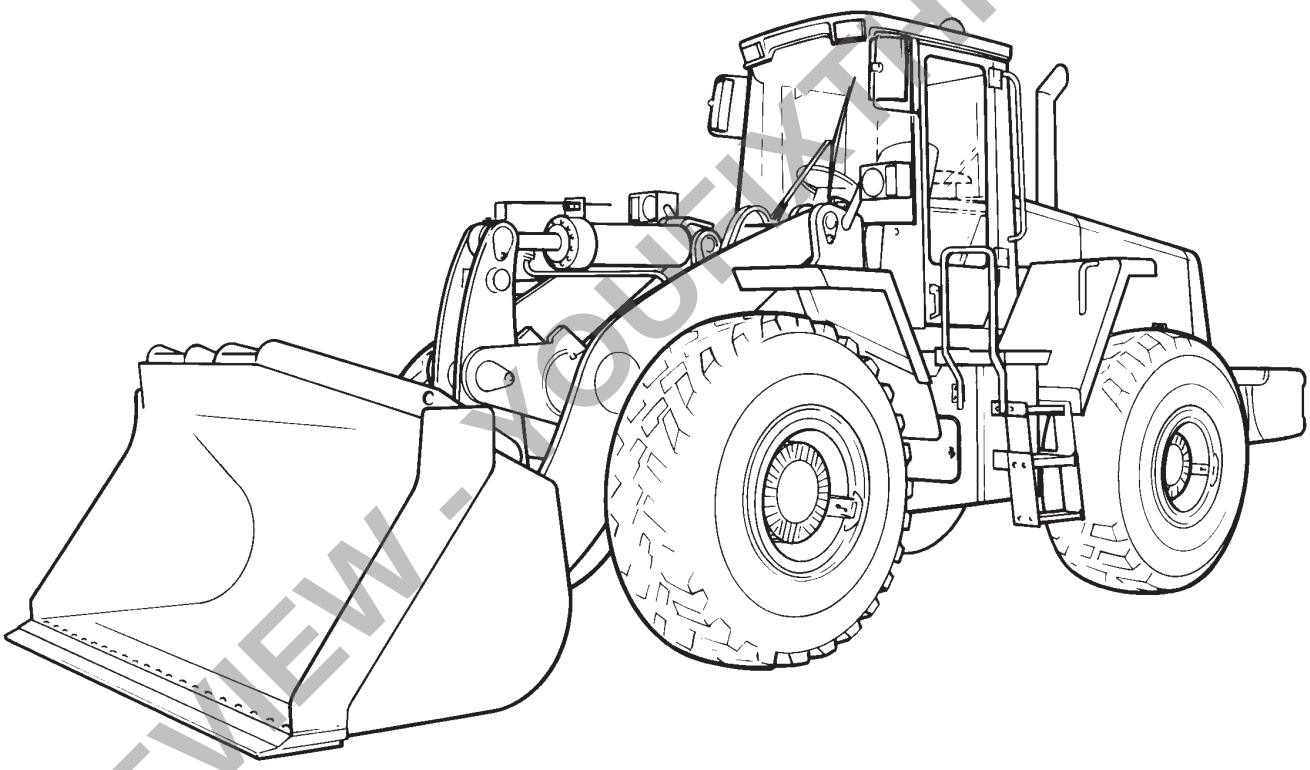
# Operator Handbook

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Produced by the Technical Publications department of JCB Service

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## 456B

! **THIS HANDBOOK MUST BE KEPT IN THE MACHINE AT ALL TIMES** !

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In this handbook and on the machine there are safety notices. Each notice starts with a signal word. The meanings of the signal words are given below.

## ⚠ DANGER

**Denotes an extreme hazard exists. If proper precautions are not taken, it is highly probable that the operator (or others) could be killed or seriously injured.**
INT-1-2-1

## ⚠ WARNING

**Denotes a hazard exists. If proper precautions are not taken, the operator (or others) could be killed or seriously injured.**
INT-1-2-2

## ⚠ CAUTION

**Denotes a reminder of safety practices. Failure to follow these safety practices could result in injury to the operator (or others) and possible damage to the machine.**
INT-1-2-3

## ⚠ WARNING

**Study This Handbook Before Starting The Machine**

You must understand and follow the instructions in this handbook. You must observe all relevant laws and regulations. If you are unsure about anything, ask your JCB distributor or employer. **Do not guess**, you or others could be killed or seriously injured.
INT-1-1-1

## ⚠ CAUTION

Do not fit an attachment to this machine which is not JCB approved. Consult your JCB distributor before fitting any non approved attachment.
8-4-1-6

### MACHINE SECURITY

Vandalism and theft of unattended machines is an ever increasing problem and JCB is doing everything possible to help combat this.

