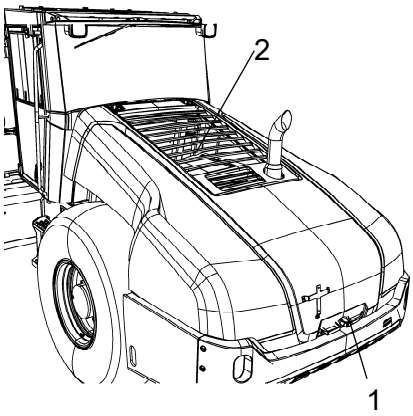


Fig. Engine hood
1. Hood lock
2. Protective grille

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 lock handle (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 gas-springs for the hood are loosend and the hood is raised to its upper position - block the hood so that it cannot fall.

Coolant level - Check

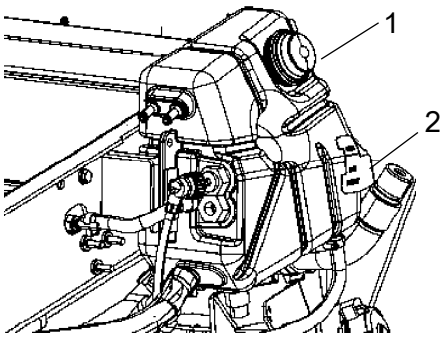


Fig. Expansion tank
1. Filler cap
2. Level indicator

Place the roller on a flat surface and check the level of the coolant (2). Top up with coolant if the level is too low.

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

Fill with a mixture of 50% water and 50% anti freeze. See 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

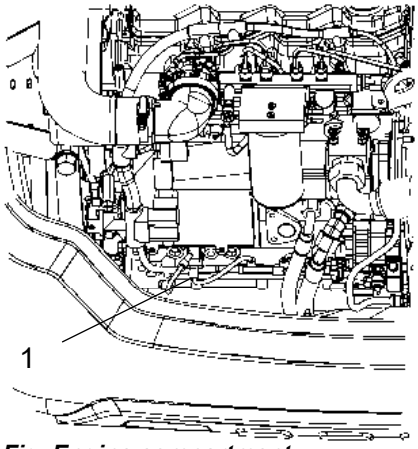


Fig. Engine compartment
1. Dipstick

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 beside the engine's oil and fuel filter.

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.

Fuel tank - Filling

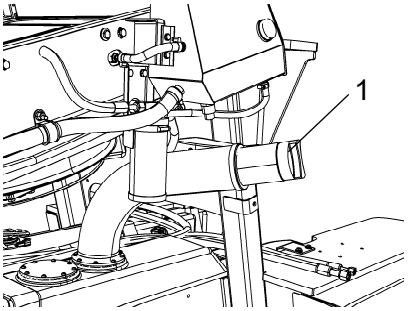


Fig. Fuel tank
1. Filler pipe

Top up the fuel tank every day. Follow the engine manufacturer's specifications for diesel fuel.

Tier 4i/Stage IIIB Cummins engines require the use of Ultra Low Sulphur Diesel (ULSD) fuel, which has a sulphur content of 15 ppm (parts per million) or less. A higher sulphur content will cause operating problems and put the useful life of components at risk, which can lead to engine trouble.

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.

Hydraulic reservoir - Check fluid level

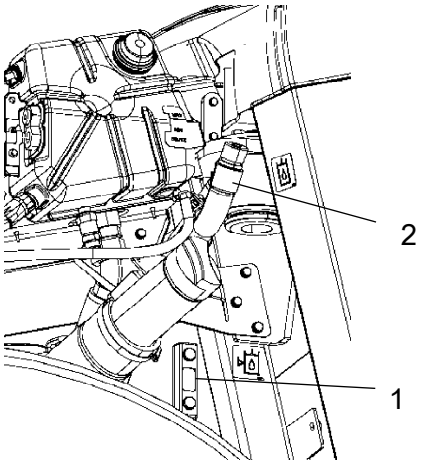


Fig. Hydraulic reservoir
1. Sight glass
2. Filler pipe

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.

The volume between the min. and max. lines is approx. 4 liters (4.2 qts).

Maintenance, first 50h

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

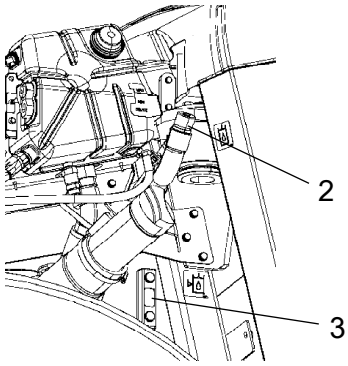


Fig. Hydraulic reservoir
2. Filler cap/Bleeding filter
3. Sight glass

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.

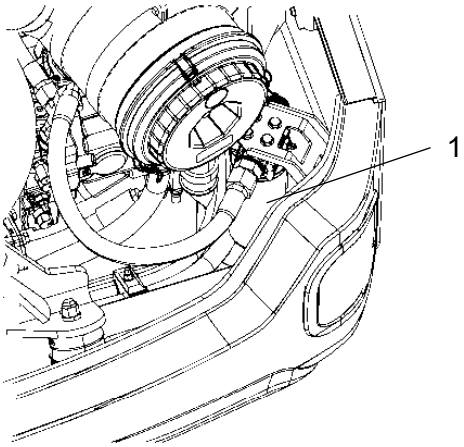


Fig. Engine compartment
1. Hydraulic fluid filter (x1).

Clean thoroughly around the oil filter.

Remove the oil filter (1) and hand in to an environment-friendly waste disposal station. This is a single-use filter and cannot be cleaned.

Make sure that the old sealing ring is not left on the filter holder, Otherwise, this could cause leakage between the new seal and the old one.

Thoroughly clean the filter holder's sealing surfaces.

Apply a thin coat of fresh hydraulic fluid on the new filter seal. Screw tight 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 check that there is no leakage of hydraulic fluid from the filter. Check level of fluid in the sight glass (3) and top up as required.

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

Drum cartridge - Oil change

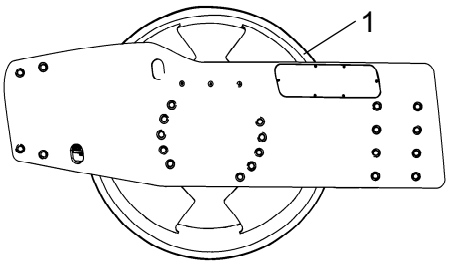


Fig. Left drum side
1. Groove

Position the roller on a flat surface with the groove (1) on the inside of the drum aligned with the top of the drum frame.

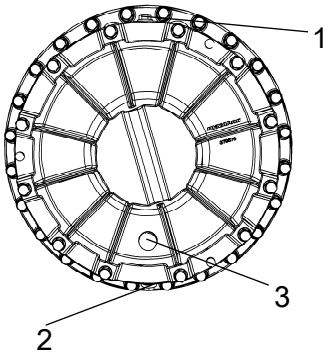


Fig. Left drum side
1. Filler plug
2. Drain plug
3. Sight glass

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

Observe care when draining drum oil/hot drum oil. Wear protective gloves and goggles.

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".

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

Repeat the procedure on the opposite side.

Tires - Air pressure - Wheel nuts - Tightening

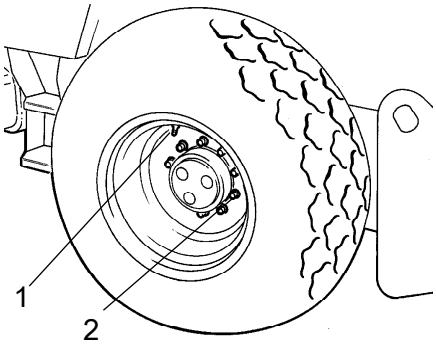


Fig. Wheels
1. Air valve
2. Wheel nut

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.

