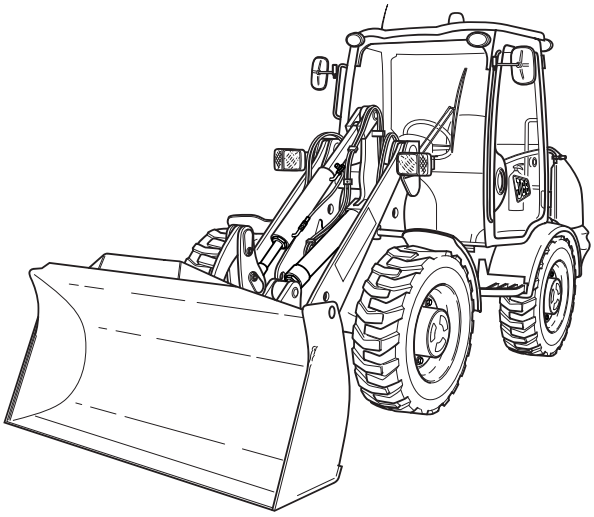
# Section 3

# Routine Maintenance





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**Notes:**

**Contents** **Page No.**

**Contents** **Page No.**

# Routine Maintenance

## 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

# Service Schedules

## Introduction

A poorly maintained machine is a hazard. Doing the regular maintenance and lubrication jobs listed in these schedules will help keep the machine in safe running order.

**⚠ 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 level ground.**

**To prevent anyone starting the engine, remove the starter key. Disconnect the battery when you are not using electrical power. If you do not take these precautions you could be killed or injured.**

8-3-1-1

**A Service History Record Book is supplied with every machine to enable you to plan your service requirements and keep a service history record. This record book should be dated, signed and stamped by your Distributor at machine installation and each time your machine is serviced.**

2-3-1-9

Apart from the daily jobs, the schedules are based on machine running hours. Keep a regular check on the hour meter reading. Do not use a machine which is due for a regular service. Rectify any defects found during regular maintenance before clearing the machine for use.

**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 |
| Every 5000 Hours | = | 5 Years |

✶ Owner or Operator Tasks ○ First 100 hrs only (to be completed by JCB Distributor) ● Regular Service

**Table 1. Engine**

| Pre-start Cold Checks, Service Points and Fluid Levels | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Oil Level and Condition | Check | ✶ | | | | | | |
| Oil and Filter (406 Machines) | Change(1) | | | | | | ● | |
| Oil and Filter (409 Machines) | Change(1) | | | | | ● | | |
| Air Cleaner Dust Valve | Clean(2) | | | ✶ | ○ | | ● | |
| Air Cleaner Outer Element | Change(3) | | | | | | ● | |
| Air Cleaner Inner Element | Change | | | | | | | ● |
| Fuel System For Leaks and Contamination | Check | ✶ | | | ○ | | ● | |
| Fuel Filter | Change | | | | | | ● | |
| Fuel Sedimenter | Drain and clean | | | ✶ | | | ● | |
| Fan Belt Tension/Condition (Change at 1000 hrs) | Check | | | | ○ | ✶ | ● | |
| Valve Clearances | Check/Adjust | | | | ○ | | ● | |
| Oil Cooler Hoses Condition | Check | | | | ○ | | ● | |
| Oil Cooler | Clean(4) | | | ✶ | | | | |
| External Oil Leaks | Check | ✶ | | | | | ● | |

*(1) In arduous conditions change the oil and filter after every 250 Hours or three months (whichever comes first).*
*(2) Clean more often when working in dusty environments*
*(3) Change outer element more frequently in dusty operating environments.*
*(4) Clean more often when working in dusty environments*

**Table 2. Transmission and Axles**

| Pre-start Cold Checks, Service Points and Fluid Levels | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Drop-box Oil | Change | | | | ○ | | ● | |
| Axles Differential Oil | Change | | | | ○ | | ● | |
| Hub Oil | Change(1) | | | | ○ | | ● | |
| Tyre Pressures/Condition | Check | | ✶ | | ○ | | ● | |
| Wheel Nut Security | Check | | ✶ | | ○ | | ● | |
| Axle Mount Security | Check | | | | ○ | | ● | |

*(1) After a hub repair, the new oil should be run to operating temperature and changed again to remove any contamination which entered during the repair. Change the oil again after a further 100 hours to remove any bedding-in wear.*

**Table 3. Hydraulics**

| Pre-start Cold Checks, Service Points and Fluid Levels | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Oil Level | Check | ✶ | | | | | | |
| Oil Filter | Change | | | | | | ● | |
| Oil | Change | | | | | | ● | |
| Suction Strainer (Tank)(1) | Change | | | | | | | ● |
| Suction Strainer (Filter Head)(2) | Change | | | | | | | ● |
| Hoses, Rams and Pipework for Damage or Leaks | Check | | | | ○ | | ● | |

*(1) Strainer filter located inside hydraulic tank.*
*(2) Strainer filter located in main hydraulic filter head.*

**Table 4. Brakes**

| Pre-start Cold Checks, Service Points and Fluid Levels | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Brake System Fluid | Check Level | ✶ | | | ○ | | | |
| Brake System Fluid | Change | | | | | | | ● |

**Table 5. Electrics**

| Pre-start Cold Checks, Service Points and Fluid Levels | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Battery Electrolyte Level (if applicable) | Check | | | ✶ | ○ | | ● | |
| Battery Charge and Condition | Check | | | ✶ | ○ | | ● | |
| Battery Terminals for Condition & Tightness | Check | | | ✶ | ○ | | ● | |
| Wiring for Chaffing and Routing | Check | | | | ○ | | ● | |

**Table 6. Bodywork and Cab**

| Pre-start Cold Checks, Service Points and Fluid Levels | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Wing Mirrors Condition & Security | Check | ✶ | | | ○ | | | |
| All Pivot Pins | Grease | | ✶ | | ○ | | ● | |
| Propshaft Joints | Grease(1) | | ✶ | | ○ | | ● | |
| Windscreen Washer Fluid Level | Fill | ✶ | | | | | | |
| Cab Heater Filter (if fitted) | Clean(2) | | | ✶ | ○ | | ● | |
| Seat Belt Condition and Security | | ✶ | | | ○ | | ● | |

*(1) Grease more frequently when operating in arduous conditions.*
*(2) Clean/change outer element more frequently in dusty operating environments.*

**Table 7. Additional Service Items**

| Pre-start Cold Checks, Service Points and Fluid Levels | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 5 Yearly 5000 Hr |
|---|---|---|---|---|---|---|---|---|
| Engine Cooling System Cleaning ⇨ *Cleaning the Engine Cooling System (3-34)* | Clean(1) | | | ✶ | ○ | | ● | |
| Engine Timing Belt | Replace | | | | | | | ● |

*(1) IMPORTANT: Under dusty conditions, carry out the engine cooling system cleaning procedure more frequently.*

**Table 8. Engine**

| Functional Test and Final Inspection | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Idle Speed | Check/Adjust | | | | ○ | | ● | |
| Max. No Load Speed | Check/Adjust | | | | ○ | | ● | |
| Throttle System and Control Cable | Check/Adjust | | | | ○ | | ● | |
| Exhaust Smoke (Excessive) | Check | | | | ○ | | ● | |
| Exhaust System Security | Check | | | | | | ● | |
| Air Inlet System Security | Check | | | | | | ● | |
| Crankcase Breather | Check | | | | | | | ● |

**Table 9. Transmission, Axles and Steering**

| Functional Test and Final Inspection | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Transmission Operation | Check | | | | ○ | | ● | |
| Forward/Reverse/Speed Range - Operation | Check | | | | ○ | | ● | |
| Neutral Start Operation | Check | | | | ○ | | ● | |
| Steer Operation | Check | | | | ○ | | ● | |

**Table 10. Hydraulics**

| Functional Test and Final Inspection | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Operation Of All Services | Check | ★ | | | ○ | | ● | |
| Hose Burst Protection Valves (if fitted) | Check | | | | ○ | | ● | |
| MRV Pressure | Check/Adjust | | | | ○ | | ● | |
| ARV Pressure | Check(1) | | | | ○ | | ● | |
| Steer Circuit MRV Pressure | Check/Adjust | | | | ○ | | ● | |
| Piston Rods Chrome (Condition) | Check | | | | ○ | | ● | |
| Parallel Lift/Lower (Forks) | Check | | | | ○ | | ● | |

*(1) ARV's are non-adjustable. Any ARV found to be outside the specified values as stated in Section E Technical Data will need to be replaced. Details on the correct procedure can be found in the relevant section of this manual.*

**Table 11. Brakes**

| Functional Test and Final Inspection | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Foot Brake Operation | Check | ★ | | | ○ | | ● | |

| Functional Test and Final Inspection | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Parking Brake | Check/Adjust | ✶ | | | ○ | | ● | |

**Table 12. Electrics**

| Functional Test and Final Inspection | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Gauges and Warning Lights | Check | | | | ○ | | ● | |
| Wiper Motors | Check | ✶ | | | ○ | | ● | |
| Cab Switches | Check Operation | ✶ | | | ○ | | ● | |
| Horn | Check | ✶ | | | ○ | | ● | |
| Heater (if fitted) | Check | ✶ | | | ○ | | ● | |
| Reverse Alarm (if fitted) | Check | ✶ | | | ○ | | ● | |
| Lights and Indicators (if fitted) | Check | ✶ | | | ○ | | ● | |

**Table 13. Bodywork and Cab**

| Functional Test and Final Inspection | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Seat/Seat Belts | Check | ✶ | | | ○ | | ● | |
| Air Conditioning (if fitted) | Check | ✶ | | | ○ | | ● | |
| Generally for damage, leaks & wear (inc. ROPS/FOPS structure for cracks, welding, etc) | Check | ✶ | | | ○ | | ● | |

**Table 14. Attachments**

| Functional Test and Final Inspection | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Attachment Condition and Operation | Check | | ✶ | | ● | | ● | |

**Table 15. Paintwork**

| Functional Test and Final Inspection | Operation | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| Condition | Check | | | | ○ | | ● | |

**Table 16. General**

| Functional Test and Final Inspection | Daily 10 Hr | Weekly 50 Hr | Monthly 100 Hr | First 100 Hr | 6 Monthly 500 Hr | Yearly 1000 Hr | 2 Yearly 2000 Hr |
|---|---|---|---|---|---|---|---|
| Check for Fluid Leaks (e.g. engine oil, hydraulic oil, etc.) | | | | ○ | | ● | |
| Registration/Certificate, SWL Stickers and Load Chart (to suit territorial requirements) | | | | ○ | | ● | |

## Periodic Replacement of Safety Related Components

Routinely replace important parts concerned with safety. It is difficult to determine by visual inspection or from operation the service life of specific parts, so routinely replace them as important parts every 2 years.

**Table 17. Fuel System**

| Important Parts | Replacement Interval |
|---|---|
| Fuel Hose (Fuel Tank - Engine) | Every 2 years or every 4000 hours, whichever comes first. |
| Fuel Hose (Fuel Filter - Injection Pump) | |
| Fuel return hose | |

**Table 18. Hydraulic System**

| Important Parts | Replacement Interval |
|---|---|
| Pump Exit Hose (Pump - Operation Valve) | Every 2 years or every 4000 hours, whichever comes first. |
| Loader Ram Line Hose | |
| Crowd Ram Line Hose | |

If any abnormality is found with any of these parts before the replacement time, repair or replace as you would do normally.

When replacing the hoses, if the hose clamps are found to be deformed or cracked, replace the clamps at the same time as the hoses.

Regarding hydraulic hoses not included in the routine replacement of safety parts, carry out the inspection described in ⇨ *Table 19. (3-11)* and re-tighten, replace, etc., when any abnormality is found.