JCB PLANTGUARD is a comprehensive package available to help you safeguard your machine. It includes such devices as vandal proof covers, window etching, immobiliser, concealed serial number, battery isolator, Tracker security system and much more.

Remember that the fitting of any one of these security devices will help to minimise not only the damage or loss of your machine but also subsequent lost productivity. It could also result in reduced insurance premiums.

Your JCB Distributor or Dealer will be pleased to provide information on any of these sensible precautions. ACT NOW!
INT-1-2-4



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## INTRODUCTION

The aim of this part of the handbook is to guide the operator step-by-step through the task of learning how to operate the machine efficiently and safely. Read the OPERATION section through from beginning to end.

Before starting the machine, sit in the driver's seat and familiarise yourself with the layout of the cab. Use your handbook to identify each control lever, switch, gauge, button and pedal. **Do not guess**. If there is anything you do not understand, ask your JCB distributor.

The operator must always be aware of events happening outside the cab as well as inside the cab. **Safety** must always be the most important feature when operating the Wheeled Loader.

When you have familiarised yourself with the operating controls, gauges and switches, practice using them. Drive the machine in an open space, clear of people. Get to know the 'feel' of the machine and its driving controls.

Finally, do not rush the job of learning, make sure you fully understand everything in the OPERATION section. Take your time and work efficiently and safely.

**Remember**

**BE CAREFUL**
**BE ALERT**
**BE SAFE**

## BEFORE ENTERING THE CAB

The following checks should be made each time you return to the machine after leaving it for any period of time. We advise you also to stop the machine occasionally during long work sessions and do the checks again.

All these checks concern the serviceability of the machine. Some concern your safety. Get your service engineer to check and correct any defects.

### ! WARNING

**Walking or working under raised attachments can be hazardous. You could be crushed by the attachments or get caught in the linkages.**

**Lower the attachments to the ground before doing these checks. If you are new to this machine, get an experienced operator to lower them for you.**

**If there is nobody to help you, study this handbook until you have learned how to lower the attachments. Also make sure that the parking brake is engaged before doing these checks.**
**2-2-1-1**