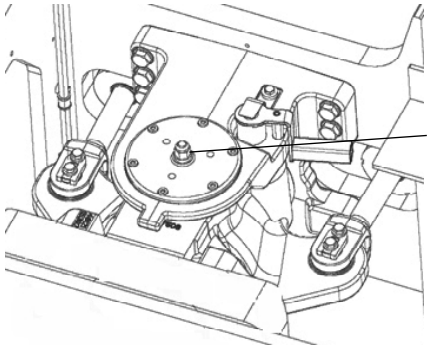


Fig. Steering hitch
1. Nut

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.

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

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

M14	174 Nm
M16	270 Nm

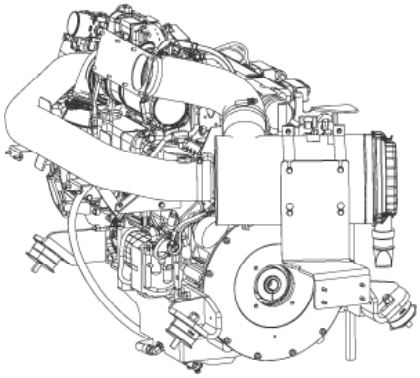
Maintenance - 50h

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
- Check hoses and connections



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.

Replace if necessary, as damage to hoses/hose clamps can seriously damage the engine

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.

Drum cartridge - Checking the oil level

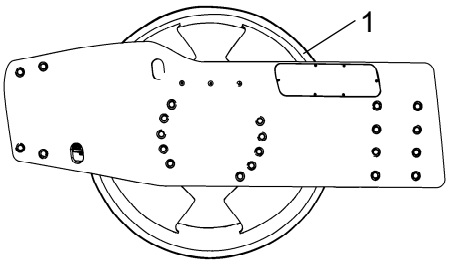


Fig. Left drum side
1. Groove

Position the roller on a flat surface with the groove (1) on the inside of the drum aligned with the top of the drum frame.

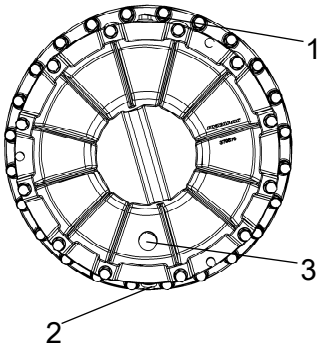


Fig. Left drum side
1. Filler plug
2. Drain plug
3. Sight glass

The oil should now come up to the sight glass (3).

If necessary, release the filler plug (1) and fill to half the sight glass (3).

Clean the magnetic filler plug (1) of any metallic residue, before refitting the plug.

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

Do not overfill with oil - risk for overheating.

Now repeat the procedure on the opposite side of the drum.

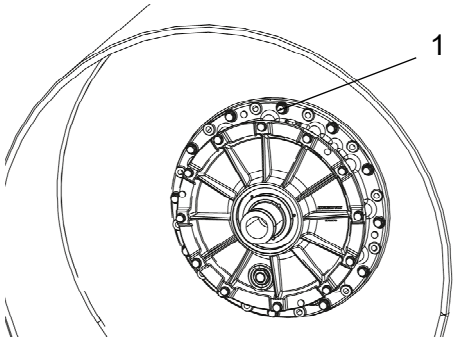


Fig. Drum
1. Ventilation screw

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.

Rear axle differential (No Spin) - Check oil level

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

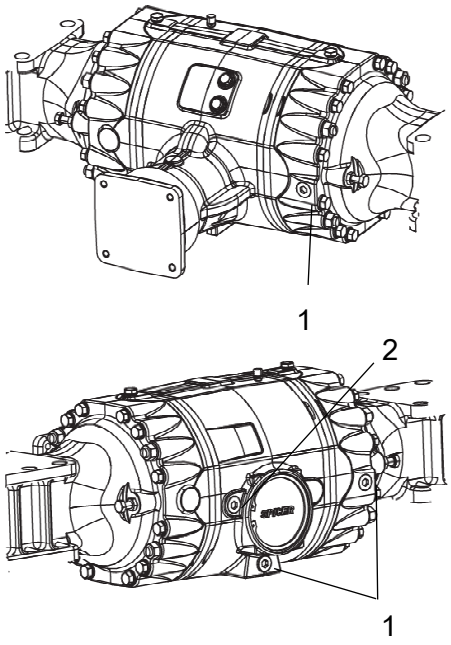


Fig. Level control - differential housing
1. Level plugs (x 3)
2. Filler plug

Wipe clean and remove the level plugs (1) and check that the oil level reaches the lower edge of the plug holes. The plugs can be found at the front or rear of the rear axle.

At a low level, remove the filler plug (2) and top up with oil to the correct level. Use transmission oil, see lubricant specifications.

Clean and refit the plug.

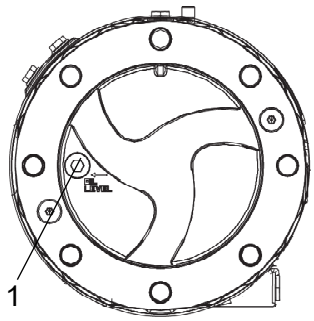


Fig. Level check - planetary gear
1. Level/Filler plug

Rear axle planetary gears (No Spin) - Check oil level

Position the roller so that the level plug (1) in the planetary gear is at "9 o'clock" or "3 o'clock".

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

Clean and refit the plug.

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

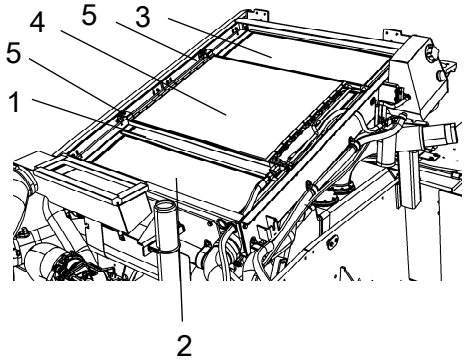


Fig. Engine compartment
1. Water cooler
2. Charge air cooler
3. Hydraulic fluid cooler
4. Condenser element AC (Optional)
5. Screws (x 2)

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.

Undo the two screws (5) and tilt the condenser element upwards.

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.

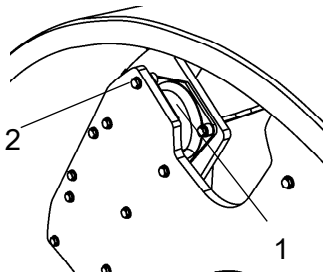


Fig. Drum, drive side
1. Rubber element
2. Attachment screws

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 condition

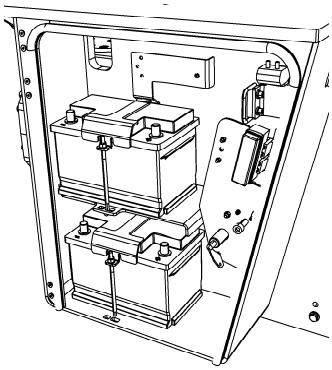


Figure. Batteries

The batteries are sealed and maintenance-free.

Make sure there is no open flame in the vicinity when checking the electrolyte level. Explosive gas is formed when the alternator charges the battery.

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

The cable shoes should be clean and tightened. Corroded cable shoes should be cleaned and greased with acid-proof Vaseline.

Wipe the top of the battery.

Air conditioning (Optional) - Inspection

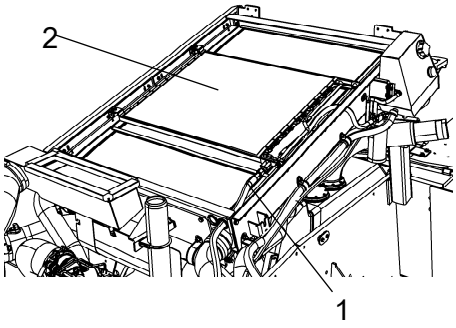


Fig. Air conditioning
1. Refrigerant hoses
2. Condensor element

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

The refrigerant contains tracing liquid, which makes it possible to detect leaks with the aid of a UV lamp. If the areas around the connections are strongly coloured, this is an indication of a leak.