***Note:*** *Replace all O-rings and gaskets at the same time as hoses. Contact your JCB distributor for replacement of safety parts. Carry out inspection of the hydraulic hoses and fuel hoses at the routine inspection listed in* ⇨ *Table 19. (3-11)**.*

**Table 19.**

| Inspection Classification | Inspection Item |
|---|---|
| Start-up Inspection | Fuel, Hydraulic hose connections, Oil Leakage from caulked parts. |
| Special Independent Inspection (Monthly Inspection) | Fuel, Hydraulic hose connections, Oil Leakage from caulked parts. Fuel, Hydraulic hose damage (cracks, wear, picking) |
| Special Independent Inspection (Yearly Inspection) | Fuel, Hydraulic hose connections, Oil Leakage from caulked parts. Fuel, Hydraulic hose interference, squeezing, aging, twisting, damage (cracks, wear, picking) |

# 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 20.**

| ITEM | CAPACITY | | FLUID/LUBRICANT | INTERNATIONAL SPECIFICATION |
|---|---|---|---|---|
| | Litres | UK Gal | | |
| Fuel Tank | 80 | 17.6 | Diesel Oil | ASTM D975-66T Nos. 1D, 2D |
| Engine (Oil) | | | **JCB Extreme Performance** | SAE15W/40, ACEA E5/B3/A3,API CH-4/SJ |
| Min | 11 | 2.42 | (-15°C to +50°C (5°F to 122°F) | |
| Max | 12 | 2.64 | | |
| | | | **! CAUTION: DO NOT USE ORDINARY ENGINE OIL** | |
| Front Axle | 3.9 | 0.86 | JCB HP Gear Oil | API-GL-4 |
| Rear Axle | 3.9 | 0.86 | JCB HP Gear Oil | API-GL-4 |
| Drop-box | 0.6 | 0.13 | JCB HP Gear Oil | API-GL-4 |
| Hubs (4) | 0.8 | 0.17 | JCB HP Gear Oil | API-GL-4 |
| Hydraulic System | 70 | 15.4 | **JCB Extreme Performance Multigrade Hydraulic Fluid 46** | ISO VG46 |
| Brake System | 1.4 | 0.3 | **JCB Light Hydraulic Fluid**<br>**! CAUTION: DO NOT USE ORDINARY BRAKE FLUID** | ISO VG15 |
| Inching System | Part of Brake System | | | ISO VG15 |
| Grease Points | --- | --- | **JCB HP Grease** | Lithium complex NLGI No.2 consistency including extreme pressure additives |
| | | | or **JCB Special MPL-EP Grease**(1) | Lithium based NLGI No.2 consistency including extreme pressure additives |
| Electrical connections | --- | --- | As a corrosion and moisture inhibitor all exposed connections should be coated liberally with petroleum jelly. | |

*(1) JCB HP Grease is the recommended specification grease, if using JCB Special MPL-EP then the greasing must be carried out more frequently.*

**Table 21. Item return Table**

⇒ ***Checking the Brake Fluid Level (3-23)***
⇒ ***Checking the Oil Level (3-29)***
⇒ ***Changing the Oil and Filter (3-30)***
⇒ ***Refilling the Hydraulic System (3-43)***
⇒ ***Checking the Front Differential Oil Level (3-51)***
⇒ ***Transmission Drop-box (3-49)***
⇒ ***Checking the Rear Differential Oil Level (3-53)***
⇒ ***Checking the Hub Oil Level (3-55)***

# 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.

# Articulation lock

## Installing the Articulation lock

### ⚠ 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

On the wheeled loader, the articulation safety lock is stowed on the machine as illustrated. The articulation lock is fitted with the machine in a "straight ahead" position.

**1** Steer the machine to bring the front and rear wheels in a straight line.

**2** Apply the parking brake, put the transmission in neutral and stop the engine.

**3** Remove the articulation lock pin retaining clip and remove the articulation lock pin **A** from its stowage position **1B** and fit the pin into the holes **2C** and **2D** and refit the retaining clip. If the articulation lock pin will not fit, turn the wheels slightly to align the holes.

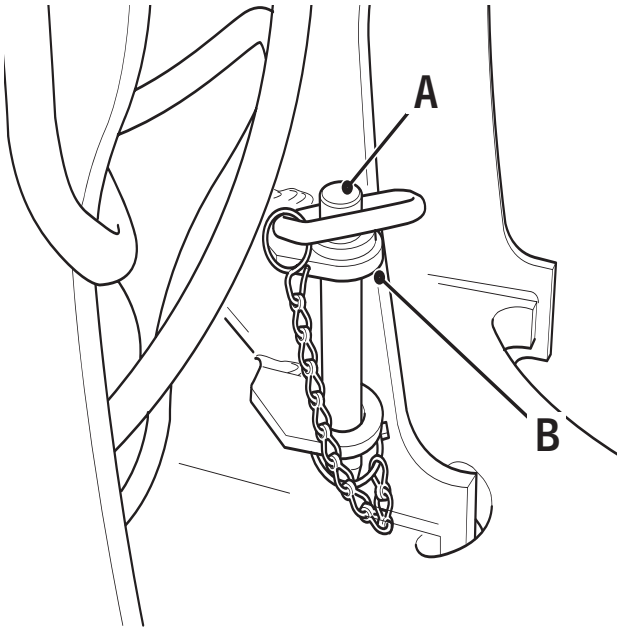


**Fig 1.**

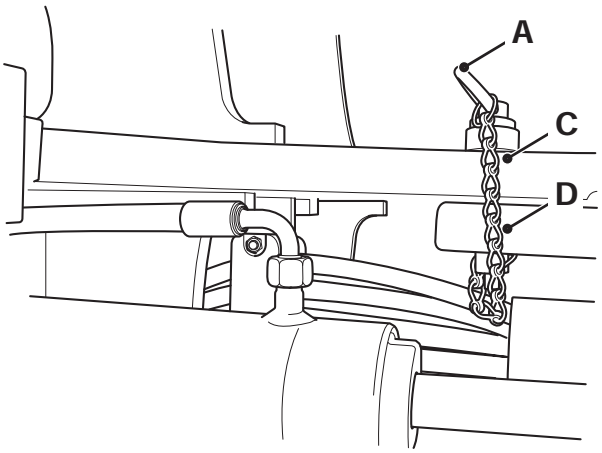


**Fig 2.**

## Removing the Articulation Lock

### ⚠ WARNING

**Always make sure the articulation safety lock has been removed before attempting to drive the machine. The machine cannot be steered with the articulation lock fitted.**

16-3-1-4

**1** Remove the articulation lock retaining clip.

**2** Remove the articulation lock pin **A** from the holes **2C** and **D** and return it to its stowage position **1B**.

**3** Lock the articulation lock into its stowed position by refitting the retaining clip.

# Loader Arm Support Strut

## Installing the Support Strut

**⚠ WARNING**

**Never walk or work under raised equipment unless it is supported by a mechanical device. Equipment which is supported only by a hydraulic device can drop and injure you if the hydraulic system fails or if the control is operated (even with the engine stopped).**

13-2-3-7

**⚠ WARNING**

**You could be killed or seriously injured if the loader control is accidentally operated. Make sure that no-one goes near the machine whilst you fit the safety strut.**

16-3-1-5

**1** Empty the shovel and raise the loader enough to fit the safety strut.

**2** Apply the parking brake, put the transmission in neutral and stop the engine.

**3** Fit the strut:

**a** Release fastener **3A**.

**b** Remove the strut **3B** from its stowage position.

**c** Place the strut around the lift ram.

**d** Secure the strut into position using the strap **3C**.

**4** Start the engine.

***Note:*** *Extreme care must be taken when lowering the loader arm onto the safety strut. "Feather" the lever to lower the loader arm slowly.*

**5** Slowly lower the loader arm onto the safety strut. Stop the movement immediately the weight of the arm is supported by the strut.

## Removing the Support Strut

**⚠ WARNING**

**You could be killed or seriously injured if the loader control is accidentally operated. Make sure that no-one goes near the machine whilst you fit the safety strut.**

16-3-1-5

**1** Make sure the parking brake is engaged, and that the transmission is in neutral.

**2** Start the engine.

**3** Raise the loader arm to take the weight off the safety strut **3B**. Stop the engine.

**4** Remove the strut:

**a** Release the securing strap **3C**.

**b** Remove the safety strut.

**c** Return the safety strut to its stowage position and secure with fastener **3A**.

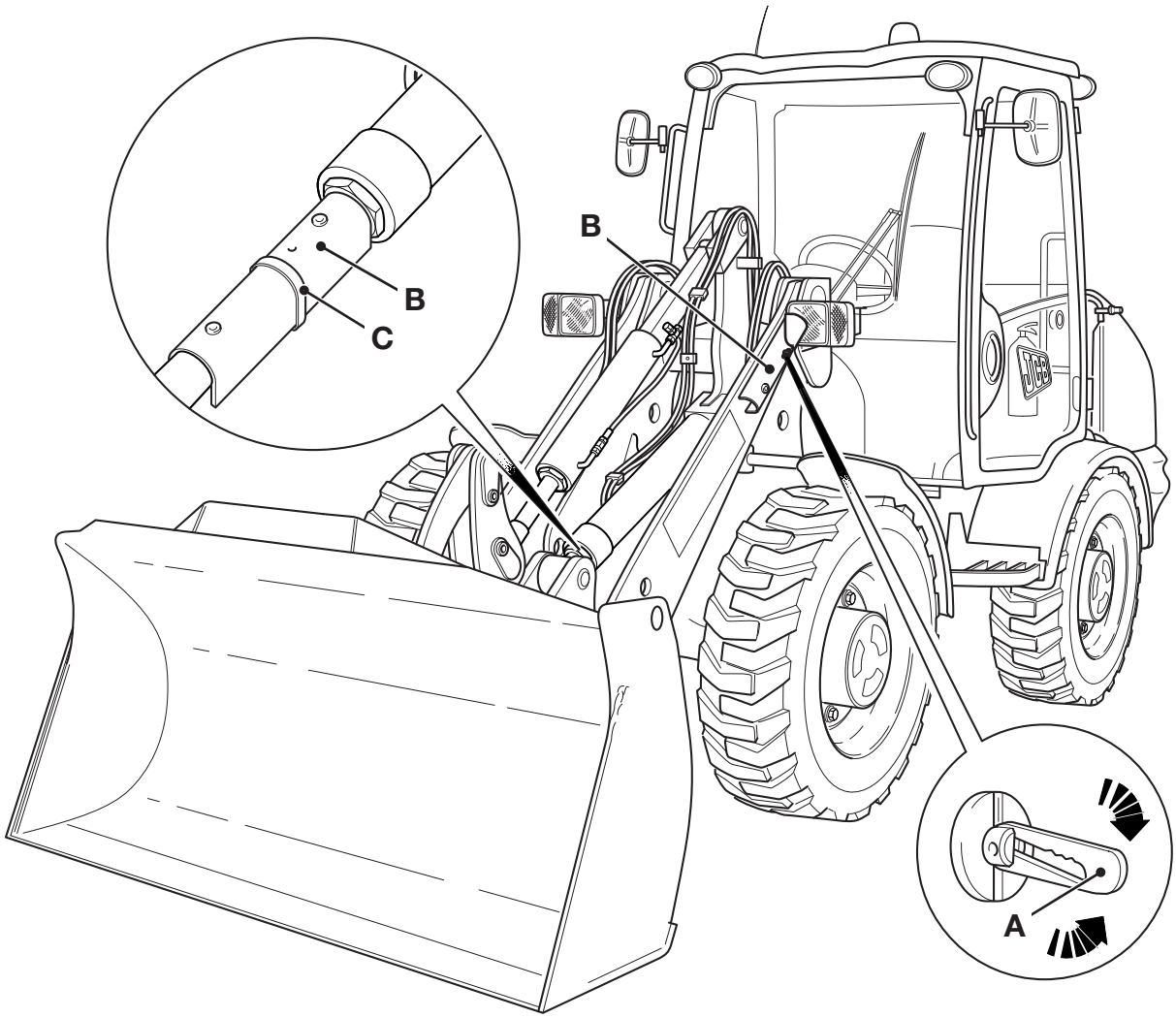


Fig 3.

# Engine Compartment

## Opening and Closing the Engine Cover

### Opening the Engine Cover

**⚠ 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

**1** Apply the parking brake, lower the attachments to the ground, place the transmission in neutral and stop the engine.

