Routine Maintenance

Service Manual - TM310

Publication No.
9803/9520-06

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Introduction

T3-002

Your machine has been designed and built to give maximum performance, economy and ease of use under a wide variety of operating conditions. Prior to delivery, your machine was inspected both at the Factory and by your Distributor to ensure that it reaches you in optimum condition. To maintain this condition and ensure trouble free operation it is important that the routine services, as specified in this Manual, are carried out by an approved JCB Distributor at the recommended intervals.

This section of the Manual gives full details of the service requirements necessary to maintain your JCB machine at peak efficiency.

It can be seen from the Service Schedules on the following pages that many essential service checks should only be carried out by a JCB trained specialist. Only JCB Distributor Service Engineers have been trained by JCB to carry out such specialist tasks, and only JCB Distributor Service Engineers are equipped with the necessary special tools and test equipment to perform such tasks, thoroughly, safely, accurately and efficiently.

JCB regularly updates its Distributors advising them of any product developments, changes in specifications and procedures. Therefore only a JCB Distributor is fully able to maintain and service your machine.

A Service Record Sheet or Book is provided which will enable you to plan your service requirements and keep a service history record. It should be dated, signed and stamped by your Distributor each time your machine is serviced.

Remember, if your machine has been correctly maintained, not only will it give you improved reliability but its resale value will be greatly enhanced.

Owner/Operator Support

JCB together with your Distributor wants you to be completely satisfied with your new JCB machine. If you do encounter a problem however, you should contact your Distributor's Service Department who are there to help you!

You will have been given the names of the relevant service contacts at your Distributor when the machine was installed.

To get the most from your Distributor please help them to satisfy you by:

1 Giving your name, address and telephone number.

2 Quoting your machine model and serial number.

3 Date of purchase and hours of work.

4 Nature of the problem.

Remember, only your JCB Distributor has access to the vast resources available at JCB to help support you. In addition, your Distributor is able to offer a variety of programmes covering Warranty, Fixed Price Servicing, Safety Inspections, including weight tests, covering both legal and insurance requirements.

Service/Maintenance Agreements

To help plan and spread the costs of maintaining your machine, we strongly recommend you take advantage of the many Service and Maintenance Agreements your Distributor can offer. These can be tailor made to meet your operating conditions, work schedule etc.

Please consult your JCB Distributor for details.

Initial Service and Inspection (100 Hours)

T3-005

To further protect your machine's performance it is essential your JCB Distributor carries out an initial service and inspection when the machine is one month old or when it has completed 100 hours of operation (whichever occurs first). You should notify your Distributor in advance to allow the necessary arrangements to be made.

Lifting Regulations - Inspections and Tests

T3-003

Only your JCB Distributor can fully meet the requirements of the inspection and test parameters to suit UK Health and Safety Executive (H.S.E.) legal requirements along with providing Annual Inspections to meet your Insurance Company Policy conditions.

Only your JCB Distributor has the ability to meet the definition described covering a "Competent Person" to carry out these necessary tests and inspections. This ensures that only JCB Factory trained, experienced and up-to-date Engineers supported with all of the available data and material provided only to a JCB Distributor will ensure a thorough and reliable standard.

Obtaining Replacement Parts

T3-004_2

We recommend you fit only JCB Genuine Parts. A Parts Book will help you identify parts and order them from your JCB distributor.

Your dealer will need to know the exact model, build and serial number of your machine. See ***Identifying Your Machine*** in INTRODUCTION section.

The data plate also shows the serial numbers of the engine, transmission and axle(s), where applicable. But remember if any of these units have been changed, the serial number on the data plate may be wrong. Check on the unit itself.

Service Schedules

Introduction

A badly maintained machine is a danger to the operator and the people working around him. Make sure that the regular maintenance and lubrication jobs listed in the service schedules are done to keep the machine in a safe and efficient working condition.

⚠ WARNING

Maintenance must be done only by suitably qualified and competent persons. Before doing any maintenance make sure the machine is safe. It should be correctly parked on firm level ground.

To prevent anyone starting the engine, remove the starter key. Disconnect the battery and block the wheels when you are working beneath the machine.

If you do not take these precautions you could be killed or injured.

9-3-1-1

Apart from the daily jobs, the schedules are based on machine running hours. Keep a regular check on the hourmeter readings to correctly gauge service intervals. Do not use a machine which is due for a service. Make sure any defects found during the regular maintenance checks are rectified immediately.

Calendar equivalents:

Every 10 Hours = Daily

Every 50 Hours = Weekly

Every 100 Hours = Monthly

Every 500 Hours = Six Months

Every 1000 Hours = 1 Year

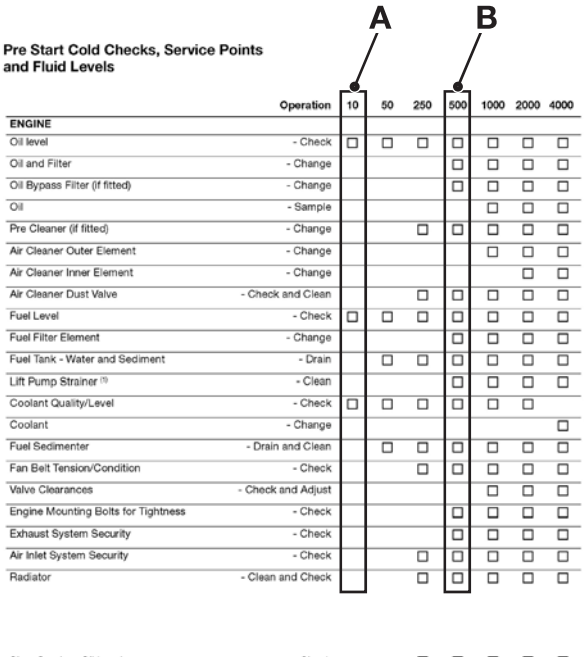
Every 2000 Hours = 2 Years

Note: *Services should be carried out at either the hourly interval or calendar interval, whichever occurs first.*

How to Use the Service Schedules

T3-012_2

In the example shown, **A** shows all service requirements to be carried out every 10 hours and **B** shows the requirements to be carried out every 500 hours.



Pre Start Cold Checks, Service Points and Fluid Levels

	Operation	A 10	50	250	B 500	1000	2000	4000
ENGINE								
Oil level	- Check	□	□	□	□	□	□	□
Oil and Filter	- Change				□	□	□	□
Oil Bypass Filter (if fitted)	- Change				□	□	□	□
Oil	- Sample					□	□	□
Pre Cleaner (if fitted)	- Change			□	□	□	□	□
Air Cleaner Outer Element	- Change					□	□	□
Air Cleaner Inner Element	- Change						□	□
Air Cleaner Dust Valve	- Check and Clean			□	□	□	□	□
Fuel Level	- Check	□	□	□	□	□	□	□
Fuel Filter Element	- Change				□	□	□	□
Fuel Tank - Water and Sediment	- Drain		□	□	□	□	□	□
Lift Pump Strainer [1]	- Clean				□	□	□	□
Coolant Quality/Level	- Check	□	□	□	□	□	□	
Coolant	- Change							□
Fuel Sedimenter	- Drain and Clean		□	□	□	□	□	□
Fan Belt Tension/Condition	- Check			□	□	□	□	□
Valve Clearances	- Check and Adjust					□	□	□
Engine Mounting Bolts for Tightness	- Check				□	□	□	□
Exhaust System Security	- Check				□	□	□	□
Air Inlet System Security	- Check			□	□	□	□	□
Radiator	- Clean and Check			□	□	□	□	□

Pre-start Cold Checks, Service Points and Fluid Levels

Table 1. Engine

	Operation	10	50	100	500	1000	2000
Oil level	- Check	☐					
Oil and Filter(1)	- Change				☐		
Air Cleaner Dust Valve(2)	- Clean		☐				
Air Cleaner Outer Element(3)	- Check				☐		
Air Cleaner Outer Element(4)	- Change					☐	
Air Cleaner Inner Element(4)	- Change						☐
Fuel Filter	- Drain		☐				
Fuel Filter	- Change				☐		
Fuel Sedimenter	- Drain		☐				
FEAD	- Check		☐				
Valve Clearances	- Check and Adjust						☐
Generally For Leaks	- Check	☐					
Coolant Level	- Check	☐					
Coolant	- Change						☐
Exhaust Smoke	- Check			☐			
Engine Mount Security	- Check					☐	
Torque Converter Stall Speed	- Check					☐	
Exhaust System Security	- Check					☐	
Air Inlet Security	- Check					☐	
Oil Filler and Dipstick O-Rings	- Change						☐
Rocker Cover Gasket and Injector Seals	- Change						☐
Crankcase Ventilation Filter	- Change					☐	

(1) If operating under arduous conditions, change oils and filters more frequently.
(2) If operating in dusty working environments, clean more frequently.
(3) If operating in dusty working environments, check more frequently.
(4) If operating in dusty working environments, change more frequently.

Table 2. Transmission and Axles

Operation		10	50	100	500	1000	2000
Oil[1]	- Change					☐	
Oil Filter[1]	- Change					☐	
Hub Oil[1]	- Change				☐		
Tyre Pressures/Condition	- Check	☐					
Wheel Nut Security	- Adjust		☐				
Transmission Oil Level	- Check	☐					
Steering Operation	- Check	☐					
Propshaft and Driveshaft	- Grease		☐				
Drive Axle(s) Oil (LSD Only)[1]	- Change				☐		
Drive Axle(s) Oil (Non LSD Only)[1]	- Change					☐	
Transfer Gearbox Oil[1]	- Change					☐	
Transfer Gearbox Oil Level	- Check				☐		
Driveshaft/Propshaft Security	- Check				☐		
Transmission Strainer	- Clean					☐	

(1) If operating under arduous conditions, change oils and filters more frequently.

Table 3. Hydraulics

Operation		10	50	100	500	1000	2000
Oil Level	- Check	☐					
Oil Filter	- Change					☐	
Oil	- Drain						☐
Suction Strainer	- Clean						☐
Hoses, Rams and Pipework for Damage or Leaks	- Check		☐				
MRV Pressure	- Check and Adjust					☐	
All ARVs	- Check and Adjust					☐	
Steer Circuit MRV	- Check and Adjust					☐	

Table 4. Brakes

Operation		10	50	100	500	1000	2000
Foot Brake Operation	- Check	☐					
Parking Brake Operation	- Check and Adjust			☐			

Table 5. Electrics

Operation		10	50	100	500	1000	2000
Battery Electrolyte Level	- Check					☐	
Battery Terminals for Condition and Tightness	- Check				☐		
Wiring for Chafing	- Check		☐				
All Electric Functions	- Check	☐					
EMS Download Codes & Rectify Issues	- Check				☐		

Table 6. Body and Cab

Operation		10	50	100	500	1000	2000
Mirrors Condition and Security	- Check	☐					
Seat and Seatbelt	-Check	☐					
All Articulation, Steer and Boom Pivots	-Grease	☐					
Windscreen Washer Fluid Level	- Check	☐					
Attachment Security	- Check	☐					
Fire Extinguisher Condition	-Check	☐					
SWL Decals Condition	-Check	☐					
Boom Wear Pad Security	-Check			☐			
Boom Wear Pads	-Check				☐		
Boom Wear Pads Runways Waxoil	-Grease				☐		
ROPS/FOPS Structures	-Check					☐	
Pins and Bushes	-Check				☐		
Pin Securing Bolt Torque	-Check				☐		

Table 7. Attachments

Operation		10	50	100	500	1000	2000
Additional Equipment (As Required)	-Check					☐	

Health and Safety

T3-001_3

Lubricants

Introduction

It is most important that you read and understand this information and the publications referred to. Make sure all your colleagues who are concerned with lubricants read it too.

Hygiene

JCB lubricants are not a health risk when used properly for their intended purposes.

However, excessive or prolonged skin contact can remove the natural fats from your skin, causing dryness and irritation.

Low viscosity oils are more likely to do this, so take special care when handling used oils, which might be diluted with fuel contamination.

Whenever you are handling oil products you should maintain good standards of care and personal and plant hygiene. For details of these precautions we advise you to read the relevant publications issued by your local health authority, plus the following.