Automatic Climate Control (Optional) - Inspection

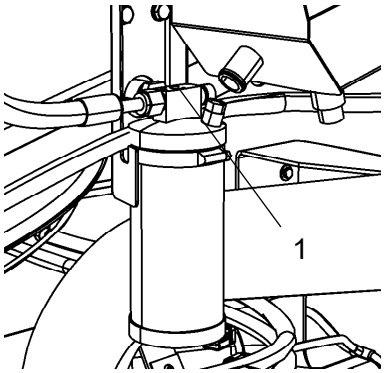


Fig. Drying filter
1. Sight glass

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 right-hand side at the front edge of the engine compartment. If bubbles are visible through the sight glass, this 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.

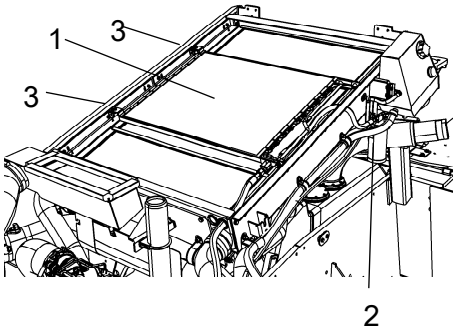


Fig. Engine compartment
1. Condenser element
2. Drying filter
3. Screws (x 2)

If there is a significant loss of cooling capacity, clean the condenser element (1) located above the coolers in the engine compartment.

Undo the two screws (3) and tilt the condenser element (1) upwards.

Also clean the cooling unit in the cab. See under the heading 2000 hours, air conditioning - overhaul.

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.

Air cleaner

Checking - Change the main air filter

Change the air cleaner's main filter when the warning lamp on the display lights when the diesel engine is operating at full speed.

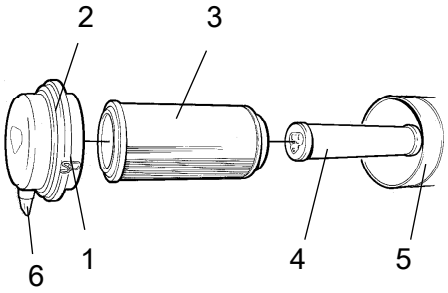


Fig. Air cleaner
1. Clips
2. Cover
3. Main filter
4. Backup filter
5. Filter housing
6. Dust valve

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

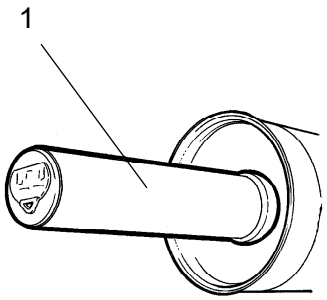


Fig. Air filter
1. Backup filter

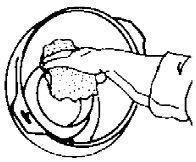
Change the backup filter with a new filter after every second replacement of the main filter.

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.

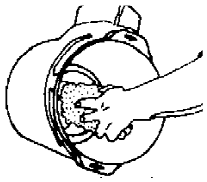
Clean the air cleaner if necessary, see section Air cleaner - Cleaning.

Air cleaner - Cleaning

Wipe clean on both sides of the outlet pipe.



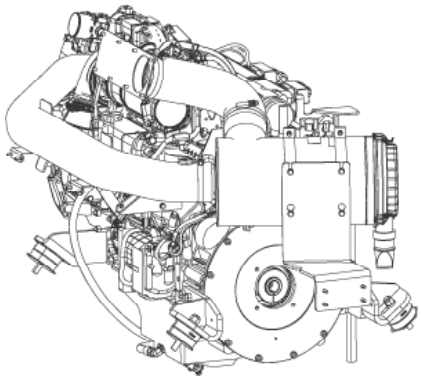
Inner edge of outlet pipe.



Outer edge of outlet pipe.

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

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.

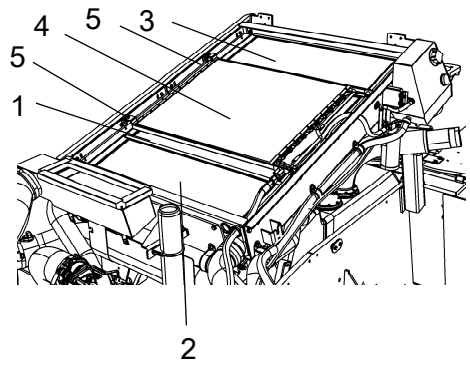


Fig. Engine compartment
1. Water cooler
2. Charge air cooler
3. Hydraulic fluid cooler
4. Condenser element AC (Optional)
5. Screws (x 2)

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.

Undo the two screws (5) and tilt the condenser element upwards.

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.

Drum cartridge - Checking the oil level

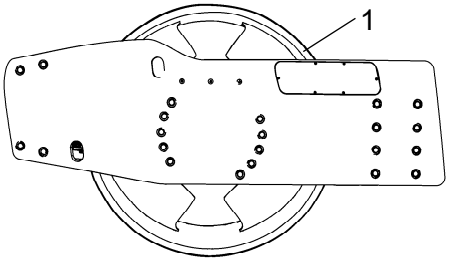


Fig. Left drum side
1. Groove

Position the roller on a flat surface with the groove (1) on the inside of the drum aligned with the top of the drum frame.

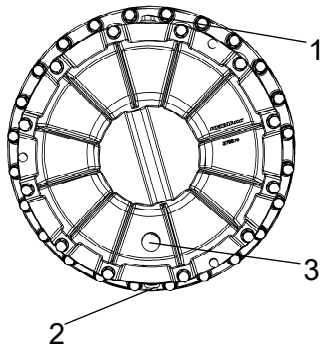


Fig. Left drum side
1. Filler plug
2. Drain plug
3. Sight glass

The oil should now come up to the sight glass (3).

If necessary, release the filler plug (1) and fill to half the sight glass (3).

Clean the magnetic filler plug (1) of any metallic residue, before refitting the plug.

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

Do not overfill with oil - risk for overheating.

Now repeat the procedure on the opposite side of the

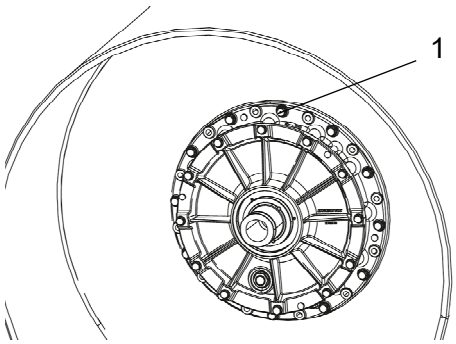


Fig. Drum
1. Ventilation screw

drum.

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.



Rear axle differential (No Spin) - Check oil level

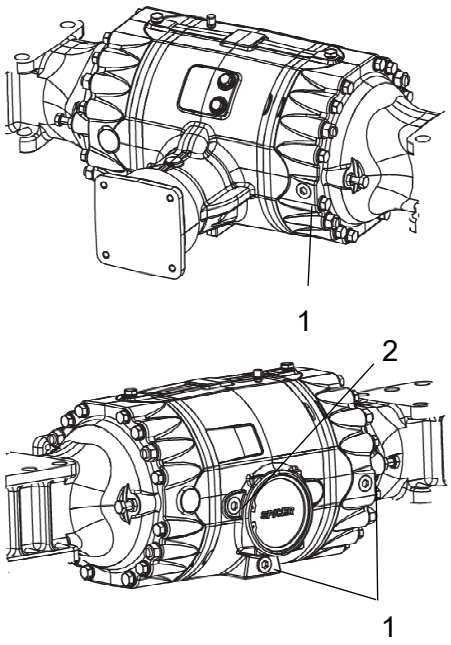


Fig. Level control - differential housing
1. Level plugs (x 3)
2. Filler plug

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

Wipe clean and remove the level plugs (1) and check that the oil level reaches the lower edge of the plug holes. The plugs can be found at the front or rear of the rear axle.

At a low level, remove the filler plug (2) and top up with oil to the correct level. Use transmission oil, see lubricant specifications.

Clean and refit the plug.