**2** Unlock the security lock built into the release button **A**. It is recommended that the cover is kept locked.

**3** Press in the release button and allow the gas struts to raise the cover.

### Closing the Engine Cover

**1** Pull down the engine cover until the catch engages.

**2** Make sure the cover is securely latched.

**3** Lock the security lock and remove the key.

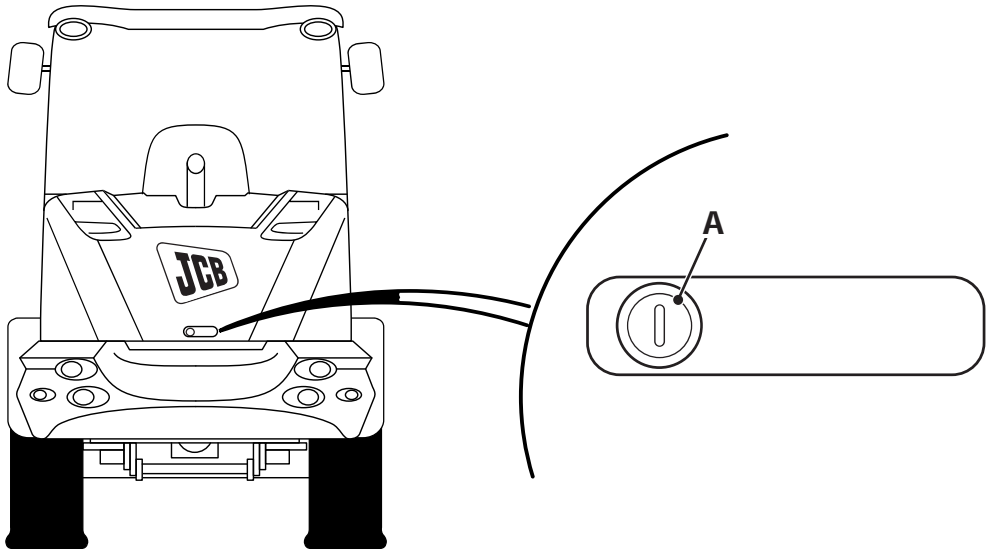


**Fig 4.**

# 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 the loader arms raised, then the loader arm safety strut must be fitted). See Loader Arm 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.**

4-3-2-4_1

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. ⇒ ***Lubricants and Capacities (3-12)***

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

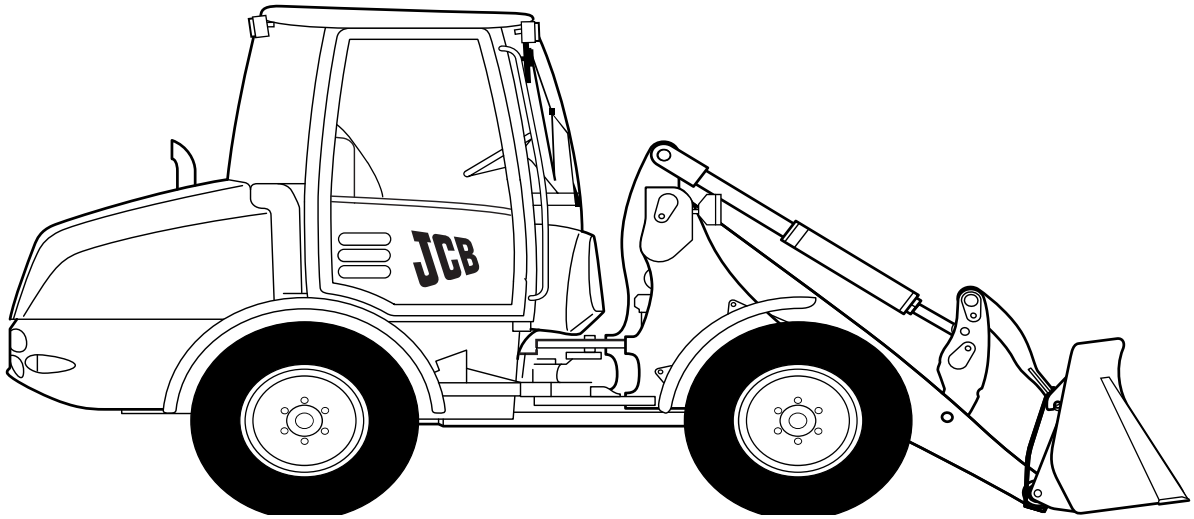


**Fig 5.**

## Loader Arms

**⚠ 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 the loader arms raised, then the loader arm safety strut must be fitted). See Loader Arm 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.**

4-3-2-4_1

There are a total of **11** grease points. Grease points **3** and **11** are on the opposite side of the machine.

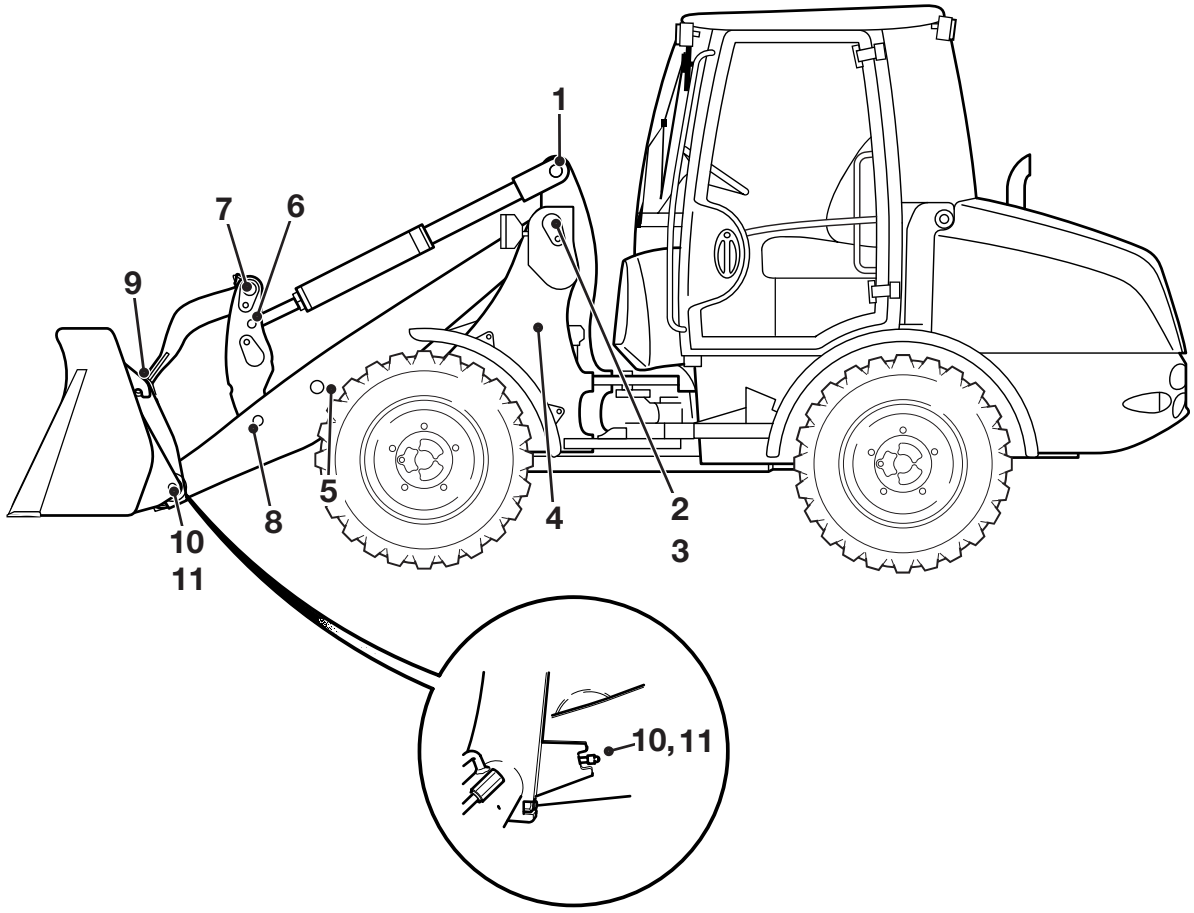


**Fig 6.**

## Articulation Joint

### ⚠ 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

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

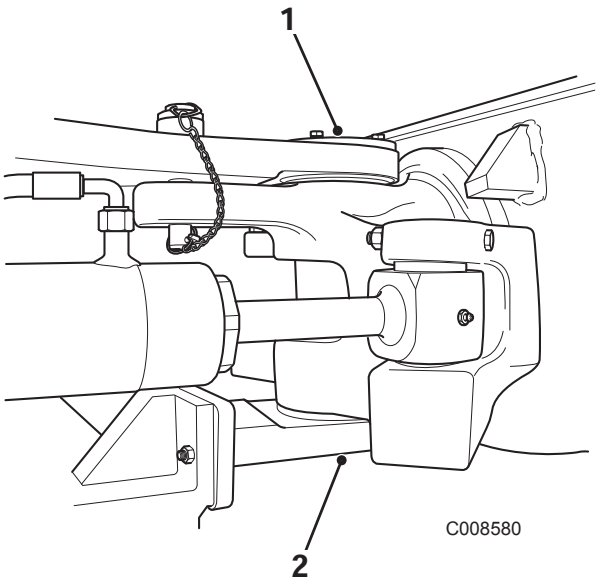


**Fig 7.**

## Propshaft Joints

### ⚠ 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 the loader arms raised, then the loader arm safety strut must be fitted). See Loader Arm 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.**

4-3-2-4_1

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

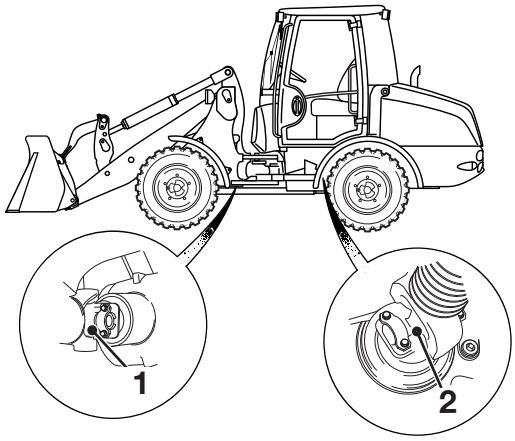


**Fig 8.**

## Steering Joints

**⚠ 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

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

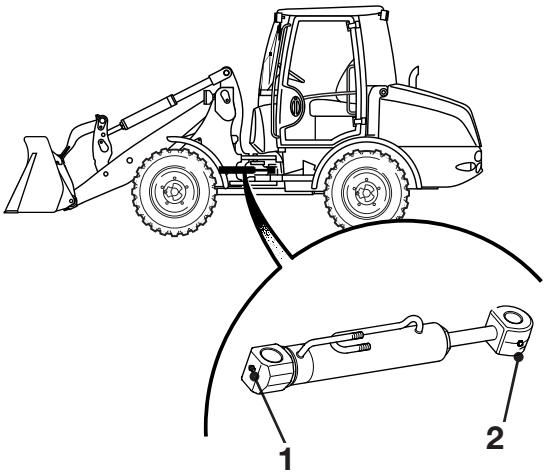


**Fig 9.**

# Brakes

## Inherent Characteristics

The new 406 machine range comes with a new braking system that has certain characteristics particular to these machines:

- The brakes, foot and park, work solely on the rear axle.
- They are of an inboard friction disc type design.
- The foot and park brakes both operate on the same friction pack.
- The foot brake applies hydraulic pressure to an operating piston inside the axle. When the brake pedal is pressed, this piston applies a clamping force to the friction plates to apply the brake.
- The park brake applies a mechanical force to the rear of the foot brake operating piston. When the park brake is applied, a cable attached to the lever operates an arm on the axle. This arm moves the park brake operating mechanism inside the axle that pushes on the rear face of the foot brake operating piston, effecting a clamping force on the friction pack and applying the brake.

### Foot Brake Applied

With the foot brake applied, if the operator then applies the park brake, it will be noticed that there is very little resistance to the hand lever in the cab, and may give the impression that the park brake is not working. This apparent excessive free play is caused by the foot brake having already moved to brake operating piston in the axle to the brake applied position. As the park brake lever is moved further, the mechanical mechanism inside the axle comes into contact with the rear of the operating piston and the operating resistance is then felt on the lever. With the park brake cab lever set in this position, when the foot pedal is release the park brake will remain fully applied.

### Park Brake Applied

With the park brake applied, if the operator presses on the foot brake pedal, it will appear to have limited travel and be very hard. This is because the operating piston in the axle is already held in the brake applied position mechanically by the park brake mechanism.

Once the park brake is released, the "normal" feel and travel will be once again felt at the foot pedal.

**⚠ CAUTION**

**Do not use a machine with faulty brakes.**

0093

Both of the aforementioned conditions are the "Normal" characteristics for this braking system. If you feel the braking systems are not performing as they should, get the machine checked by your local JCB dealer. **DO NOT** use a machine with faulty brakes.