Storage

Always keep lubricants out of the reach of children.

Never store lubricants in open or unlabelled containers.

Waste Disposal

⚠ CAUTION

It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.

Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.

INT-3-2-14

All waste products should be disposed of in accordance with all the relevant regulations.

The collection and disposal of used oil should be in accordance with any local regulations. Never pour used engine oil into sewers, drains or on the ground.

Handling

New Oil

There are no special precautions needed for the handling or use of new oil, beside the normal care and hygiene practices.

Used Oil

Used engine crankcase lubricants contain harmful contaminants.

Here are precautions to protect your health when handling used engine oil:

1. Avoid prolonged, excessive or repeated skin contact with used oil.
2. Apply a barrier cream to the skin before handling used oil. Note the following when removing engine oil from skin:
   - **a** Wash your skin thoroughly with soap and water.
   - **b** Using a nail brush will help.
   - **c** Use special hand cleansers to help clean dirty hands.
   - **d** Never use petrol, diesel fuel, or paraffin for washing.
3. Avoid skin contact with oil soaked clothing.
4. Don't keep oily rags in pockets.
5. Wash dirty clothing before re-use.
6. Throw away oil-soaked shoes.

First Aid - Oil

Eyes

In the case of eye contact, flush with water for 15 minutes. If irritation persists, get medical attention.

Swallowing

If oil is swallowed do not induce vomiting. Get medical advice.

Skin

In the case of excessive skin contact, wash with soap and water.

Spillage

Absorb on sand or a locally approved brand of absorbent granules. Scrape up and remove to a chemical disposal area.

Fires

⚠ WARNING

Do not use water to put out an oil fire. This will only spread it because oil floats on water.

Extinguish oil and lubricant fires with carbon dioxide, dry chemical or foam. Fire fighters should use self contained breathing apparatus.

7-3-1-3_1

Battery

⚠ WARNING

Batteries give off an explosive gas. Do not smoke when handling or working on the battery. Keep the battery away from sparks and flames.

Battery electrolyte contains sulphuric acid. It can burn you if it touches your skin or eyes. Wear goggles. Handle the battery carefully to prevent spillage. Keep metallic items (watches, rings, zips etc) away from the battery terminals. Such items could short the terminals and burn you.

Set all switches in the cab to OFF before disconnecting and connecting the battery. When disconnecting the battery, take off the earth (-) lead first.

Re-charge the battery away from the machine, in a well ventilated area. Switch the charging circuit off before connecting or disconnecting the battery. When you have installed the battery in the machine, wait five minutes before connecting it up.

When reconnecting, fit the positive (+) lead first.

First Aid - Electrolyte

Do the following if electrolyte:

GETS INTO YOUR EYES

Immediately flush with water for 15 minutes, always get medical help.

IS SWALLOWED

Do not induce vomiting. Drink large quantities of water or milk. Then drink milk of magnesia, beaten egg or vegetable oil. Get medical help.

GETS ONTO YOUR SKIN

Flush with water, remove affected clothing. Cover burns with a sterile dressing then get medical help.

5-3-4-3_1

Warning Symbols

The following warning symbols may be found on the battery.

Symbol	Meaning
	Keep away from children.
	Shield eyes.
	No smoking, no naked flames, no sparks.
	Explosive Gas.
	Battery acid.
	Note operating instructions.

⚠ CAUTION

Do not disconnect the battery while the engine is running, otherwise the electrical circuits may be damaged.

INT-3-1-14

⚠ WARNING

Electrical Circuits

Understand the electrical circuit before connecting or disconnecting an electrical component. A wrong connection can cause injury and/or damage.

INT-3-1-4

⚠ DANGER

Electrolyte

Battery electrolyte is toxic and corrosive. Do not breathe the gases given off by the battery. Keep the electrolyte away from your clothes, skin, mouth and eyes. Wear safety glasses.

INT-3-2-1_3

⚠ CAUTION

Damaged or spent batteries and any residue from fires or spillage should be put in a closed acid proof receptacle and must be disposed of in accordance with local environmental waste regulations.

INT-3-1-12

⚠ WARNING

Battery Gases

Batteries give off explosive gases. Keep flames and sparks away from the battery. Do not smoke close to the battery. Make sure there is good ventilation in closed areas where batteries are being used or charged. Do not check the battery charge by shorting the terminals with metal; use a hydrometer or voltmeter.

INT-3-1-8

Fluids, Lubricants and Capacities

Note: *New engines DO NOT require a running-in period. The engine/machine should be used in a normal work cycle immediately, glazing of the piston cylinder bores, resulting in excessive oil consumption, could occur if the engine is gently run-in. Under no circumstances should the engine be allowed to idle for extended periods; (e.g. warming up without load).*

Table 8.

ITEM	CAPACITY		FLUID/LUBRICANT	INTERNATIONAL SPECIFICATION
	Litres	UK Gal		
Fuel System			Diesel Oil	***See Fuel, Section 1 - General Information.***
Engine (Oil)			JCB Extreme Performance -15°C to 50°C (-5°F to 122°F)(1)(2)	SAE15W/40, ACEA E5/B3/A3, API CH-4/SJ
- MIN	11.5	2.5		
- MAX	14	3.1		
Engine (Coolant)	25	5.6	JCB High Performance Antifreeze and Inhibitor/Water	ASTM D6210
Gearbox	19	4.2	JCB Special Transmission Fluid	Ford ESN-M2C 33G
Transfer Box	1.3	0.3	JCB HD 90 Gear Oil	API-GL-5, MIL-L-2105C
Axles	20	4.4	JCB Special Gear Oil	Ford ESE-M2C 86B
Hydraulic System	135	30		
Grease Points	---	---	JCB Special MPL-EP Grease	Lithium complex NLGI No.2 consistency including extreme pressure additives
Wear Pad Runways	---	---	JCB Waxoyl	

(1) CAUTION: Do not use ordinary engine oil.
(2) Superior grade oils may be more appropriate for heavy duty applications (such as sustained high loads and operation at elevated temperatures).

Cleaning the Machine

Clean the machine using water and/or steam. Pay particular attention to the underside. Do not allow mud to build up on the engine or transmission. Make sure the radiator grille is not clogged up.

It is important to note that excessive power washing can cause damage to the seals and bearings. Take care during routine machine washing not to direct high pressure water jets directly at oil seals or universal joints.

Note: *The machine should always be greased after pressure washing or steam cleaning.*

Avoid using neat detergent - always dilute detergents as per the manufacturer's recommendations, otherwise damage to the paint finish may occur.

Rinse off all the detergent with water.

⚠ CAUTION

Do not steam clean the batteries.

4-3-1-4

⚠ CAUTION

Never use water or steam to clean inside the cab. The use of water or steam could damage the on-board computer and render the machine inoperable. Remove dirt using a brush or damp cloth.

8-3-4-8

Checking for Damage

T3-013

1 Inspect steelwork for damage. Note damaged paintwork for future repair.

2 Make sure all pivot pins are correctly in place and secured by their locking devices.

3 Ensure that the steps and handrails are undamaged and secure.

4 Check for broken or cracked window glass. Replace damaged items.

5 Check all bucket teeth for damage and security.

6 Check all lamp lenses for damage.

7 Inspect the tyres for damage and penetration by sharp objects.

8 Check that all safety decals are in place and undamaged. Fit new decals where necessary.

Seat Belt

Checking the Seat Belt Condition and Security

T3-008

⚠ WARNING

When a seat belt is fitted to your machine replace it with a new one if it is damaged, if the fabric is worn, or if the machine has been in an accident. Fit a new seat belt every three years.

2-3-1-7_1

Inspect the seat belt for signs of fraying and stretching. Check that the stitching is not loose or damaged. Check that the buckle assembly is undamaged and works correctly.

Check that the belt mounting bolts are undamaged, correctly fitted and tightened.

Checking the ROPS/FOPS Structure

⚠ WARNING

You could be killed or seriously injured if you operate a machine with a damaged or missing ROPS/FOPS. If the Roll Over Protection Structure (ROPS)/Falling Objects Protection Structure (FOPS) has been in an accident, do not use the machine until the structure has been renewed. Modifications and repairs that are not approved by the manufacturer may be dangerous and will invalidate the ROPS/FOPS certification.

INT-2-1-9_6

1 Check the structure for damage.

2 Make sure that all the ROPS/FOPS mounting bolts are in place and are undamaged.

3 Make sure that the ROPS/FOPS mounting bolts are tightened to the correct torque setting. This should be 200 Nm (147.5 lbf ft).

Fire Extinguisher (if fitted)

T3-022

Checking the Fire Extinguisher

Check the fire extinguisher for damage, security and signs of leaking.

Check that the gauge **A** indicates that the extinguisher is charged i.e. the needle is in the GREEN segment.

Note: *If the needle is in or very near the RED segment at either end of the gauge, the extinguisher must be serviced or replaced.*

Make sure the safety pin **B** is fitted and secure.

The extinguisher should be serviced every 12 months by a suitably qualified person.

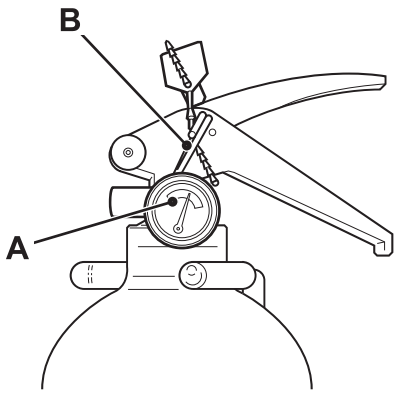


Fig 1.

Greasing

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground and lower the attachments, (If it is necessary to work with boom raised, then the boom safety strut must be fitted). See Boom Safety Strut in MAINTENANCE section. Engage the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels. If you are working near the articulation danger zone, fit the articulation safety lock. See Articulation Lock in MAINTENANCE section.

4-3-2-6

The machine must be greased regularly to keep it working efficiently. Regular greasing will also increase the machine's working life. Grease should be applied with a grease gun, normally two strokes of the gun should be sufficient. Stop the greasing procedure when fresh grease appears at the joint. For the correct grade of lubricant. ⇨ *Fluids, Lubricants and Capacities (3-11)*

In the following illustrations, the grease points are numbered. Count off the grease points as you apply grease to each one. Refit the dust caps after greasing.

Boom Pivot Pins

Total of 17 grease points.

Note: *Grease Points **5**, **8** and **16** are on the opposite side of the machine. Grease points **6**, **9**, **10**, **11** are on the main ram and will require the boom to be raised and correctly supported to gain access. Access to grease points **10** and **11** are through holes cut in the bottom structure.*

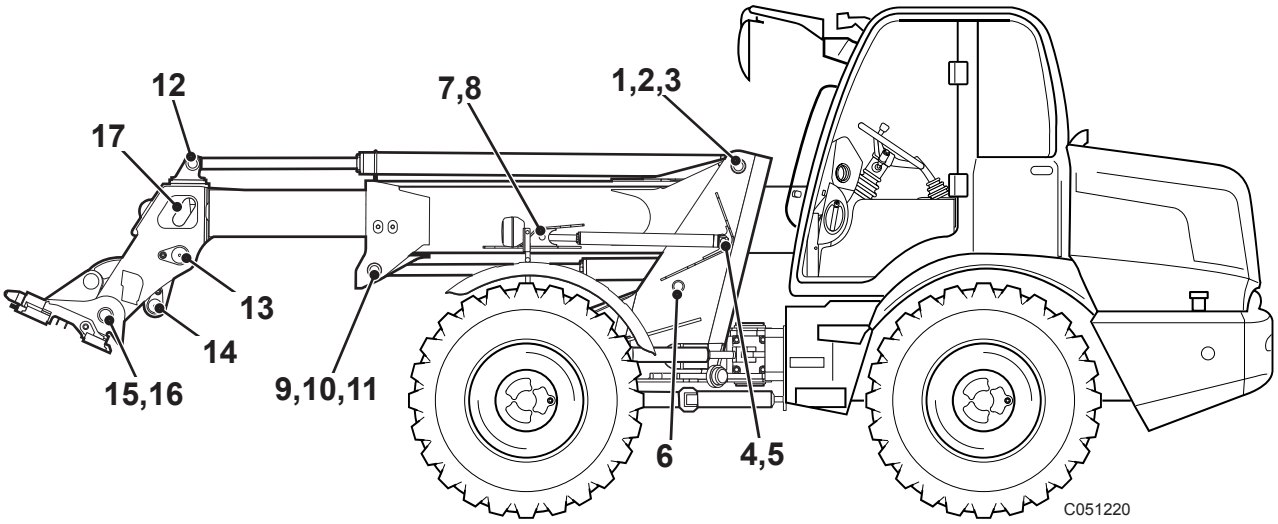


Fig 2.