Rear axle planetary gears (No Spin) - Check oil level

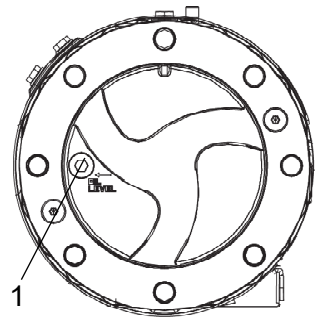


Fig. Level check - planetary gear
1. Level/Filler plug

Position the roller so that the level plug (1) in the planetary gear is at "9 o'clock" or "3 o'clock".

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

Clean and refit the plug.

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

Diesel engine - Oil and Filter change

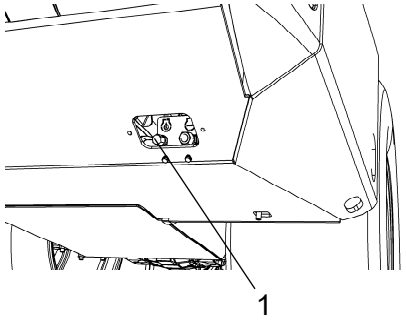


Fig. Tractor frame
1. Drain plug

The oil drain plug (1) can be accessed most easily from the right rear underside of the tractor frame, and is installed with a hose in the engine.

Drain the oil when the engine is warm. Place a receptacle that holds 19 liters (5 gal) under the drain plug.

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

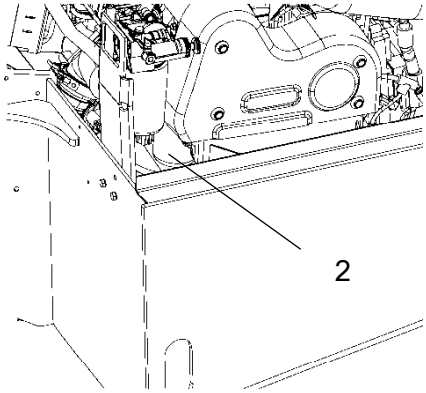


Fig. Engine compartment
2. Oil filter

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

Hand in the drained oil and filter to an environment-friendly waste disposal station.

Fuel pre-filter - Replacement

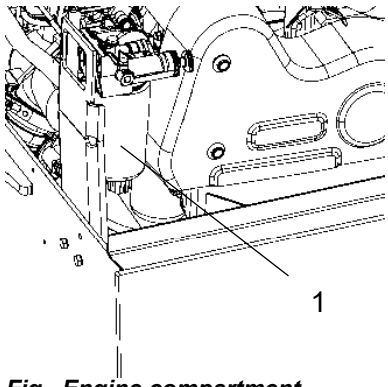


Fig. Engine compartment
1. Fuel prefilter

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

See the engine's instruction manual for filter replacement, in the Fuel system chapter.

Replacing the fuel filter

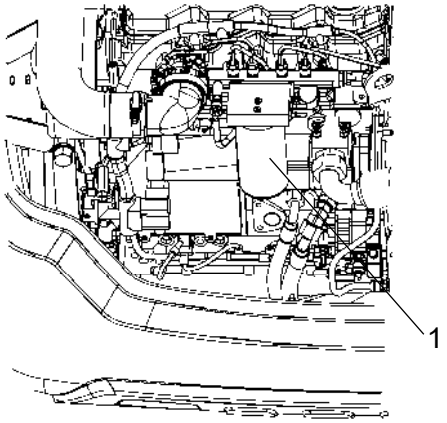


Fig. Engine compartment
1. Fuel filter

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. Han in to environment-friendly station.

Deliver the drain oil to environmentally correct handling.

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

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

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

NOTE! The new fuel filters must not under any circumstances be pre-filled with fuel due to the purity requirements of the fuel system.

Hood, hinges - Lubrication

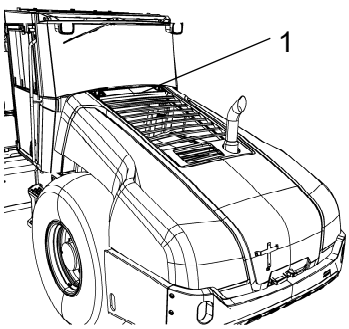


Fig. Hood
1. Hinge

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.

Seat bearing - Lubrication

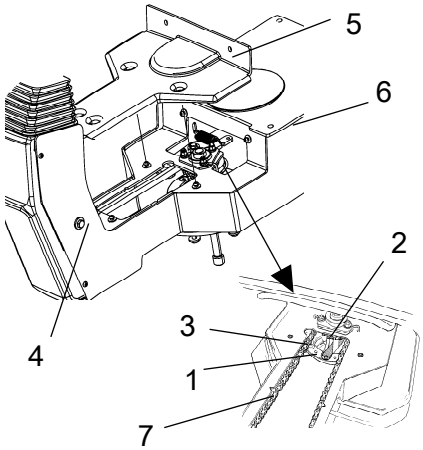


Figure. Seat bearing
1. Grease nipple
2. Gearwheel
3. Steering chain
4. Adjusting screw
5. Cover
6. Slide rails
7. Marking

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

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.

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

Also grease the seat slide rails (6).

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.

No not tension the chain too tightly. It should be possible to move the chain about 10 mm (0.4 in) to the side with a forefinger/thumb at the marking (7) in seat frame. Fit the chain lock at the bottom.

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

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

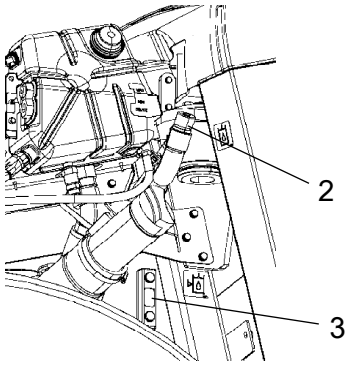


Fig. Hydraulic reservoir
2. Filler cap/Bleeding filter
3. Sight glass

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.

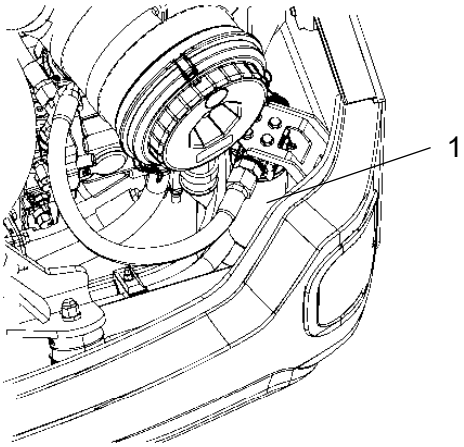


Fig. Engine compartment
1. Hydraulic fluid filter (x1).

Clean thoroughly around the oil filter.

Remove the oil filter (1) and hand in to an environment-friendly waste disposal station. This is a single-use filter and cannot be cleaned.

Make sure that the old sealing ring is not left on the filter holder, Otherwise, this could cause leakage between the new seal and the old one.

Thoroughly clean the filter holder's sealing surfaces.

Apply a thin coat of fresh hydraulic fluid on the new filter seal. Screw tight 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 check that there is no leakage of hydraulic fluid from the filter. Check level of fluid in the sight glass (3) and top up as required.

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

Drum cartridge - Checking the oil level

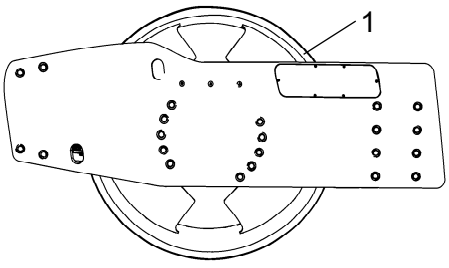


Fig. Left drum side
1. Groove

Position the roller on a flat surface with the groove (1) on the inside of the drum aligned with the top of the drum frame.

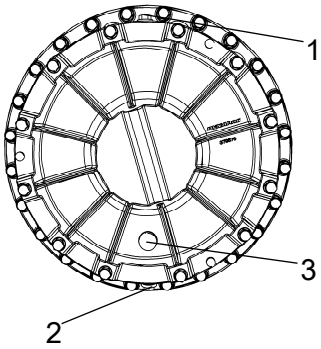


Fig. Left drum side
1. Filler plug
2. Drain plug
3. Sight glass

The oil should now come up to the sight glass (3).

If necessary, release the filler plug (1) and fill to half the sight glass (3).