## Checking the Brake Fluid Level

### ⚠ CAUTION

**Using incorrect fluid could damage the system. See Fluids, Capacities and Lubricants for the correct fluid. The fluid can harm your skin. Wear rubber gloves. Cover cuts or grazes.**

2-3-5-1_2

### ⚠ WARNING

**Faulty brakes can kill. If you have to top up the brake reservoir frequently, get the brake system checked by your JCB Dealer. Do not use the machine until the fault has been put right.**

2-3-2-5_1

### ⚠ 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

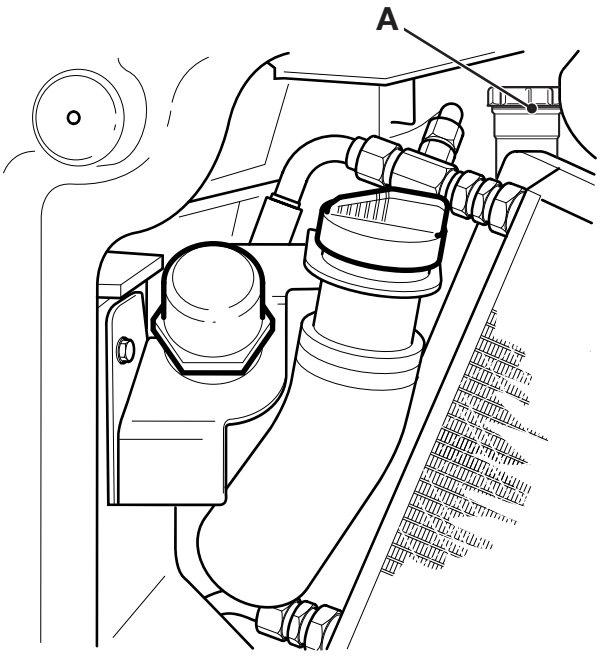


**Fig 10.**

**1** The brake fluid reservoir is mounted on the rear bulkhead under the engine cover. Access is easier from the left hand side of the machine.

**2** The brake fluid level must be between the MAX and MIN marks as detailed on the side of the reservoir **A**.

**3** If necessary, remove the cap and top up with the correct brake fluid. ⇨ ***Lubricants and Capacities (3-12)***. Refit the cap.

## Testing the Parking Brake

### ⚠ WARNING

**Before testing the park brake make sure the area around the machine is clear of people.**

2-2-4-5

1 Park the machine on a firm level surface lower the attachments to the ground. Fully apply the park brake and select neutral on the forward reverse lever. Chock both sides of the front wheels.

2 Release the park brake lever and ensure the adjusting capability of the lever is in the FULLY ADJUSTED position, by turning the lever handle as shown until the stop is reached. ⇨ *Fig 11. (3-24)*.

***Important:*** *The park brake on the 406 machines cannot be adjusted by using the park brake lever as with other JCB machine ranges. The lever adjustment is set when the park brake is set-up and requires no further adjustment. For further information refer to* ***Section G - Brakes.***

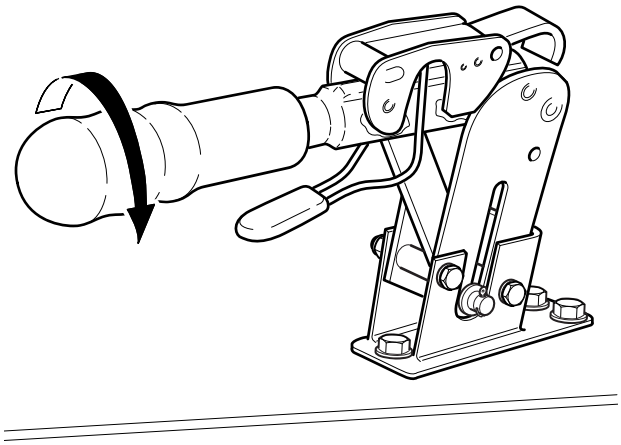

**Fig 11.**

3 With the park brake fully applied, ensure the park brake lever `locks' in the applied position by `knocking' the lever with the palm of your hand in the direction of release. The park brake lever MUST not release without the safety catch being released.

4 With the park brake fully applied, remove the chocks from the wheels and raise the attachment to just above the travelling position.

### ⚠ WARNING

**If the machine starts to move during the following test, immediately apply the foot brake and reduce the engine speed.**

2-2-5-1

Test the brake on a 20% gradient with a suitable, dry surface. Make sure your seat belt is securely fastened.

5 Test the Parking Brake

- **a** Drive the machine onto a 20% gradient.
- **b** With the foot pedal firmly pressed, fully apply the park brake.
- **c** Set the forward/reverse lever to neutral (**N**).
- **d** Slowly release the pressure from the foot brake pedal. If the machine starts to move, immediately re-apply the foot brake, remove the machine from the gradient and investigate further the park brake system. ***Section G - Brakes.***
- **e** With the foot brake fully released, the park brake should hold the weight of the machine on the gradient without any "creep".

6 Remove the machine from the gradient, lower the attachments to the ground and stop the engine.

**If you have any queries concerning this procedure or the parking brake adjustment, consult your local JCB distributor.**

### ⚠ WARNING

**Do not use a machine with a faulty park brake.**

3-2-3-10_2

### ⚠ WARNING

**Non approved modifications to drive ratios, machine weight or wheel and tyre sizes may adversely affect the performance of the parking brake.**

3-2-3-11

# Electrical System

## Battery

### Checking the Battery Electrolyte Level

Maintenance free batteries used in normal temperate climate operations should not need topping up. However, in certain conditions (such as prolonged operation at tropical temperatures or if the alternator overcharges), or if a non-original battery has been fitted, check the electrolyte level every 100 hours as described below.

**⚠ 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

**⚠ WARNING**

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

2-3-4-6

**1** Park the machine on firm level ground, engage the park brake and set the transmission to neutral. Lower the attachments to the ground and stop the engine.

**2** Unlock and open the engine cover.

**3** Protect you eyes by wearing safety goggles. Remove the battery cell covers. 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. ⇒ *Fig 12. (3-25)*.

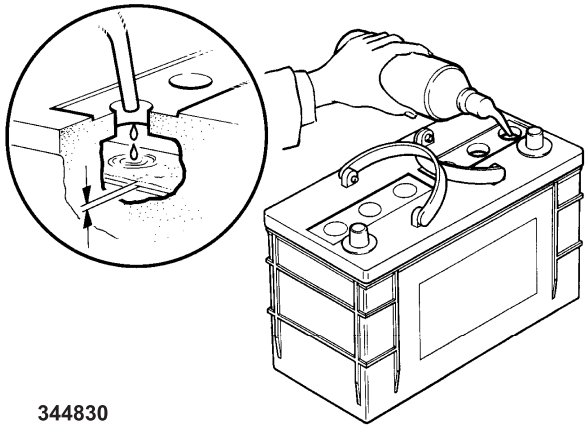


**Fig 12.**

### Battery Isolator

To disconnect the battery from the machine electrics a battery isolator has been 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 **A** and remove. Keep the key 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 **B**.

**⚠ 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

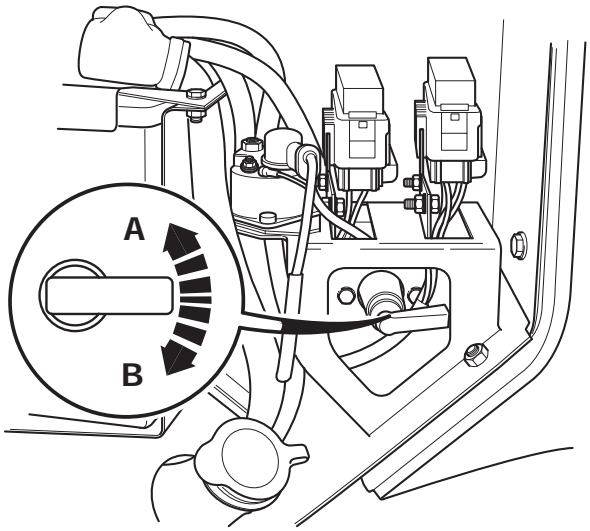


**Fig 13.**

## Jump Starting The Engine

### ⚠ 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 parking brake should have been engaged when the machine was last parked. If it is not engaged, engage it now.

**2** Set all switches in the cab to off.

### ⚠ DANGER

**Before lowering the attachments to the ground, make sure that the machine and the area around it are clear of other people. Anyone on or close to the machine could fall and be crushed by the attachments, or get caught in the linkages.**

2-2-3-4

**3** Lower the loader shovel to the ground, if it is not already there. It will lower itself under its own weight when you operate the lever. Operate the lever carefully to control the rate of descent. If your machine is fitted with hose burst protection valves you will not be able to lower the shovel. In this case install the safety strut.

**4** Unlock and open the engine cover.

**5** 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.

**6** Connect the negative (-) booster cable to a suitable point on the engine.

**7** 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

**8** Disconnect the negative booster cable from the engine. Then disconnect it from the booster supply.

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

## Fuses

For information on fuses see ***Section C - Electrics, Fuses and Relays***

## Primary Fuses

For information on primary fuses see ***Section C - Electrics, Fuses and Relays***

## Relay Identification

For information on relays see ***Section C - Electrics, Fuses and Relays***

# Engine Oil and Filter

## Checking the Oil Level

**⚠ CAUTION**

**Hot oil and engine components can burn you. Make sure the engine is cool before doing this job.**

2-3-3-2

1 Park the machine on firm level ground and lower the attachments to the ground.

2 Stop the engine. Put the transmission into neutral and remove the starter key.

3 Open the engine cover.

4 Check that the oil is between the two marks on the dipstick **A**.

5 If necessary, add the recommended oil through the filler point **B**. Refer to ⇨ *Lubricants and Capacities (3-12)*.

6 Make sure the filler cap and the dipstick are refitted correctly and are secure.

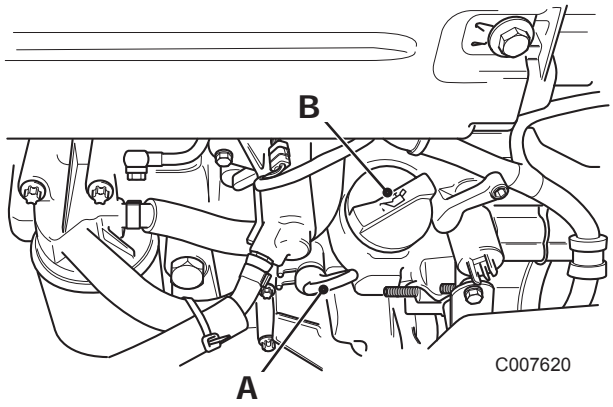


**Fig 14.**

## Changing the Oil and Filter

### ⚠ 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

### ⚠ CAUTION

**Hot oil and engine components can burn you. Make sure the engine is cool before doing this job.**

2-3-3-2

1 Do steps 1 to 3 of Checking the Oil Level. ⇨ *Checking the Oil Level (3-29)*.

2 Place a suitable container beneath the drain plug (to catch the oil).

3 Remove the drain plug and drain the oil from the sump.

4 Clean and refit the drain plug. Tighten to 55 Nm (40.6 lbf ft).

5 Unscrew the filter canister **A**. Remember that it will be full of oil.Clean filter head **B**.

6 Add clean engine oil to the new filter canister. Allow time for the oil to pass through the filter element. Smear seal **C** on the new filter canister with clean engine oil.Screw on the new filter canister - hand tight only.Fill the engine with the recommended oil to the MAX mark on the dipstick, through the filler point. Wipe off any spilt oil, refit the filler cap and make sure it is secure. ⇨ *Lubricants and Capacities (3-12)*.

7 Start the engine. Check for leaks. When the engine has cooled, check the oil level. Close and secure the engine cover.

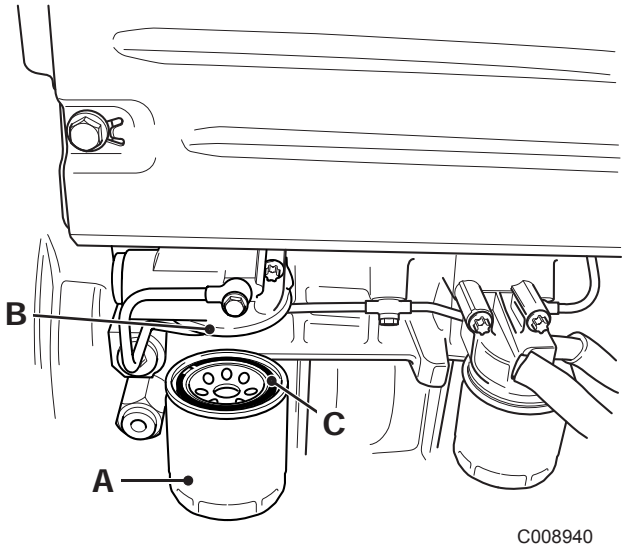


**Fig 15.**

# Filtration

## Changing the Engine Air Filter Elements (406 Machines)

**⚠ CAUTION**

**The outer element must be renewed immediately if the warning light on the instrument panel illuminates.**

2-3-3-1

**⚠ CAUTION**

**Do not run the engine when the outer element has been removed.**

16-3-3-1

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

**2** Open the engine cover.

**3** If changing the inner element, disconnect the filter induction hose **A** to prevent dust getting into the engine. Cover the hose to prevent rain and dirt getting into the engine. Release the end cover lock **B** by pulling the yellow tab outwards. The end cover **C** can now be turned anti-clockwise (approximately a quarter of a turn) and the cover removed. Pull out the outer element **D**. Take care not to tap or knock the element as you remove it. If necessary pull out the inner element **E**.Carefully insert the new elements into the canister. Make sure that they are seated correctly.Refit cover **C** and fasten the lock. Make sure that dust valve **F** is at the bottom.Connect the induction hose **A**. Make sure the air filter blocked switch connector is fitted. Check all hoses for condition and tightness.