**1 Check for Cleanliness**

**a** Clean the windows, light lenses and rear view mirrors.

**b** Remove dirt and debris, especially from around the linkages, rams, pivot points and radiator.

**c** Make sure the cab step and handholds are clean and dry.

**d** Clean all safety decals. Replace any that are missing or cannot be read.

**2 Check for Damage**

**a** Inspect the machine generally for damaged and missing parts.

**b** Make sure that the bucket is secure and in good condition.

**c** Make sure that all pivot pins are secured correctly in place.

**d** Inspect the windows for cracks and damage. Glass splinters can blind you.

**e** Check for oil, fuel and coolant leakages underneath the machine.



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## CAB LAYOUT

**1** Steering Wheel

**2** Display Panel (see Page 36)

**3** Steering Column Switch (see Page 31)

**4** Engine Starter/Stop Switch (see Page 33)

**5** Steering Column Tilt Lock (see Page 34)

**6** Accelerator Pedal (see Page 28)

**7** Parking Brake Switch (see Page 28)

**8** Brake Pedal (see Page 28)

**9** Master Warning Light (see Page 38)

**10** Forward/Reverse Lever (see Page 30)

**11** Gear Change Switch (see Page 29)

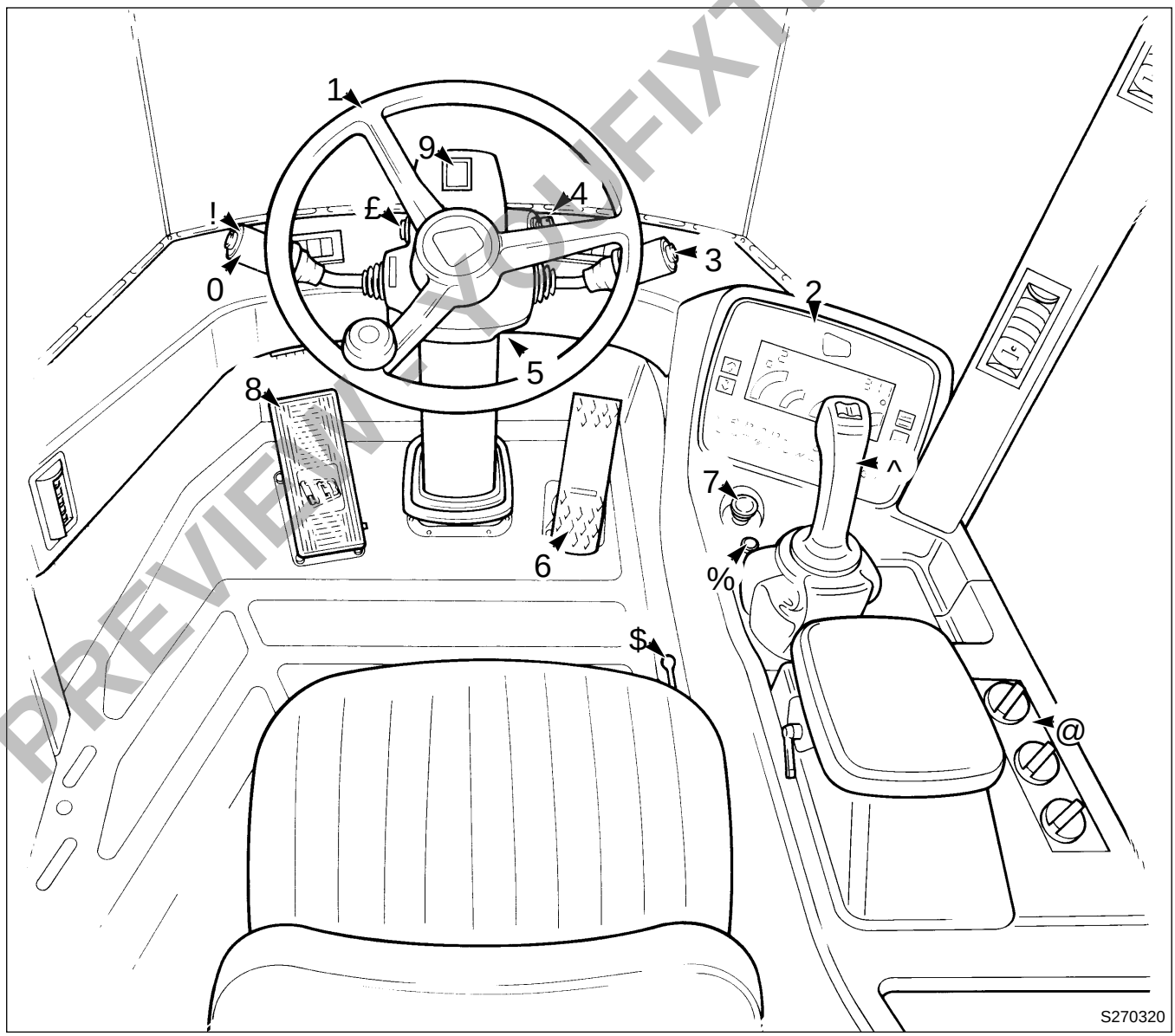
**12** Heater Controls (see Page 40)

**13** Hazard Light Switch (see Page 32)

**14** Loader Controls Lock (see Page 35)

**15** Warning Light Test Switch (see Page 39)

**16** Loader Controls (see Page 41)






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## LOADER CONTROLS

### Standard Shovel

**1** Loader arm raise.

**2** Loader arm lower.

**3** Arm float
Push the lever forward as far as it will go, and leave it there.

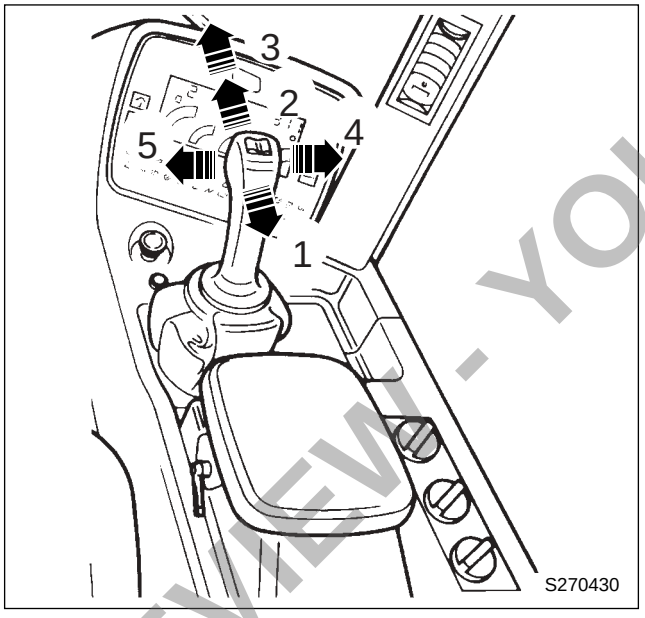
**4** Shovel open.