Clean the magnetic filler plug (1) of any metallic residue, before refitting the plug.

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

Do not overfill with oil - risk for overheating.

Now repeat the procedure on the opposite side of the drum.

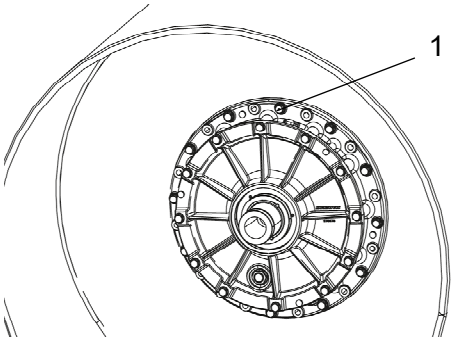


Fig. Drum
1. Ventilation screw

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.

Air cleaner
Checking - Change the main air filter

Change the air cleaner's main filter when the warning lamp on the display lights when the diesel engine is operating at full speed.

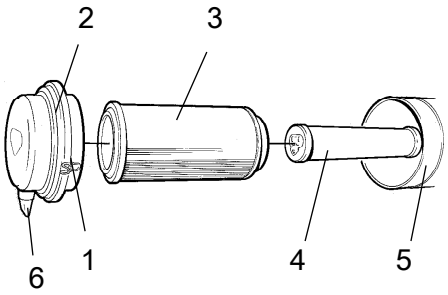


Fig. Air cleaner
1. Clips
2. Cover
3. Main filter
4. Backup filter
5. Filter housing
6. Dust valve

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

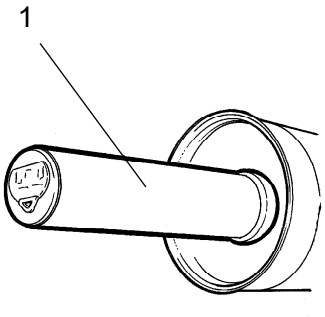


Fig. Air filter
1. Backup filter

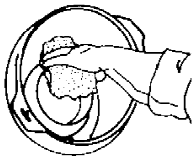
Change the backup filter with a new filter after every second replacement of the main filter.

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.

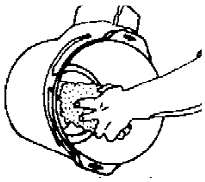
Clean the air cleaner if necessary, see section Air cleaner - Cleaning.



Wipe clean on both sides of the outlet pipe.



Inner edge of outlet pipe.

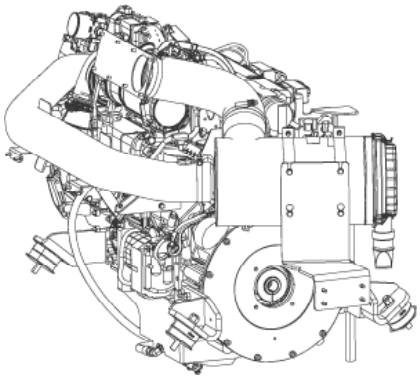


Outer edge of outlet pipe.

Air cleaner
- Cleaning

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

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.

Rear axle differential (No Spin) - Oil change

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

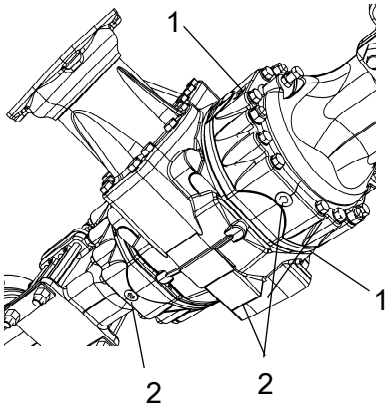


Fig. Rear axle, underside
1. Level/Filler plugs (x 3)
2. Drain plugs (x 3)

Wipe clean and remove the three level/filler plugs (1) and (3) and all three drain plugs (2). The level/filler plugs are located on the front and rear of the axle, and the drain plugs are located on the underside and rear. Drain the oil into a container. The volume is approx. 8.3 litres (8.8 qts).

Deliver the drain oil to environmentally correct handling.

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 planetary gear (No Spin) - Oil change

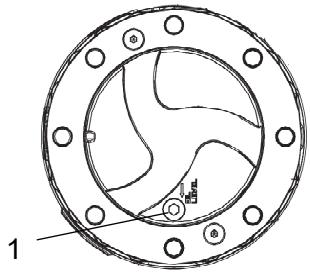


Fig. Planetary gear/drainage position
1. Plug

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

Wipe clean, unscrew the plug (1) and drain the oil into a suitable receptacle. The volume is approximately 0.65 liters (0.7 qts).

Oil should be taken to your local waste disposal station.

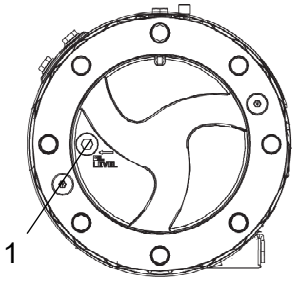


Fig. Planetary gear/filling position
1. Plug

Position the roller so that the plug (1) in the planetary gear is at "9 o'clock" or "3 o'clock".

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.

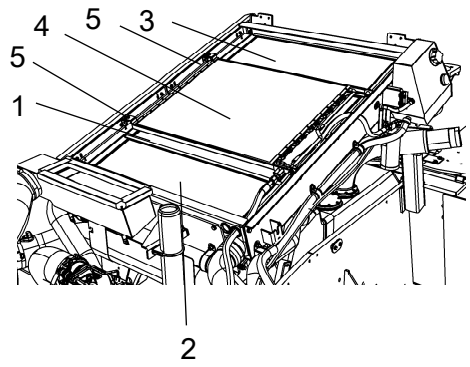


Fig. Engine compartment
1. Water cooler
2. Charge air cooler
3. Hydraulic fluid cooler
4. Condenser element AC (Optional)
5. Screws (x 2)

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.

Undo the two screws (5) and tilt the condenser element upwards.

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.

Fuel pre-filter - Replacement

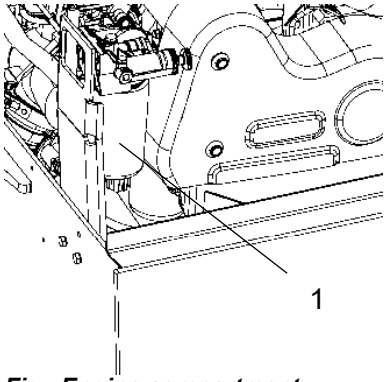


Fig. Engine compartment
1. Fuel prefilter

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

See the engine's instruction manual for filter replacement, in the Fuel system chapter.

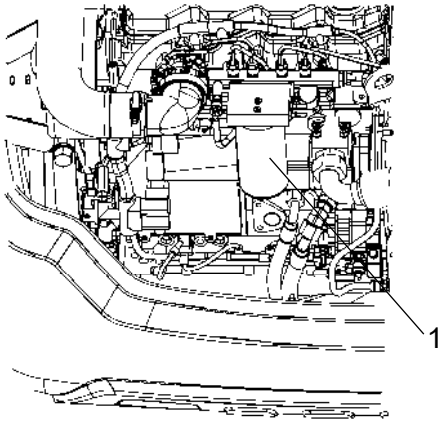


Fig. Engine compartment
1. Fuel filter

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. Han in to environment-friendly station.

Deliver the drain oil to environmentally correct handling.

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

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

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

NOTE! The new fuel filters must not under any circumstances be pre-filled with fuel due to the purity requirements of the fuel system.

Diesel engine - Oil and Filter change

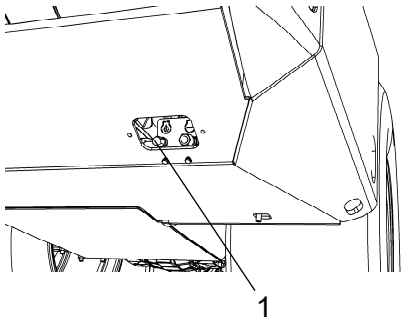


Fig. Tractor frame
1. Drain plug

The oil drain plug (1) can be accessed most easily from the right rear underside of the tractor frame, and is installed with a hose in the engine.