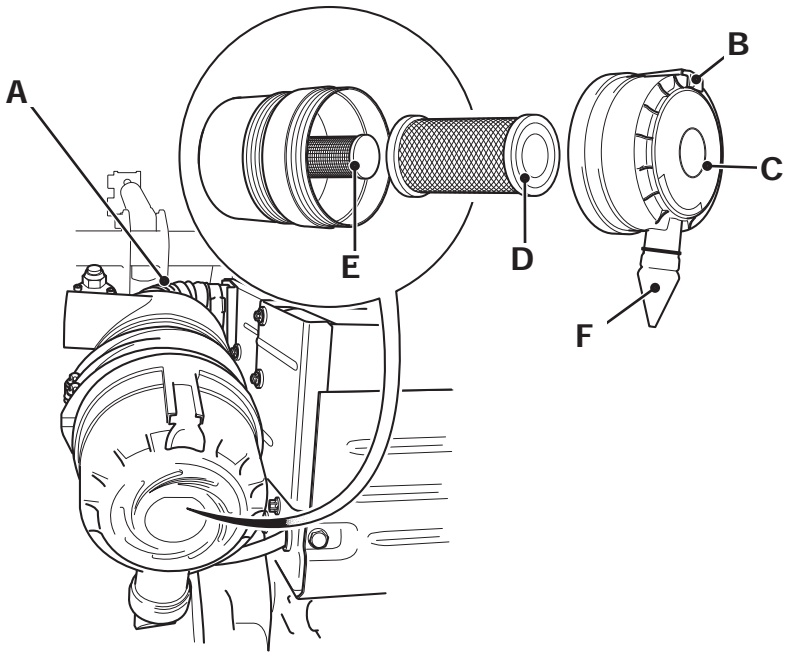


**Fig 16.**

## Changing the Engine Air Filter Elements (409 Machines)

**⚠ CAUTION**

**The outer element must be renewed immediately if the warning light on the instrument panel illuminates.**

2-3-3-1

**⚠ CAUTION**

**Do not run the engine when the outer element has been removed.**

16-3-3-1

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

**2** Open the engine cover.

**3** If changing the inner element, disconnect the filter induction hose **A** to prevent dust getting into the engine. Cover the hose to prevent rain and dirt getting into the engine. Release the end cover latches **B** and remove the cover **C**. Pull out the outer element **D**. Take care not to tap or knock the element as you remove it. If necessary pull out the inner element **E**. Carefully insert the new elements into the canister. Make sure that they are seated correctly.Refit cover **C** and fasten the latches. Make sure that dust valve **F** is at the bottom.Connect the induction hose **A**. Make sure the air filter blocked switch connector is fitted. Check all hoses for condition and tightness.

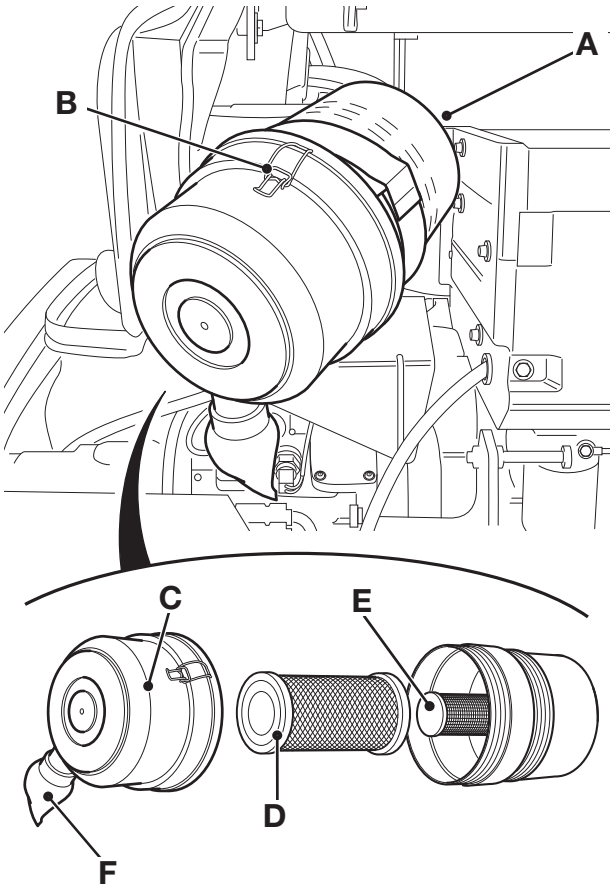


**Fig 17.**

# 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 parking brake. Put the transmission into neutral, lower the attachments to the ground. Stop the engine and remove the starter key.

**2** To gain access to the cab heater filter, unlock and open the right hand side cab panel.

**3** Remove the thumb screw **A** and pull the top edge of the securing bracket **B** towards you and un-hook from the heater housing. Slide the filter **C** from its aperture.

***Note:*** *Do NOT wash out this type of filter element.*

**4** Shake out the loose dust from the filter. Replace the filter if severely blocked or the element is damaged.

***Note:*** *The sponge seal of the filter element faces towards the heater assembly. See the arrows embossed on the element.*

**5** Refit the filter, securing bracket and thumb screw and close and secure the access panel.

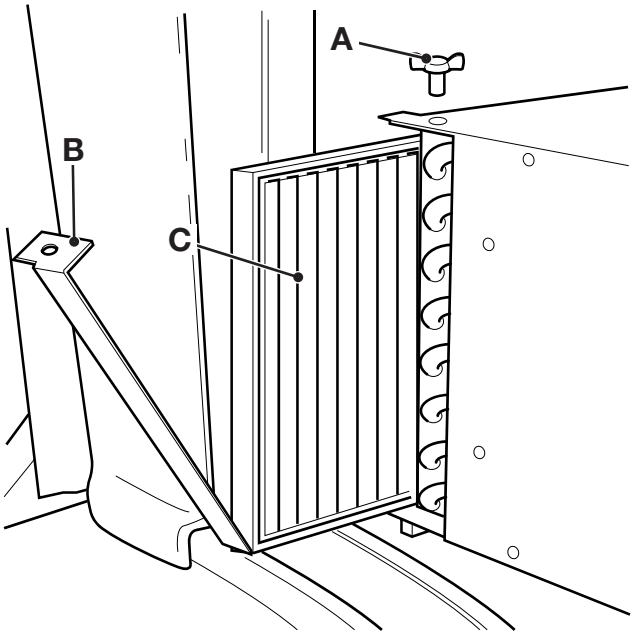


**Fig 18.**

# Engine Cooling

## Cleaning the Engine Cooling System

### Preparation

**⚠ WARNING**

**Do not run the engine with the cooling cover(s) and/or cooling air hood removed. Failure to comply may result in the engine overheating.**

ENG-3-1

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

**2** Open the engine cover.

**3** Remove the engine cooling air hood **19A** by removing the two bolts **19B**.

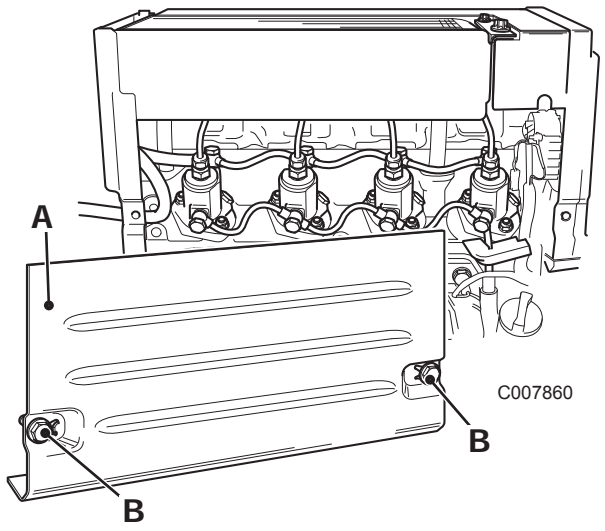


**Fig 19.**

**⚠ CAUTION**

**The engine or certain components could be damaged by high pressure washing systems; special precautions must be taken if the engine is to be washed using a high pressure system.**

**Ensure that the alternator, starter motor and any other electrical components are shielded and not directly cleaned by the high pressure cleaning system.**

ENG-3-3

**4** Cover the electrical/electronic components and connections (e.g. alternator, starter motor, governor solenoid).

### Using Compressed Air

**⚠ WARNING**

**Compressed air is dangerous. Wear suitable eye protection and gloves. Never point a compressed air jet at yourself or others.**

0147_1

**Important:** To avoid damaging the cooling fins, compressed air used for cleaning purposes must not exceed 30 psi (2 bar).

**1** Blow through the engine, (using a regulated air supply), taking care not to damage the cooler or cooling fins. (Begin by blowing air through from the exhaust side of the engine.)

**2** Remove the dirt and debris which has blown into the interior space.

**3** Remove any protective coatings from the electrical/ electronic components and refit the cooling covers.

### Using Cold-Cleaning Compounds

**1** Spray the engine with commercial cold-cleaning compound and allow it to react for approximately 10 minutes.

**2** Spray clean engine with strong water jet, repeating if necessary.

3 Remove any protective coatings from the electrical/ electronic components and refit the cooling air hood.

4 Start the engine and allow to run warm so that the remaining water evaporates.

### Using High-Pressure Water

1 Clean the engine with steam jet (maximum spray pressure 60 bar, maximum steam temperature of 90 °C (194 °F).

2 Remove any protective coatings from the electrical/ electronic components and refit the cooling air hood.

3 Start the engine and allow to run warm so that the remaining water evaporates.

# Alternator Drive Belt

## Adjusting the Drive Belt

**⚠ WARNING**

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

2-3-3-5

**1** Park the machine on firm level ground

**2** Apply the parking brake, put the transmission in neutral and stop the engine.

**3** Open the engine compartment cover.

**4** Check the alternator drive belt for damage.

**5** Slacken the Allen headed pivot bolt **B**

**6** Using a 1/2 in. square drive inserted into the belt tensioner at **C**, apply a clockwise pressure to the tensioner until the correct tension has been achieved.

***Note:*** *The correct belt tension has been achieved when there is 5/8 in. deflection on the longest run of the belt.*

***Note:*** *Before fitting a new belt, check the tensioner pulley rotates smoothly and that there is no side play in the bearing.*

**7** Whilst maintaining an even pressure on the driver, tighten the adjuster lock bolt **A**.

**8** Tighten the pivot bolt **B**.

**9** Recheck the belt tension.

**10** Close and secure the engine compartment cover.

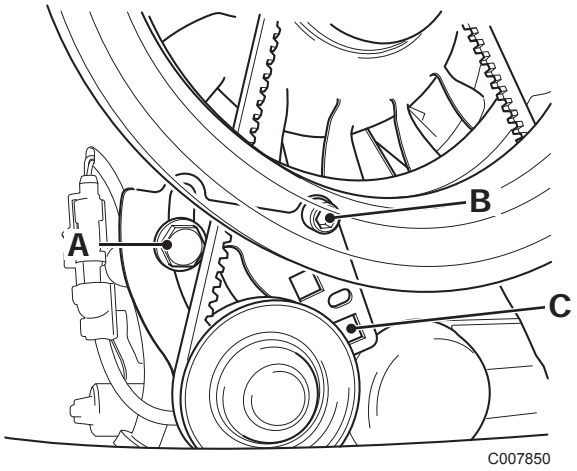


**Fig 20.**

# Fuel System

## Types of Fuel

T3-007_2

Use good quality diesel fuel to get the correct power and performance from your engine.

### Recommended Fuel Specification

- EN590 Diesel Fuel Types - Auto/Co/C1/C2/C3/C4.
- BS2869 Class A2.
- ASTM D975-91 Class 2-2DA, US DF1, US DF2, US DFA.
- JIS K2204 (1992) Grades 1, 2, 3, and Special Grade 3.

***Note:*** *Where low sulphur/low aromatic fuels are used it is important that lubricity additives are used. The additives listed below are advertised as being suitable for bringing the lubricity levels of kerosene/low sulphur fuels up to those of diesel fuels. They have not been tested or approved by the engine manufacturer. They should be added by your fuel supplier who should understand the concentration level necessary.*

**1** Elf 2S 1750. Dosage 1000-1500 ppm (0.1 - 0.15%), specifically for Indian Superior Kerosene (SKO) but may be applicable to other fuels.