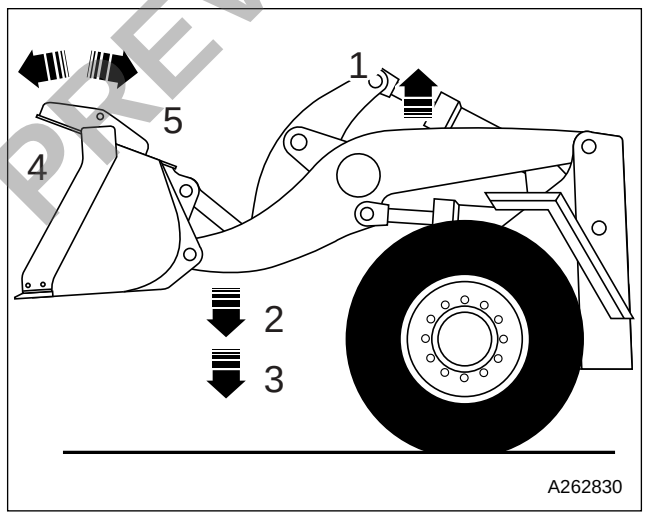
**5** Shovel close.

**! CAUTION**

**If Float is selected with the loader raised, the loader will descend to ground level and 'float' across it as you travel. You will have no control over the rate of fall.**

**2-2-2-7**




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## TRANSPORTING THE MACHINE

**The safe transit of the load is the responsibility of the transport contractor and driver. Any machine attachments or parts that may move during transit must be adequately secured**
5-2-5-9

**Note:** Before transporting the machine make sure you will be obeying the rules and laws of all the areas that the machine will be carried through.

Make sure that the transporting vehicle is suitable. See **Static Dimensions** in SPECIFICATIONS section for the dimensions of your machine.

### ! WARNING

**Ramps and Trailers**

**Water, mud, ice, grease and oil on ramps or trailers can cause serious accidents. Make sure ramps and trailers are clean before driving onto them. Use extreme caution when driving onto ramps and trailers.**
**INT-2-2-6**

**1** Place blocks at the front and rear of the trailer wheels.

**2** **a** Make sure the ramps are correctly in place and secure.

**b** Raise the shovel to approximately 305 mm (12 in) from the ground.

**c** Carefully drive the machine onto the trailer.

**d** When the machine is safely in position, lower the Loader Shovel.

**e** Set the drive to neutral and engage the parking brake.

**f** Check that the overall height of the load is within regulations. Adjust if necessary.

**g** Switch off the engine.

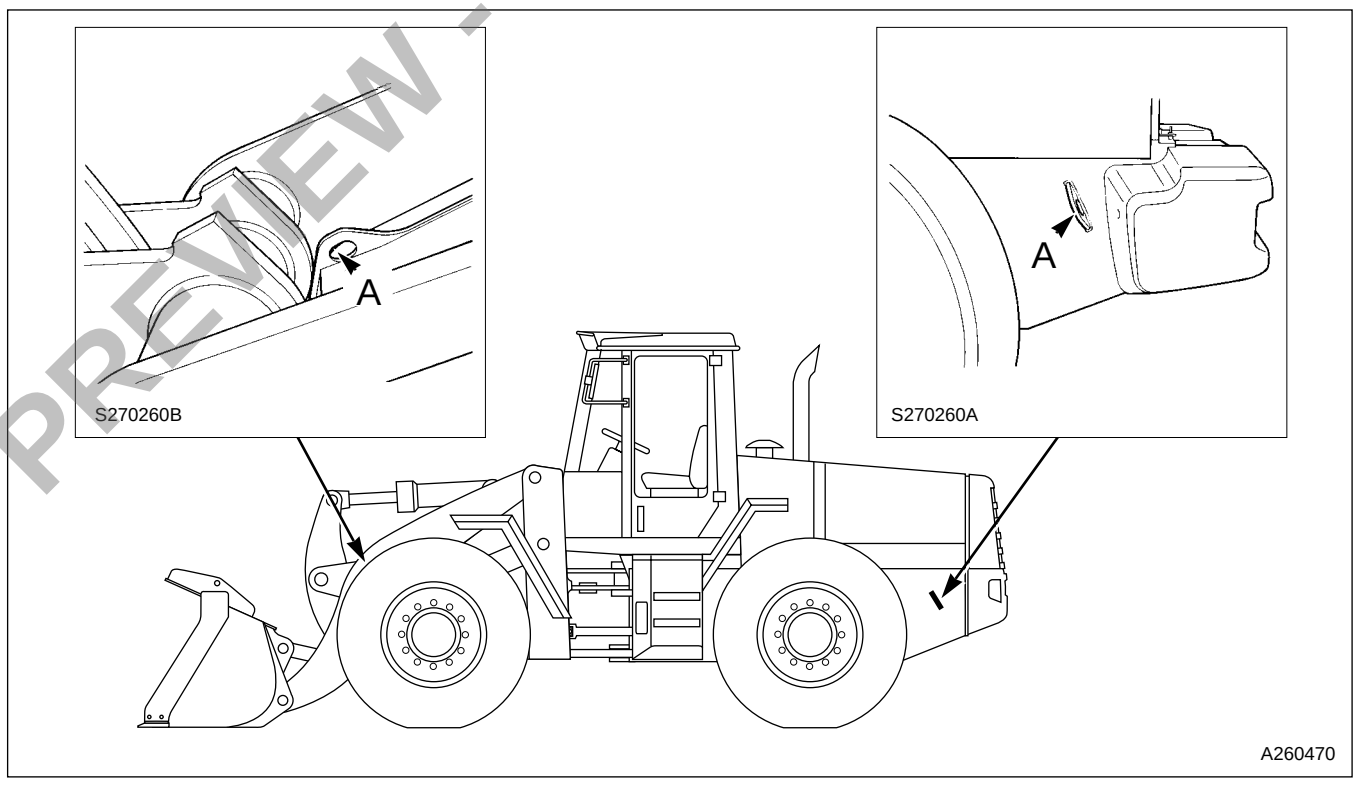
**h** Install the articulation lock.

