

SAFETY NOTICES

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

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

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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Winterisation

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ABOUT THIS HANDBOOK

Machine Model

This handbook provides information for the 4CX military Backhoe Loader machine.

Using this Handbook

The illustrations in this handbook are for guidance only. Where the machines differ, the text and/or the illustration will specify.

This handbook is arranged to give you a good understanding of the machine and its safe operation. It also contains maintenance information and specification data. Read this handbook from front to back before using the machine for the first time. Particular attention must be given to all the safety aspects of operating and maintaining the machine.

General warnings in this chapter are repeated throughout the book, as well as specific warnings. Read all the safety statements regularly, so you do not forget them. Remember that the best operators are the safest operators.

Finally, treat this handbook as part of the machine. Keep it clean and in good condition. Do not operate the machine without a handbook in the cab. If there is anything you are not sure about, ask your JCB distributor or employer. Do not guess, you or others could be killed or seriously injured.

The manufacturer's policy is one of continuous improvement. The right to change the specification of the machine without notice is reserved. No responsibility will be accepted for discrepancies which may occur between specifications of the machine and the descriptions contained in this publication.

INT-1-2-5/1

Units of measurement

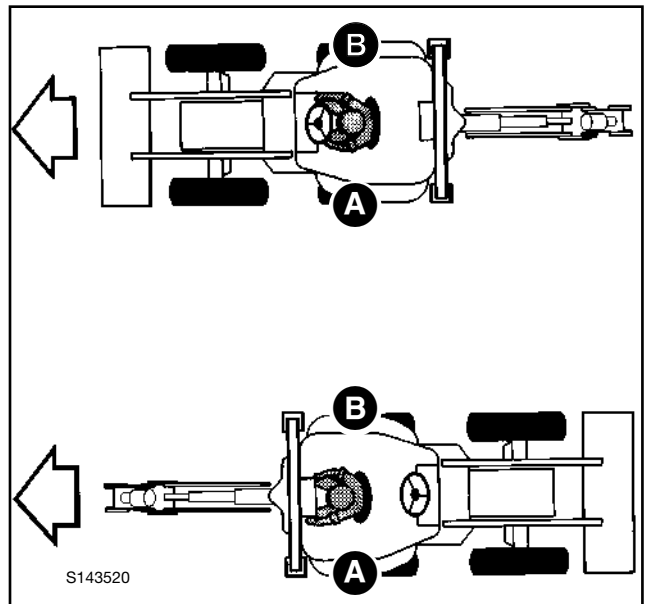
In this handbook, the S.I. system of units is used. For example, liquid capacities are given in litres. The Imperial units follow in parenthesis () eg 28 litres (6 gal).

Using the machine

To use the JCB Backhoe Loader efficiently and safely you must know the machine and have the skill to use it. This handbook instructs you on the machine, its controls and its safe operation. It is not a training manual on the art of excavating or loading. If you are a new operator, get yourself trained in the skills of using a JCB Backhoe Loader before trying to work with it. If you don't, you will not do your job well, and you will be a danger to yourself and others.

Left Side, Right Side

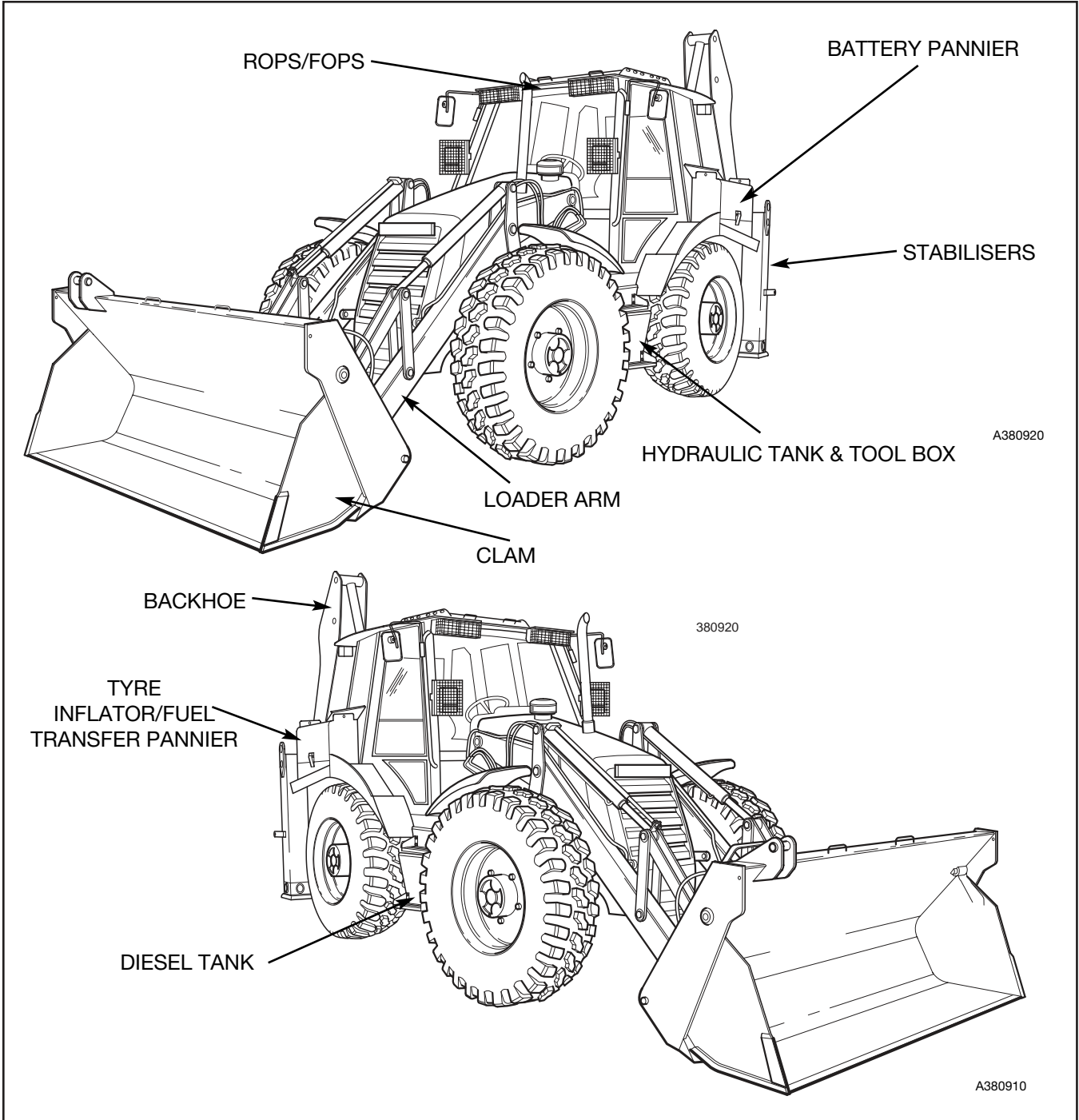
In this handbook, 'left' **A** and 'right' **B** mean your left and right when you are seated correctly in the machine. This is so whether you are facing the loader (front) or the backhoe (rear).



THE JCB BACKHOE LOADER

Machine Description

The backhoe loader is a self propelled wheeled machine with a main structural support designed to carry both a front mounted bucket loading mechanism and a rear mounted backhoe. When used in the backhoe mode, the machine normally digs below ground level with bucket motion towards the machine; the backhoe lifts, swings and discharges material while the machine is stationary. When used in the loader mode, the machine loads or excavates through forward motion of the machine, and lifts, transports and discharges material.



SAFETY - YOURS AND OTHERS

All construction and agricultural equipment can be hazardous. When a backhoe loader is correctly operated and properly maintained, it is a safe machine to work with. But when it is carelessly operated or poorly maintained it can become a danger to you (the operator) and others.

In this handbook and on the machine you will find warning messages. Read and understand them. They tell you of potential hazards and how to avoid them. If you do not fully understand the warning messages, ask your employer or JCB distributor to explain them.

But safety is not just a matter of responding to the warnings. All the time you are working on or with the machine you must be thinking what hazards there might be and how to avoid them.

Do not work with the machine until you are sure that you can control it.

Do not start any job until you are sure that you and those around you will be safe.

If you are unsure of anything, about the machine or the job, ask someone who knows. Do not assume anything.

**Remember
BE CAREFUL
BE ALERT
BE SAFE**

INT-1-3-1/1

SAFETY CHECK LIST

General Safety

WARNING Handbook

You and others can be injured if you operate or maintain the machine without first studying this handbook. Read the safety instructions before operating the machine. If you do not understand anything, ask your employer or JCB distributor to explain it. Keep this handbook clean and in good condition. Do not operate the machine without a handbook in the cab, or if there is anything on the machine you do not understand.

INT-1-3-2

WARNING Clothing

You can be injured if you do not wear the proper clothing. Loose clothing can get caught in the machinery. Wear protective clothing to suit the job. Examples of protective clothing are: a hard hat, safety shoes, safety glasses, a well fitting overall, ear-protectors and industrial gloves. Keep cuffs fastened. Do not wear a necktie or scarf. Keep long hair restrained.

INT-1-3-6

WARNING Machine Modifications

This machine is manufactured in compliance with legislative and other requirements. It should not be altered in any way which would affect or invalidate any of these requirements. For advice consult your JCB Distributor.

Reference should also be made to Optional Attachments section where appropriate.

INT-1-3-10

WARNING Alcohol and Drugs

It is extremely dangerous to operate machinery when under the influence of alcohol or drugs. Do not consume alcoholic drinks or take drugs before or whilst operating the machine or attachments. Be aware of medicines which can cause drowsiness.

INT-1-3-9

CAUTION Passengers

Passengers in or on the machine can cause accidents. The JCB Backhoe Loader is a one-man machine. Do not carry passengers.

INT-2-2-2

WARNING Raised Attachments

Raised attachments can fall and injure you. Do not walk or work under raised attachments unless they are safely blocked.

INT-1-3-8

CAUTION Regulations

Obey all laws, work site and local regulations which affect you and your machine.

INT-1-3-3

WARNING Care and Alertness

All the time you are working with or on the machine, take care and stay alert. Always be careful. Always be alert for hazards.

INT-1-3-5

SAFETY CHECK LIST (continued)

Operating Safety

WARNING

Machine Condition

A defective machine can injure you or others. Do not operate a machine which is defective or has missing parts. Make sure the maintenance procedures in this handbook are completed before using the machine.

INT-2-1-2

WARNING

Lifting Equipment

You can be injured if you use faulty lifting equipment. Make sure that lifting equipment is in good condition. Make sure that lifting tackle complies with all local regulations and is suitable for the job. Make sure that lifting equipment is strong enough for the job.

INT-1-3-7

WARNING

Engine

The engine has exposed rotating parts. Do not open the engine cover while the engine is running. Do not use the machine with the cover open.

INT-2-1-6/1

WARNING

Machine Limits

Operating the machine beyond its design limits can damage the machine, it can also be dangerous. Do not operate the machine outside its limits. Do not try to upgrade the machine performance with unapproved modifications.

INT-2-1-4

WARNING

Controls

You and others can be killed or injured if you operate the control levers from outside the cab. Operate the control levers only when you are seated correctly in the cab.

INT-2-1-3

DANGER

Sparks

Explosions and fire can be caused by sparks from the exhaust or the electrical system. Do not use the machine in closed areas where there is flammable material, vapour or dust.

INT-2-2-10

WARNING

Visibility

Accidents can be caused by working in poor visibility. Keep windows clean and use your lights to improve visibility. Do not operate the machine if you cannot see properly.

INT-2-1-11

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

WARNING

Safety Barriers

Unguarded machines in public places can be dangerous. In public places, or where your visibility is reduced, place barriers around the work area to keep people away.

INT-2-2-8

WARNING

Parking

An incorrectly parked machine can move without an operator. Follow the instructions in this handbook to park the machine correctly.

INT-2-2-4

WARNING

Hazardous Atmospheres

This machine is designed for use in normal out door atmospheric conditions. It should not be used in an enclosed area without adequate ventilation. Do not use the machine in a potentially explosive atmosphere, i.e. combustible vapours, gas or dust, without first consulting your JCB Distributor.

INT-2-1-14

WARNING

Should the machine start to roll over, you can be crushed if you try to leave the cab. If the machine starts to roll over, **DO NOT TRY TO JUMP FROM THE CAB. STAY IN THE CAB, WITH YOUR SEAT BELT FASTENED.**

INT-2-1-12

SAFETY CHECK LIST (continued)

Maintenance Safety

WARNING

Modifications and Welding

Non-approved modifications can cause injury and damage. Parts of the machine are made from cast iron; welds on cast iron can weaken the structure and break. Do not weld cast iron. Contact your JCB dealer before modifying the machine.

INT-3-1-2/1

WARNING

Metal Splinters

You can be injured by flying metal splinters when driving metal pins in or out. Use a soft faced hammer or drift to remove and fit metal pins. Always wear safety glasses.

INT-3-1-3

WARNING

Safety Strut

Raised loader arms can drop suddenly and cause serious injury. Before working under raised loader arms, fit the loader arm safety strut.

2-1-1-6

WARNING

Communications

Bad communications can cause accidents. If two or more people are working on the machine, make sure each is aware of what the others are doing. Before starting the engine make sure the others are clear of the danger areas; examples of danger areas are: the rotating blades and belt on the engine, the attachments and linkages, and anywhere beneath or behind the machine. People can be killed or injured if these precautions are not taken.

INT-3-1-5

WARNING

Counterweights

Your machine may be fitted with counterweights. They are extremely heavy. Do not attempt to remove them.

INT-3-2-5

WARNING

Fires

If your machine is equipped with a fire extinguisher, make sure it is checked regularly. Keep it in the operator's cab until you need to use it.

Do not use water to put out a machine fire, you could spread an oil fire or get a shock from an electrical fire. Use carbon dioxide, dry chemical or foam extinguishers. Contact your nearest fire department as quickly as possible. Firefighters should use self-contained breathing apparatus.

INT-3-2-7/1

WARNING

Battery Terminals

The machine is negatively earthed. Always connect the negative pole of the battery to earth.

When connecting the battery, connect the earth (-) lead last.

When disconnecting the battery, disconnect the earth (-) lead first.

INT-3-1-9

WARNING

Repairs

Do not try to do repairs or any other type of maintenance work you do not understand. Get a Service Manual from your JCB distributor, or get the work done by a specialist engineer.

INT-3-1-1

WARNING

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, stop the engine and operate the controls to release pressure trapped in the hoses. Make sure the engine cannot be started while the hoses are open.

INT-3-1-11/1

WARNING

Hydraulic hoses

Damaged hoses can cause fatal accidents. Inspect the hoses regularly for:

- Damaged end fittings
- Chafed outer covers
- Ballooned outer covers
- Kinked or crushed hoses
- Embedded armouring in outer covers
- Displaces end fittings.

INT-3-3-2

WARNING

Accumulators

The accumulators contain hydraulic oil and gas at high pressure. Prior to any work being carried out on the braking system they must be discharged by a JCB distributor as the sudden release of the hydraulic oil or gas may cause injury.

7-1-1-4

WARNING

Soft Ground

A machine can sink into soft ground. Never work under a machine on soft ground.

INT-3-2-4

SAFETY CHECK LIST (continued)

Maintenance Safety (continued)

WARNING

Fluoroelastomeric Materials

Certain seals and gaskets (e.g. crankshaft oil seal) on JCB machines contain fluoroelastomeric materials such as Viton, Fluorel and Technoflon. Fluoroelastomeric materials subjected to high temperatures can produce highly corrosive hydrofluoric acid. **THIS ACID CAN SEVERELY BURN.**

New fluoroelastomeric components at ambient temperature require no special safety precautions.

Used fluoroelastomeric components whose temperatures have not exceeded 300°C require no special safety precautions. If evidence of decomposition (e.g. charring) is found, refer to the next paragraph for safety instructions **DO NOT TOUCH COMPONENT OR SURROUNDING AREA.**

Used fluoroelastomeric components subjected to temperatures greater than 300°C (e.g. engine fire) must be treated using the following safety procedure. Make sure that heavy duty gloves and special safety glasses are worn:

- 1 Ensure that components have cooled then remove and place material into plastic bags.
- 2 Thoroughly wash contaminated area with 10% calcium hydroxide or other suitable alkali solution, if necessary use wire wool to remove burnt remains.
- 3 Thoroughly wash contaminated area with detergent and water.
- 4 Contain all removed material, gloves etc. used in this operation in sealed plastic bags and dispose of in accordance with Local Authority Regulations.

DO NOT BURN FLUOROELASTOMERIC MATERIALS.

If contamination of skin or eyes occurs, wash the affected area with a continuous supply of clean water or with calcium hydroxide solution for 15-60 minutes. Get medical attention immediately.

INT-3-3-5/1

WARNING

Jacking

A machine can roll off jacks and crush you unless the wheels have been chocked. Always chock the wheels at the opposite end of the machine that is to be jacked. Do not work underneath a machine supported only by jacks. Always support a jacked-up machine on axle stands before working underneath it.

INT-3-2-8

WARNING

Under no circumstances must the engine be run with the transmission in gear and only one driving wheel jacked clear of the ground, since the wheel on the ground will move the machine.

INT-3-1-16

CAUTION

Rams

The efficiency of the rams will be affected if they are not kept free of solidified dirt. Clean dirt from around the rams regularly. When leaving or parking the machine, close all rams if possible to reduce the risk of weather corrosion.

INT-3-2-10

CAUTION

Arc Welding

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.

Make sure that the welding earth return path is kept as short as possible. This prevents high currents being induced in the machine chassis or wiring harnesses.

If the machine is equipped with amplifier drivers or electronic control units (E.C.U.s), then disconnect them before welding. Failure to disconnect the amplifier drivers or E.C.U.s could result in irreparable damage to the electronic components.

INT-3-1-15/1

WARNING

Oil

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

INT-3-2-3

DECALS

Keep all decals clean and readable. Replace lost or damaged decals. The decals and their attachment points are shown on the following pages. Each decal has a part number printed on it, use this number to order a new decal from your JCB distributor.

INT-3-3-6

⚠ WARNING

Decals

You can be injured if you do not obey the decal safety instructions. Keep decals clean. Replace unreadable or missing decals with new ones before operating the machine. Make sure replacement parts include warning decals where necessary.

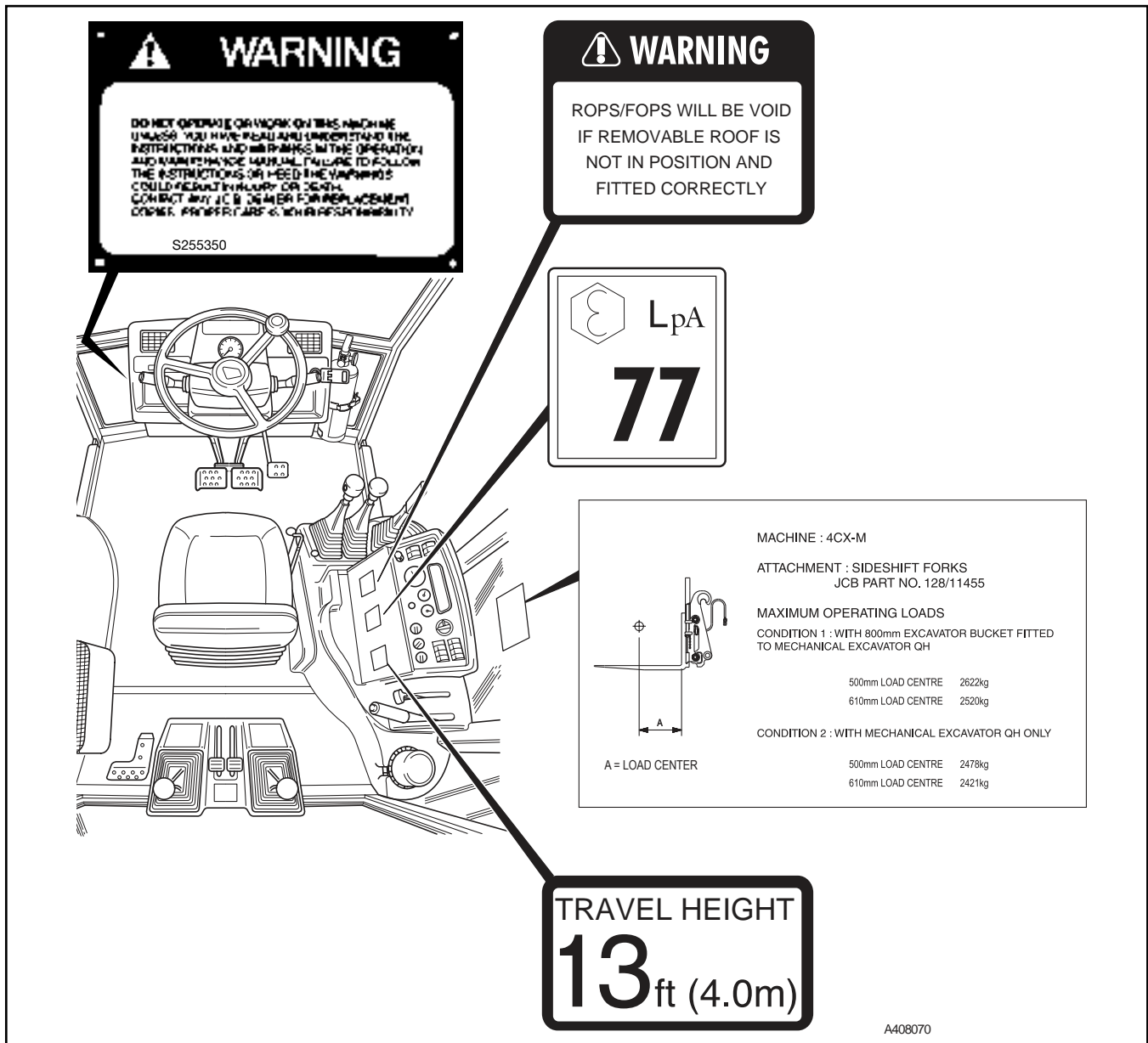
INT-1-3-4

⚠ WARNING

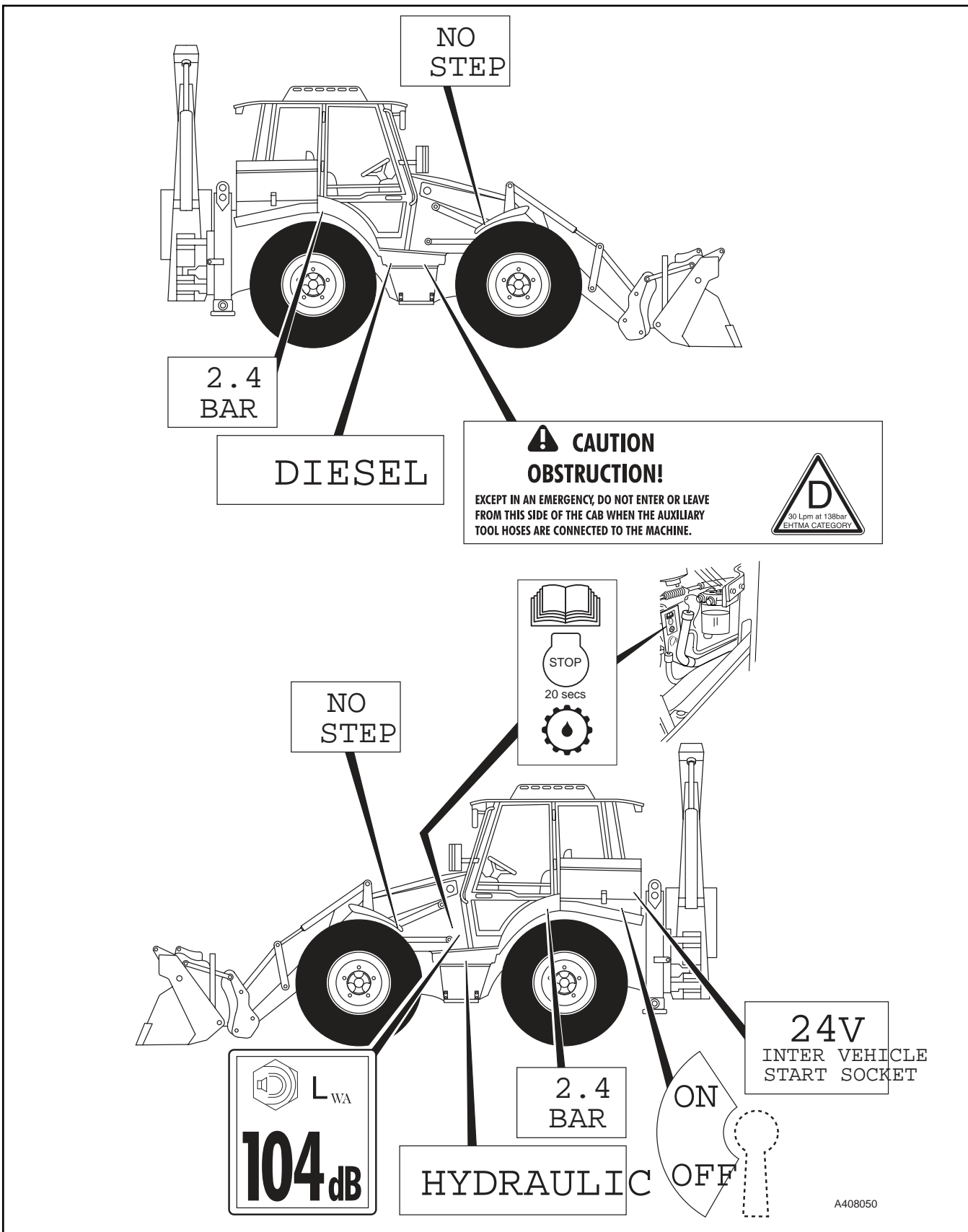
If you need eye-glasses for reading, make sure you wear them when reading the safety decals. Decals are strategically placed around the machine to remind you of possible hazards. Do not over-stretch or place yourself in dangerous positions to read the decals.

INT-3-3-4

Note: See OPTIONAL ATTACHMENTS Section for information regarding the decals fitted on attachments.



DECALS
(continued)



A408050




IDENTIFYING YOUR MACHINE

Machine Identification Plate

Your machine has an identification plate mounted on the loader tower. The serial numbers of the machine and its major units are stamped on the plate.

The serial number of each major unit is also stamped on the unit itself. If a major unit is replaced by a new one, the serial number on the identification plate will be wrong. Either stamp the new number of the unit on the identification plate, or simply stamp out the old number. This will prevent the wrong unit number being quoted when replacement parts are ordered.

The machine and engine serial numbers can help identify exactly the type of equipment you have.

 		J.C.BAMFORD EXCAVATORS LTD. ROCESTER, STAFFS, ENGLAND CONSTRUCTOR		
<input type="text"/> VIN Vehicle Identification Number		<input type="text"/> PIN Product Identification Number		
<input type="text"/> ENGINE SERIAL NUMBER		<input type="text"/> FRONT AXLE SERIAL NUMBER		
<input type="text"/> TRANSMISSION SERIAL NUMBER		<input type="text"/> REAR AXLE SERIAL NUMBER		
<input type="text"/> WEIGHT kg	<input type="text"/> YEAR OF CONST.	<input type="text"/> ENGINE POWER kW @ RPM		
				817/00000

A276550

Typical Vehicle Identification Number (VIN)

SLP 4CX T S R E 0930001
 (A) (B) (C) (D) (E) (F) (G)

- (A)** World Manufacturer Identification
- (B)** Machine Model
- (C)** Steer Type (T= 2WS, F=4WS)
- (D)** Build Type (S=Sideshift, C=Centremount, L=Loader)
- (E)** Year of Manufacture:
 - 1 = 2001
 - 2 = 2002
 - 3 = 2003
 - 4 = 2004
 - 5 = 2005
 - 6 = 2006
 - 7 = 2007
- (F)** Manufacturer Location (E = England)
- (G)** Machine Serial Number:

Typical Engine Identification Number

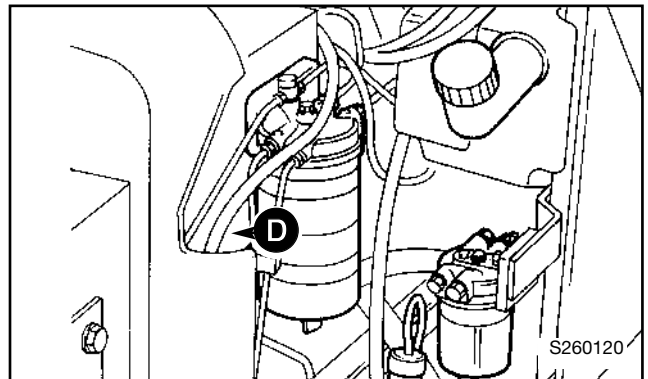
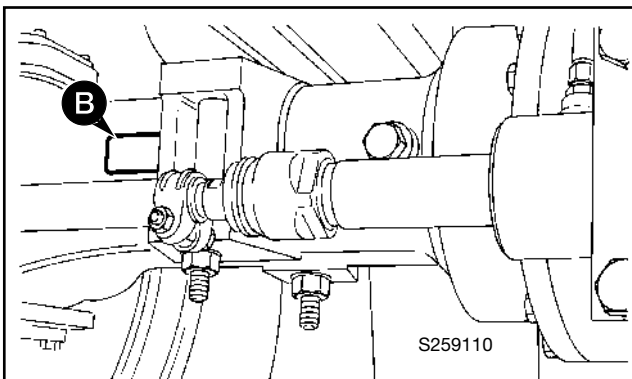
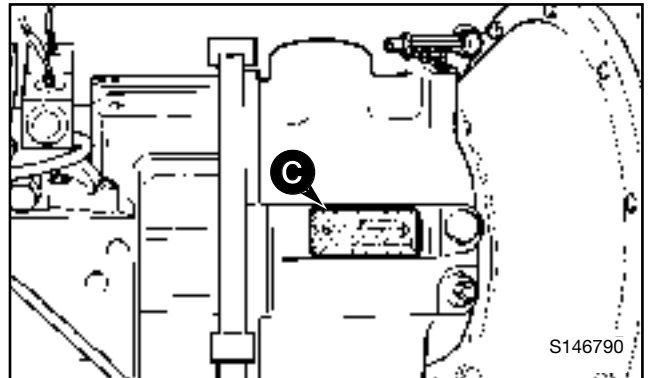
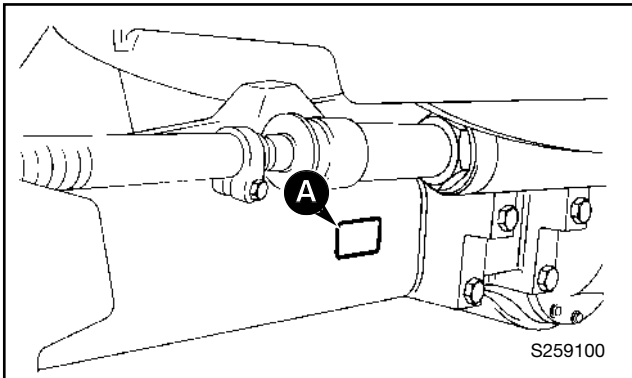
AB 50262 U 500405 P
 (A) (B) (C) (D) (E)

- (A)** Engine Type
AB = 4 cylinder turbo
- (B)** Build Number
- (C)** Country of Origin
- (D)** Engine Sequence Number
- (E)** Year of Manufacture

IDENTIFYING YOUR MACHINE

Serial Plates

- A** Front Axle (4WS machine)
- B** Rear Axle (4WS machine)
- C** Powershift Transmission
- D** Engine



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 drivers 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 JCB Backhoe 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.
- e Check for oil, fuel and coolant leakages underneath the machine.

WARNING

You could be killed or injured if a machine tyre bursts. Do not use the machine with damaged, incorrectly inflated or excessively worn tyres.