Centre Pivot and Steering Ram

There are a total of **2** grease points.

⚠ DANGER

Make sure the articulation safety lock is fitted before transporting the machine. The articulation safety lock must also be fitted if you are carrying out daily checks or doing any maintenance work in the articulation danger zone.

If the articulation lock is not fitted you could be crushed between the two parts of the chassis.

GEN-3-1_1

Note: *Grease points **2** and **3** are repeated on the other steer ram. Grease point **4** is the lower grease point for the centre pivot and is accessible through a hole in the bottom of the rear chassis.*

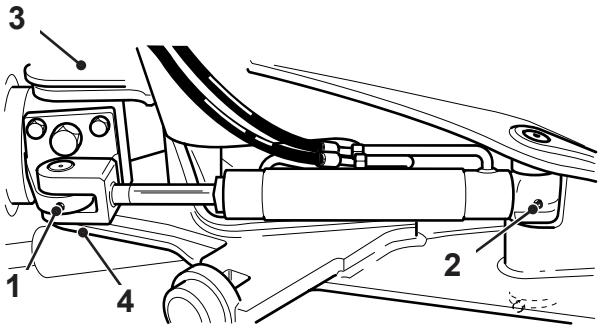


Fig 3.

Propshaft Joints

Intermediate Propshaft - Total of 3 grease points (**1** to **3**).

Propshaft (Except Intermediate) - Total of 7 grease points (**4** to **10**)

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground and lower the attachments, (If it is necessary to work with boom raised, then the boom safety strut must be fitted). See Boom Safety Strut in MAINTENANCE section. Engage the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels. If you are working near the articulation danger zone, fit the articulation safety lock. See Articulation Lock in MAINTENANCE section.

4-3-2-6

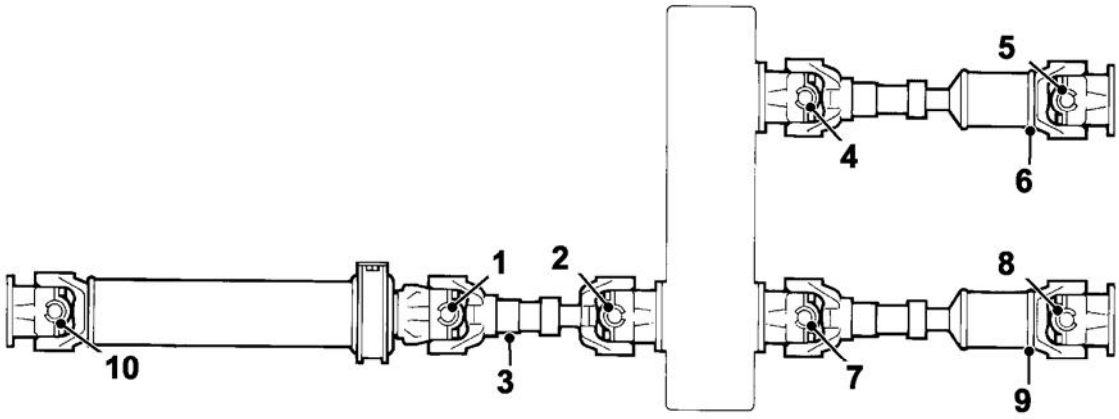


Fig 4.

Inner and Outer Booms

Extend the boom fully. Spray Waxoyl evenly over the outer faces of the inner boom and the inner faces of the outer boom. Allow 2-3 hours drying time before retracting the boom.

⚠ CAUTION

Waxoyl contains turpentine substitute which is flammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period.

Do not weld near the affected area during the drying period. Take the same precautions as for oil to keep Waxoyl off your skin. Do not breathe the fumes. Apply in a well-ventilated area.

5-3-1-9

Engine Canopy

Opening the Canopy

⚠ WARNING

The engine has exposed rotating parts. Switch OFF the engine before working in the engine compartment. Do not use the machine with the engine cover open.

5-2-6-5

⚠ WARNING

Touching hot surfaces can burn skin. The engine and machine components will be hot after the unit has been running. Allow the engine and components to cool before servicing the unit.

10-1-1-40

Note: *Before you stop the engine, you must allow the engine to operate at low idle for four minutes. The delay allows the coolant temperature to stabilise before you open the engine cover.*

⚠ CAUTION

Do not use the machine with the engine exposed.

5-3-1-6

1 Apply the park brake, put the transmission in neutral and stop the engine.

2 Press the handle lock **A** to unlatch the canopy.

3 Lift canopy.

Note: *The raising of the engine canopy is assisted by two gas struts. The struts also hold the cover in the fully open position.*

Closing the Canopy

⚠ CAUTION

The struts holding the engine cover can over time become weak. This will be noticed by the fact that the cover will not hold in the fully open position, but will tend to sag slightly. Do not work under an engine cover that will not retain its fully open position.

0107

1 Close canopy, make sure canopy is latched.

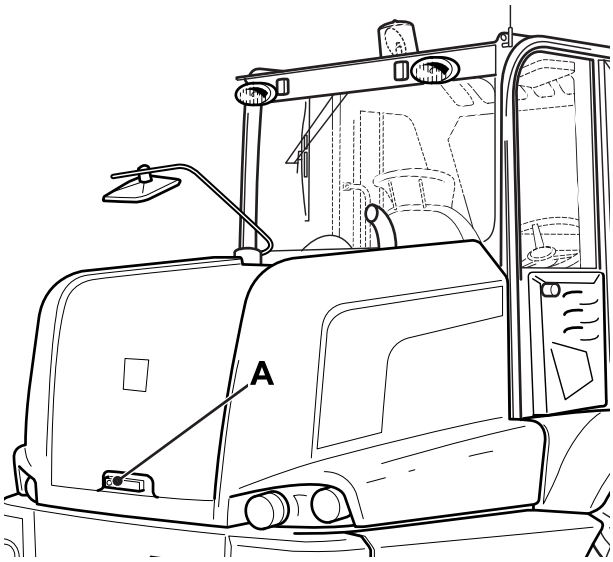


Fig 5.

Heating and Ventilation

Cleaning the Cab Heater Filter

⚠ CAUTION

The filter may be filled with dust. Wear goggles and a face mask when removing the filter.

2-3-3-6

1 Park the machine on firm level ground. Engage the park brake. Put the transmission into neutral, lower the attachments to the ground. Stop the engine and remove the starter key.

2 The filter is behind a grille panel on the right hand side of the cab. To gain access to the cab heater filter **A**, undo bolts **B** and remove cover **C**.

3 Remove the filter and shake out the loose dust. Trapped dust can be removed using a low pressure airline. (The pressure must be no greater than 25 psi.) Replace the filter as necessary.

4 Refit the cover.

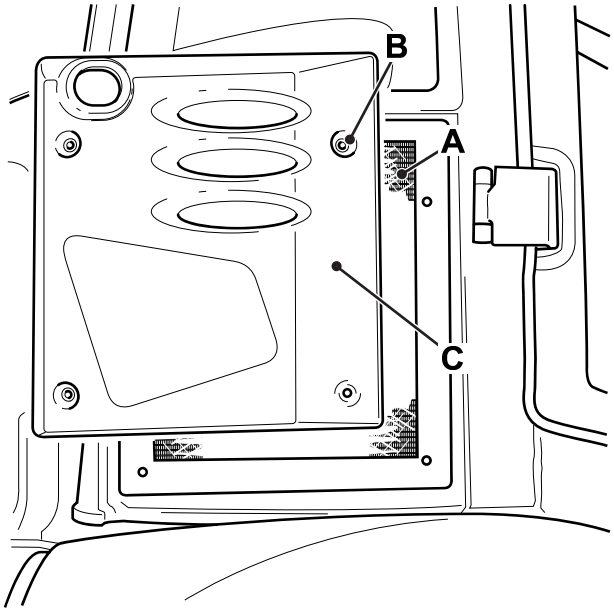


Fig 6.

Electrical System

Battery

Battery Disconnection/Connection

T3-019_2

⚠ WARNING

Keep metal watch straps and any metal fasteners on your clothes, clear of the positive (+) battery terminal. Such items can short between the terminal and nearby metal work. If it happens you can get burned.

5-2-2-4

Disconnection

1 Open the battery compartment. See ***Battery Cover***.

2 Remove the leads. Disconnect the earth (-) terminal first.

Connection

1 Check the battery.

a If the terminal is dirty, clean the post.

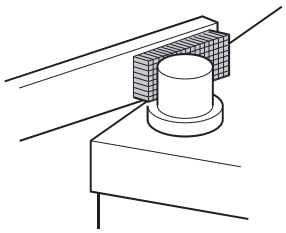


Fig 7.

b If the terminal post is corroded and generates white powder wash the terminal with hot water. If considerable corrosion is detected, clean with a wire brush or abrasive paper.

c After cleaning, apply a thin coat of petroleum jelly to the terminal.

2 Re-connect the leads. Connect the earth (-) terminal last.

3 Close and lock the battery compartment.

Checking the Electrolyte Level

T3-020

Maintenance free batteries used in normal temperate climate applications should not need topping up. However, in certain conditions (such as prolonged operation at tropical temperatures or if the alternator overcharges) the electrolyte level should be checked as described below.

1 Open the battery compartment cover. See ***Battery Cover***.

2 Disconnect and remove battery. See ***Battery Disconnection/Connection.***

⚠ WARNING

Do not top the battery up with acid. The electrolyte could boil out and burn you.

2-3-4-6

3 Remove covers **A**. Look at the level in each cell. The electrolyte should be 6 mm (1/4 in) above the plates. Top up if necessary with distilled water or de-ionized water.

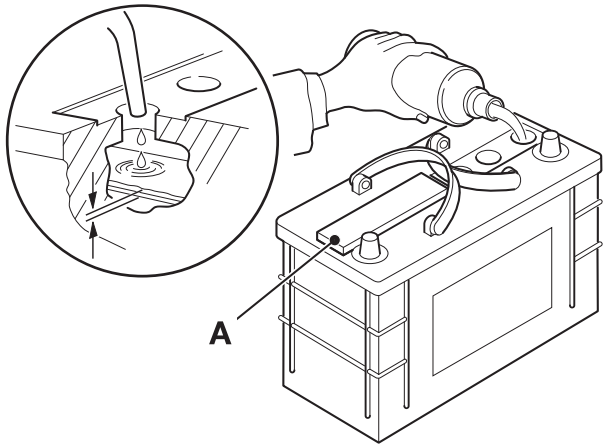


Fig 8.

4 Refit battery.

5 Close and lock the battery compartment.

Battery Isolator (if fitted)

⚠ CAUTION

Except in an emergency, do not use the battery isolator to switch OFF the engine. Failure to comply may result in damage to the electrical circuits.

INT-3-2-13

At the end of a working cycle or if the machine is being left unattended, provided the lights are not required, the battery must be isolated. Before attempting to start the engine or use the machine electrics the battery isolator key must be fitted and switched on.

1 To isolate the battery turn the battery isolator key in an anti-clockwise direction and remove. If the key is removable, keep it in a safe place and available for when the machine is next required.

2 To connect the battery insert the key and turn in a clockwise direction.

⚠ CAUTION

Before carrying out arc welding on the machine, disconnect the battery and alternator to protect the circuits and components. The battery must still be disconnected even if a battery isolator is fitted.