**i** Secure the cab.

**j** Cover the exhaust stack.

**3** Put blocks at the front and rear of all four tyres. Anchor the machine to the trailer with chains, using the four holes **A** in the chassis side plates at the front and rear.

**4** Measure the maximum height of the machine from the ground. Make sure the truck driver knows the clearance height before he drives away.






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## GENERAL SAFETY

**When working on a Wheeled Loader, the machine must be made safe before carrying out any servicing.**

Position the machine on firm level ground. Engage the parking brake.

Chock both sides of all four wheels.

Make sure the transmission is in neutral.

Lower the loader arms to the ground; make sure that the shovel/attachment is flat on the ground to prevent accidental movement.

Fit the articulation lock.

Switch OFF the engine and remove the starter key.

Operate the controls to vent residual pressure.

If working with the loader arms raised, fit the loader arm safety strut.

If working on an area not reachable when standing on the ground, use a suitable stable working platform.

### ! WARNING

**Maintenance must be done by suitably qualified personnel. Before attempting any maintenance work, make sure the machine is safe. Park on level ground. If it is necessary to work with the loader arm raised, then the loader arm safety strut must be fitted. See Loader Arm Safety Strut in MAINTENANCE section. The articulation lock must be fitted if you are inspecting and/or doing any maintenance work in the articulation danger zone. See Installing the Articulation Lock in MAINTENANCE section.**
**4-3-1-1/1**

## SERVICE SCHEDULES

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 schedules are done to keep the machine in a safe and efficient working condition.

The schedules are based on machine running hours. Keep a regular check on the hourmeter readings. Do not use a machine which is due for a service. Make sure any defects found during the regular maintenance checks are rectified immediately.

| **Pre-start Cold Checks<br>Maintenance Points and Fluid Levels** | **Operation** | **10 Hr** | **100 Hr** | **250 Hr** | **As and When** | **500 Hr** | **1000 Hr** | **2000 Hr** |
|---|---|---|---|---|---|---|---|---|
| **ENGINE** | | | | | | | | |
| Oil level | - Check | ❑ | ❑ | | | | | |
| Oil and Filter | - Change | | | ❑ | | ❑ | ❑ | ❑ |
| Air Cleaner Outer Element | - Change | | | | ❑ | | | |
| Air Cleaner Inner Element (Every 3rd Outer Element) | - Change | | | | ❑ | | | |
| Fuel Filter | - Drain | | | | ❑ | | | |
| Fuel Filter | - Change | | | | | ❑ | ❑ | ❑ |
| Coolant Level | - Check | ❑ | ❑ | ❑ | | ❑ | ❑ | |
| Coolant Filter | - Change | | | ❑ | | | | |
| Antifreeze Strength | - Check | | | | ❑ | | | |
| Coolant | - Change | | | | | | | ❑ |
| Fuel Sedimenter | - Drain | | | | ❑ | | | |
| Drive Belt Tension/Condition | - Check | | | ❑ | | ❑ | ❑ | ❑ |
| Valve Clearances | - Check and Adjust | | | | | | | ❑ |
| Engine Mount Security | - Check | | | | | ❑ | ❑ | ❑ |
| Air Compressor Belt Tension/Condition (if fitted) | - Check | | | ❑ | | ❑ | ❑ | ❑ |



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## ENGINE AIR FILTER

### Changing the Elements

**Note:** In a dusty working environment, the outer element may have to be renewed more frequently than the service schedule recommendation. A new inner element must be fitted at latest every third time the outer element is changed. As a reminder, mark the inner element with a felt tip pen each time you change only the outer element. DO NOT attempt to wash or clean elements - they must be renewed.