**2** Lubrizol 539N. Dosage (on Swedish low sulphur fuel) 250 ppm.

**3** Paradyne 7505 (from Infineum). Dosage 500 ppm (0.05%).

### ⚠ CAUTION

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

GEN-9-2

### Acceptable Fuel Specification

### ⚠ CAUTION

**The fuel specification below is acceptable, however this fuel may reduce the life of the fuel injection equipment. The use of this fuel may also affect the engine performance.**

GEN-9-3

- ASTM D975-91 Class 1-1DA.
- JP7, MIL T38219 XF63.
- NATO F63.

### Sulphur Content

### ⚠ CAUTION

**A combination of water and sulphur will have a corrosive chemical effect on fuel injection equipment. It is essential that water is eradicated from the fuel system when high sulphur fuels are used.**

ENG-3-2

High sulphur content can cause engine wear. (High sulphur fuel is not normally found in North America, Europe or Australia.) If you have to use high sulphur fuel you must change the engine oil more frequently.

**Table 22.**

| Percentage of sulphur in the fuel (%) | Oil Change Interval |
|---|---|
| Less than 0.5 | Normal |
| 0.5 to 1.0 | 0.75 of normal |
| More than 1.0 | 0.50 of normal |

### Aviation Kerosene Fuels

***Note:*** *Aviation kerosene fuels are not approved and their use may cause damage to components. Warranty will not be allowed on any component where damage is found to have been caused by the use of aviation kerosene.*

### Low Temperature Fuels

Special winter fuels may be available for engine operation at temperatures below 0°C (32°F). These fuels have a lower viscosity. They also limit wax formation in the fuel at low temperatures. (Wax forming in the fuel can stop the fuel flowing through the filter.)

### Fatty Acid Methyl Ester Fuels as a Replacement for diesel Fuels

Fuel resources such as Rape Methyl Ester and Soybean Methyl ester, collectively known as Fatty Acid Methyl

Esters are being used as alternatives and extenders for mineral oil.

Fatty Acid Methyl Esters must conform to certain standards to be of acceptable quality, just as mineral oils do at present.

Consult your JCB distributor for advice about the use of Fatty Acid Methyl Ester fuels, as improper application may impair engine performance.

**⚠ 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

### Petrol

**⚠ 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

## Filling the Tank

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.

## Changing the Fuel Filter

**1** Apply the parking brake, put the transmission into neutral and stop the engine.

**2** Open the engine cover.

**3** Unscrew the filter element **A**, the element is hand tight but may require a strap wrench to remove. The filter will be full of fuel.

**4** Clean the filter head **B**

**5** Fill the new element with clean fuel (to assist the self bleed system), lubricate the sealing ring **C** with clean fuel and screwed the filter on until the seal contacts the filter head. Tighten the bowl a further quarter of a turn.

### ⚠ CAUTION

**Do not operate the starter motor for more than 20 seconds at one time. Let the starter motor cool for at least 2 minutes.**

0124

**6** Start the engine. If the engine does not fire within 20 seconds, wait at least two minutes before cranking the engine again.

**7** Run the engine and check for leaks.

**8** Close and secure the engine cover.

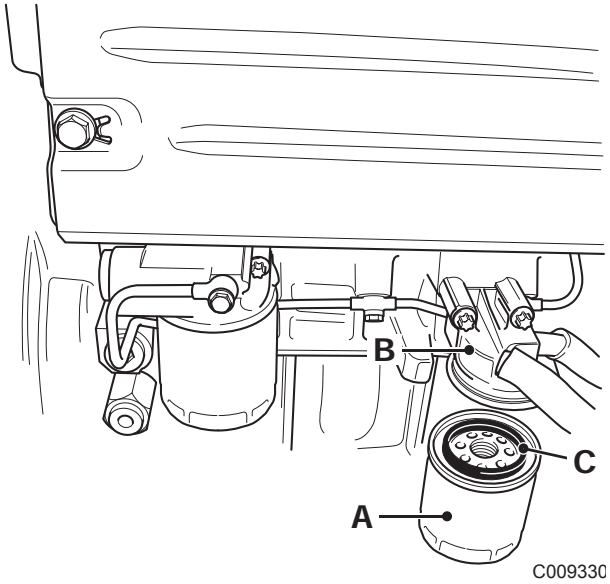


**Fig 21.**

## Draining the Sedimenter Bowl

**1** Apply the parking brake, put the transmission into neutral and stop the engine.

**2** Open the engine cover.

***Important:*** *Collect all drained fuel/water in a suitable container and dispose of in accordance with local legislation. Do not allow the drained fuel/water to spill onto the engine mounting.*

**3** Drain off any water in the bowl by turning tap **A**.

**4** Make sure tap **A** is turned off and secure.

**5** Close and secure the engine cover.

### ⚠ 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

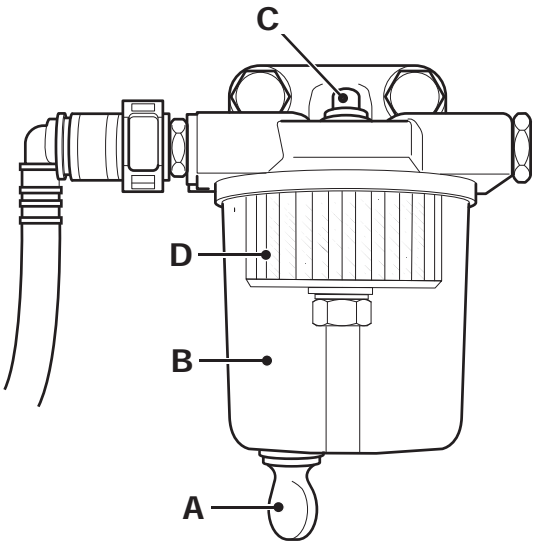


**Fig 22.**

## Cleaning the Sedimenter Bowl

If the sedimenter bowl contains any sediment carry out the following:-

**1** Hold the bolt **C** and unscrew bowl **B**.

**2** Remove the bowl.

**3** Remove the filter element **D**.

**4** Wash out the bowl with clean fuel.

**5** Fit a new filter element.

**6** Make sure the gasket is in good condition and correctly positioned.

**7** Fill the bowl with clean fuel to aid the self bleeding system.

***Note:*** *It is most important that bowl **C** is held while the bowl is screwed onto it and that the bowl is not over tightened.*

**8** Screw the filter bowl onto the bolt **C** until the seal contacts the filter head. Tighten the bowl a further quarter of a turn.

### ⚠ CAUTION

**Do not operate the starter motor for more than 20 seconds at one time. Let the starter motor cool for at least 2 minutes.**

0124

**9** Start the engine. If the engine does not fire within 20 seconds, wait at least two minutes before cranking the engine again.

**10** Run the engine and check for leaks.

**11** Close and secure the engine cover.

# 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 parking brake, put the transmission into neutral, lower the attachments 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 **23A**. the level should be in the center of the sight glass.

3 If necessary, top up with hydraulic fluid, through filler point **24A**. For the correct grade of lubricant. ⇨ *Lubricants and Capacities ( 3-12)*.

**⚠ 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

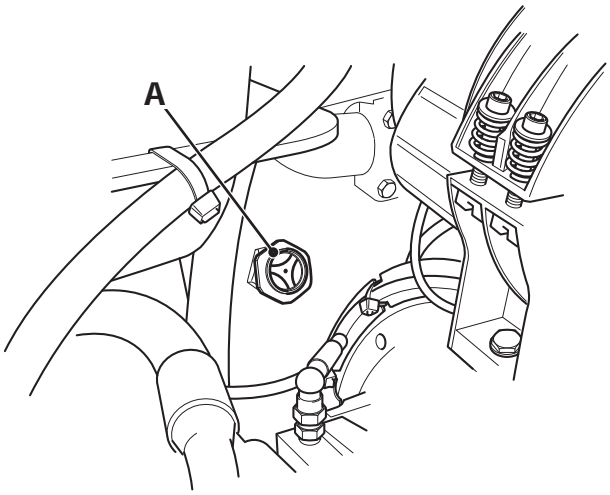


**Fig 23.**

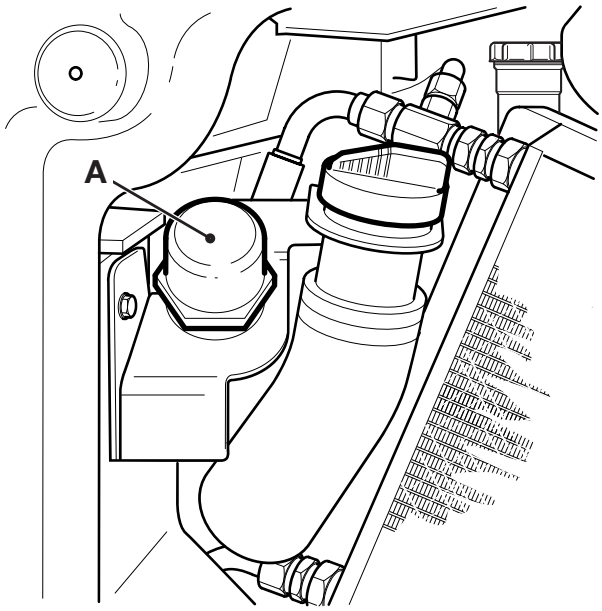


**Fig 24.**

## 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 parking brake, put the transmission in neutral, lower the attachments to the ground. Stop the engine.

2 Open the engine cover.

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

4 Replace the "O" ring **C** 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 (3-41)***

7 Close and secure the engine cover.

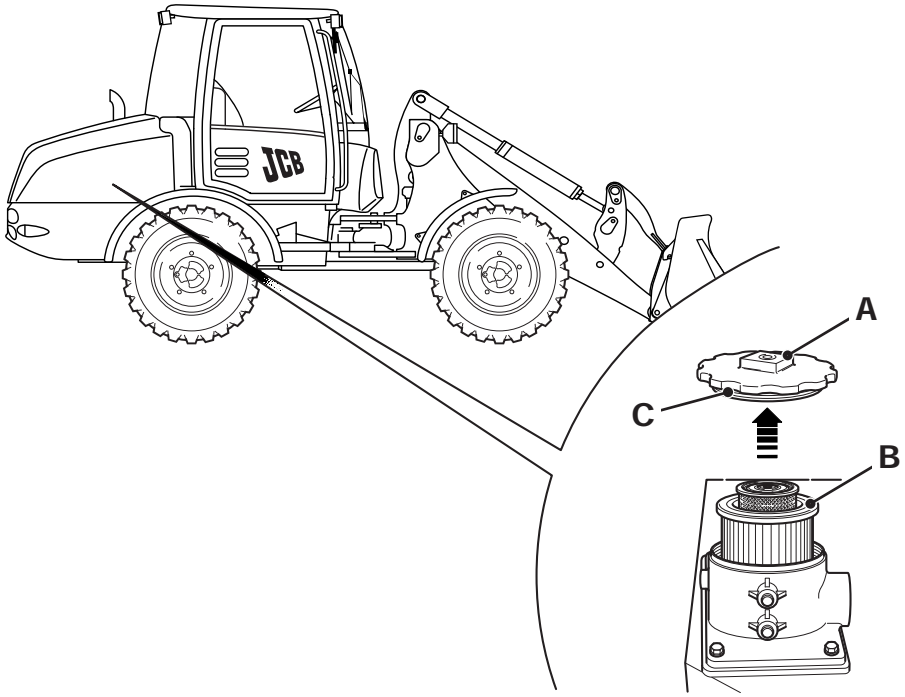


**Fig 25.**

## Refilling the Hydraulic System

In order to make sure that the hydraulic fluid is as clean as possible, when refilling or after replacing the pump or motor, the fluid should be added using the following procedure:

1 Apply the parking brake, put the transmission in neutral, lower the attachments to the ground. Make sure the attachments are flat on the ground. Stop the engine.

2 Remove the filter element. ⇨ ***Changing the Filter Element ( 3-42)***.

3 Add the hydraulic fluid through the filter housing using a very fine mesh filter, this ensures that the pump is primed before the machine is started. For the correct grade of fluid. ⇨ ***Lubricants and Capacities ( 3-12)***.

4 Refit the filter element. ⇨ ***Changing the Filter Element ( 3-42)***.

## Replacing the `Tank' Suction Strainer Filter

⇨ *Fig 26. (🗋 3-45)*.

In order to keep the hydraulic system clean, the tank suction strainer filter needs period replacement. For the replacement schedule refer to ⇨ *Table 3. Hydraulics (🗋 3-7)*.