2-2-1-2

3 Check the Tyres

- a Make sure the tyres are correctly inflated.
- b Check for cut rubber and penetration by sharp objects. Do not use a machine with damaged tyres.

4 Check the Engine Panels, Bonnet and Fuel Cap

- a Make sure the engine panels and bonnet catches are secure.
- b Make sure the fuel filler cap is tightly closed and locked.

ENTERING AND LEAVING THE CAB

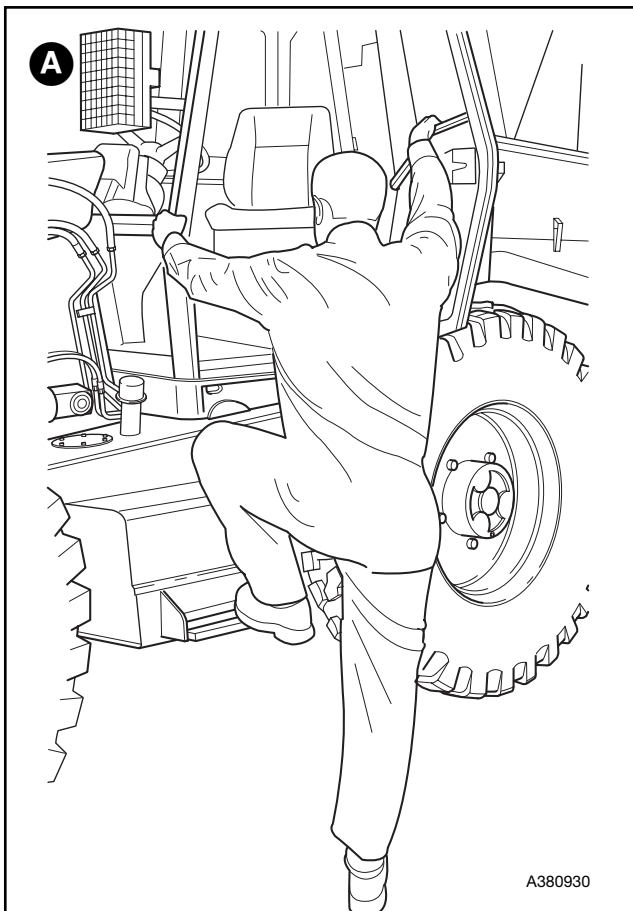
Entering & Leaving the Cab

⚠ WARNING

Entering or leaving the cab or canopy must only be made where steps and handrails are provided. Always face the machine when entering and leaving. Make sure the step(s), handrails and your boot soles are clean and dry. Do not jump from the machine. Do not use the machine controls as handholds, use the handrails.

INT-2-1-7/1

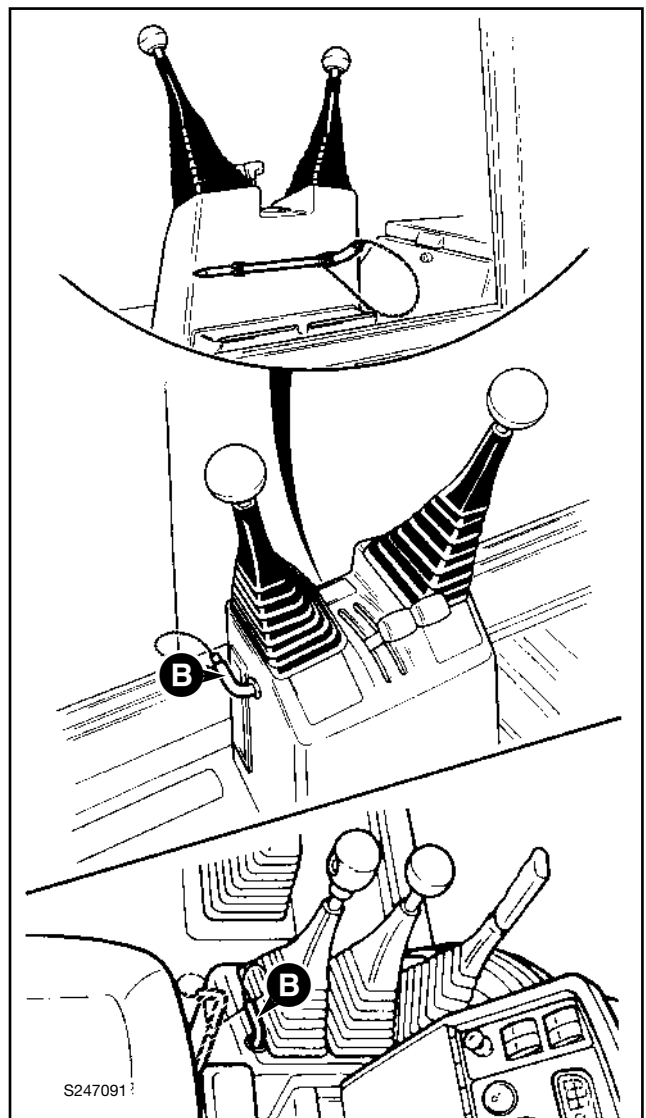
Make sure the machine is stopped and correctly parked before entering or leaving the cab. When you get on and off the machine always maintain a three point contact with the handrails and step as shown at **A**. Do not use the machine controls or steering wheel as handholds.



Control Lever Locks

To prevent the loader arms and the backhoe from being accidentally operated when the driver is entering or leaving the cab, or driving on the highway, safety locking pins **B** can be installed.

Always fit the locking pin before leaving the cab. Only remove the locking pin when you are correctly seated inside the cab. Put the pins in their stowage position during machine operation. This will prevent the pin from being misplaced.



DOORS AND WINDOWS

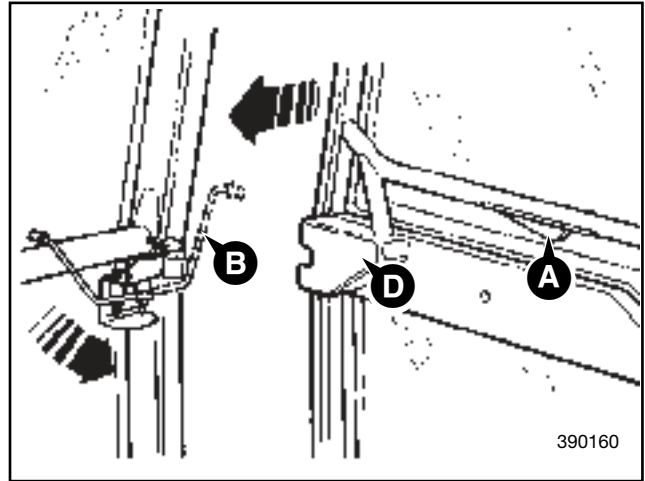
Opening and Closing the Doors

To open a door from the outside, unlock it with the key provided and press the lock barrel. The door is fitted with an assister which will spring it open and hold it open.

Close the door from the inside by pulling it firmly; it will latch itself. To open the door from the inside, operate lever **A**.

If extension rod **B** is fitted, the door can be latched partly open; swing extension rod **B** towards the door and hold it there while you pull the door onto it. Make sure the door latches fully onto the extension rod.

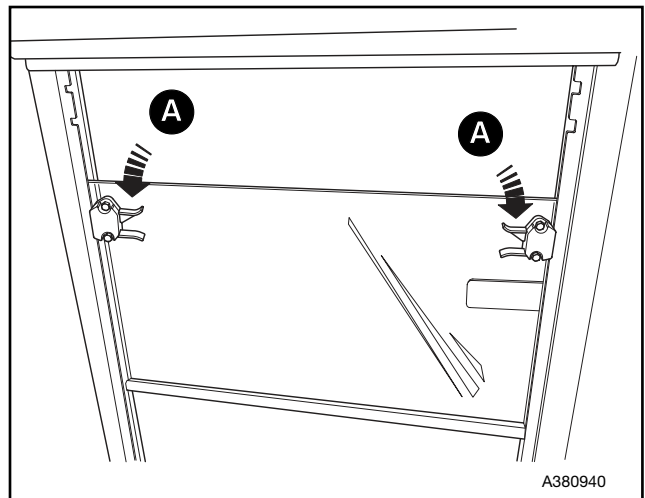
Note: Do not drive the machine with the doors unlatched. Otherwise they could swing open.



Opening and Closing the Rear Window

To open the rear window, press locking levers **A**. Lower the window to the required position, release locking levers to lock in required position.

To close the rear window, press locking levers **A**. Raise the window, release locking levers to lock.



SEAT CONTROLS

The operator's seat can be adjusted for your comfort. A correctly adjusted seat will reduce operator fatigue. Position the seat so that you can comfortably reach the machine controls. For driving the machine, adjust the seat so that you can depress the brake pedals fully with your back against the seat back. The Operator's Handbook and Parts Book are located in the pouch **X** at the rear of the seat.

Headrest **A** (optional)

The headrest can be adjusted to suit, take hold of the rest and lift or lower as required.

Armrest **B** (optional)

The angle of the armrest can be adjusted, rotate the control knob clockwise to rise the armrest and anti-clockwise to lower the armrest.

Swivel **C**

Important Note: Before swiveling the seat, move the seat fully forward, see Fore/Aft below. The side console can be damaged if the seat is not fully forward.

To swivel lift the lever, swivel the seat all the way around to face the opposite direction then release lever. Make sure the seat fully latches into position.

Fore/Aft **D**

To move the seat fore and aft, lift the bar and slide the seat to the position you want, release the bar to lock the seat. Make sure the seat is locked in position.

! WARNING

Whilst seated, adjust the dial on the left of the seat until your weight in kgs appears in the red shaded area. Failure to set the weight adjustment dial will reduce the beneficial isolation effect of the seat suspension and may result in personal discomfort or injury.

2-2-1-12

Weight **E**

Whilst seated, turn the weight adjustment dial until your weight is shown in the red shaded area of the dial. This will set the seat to the most suitable support for your weight. The dial is calibrated in kilograms (kg).

Backrest Angle **F**

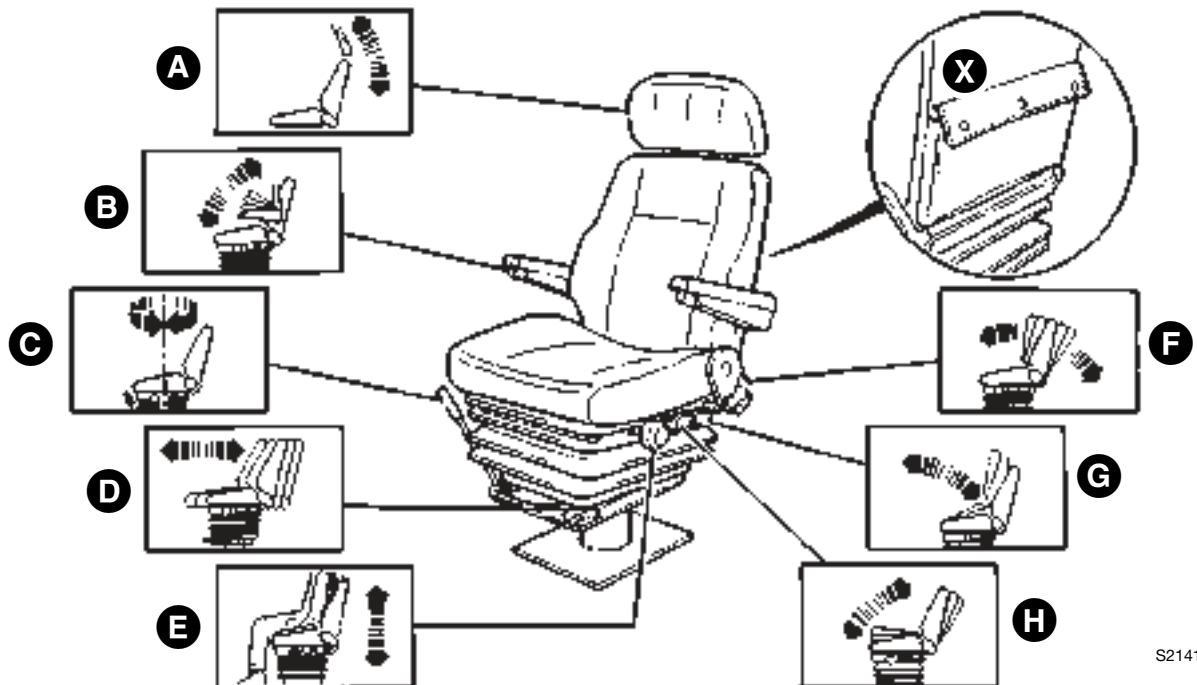
Press your back firmly against the backrest. Lift the control lever and position the backrest as required. When the backrest is in position release the control lever. Make sure the backrest has locked in position.

Height and Slope **G** (rear)

To raise or lower the rear of the seat lift the control lever. Allow the seat to move into position and then release the lever. Make sure the seat has locked in position.

Height and Slope **H** (front)

To raise or lower the front of the seat lift the control lever. Allow the seat to move into position and then release the lever. Make sure the seat has locked in position.



S214190

SEAT BELT

WARNING

The ROPS cab is designed to give you protection in an accident. If you do not wear your seat belt you could be thrown about inside the cab, or thrown out of the machine and crushed. You must wear a seat belt when using the machine. Fasten the seat belt before starting the engine.

2-2-1-9

WARNING

Do not use a seat belt which is damaged or excessively worn.

Do not use a seat belt that has been in an accident.

A worn, damaged or already stressed seat belt could break or give way in a collision. If that happens you could be killed or injured.

2-2-3-8

Fasten the Seat Belt

- 1 Sit correctly in the seat. Pull the belt from its reel holder in one continuous movement.
- 2 Push the male fitting **A** into the buckle **B** until it latches into position. Make sure the seat belt is not twisted and that it is over your hips not your stomach.

Note: If the belt 'locks' before the male fitting **A** has been engaged, allow the belt to fully retract in its reel holder and then try again. The inertia mechanism may lock if you pull the belt too sharply or if the machine is parked on an incline. In such cases, ease the belt gently from its reel holder.

Check the Seat Belt Is Operating Correctly

- 1 Sit correctly in the seat and fasten the seat belt as described.
- 2 Hold the middle of the seat belt as shown at **D** and tug. The seat belt should 'lock'.

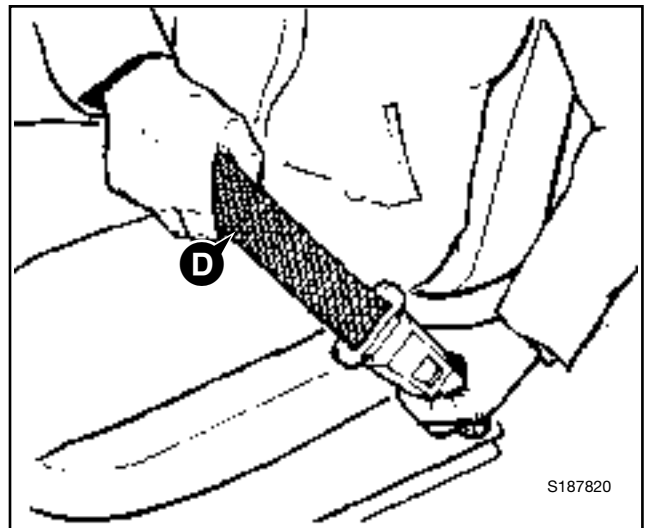
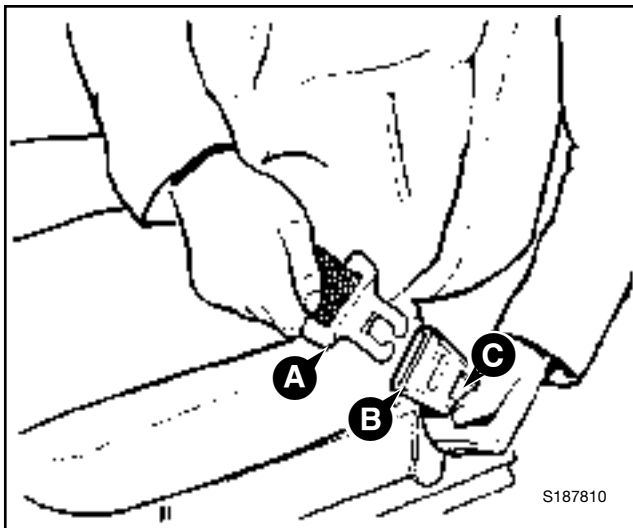
WARNING

If the seat belt does not 'lock' when you check if the seat belt is operating correctly, do not drive the machine. Get the seat belt repaired or replaced immediately.

2-2-2-1

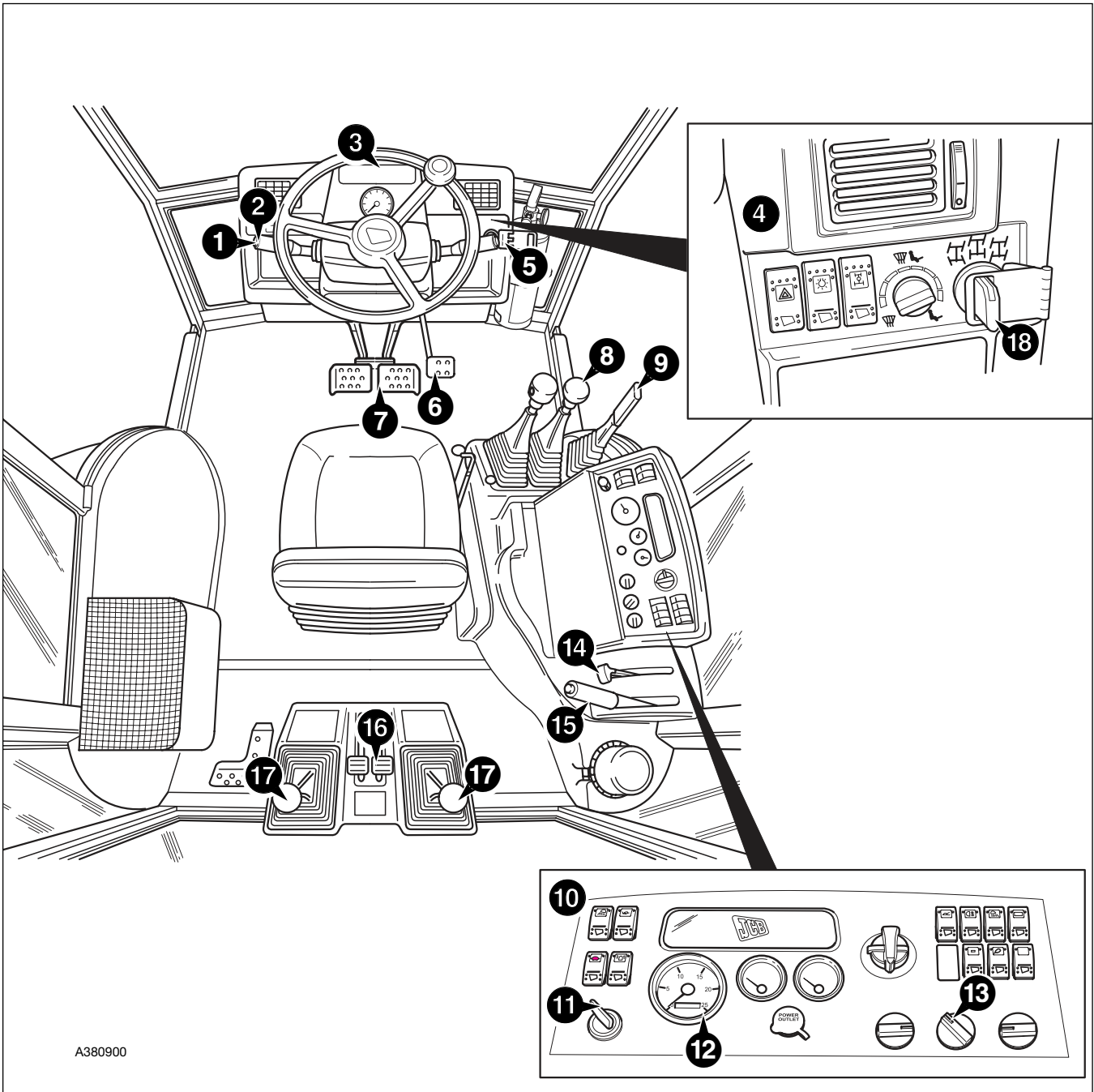
Release the Seat Belt

- 1 Press button **C** and pull the male fitting **A** from the buckle.
- 2 Let the seat belt retract into its reel holder.



ENGINE AND DRIVE CONTROLS, SWITCHES AND INSTRUMENTS

- | | | | |
|----|--------------------------------------|----|--------------------------|
| 1 | Gear select switch | 11 | Starter switch |
| 2 | Forward/reverse lever & horn | 12 | Side console gauges |
| 3 | Front instrument panel | 13 | Heater controls |
| 4 | Front console switches | 14 | Hand throttle lever |
| 5 | Multi-purpose steering column switch | 15 | Remote boom lock |
| 6 | Accelerator pedal | 16 | Stabiliser controls |
| 7 | Brake pedals and locking bar | 17 | Backhoe controls |
| 8 | Loader controls | 18 | Steer mode select switch |
| 9 | Parking brake lever | | |
| 10 | Side console switches | | |



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ENGINE AND DRIVE CONTROLS, SWITCHES AND INSTRUMENTS (continued)

Controls

1 Accelerator Pedal

Push this pedal down to increase engine speed. Let the pedal up to reduce engine speed. With your foot off the pedal the engine will idle.

⚠ WARNING

When driving the machine, use only the accelerator pedal to control the engine speed. Do not use the hand throttle lever to set the engine speed while driving.

2-2-2-2

2 Brake Pedal

Push down on the brake pedal to slow or stop the machine. Use the brakes to prevent overspeeding down a slope. The stop lights should come on when the brakes are applied. Do not drive the machine unless both stop lights work correctly.

There are two brake pedals. The left rear brake is operated by the left pedal. The right rear brake is operated by the right pedal. The pedals can be locked together by a steel locking bar.

⚠ WARNING

You and others can be killed or injured if the brake pedal locking bar is not engaged as recommended. If only one brake is applied for a quick stop, the machine could swerve out of control.

2-2-2-3

Separate the pedals only when driving in first gear (1) off the road. Lock the pedals together when driving in any other gear off the road. Lock the pedals together when driving on the road in any gear.

3 Gear Select Switch

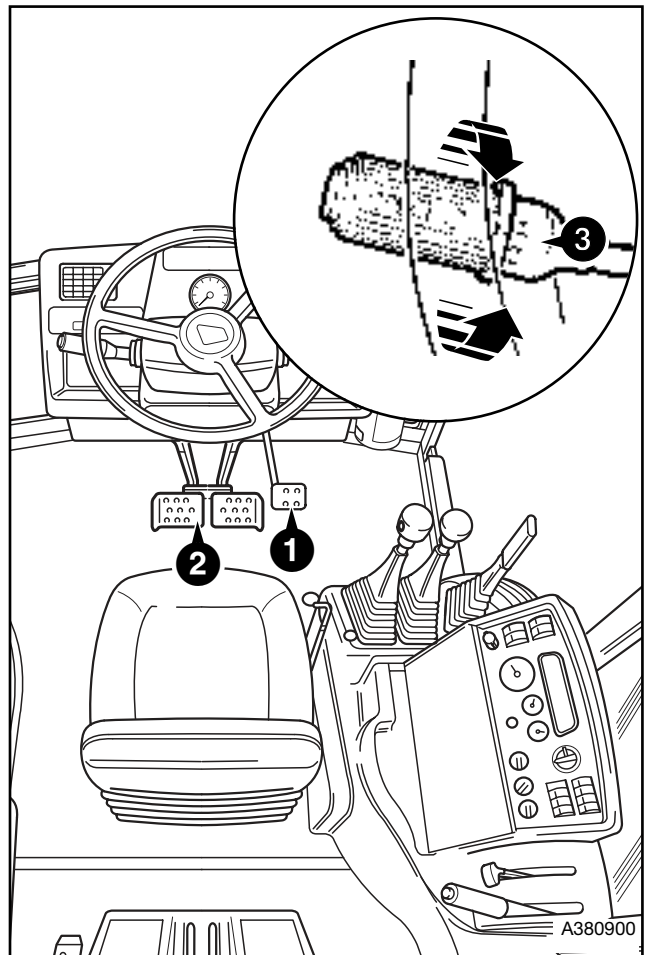
⚠ WARNING

Do not change from a high gear to a low gear (for instance, 4th to 1st) in one sudden movement whilst the machine is moving. Otherwise the machine will rapidly decelerate, you or others could be killed or seriously injured. When selecting lower gears, allow the engine speed to drop before each gear change.

2-1-1-9/1

When moving or stationary, to select a gear, rotate the barrel so that the arrow marked on the barrel aligns with the required gear.

When selecting lower gears, allow the engine speed to drop before each gear change. Take notice of the warning above, do not change from a high gear to a low gear in one sudden movement whilst the machine is moving. Otherwise the machine will rapidly decelerate.



ENGINE AND DRIVE CONTROLS, SWITCHES AND INSTRUMENTS (continued)

Controls (cont'd)

4 Forward/Reverse Lever & Horn

⚠ WARNING

You and others can be killed or injured if you operate the forward/reverse lever while travelling. The machine will immediately reverse direction without warning to others. Follow the recommended procedure for proper use of this selector.

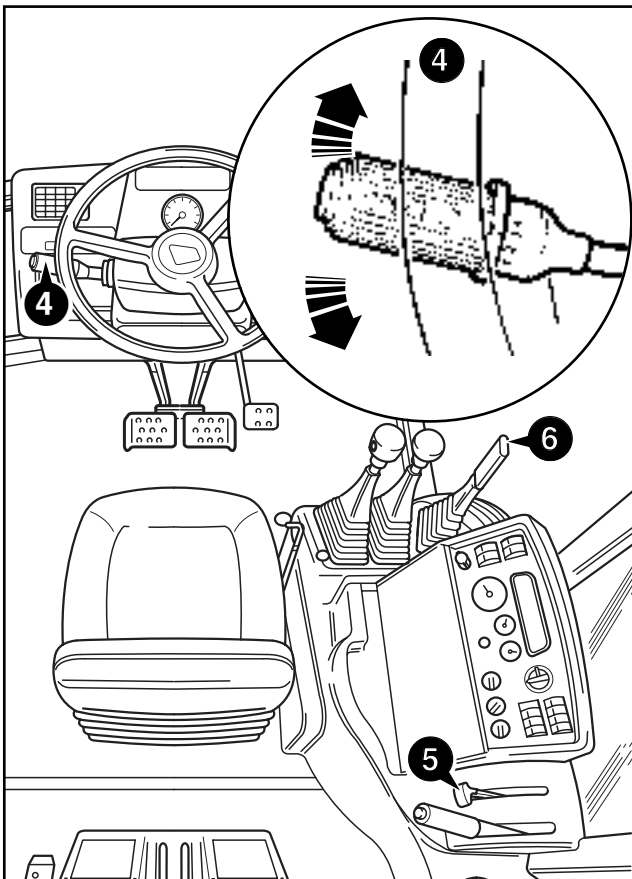
2-2-2-4

Stop the machine before moving this lever. To select forward, reverse or neutral, 'lift' and move the lever to the required position. All four gears are available in both forward and reverse. The engine will only start if the lever is at neutral.

To reverse direction:

- Stop the machine: keep the foot brakes applied.
- Let the engine speed drop to idle.
- Select the new direction.
- Release the foot brakes and accelerate away.

Press the button on the end of the lever to operate the horn. Functions only with the starter switch at position I.



5 Hand Throttle Lever

Move this lever to increase or decrease the engine speed. Pushing the accelerator pedal fully down will return the hand throttle to its idle position.

6 Parking Brake Lever

Use this lever to engage the parking brake before leaving the machine.

Note also that the transmission drive is automatically disconnected when the parking brake is engaged.

⚠ CAUTION

The parking brake must not be used to slow the machine from travelling speed, except in an emergency, otherwise the efficiency of the brake will be reduced. Whenever the parking brake has been used in an emergency, always renew the brake pads.

4-2-1-1/1

To engage the parking brake, pull the lever up (vertical). Check that the indicator light comes on.

To release the parking brake, lower the lever as far as it will go (horizontal). Check that the indicator light goes out.

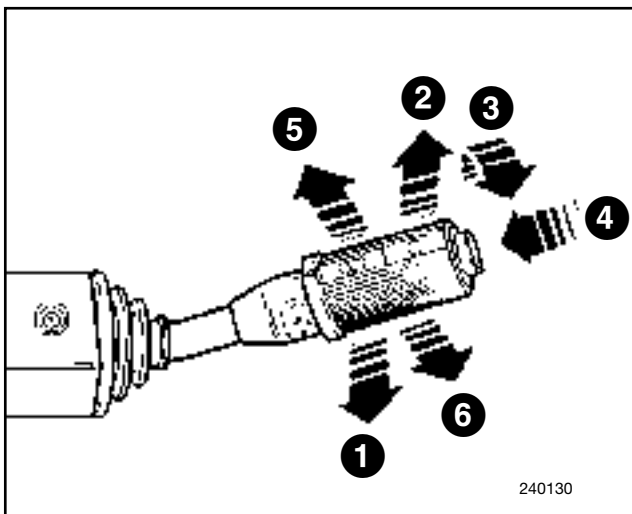
ENGINE AND DRIVE CONTROLS, SWITCHES AND INSTRUMENTS (continued)

Multi-Purpose Steering Column Switch

- 1 **Direction Indicators (Right)**
Pull the lever towards you to indicate a right turn. Switch the indicators off when you have completed the turn. Functions only with the starter switch at position I.
- 2 **Direction Indicators (Left)**
Push the lever away from you to indicate a left turn. Switch the indicators off when you have completed the turn. Functions only with the starter switch at position I.
- 3 **Windscreen Wiper**
Rotate the lever barrel to switch the windscreen wipers on and off. The following functions are available (only with the starter switch turned on).

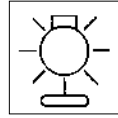
I On	0 Off
------	-------

The wipers will self-park when switched off.
- 4 **Windscreen Washer**
Push the button towards the steering wheel to operate the windscreen washer. Functions only with the starter switch at position I.
- 5 **Headlights Flash**
Lift the lever to flash the headlights. Functions only with the starter switch at position 1.
- 6 **Headlight/Mainbeam**
Push the lever down for high beam. Centre position is dipped beam. Functions only with the side/head lights on.



Front Console Switches

Each switch has an insert with a graphic symbol, this symbol and the switch descriptions are detailed below.



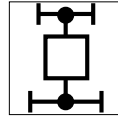
Side Lights and Headlights

Press once to switch on the side lights. Press again to switch on the headlights.



Hazard Warning Lights

Press to switch on the hazard warning lights. A light on the instrument panel flashes with the outside lights.



2/4 Wheel Drive Select Switch

Refer to *2/4 Wheel Drive Select Switch*, this section. Illuminates when 2 wheel drive is selected.

ENGINE AND DRIVE CONTROLS, SWITCHES AND INSTRUMENTS (continued)

Side Console Switches

Each switch has an insert with a graphic symbol, this symbol and the switch descriptions are detailed below.



Beacon

Press to switch on the flashing beacon.

Front Work Lights



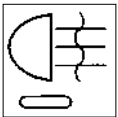
WARNING

Do not drive on the road with the work lights switched on. You can dazzle other drivers and cause an accident.

2-2-2-5

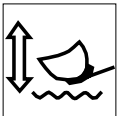


Press to switch on the front work lights. The work lights will work independently of the main lights circuit (see note).



Rear Fog Light

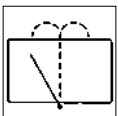
Press down to switch on high intensity fog light. Functions only with side and headlights on.