INT-3-1-13

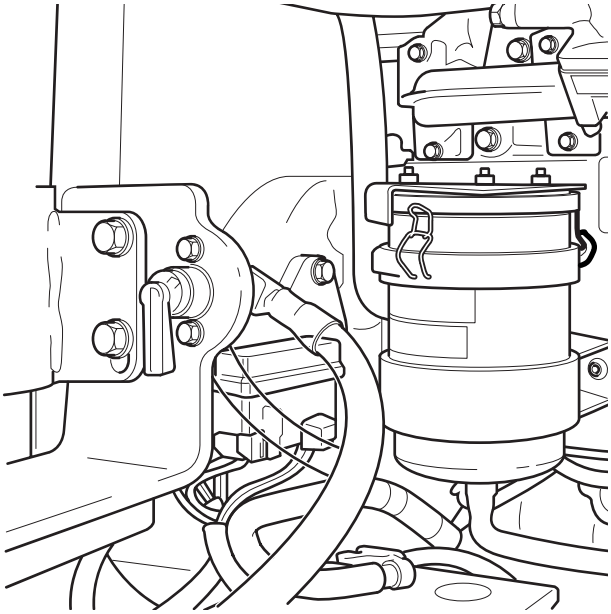


Fig 9.

Jump Starting the Engine

T3-021

⚠ WARNING

Do not use a battery if its electrolyte is frozen. To prevent the battery electrolyte from freezing, keep the battery fully charged.

Do not try to charge a frozen battery or jump-start and run the engine, the battery could explode.

Batteries produce a flammable gas, which is explosive; do not smoke when checking the electrolyte levels.

When jump-starting from another vehicle, make sure that the two vehicles do not touch each other. This prevents any chance of sparks near the battery.

Set all the machine switches to their OFF positions before connecting the external power supply. Even with the starter switch set to off some circuits will be energised when the external power supply is connected.

Do not connect the booster (slave) supply directly across the starter motor. Doing this by-passes the neutral gear safety switch. If the machine is in gear, it may 'runaway' and kill or injure bystanders.

Use only sound jump leads with securely attached connectors. Connect one jump lead at a time.

The machine has a negative earth electrical system. Check which battery terminal is positive (+) before making any connections.

Keep metal watch straps and jewellery away from the jump lead connectors and the battery terminals - an accidental short could cause serious burns and damage equipment.

Make sure you know the voltage of the machine. The booster (slave) supply must not be higher than that of the machine. Using a higher voltage supply will damage your machine's electrical system.

If you do not know the voltage of your booster (slave) supply, then contact your JCB dealer for advice. Do not attempt to jump-start the engine until you are sure of the voltage of the booster (slave) supply.

4-2-2-3_1

1 The park brake should have been engaged when the machine was last parked. If it is not engaged, engage it now. The engine will not start unless the park brake is on.

2 Set all switches in the cab to off.

3 Connect the booster cables as follows:

a Unlock and open the battery cover.

b Connect the positive booster cable to the positive (+) terminal on the machine battery. Connect the other end of this cable to the positive (+) terminal of the booster supply.

c Connect the negative (-) booster cable to a good frame earth on the machine, away from and below the battery.

Note: *A good frame earth is part of the main frame, free from paint and dirt. Do not use a pivot pin for an earth.*

d Connect the other end of this cable to the negative (-) terminal on the booster supply.

4 Do the Pre-Start Checks.

5 Start the engine.

⚠ WARNING

When the engine is running, there are rotating parts in the engine compartment. Before disconnecting the cables, make sure that you have no loose clothing (cuffs, ties etc.) which could get caught in rotating parts.

2-2-4-3

6 Disconnect the negative booster cable from the machine frame earth. Then disconnect it from the booster supply.

Disconnect the positive booster cable from the positive (+) terminal on the battery. Then disconnect it from the booster supply.

7 Close and lock the battery cover.

Fuses

For information about fuses see ***Section C, Electrics, Fuses and Relays.***

Relay Identification

For information about relays see ***Section C, Electrics, Fuses and Relays***.

Engine

⚠ CAUTION

It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.

Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.

INT-3-2-14

⚠ WARNING

Oil

Oil is toxic. If you swallow any oil, do not induce vomiting, seek medical advice. Used engine oil contains harmful contaminants which can cause skin cancer. Do not handle used engine oil more than necessary. Always use barrier cream or wear gloves to prevent skin contact. Wash skin contaminated with oil thoroughly in warm soapy water. Do not use petrol, diesel fuel or paraffin to clean your skin.

INT-3-2-3

Checking the Oil Level

Engine oil and oil filter change must be completed in accordance with the service schedules. Failure to change the oil and filter at the recommended interval could cause serious engine failure.

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key.

2 Check that the oil level is between the two marks on the dipstick **10-A**.

3 If necessary, add recommended oil through one of the filler points **10-B**.

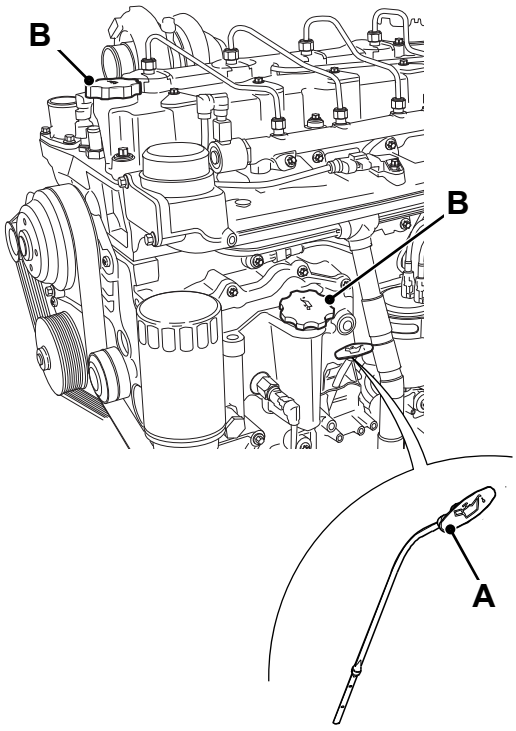


Fig 10.

Changing the Oil and Filter

Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil.

1 Place a container of suitable size beneath the drain plug **11-C**.

⚠ CAUTION

Oil will gush from the hole when the drain plug is removed. Hot oil and engine components can burn you. Keep to one side when you remove the plug.

13-3-1-15

2 Remove drain plug **11-C** and its 'O' ring **11-D**. Let the oil drain out, then clean and refit the drain plug with a new 'O' ring. Torque tighten the plug to 40 - 60 Nm (30 - 44 lbf ft).

3 Loosen and remove filter housing drain plug **11-E**. Let the oil fully drain. Refit the plug. Torque tighten the plug to 40 - 60 Nm (30 - 44 lbf ft).

4 Unscrew the filter canister **11-F**, using a chain wrench if necessary.

5 Clean the seal face of the filter head **11-G**.

6 Smear the seal **11-H** on the new filter canister with clean engine oil.

7 Screw in the new filter canister - hand tight only.

⚠ CAUTION

It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.

Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.

INT-3-2-14

8 Through one of the filler points **11-B**, fill the engine with the recommended oil to the MAX mark on the dipstick **11-A**. Wipe off any spilt oil, refit the filler cap and make sure it is secure.

9 Operate the engine until the oil pressure low warning light has extinguished. Check for oil leakage. When the oil has cooled, check the oil level again, and if necessary top up with clean engine oil.

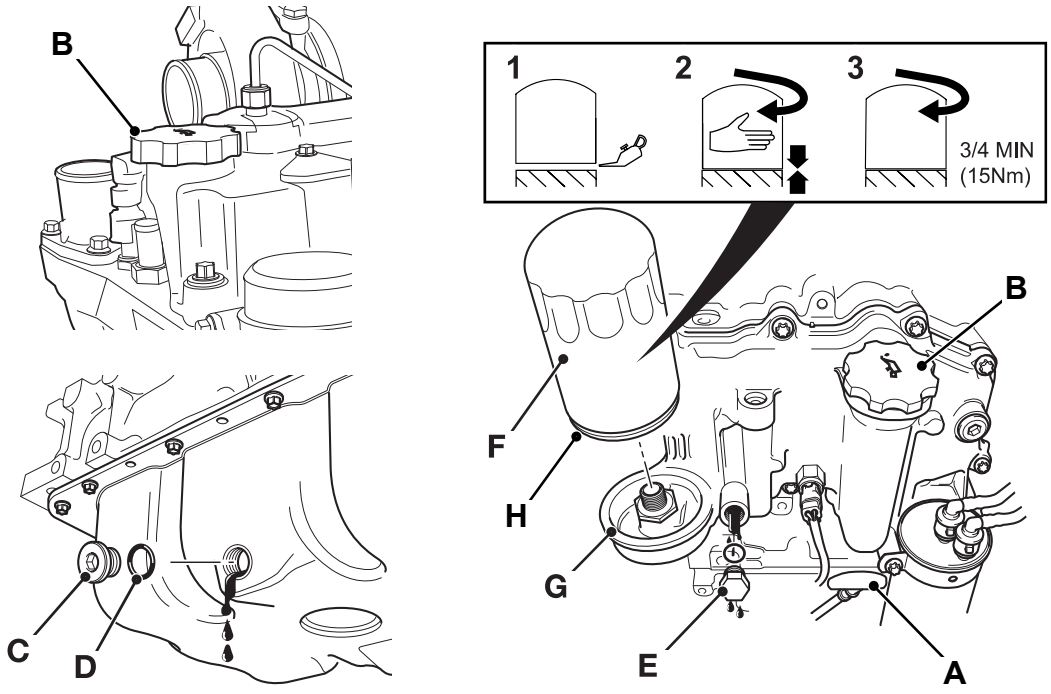


Fig 11.

Coolant Mixtures

The protection provided by JCB Four Seasons Anti-freeze and Summer Coolant is shown below. If any other anti-freeze is used, refer to the manufacturer's instructions and ensure that a corrosion inhibitor is included.

DO NOT use solutions of more than 50% or damage to the engine may occur.

Solution	Maintains circulation down to:	Protects against damage down to:
50%	-33°C (-27°F)	-45°C (-49°F)

The strength of the anti-freeze solution must be checked at least once a year, preferably at the beginning of the cold period.

It is an advantage to leave the anti-freeze in all the year round as it gives continued protection against corrosion. Always renew the anti-freeze every two years.

A 50% anti-freeze mixture must be used even if frost protection is not needed. This gives protection against corrosion and raises the coolant's boiling point.

⚠ WARNING

Antifreeze can be harmful. Obey the manufacturer's instructions when handling full strength or diluted antifreeze.

7-3-4-4_1

Checking the Coolant Level

The procedures below describes a typical coolant package installation.

⚠ WARNING

The cooling system is pressurised when the coolant is hot. When you remove the cap, hot coolant can spray out and burn you. Make sure that the engine is cool before checking the coolant level or checking the system.

9-3-3-1_1

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key.

2 Check the level of coolant in the expansion bottle **12-A**. If necessary remove the filler cap and top up to the level indicated.

3 Refit the filler cap and make sure it is tight.

4 Run the engine for a while to raise the coolant to working temperature and pressure. Stop the engine and check for leaks.

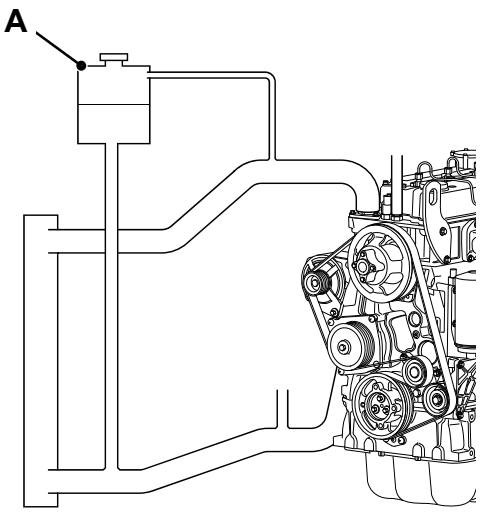


Fig 12.

Changing the Coolant

The procedures below describes a typical coolant package installation.

⚠ WARNING

The cooling system is pressurised when the coolant is hot. When you remove the cap, hot coolant can spray out and burn you. Make sure that the engine is cool before checking the coolant level or checking the system.

9-3-3-1_1

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key. Let the engine cool down.