Drain the oil when the engine is warm. Place a receptacle that holds 19 liters (5 gal) under the drain plug.

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

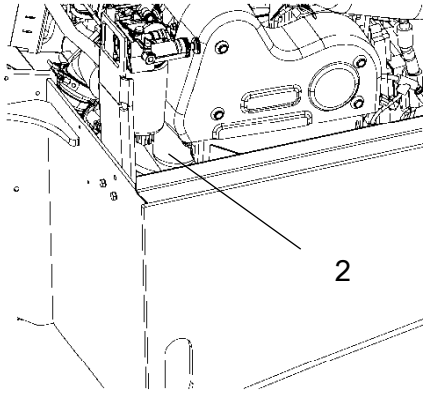


Fig. Engine compartment
2. Oil filter

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

Hand in the drained oil and filter to an environment-friendly waste disposal station.

Hood, hinges - Lubrication

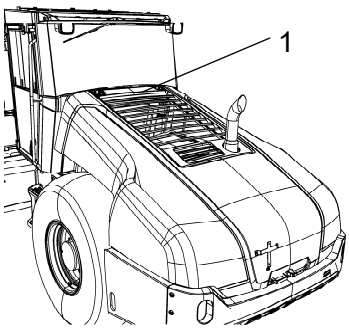


Fig. Hood
1. Hinge

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.

Seat bearing - Lubrication

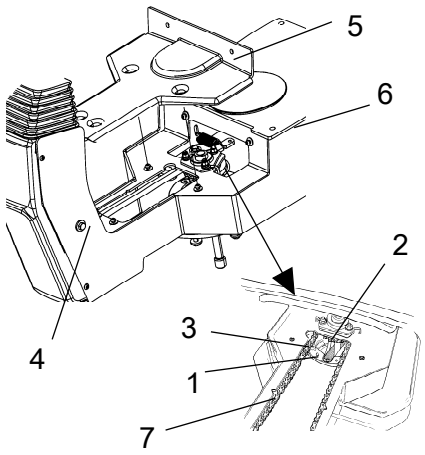


Figure. Seat bearing
1. Grease nipple
2. Gearwheel
3. Steering chain
4. Adjusting screw
5. Cover
6. Slide rails
7. Marking

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

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.

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

Also grease the seat slide rails (6).

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.

No not tension the chain too tightly. It should be possible to move the chain about 10 mm (0.4 in) to the side with a forefinger/thumb at the marking (7) in seat frame. Fit the chain lock at the bottom.

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

Hydraulic reservoir - Draining

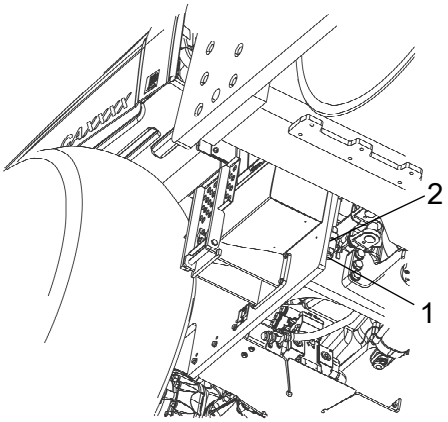


Fig. Machine's right underside
1. Drain cock
2. Plug

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 - Draining (Optional)

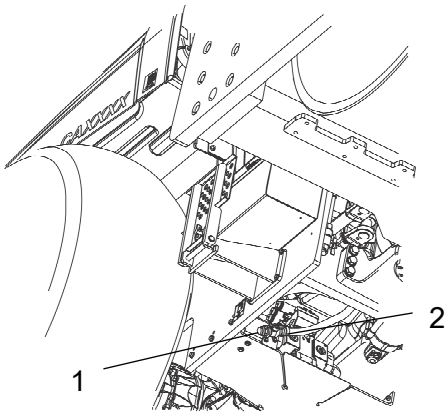


Fig. Machine's right underside
1. Drain plug
2. Drain cock

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.

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).

Loosen the drain plug (1). Then open the drain cock (2) and drain out water and sediment until only pure diesel fuel emerges at the plug. Close the drain cock and screw in the plug again.

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.

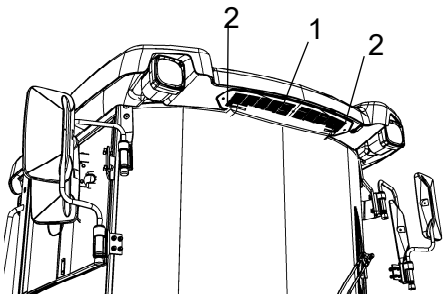


Fig. Cab
1. Fresh air filter (x 2)
2. Screws (x 3)

There is a fresh air filter (1), located at the front of the cab.

Undo the three screws (2) and remove the protective cover.

Remove the two air filter inserts and replace with new ones.

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

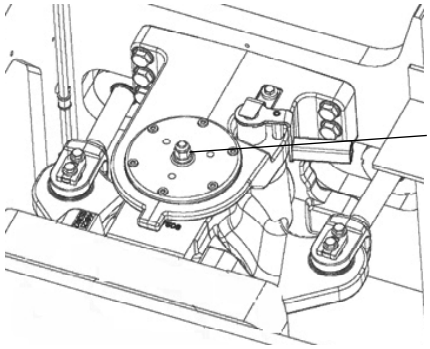


Fig. Steering hitch
1. Nut

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.

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

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

M14	174 Nm
M16	270 Nm

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 reservoir - Oil change

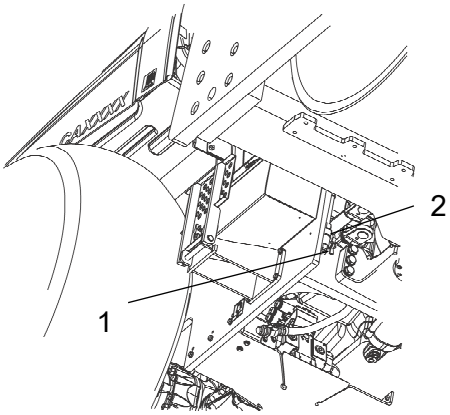


Fig. Machine's right underside
1. Drain cock
2. Plug

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.

A suitable receptacle may be an empty oil drum or similar item which is placed beside the roller. The oil then runs from the drain cock (1) to the receptacle, after the plug (2) has been removed and the cock opened.

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

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.

Hydraulic filter - Replacement

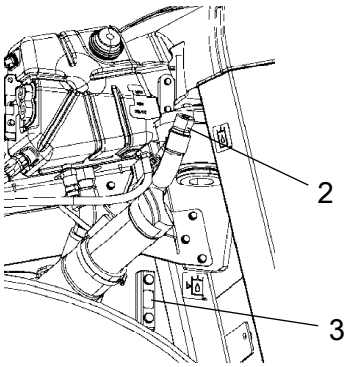


Fig. Hydraulic reservoir
2. Filler cap/Bleeding filter
3. Sight glass

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.

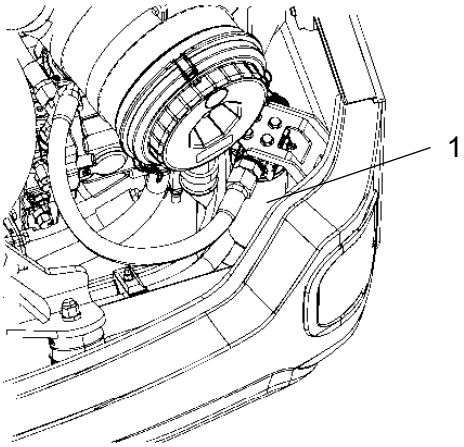


Fig. Engine compartment
1. Hydraulic fluid filter (x1).

Clean thoroughly around the oil filter.

Remove the oil filter (1) and hand in to an environment-friendly waste disposal station. This is a single-use filter and cannot be cleaned.

Make sure that the old sealing ring is not left on the filter holder, Otherwise, this could cause leakage between the new seal and the old one.

Thoroughly clean the filter holder's sealing surfaces.