In order to replace the filter the following procedure should be followed.

### ⚠ WARNING

**Hydraulic fluid at pressure can injure you. Make the machine safe before connecting or disconnecting quick release couplings; stop the engine and then operate the attachment control a few times to vent residual hydraulic pressure in the attachment hoses.**

2-4-1-11

### ⚠ WARNING

**Make sure that the engine cannot be started. Disconnect the battery. Disconnect the earth lead first.**

ENG-6-2

1 Park the machine on firm level ground, apply the parking brake, lower the attachments to the ground and switch off the engine. Disconnect the battery to prevent the machine being started.

### ⚠ WARNING

**As it is necessary to lean over the engine, stop engine before making adjustments. Beware of the hot exhaust system even when the engine is stopped.**

ENG-6-1

### ⚠ WARNING

**The temperature of the hydraulic oil will be high soon after stopping the engine. Wait until it cools (less than 40°C) before beginning maintenance.**

8-3-4-10

2 Open the engine cover. Allow the engine and hydraulic oil to cool down before attempting to carry out this procedure.

3 Slowly release the hydraulic tank filler cap to ensure all residual pressure has been released. Remove the hose clip **A** and remove the hose **B** from the access cover **C**.

4 Remove the six bolts securing the access cover to the hydraulic tank and remove the cover and the gasket **D**.

***Note:*** *The suction strainer filter has an internal thread. This thread is conventional, screw the filter counter-clockwise to release, clockwise to tighten.*

5 Reach down inside the tank and locate the suction strainer element **E**. Unscrew the filter from the suction tube. Remove and discard the filter.

6 Place a new filter onto the suction tube and hand tighten only.

7 Fit a new gasket **D** to the tank and refit the access cover.

8 Reconnect the filler hose **B** and secure the hose clip **A**.

9 Top up the hydraulic fluid as necessary and refit the filler cap. ⇨ *Checking the Fluid Level (🗋 3-41)*.

10 Reconnect the battery and close and secure the engine cover.

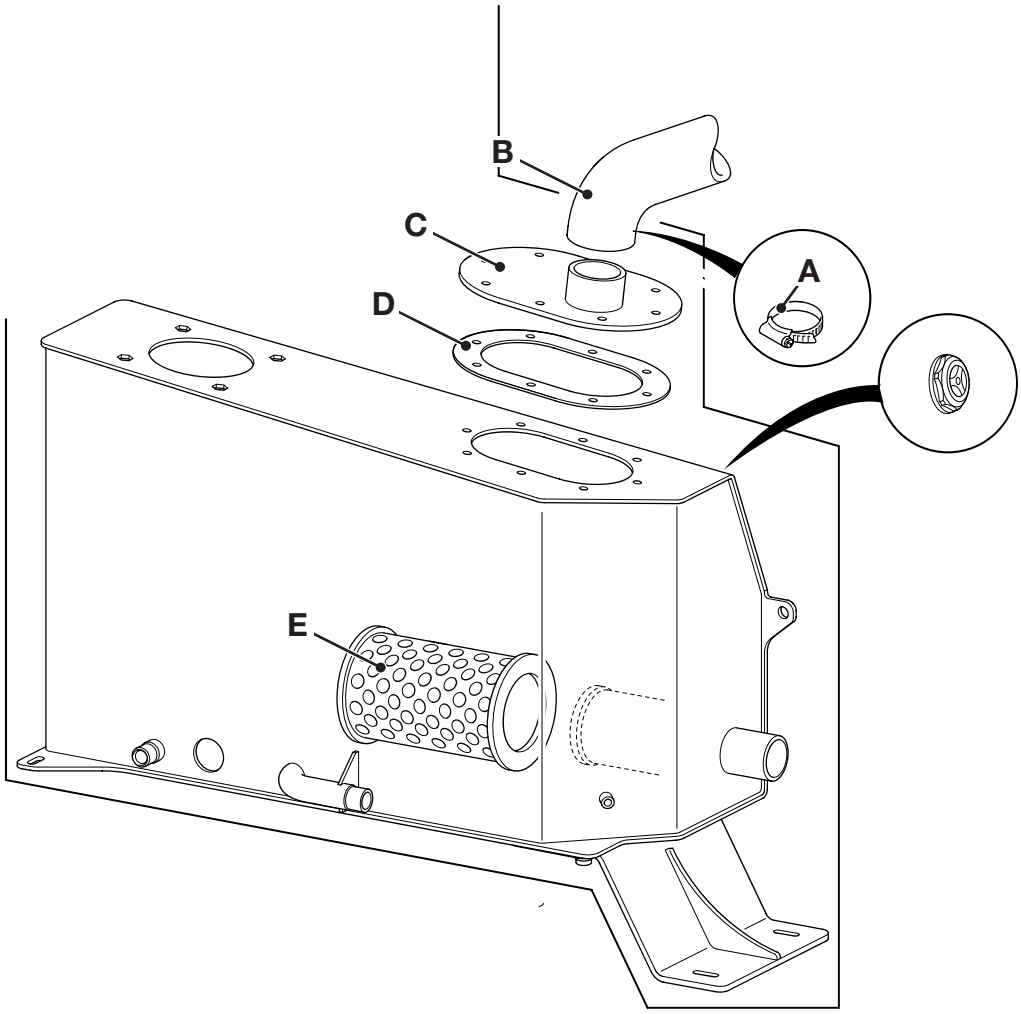


**Fig 26. Suction Strainer Filter**

## Replacing the Filter-head Suction Strainer Filter

In order to keep the hydraulic system clean, the tank suction strainer filter needs period replacement. For the replacement schedule refer to ⇨ *Table 3. Hydraulics (3-7)*.

In order to replace the filter the following procedure should be followed.

### ⚠ WARNING

**Hydraulic fluid at pressure can injure you. Make the machine safe before connecting or disconnecting quick release couplings; stop the engine and then operate the attachment control a few times to vent residual hydraulic pressure in the attachment hoses.**

2-4-1-11

### ⚠ WARNING

**Make sure that the engine cannot be started. Disconnect the battery. Disconnect the earth lead first.**

ENG-6-2

### ⚠ WARNING

**The temperature of the hydraulic oil will be high soon after stopping the engine. Wait until it cools (less than 40°C) before beginning maintenance.**

8-3-4-10

1 Park the machine on firm level ground, apply the parking brake, lower the attachments to the ground and switch off the engine. Disconnect the battery to prevent the machine from being started.

2 Open the engine cover. Allow the engine and the hydraulic oil to cool before attempting to carry out this procedure.

3 Undo the filter assembly cover. ⇨ *Changing the Filter Element (3-42)*.

4 Remove the screw **A** securing the suction strainer filter **B** to the main filter assembly.

5 Discard the suction strainer filter complete.

6 Fit a new suction strainer filter and secure with screw **A**.

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

7 Refit the main filter cover. Torque tighten the cap to 40 Nm (29.5 lbf ft). ⇨ *Changing the Filter Element (3-42)*.

8 Check the hydraulic fluid level and top up if necessary. ⇨ *Checking the Fluid Level (3-41)*.

9 Close and secure the engine cover.

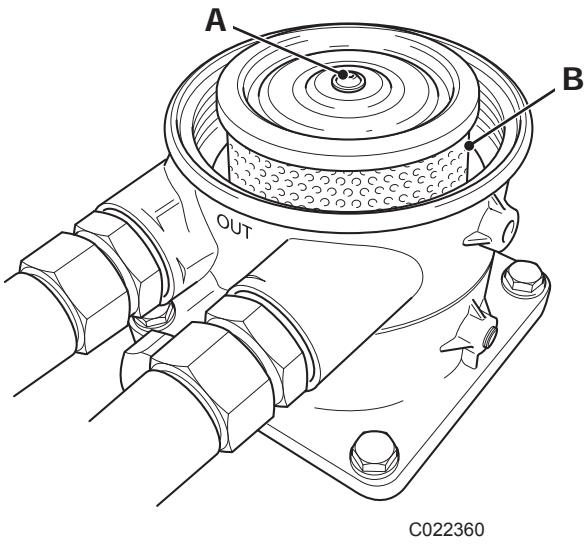


**Fig 27.**

# Wheels and Tyres

## Tyre Sizes and Pressures

***Note:*** *The maximum pressure embossed on the tyre may differ from the pressure stated below. Inflate to pressures below, these are agreed with the tyre manufacturer/s in accordance with the European Tyre and Rim Organisation (ETRTO) standards to satisfy machine stability performance.*

| | | FRONT | | REAR | |
|---|---|---|---|---|---|
| **Size** | **Ply** | **Bar** | **lbf/in²** | **Bar** | **lbf/in²** |
| 12.5/80-18 | 10 | 3.0 | 43.5 | 2.5 | 36 |
| 12.5/80-18 | 12 | 3.0 | 43.5 | 2.5 | 36 |
| 12.5-18 | 10 | 3.0 | 43.5 | 2.5 | 36 |
| 335/80 R18 | - | 3.0 | 43.5 | 2.5 | 36 |
| 365/70 R18 | - | 2.75 | 40 | 2.5 | 36 |
| 405/70 R18 | - | 2.5 | 36 | 2.25 | 32.5 |
| 12.5-20 | 10 | 2.5 | 36 | 2.25 | 32.5 |
| 335/80 R20 | - | 2.75 | 40 | 2.5 | 36 |

***Note:*** *If the tyres fitted to your machine are not listed, then contact your JCB Distributor for advice, DO NOT guess tyre pressures.*

Always check the tyre pressures with the machine in an unladen state. ⇨ ***Tyre Inflation (🗋 3-48)***.

Always try to maintain your tyre pressure to the recommended settings. Using your machine with under-inflated tyres means:

- Decreasing the machines stability
- Higher tyre temperatures
- Excessive strain of the tyre fabric
- More bulging of the sidewalls
- Shortens the tyres life.

Using the machine with over inflated tyres is dangerous:

- It causes excessive tensile loads in the fabric: this makes a tyre more susceptible to cuts and punctures.

Do not cut or weld on the rim of an inflated tyre.

Always deflate the tyre before removing foreign obstacles from the tread.

After checking or amending the tyre pressure always replace and secure the valve cap.

Under special conditions (e.g. on sand) the air pressure in the tyre may be reduced after consulting your JCB Distributor or tyre manufacturer.

## 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.

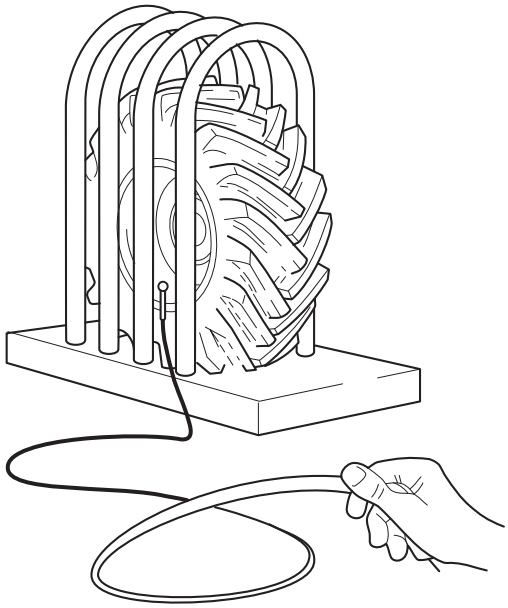

**Fig 28.**

## Checking the Wheel Nut Torques

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

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

The correct torques are shown in the tables below.

| FRONT | | REAR | |
|---|---|---|---|
| Nm | lbf ft | Nm | lbf ft |
| 690 | 509 | 690 | 509 |

### ⚠ 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

# Transmission Drop-box

## Checking the Oil Level

⇨ *Fig 29. (3-49)*

**⚠ CAUTION**

**The axle oil level must be checked with the machine level, otherwise a false indication of the amount of oil in the axle will be given.**

16-3-5-3

**⚠ 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

***Note:*** *The transmission drop-box is bolted to the front of the rear axle but is drained/refilled as a separate unit.The drop-box level plug is on the front side of the drop-box.*

**1** Clean the area around the fill/level plug **B**

**2** Remove the fill/level plug **B** and its seal, oil should be level with the bottom of the hole.

**3** Top up with the recommended oil as necessary. ⇨ *Lubricants and Capacities (3-12)*

**4** Clean and refit the level/fill plug **B** and its seal. Tighten to 35 - 40 Nm (26 - 29 lbf ft).

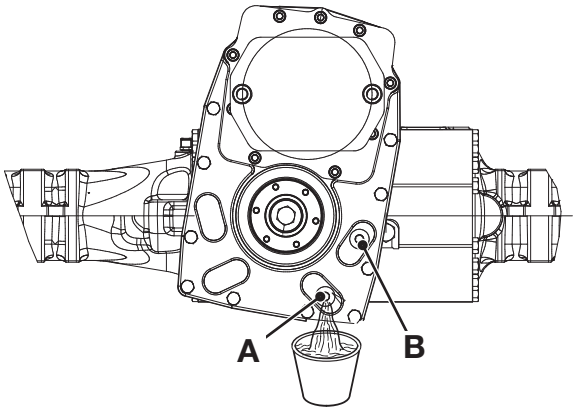


**Fig 29.**

## Draining and Refilling the Drop-box Oil

⇨ *Fig 29. (3-49)*

### ⚠ 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

***Note:*** *The transmission drop-box is bolted to the front of the rear axle but is drained/refilled as a separate unit.The drop-box filler and drain plugs are on the front side of the drop-box.*

**1** Clean the area around the fill/level plug **B**.

**2** Remove the fill/level plug **B** and its seal.

**3** Place a suitable container beneath the drain plug **A** (to catch the oil).

### ⚠ 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

**4** Remove the drain plug **A** and its seal.

**5** Allow the oil to drain fully.

**6** Clean and refit the drain plug **A** and its seal. Tighten 35 - 40 Nm (26 - 29 lbf ft).

**7** Fill the axle with the recommended oil, oil should be level with the bottom of the hole ⇨ *Lubricants and Capacities (3-12)*.