2 Carefully loosen cap **13-A** just enough to let any pressure escape. Remove the cap when all pressure is released.

3 Disconnect the bottom radiator hose at **13-B** and allow the coolant to drain.

4 Flush the system by pouring clean water into filler port **13-A**.

5 Reconnect the radiator hose.

6 Fill the expansion bottle **13-C**, using the necessary anti-freeze solution, to the level indicated.

7 Check for leaks.

8 Run the engine for a while to raise the coolant to working temperature and pressure. Stop the engine and check for leaks. Check the level in the expansion bottle and top up if necessary.

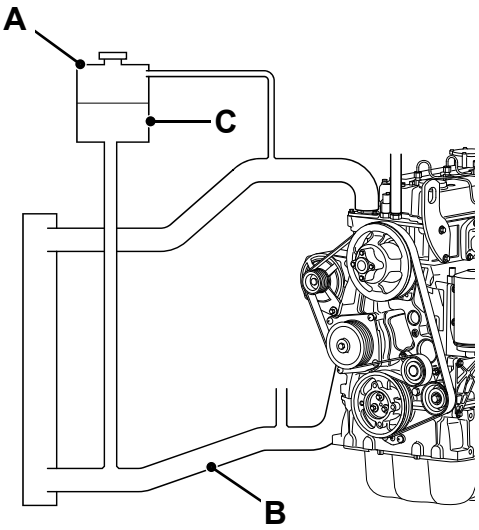


Fig 13.

Front End Accessory Drive (FEAD) Belt

A spring loaded tensioning unit **14-A** ensures that the front end accessory drive belt (FEAD) **14-B** is kept at the correct tension.

⚠ WARNING

Make sure the engine cannot be started. Disconnect the battery before doing this job.

2-3-3-5

⚠ WARNING

Turning the Engine

Do not try to turn the engine by pulling the fan or fan belt. This could cause injury or premature component failure.

0094

Front End Accessory Belt (FEAD) Inspection

At the recommended service interval, visually inspect the belt for damage.

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key. Let the engine cool down.

2 Renew the belt if it has cracks or if it is frayed or has pieces of material missing (as shown at **14-C**).

If the belt does need replacing follow the procedures described below:

Front End Accessory Belt (FEAD) Replacement

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key. Let the engine cool down.

2 Use a 16mm socket located on the hexagon spigot nut **14-D**, carefully rotate the tensioner against spring force in the direction shown. Do not use excessive force or the tensioner will be damaged.

3 Keep holding the tensioner against the spring force and lift the belt off the drive tensioner pulley.

4 Slowly release the spring force by rotating the tensioner unit in the opposite direction.

5 Before fitting the new belt, check that the tensioner roller and the fan pulley rotate smoothly and that there is no play in the bearings.

6 Fit the new belt using a reversal of the above procedures.

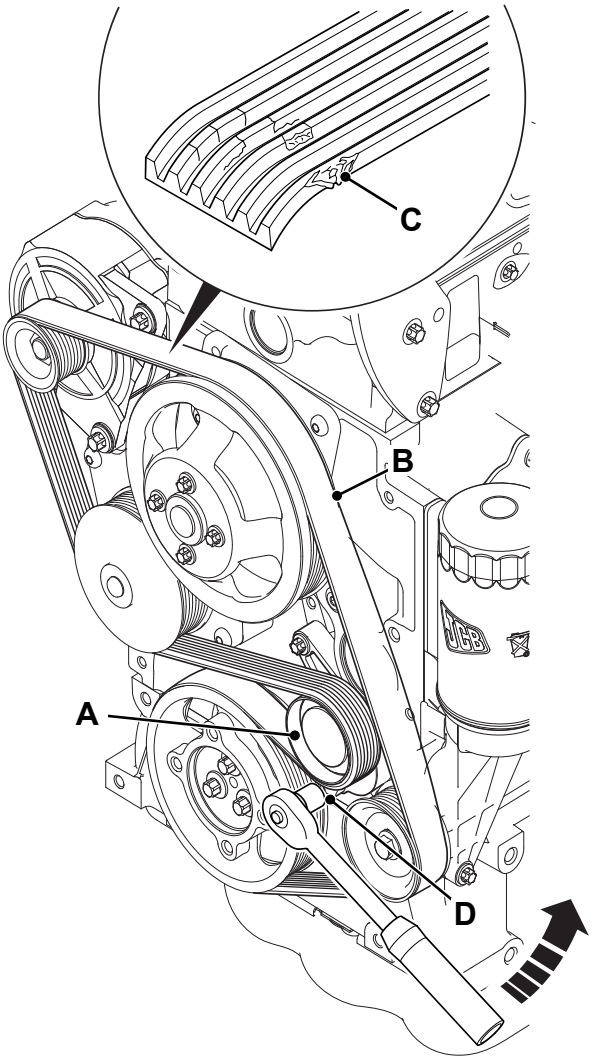


Fig 14.

Engine Crankcase Ventilation

Changing the Filter Element

The filter element must be changed at the recommended interval. ⇒ *Service Schedules (3-3)*.

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key.

2 Undo the clips **15A** and lift off the filter cover **15B**.

3 Lift out the filter element **15C** and discard it.

4 Clean the inside of the filter housing **15D**. Remove all oil and sludge contamination.

5 Make sure that the oil drain in the bottom of the filter housing is not blocked with sludge. If necessary remove the drain pipe **15E** at the engine. Make sure that the drain pipe non return ball valve at the bottom of the filter housing is fitted and free to move.

6 Fit a new filter element **15C**.

Important: *Install the correct type of filter element.*

7 Install the filter cover **15B**.

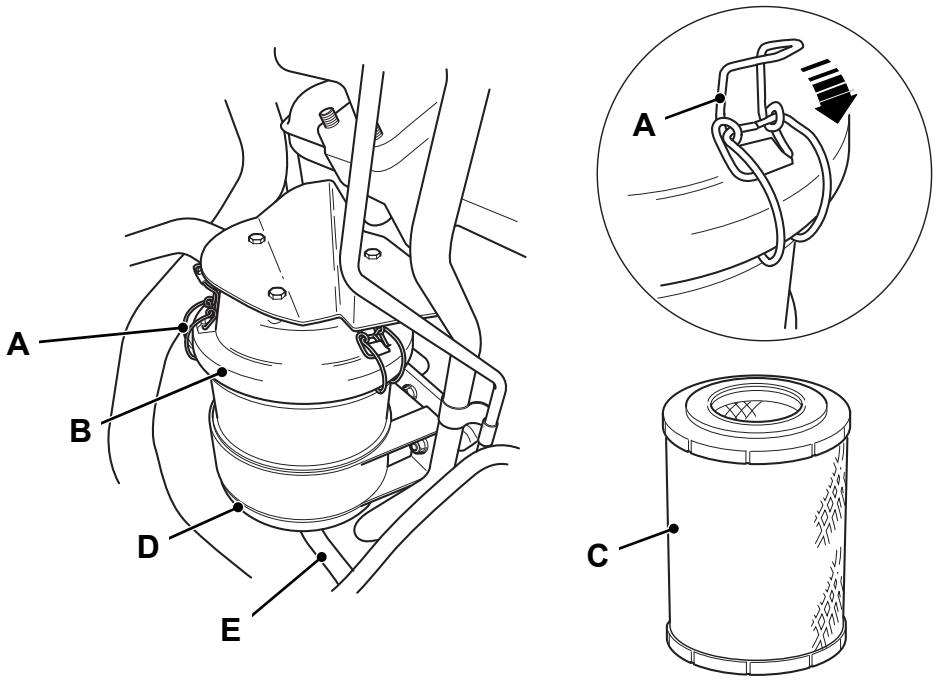


Fig 15.

Engine Air Filter

Changing the Filter Elements

Outer Element

The elements must be changed at the recommended interval. ⇨ *Service Schedules (3-3)*.

1 Apply the park brake, put the transmission in neutral and stop the engine.

2 Open the engine canopy. ⇨ *Engine Canopy (3-21)*.

3 Undo clips **A** and lift off the cyclone block **C**.

4 Remove the filter outer element **E** and discard it.

5 Clean the filter housing **G**, cyclone block **C** and the dust valve **B**. Replace the dust valve if it is damaged or cracked.

6 Fit a new filter outer element **E**.

7 Refit the cyclone block **C** and secure with clips **A**.

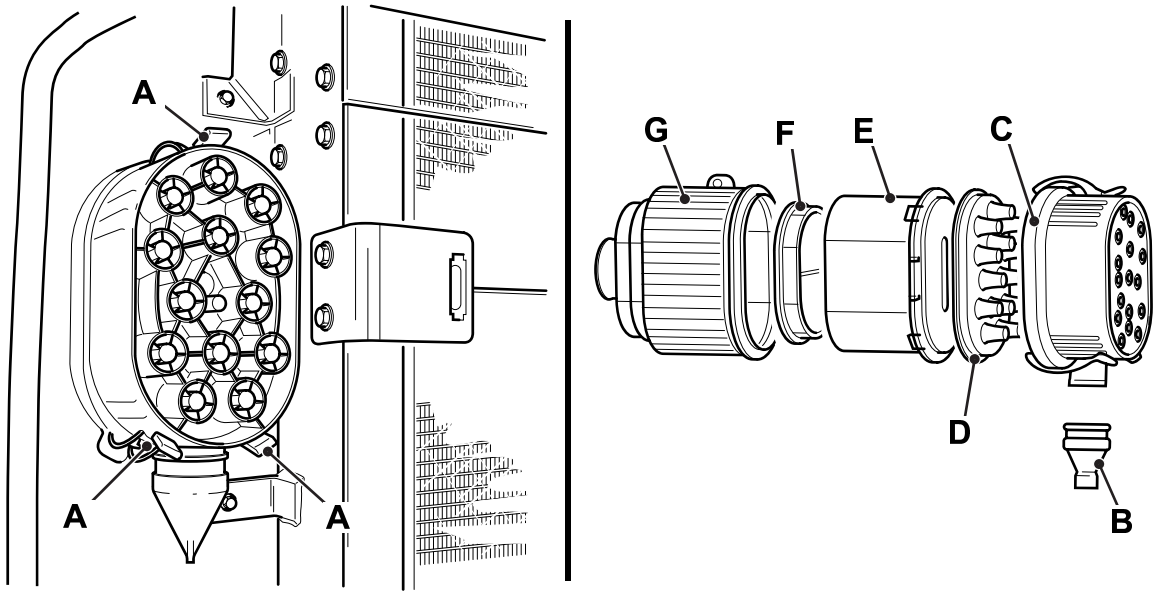


Fig 16.

Inner Element

The elements must be changed at the recommended interval. ⇨ *Service Schedules (3-3)*.

1 Apply the park brake, put the transmission in neutral and stop the engine.

2 Open the engine canopy. ⇨ *Engine Canopy (3-21)*.

3 Undo clips **A** and lift of the cyclone block **C**.

4 Remove the filter outer element **E** and discard it.

5 Remove the filter inner element **F** and discard it.

6 Clean the filter housing **G**, cyclone block **C** and the dust valve **B**. Replace the dust valve if it is damaged or cracked.

7 Fit a new filter inner element **F** and a new filter outer element **E**.

8 Refit the cyclone block **C** and secure with clips **A**.

Fuel System

Filling the Tank

Important: *Use the correct fuel. The potential for damage due to the use of incorrect or contaminated fuel is much greater with common rail injection technology (as fitted to this machine) than with mechanical injection systems. For information about fuel types and cleanliness requirements refer to* ***Section 1 - General Information.***

⚠ CAUTION

Consult your fuel supplier or JCB distributor about the suitability of any fuel you are unsure of.

GEN-9-2

⚠ WARNING

Diesel Fuel

Diesel fuel is flammable; keep naked flames away from the fuel system. Do not smoke while refuelling or working on the fuel system. Do not refuel with the engine running. There could be a fire and injury if you do not follow these precautions.

INT-3-2-2_1

⚠ WARNING

Petrol

Do not use petrol in this machine. Do not mix petrol with the diesel fuel; in storage tanks the petrol will rise to the top and form flammable vapours.