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

**2** Open the engine air cleaner cover on the right side of the machine above the rear fender.

**3** If changing the inner element, disconnect the filter induction hose **J** to prevent dust getting into the engine. Cover the hose to prevent rain and dirt getting into the engine.

**4** Unscrew knob **A** and remove cover **B**. Unscrew nut **C** and pull out the outer element **D**. Take care not to tap or knock the element as you remove it. If necessary, unscrew nut **E** and pull out the inner element **F**.

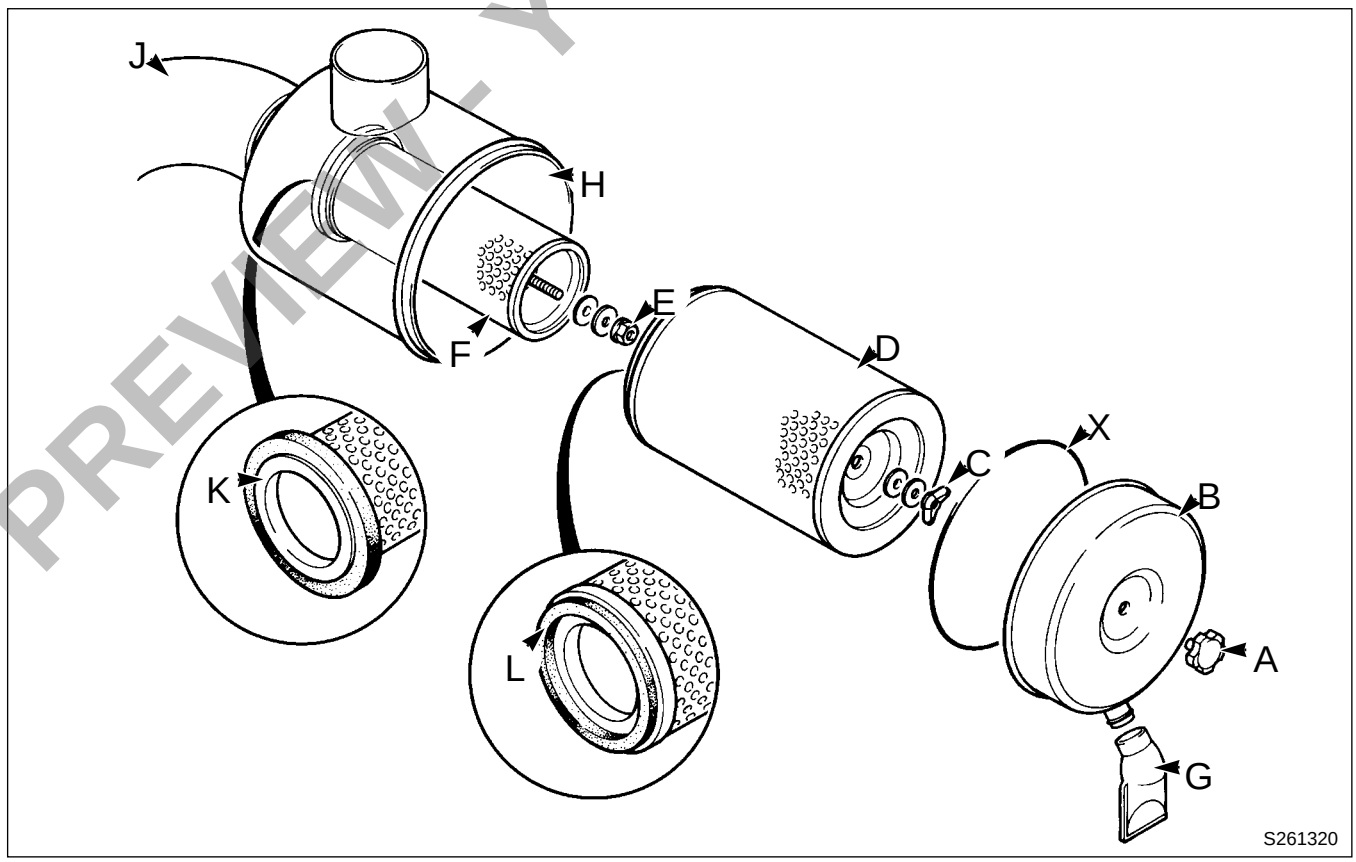
**Note:** Take care not to lose 'O' ring **X**.