**8** Clean and refit the fill/level plug **B** and its seal. Tighten to 35 - 40 Nm (26 - 29 lbf ft).

# Front and Rear Axles

## Checking the Front Differential Oil Level

**⚠ CAUTION**

**The axle oil level must be checked with the machine level, otherwise a false indication of the amount of oil in the axle will be given.**

16-3-5-3

**⚠ 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 Clean the area around the fill/level plug **B**.

2 Remove the fill/level plug **B** and its seal, oil should be level with the bottom of the hole.

3 Top up with the recommended oil as necessary. ⇨ *Lubricants and Capacities ( 3-12)*

4 Clean and refit the level/fill plug **B** and its seal. Tighten to 35 - 40 Nm (26 - 29 lbf ft).

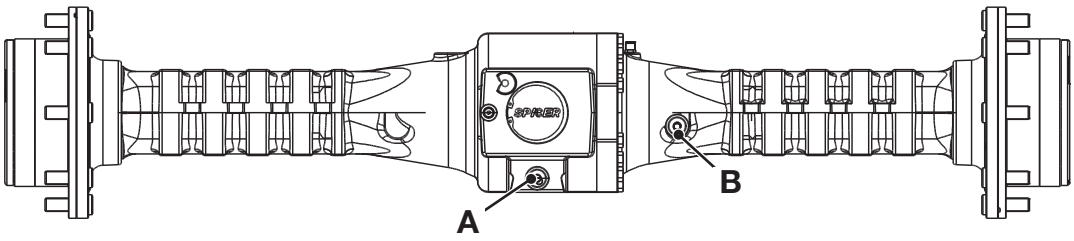


**Fig 30.**

## Draining and Refilling the Front Differential Oil

### ⚠ 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** Clean the area around the fill/level plug **B**.

**2** Remove the fill/level plug **B** and its seal.

**3** Place a suitable container beneath the drain plug **A** (to catch the oil).

### ⚠ 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

**4** Remove the drain plug **A** and its seal.

**5** Allow the oil to drain fully.

**6** Clean and refit the drain plug **A** and its seal. Tighten to 35 - 40 Nm (26 - 29 lbf ft).

**7** Fill the axle with the recommended oil, oil should be level with the bottom of the hole. ⇨ ***Lubricants and Capacities (3-12)***.

**8** Clean and refit the fill/level plug **B** and its seal. Tighten to 35 - 40 Nm (26 - 29 lbf ft).

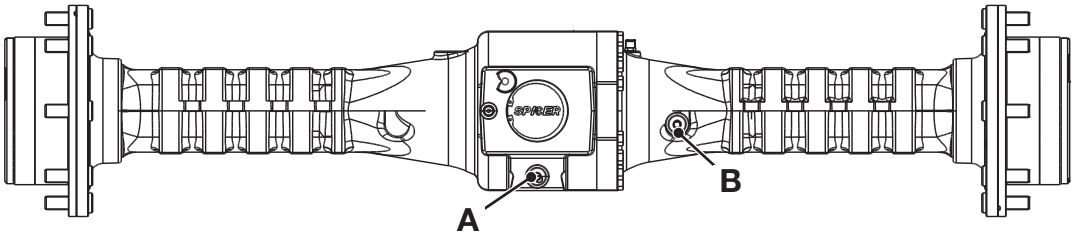


**Fig 31.**

## Checking the Rear Differential Oil Level

### ⚠ CAUTION

**The axle oil level must be checked with the machine level, otherwise a false indication of the amount of oil in the axle will be given.**

16-3-5-3

### ⚠ 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

***Note:*** *The transmission drop-box is bolted to the front of the rear axle but is drained/refilled as a separate unit.The axle level plug is on the rear side of the axle.*

1 Clean the area around the fill/level plug **B**.

2 Remove the fill/level plug **B** and its seal, oil should be level with the bottom of the hole.

3 Top up with the recommended oil as necessary. ⇨ *Lubricants and Capacities ( 3-12)*

4 Clean and refit the level/fill plug **B** and its seal. Tighten to 35 - 40 Nm (26 - 29 lbf ft).

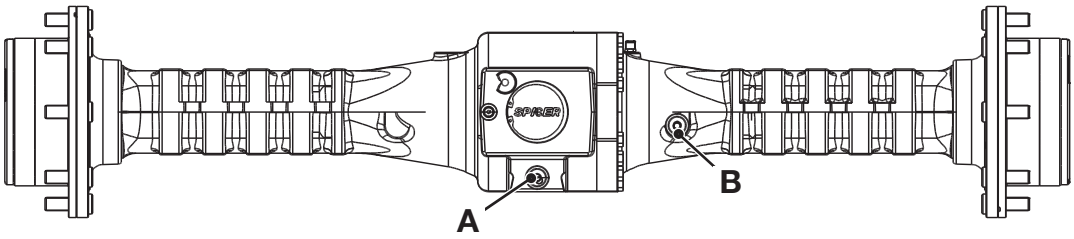


**Fig 32.**

## Draining and Refilling the Rear Differential Oil

### ⚠ 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

***Note:*** *The transmission drop-box is bolted to the front of the rear axle but is drained/refilled as a separate unit.The axle filler and drain plugs are on the rear side of the axle.*

**1** Clean the area around the fill/level plug **B**.

**2** Remove the fill/level plug **B** and its seal.

**3** Place a suitable container beneath the drain plug **A** (to catch the oil).

### ⚠ 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

**4** Remove the drain plug **A** and its seal.

**5** Allow the oil to drain fully.

**6** Clean and refit the drain plug **A** and its seal. Tighten to 35 - 40 Nm (26 - 29 lbf ft).

**7** Fill the axle with the recommended oil, oil should be level with the bottom of the hole. ⇨ ***Lubricants and Capacities (🗋 3-12)***.

**8** Clean and refit the fill/level plug **B** and its seal. Tighten to 35 - 40 Nm (26 - 29 lbf ft).

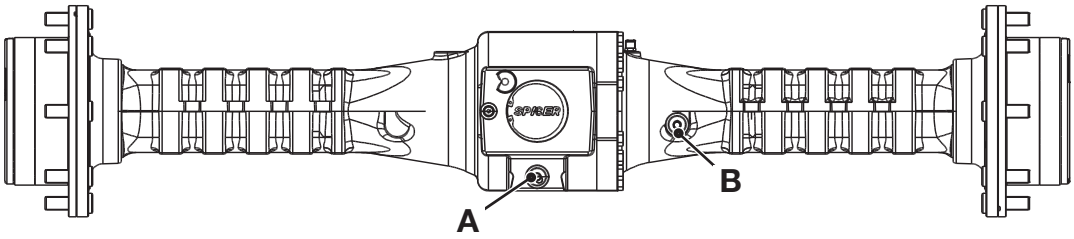


**Fig 33.**

## Checking the Hub 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** Clean the area around the fill plug **A**.

**2** Make sure the OIL LEVEL mark on the hub is horizontal, as shown at **B**.

**3** Remove fill/drain plug A and its seal, oil should be level with the bottom of the hole

**4** If necessary, top up with the recommended oil. ⇨ ***Lubricants and Capacities ( 3-12)***.

**5** Clean and refit the fill plug A and its sealing ring. Tighten to 35 - 40 Nm (26 - 29 lbf ft).

***Note:*** *The hubs must be treated separately, a total of four hubs.*

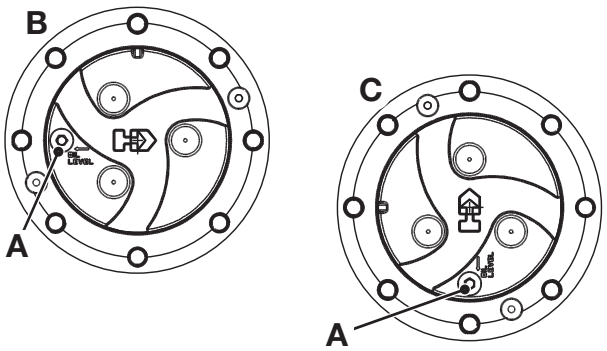


**Fig 34.**

## Draining and Refilling the Hub Oil

### ⚠ 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** Clean the area around the fill/drain plug **A**.

**2** Make sure the fill/drain plug **A** is at the bottom, as shown at **C**.

**3** Remove fill/drain plug **A** and its seal, drain the oil into a suitable container. Allow the oil to drain fully.

### ⚠ CAUTION

**There will be no oil in the hub when the machine is driven forward. Only drive the machine forward one quarter revolution of the wheel. Do not drive the machine more than is necessary.**

4-3-5-1

**4** Drive the machine slowly forward to bring the OIL LEVEL mark on the hubs into the horizontal position, as shown at **B**

**5** Fill the hub with the recommended oil through fill/drain plug **A,** ⇨ ***Lubricants and Capacities ( 3-12)***.

**6** Clean and refit the fill plug **A** and its sealing ring. Tighten to 35 - 40 Nm (26 - 29 lbf ft).

***Note:*** *The hubs must be treated separately, a total of four hubs.*

# Windscreen Washer

## Filling the Reservoir

To gain access to the washer reservoir **A**, open the engine cover. The washer reservoir filler cap is located on the right hand side of the machine adjacent to the battery.

Fill the reservoir with a suitable liquid. The liquid should contain a suitable de-icing agent to prevent it freezing. **Do not use engine coolant anti-freeze**.

On completion, fit and secure the reservoir cap, close and secure the engine cover.

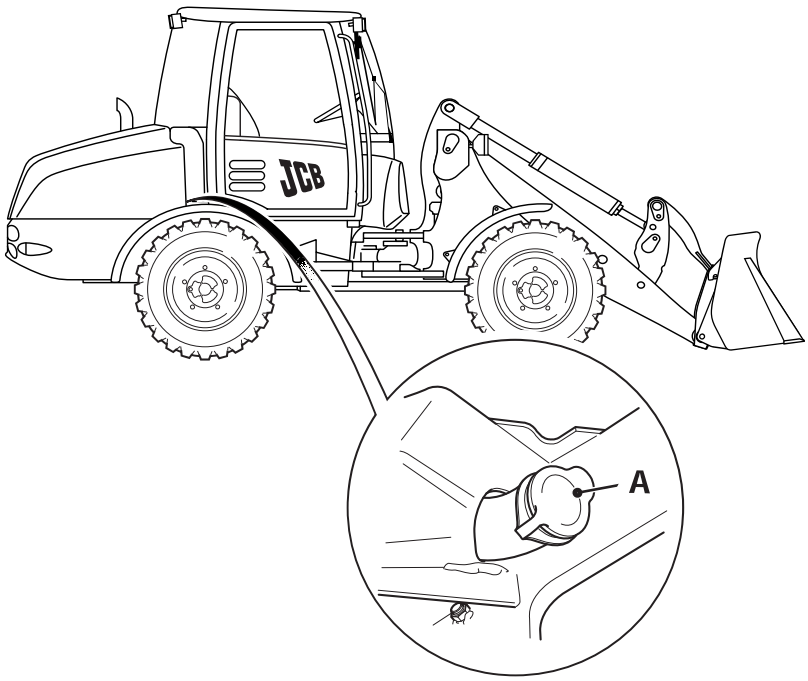


**Fig 35.**