Smooth Ride System

Press down to switch on Smooth Ride System. The switch is illuminated when ON. Refer to **Preparing The Machine For Travel**,

this section.



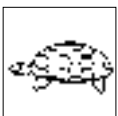
Rear Window Wiper (if fitted)

Press to switch on the rear window wiper. Press again to operate the washer (if fitted). Note that the wiper will self-park when switched off.



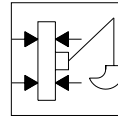
Rear Work Lights

Press down to switch on the rear work lights. The work lights will work independently of the main lights circuit.



Hydraulic Speed Control

Refer to **Hydraulic Speed Control**, *this section.*



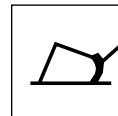
Hydraclamps

Refer to **Sideshifting the Backhoe - Powered**, *this section.*



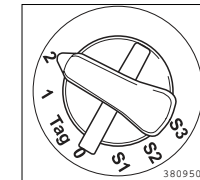
Auxiliary Circuit Enable Switch (if fitted)

Refer to **Hydraulic Tool Circuit, OPTIONAL ATTACHMENT** *section.*



Return To Dig Enable Switch (if fitted)

Refer to **Loader Controls, OPERATION** *section.*



Master Blackout Switch

The master black out switch is fitted allowing illumination, including reversing and stop lights and any audible alarms, to be extinguished as required. The switch will not deactivate the hour meter or warning

lights that indicate equipment failure.

Switch position

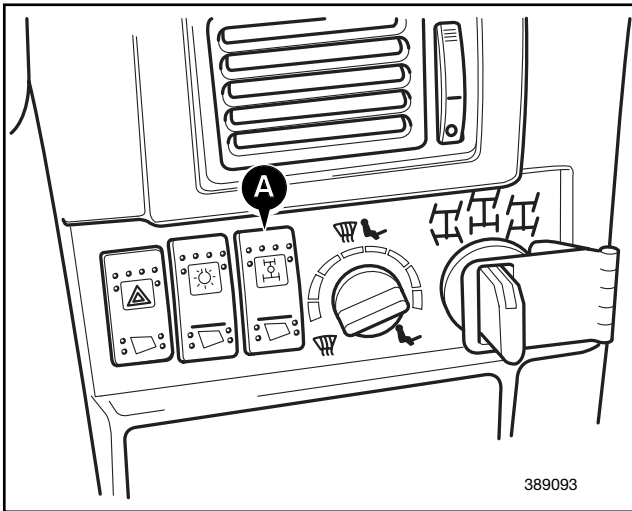
- 2** All functions normal.
- 1** As 2 but isolates headlights and fog lights.
- TAG** Only hazard, steer mode warning, direction indicators and rear brake lights function.
- 0** Only engine warning lights function.
- S1** Only engine warning lights and convoy lights function.
- S2** As S1 but with front side lights.
- S3** As S2.

ENGINE AND DRIVE CONTROLS, SWITCHES AND INSTRUMENTS (continued)

2/4 Wheel Drive Select Switch

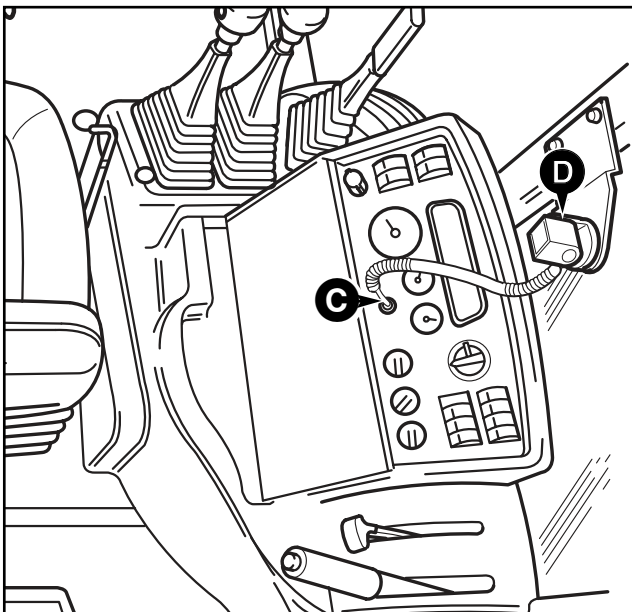
Press rocker switch **A** UP for 4-wheel drive, the light will go OFF.

Note: With 2-wheel drive selected, when the brake pedal is pressed, the machine will automatically go into 4-wheel drive and the indicator light on the switch will come on.



Cab Interior Light

Plug the interior light into the 24 volt auxiliary socket **C** and press rocker switch **D** on the side of the light to switch ON/OFF.



Starter Switch

This is operated by the starter key **B**. It has four positions. The key can be removed only with the switch set to 'O'.

⓪ Off/Stop Engine

Turn the key to this position to stop the engine. Make sure the transmission is in neutral, the attachments have been lowered and the parking brake is engaged before stopping the engine.

Ⅰ 'IGN' On

Putting the switch to this position connects the battery to all the electrical circuits except the lights and the 4-way flashers warning circuit. (The lights and hazard warning circuits are permanently live.) The starter key will spring back to this position when it is released from Ⅱ or Ⅲ.

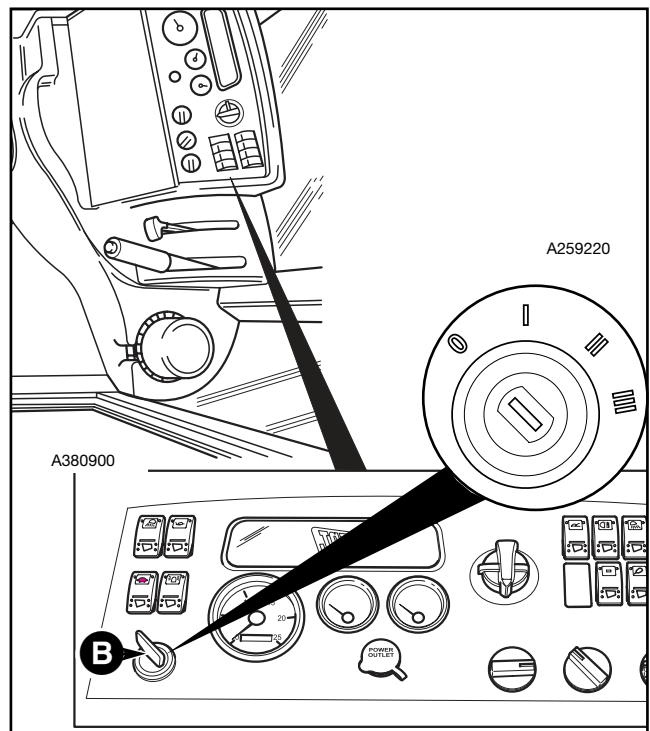
Ⅱ Heat Position

Holding the key in the heat position warms the engine induction manifold for cold weather starting. Do not hold in this position for more than 15 seconds.

Ⅲ Start Position

Operates the starter motor to turn the engine.

Note: Do not operate the starter motor for more than 20 seconds at one time. Let the starter motor cool for at least two minutes between starts.



ENGINE AND DRIVE CONTROLS, SWITCHES AND INSTRUMENTS (continued)

Steer Mode Selector Switch

This is a three-position rotary switch, equipped with a hinged lockplate. The lockplate enables the selector switch to be locked into the 2-wheel steer mode, when the machine is driven on public roads.

Indicator lights on the instrument panel tell you what steer mode the machine is in. If you have any doubt about the steer mode the machine is in, always remember that it is the indicator light which is correct.

Never change steer mode on the move, the machine should be stationary. Only change the steer mode when the engine is at low engine rpm/idling. Never change from 4 wheel steer to crab steer (or vice versa) without first selecting 2 wheel steer for approximately 5 seconds (as shown by the decal **A**).

1 2-Wheel Steer

The front wheels only are controlled by the steering wheel. This position must be used for driving on public roads. Make sure the hinged lockplate is engaged.

2 4-Wheel Steer

The front wheels steer one way and the rear wheels steer in the opposite direction. This position provides the tightest turning circle.

3 Crab Steer

The front and rear wheels steer in the same direction. This position improves manoeuvrability in confined spaces.

Re-phasing the Steer System

4 Wheel Steer Machines Only

⚠ WARNING

Failure to phase 4-wheel steer at least once per day may mean a reduction in steering effectiveness.

5-2-1-6

The steering must be re-phased:

- i At the start of each working period
- ii At least once per day.
- ii If having difficulty in steering.

Follow the procedures below for re-phasing the steer system:

1 Select 2-wheel steer.

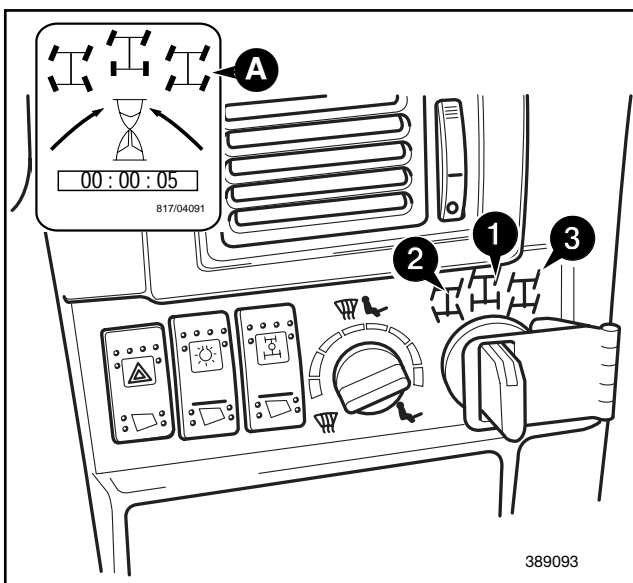
Sensors on the axles prevent the steer mode from changing until the wheels straighten up or pass through the 'straight ahead' position. Because of this, there will be a short period when the indicator lights do not agree with the switch position.

2 Operate the machine until the rear wheels straighten up.

When the rear wheels straighten up the machine will go into 2-wheel steer. The indicator light will show when 2-wheel steer has engaged.

3 Select 4-wheel steer again

The front and rear wheels are now back in phase.



ENGINE AND DRIVE CONTROLS, SWITCHES AND INSTRUMENTS (continued)

Instruments

All instruments power down when the starter switch is set to **O**, apart from the hazard warning lights indicator.

Front Console

The driving indicators and gauges are located at the side of the driver's seat.

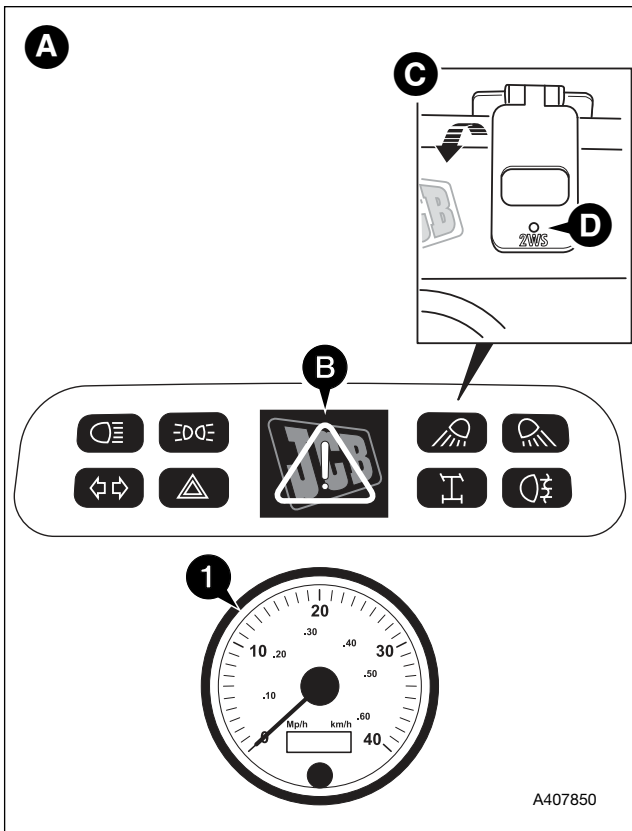
On the front console **A** the master warning light **B** will illuminate when any of the following warning lights on the side console are illuminated:

Air Filter Blocked; Water Temperature; Transmission Oil Temperature; Engine Oil Pressure; Parking Brake Engaged; Transmission Oil Pressure.

1 Speedometer

Indicates the road speed, the outer ring is MPH and the inner ring is kph.

Note: The 2 wheel steer indicator light is provided with a night combat shade as shown at **C**. When the shade is lowered, the indicator light is visible through the small pin-hole **D**.



Side Console

1 Tachometer

Indicates the engine speed in revolutions per minute (RPM). A green band on the scale indicates the RPM which gives best fuel economy. Operate within that band whenever possible.

2 Hourmeter

Records the total running time of the engine. Use it to keep a check of running hours during maintenance intervals.

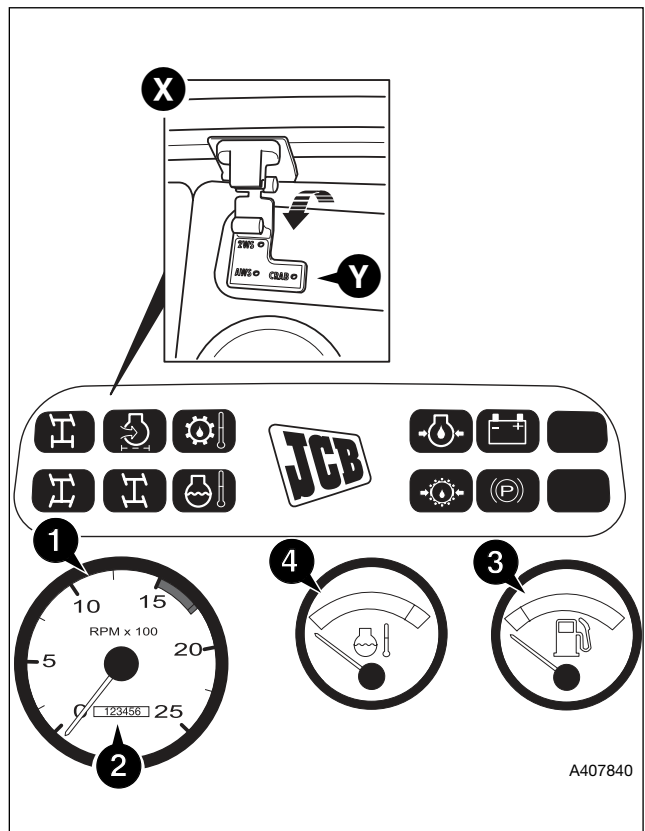
3 Fuel Gauge

Indicates the level of diesel fuel in the tank. Do not let the tank run dry, or air will enter the fuel system.

4 Coolant Temperature Gauge

Indicates the temperature of the engine coolant. The gauge pointer will gradually swing upwards as the coolant temperature rises.

Note: The 2 wheel steer, 4 wheel steer and crab steer indicator lights are provided with a night combat shade as shown at **X**. When the shade is lowered, the indicator lights are visible through the small pin-holes **Y**.



ENGINE AND DRIVE CONTROLS, SWITCHES AND INSTRUMENTS (continued)

Instruments (cont'd)

Warning Lights



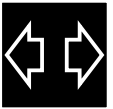
Main Beam On

Lights up when the headlight main beams are switched on. Switch the main beams off for on-coming vehicles.



Hazard Warning

Flashes with the hazard warning lights (even with the starter switch at O). Switch the flashers on whenever your machine is a possible hazard.



Direction Indicators

Flashes with the direction indicators. Use the indicators to signal before turning the machine.



Sidelights

Lights up when the sidelights are switched on.



Front Work Lights

Lights up when the front work lights are switched on.



Rear Work Lights

Lights up when the rear work lights are switched on.



Parking Brake Engaged

Lights when the parking brake is engaged with the machine in forward or reverse.



2 Wheel Steer Engaged

Lights up when 2 wheel steer is selected.



4 Wheel Steer Engaged

Lights up when 4 wheel steer is selected.



Crab Steer Engaged

Lights up when crab steer is selected.

Warning Lights with Audible Alarm

Note: If any of the following lights come on while the engine is running, stop the engine as soon as it is safe to do so. Do not use the machine until the fault is put right.



No Charge

Lights if the battery charging circuit fails while the engine is running. The light should go out a few seconds after the engine is started.



Water Temperature High

Lights if the engine coolant overheats.



Engine Oil Pressure Low

Operates if the engine oil pressure drops too far. The light should go out when the engine is started.



Transmission Oil Pressure Low

Lights if the transmission oil pressure drops too far. The light should go out when the engine is started.



Transmission Oil Temperature High

Lights if the transmission oil temperature rises too far.



Air Filter Blocked

Lights if the engine air filter clogs up.

HEATER CONTROLS

The heater system is controlled by the following switches:

- A** - Re-circulation Switch
- B** - Three Speed Fan Switch
- C** - Temperature Control Switch
- E** - Air Distribution Control Switch

Heater Controls

Hot air can be directed to the front windscreen (for demisting) and/or the cab floor by operating control **E**. The temperature can be adjusted by operating control **C**. A heater control switch **B** controls a three speed heater fan.

Air Control

Rotate control **E** anti-clockwise to direct more air to the front windscreen. Rotate clockwise to direct more air to the cab floor. With the control in the middle, air is directed to both areas.

Rotate control **A** to position **1** to allow fresh air to enter the cab. Position **2** gives re-circulated air and should be used when operating in a dusty working environment. Position **2** can also be used to increase the heater performance during cab warm up, and whilst operating the machine on light duties.

Heat control

Rotate control **C** clockwise to increase the temperature. Rotate anti-clockwise to decrease the temperature.

Heater Fan (Three Speeds)

Rotate control **B** to switch on the cab three speed heater fan. Functions only with the starter switch at IGN.

Air Conditioning Controls

To operate the air conditioning, press switch **D** to the ON position (the switch will be illuminated).

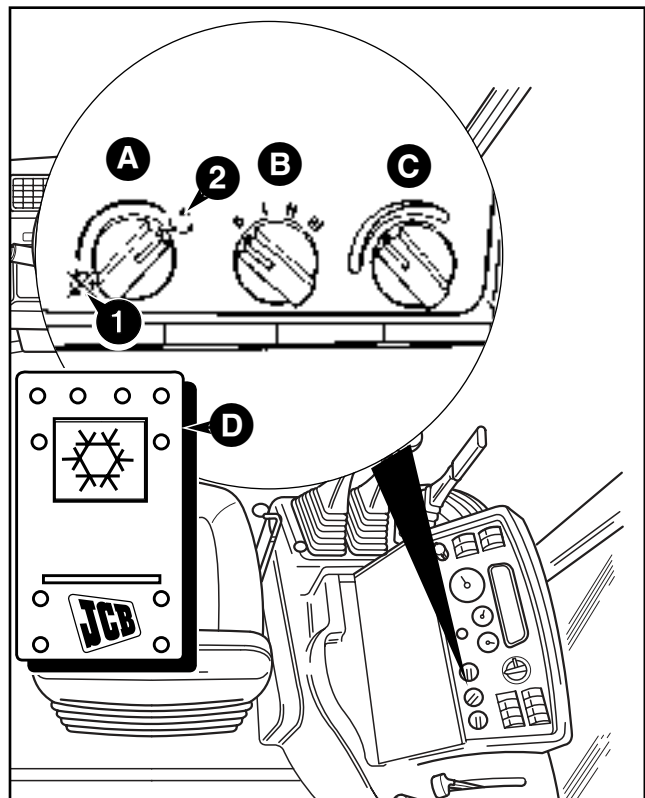
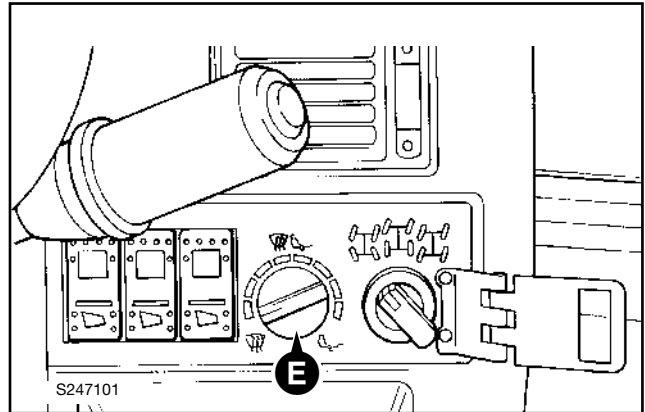
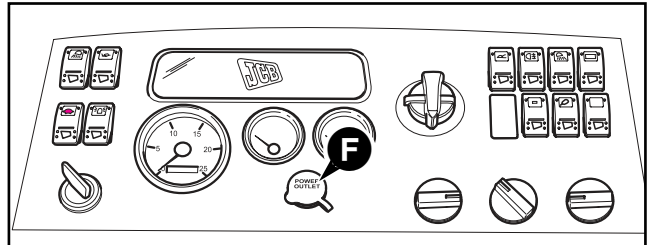
The air conditioning controls operate in the same manner as described for 'Heater Controls', except cool de-humidified air is directed via vents into the cab (not heated air).

Rotate the control **C** anti-clockwise to decrease the temperature from ambient to cold. To obtain best results from the air conditioning system ensure that all doors and windows are closed.

Air conditioning performance is improved when the re-circulation switch **A** is in position **2**.

Power Outlet

A power outlet socket **F** is located on the side console. Auxiliary electrical equipment such as a light can be connected to the socket. Note that the power supply from the socket is 24V, DO NOT connect 12V equipment.



LOADER CONTROLS

Hydraulic Speed Control

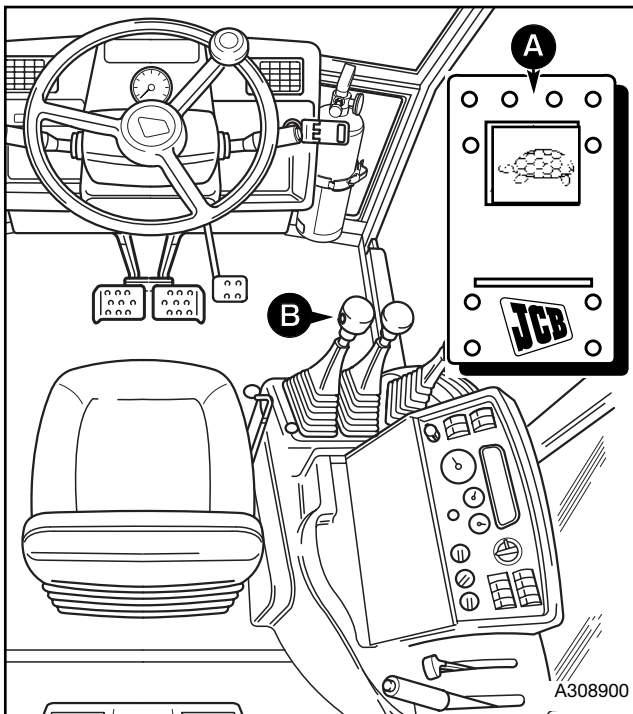
Pressing the hydraulic speed control (HSC) button(s) causes oil flow from the second section of the hydraulic pump to be dumped directly back to the hydraulic tank. The applications for this control are:

- 1 More tractive force available to the loader when entering a stockpile.
- 2 More power from the engine made available whilst travelling on the highway, giving improved fuel economy.
- 3 Reduced backhoe speed when placing objects.

To use the HSC when travelling on the highway, press the rocker switch **A** into the 'ON' position. The switch will illuminate when the HSC is on.

To use the HSC intermittently (for instance, when entering a stockpile) or to temporarily override rocker switch **A** when in the 'ON' position, press the pushbutton **B** as required.

Note: When the gear select switch is in the 4th gear position, or auto mode position 'A' the HSC facility is automatically selected. If the machine is parked (neutral selected) and the backhoe (or loader) is being used, make sure that the gear switch is not set to 4th gear or 'A', otherwise the machine operation will be slow.



Loader Shovel

On standard machines the loader shovel is operated from a single control lever **C**. Pressing the transmission dump pushbutton **D** on the lever knob quickly disconnects the transmission from the engine. This gives more power to the loader.

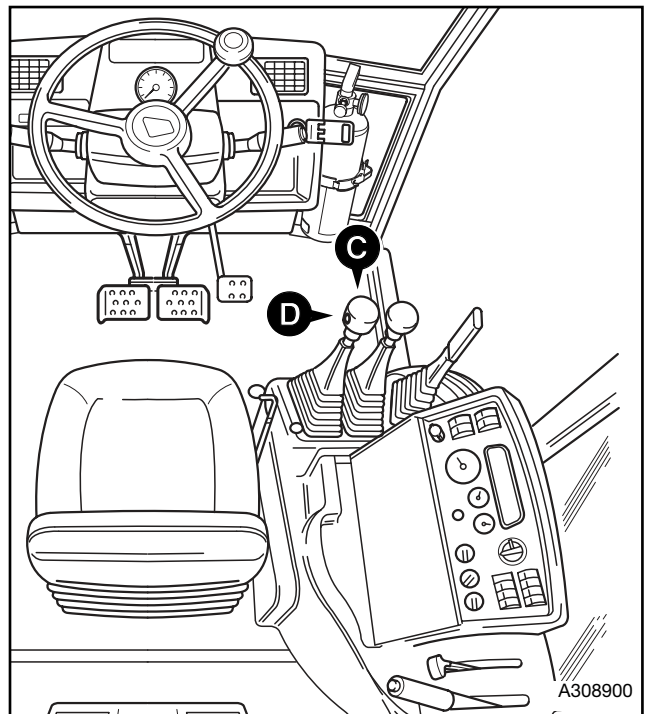
For individual loader movements (raise, lower, roll forward, roll back) the lever is moved in a '+' pattern.

Combined movements can be selected by moving the lever in directions between the four main ones. For example, the shovel is raised by pulling the lever straight back; while to roll the shovel back the lever must be moved to the left.

So if you pull the lever diagonally back-and-left the shovel will both rise and roll back.

The speed of loader actions depends on how far you move the lever. The further you move it the faster the action. The lever is spring-loaded to its central (hold) position. The loader will stay in any position until you move it with the control lever except for Float and Return To Dig operations.

A plastic decal, located beside the control lever, shows by symbols what lever movements cause which loader actions. The symbols, lever movements and loader actions are described on the following pages.



LOADER CONTROLS (continued)

Raise **A**

To raise the shovel, pull the lever straight back. As the shovel rises, it will stay at the same angle to the ground. This is due to the parallel linkages on the loader arms.

Lower **B**

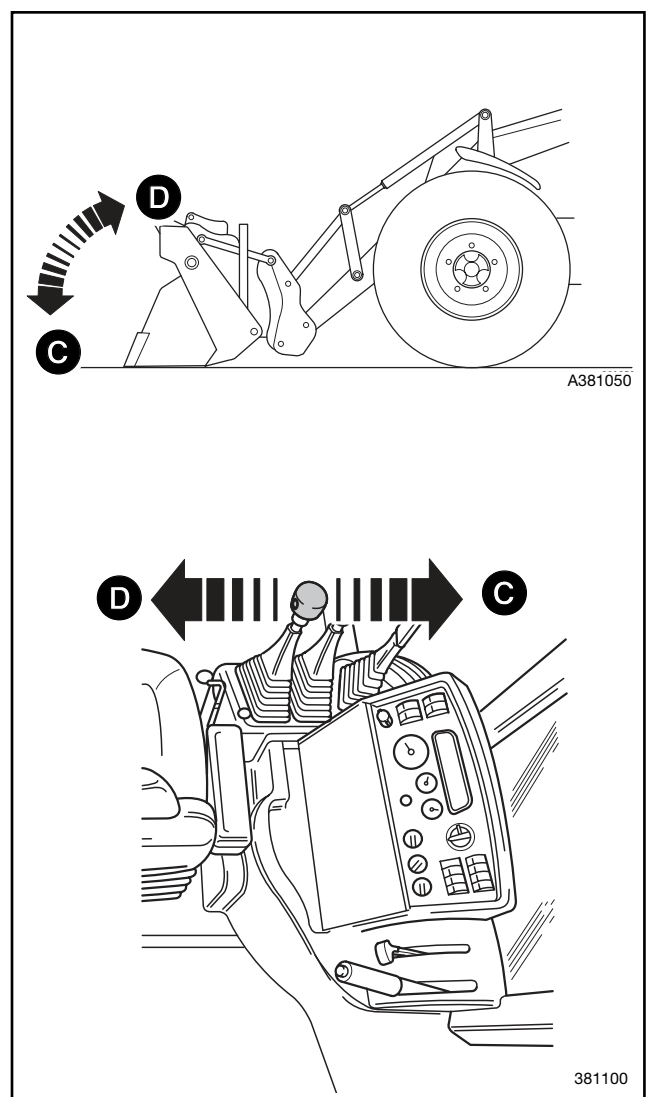
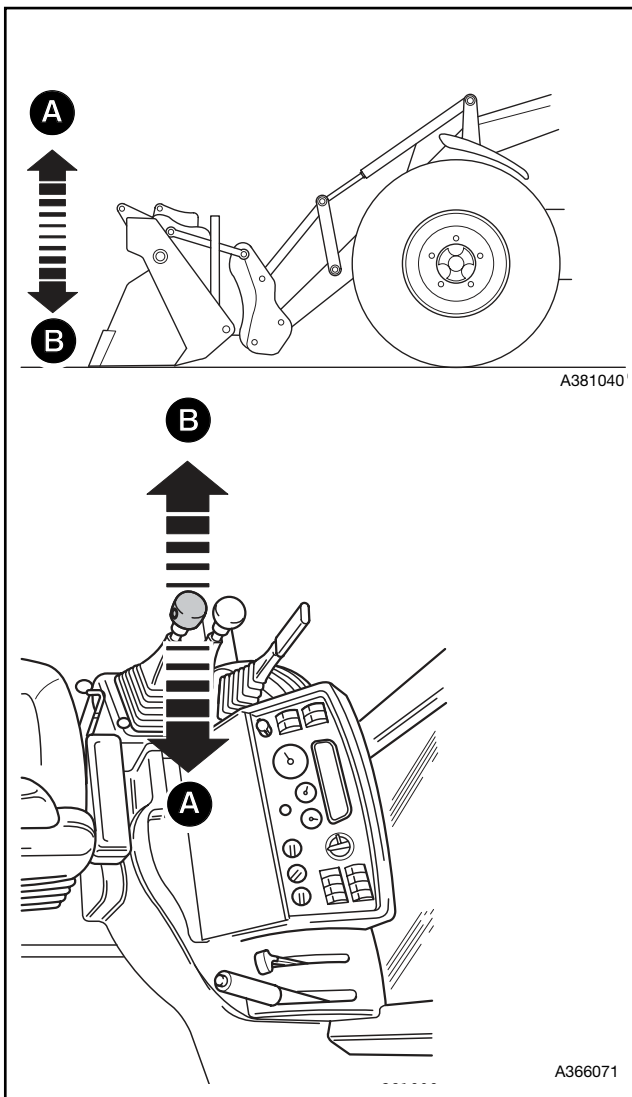
To lower the shovel, push the lever forward. The shovel will stay at the same angle to the ground. This is due to the parallel linkages on the loader arms.

Roll Forward **C**

To roll the shovel forward push the lever to the right.

Roll Back **D**

To roll the shovel back pull the lever to the left.