Apply a thin coat of fresh hydraulic fluid on the new filter seal. Screw tight 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 check that there is no leakage of hydraulic fluid from the filter. Check level of fluid in the sight glass (3) and top up as required.

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

Drum cartridge - Checking the oil level

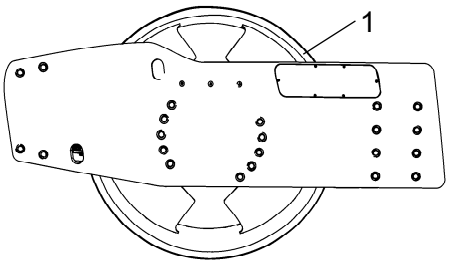


Fig. Left drum side
1. Groove

Position the roller on a flat surface with the groove (1) on the inside of the drum aligned with the top of the drum frame.

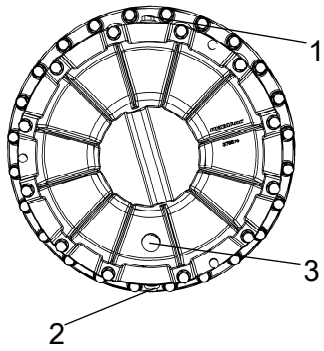


Fig. Left drum side
1. Filler plug
2. Drain plug
3. Sight glass

The oil should now come up to the sight glass (3).

If necessary, release the filler plug (1) and fill to half the sight glass (3).

Clean the magnetic filler plug (1) of any metallic residue, before refitting the plug.

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

Do not overfill with oil - risk for overheating.

Now repeat the procedure on the opposite side of the drum.

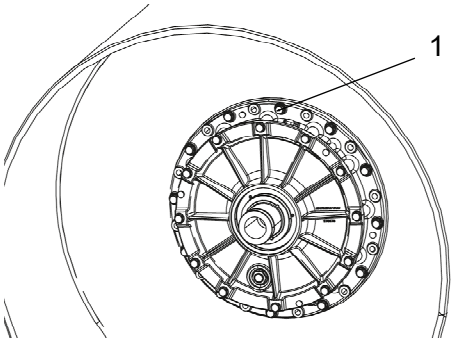


Fig. Drum
1. Ventilation screw

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.

Air cleaner
Checking - Change the main air filter

Change the air cleaner's main filter when the warning lamp on the display lights when the diesel engine is operating at full speed.

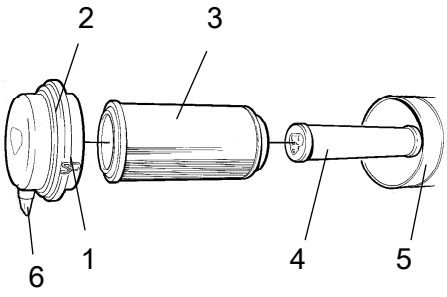


Fig. Air cleaner
1. Clips
2. Cover
3. Main filter
4. Backup filter
5. Filter housing
6. Dust valve

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

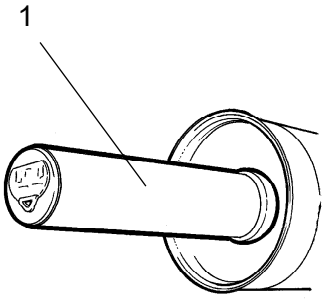


Fig. Air filter
1. Backup filter

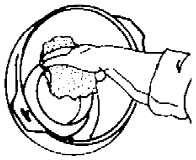
Change the backup filter with a new filter after every second replacement of the main filter.

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.

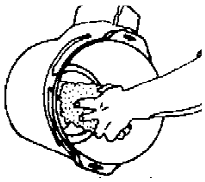
Clean the air cleaner if necessary, see section Air cleaner - Cleaning.



Wipe clean on both sides of the outlet pipe.



Inner edge of outlet pipe.

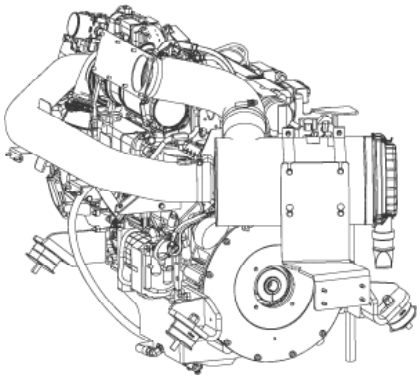


Outer edge of outlet pipe.

Air cleaner
- Cleaning

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

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.

Rear axle differential (No Spin) - Oil change

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

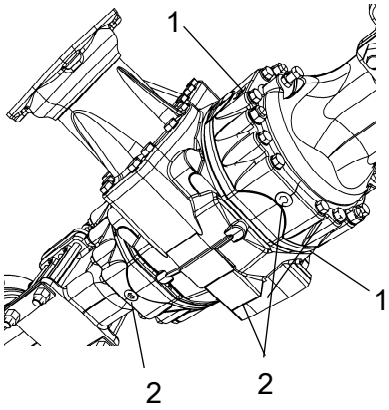


Fig. Rear axle, underside
1. Level/Filler plugs (x 3)
2. Drain plugs (x 3)

Wipe clean and remove the three level/filler plugs (1) and (3) and all three drain plugs (2). The level/filler plugs are located on the front and rear of the axle, and the drain plugs are located on the underside and rear. Drain the oil into a container. The volume is approx. 8.3 litres (8.8 qts).

Deliver the drain oil to environmentally correct handling.

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 planetary gear (No Spin) - Oil change

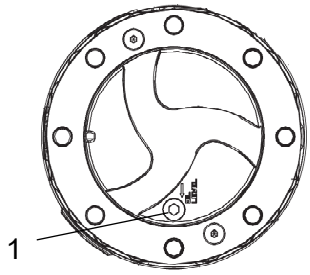


Fig. Planetary gear/drainage position
1. Plug

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

Wipe clean, unscrew the plug (1) and drain the oil into a suitable receptacle. The volume is approximately 0.65 liters (0.7 qts).

Oil should be taken to your local waste disposal station.

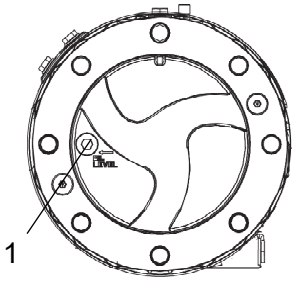


Fig. Planetary gear/filling position
1. Plug

Position the roller so that the plug (1) in the planetary gear is at "9 o'clock" or "3 o'clock".

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.

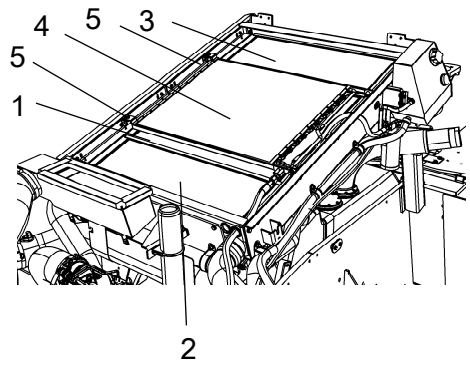


Fig. Engine compartment
1. Water cooler
2. Charge air cooler
3. Hydraulic fluid cooler
4. Condenser element AC (Optional)
5. Screws (x 2)

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.

Undo the two screws (5) and tilt the condenser element upwards.

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.

Fuel pre-filter - Replacement

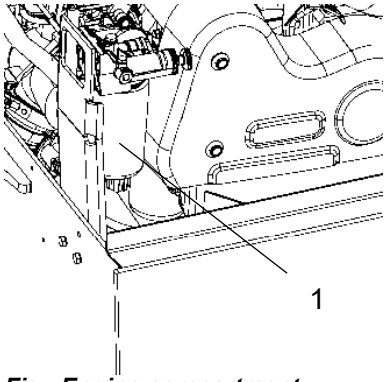


Fig. Engine compartment
1. Fuel prefilter

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

See the engine's instruction manual for filter replacement, in the Fuel system chapter.