INT-3-1-6

⚠ WARNING

Mobile Phones

Switch off your mobile phone before entering an area with a potentially explosive atmosphere. Sparks in such an area could cause an explosion or fire resulting in death or serious injury.

Switch off and do not use your mobile phone when refuelling the machine.

INT-3-3-9

⚠ CAUTION

Spilt fuel may cause skidding and therefore accidents. Clean any spilt fuel immediately.

Do not use fuel to clean the machine.

When filling with fuel, choose a well aired and ventilated area.

INT-2-2-12

At the end of every working day, fill the tank with the correct type of fuel. This will prevent overnight condensation from developing in the fuel.

We recommend that you lock the fuel cap to prevent theft and tampering.

Draining the Water Separator and Fuel Filter

⚠ CAUTION

It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.

Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.

INT-3-2-14

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key.

2 Drain off any water in the element **17A** by turning tap **17B**.

3 Drain off any water in the water separator bowl **18A** by turning tap **18B**. DO NOT disconnect the water in fuel electrical connector **18C**.

4 If there is sediment in the bowl after draining, support the bowl and release the locking ring **18D**.

5 Wash the bowl in clean fuel.

6 Refit the bowl, secure in position with locking ring **18D**.

7 Make sure that the water in fuel electrical connector **18C** is correctly fitted.

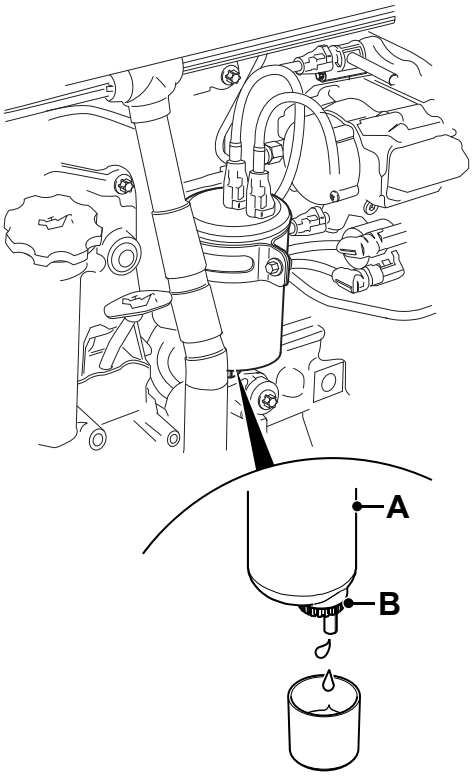


Fig 17.

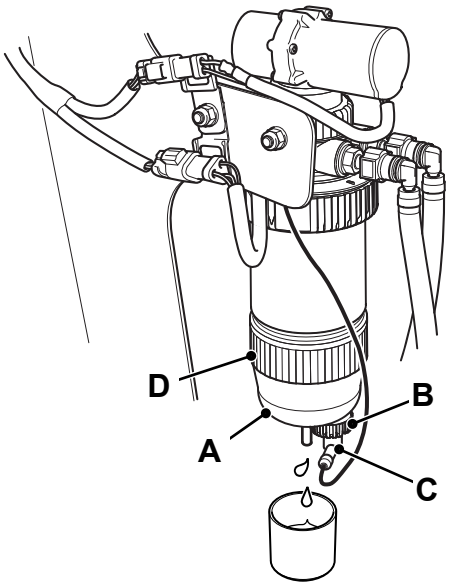


Fig 18.

Changing the Filter Element

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key.

⚠ CAUTION

Do not allow dirt to enter the fuel system. Before disconnecting any part of the fuel system, thoroughly clean around the connection. When a component has been disconnected, for example a fuel pipe, always fit protective caps and plugs to prevent dirt ingress.

Failure to follow these instruction will lead to dirt entering the fuel system. Dirt in the fuel system will seriously damage the fuel injection equipment and could be expensive to repair.

ENG-1-7

2 Thoroughly clean the outside of the filter housing and around the filter head.

3 Loosen the drain tap **19B** and allow the water/fuel to drain into a suitable container.

4 Remove the low pressure fuel lines **19C** and **19E**. Mark the pipes prior to removal to ensure they are refitted in the correct position.

5 Release the filter strap retaining screw **19D** and lift the filter clear.

6 Install new filter element **19A**. Make sure that the filter is in the correct position to enable connection of the fuel lines. Torque tighten the filter strap retaining screw **19D** to 24 Nm (17.7 lbf ft).

7 Reconnect the fuel lines **19C** and **19E**.

8 Bleed the fuel system. ⇒ *Bleeding the Fuel System (🗋 3-38)*

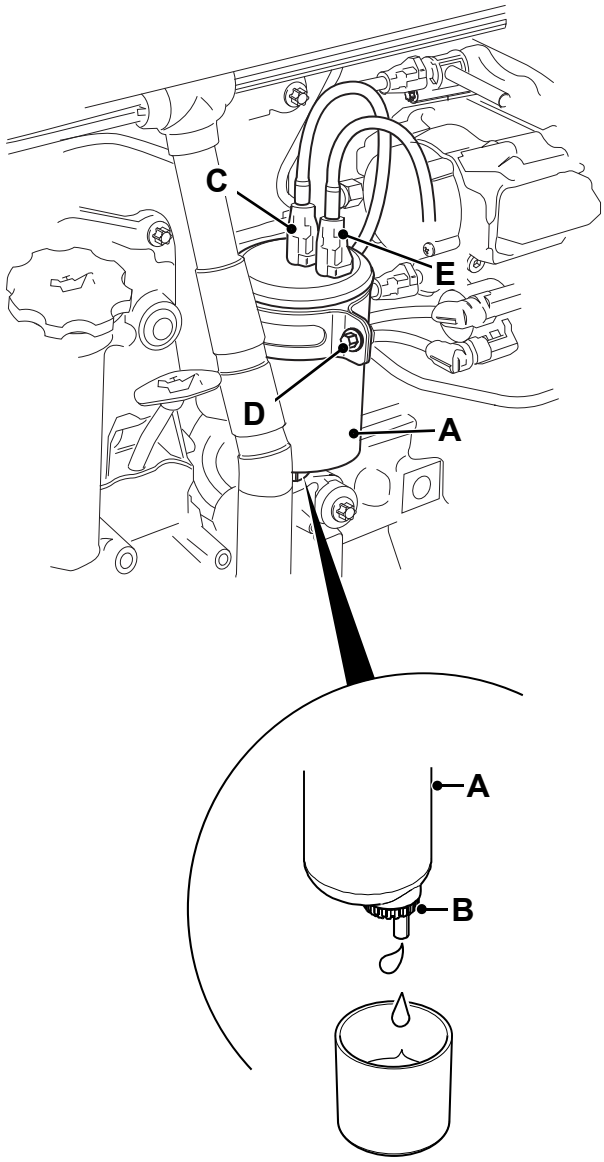


Fig 19.

Changing the Water Separator Pre- Filter

Note: *Refer to the machine handbook for information relating to the location of the pre-filter and water separator.*

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key.

⚠ CAUTION

Do not allow dirt to enter the fuel system. Before disconnecting any part of the fuel system, thoroughly clean around the connection. When a component has been disconnected, for example a fuel pipe, always fit protective caps and plugs to prevent dirt ingress.

Failure to follow these instruction will lead to dirt entering the fuel system. Dirt in the fuel system will seriously damage the fuel injection equipment and could be expensive to repair.

ENG-1-7

2 Drain and remove the water separator bowl **20C**. ⇨ ***Draining the Water Separator and Fuel Filter (3-35)***.

3 To remove the filter element **20A**, release locking ring **20B** and discard element.

4 Fit new element and secure in position with locking ring **20B**.

5 Refit water separator bowl **20C**.

6 Make sure that the water in fuel electrical connector **20D** is correctly fitted.

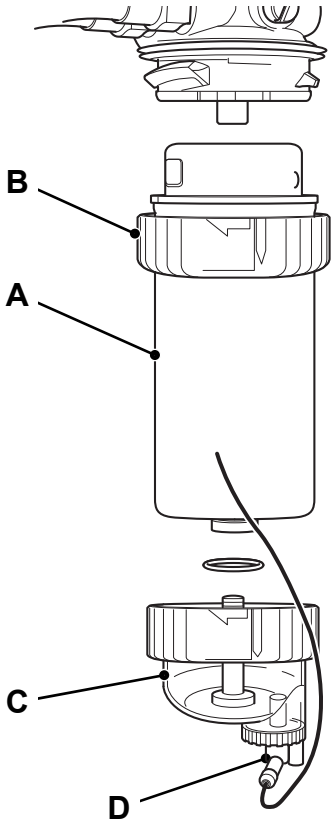


Fig 20.

Bleeding the Fuel System

⚠ CAUTION

Running the engine with air in the system could damage the fuel injection pump. After maintenance, the system must be bled to remove any air.

2-3-3-11

The entry of air into the fuel system can cause problems such as difficult engine starting and unstable engine running.

Air can enter the system if the following occurs:

- A fuel system component has been disconnected. For example, a fuel filter renewal.
- A leak in the low pressure side of the fuel system during engine operation, or the low pressure pipes have been disconnected. Refer to ***System Descriptions*** for a more detailed description of the fuel circuit.
- The fuel tank is allowed to drain during normal operation.

The engine installation features an electrically operated fuel lift pump **21A**. The system is designed to bleed automatically when the lift pump is operated. Make sure that as much air is removed from the fuel as possible BEFORE starting the engine. Bleed the system as follows:

⚠ WARNING

Do not open the high pressure fuel system with the engine running. Engine operation causes high fuel pressure. High pressure fuel spray can cause serious injury or death.

13-3-2-16

Important: *DO NOT attempt to bleed the high pressure fuel system by loosening high pressure pipe connections even when the engine is not running. To bleed the fuel system follow the correct procedure.*

1 Turn on the machine starter switch to start the fuel lift pump **21A**. DO NOT start the engine. Allow the pump to run for 30 seconds.

2 Turn off the machine starter switch to stop the fuel lift pump **21A**. Wait 10 seconds and then turn the starter switch to start the pump. DO NOT start the engine. Allow the pump to run for 30 seconds.

3 Repeat step 2 twice more before starting the engine.

4 Start the engine and make sure it runs smoothly.

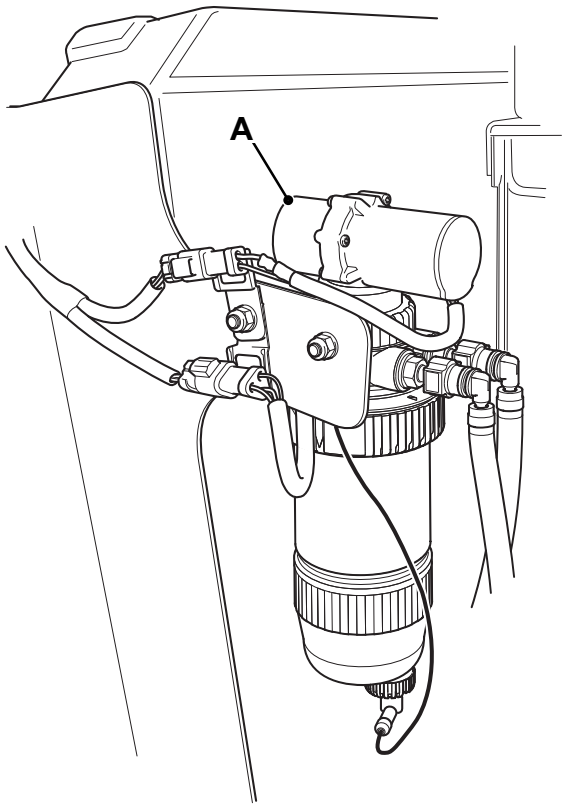


Fig 21.

Hydraulic System

WARNING

Fluid Under Pressure

Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear protective glasses. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

INT-3-1-10_2

Checking the Fluid Level

1 Apply the park brake, put the transmission into neutral, retract the boom, lower the attachment to the ground. Make sure the attachment is flat on the ground and switch off the engine.