LOADER CONTROLS (continued)

Float

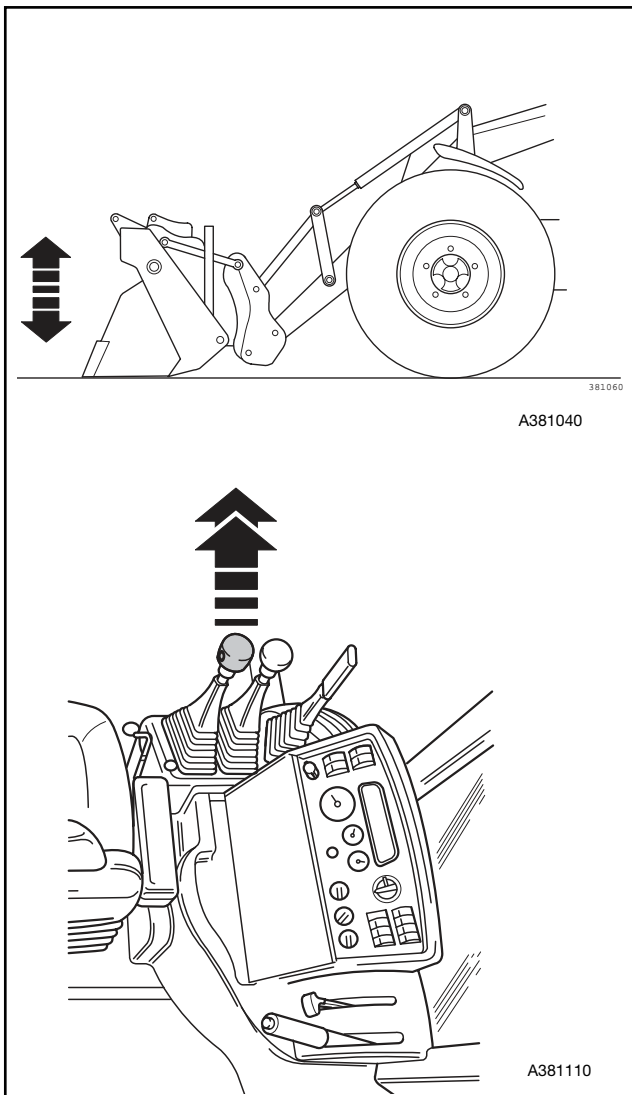
CAUTION

If **Float** is selected with the loader raised, the loader will descend to ground level and 'float' across it as you travel. You will not have control over the rate of fall.

2-2-2-7

Always lower the loader before selecting **Float**.

To make the shovel 'float' across the ground, push the lever forwards as far as it will go and leave it there. You will feel a slight pressure on the lever as it passes through the **Lower** position.



Return To Dig

This enables you to roll the shovel from the rolled forward position into the digging position quickly and easily.

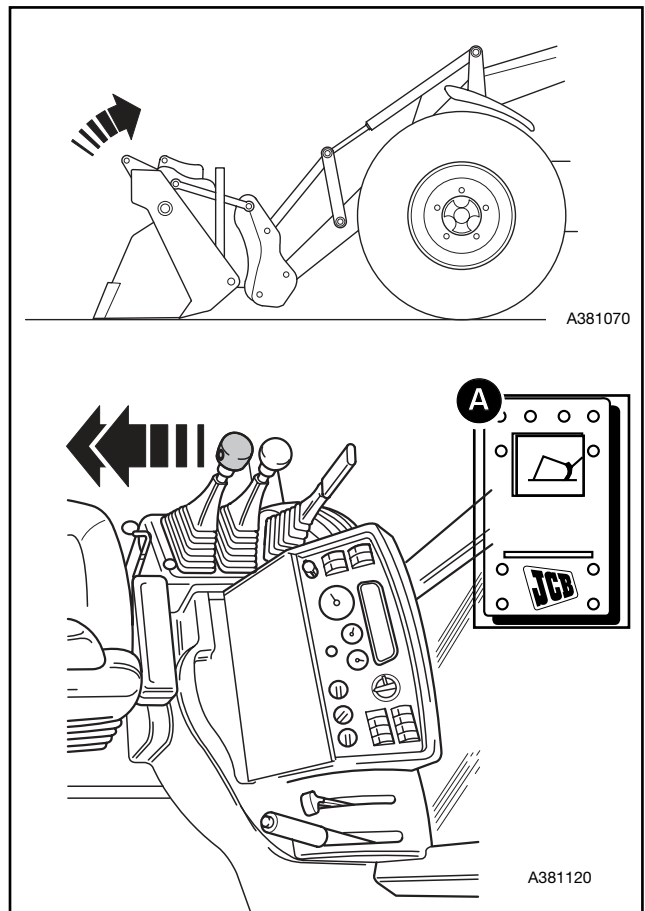
When you select **Return To Dig** a switch on one of the loader arms cuts off the hydraulic pressure immediately the shovel reaches the correct angle for digging.

To select **Return To Dig**

Press the 'return to dig enable' switch **A** to the ON position, the switch will illuminate.

Pull the lever to the left as far as it will go. You will feel a slight pressure on the lever as it passes through the **Roll Back** position. Release the lever, it will stay in the detent position until the shovel reaches the return to dig position when the lever will automatically return to the central hold position.

When return to dig is no longer required press the enable switch to the OFF position.



LOADER CONTROLS (continued)

Multi-Purpose Shovel

On machines fitted with a multi-purpose shovel there is a second control lever next to the standard one. On these machines, the standard lever operates as described earlier. The second lever operates the clam on the multi-purpose shovel.

The two levers can be operated at the same time to produce combined loader actions. The lever movements and their effects on the shovel are shown on a plastic decal located close to the lever.

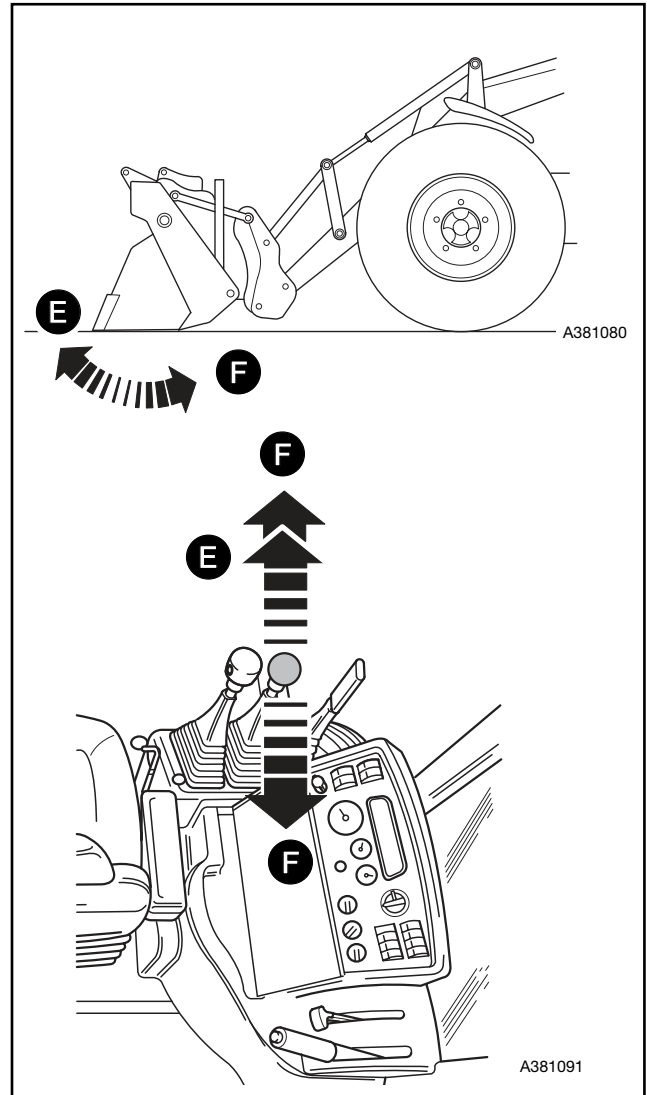
Open Clam **E**

To open the clam, push the lever forward.

Close Clam **F**

To close the clam, pull the lever back.

Note: When a sweeper collector or leveller is used, push the lever forwards as far as it will go and leave it there. You will feel a slight pressure on the lever as it passes through the **dentent** position.



STABILISER CONTROLS

Lever Controls

⚠ WARNING

Stabilisers

Bystanders could be crushed and obstacles could be damaged if they are beneath the stabilisers while they are being lowered. Before lowering the stabilisers, make sure any bystanders are clear of the machine. Also make sure that there are no obstacles beneath the stabilisers.

2-2-2-10

⚠ WARNING

You must be sitting in the driving seat when operating the stabiliser controls.

Do not operate the stabilisers from outside the machine. Otherwise you could be crushed when the machine moves.

The stabilisers must be down when you use the excavator, or the machine will rock violently. Each stabiliser has its own control lever and can be operated independently.

Lower each stabiliser to level the machine and take the weight off of the rear tyres. The loader shovel should be used along with the stabilisers to level and steady the machine.

2-2-2-8/1

Before travelling, fully raise both stabiliser legs and if travelling on the public highway fit the control lever lock, see **Control Lever Locks**, OPERATION section.

Raise Stabilisers **A C**

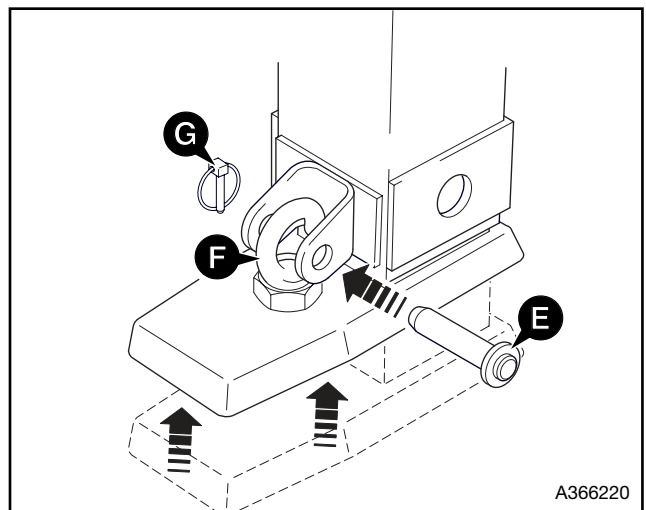
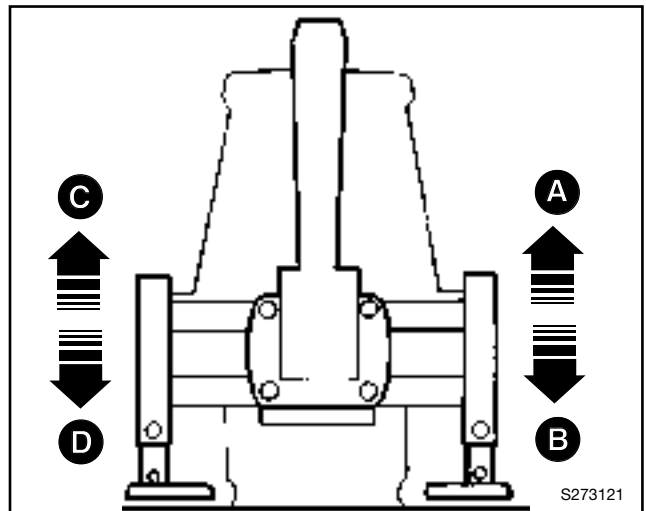
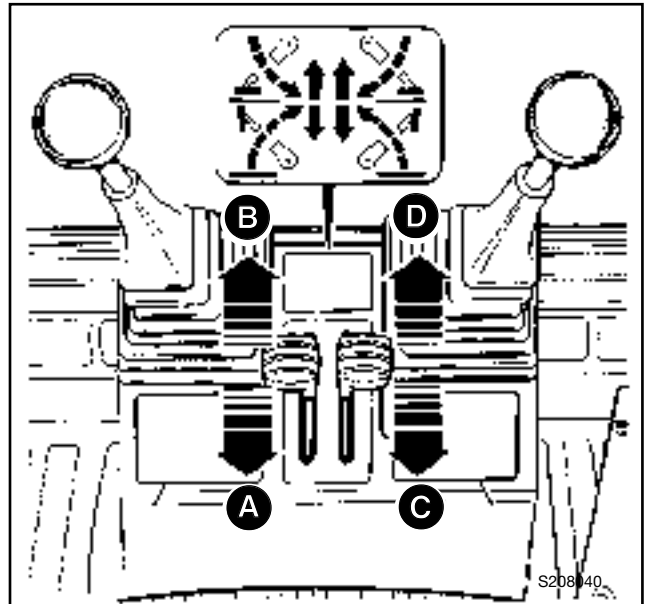
To raise the stabilisers, pull the levers towards the front of the machine.

Before travelling on the public highway both stabiliser legs must be locked in the raised position. Fit pin **E** through hook **F** and secure with locking pin **G** to lock each stabiliser leg.

Lower Stabilisers **B D**

Before lowering the stabilisers, check that both stabiliser leg locks are removed.

To lower the stabilisers, push the levers towards the rear of the machine.



BACKHOE CONTROLS

ISO Plus ('+') Pattern

WARNING

Do not operate the backhoe controls from outside the machine, or you could be crushed by the backhoe.

2-2-3-1

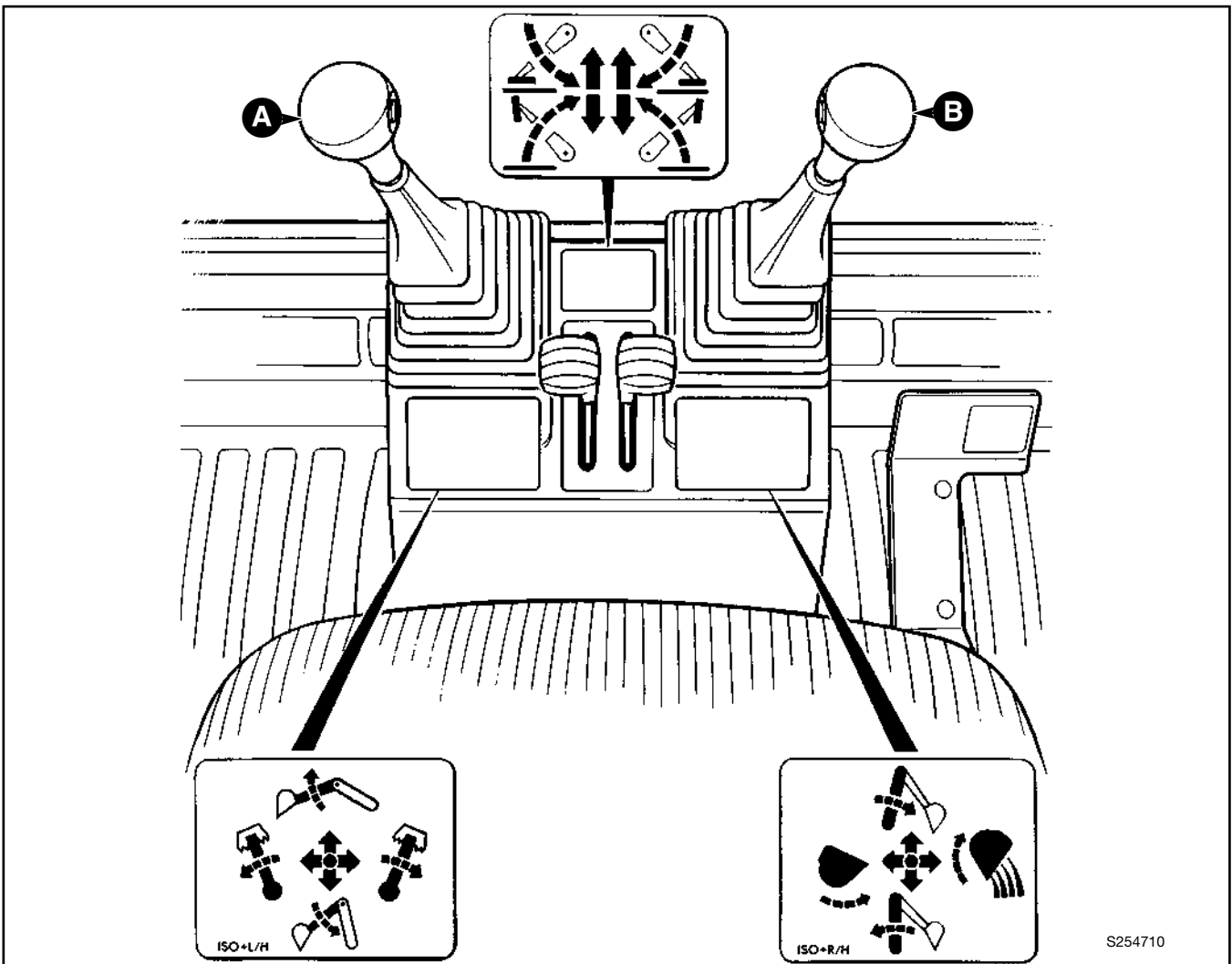
On machines with ISO Plus ('+') Pattern control, there are two backhoe control levers. The left hand lever **A** operates the slew and dipper. The right hand lever **B** operates the boom and bucket. The stabilisers are operated as described in **Stabiliser Controls** (*OPERATION* section).

Both levers move in a '+' pattern for individual backhoe actions. Combined actions can be selected by moving the levers in directions between the four main ones.

Both levers can be operated at the same time, for more efficient operation. The speed of the backhoe action depends on how far you move the levers. The further you move a lever, the faster the action.

Both levers are spring-loaded to their central (*hold*) positions. The backhoe will stay in any position until you move it with the levers.

A plastic decal near the controls shows, by symbols, what lever movements cause which backhoe actions. The symbols, lever movements and backhoe actions are explained on the following pages.



BACKHOE CONTROLS (continued)

ISO Plus ('+') Pattern (cont'd)

Dipper In **A**

To bring the dipper in, pull the lever towards the front of the machine.

Note: Some backhoe attachments may collide with the boom if brought too far in. Check this before using different attachments.

Dipper Out **B**

To push the dipper out, push the lever towards the rear of the machine. If the boom is already up, check that it is clear overhead before swinging the dipper out.

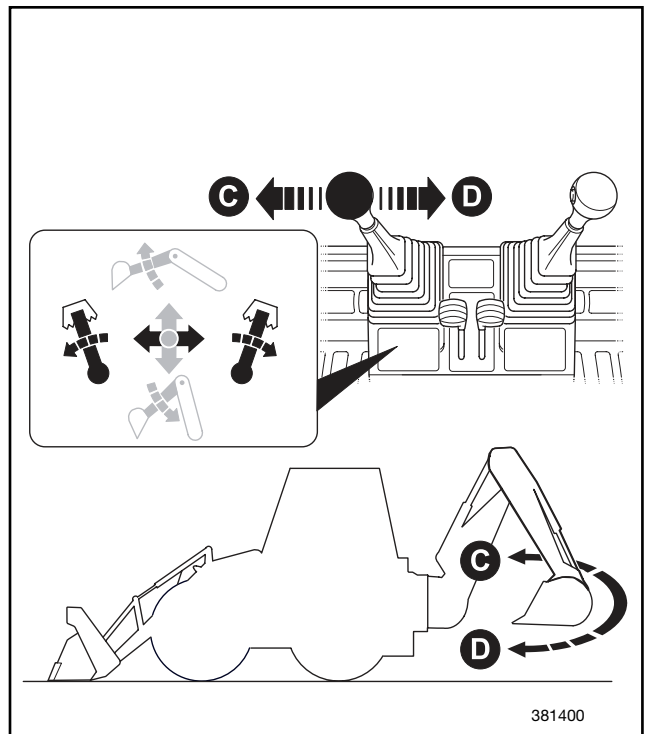
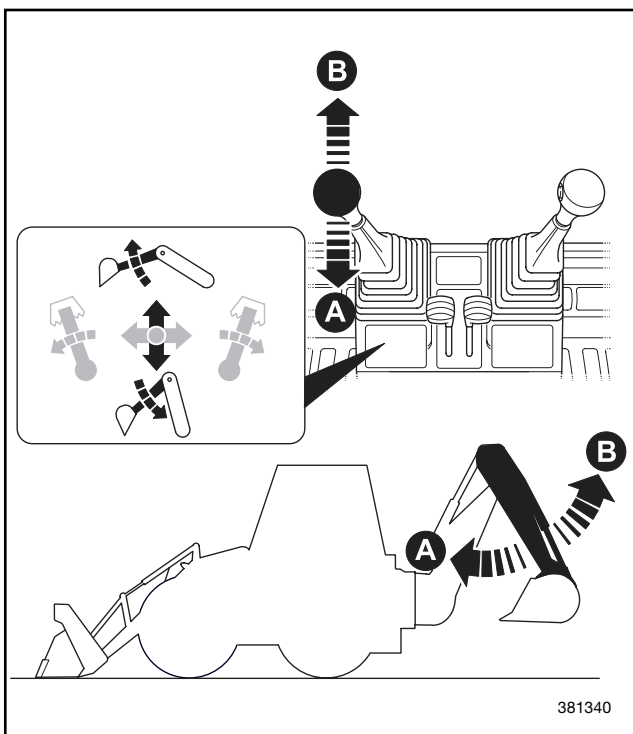
Slew Left **C**

To slew the boom to your left, move the lever to your left.

Note: Some backhoe attachments may collide with the stabiliser legs if slewed too far round. Check this before using different attachments.

Slew Right **D**

To slew the boom to your right, move the lever to your right.



BACKHOE CONTROLS (continued)

ISO Plus ('+') Pattern (cont'd)

Raise Boom **E**

To raise the boom, pull the lever towards the front of the machine. Before raising the boom check that it is clear overhead.

Lower Boom **F**

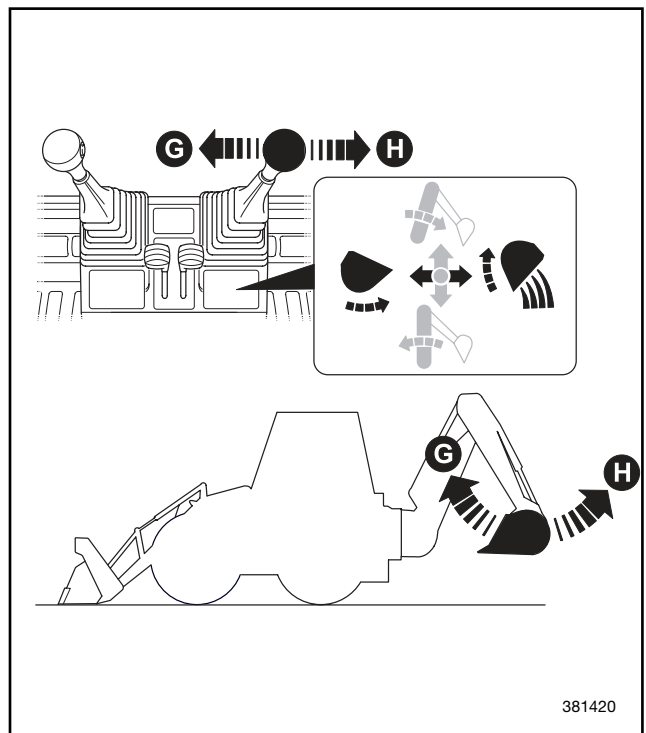
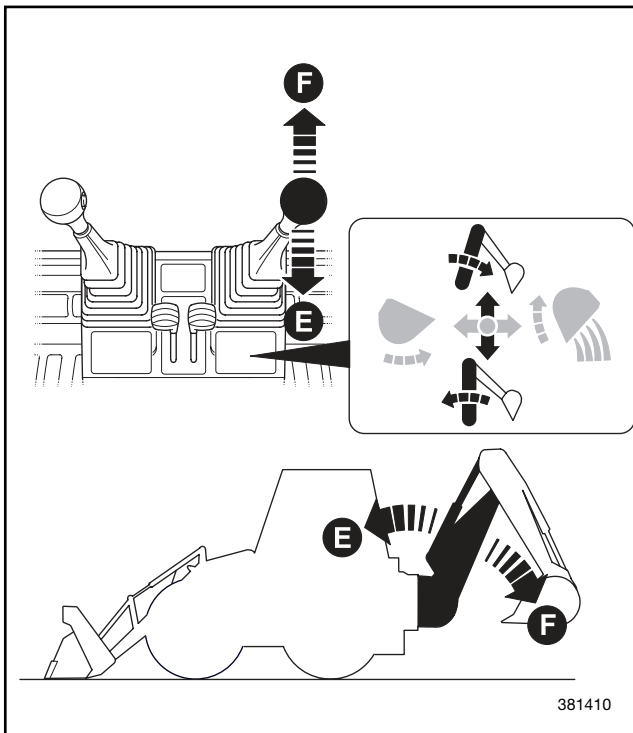
To lower the boom, push the lever towards the rear of the machine.

Close Bucket **G**

To close the bucket (to gather a load) move the lever to your left.

Open Bucket **H**

To open the bucket (to dump a load) move the lever to your right.



BACKHOE CONTROLS (continued)

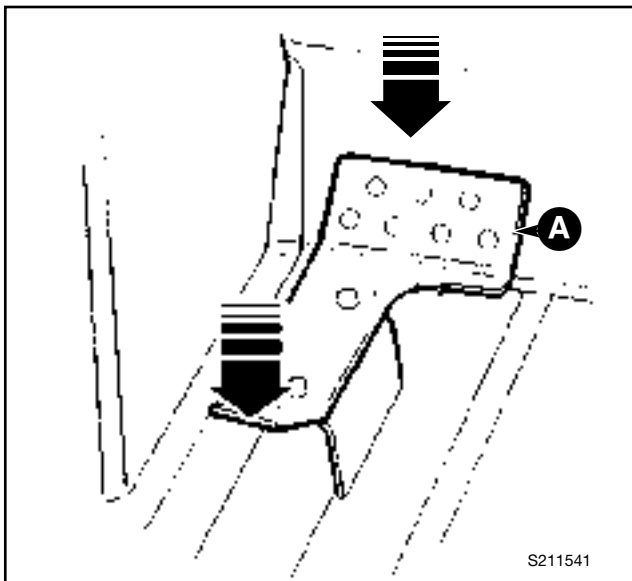
Backhoe Foot Pedal Control

Some machines have a foot operated pedal **A**. This can be used to operate various options such as auxiliary attachments.

A plastic decal, located on the pedal, shows the pedal and the attachment movements.

The pedal is the rocking type, operated by heel-and-toe. It is spring-loaded to its mid-position. Speed of operation depends on how far the pedal is pressed down. The attachment will stay in any position until you move it with the pedal.

For auxiliary operation, refer also to **Backhoe Attachment Operation** (*OPTIONAL ATTACHMENTS* section).



Kingpost Clamps

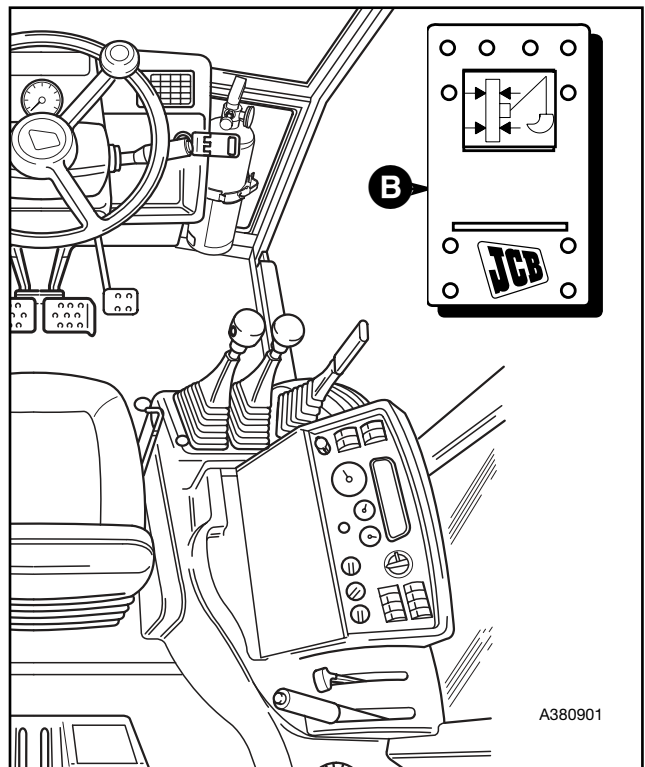
On sideshift machines only, the kingpost assembly must be 'clamped' to the cross rails before starting any excavation work. See **Sideshifting the Backhoe** (*OPERATION* section) for detailed instructions on how to move the kingpost and backhoe assembly across the rails.

Release Clamps

To release the clamps, press switch **B** on, switch light illuminated.

Tighten Clamps

To enable the clamps to tighten, press switch **B** off.



BOOM AND SLEW LOCKS

Boom Lock

We recommend that the boom lock and the slew lock be engaged before travelling on the road.

Check on a daily basis that the boom lock fully engages and secures the boom. If the lock does not fully engage (or disengage) the boom stop **A** may need adjusting (consult your JCB Distributor).

WARNING

You or others can be killed or seriously injured if you operate the control levers from outside the cab. Operate the control levers only when you are correctly seated inside the cab.

INT-2-1-3

It is recommended that the slew lock be engaged before fitting the boom lock.

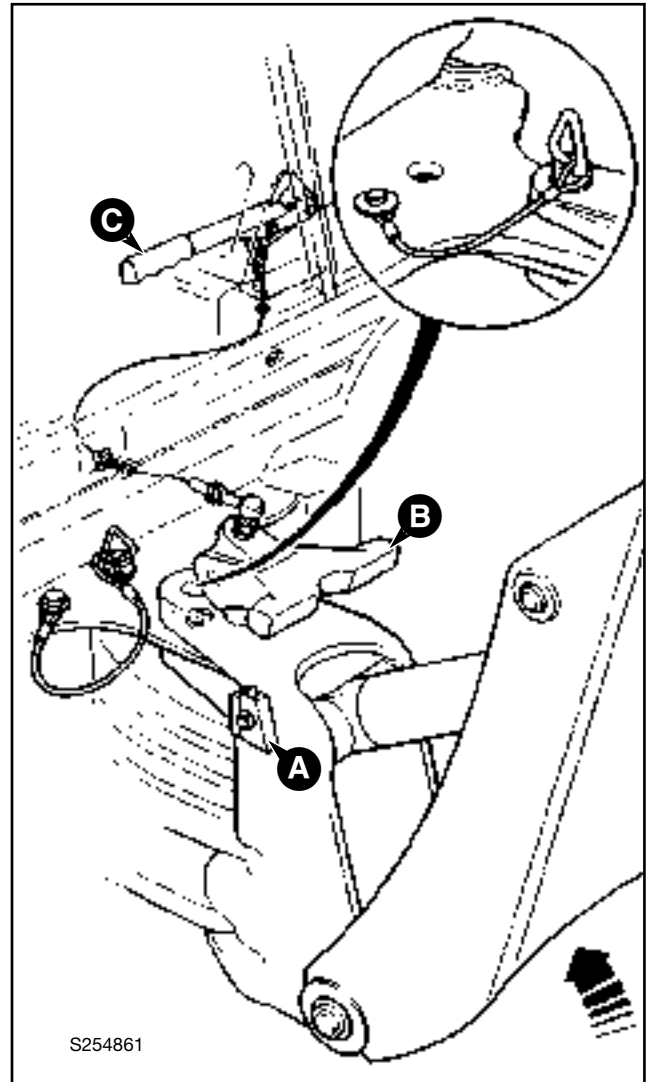
Note: The illustration shows a centremount boom and slew lock arrangement. Sideshift machines stow the slew lock in a bracket which is mounted on the kingpost casting.

Engage the Boom Lock

- 1 Make sure that the boom lock **B** is fully raised, if necessary lift control lever **C** to raise the lock.
- 2 Close the boom ram (raise the boom).
- 3 Lower control lever **C** to lower the boom lock **B**, make sure that the lock is fully engaged in the boom lugs.
- 4 Lower the boom a little to tighten the lock.

Disengage the Boom Lock

- 1 Raise the boom a little to release the lock.
- 2 Lift control lever **C** to raise the boom lock **B**.



BOOM AND SLEW LOCKS (continued)

Slew Lock

We recommend that the boom lock and the slew lock be engaged before travelling on the road.