**5** Clean inside canister **H** and dust valve **G**.

**6** Carefully insert the new elements into the canister. Make sure they seat correctly, by smearing the seals **K** and **L** with grease and checking for a witness mark on the canister base. Fit and tighten nuts **C** and **E**.

**7** Refit cover **B** and tighten knob **A**. Make sure that the dust valve **G** is at the bottom.

**8** Connect the induction hose **J**. Make sure the air filter blocked switch connector is fitted. Check all hoses for condition and tightness.






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# FLUIDS, CAPACITIES AND LUBRICANTS (456B)

**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). Engines of new machines are filled at the factory with JCB 10W/30 Multigrade oil. This oil should be drained after the first 100 hours operation and the engine filled with the appropriate recommended grade as shown in the lubrication chart. JCB 10W/30 Multigrade should also be used for the first 100 hours operation whenever a new or reconditioned engine is fitted to the machine. After the first 100 hours operation, it is essential that the 10W/30 oil is replaced by the lubricant recommended below.

| ITEM | CAPACITY | FLUID/LUBRICANT | SPECIFICATION |
|---|---|---|---|
| **Engine Oil**<br>-18 to 0° C<br>-10 to 50° C | 18.9 litres (4.2 UK gal) | JCB Torque Converter Fluid<br>JCB 15W/40 Multigrade | API CE, MIL-L-2104C/D |
| **Gearbox** | †28.0 litres (6.2 UK gal) | JCB Torque Converter Fluid | API CE, MIL-L-2104C/D |
| **Axles** | 51.0 litres (11.2 UK gal) | JCB LS Gear Oil | API GL4, MIL-L-2105A |
| **Hydraulic System** | 215 litres (47.3 UK gal) | JCB HP32 Hydraulic Fluid | ISO VG32 |
| **Cooling System** | 38 litres (8.4 UK gal) | Water/Anti-freeze (see **Coolant mixture**) | ASTM D3306-74 |
| **Fuel System** | 325 litres (71.5 UK gal) | Diesel Oil (see **Types of Fuel**) | ASTM D975-66T Nos. 1D, 2D. |
| **Grease Points** | | JCB HP Grease | Lithium based |

**Note:** The total hydraulic system capacity depends on the equipment being used. Fill the system with all rams closed and watch the level indicator.

**Note:** If JCB Special MPL Grease is used, all 100 hour greasing operations must be carried out at TEN (10) HOUR intervals.

† The figure quoted is TOTAL system capacity. Use the **'MAX'** and **'MIN'** marks on the dipstick when refilling the system.

**Note:** Biodegradable Hydraulic Fluid is a factory option ONLY. Replenish with JCB Biodegradable Multigrade Hydraulic Fluid. For further information, contact Wheeled Loader Technical Service.

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## SERVICE SCHEDULES (continued)

| Pre-start Cold Checks<br>Maintenance Points and Fluid Levels | Operation | 10 Hr | 100 Hr | 250 Hr | As and When | 500 Hr | 1000 Hr | 2000 Hr |
|---|---|---|---|---|---|---|---|---|
| **TRANSMISSION AND AXLES** | | | | | | | | |
| Transmission Oil Level | - Check | | ❑ | | | | | |
| Transmission Oil | - Change | | | | | | ❑ | ❑ |
| Transmission Strainer/Filter | - Change | | | | | | ❑ | ❑ |
| Axle(s) Oil Level | - Check | | ❑ | | | | | |
| Axle(s) Oil | - Change | | | | | ❑ | ❑ | ❑ |
| Hub Oil Levels | - Check | | ❑ | | | | | |
| Hub Oil | - Change | | | | | ❑ | ❑ | ❑ |
| Rear Axle Pivots | - Grease | | | ❑ | | | | |
| Prop. Shaft and Universal joints | - Grease | | | | | | ❑ | ❑ |
| Prop. Shaft Security | - Check | | | | | | ❑ | ❑ |
| Centre Prop. Shaft Slide | - Grease | | | ❑ | | ❑ | ❑ | ❑ |
| Tyre Pressures and Condition | - Check | | ❑ | | | ❑ | ❑ | ❑ |
| Parking Brake Operation | - Check and Adjust | | | | ❑ | | | |
| **HYDRAULICS** | | | | | | | | |
| Oil Level | - Check | ❑ | ❑ | ❑ | | ❑ | ❑ | |
| Oil Filter | - Change | | | | | ❑ | ❑ | ❑ |
| Oil | - Sample/Change | | | | | | | ❑ |
| Suction Strainer | - Clean | | | | | | | ❑ |
| Servo Filter | - Change | | | | | ❑ | ❑ | ❑ |
| Tank Filler Cap | - Change | | | | | | | ❑ |
| Hoses & Pipework - Damage or Leaks | - Check | | | ❑ | | ❑ | ❑ | ❑ |
| **ELECTRICS** | | | | | | | | |
| Instrument Panel Operation | - Check | ❑ | | ❑ | | ❑ | ❑ | ❑ |
| Wiring for Chaffing | - Check | | | ❑ | | ❑ | ❑ | ❑ |
| Battery Terminals for Condition and Tightness | - Check | | | | | | ❑ | ❑ |
| **BODY AND FRAMEWORK** | | | | | | | | |
| Loader End Pivots | - Grease | | ❑ | | | ❑ | ❑ | ❑ |
| All Hinges | - Grease | | | | | ❑ | ❑ | ❑ |
| Lower Centre Pivot | - Grease | | ❑ | | | ❑ | ❑ | ❑ |
| Steer Ram Pivots | - Grease | | ❑ | | | ❑ | ❑ | ❑ |
| Upper Centre Pivot | - Grease | | ❑ | | | ❑ | ❑ | ❑ |
| Machine Condition Generally | - Check | | | | ❑ | | | |
| **CAB** | | | | | | | | |
| Windscreen Washer Fluid Level | - Fill | | | | ❑ | | | |
| Cab Heater Filter | - Clean | | | | ❑ | | | |
| ROPS/FOPS Structures | - Check | | | | | | ❑ | ❑ |
| Seat Belt Security and Condition | - Check | | | | ❑ | | | |