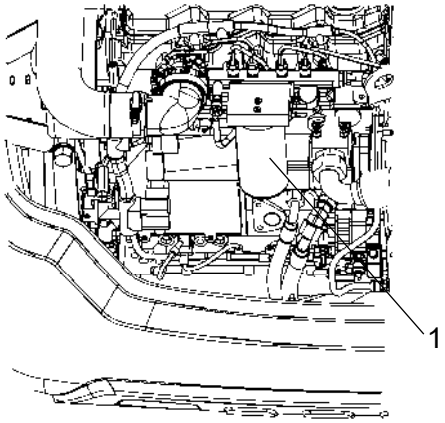


Fig. Engine compartment
1. Fuel filter

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. Han in to environment-friendly station.

Deliver the drain oil to environmentally correct handling.

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

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

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

NOTE! The new fuel filters must not under any circumstances be pre-filled with fuel due to the purity requirements of the fuel system.

Diesel engine - Oil and Filter change

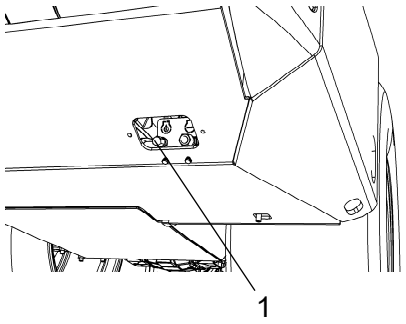


Fig. Tractor frame
1. Drain plug

The oil drain plug (1) can be accessed most easily from the right rear underside of the tractor frame, and is installed with a hose in the engine.

Drain the oil when the engine is warm. Place a receptacle that holds 19 liters (5 gal) under the drain plug.

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

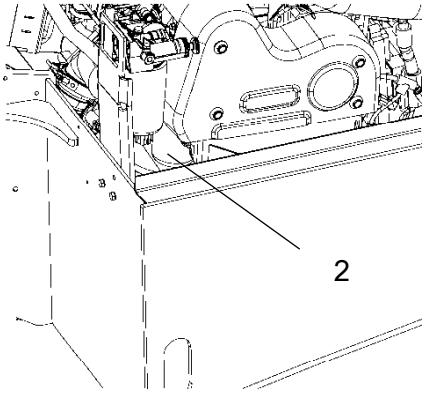


Fig. Engine compartment
2. Oil filter

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

Hand in the drained oil and filter to an environment-friendly waste disposal station.

Hood, hinges - Lubrication

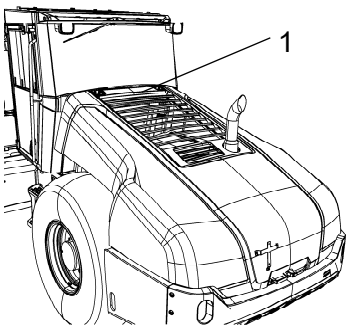


Fig. Hood
1. Hinge

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.

Seat bearing - Lubrication

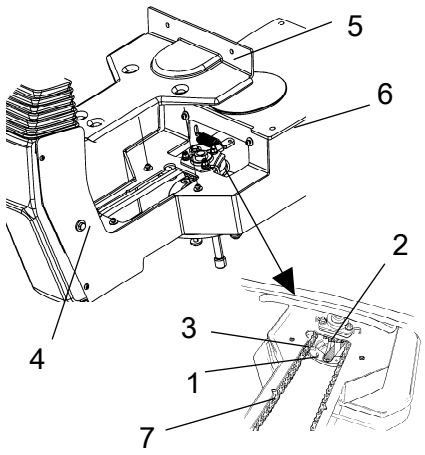


Figure. Seat bearing
1. Grease nipple
2. Gearwheel
3. Steering chain
4. Adjusting screw
5. Cover
6. Slide rails
7. Marking

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

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.

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

Also grease the seat slide rails (6).

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.

No not tension the chain too tightly. It should be possible to move the chain about 10 mm (0.4 in) to the side with a forefinger/thumb at the marking (7) in seat frame. Fit the chain lock at the bottom.

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

Hydraulic reservoir - Draining

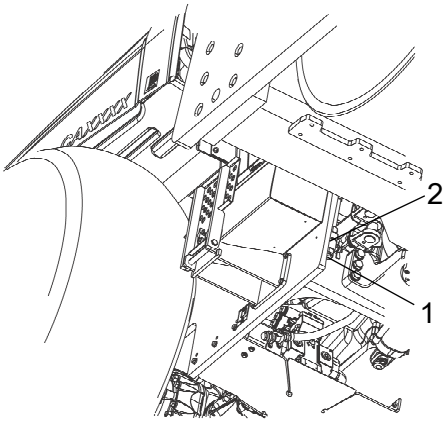


Fig. Machine's right underside
1. Drain cock
2. Plug

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 - Draining (Optional)

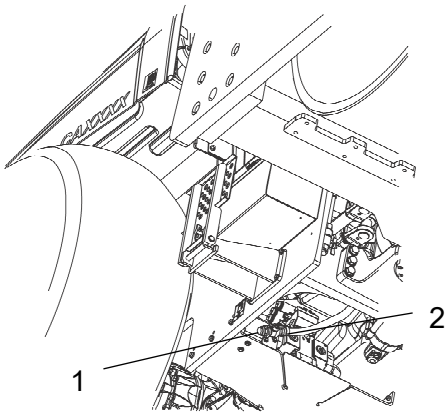


Fig. Machine's right underside
1. Drain plug
2. Drain cock

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.

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).

Loosen the drain plug (1). Then open the drain cock (2) and drain out water and sediment until only pure diesel fuel emerges at the plug. Close the drain cock and screw in the plug again.

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.

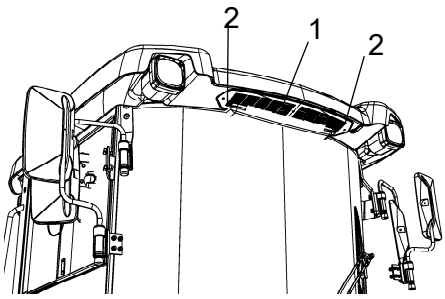


Fig. Cab
1. Fresh air filter (x 2)
2. Screws (x 3)

There is a fresh air filter (1), located at the front of the cab.

Undo the three screws (2) and remove the protective cover.

Remove the two air filter inserts and replace with new ones.

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

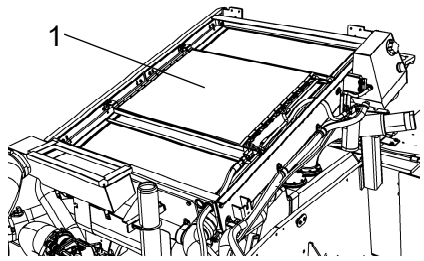


Fig. Engine compartment
1. Code element

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 underneath.

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

Wear protective goggles when working with compressed air.

Inspect the condenser element attachment.

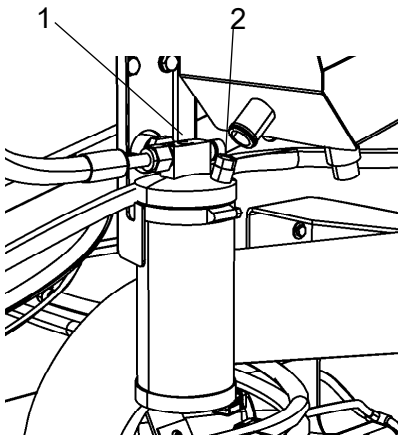


Fig. Drying filter in engine compartment
1. Sight glass
2. Moisture indicator

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 carriedd out by authorized companies.

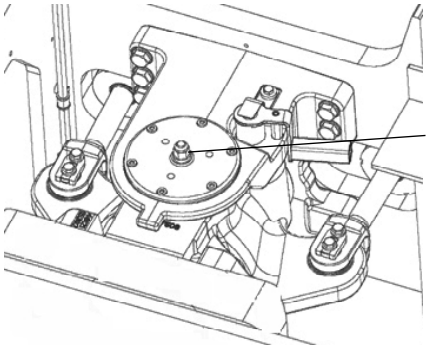


Fig. Steering hitch
1. Nut

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.

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

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

M14	174 Nm
M16	270 Nm

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