⚠ WARNING

You or others can be killed or seriously injured if you operate the control levers from outside the cab. Operate the control levers only when you are correctly seated inside the cab.

INT-2-1-3

⚠ WARNING

If two people are doing this job, make sure that the person working the controls is a competent operator. If the wrong control lever is moved or the controls are moved violently, the other person could be killed or injured.

2-2-6-5

It is recommended that the slew lock be engaged before fitting the boom lock.

Note: The illustration shows a centremount boom and slew lock arrangement. Sideshift machines stow the slew lock in a bracket which is mounted on the kingpost casting.

Engage the Slew Lock

- 1 Slew the backhoe into the required position. Make sure that hole **E** (in the kingpost) aligns with hole **F** (in the mainframe). Stop the engine.

⚠ WARNING

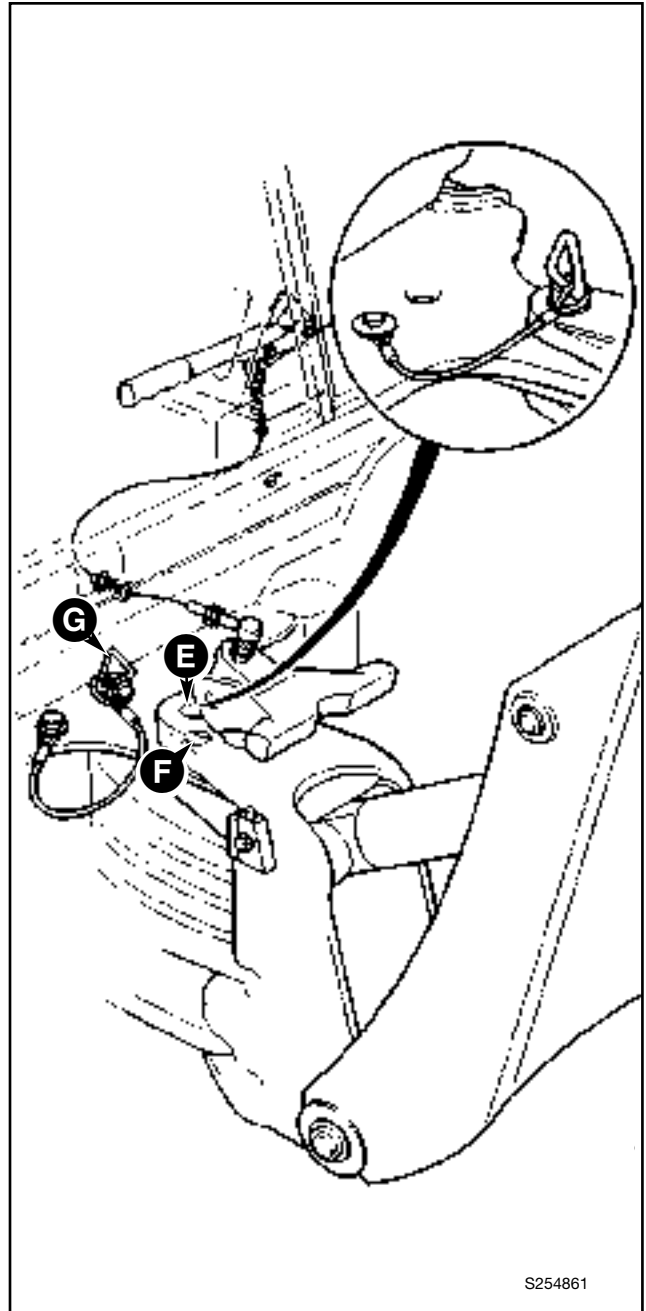
Do not attempt to install or remove the slew lock pin whilst sitting in the cab, you will be leaning over the backhoe control levers. You or others can be killed or seriously injured if the control levers are accidentally operated.

2-2-3-10

- 2 Remove the slew lock pin **G** from its stowage position and fit it into the aligned holes.

Disengage the Slew Lock

- 1 Stop the engine.
- 2 Remove the lock pin **G** and put it in its stowage position.



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BEFORE STARTING THE ENGINE

1 Engage the Parking brake

The parking brake should have been engaged when the machine was last parked. But if it is not already engaged, engage it now.

⚠ 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

2 Lower the Attachments to the Ground

Ensure that both the loader and the backhoe are on the ground, or the backhoe is in its transport position.

3 Do a Pre-start Inspection

For your own safety (and others) and for a maximum service life of your machine, do a pre-start inspection before starting the engine.

- a If you haven't already done it, do a walkround inspection of the outside of the machine.
- b Remove dirt and rubbish from the cab interior, specially around the pedals and control levers.

⚠ WARNING

Keep the machine controls clean and dry. Your hands and feet could slide off slippery controls. If that happens you will lose control of the machine.

2-2-3-6

- c Remove oil, grease and mud from the pedals, control levers and the steering wheel.
- d Make sure that your hands and shoes are clean and dry.

⚠ WARNING

Loose articles can fall and strike you or roll on the floor. You could be knocked unconscious, or the controls could get jammed. If that happens you will lose control of the machine.

2-2-3-7/1

- e Remove or secure all loose articles in the cab - such as lunch boxes, tools etc.
- f Inspect the ROPS/FOPS structure for damage. Get your JCB Distributor to repair any damage. Make sure all its securing bolts are fitted and correctly tightened.

- g Check around the cab for loose or missing bolts, screws etc. Replace or tighten where necessary.
- h Inspect the seat belt and its mountings for damage and excessive wear.

⚠ 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

- i Check that the following are in working order :-

Lights, Warning Lights, Horn, Indicator Lights, All Switches, Direction Indicators, Hazard Warning Lights, Windscreen Washer and Wipers (if fitted).

4 Adjust the Seat

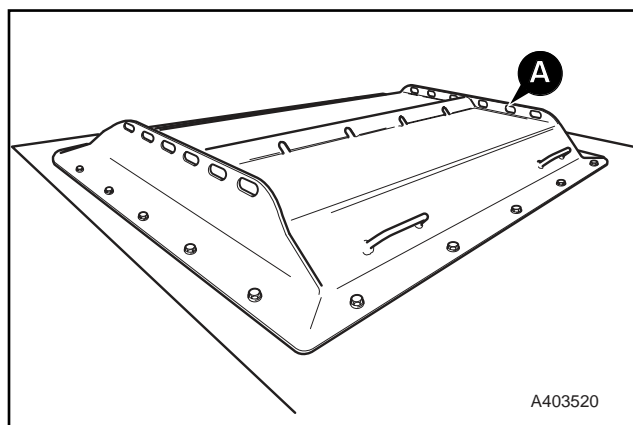
Adjust the seat so that you can comfortably reach all the driving controls. You should be able to apply full brake pedal travel with your back against the seat back.

5 Set the Rear View Mirror(s)

Set the rear view mirror(s) to give you a good view close behind the machine when you are correctly seated.

6 Fasten the Seat Belt

Note: If the detachable cab roof section **A** has been removed (for transportation in a cargo hold for example) it must be refitted as soon as the machine has been unloaded. Failure to refit the roof section will invalidate the ROPS/FOPS certification. See **ROPS/FOPS Structure (MAINTENANCE section)**.



A403520

STARTING THE ENGINE

- 1 Read and comply with **Before Starting the Engine** on the previous page.
- 2 **Put the Forward/Reverse Lever in Neutral**
The engine will not start unless the forward/reverse lever **A** is in neutral.
- 3 **Set the Hand Throttle Lever to Minimum**
Make sure that hand throttle lever **C** is set at the minimum engine revs position.
- 4 **Start the Engine**

WARNING

Breathing the machine exhaust gases can harm and possibly kill you. Do not operate the machine in closed spaces without making sure there is good ventilation. If possible, fit an exhaust extension. If you begin to feel drowsy, stop the machine at once. Get out of the cab into fresh air.

INT-2-1-10

Note: If the outside temperature is low, 0 °C (32 °F) or below, turn the starter switch key to the 'heat' position for 15-20 seconds to warm the engine induction manifold.

- a Slightly depress the accelerator pedal **D**.
- b Turn the starter switch **E** to the 'start' position and hold it there until the engine starts.

Note: If the engine has not started after 20 seconds, release the starter switch. Wait two minutes before attempting another start. This will allow the starter motor to cool down.

- c Release the starter key as soon as the engine starts. The switch will return to 'IGN' position.
- d Ease off on the accelerator pedal to reduce engine speed.

5 Check the Warning Lights

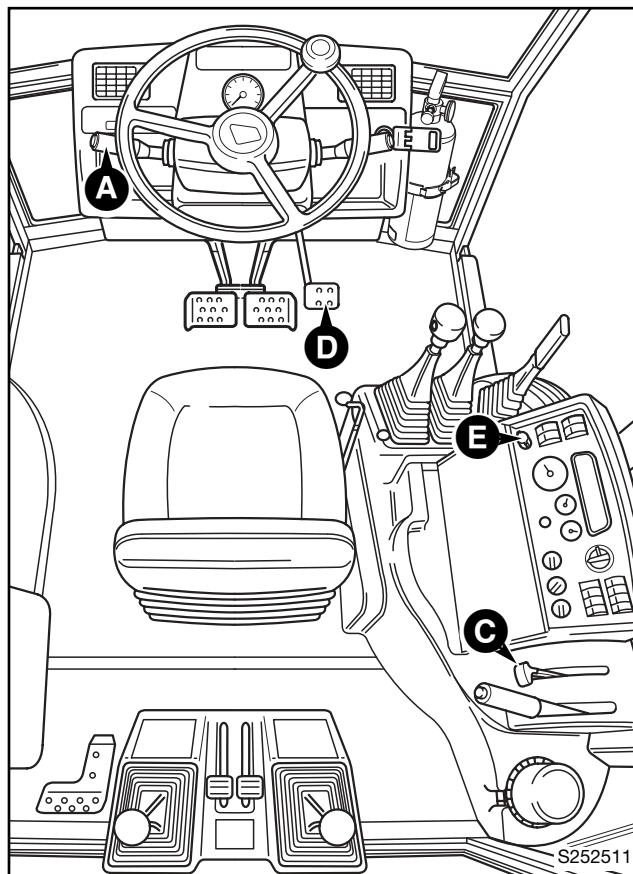
Once the engine has started, check that all the warning lights have gone off. Do not race the engine until the **oil pressure low** light has gone out. Racing the engine too soon could damage the turbo-charger due to under lubrication. Check that the audible alarm is silent.

Note: If any warning lights fail to go off, or come on while the engine is running, stop the engine as soon as it is safe to do so.

6 Warm Up the Hydraulics.

Operate the backhoe a few times to help warm up the hydraulic system.

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).



INTER-VEHICLE START CONNECTOR

⚠ WARNING

If you try to charge a frozen battery or jump-start and run the engine, the battery could explode.

Do not use a battery if its electrolyte is frozen. To prevent the battery electrolyte from freezing, keep the battery at full charge.

Batteries give off a flammable gas that can explode.

Do not smoke when checking the electrolyte levels. When starting from another machine, make sure the two vehicles do not touch each other. This prevents any chance of sparks near the battery. Sparks could ignite the battery gas. If that happens the battery could explode.

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

Do not connect a booster supply directly across the starter motor. Doing this by-passes the neutral safety switch and the engine can start with the transmission in gear.

Use only booster cables which are in good condition with securely attached connectors. Connect both ends of one booster cable before connecting the other one.

5-2-2-3

This Backhoe is a 24 volt machine.

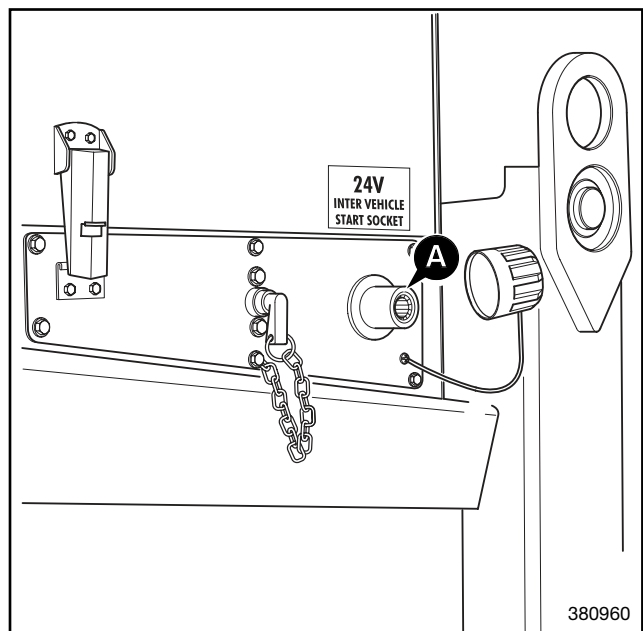
- 1 The parking brake should have been engaged when the machine was last parked. If it is not engaged, engage it now.
- 2 Set all switches in the cab to off.

⚠ 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 Connect the inter vehicle cable to connector **A** and the other end to the booster supply.
- 5 Do the pre-start checks, see *Before Starting the Engine*.
- 6 Start the engine, see *Starting the Engine (OPERATION section)*.
- 7 Disconnect the inter vehicle cable from the booster supply and connector **A**, fit the cover.



PREPARING THE MACHINE FOR TRAVEL

When travelling on the road or on site there are usually local rules and safety regulations for the machine travelling position. The '**Road Travelling Position**' and '**Site Travelling Position**' described on the following pages are recommendations that should help you meet the requirements of these regulations; they are not necessarily the applied law:

PLEASE MAKE SURE THAT BEFORE TRAVELLING ON THE ROAD OR ON SITE, YOU AND YOUR MACHINE COMPLY WITH ALL THE RELEVANT LOCAL LAWS - IT IS YOUR RESPONSIBILITY.

Whether driving on the road or on site, there are two possible travelling positions:

- 1 The 'tucked-in' position, i.e. the backhoe is placed across the back of the machine, as shown at **A**.
- 2 The 'central protruding' position, i.e. the backhoe is placed central and protruding from the back of the machine, as shown at **B**.

Choosing the correct travelling position will depend on; the type of machine you are operating and the type of equipment you have fitted to the backhoe.

Convoy Light

To use the convoy light the machine must be in the 'tucked-in' position as shown at **A**. Attach the convoy light to the boom as shown at **C**. The light is held in place magnetically. When not in use stow the light assembly on the battery box as shown at **D**. Be sure to coil and stow the electrical wires out of harms way.

Backhoe Attachments

We recommend that all backhoe attachments be removed before travelling on the road. However, if the machine IS driven on the road with attachments fitted, then the conditions listed under the headings **Tucked-In Travel Position** and **Central Protruding Travel Position** should be maintained.

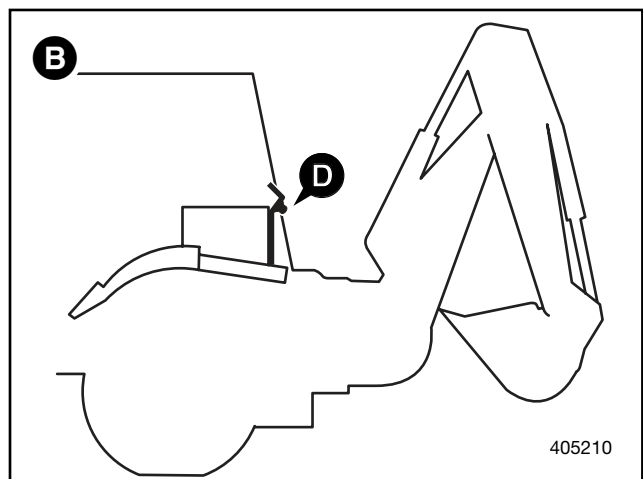
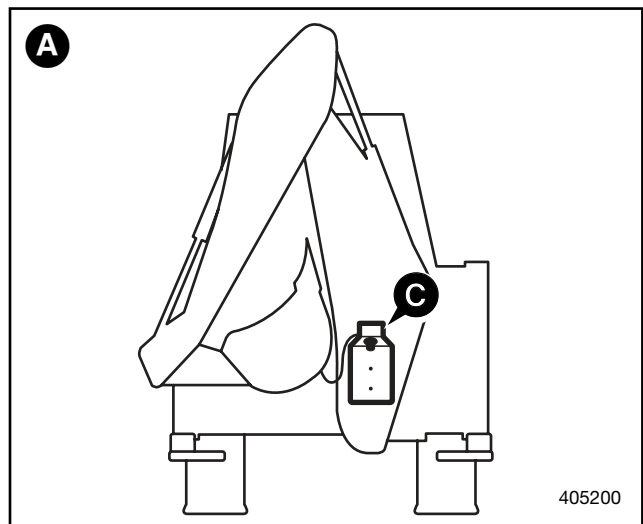
Tucked-In Travel Position

- 1 The attachments must not cause the maximum overall machine width to exceed 2.5m (8.2ft). If any part protrudes beyond the outer edge of the rear frame, it must be marked with red and white stripes to warn that a hazard exists.
- 2 The boom lock and slew lock must be securely fitted.
- 3 In certain territories, it will be necessary to fit a bucket crowd ram safety strut.
- 4 The attachments must not protrude from the back of the machine by more than 1m (3.28ft). If the attachments do protrude by more than 1m (3.28ft) then a rear protrusion plate/light must be fitted. If the attachment is removed, then the tipping link must be secured.

- 5 Machine stability must be maintained.
- 6 The rear stop/tail/indicator lights (both sides) must be clearly visible from the rear of the machine.
- 7 The hydraulic clamps (hydraclamps) must be engaged.

Central Protruding Travel Position

- 1 The attachments must not affect machine stability. For instance there must be at least 20% of the total machine weight acting on the front axle.
- 2 The backhoe must be set centrally on the rear frame and hydraulic clamping engaged (applicable to sideshift machines only).
- 3 The boom lock and slew lock must be securely fitted.
- 4 In certain territories, it will be necessary to fit a bucket crowd ram safety strut.
- 5 A protrusion plate/light must be fitted. If the attachment is removed, then the tipping link must be secured and the rear protrusion plate/light must still be fitted.



PREPARING THE MACHINE FOR TRAVEL (continued)

Road Travelling Position

Read and understand the information given on page 40. The recommendations given below ARE NOT necessarily the applied law, please make sure you are complying with the relevant local laws.

Note: If the machine is to be used outside the UK and travelling on the opposite side of the road the headlight lens must be changed and the convoy light and number plate and light must be swapped over.

- 1 Secure ancillary equipment, see Installing Ancillary Equipment In Preparation For Road Travel, in **OPTIONAL ATTACHMENTS** section.
- 2 If Required Select Smooth Ride System to On

CAUTION

Do not use the Smooth Ride System with the travel struts fitted as the struts or hydraulic cylinder may be damaged.

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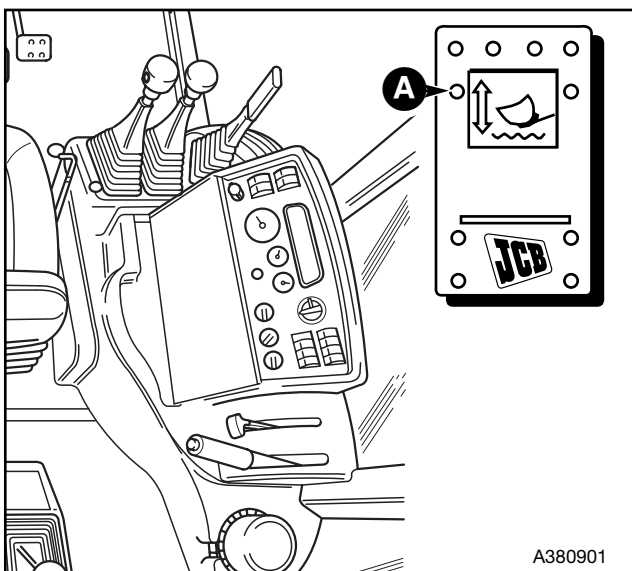
CAUTION

When the Smooth Ride System is selected ON the loader arms may lift or lower slightly, make sure personnel are clear.

2-2-5-10

Use of the Smooth Ride System during loader operation not requiring power down of the loader arms will enhance machine operation by smoothing the ride across uneven surfaces.

Raise the front loader shovel 600 mm (2ft), press switch **A** which will illuminate when the system is ON.



- 3 Fit the travel struts **B** if the Smooth Ride System not required and is switched Off.

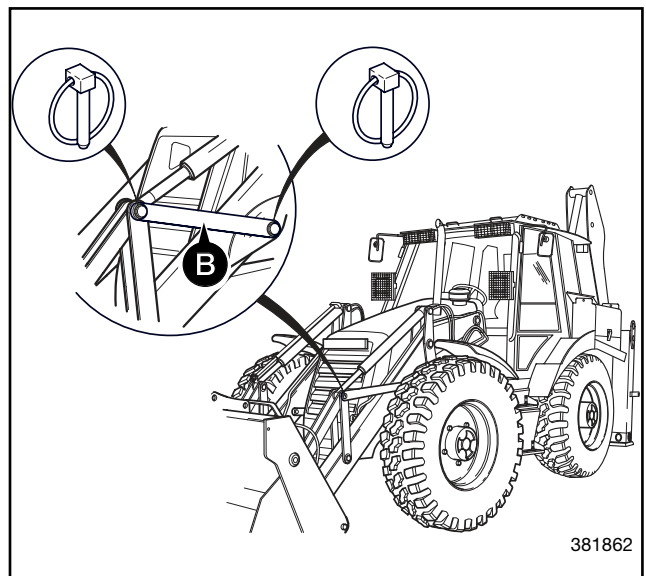
CAUTION

Do not use the Smooth Ride System with the travel struts fitted as the struts or hydraulic cylinder may be damaged.

0046

- 4 Engage the boom and slew locks.
- 5 If the backhoe is set central to the rear frame, attach a protrusion plate/light to the dipper. Ensure that the plate light is plugged in.
- 6 If any attachments are fitted, make them safe, for example, fit tooth guards etc. If forks are fitted, put them in the fork stowage position.

Note: In certain territories you will be breaking the law if you do not fit a tooth guard to the loader shovel. Make sure you are complying with local laws.



PREPARING THE MACHINE FOR TRAVEL (continued)

Road Travelling Position (cont'd)

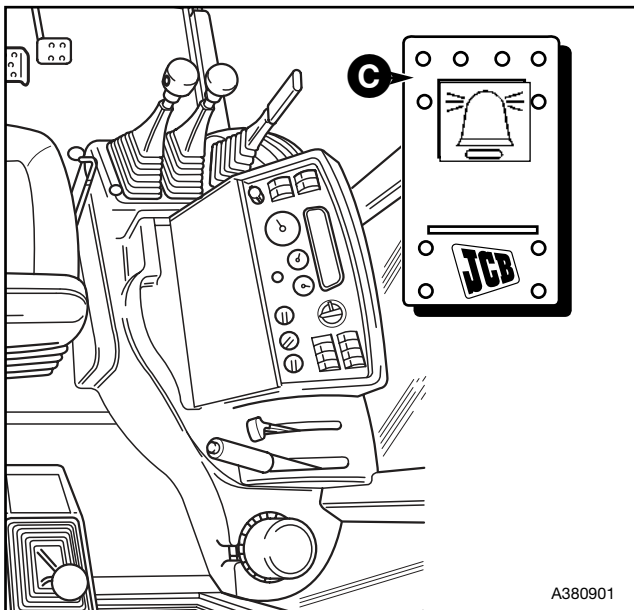
- 7 The stop lights should come on when the brakes are applied.
- 8 Make sure the stabilisers are fully up and locked.
- 9 Fit the loader and backhoe lever locks.
- 10 Fit the Flashing Beacon:

In some territories, to meet legislative requirements, a beacon extension mount must be fitted, or the beacon must be mounted on the dipper. Consult your JCB Distributor for advice.

- a Fit the beacon to the cab roof and plug the lead into the cab roof socket, the beacon will start flashing when switch **C** is pressed on.
- b DO NOT climb on the machine to fit the beacon on the dipper. Fully extend and lower the boom and dipper so that it is possible to fit the beacon whilst standing on the ground.

Note: We recommend that a flashing beacon is fitted if the machine is travelling on public highways. In certain territories you will be breaking the law if you do not fit a flashing beacon when travelling on public highways - make sure you are complying with local laws.

- 11 Check that the road lamps, including the flashing beacon, are all in working order and clearly visible. Do not drive the machine unless both stop lights work correctly.



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PREPARING THE MACHINE FOR TRAVEL (continued)

Site Travelling Position

Read and understand the information given on page 40. The recommendations given below ARE NOT necessarily the applied law, please make sure you are complying with the relevant local laws.

- 1 If Required Select Smooth Ride System to On

CAUTION

Do not use the Smooth Ride System with the travel struts fitted as the struts or hydraulic cylinder may be damaged.

0046

CAUTION

When the Smooth Ride System is selected ON the loader arms may lift or lower slightly, make sure personnel are clear.

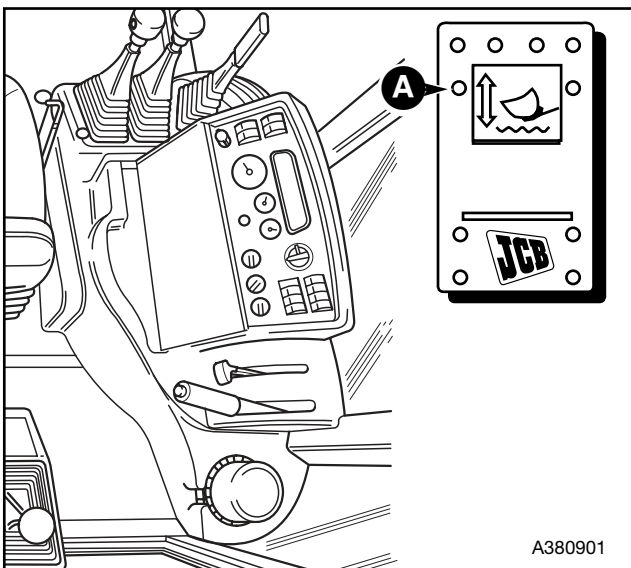
2-2-5-10

Use of the Smooth Ride System during loader operation not requiring power down of the loader arms will enhance machine operation by smoothing the ride across uneven surfaces.

If Smooth Ride System is fitted and selected ON the loader can not power down. For duties other than light handling the system should be selected OFF.

Raise the front loader shovel 600 mm (2ft), press switch **A** which will illuminate when the system is ON.

- 2 Fit the travel struts **B** if the Smooth Ride System not required and is switched Off.



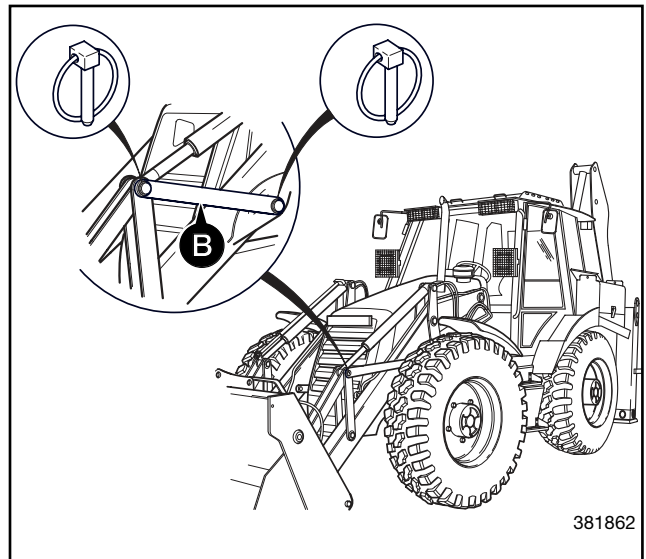
A380901

CAUTION

Do not use the Smooth Ride System with the travel struts fitted as the struts or hydraulic cylinder may be damaged.

0046

- 3 Set the backhoe, there are two possible positions, see page 40.
- 4 If any attachments are fitted, make them safe. Unless you are using the forks to carry a load, put the forks in the stowage position.
- 5 Engage the boom and slew locks.
- 6 Make sure the stabilisers are fully up.
- 7 Select the drive/brake mode most suitable for the terrain and the work you are doing.



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TESTING THE PARKING BRAKE

SAFETY NOTICE: Ensure all routine health and safety precautions are observed before operating machines.

⚠ WARNING

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

2-2-4-5

- 1 Enter the machine. Fasten your seat belt and park the machine on a level dry surface.
- 2 Fully apply the parking brake **1**.
- 3 On machines with two brake pedals ensure they are locked together.
- 4 Start the engine and raise the attachments to the appropriate travelling position.
- 5 Select fourth gear **3**.
- 6 Push down hard on foot brake pedals **4**.
- 7 Select forward drive **5**.

⚠ WARNING

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

2-2-5-1

Test the parking brake as follows:

- 8 Move the parking brake lever fractionally forward until the warning light **6** is just extinguished.
- 9 Slowly release the foot brake pedal **4**.
- 10 If the machine has not moved, use the accelerator pedal to gradually increase the engine speed to 1500 RPM. The machine should not move.
- 11 Do not do this test for longer than 20 seconds.
- 12 Reduce the engine speed to idle and select neutral **5**.
- 13 Return the park brake lever **1** to the fully on position from its partially applied position.
- 14 Lower attachments and stop the engine.
- 15 If the machine moved during this test, adjust the parking brake and repeat the test. See **Parking Brake Adjustment** (MAINTENANCE Section).

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

⚠ WARNING

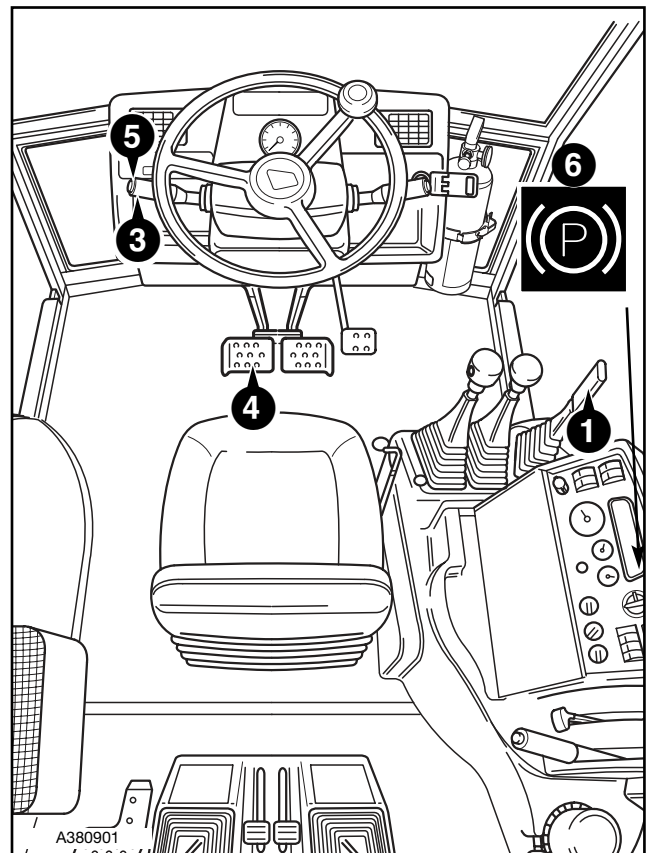
Do not use a machine with a faulty parking brake.

3-2-3-10

⚠ CAUTION

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

3-2-3-11



GETTING THE MACHINE MOVING

Operating Hints

The machine can be put in motion in any gear. But do not overwork the engine unnecessarily by using too high a gear for example, on a hill. Operating in too high a gear will overheat the torque converter fluid.

When moving the machine, keep it under control at all times. Stay alert for obstructions and possible hazards.

Do not use the brake pedals as footrests.

Do not coast the machine in neutral, you will not have full control. Also, coasting the machine will damage the transmission.