2 Look at the fluid level in the "Bulls-eye" sight glass **22A**. the level should be in the centre of the sight glass.

3 If necessary, top up with hydraulic fluid, through filler point **22A**. For the correct grade of lubricant. ⇨ *Fluids, Lubricants and Capacities (3-11)*.

CAUTION

If the fluid is cloudy, then water or air has contaminated the system. This could damage the hydraulic pump. Contact your JCB Distributor immediately.

12-5-1-4

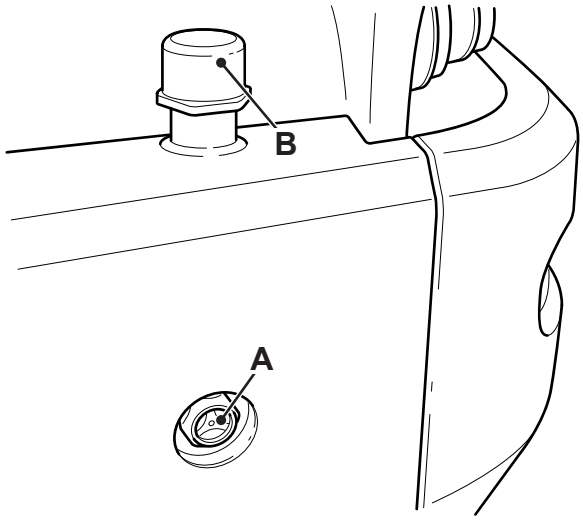


Fig 22.

Changing the Filter Element

WARNING

Fluid Under Pressure

Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear protective glasses. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

INT-3-1-10_2

1 Park the machine on firm level ground. Apply the park brake, put the transmission in neutral, lower the attachments to the ground. Stop the engine.

2 Raise the canopy. ⇨ *Engine Canopy (3-21)*.

3 Undo the filter assembly cover **A**. Lift the handle attached to the top of the filter and pull the filter straight upwards from its housing. Discard the old element.

4 Replace the "O" ring on the cap, insert a new filter element into its tube and make sure it is fully home.

Note: *The torque setting for the filter cap must not be exceeded.*

5 Fold over the lifting handle and screw on the cover. Torque tighten the cap to 40 Nm (29.5 lbf ft).

6 Check the hydraulic fluid level and top up if necessary. ⇨ *Checking the Fluid Level (3-39)*

7 Close and secure the canopy.

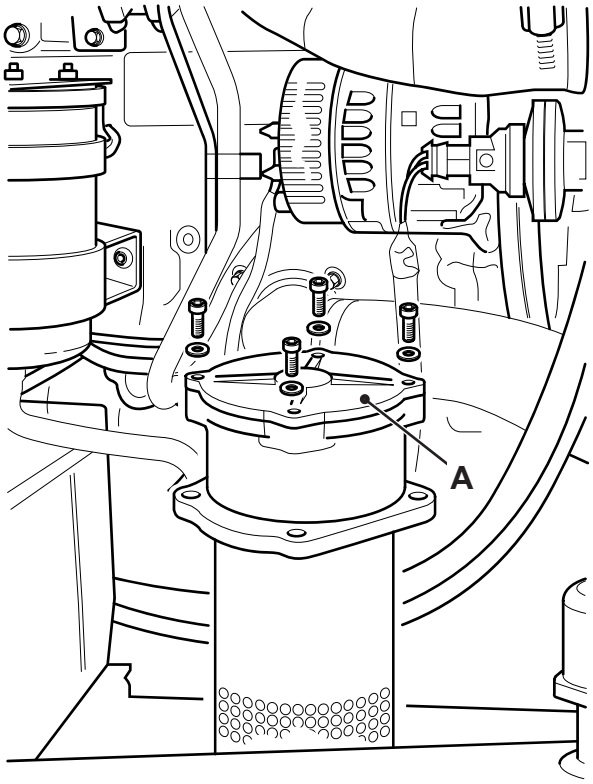


Fig 23.

Transmission

Checking the Transmission Oil Level

1 Start then operate the engine at low idle for four minutes. The delay allows the oil to fill the filter, pump, torque converter, oil cooler and hoses.

2 Switch OFF the engine and remove the starter key.

3 Raise the canopy. ⇨ *Engine Canopy (3-21)*.

Before you complete a check of the oil level you must wait for one minute.

4 Check that the oil level is between the end of the dipstick and maximum mark on the dipstick **A**.

5 Add oil as necessary. Fill through the dipstick tube to maximum dipstick level. Use only the recommended oil.

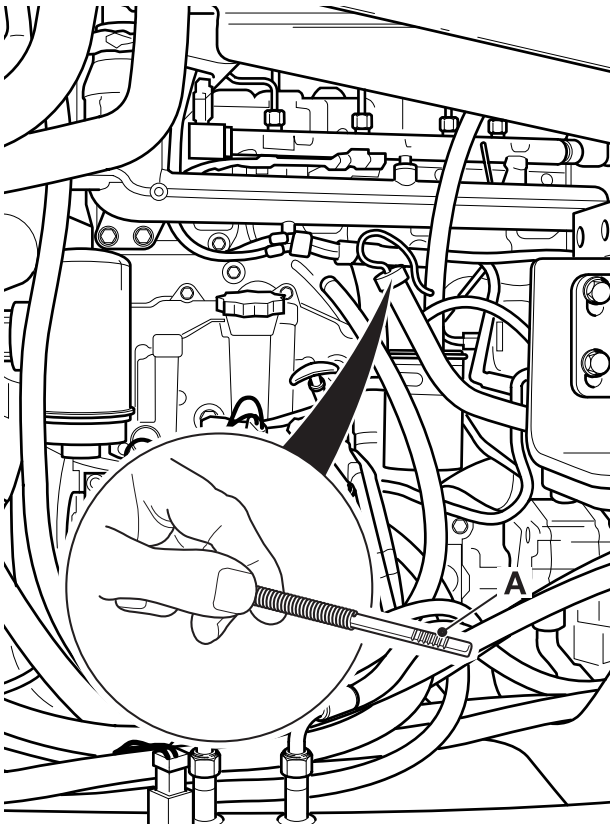


Fig 24.

Changing the Transmission Oil and Filter

3-Speed Transmission

The transmission oil should be drained through the suction strainer aperture to flush out any particles which fall off the strainer during its removal.

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key.

2 Disconnect the battery.

⚠ CAUTION

When the strainer is removed, oil will gush out. Keep to one side when you remove the strainer.

2-3-4-1

3 Place a container, of suitable size beneath the suction strainer. Remove bolts **D**. Pull out the strainer **E** and its gasket **F**. Allow the oil to drain into the container. Be aware that the oil may be hot.

4 Clean the strainer with a suitable solvent. Follow the solvent manufacturer's instructions on safety.

5 Fit the strainer **E** and a new gasket **F**. Apply JCB Threadlocker and Sealer to bolts **D** before fitting and tightening them. Torque tighten the bolts to 10 Nm (7 lbf ft).

6 Unscrew and remove the filter **B**. Some machines feature a remote chassis mounted filter as shown at **X**. Fit the new filter:

- **a** Smear seal **C** with transmission oil.
- **b** Screw the filter on until it just contacts the filter head.
- **c** Turn the filter at least another 3/4 of a turn.

7 Fill the system with new oil through the dipstick/filler. Do not fill past the top mark on the dipstick.

Note: *Fit only a genuine supplied JCB filter, otherwise damage to the system may be incurred through contamination.*

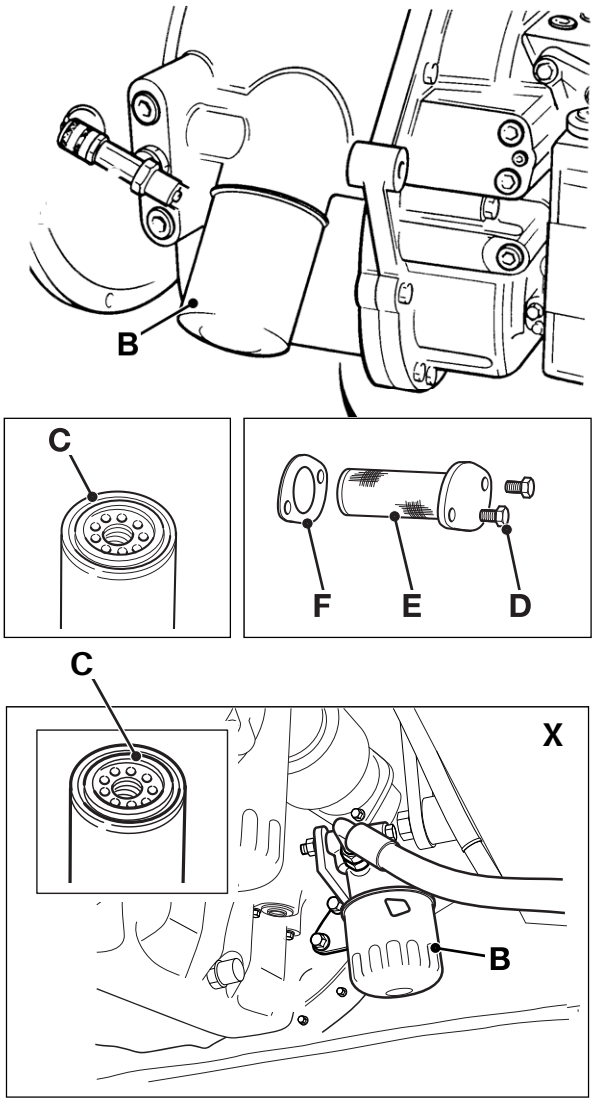


Fig 25.

6-Speed Transmission

The transmission oil should be drained through the suction strainer aperture to flush out any particles which fall off the strainer during its removal.

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

1 Make sure the park brake is engaged and the transmission set to neutral. Lower the attachments to the ground, switch OFF the engine and remove the starter key.

2 Disconnect the battery.

⚠ CAUTION

When the strainer is removed, oil will gush out. Keep to one side when you remove the strainer.

2-3-4-1

3 Place a container, of suitable size beneath the suction strainer. Remove bolts **D**. Pull out the strainer **E** and its gasket **F**. Allow the oil to drain into the container. Be aware that the oil may be hot.

4 Clean the strainer with a suitable solvent. Follow the solvent manufacturer's instructions on safety.

5 Fit the strainer **E** and a new gasket **F**. Apply JCB Threadlocker and Sealer to bolts **D** before fitting and tightening them. Torque tighten the bolts to 10 Nm (7 lbf ft).

6 Unscrew and remove the filter **B**. Some machines feature a remote chassis mounted filter as shown at **X**. Fit the new filter:

- **a** Smear seal **C** with transmission oil.
- **b** Screw the filter on until it just contacts the filter head.
- **c** Turn the filter at least another 3/4 of a turn.

7 Fill the system with new oil through the dipstick/filler. Do not fill past the top mark on the dipstick.

Note: *Fit only a genuine supplied JCB filter, otherwise damage to the system may be incurred through contamination.*

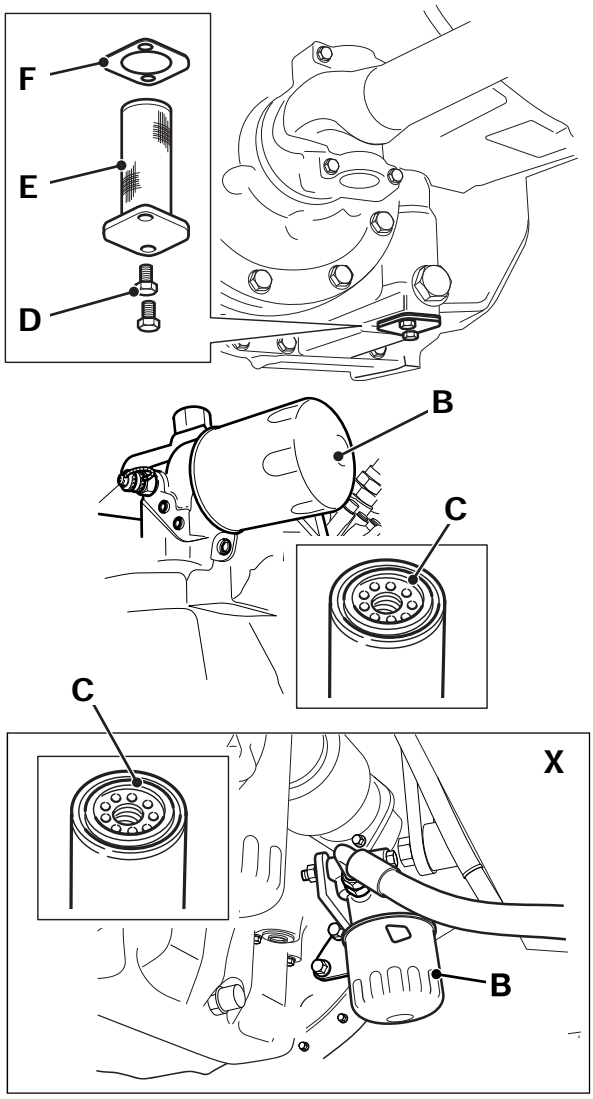


Fig 26.