**Note:** Operations must be carried out at the end of each set period, ie. The 10 Hour operations must be carried out after **every** 10 hours.

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## USING THE ATTACHMENTS AND SITE SAFETY

This section explains some techniques for efficient and safe use of the machine and its attachments. Attention is also drawn to the various safety aspects of operating on site. Read and understand this section before you start working with the machine. Practice using the attachments until you are completely familiar with the controls and what they do.

Before you start using the machine, tell your work mates what you will be doing and where you will be working. On a busy site, use a signalman.

Remember that your machine is mobile. Whenever possible, manoeuvre your machine into a position which combines safety with efficiency. If you have to choose, remember that:

**SAFETY MUST COME FIRST**

Choose the correct attachment for the job. Do not use an oversize shovel for rocky material. It could overload the system and shorten service life.

### ! WARNING

**Work Sites**

**Work sites can be hazardous. Inspect the site before working on it. Look for potholes, weak ground, hidden rocks etc. Check for utilities such as electric cables (overhead and underground), gas and water pipes etc. Mark the positions of the underground cables and pipes. Make sure that you have enough clearance beneath overhead cables and structures.**

**INT-2-2-1**

### ! WARNING

**General Site Safety**

**Before you start using the machine, inspect the job site. You could be killed or injured if the ground gives way under your machine or if piled material collapses onto it. Check for potholes and hidden debris, logs, ironwork etc. Any of these could cause you to lose control of your machine.**

**2-2-5-2**

### ! CAUTION

**Legal Liability**

**You and/or your company could be legally liable for any damage you may cause to public utilities. It is your responsibility to make sure that you know the locations of all public utility cables or pipes on the site which could be damaged by your machine.**

**2-2-5-3**

### ! WARNING

**Electrical Power Cables**

**You could be electrocuted or badly burned if you get the machine or its attachments too close to electrical power cables.**

**You are strongly advised to make sure that the safety arrangements on site comply with the local laws and regulations concerning work near electric power lines.**

**Buried Electric Power Cables**

**Before you start using the machine, check with your electricity supplier if there are any buried power cables on the site.**

**Overhead Electric Power Cables**

**There is a minimum clearance required for working beneath overhead power cables. You must obtain details from your local electricity supplier.**

**2-2-5-4**

### ! WARNING

**Reworking Old Sites**

**There could be dangerous materials such as asbestos, poisonous chemicals or other harmful substances buried on the site. If you uncover any containers or you see any signs of toxic waste, stop the machine and advise the site manager immediately.**

**2-2-5-5**

### ! WARNING

**Water Supplies and Drains**

**Before you start using the machine, check with your local public water supplier if there are buried pipes and drains on the site. If there are, obtain a map of their locations and follow the advice given by the water supplier.**

**You are strongly advised to make sure that the safety arrangements on site comply with the local laws and regulations concerning work near buried water pipes and drains.**

**2-2-5-6**

### ! WARNING

**Communications**

**Bad communications can cause accidents. Keep people around you informed of what you will be doing. If you will be working with other people, make sure any hand signals that may be used are understood by everybody. Work sites can be noisy, do not rely on spoken commands.**

**INT-2-2-3**



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