Select the necessary gear **before** starting down a slope. Use the same gear you would use to go up the slope. Do not change gear on the slope. If operating a machine with autoshift transmission, **select low gears in manual mode before** starting down a steep slope.

If the load will be pushing the machine on a downslope, select first gear (1) before starting downhill.

Use the brake pedal to prevent overspeeding down a slope.

Approach deep mud in first gear (1) with the front wheels straight.

The front and rear axles are fitted with axle breathers. If the machine is to be driven into deep water (i.e. above the level of the breather), care should be taken to ensure that water does not enter the breather.

UNDER NO CIRCUMSTANCES must the rear axle breather be blanked off, as this could cause a reduction in brake efficiency.

After you have warmed up the engine and tested the parking brake, move off as described below.

1 Check Your Seat Belt and Seat

Make sure that your seat belt is correctly fastened. Make sure that the seat is correctly adjusted.

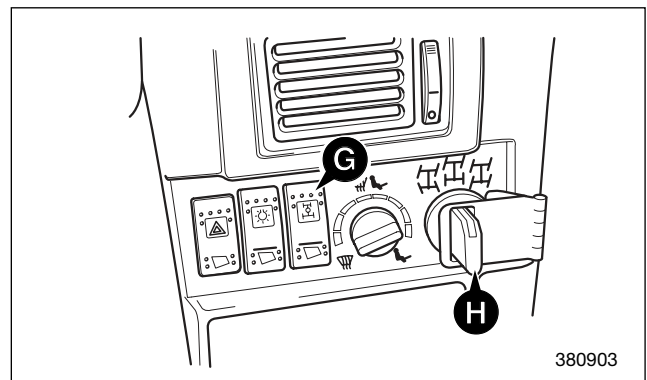
2 Select 2- or 4-Wheel Drive

Select with rotary rocker switch **G**.

Note: Do not use 4-wheel drive on the road or hard surfaces, as it will cause excessive tyre wear and fuel consumption.

3 Select steer mode

This is a three-position rotary switch **H**, equipped with a hinged lockplate. The lockplate enables the selector switch to be locked into the 2-wheel steer mode, when the machine is driven on public roads.



GETTING THE MACHINE MOVING (continued)

4 Engage a Gear

Select the required gear using gear select switch **E**.

⚠ WARNING

Do not change from top gear (4th) to bottom gear (1st) in one sudden movement whilst the machine is moving. Otherwise the machine will come to a sudden stop, you or others could be killed or seriously injured. When selecting lower gears, allow the engine speed to drop before each gear change.

2-1-1-9

5 Select Forward/Reverse and Move Off

⚠ WARNING

You and others could be killed or injured if you operate the forward/reverse lever while travelling. The machine will immediately reverse direction without warning to others. Follow the recommended procedure for proper use of this selector.

2-2-2-4

- Check that the attachments are in one of their travel positions.
- Push the brake pedal(s) **D** hard down.

⚠ WARNING

Reversing at high speeds can cause accidents. Do not reverse in third or fourth (if fitted) gear with full throttle. Always drive at a safe speed to suit working conditions.

INT-2-2-9

- Lift the forward/reverse lever **E** from its detent position and select forward or reverse.

Note: When forward or reverse drive is selected, an audible alarm will sound and a warning light will show to remind you that the parking brake is still engaged.

- Release the parking brake **F**.

⚠ WARNING

When driving the machine, use only the accelerator pedal to control the engine speed. Do not use the hand throttle lever to set the engine speed while driving.

2-2-2-2

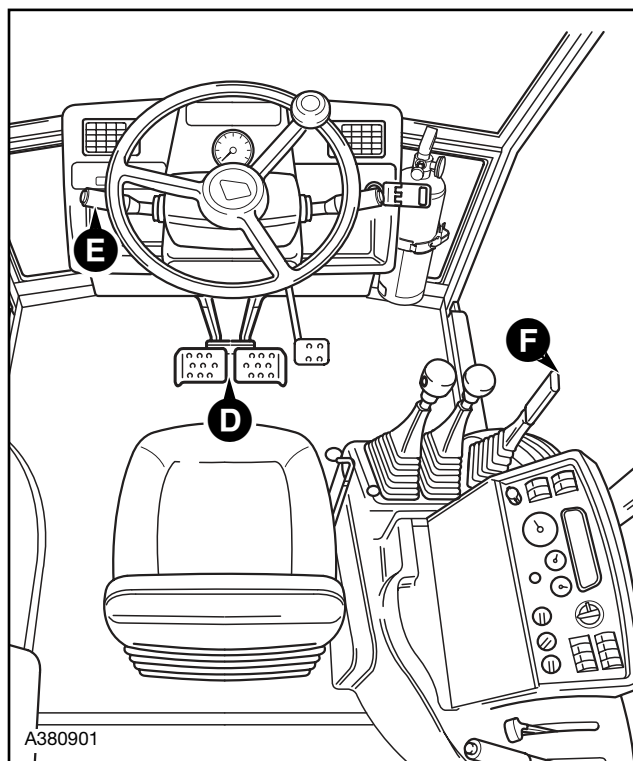
- Make sure it is safe to move off, then release the brake pedals and push down on the accelerator pedal. The machine will move smoothly away.

⚠ WARNING

If the engine or steering fails, stop the machine as quickly as possible. Do not operate the machine until the fault has been corrected.

INT-2-1-5

- While the machine is travelling slowly, check the steering and brakes. Do not drive the machine unless the steering and brakes are working correctly. If you are not sure, assume they are faulty.



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STOPPING AND PARKING THE MACHINE

Stop the machine on dry and level ground where the machine will not be a hazard or danger. It is recommended that the backhoe is extended when parking, make sure there is enough room.

⚠ WARNING

An incorrectly parked machine can move without an operator. Follow the instructions in this handbook to park the machine correctly.

INT-2-2-4

- 1 Ease up on the accelerator pedal **A** and down on the brake pedals **B** to bring the machine to a smooth stop. Keep the foot brakes on until the parking brake has been pulled on, (Step 2).

⚠ CAUTION

The parking brake must not be used to slow the machine from travelling speed, except in an emergency, otherwise the efficiency of the brake will be reduced.

Whenever the parking brake has been used in an emergency, always renew both brake pads.

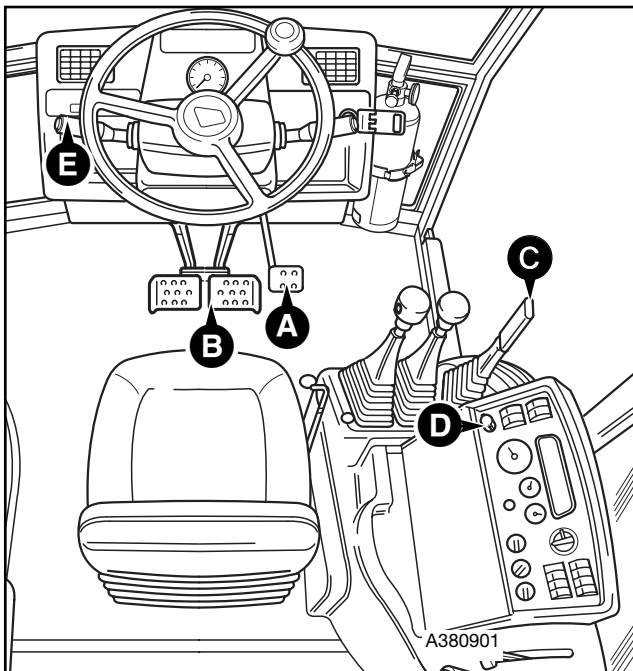
4-2-1-1/2

- 2 Pull the parking brake lever **C** fully up. Make sure that the parking brake indicator lights up. Release the foot brakes.

⚠ WARNING

Do not dismantle a moving machine.

3-2-3-12



- 3 Set the forward/reverse lever **E** to neutral. Make sure the lever is in its detent position.
- 4 Unlock and lower the stabiliser legs until they just touch the ground.

⚠ 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

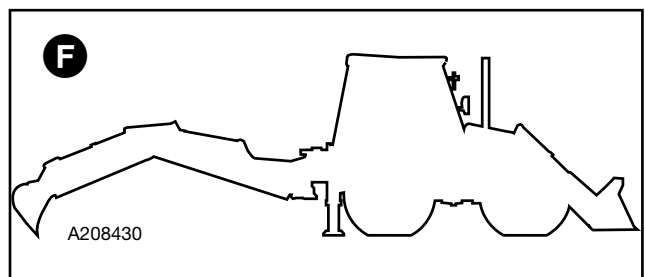
- 5 Lower the loader arms and backhoe assembly to the ground. It is recommended that the backhoe is positioned as shown at **F** (bucket fully open, boom and dipper fully extended).
- 6 It is recommended that turbocharged engines are run at 1000 RPM (approximately) and reduced load for 2 - 3 minutes before shut down. This will allow the turbocharger to cool.
- 7 If you are leaving the machine, make sure that all switches are set to off. If necessary, leave the hazard warning and/or side lights switched on. Remove the starter key **D**.
- 8 Use the handholds and step when you climb down from the machine. If you are leaving the machine, close and latch all windows and lock both doors. Make sure that the filler cap is locked on.

⚠ WARNING

Always face the machine when entering (and leaving) the cab. Make sure your shoes and hands are clean and dry. Otherwise you could slip and fall.

2-2-1-3

- 9 At the end of a working cycle or if the machine is being left unattended, provided the lights are not required remove the battery isolator key (if fitted), see **Battery** (MAINTENANCE section).



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 bucket for rocky material. It could overload the system and shorten service life.

Safety Check List

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 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

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

Communications

Bad communications can cause accidents. If two or more people are working on the machine, make sure each is aware of what the others are doing. Before starting the engine make sure the others are clear of the danger areas; examples of danger areas are: the rotating blades and belt on the engine, the attachments and linkages, and anywhere beneath or behind the machine. People can be killed or injured if these precautions are not taken.

INT-3-1-5

WARNING

Safety Barriers

Unguarded machines in public places can be dangerous. In public places, or where your visibility is reduced, place barriers around the work area to keep people away.

INT-2-2-8

USING THE ATTACHMENTS AND SITE SAFETY (continued)

Safety Check List (Cont'd)

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

Underground Gas Pipes

Before you start using the machine, check with your local gas company if there are any buried gas pipes on the site.

If there are buried gas pipes we recommend that you ask the gas company for any specific advice regarding the way you should work on the site.

Some modern gas pipes cannot be detected by metal detectors, so it is essential that an accurate map of buried gas pipes is obtained before any excavation work commences.

Hand dig trial holes to obtain precise pipe locations. Any cast iron pipes found should be assumed to be gas pipes until contrary evidence is obtained.

Older gas pipes can be damaged by heavy vehicles driving over the ground above them.

LEAKING GAS IS HIGHLY EXPLOSIVE.

If a gas leak is suspected, contact the local gas company immediately and warn all personnel on the site. Ban smoking, ensure that all naked lights are extinguished and switch off any engines which may be running.

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

2-2-6-1/1

WARNING

Hillsides

Operating the machine on hillsides can be dangerous if proper precautions are not taken. Ground conditions can be changed by rain, snow, ice etc. Check the site carefully. Operate in first gear on hillsides, when applicable, keep all attachments low to the ground. Never coast down a hill with the engine off or the transmission in neutral.

INT-2-2-7

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

WARNING

Practice

You or others can be killed or seriously injured if you do unfamiliar operations without first practising them. Practice away from the work site on a clear area. Keep other people away. Do not perform new operations until you are sure you can do them safely.

INT-2-1-1

WARNING

Banks and Trenches

Banked material and trenches can collapse. Do not work or drive too close to banks and trenches where there is danger of collapse.

INT-2-2-5

WORKING WITH THE LOADER

Operating Hints

To use the JCB Backhoe Loader efficiently and safely you must know the machine and have the skill to use it. This handbook instructs you on the machine, its controls and its safe operation. It is not a training manual on the art of loading. If you are a new operator, get yourself trained in the skills of using a JCB Backhoe Loader before trying to work with it. If you don't, you will not do your job well, and you will be a danger to yourself and others.

Remember that you will be driving the machine while you are using the loader. Keep alert for bystanders and possible hazards. Stay in the correct driving position. Keep your seat belt fastened.

When working with the loader, set the backhoe straight behind the machine, as for road travel.

Keep the loader shovel low to the ground when travelling. This increases your visibility and makes the machine more stable.

Whenever possible, travel in reverse when you are carrying a loaded shovel downhill. Travel forward when you are going uphill. With heavily loaded shovels, do not travel faster than 8 km/h (5 mph).

If Smooth Ride System is fitted and selected ON the loader can not power down. For duties other than light handling the system should be selected OFF.

Filling the Loader Shovel

⚠ WARNING

When loading with material from a high bank or pile, remove any overhang first. Watch out for sliding material. If overhanging material falls, you and your machine could be buried.

2-2-6-3

On hard surfaces, select **Float**. As the shovel enters the pile, start rolling the shovel back while raising it at the same time. This will sweep the shovel up the pile, gathering material as it goes.

When entering a stockpile, pressing the 'hydraulic speed control' switch will give more tractive force to the loader.

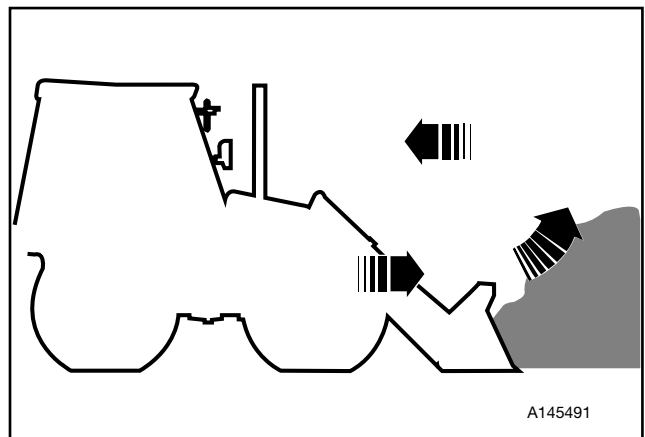
Pressing the transmission dump switch will give more power to the loader and speed the operation. Try to fill the shovel in one pass. Half full shovels are less productive.

When moving the load, roll the shovel right back to prevent spillage.

When you are loading from a pile of loose material, start at the bottom and follow up the face as shown. Approach the pile with the shovel level and skimming the ground.

In tightly packed material, start at the top and work down.

When removing material from a stockpile, start at a shovel's height from the base. Once the height of the stockpile has been reduced, begin loading from the base.



WORKING WITH THE LOADER (continued)

Loading a Truck

Put the truck(s) at an angle of about 45° to the pile, as shown. This cuts out unnecessary manoeuvring. Allow enough distance for the shovel to reach its unloading height while you are travelling, without slowing down.

Keep the wind on your back. This keeps dust away from you and your machine.

Move your machine as close as possible to the truck before unloading.

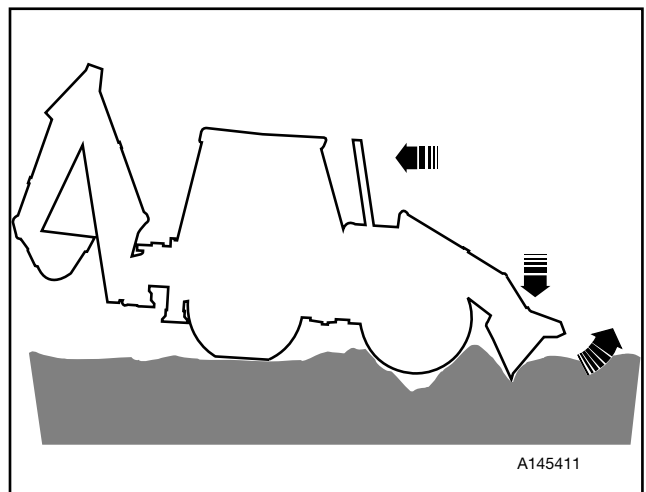
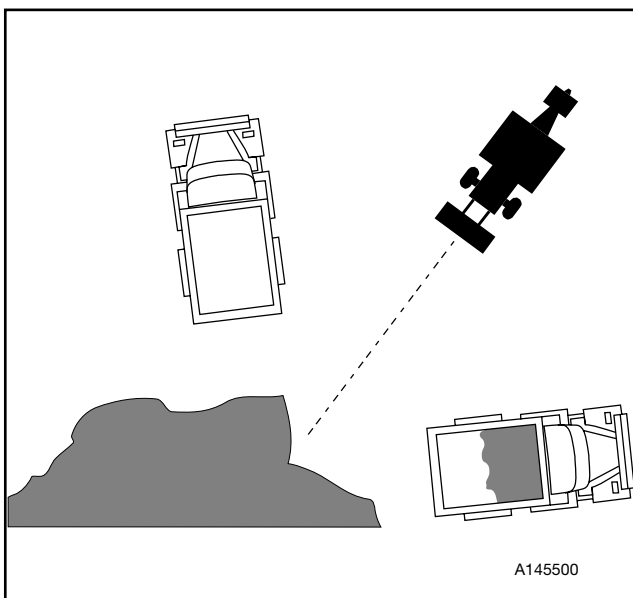
If the truck body is about as long as a shovel's width, tip the load into the centre of the truck. If the truck is two shovel-widths long or more, load the front of the truck first.

Do not dump the material in one sudden movement. Roll the shovel forward in stages until it is empty. Use the control lever to rock the shovel back and forth to loosen any sticky material.

Getting the Machine Unstuck

If the machine gets stuck in the trench, use the shovel to free it: set the drive in neutral, then roll the shovel forward as shown.

Then select shovel **Lower** to raise the front wheels. When the front wheels are free, slowly roll the shovel back, to push the machine backwards. When the front wheels are on firm ground, select reverse and drive clear.



WORKING WITH THE BACKHOE

Operating Hints

⚠ WARNING

Before you start using the backhoe, you must convert the machine into a safe and stable working platform. See *Preparing to Use the Backhoe* in OPERATION section for details.

2-2-6-4/1

To use the JCB Backhoe Loader efficiently and safely you must know the machine and have the skill to use it. This handbook instructs you on the machine, its controls and its safe operation. It is not a training manual on the art of excavating. If you are a new operator, get yourself trained in the skills of using a JCB Backhoe Loader before trying to work with it. If you don't, you will not do your job well, and you will be a danger to yourself and others.

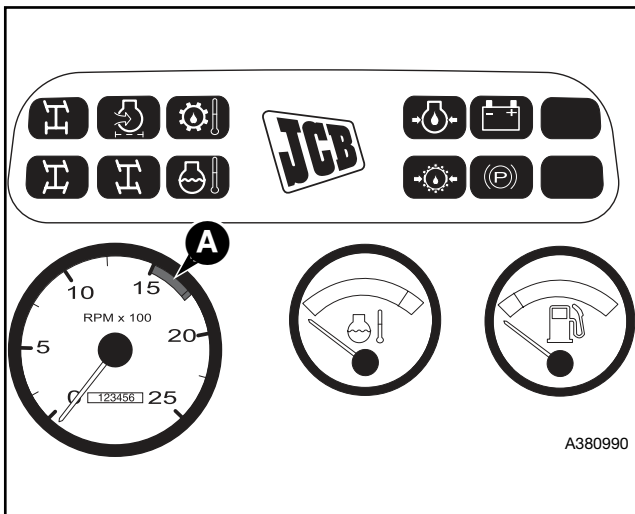
If you will be working with a labourer, make sure you both understand what each other will be doing. Learn and use the recognised signalling procedures. Do not rely on shouting - **he will not hear you.**

Make sure the correct bucket for the job is fitted. Instructions for removing and installing buckets are given on the following pages.

For the best fuel economy when using the backhoe, keep the tachometer pointer in the green band **A**.

Convoy Light

Before using the backhoe be sure to detach and stow the convoy light (if applicable). See *Preparing the Machine for Travel*.



Preparing to Use the Backhoe

When choosing a digging position, avoid digging downhill if possible. Whenever possible, dump the load on the uphill side of the excavation. Both these precautions will help to keep the machine stable.

- 1 When the machine is in the desired position on the site, roll the shovel forward, then lower it to take the weight off the front tyres.

If Smooth Ride System is fitted, switch OFF the system then lower the shovel in order to take the weight off the front tyres.

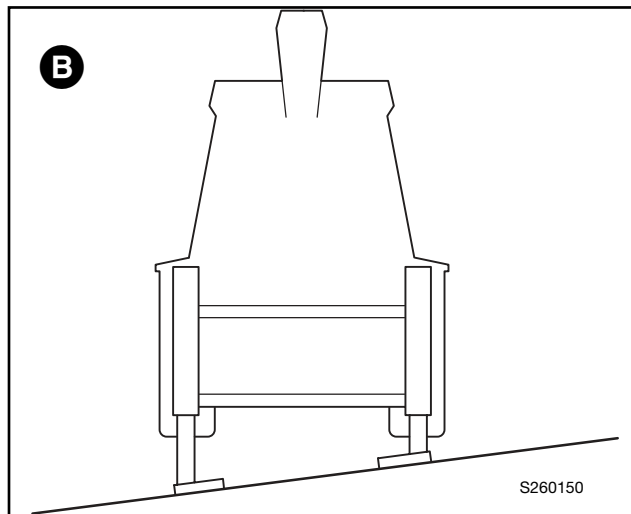
⚠ WARNING

The machine will drop suddenly if the Smooth Ride System is selected ON when the machine is supported on the loader shovel.

2-2-6-9

Note: On tarmac surfaces, do not roll the shovel fully forward. Keep the bottom of the shovel flat on the ground. This will minimise damage to the surface. When a Clamshovel is fitted, do not put weight on the fork carriers.

- 2 Set the forward/reverse lever to neutral. Make sure the lever is in its detent position.
- 3 Engage the parking brake.
- 4 Turn the seat to face the backhoe. Make sure the seat locks in position. Then lower the stabilisers to raise the rear tyres just clear of the ground. Remove travel pins before lowering the stabilisers. Adjust the stabiliser positions until the machine is level, shown at **B**. In soft ground, put heavy duty planks beneath the stabilisers. This will spread the weight and prevent sinking.



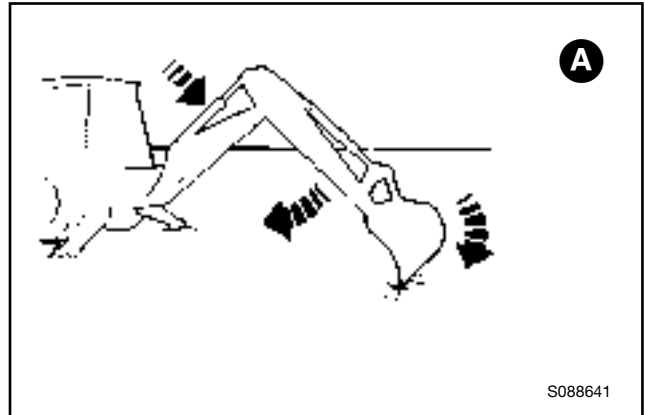
WORKING WITH THE BACKHOE (continued)

Digging

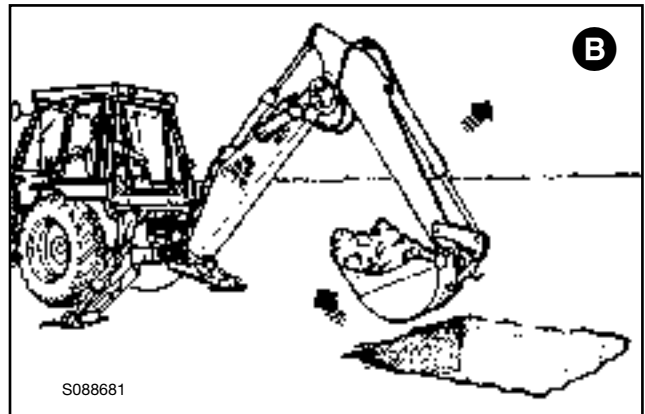
Note: The illustration shows a typical JCB Backhoe Loader. It may not look exactly like your machine.

To start the dig, reach out with the boom and dipper and position the bucket as shown at **A**.

Slowly close the bucket and at the same time bring the dipper in. Make sure the bucket stays at the same angle to the ground while it travels. If necessary, at the same time apply a downward pressure on the boom, to increase the digging force on the bucket.



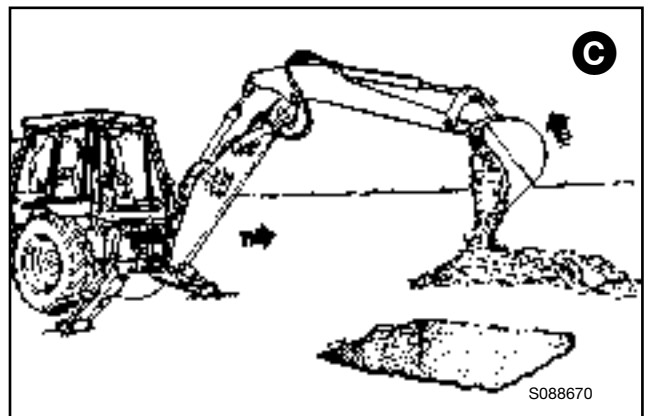
When the bucket is full, close it fully and at the same time move the dipper out a little way, shown at **B**. This will keep soil from building up under the machine.



Swing the bucket towards the dump area, shown at **C**. Start dumping as the bucket approaches the pile. Do not waste time by dumping too far from the excavation. Dump close to the start dig position. Swing the bucket back to the excavation and start the next dig.

Note: Do not use the side of the excavation to stop the bucket. This could damage the machine.

Backfill the excavation by loading the bucket with soil from the pile. Do not push the soil with the side of the bucket.



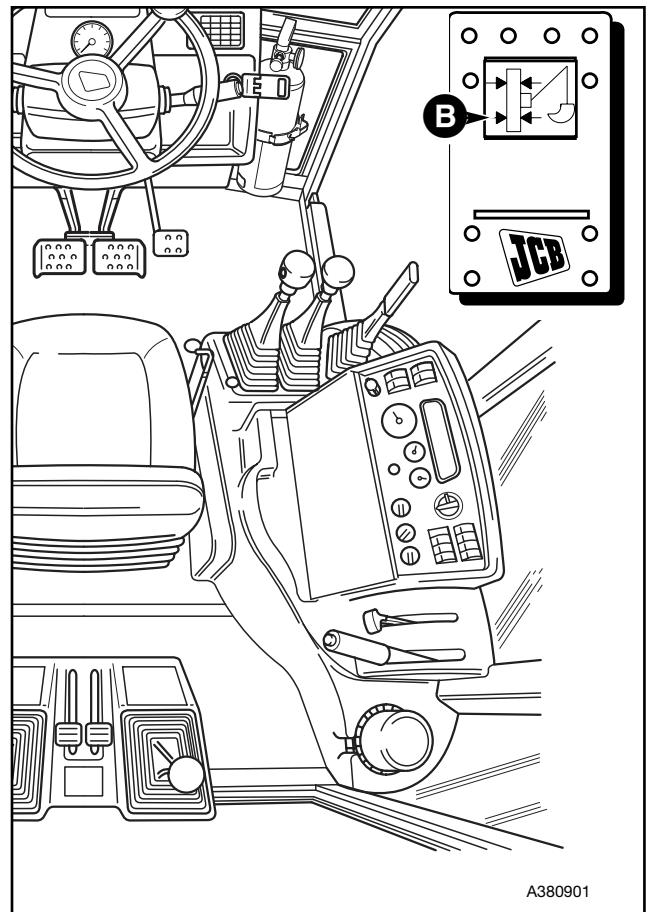
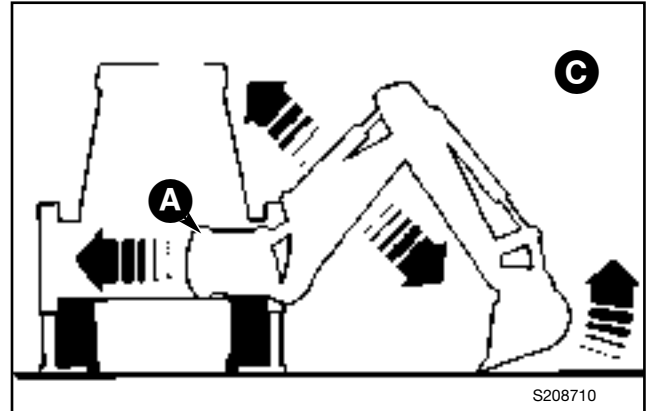
WORKING WITH THE BACKHOE (continued)

Sideshifting the Backhoe

Note: Before sideshifting the backhoe, make sure that the kingpost rails are clear of debris.

- 1 Use the stabilisers to set the machine level and stable, with the kingpost **A** vertical.
- 2 Rest the bucket on the ground, straight behind the machine.
- 3 Release the clamps, press the rocker switch **B** to the 'ON' position, the switch light should be illuminated.
- 4 Loosen the kingpost on its rails, operate the boom up and down a few times.
- 5 Raise and slew the backhoe directly to one side of the machine as shown at **C**. Slew to the left if you want to sideshift to the right. Slew to the right if you want to sideshift to the left. Set the bucket on the ground, with the dipper at 90° to the boom as shown.
- 6 Open the bucket. As the bucket opens, the kingpost will be pushed across the back of the machine. If the kingpost **A** sticks in mid-travel, raise or lower the boom slightly to keep the kingpost vertical to the rails.
- 7 Once the kingpost has been sideshifted to the required position, raise and slew the backhoe around so that it is straight behind the machine before applying the clamps. Failure to do so may cause the kingpost to be clamped whilst at a slight angle instead of vertical.
- 8 Apply the clamps by pressing rocker switch **B** to the 'OFF' position.

Note: Pressure generated in the backhoe services will ensure the clamps fully engage. Before operating the backhoe, move the bucket control lever to fully crowd the bucket, hold the lever in this position for a minimum of five seconds (engine at 1500 r.p.m.).



WORKING WITH THE BACKHOE (continued)

Lifting with the Backhoe

The owner and/or operator must make sure that he fully understands the laws and regulations concerning the use of the JCB Backhoe Loader as an earthmover and as a crane. Consult your JCB distributor for further information.

If your machine has not been fitted with an approved lifting point such as a hook or shackle **A** then it must not be used as a crane. Use the machine for earthmoving purposes only.

Your machine may be used as a crane if it has been fitted with an approved lifting point such as a hook or shackle, if it has been tested, plated and certified for its safe working load, and if all other regulation requirements have been met (consult your JCB distributor).

WARNING

Before lifting a load with the backhoe, read the following:

A bucket must be fitted when lifting with the backhoe. Check that the load is not greater than the safe working load for the backhoe. To obtain the safe working load for the backhoe unit, subtract the weight of the bucket from the relevant figure given for safe working load - no bucket fitted, see **Safe Working Loads - Craning (No Bucket Fitted)** in SPECIFICATIONS Section.

Always use lifting tackle which is strong enough and in good condition. Check the load weight before choosing the lifting chains.

Use a signalman when lifting with the backhoe. Make sure you both understand and use the recognised signals.

Attach a handline to the load. Make sure the person holding the handline stands clear of the load and machine. Test the load by lifting it 25-50 mm (one or two inches) and slowly manoeuvring it across the ground with the backhoe controls.

Keep all persons clear of the load and machine while the load is on the backhoe.