Transfer Gearbox

Checking the Oil Level

⚠ WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

1 Remove the fill/level plug **A**, oil should flow from the hole.

2 If necessary, top up with recommended oil.

3 Clean plug **A** and refit using a new bonded washer, tighten to 102 Nm (75 lbf ft).

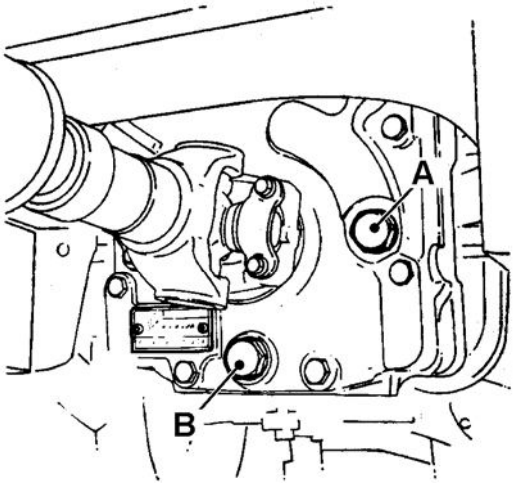


Fig 27.

Changing the Oil

1 Remove the fill/level plug **A**.

⚠ CAUTION

Oil will gush from the hole when the drain plug is removed. Keep to one side when you remove the plug.

2-3-4-2

2 Remove drain plug **B**, and drain the oil into a suitable container.

3 Clean plug **B** and refit using a new bonded washer, tighten to 102 Nm (75 lbf ft).

4 Fill with recommended oil through fill/level hole **A**.

5 Clean plug **A** and refit using a new bonded washer, tighten to 102 Nm (75 lbf ft).

Axles

Checking the Oil Level

1 At the drive head casing remove fill/level plug **A**. Oil should be level with the bottom of the fill/level plug.

2 If necessary, top up with JCB recommended axle oil. Clean and refit fill/level plug **A**.

Note: *It is essential that the machine is parked on level ground to ensure accurate oil level checking.*

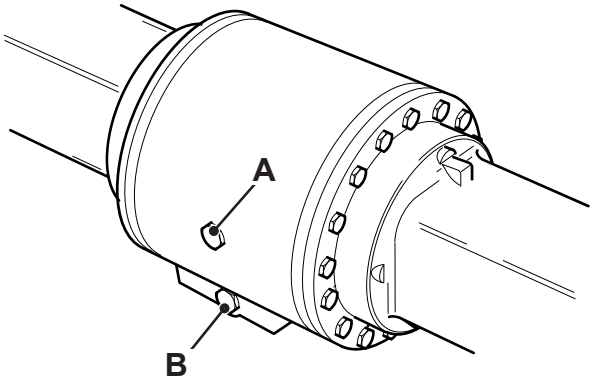


Fig 28.

Changing the Oil

1 Set the machine level, with the machine tyres just clear of the ground. Manually rotate both wheels of the axle to bring the oil level mark on the hubs to the vertical position, with the fill/level plugs **C** at the bottom as shown at **D**.

2 Remove fill/level plugs **C** from the hubs and drain plug **B** from the drive head casing. Allow time for the oil to drain out.

3 Clean and refit drain plug and bonded washer **B**. Torque tighten to 79 Nm (58 lbf ft).

4 Set both hub **OIL LEVEL** marks to the horizontal as shown at **E**. There is a tolerance of 5 mm (0.2 in) above or below the horizontal.

5 Fill the axle with the specified quantity of oil through drive head casing fill/level plug **A**. If the machine has been set level, oil should just dribble out both hub fill/level points.

6 Clean and refit both hub fill/level plugs **C** and fill/level plug **A** and their bonded washer.

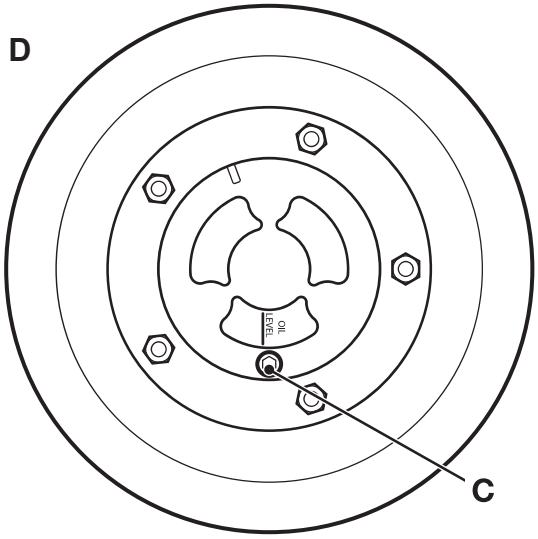


Fig 29.

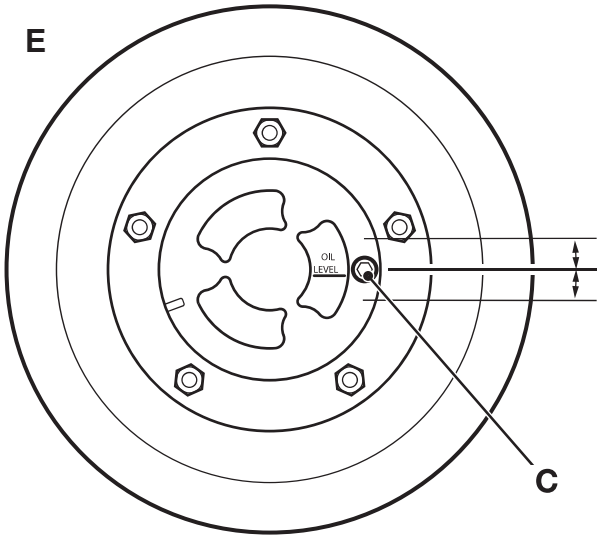


Fig 30.

Tyres and Wheels

Tyre Inflation

T3-010

These instructions are for adding air to a tyre which is already inflated. If the tyre has lost all its air pressure, call in a qualified tyre mechanic. The tyre mechanic should use a tyre inflation cage and the correct equipment to do the job.

⚠ WARNING

An exploding tyre can kill. Inflated tyres can explode if over-heated or over-inflated. Follow the instructions given when inflating the tyres. Do not cut or weld the rims. Use a tyre/wheel specialist for all repair work.

2-3-2-7_2

1 Prepare the wheel.

Before you add air to the tyre, make sure it is correctly fitted on the machine or installed in a tyre inflation cage.

2 Prepare the equipment.

a Use only an air supply system which includes a pressure regulator. Set the regulator no higher than 1.38 bar (20 psi) above the recommended tyre pressure. For recommended tyres and pressures for your machine, see ***Tyre Sizes and Pressures***.

b Use an air hose fitted with a self-locking air chuck and remote shut-off valve.

3 Add the air.

a Make sure that the air hose is correctly connected to the tyre valve. Clear other people from the area. Stand behind the tread of the tyre while adding the air.

b Inflate the tyre to the recommended pressure. Do not over-inflate.

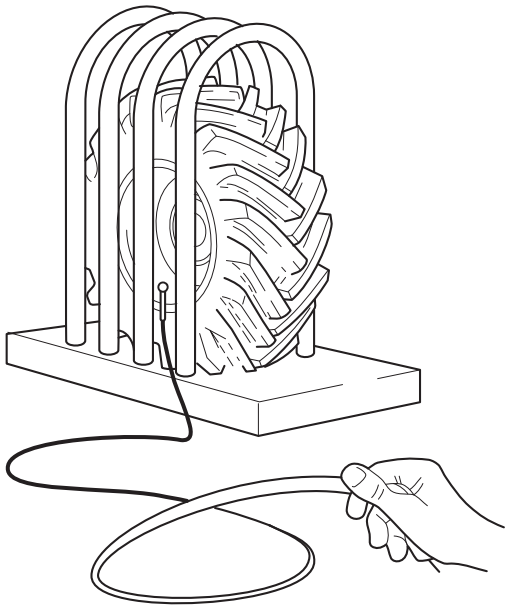


Fig 31.

Checking the Wheel Nut Torques

T3-014

⚠ WARNING

If, for whatever reason, a wheel stud is renewed, all the studs for that wheel must be changed as a set, since the remaining studs may have been damaged.

2-3-2-8

On new machines, and whenever a wheel has been removed, check the wheel nut torques every two hours until they stay correct.

Every day, before starting work, check that the wheel nuts are tight.

The correct torques are shown in the table below.

Table 9.

Front		Rear	
Nm	**lbf ft**	**Nm**	**lbf ft**
680	500	680	500

Windscreen Washer

Fill the windscreen washer bottle **A** with a suitable liquid. The liquid should contain a de-icing fluid to prevent it freezing. **Do not us engine coolant antifreeze**.

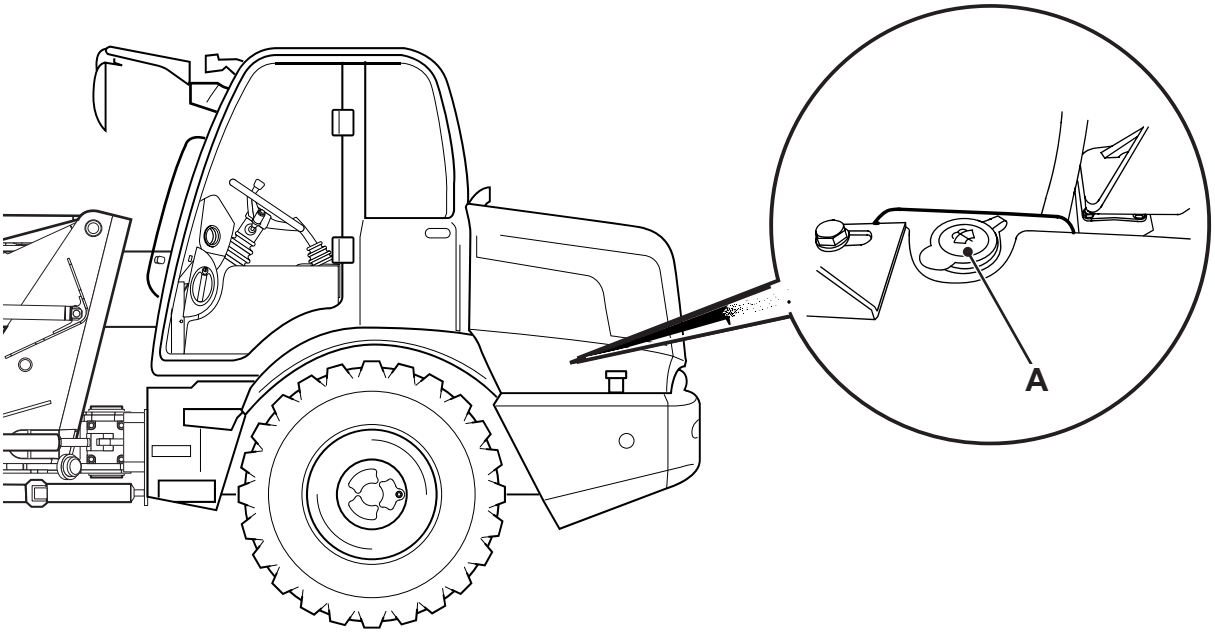


Fig 32.

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