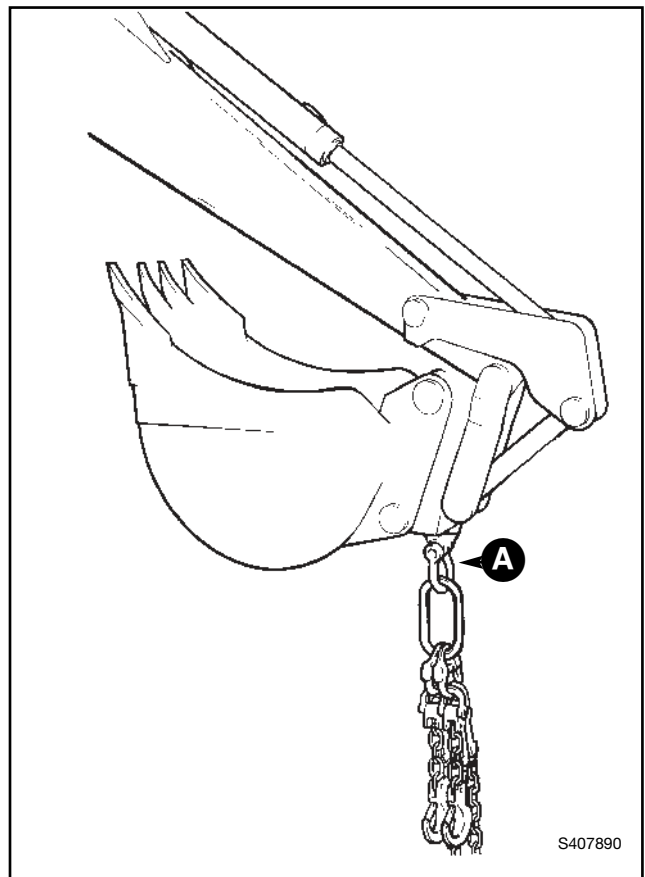
Lower the load to the ground if you feel any instability - of the load or the machine.

Failure to take these precautions could result in death or injury.

For further information read, **Lifting (Craning) Regulations and Safe Working Loads** in SPECIFICATIONS Section.

2-2-7-2

- 1 Position the machine, see **Preparing to use the Backhoe**.
- 2 Attach the lifting chains to the shackle **A**. Keep the chain length as short as possible, to prevent swinging. Start the lift with the bucket closed. Set the dipper in close to the boom.
- 3 Open the bucket (slowly) to bring the load up and out. Then swing the dipper out to raise the load. Open the bucket to adjust the height accurately.
- 4 Lower the load by bringing the dipper in.



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OPERATING IN LOW AND HIGH TEMPERATURES

Low Temperatures

In low temperature situations, take the following precautions. They will make for easier starting and prevent possible damage to your machine

- 1 Use the correct viscosity engine lubricating oil.
- 2 If available use a low temperature diesel fuel.
- 3 Use the correct coolant mixture.
- 4 Keep the battery at full charge.
- 5 Fill the fuel tank at the end of each work period. This will help to prevent condensation forming on the tank walls.
- 6 Protect the machine when not in use. Park the machine inside a building or cover it with a tarpaulin.
- 7 Install a cold weather starting aid. In very low temperatures, -20°C (-4°F). Below, -20°C (-4°F) an ether cold start kit is available, refer to manufactures instructions for use and fitment. Examples are fuel, oil and coolant heaters. Ask your JCB distributor for advice.
- 8 Remove snow from the bonnet and air intake area **A** (between windshield and bonnet) before starting, otherwise snow could get into the air cleaner.

WARNING

Do not attempt to operate the machine immediately after starting in cold conditions. The machine may not respond properly to control movements. Allow at least 10 minutes warm up time with the engine at half throttle. Operate the arm and bucket services to warm the hydraulic oil

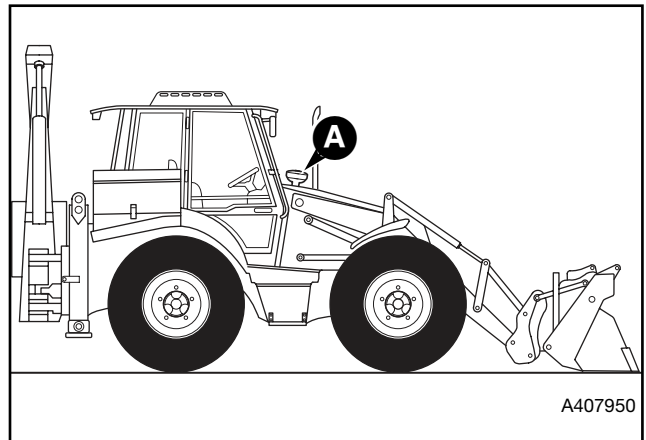
3-1-1-5

- 9 If using snow chains, refer to the manufactures instructions for fitment and usage. When snow chains are fitted the front fender must be removed and the machine driven in 2 wheel steer 2nd gear.

High Temperatures

In high temperature situations, take the following precautions to prevent possible damage to the machine.

- 1 Use the correct viscosity engine lubricating oil.
- 2 Use the correct coolant mixture.
- 3 Check the coolant system regularly, keep the coolant at the correct level. Make sure there are no leaks.
- 4 Keep the radiator clean, regularly remove dirt and debris from the radiator and the engine.
- 5 Check the fan belt regularly.



MOVING A DISABLED MACHINE

Preparation for Towing

Do not tow a machine unless there is no alternative. Remember that further damage might be caused to the machine by towing it. If at all possible repair the machine where it stands. If the machine must be towed read the following **CAUTIONS** and **WARNINGS** and use the procedure given here.

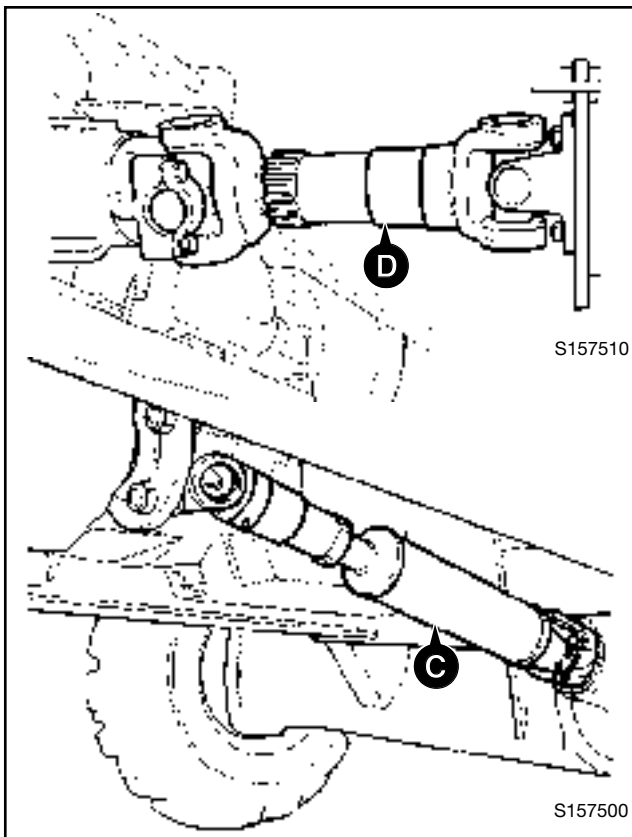
CAUTION

Use a rigid draw-bar. If a towing chain must be used, then use two towing vehicles. One towing vehicle should be coupled to the front of disabled machine. The other towing vehicle should be coupled to the rear of disabled machine, to provide braking power.

The towing vehicle(s) must have enough pulling and braking power to move and stop the machine.

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- 1 Engage the parking brake.
- 2 Set the forward/reverse lever to neutral.
- 3 Remove the front **C** and rear **D** drive propshafts. Refer to Service Manual 9803/3275 section F for fitting of propshaft procedure.



- 4 Prepare the machine for travel. If the engine cannot be run, the backhoe, loader and stabilisers must be hoisted into their transport positions and secured.

The procedure for doing this will depend on the machine's condition and its hydraulic circuits.

For this reason you should contact your JCB Distributor for help and advice before attempting this work.

- 5 Attach the drawbar to towing points **A** or **B**. Both towing points at either the front or the rear of the machine must be used to spread the load evenly. The maximum load is limited to 7500kg for each tow point within 22°, as shown at **E**.

WARNING

Block the loader arms before attaching the draw-bar.

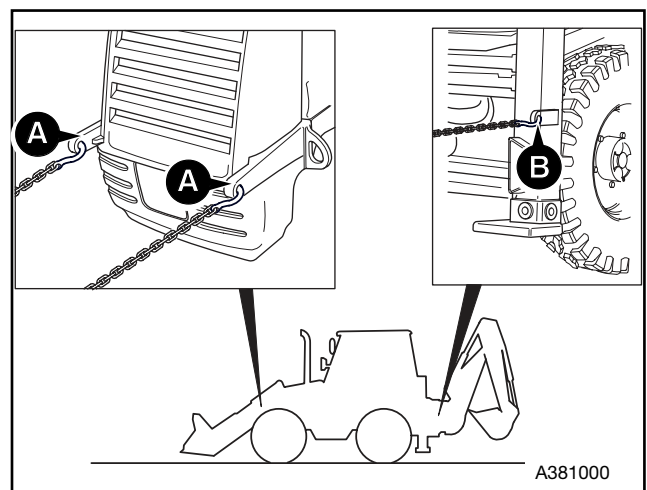
2-2-7-4

The machine is now ready for towing. Make sure you understand what the towing driver will be doing. Obey his instructions and all relevant regulations.

CAUTION

Do not tow faster than 16 Kph (10 mph).

Also note that if the engine cannot be started, the effort required to steer the machine is greatly increased.



LIFTING A MACHINE

The procedure detailed below is NOT applicable for airlifting. Refer to JATEU HEL section for safe lifting with helicopter.

Lifting points are provided on the chassis **A** and the stabiliser legs **B**.

Carry out the following procedure when lifting a machine:

The backhoe is in the tucked in position and the boom and slew locks are fully engaged.

Remove all attachments.

Switch OFF the engine, remove the key, shut window(s), vacate the machine and shut the door.

Remove all loose equipment from machine exterior.

Check the unladen weight of the machine, see **Static Dimensions** (SPECIFICATIONS section).

⚠ WARNING

You can be injured if you use faulty lifting equipment. Make sure that lifting equipment is in good condition. Make sure that lifting tackle complies with all local regulations and is suitable for the job. Make sure that lifting equipment is strong enough for the job.

INT-1-3-7

Attach lifting equipment to lifting points as shown.

Take the weight of the machine. If the lifting equipment is fouling on the machine use spreader bars to prevent damage.

Check that the lifting eye is positioned directly above the machine centre of gravity, see **Static Dimensions** (SPECIFICATIONS section).

⚠ DANGER

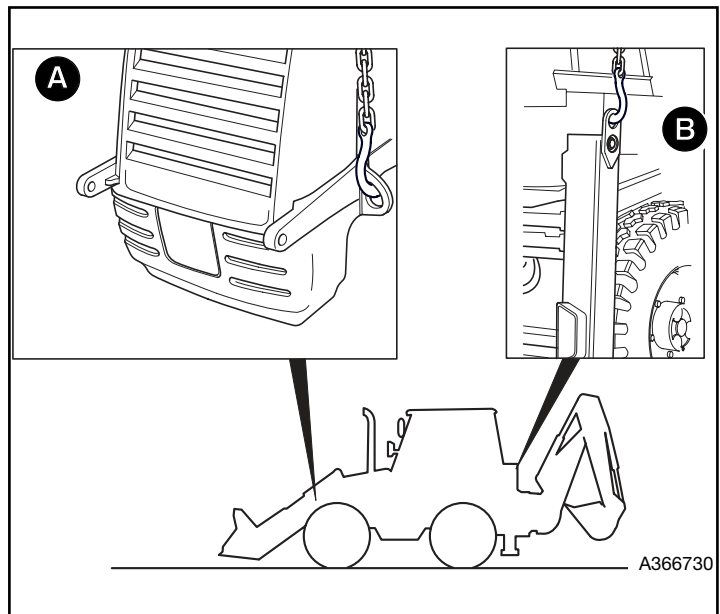
Do not stand underneath a raised load. Stand clear and to one side until the load has been safely lowered. Make sure that the area is clear of other people before lowering the load. If you do not follow these precautions you or others could be killed or seriously injured.

2-3-5-3

⚠ WARNING

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



TRANSPORTING THE MACHINE

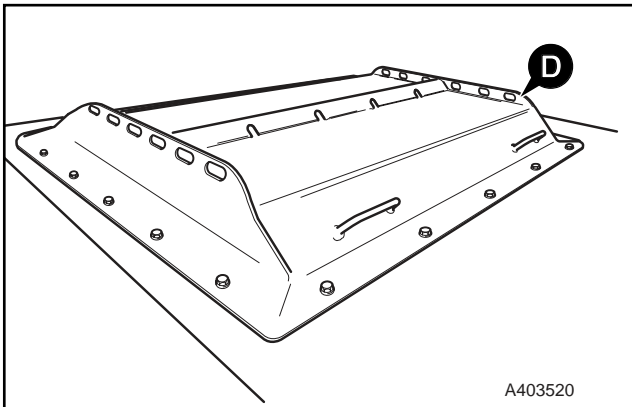
The safe transit of the load is the responsibility of the transport contractor and driver. Any machine, attachments or parts that may move during transit must be adequately secured.

5-2-5-9

Note 1: 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 (SPECIFICATIONS section)* for the dimensions of your machine.

Note 2: Before loading the machine into a cargo hold with a height restriction, if applicable, remove the detachable cab roof section **D**. For overall machine heights see *Static Dimensions (SPECIFICATIONS section)*. Undo the retaining bolts and stow the roof section correctly, see *DETACHABLE ROOF SECTION, Removing (OPERATION section)*.



WARNING

Before moving the machine onto the trailer, make sure that the trailer and ramp are free from oil, grease and ice. Remove oil, grease and ice from the machine tyres. Make sure the machine will not foul on the ramp angle. See *Static Dimensions (SPECIFICATION section)* for the minimum ground clearance of your machine.

2-2-7-5/1

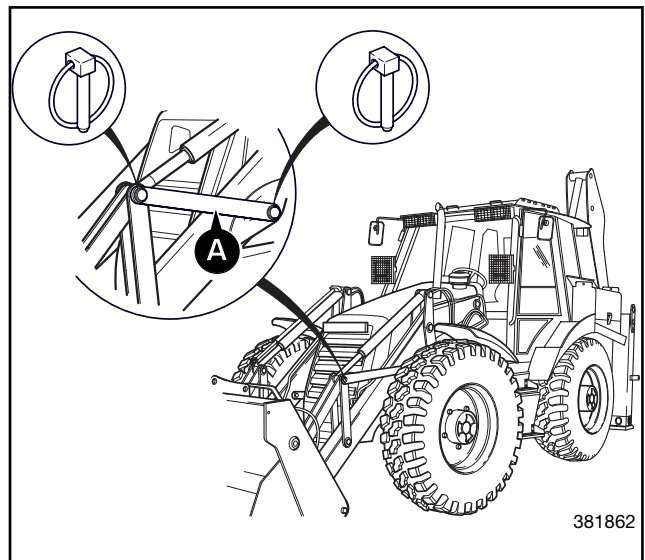
- 1 Place chocks at the front and rear of the trailer wheels.
- 2 Move the machine onto the trailer.
 - a Make sure the ramps are correctly in place and secure.
 - b Set the loader shovel and backhoe as in *Preparing for Road Travel (OPERATION section)*.
 - c Carefully drive the machine onto the trailer.

- 3 Engage the parking brake and set the drive to neutral.
- 4 When the machine is safely in position, release the boom lock, lower the backhoe onto the trailer. Lower the stabilisers.
- 5 Fit the slew lock.

Note 3: If for any reason the slew lock can not be fitted, then the bucket must be securely lashed to the trailer bed, if no bucket is fitted, then secure the dipper end to the trailer bed.

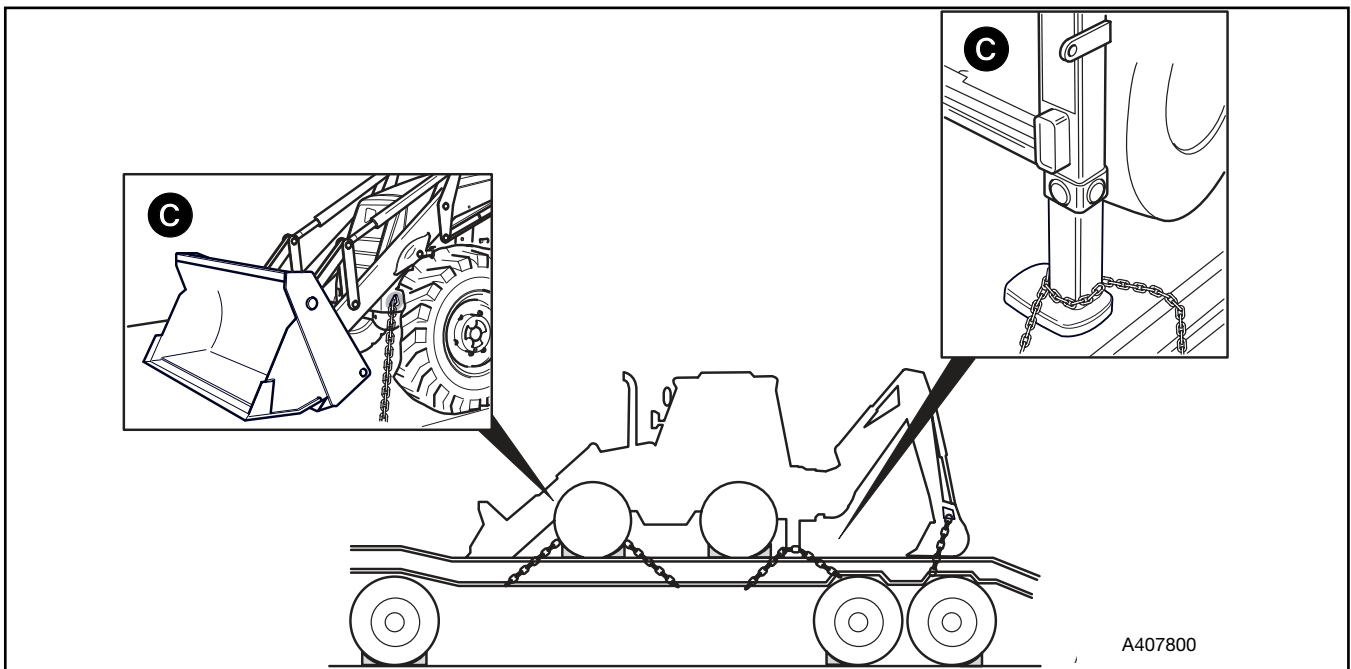
- 6 Lower the loader shovel and fit the strut **A**.

Note 4: The machine can be transported together with its ancillary equipment if required. The equipment must be correctly stowed, see *Ancillary Equipment (OPTIONAL ATTACHMENTS Section)* for the correct procedure.



TRANSPORTING THE MACHINE (continued)

- 7 Check that the overall height of the load is within regulations, see **Note 2** opposite. Adjust if necessary.
- 8 Fit the loader and backhoe lever locks, see Backhoe and Loader Controls.
- 9 Switch off the engine.
- 10 Secure the cab.
- 11 Cover the exhaust stack.
- 12 Put chocks at the front and rear of all four tyres. Anchor the machine to the trailer with chains. The anchor points **C** are shown on the illustration.
- 13 Measure the maximum height of the machine from the ground. Make sure the truck driver knows the clearance height before he drives away.



DETACHABLE ROOF SECTION

The preferred method for removing and replacing the detachable roof section is to use a mechanical lifting device (crane or hoist). If however a suitable lifting device is not available, the roof section can be removed manually using 4 people as illustrated.

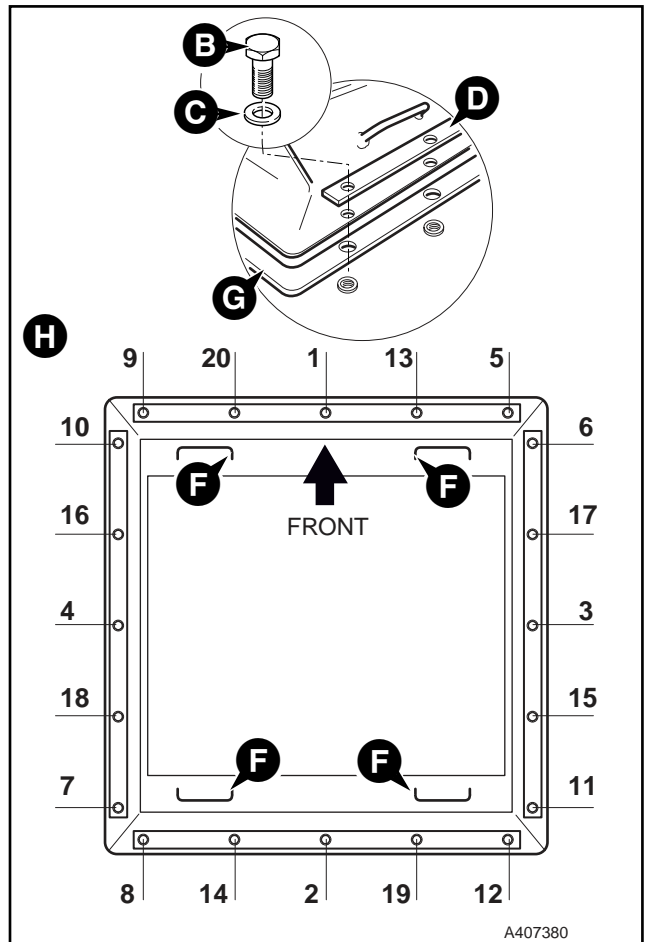
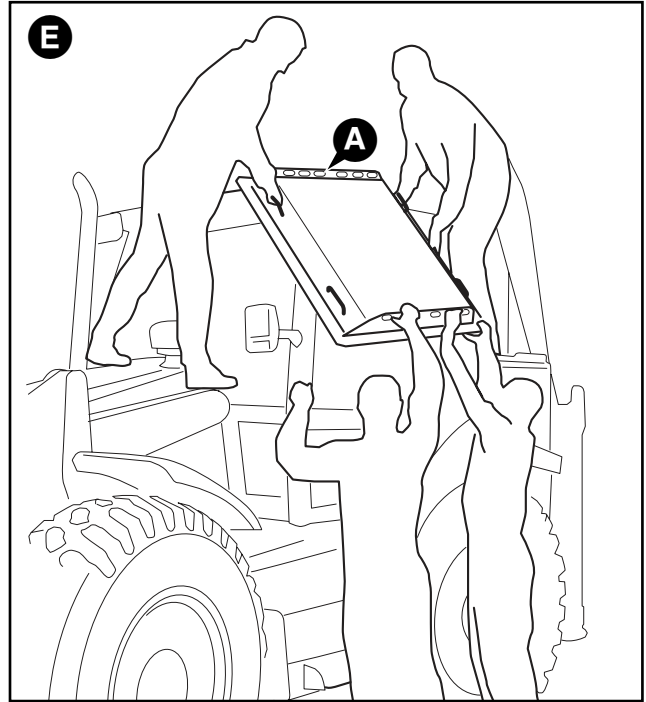
Note: The detachable roof section **A** weighs 48.5 kg and requires 4 people to safely remove and replace.

Removing

- 1 Park the machine on firm level ground. Lower the loader to the ground. Set the transmission to neutral and apply the parking brake. Stop the engine and remove the starter key.
- 2 Undo and remove the 20 bolts **B** together with washers **C**.
- 3 Remove the 4 spreader bars **D**.
- 4 Station 2 people on the machine and 2 people on the ground as shown at **E**. Using the lifting handles **F** remove the section and pass it to the people on the ground as shown at **E**.
- 5 Carefully remove the sealing gasket **G**. Roll up the gasket and stow, together with the bolts, washers and spreader bars, in the tools stowage box.

Replacing

- 1 Park the machine on firm level ground. Lower the loader to the ground. Set the transmission to neutral and apply the parking brake. Stop the engine and remove the starter key.
- 3 Carefully locate the sealing gasket **G** on the cab roof. Make sure that the holes in the gasket fit around the threaded holes in the cab roof.
- 4 Station 2 people on the machine and 2 people on the ground as shown at **E**. Using the lifting handles **F** lift the section and pass it to the people on the machine as shown at **E**.
- 5 Carefully locate the roof section on the gasket **G**, be sure not to dislodge the gasket. Locate the 4 spreader bars **D**. Fit the washers **C** and bolts **B** and tighten finger tight.
- 6 Use a 19mm socket and 1/2 inch drive ratchet tighten the bolts in the sequence shown at **H** the clamp bars are flat on the removable roof and no gaps can be seen between the clamps and the removable roof.
- 7 Further tighten bolts **B** in the sequence shown at **H** until the gasket begins to compress. Tighten the bolts in the same sequence a further 180 degrees (1/2 a turn).



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FIRE EXTINGUISHER

The following instructions are of a general nature intended to familiarise the user with basic techniques of using this hand portable fire extinguisher. Consult the extinguisher instruction label for specific procedures.

Using the Fire Extinguisher

The fire extinguisher should be inspected daily.

WARNING

Do not use the fire extinguisher in a confined space. Make sure that the area is well ventilated during and after using the extinguisher.

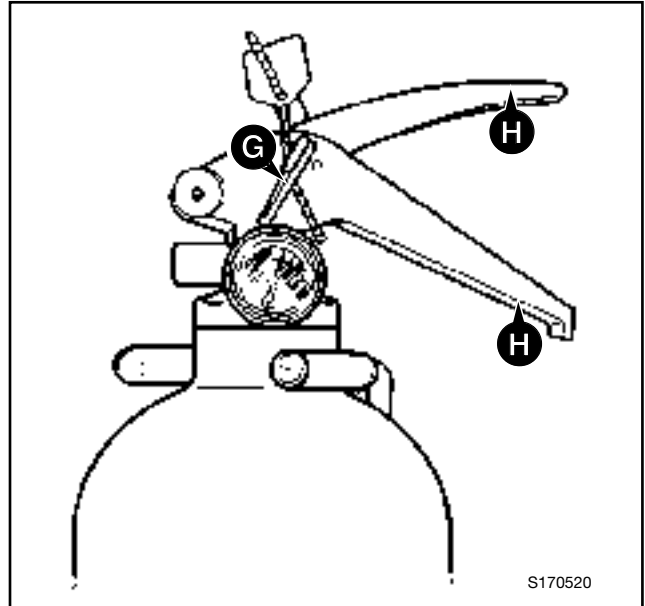
4-2-3-1

- 1 Remove extinguisher from its stowage bracket.
- 2 Hold the extinguisher upright, remove safety pin **G** which will snap the tamper proof seal.
- 3 Stand back from the fire a safe distance and aim, wherever possible, at the base of the fire.
- 4 Keeping the extinguisher upright, squeeze the triggers **H** together to discharge and sweep from side to side to cover the whole area of the fire. Move closer as the fire is extinguished but so close as to scatter burning material. Release the handles to stop the discharge as soon as the fire is extinguished.
- 5 Watch out for re-ignition and use any remaining powder to extinguish.

WARNING

After any use, the extinguisher should be replaced or serviced.

4-2-3-2



LUBRICANTS - HEALTH AND SAFETY

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

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.
- 3 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.
- 4 Avoid skin contact with oil soaked clothing.
- 5 Don't keep oily rags in pockets.
- 6 Wash dirty clothing before re-use.
- 7 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

Extinguish with carbon dioxide, dry chemical or foam. Fire-fighters should use self-contained breathing apparatus.

SERVICE REQUIREMENTS

Introduction

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

Maintenance

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

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

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

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

At the rear of this Handbook is a Service Record Sheet which will enable you to plan your service requirements and keep a service history record. This record sheet should be dated, signed and stamped by your Distributor each time your machine is serviced.

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

Owner/Operator Support

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

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

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

- 1 Giving your name, address and telephone number.
- 2 Quoting your machine model and serial number.
- 3 Date of purchase and hours of work.
- 4 Nature of the problem.

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

Service/Maintenance Agreements

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

Please consult your JCB Distributor for details.

Lifting Regulations - Inspections and Tests

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

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

CLEANING THE MACHINE

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

Clean the machine using water and/or steam. Do not allow mud, debris etc to build up in the following areas:

- 1 Backhoe hoses passing through mainframe.
- 2 Around twin slew rams.
- 3 Twin ram slew recess in chassis (centremount).
- 4 Kingpost slide rails (sideshift).
- 5 Kingpost hose tray and bottom 'shelf' (sideshift).
- 6 Recess between slew ram and kingpost casting (sideshift).

Do not allow mud to build up on the engine and transmission. Make sure the radiator grille is not clogged up.

WARNING

Airborne particles of light combustible material such as straw, grass, wood shavings, etc. must not be allowed to accumulate within the engine compartment or in the propshaft guards (when fitted). Please inspect these areas frequently and clean at the beginning of each work shift or more often if required. Before opening the engine cover, ensure that the top is clear of debris.

5-3-1-12/2

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

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

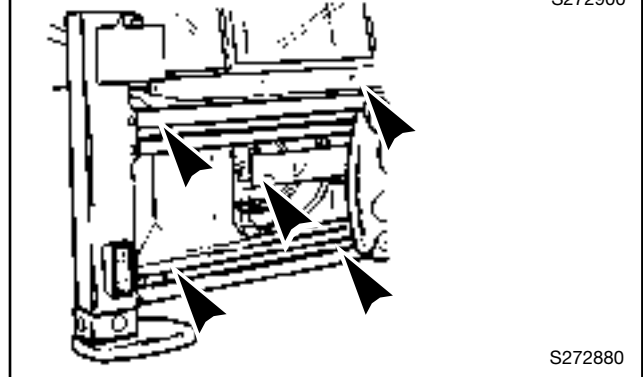
Note: The machine must always be greased after pressure washing or steam cleaning.

Always adhere to local regulations regarding the disposal of debris created from machine cleaning.

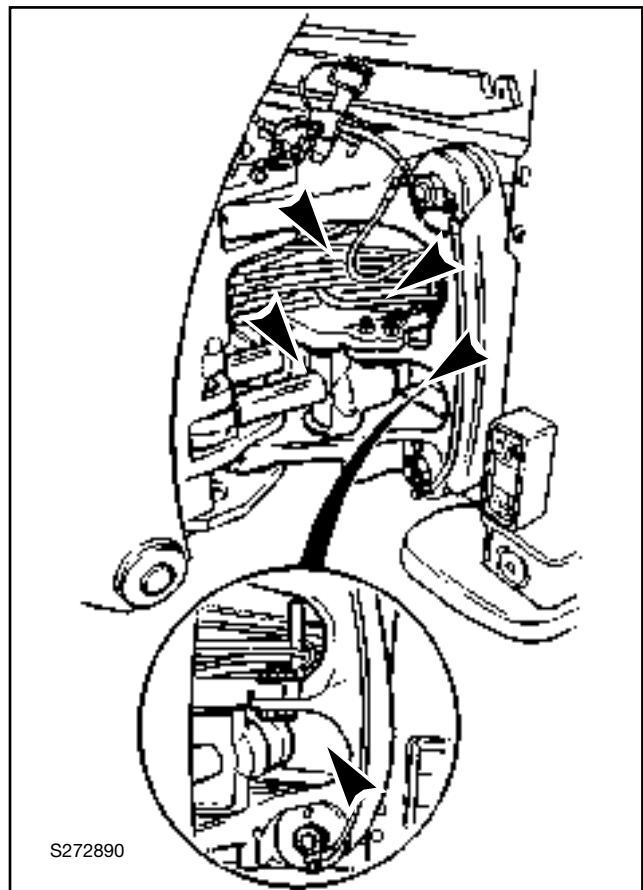
The illustrations show some of the areas that must be thoroughly cleaned as required.



S272900



S272880



S272890

CHECKING FOR DAMAGE

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

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

Ensure that the steps and handrails are undamaged and secure.

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

Check all bucket teeth for damage and security.

Check all lamp lenses for damage.

Inspect the tyres for damage and penetration by sharp objects.

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

OBTAINING REPLACEMENT PARTS

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




Your dealer will need to know the exact model, build and serial number of your machine. The machine's serial number is stamped on a data plate at the right hand side of the machine.

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

WARNING

Some parts of your machine have Warning Decals attached. Before you fit a replacement part, make sure it has its warning decal, fixed in its correct position. See *Safety Decals* in *INTRODUCTION* section. Contact your distributor if the decal is missing.

2-3-5-2/

 		J.C.BAMFORD EXCAVATORS LTD. ROCESTER, STAFFS, ENGLAND CONSTRUCTOR		
<input type="text"/> VIN Vehicle Identification Number		<input type="text"/> PIN Product Identification Number		
<input type="text"/> ENGINE SERIAL NUMBER		<input type="text"/> FRONT AXLE SERIAL NUMBER		
<input type="text"/> TRANSMISSION SERIAL NUMBER		<input type="text"/> REAR AXLE SERIAL NUMBER		
<input type="text"/> WEIGHT kg	<input type="text"/> YEAR OF CONST.	<input type="text"/> ENGINE POWER kW @ RPM		
				817/00000

A276550

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

WARNING

Maintenance

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 arms raised, then the loader arm safety strut must be fitted as shown in *Loader Arm Safety Strut* in MAINTENANCE section.

2-3-1-1

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

Calendar equivalents:

10 Hours	=	Daily
50 Hours	=	Weekly
500 Hours	=	Six Months
1000 Hours	=	Yearly
2000 Hours	=	2 Years

Pre-start Cold Checks Service Points and Fluid Levels	Operation	10 Hr	50 Hr	†100 Hr	500 Hr	1000 Hr	2000 Hr
ENGINE							
Oil level	- Check	•	•				
Oil and Filter ④	- Change			•	•	•	•
Air Cleaner Outer Element ⑥	- Change					•	•
Air Cleaner Inner Element	- Change						•
Fuel Filter	- Change			•	•	•	•
Fuel Filter	- Drain		•				
Coolant Quality/Level	- Check	•	•	•	•	•	•
Fuel Sedimenter	- Drain and Clean		•	•	•	•	•
Fan Belt Tension/Condition	- Check		•	•	•	•	•
Valve Clearances ③	- Check and Adjust						•
Engine Mounting Bolts for Tightness ③	- Check			•	•	•	•
Radiator	- Clean				•	•	•
All Hoses - Condition	- Check			•	•	•	•
TRANSMISSION, AXLES AND STEERING							
Transmission Oil Level	- Check	•	•	•	•		
Transmission Oil ⑧	- Change					•	•
Transmission Filter	- Change			•	•	•	•
Axle Oil Level (incl. Hubs when applicable) ①	- Check			•	•	•	•
Axle Oil (incl. Hubs when applicable) ⑨ ⑩	- Change	See ⑩					
Tyre Pressures/Condition	- Check		•	•	•	•	•
Front Hub Bearings ③	- Check			•	•	•	•
Transmission Strainer	- Clean					•	•
Drive Shafts	- Security/Grease			•	•	•	•
Steer Axle Movement/Shimming ③	- Check			•	•	•	•
Steer Axle Pivots and Linkages ⑦	- Grease			•	•	•	•
Front Axle Main Pivot	- Grease	•	•	•	•	•	•
HYDRAULICS							
Oil Level ②	- Check	•	•	•	•	•	
Oil ③	- Sample/Change						•
Oil Filter	- Change			•	•	•	•
Rams - Chrome Condition	- Check			•	•	•	•

SERVICE SCHEDULES (continued)

Pre-start Cold Checks Service Points and Fluid Levels	Operation	10 Hr	50 Hr	†100 Hr	500 Hr	1000 Hr	2000 Hr
Hydraulic Oil Cooler	- Clean				•	•	•
Hydraulic Oil Strainer	- Clean						•
Hydraulic Tank Filler Cap (with integral filter)	- Change						•
Hydraulic Pump Drive Shaft	- Examine/Grease			•	•	•	•
BRAKES							
Brake System Fluid Level	- Check	•	•	•	•	•	•
Brake System Fluid ③	- Change						•
Parking Brake	- Check and Adjust			•	•	•	•
ELECTRICS							
Battery Electrolyte Level (if applicable)	- Check				•	•	•
Wiring for Chaffing/Routing	- Check		•	•	•	•	•
Battery Terminals for Condition and Tightness	- Check			•	•	•	•
BODYWORK AND CAB							
All Pins and Bushes	- Check and Grease	•	•	•	•	•	•
Door/Window Hinges	- Lubricate				•	•	•
All Cables	- Lubricate				•	•	•
Cab Heater Filter ⑥	- Clean/Change				•	•	•
Hydraclamp ③	- Check and Adjust			•	•	•	•
Door - Fit and Catches	- Check			•	•	•	•
Cab Seat - Operation	- Check			•	•	•	•
Front Mudguards - Security (if fitted)	- Check			•	•		
Windscreen Washer Fluid Level	- Check	•	•	•	•	•	•
Boom Lock Engagement	- Check	•	•	•	•	•	•
Condition of Paintwork	- Check			•	•	•	•
Stabiliser Legs (Sideshift)	- Check/Adjust		•	•	•	•	•
Machine Generally ③	- Check and Clean	•	•	•	•	•	•
ATTACHMENTS							
Multi-Purpose Shovel	- Grease	•	•	•	•	•	•
Backhoe & Loader Quick Hitch	- Grease	•	•	•	•	•	•
Sideshift Carriage	- Grease	•	•	•	•	•	•
Functional Test and Final Inspection							
ENGINE							
Idle Speed ③	- Check and Adjust			•	•	•	•
Stall Speed ③	- Check			•	•	•	•
Maximum No-Load Speed ③	- Check and Adjust			•	•	•	•
Exhaust Smoke (excessive)	- Check		•	•	•	•	•
Exhaust System Security ③	- Check			•	•	•	•
Air Inlet System Security	- Check			•	•	•	•
Throttle System and Control Cable ③	- Check			•	•	•	•
TRANSMISSION, AXLES AND STEERING							
Steer Modes - Operation	- Check	•	•	•	•	•	•
2WD/4WD Selection	- Check			•	•	•	•

SERVICE SCHEDULES (continued)

Wheel Nuts Torque	- Check	•	•	•	•	•	•
Forward/Reverse and Gear Change - Operation	- Check			•	•	•	•
Functional Test and Final Inspection	Operation	10 Hr	50 Hr	†100 Hr	500 Hr	1000 Hr	2000 Hr
Hydraulic Speed Control - Operation (if fitted)	- Check			•	•	•	•
Steer Circuit Pressure ③	- Check			•	•	•	•
Transmission Main Line Pressure ③	- Check				•	•	•
Transmission Dump Operation	- Check			•	•	•	•
Neutral Start Operation	- Check		•	•	•	•	•
Clutch Pack Pressures ③	- Check			•	•	•	•
HYDRAULICS							
MRV Pressure ③	- Check and Adjust			•	•	•	•
Operation All Services	- Check		•	•	•	•	•
Hose Burst Protection Valves (if fitted)	- Check			•	•	•	•
Offloader Valve Pressure ③	- Check and Adjust			•	•	•	•
Auxiliary Circuit & Pressures ③	- Check and Adjust			•	•	•	•
BRAKES							
Foot Brake - Operation	- Check	•	•	•	•	•	•
Parking Brake - Operation	- Check	•	•	•	•	•	•
Servo Operation (if fitted)	- Check			•	•	•	•
ELECTRICS							
Starter Motor	- Check			•	•	•	•
Alternator - Output	- Check			•	•	•	•
All Electrical Equipment Operation, (e.g. warning lights, beacon, alarms, horn, wipers etc)	- Check	•	•	•	•	•	•
Operation of Stop Control/E.S.O.S.	- Check	•	•	•	•	•	•
BODYWORK AND CAB							
Teeth and Side Cutters	- Check			•	•	•	•
Doors and Windows - Fitment/Leaks	- Check			•	•	•	•
Seat/Seat Belts	- Check			•	•	•	•

† **Note:** First 100 Hours Service only, to be completed by your JCB Distributor.

- ① **Note:** Check for leaks every 50 hours, check level if leaking.
- ② **Note:** Check the hydraulic fluid level with the loader and backhoe in the travel position.
- ③ **Note:** Jobs which should only be done by a specialist are indicated by a ③.
- ④ **Note:** If operating under arduous conditions, change the engine oil and filter every 250 hours.
- ⑤ **Note:** Check generally for leaks on ALL systems, for example, hydraulic, engine (coolant, fuel and oil), transmission, brakes, axles etc. If a leak is evident find the source and repair as required. Make sure that the system is topped up with the recommended fluid after repair. Examples of machine general damage are paintwork, toe plate, glazing rubbers etc., repair any damage as required. If any of the repair or top up procedures are not detailed in this handbook, then contact your local JCB Distributor for advice.
- ⑥ **Note:** If operating in dusty working environments, change more frequently.
- ⑦ **Note:** The axles and driveshafts are factory greased with a high performance grease, if during service a standard grease is used, then the interval must be reduced to every 50 hours, contact your JCB Distributor for advice.
- ⑧ **Note:** After a major transmission 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 and filter after a further 100 hours if the oil was heavily contaminated because of, or from the failure (eg. water contamination).
- ⑨ **Note:** 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. This is particularly important if new brake plates have been fitted.
- ⑩ **Note:** Change the oil at 3 yearly interval.

LOADER ARM SAFETY STRUT

Installing

Install the loader arm safety strut as detailed below before working underneath raised loader arms.

⚠ WARNING

Raised loader arms can drop suddenly and cause serious injury. Before working under raised loader arms, fit the loader arm safety strut.

2-1-1-6

1 Empty the Shovel and Raise the Loader Arms fully.

2 Stop the Engine

Remove the starter key.

⚠ WARNING

You could be killed or injured if the loader control is accidentally operated. Make sure no-one comes near the machine while you release the safety strut.

2-3-1-2

3 Release the Strut

- a Release fastener **A**.
- b Remove strut **C** from its stowage bracket.

4 Install the Strut

- a Push strut **C** over the ram piston rod.
- b Secure the strut in position with strap **B**.

5 Lower the Strut Onto the Cylinder

To prevent any chance of the loader arms creeping down and trapping your fingers, the loader arms should be carefully lowered onto the safety strut as shown.

Start the engine and slowly lower the loader arms onto the safety strut, stop the movement immediately the weight of the loader arms is supported by the safety strut.

Note: When lowering the loader, operate the control lever carefully. 'Feather' the lever to lower the loader very slowly.

Removing

1 Fully Raise the Loader Arms

To take the weight off the safety strut.

2 Stop the Engine

Remove the starter key.

⚠ WARNING

You could be killed or injured if the loader control is accidentally operated. Make sure no one comes near the machine while you remove the safety strut.

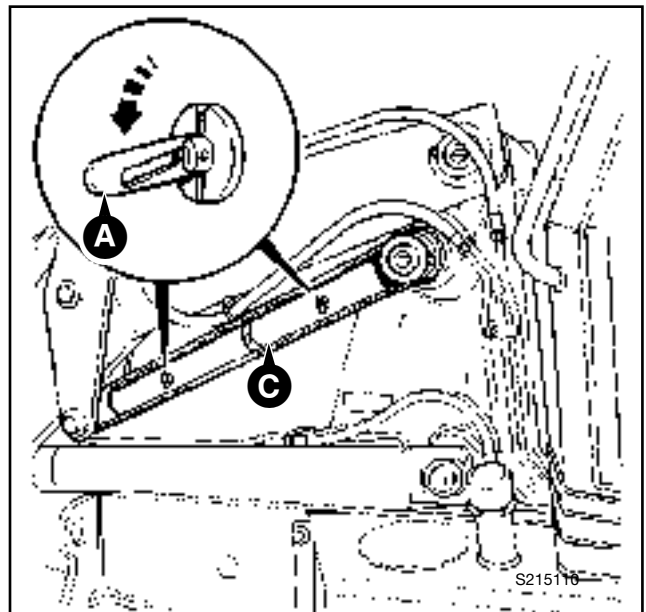
2-3-1-3

3 Remove the Strut

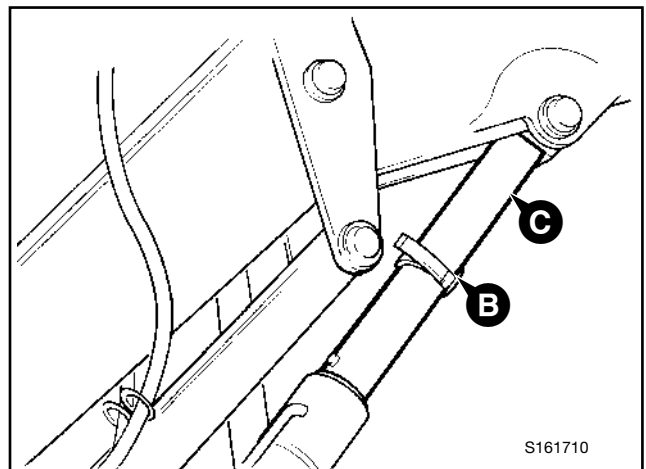
- a Undo the strap **B**.
- b Remove the strut **C** from the ram piston rod.

4 Stow the Strut

Secure the strut in its stowage position with fastener **A**.



S215110



S161710

ENGINE PANELS

Removing and Fitting a Side Panel

⚠ WARNING

The loader arms must be raised and locked before you remove an engine side panel. Keep the arms locked up until the side panel is put back. If you do not lock the loader arms, the shovel can fall and you could be crushed. See *Loader Arm Safety Strut* in **MAINTENANCE** section.

2-3-1-4/1

- 1 Raise and lock the Loader Arms.

⚠ WARNING

Do not remove the engine side panels while the engine is running.

2-3-1-5

- 2 Stop the engine and remove the starter key.

- 3 To remove a side panel:

Insert the key in the side panel lock, turn the handle **A** and holding the handle **A** and grab handle **B** lift the panel off.

- 4 Reverse the above procedure to refit the panel, remember to lock the panel once it has been fitted.

Removing and Fitting the Access Panel

⚠ WARNING

Raised loader arms can drop suddenly and cause serious injury. Before working under raised loader arms, fit the loader arm safety strut.

2-1-1-6

To gain access to the engine oil dipstick, there is a small access panel **F** fitted in the right hand side panel.

To remove the access panel:

- 1 Make sure the park brake is engaged and the transmission set to neutral. If the loader arms are raised, lower them under their own weight, or fit the safety strut.
- 2 Use the starter switch key to unlock the panel.
- 3 Remove the panel (to prevent the panel from being lost, it is attached to a retaining wire).
- 4 Reverse the above procedure to refit the panel, remember to lock the panel once it has been fitted.

Removing and Fitting The Engine Cover

- 1 Remove the side panels.

⚠ WARNING

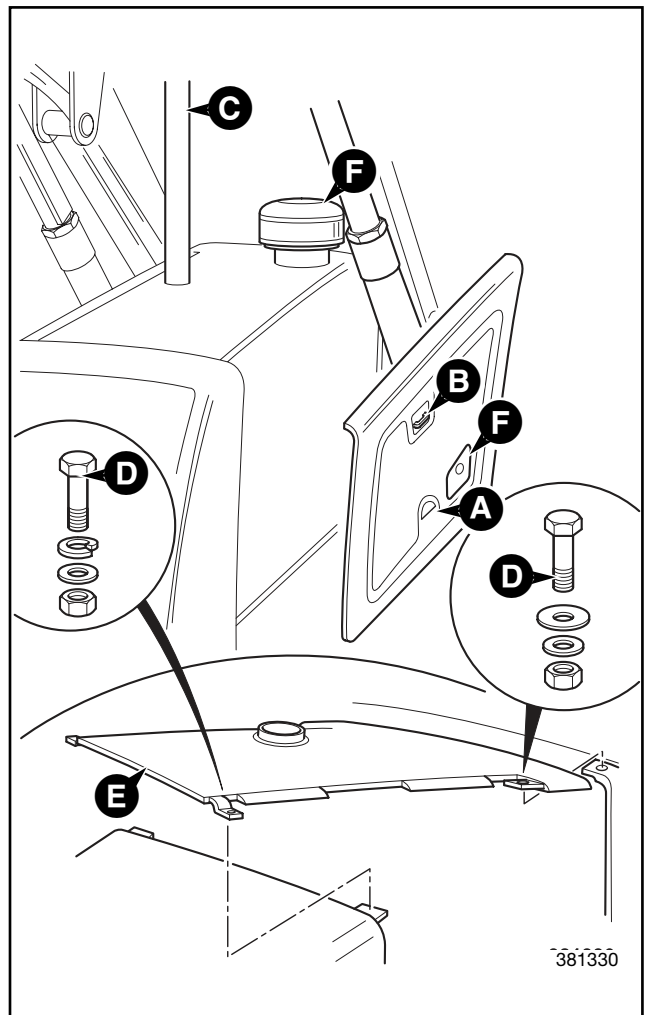
A hot exhaust will burn you. Make sure the exhaust stack is cool before removing it.

2-3-1-6

- 2 Lift-off the stack **C** and pre cleaner **F**.

- 3 Remove bolts **D** and lift off the cover **E**.

- 4 Reverse the above procedure to refit the engine cover.



381330

SEAT BELT

Checking the Seat Belt Condition and Security

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.

ROPS/FOPS STRUCTURE

Checking the ROPS/FOPS Structure

WARNING

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

INT-2-1-9/3

For assistance, contact your JCB distributor. Failure to take these precautions could result in death or injury to the operator.

Check the structure for damage. Check that the mounting bolts are installed and undamaged. Check the bolt torques. Tighten them to the correct torque if necessary.

Torque Settings

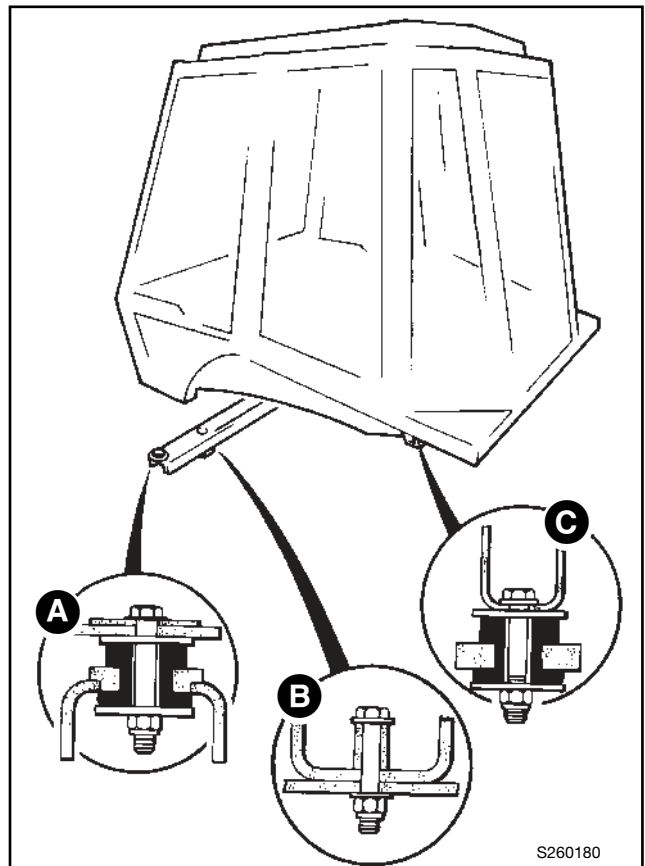
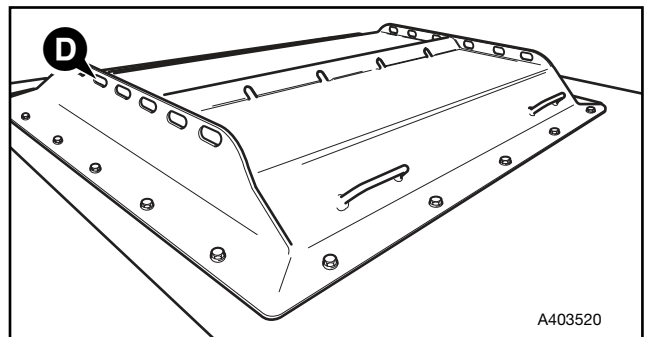
Bolts **A** 205 Nm (150 lbf ft)

Bolts **B** 476 Nm (352 lbf ft)

Bolts **C** 205 Nm (150 lbf ft)

IMPORTANT NOTE:

The detachable section of the cab roof section **D** must be fitted correctly for the ROPS/FOPS certification to be valid see *DETACHABLE ROOF SECTION, Replacing, (OPERATION Section)* for the correct procedure.



GREASING

You must grease the machine regularly to keep it working efficiently. Regular greasing will also lengthen the machine's working life.

The machine must always be greased after pressure washing or steam cleaning.

⚠ WARNING

You will be working close into the machine for these jobs. Lower the attachments if possible. Remove the starter key and disconnect the battery. This will prevent the engine being started. Make sure the parking brake is engaged.

Chock all four wheels before getting under the machine.

2-3-2-1

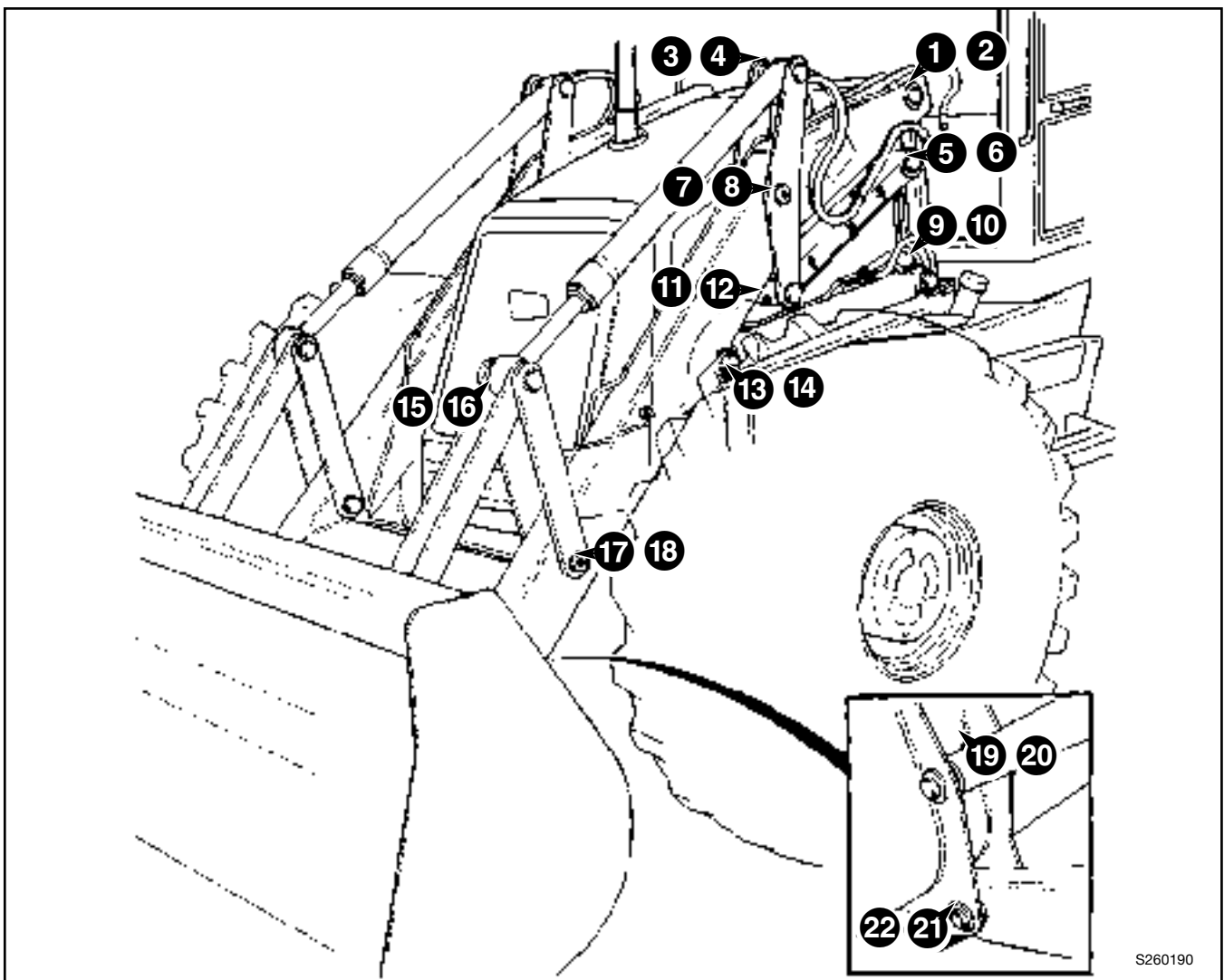
Greasing should be done with a grease gun. Normally, two strokes of the gun should be sufficient. Stop greasing when fresh grease appears at the joint.

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

Loader Arms

For each grease point shown, there is another on the other side of the machine.

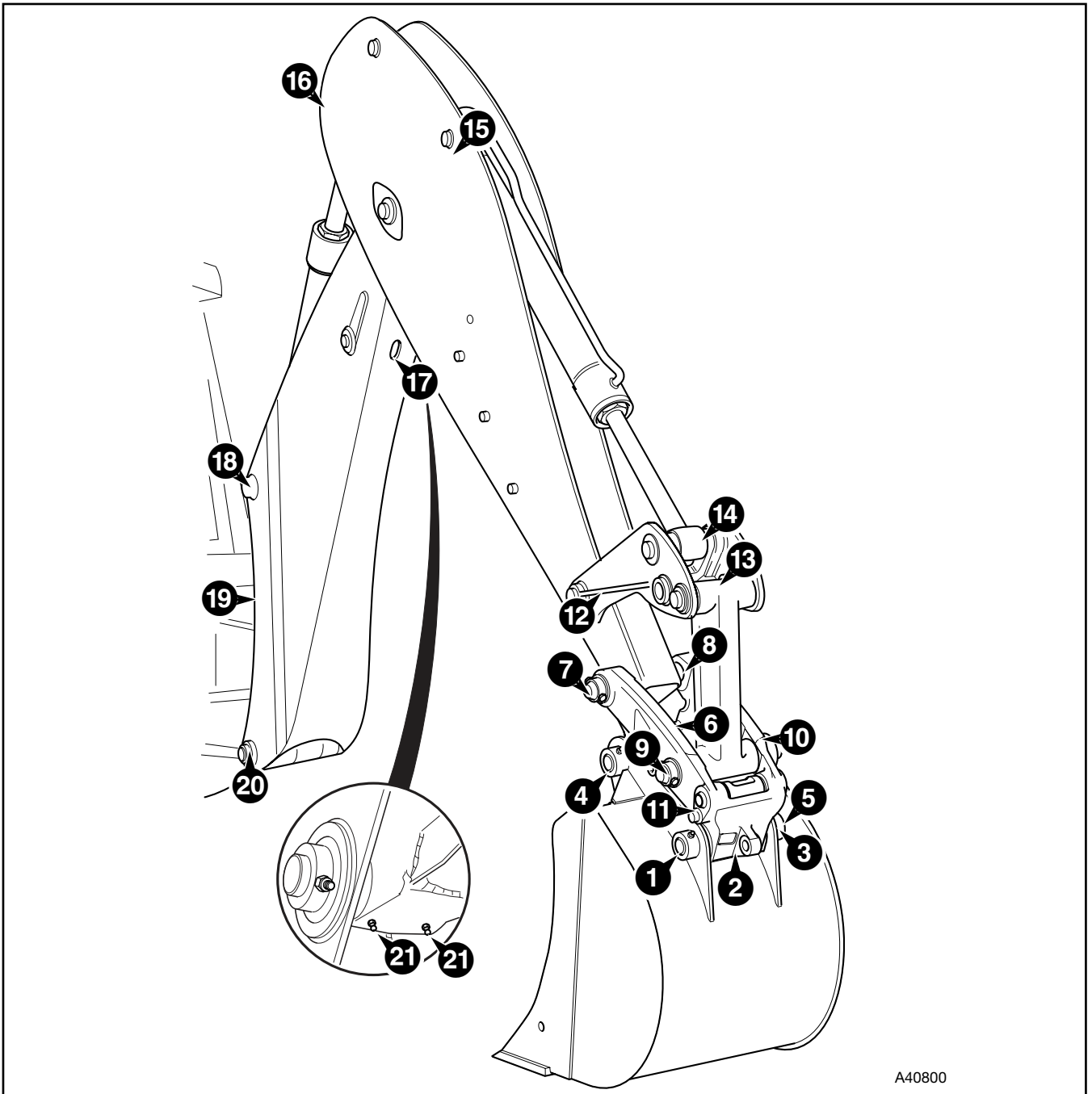
Total 22 grease points.



**GREASING
(continued)**

Backhoe & Quick Hitch

22 Grease Points



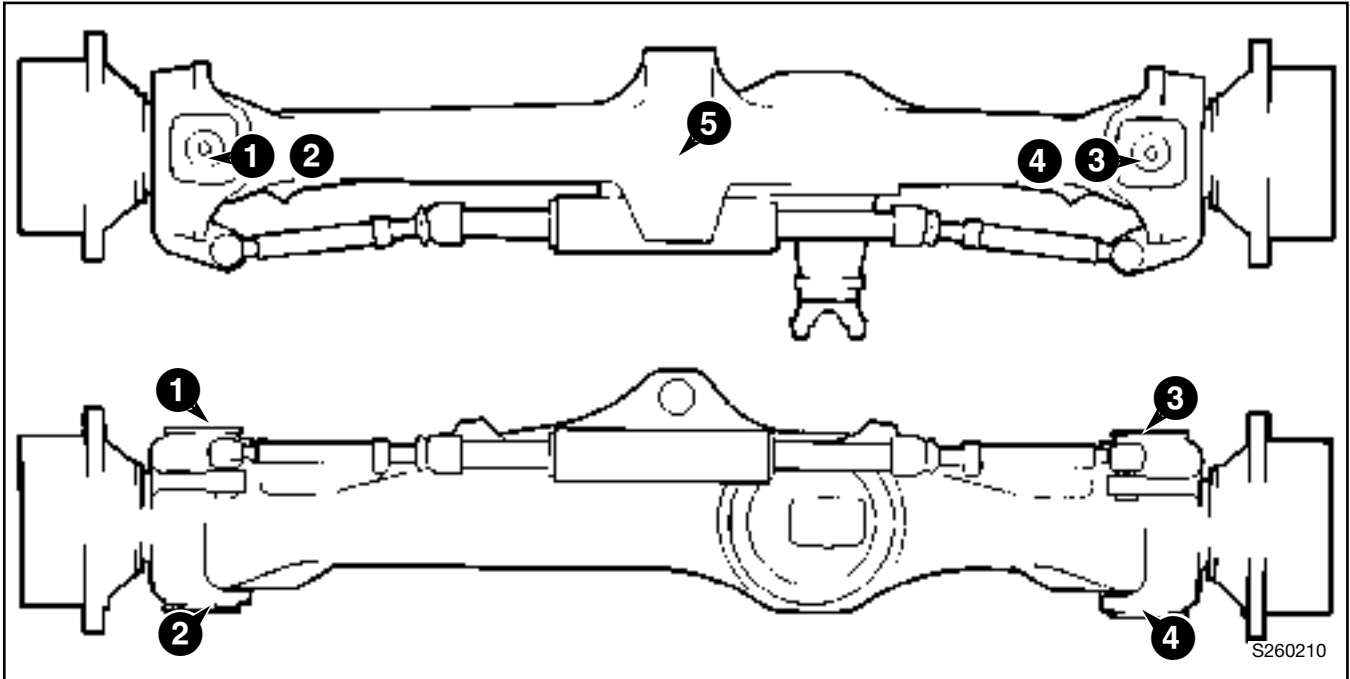
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GREASING (continued)

Front Axle

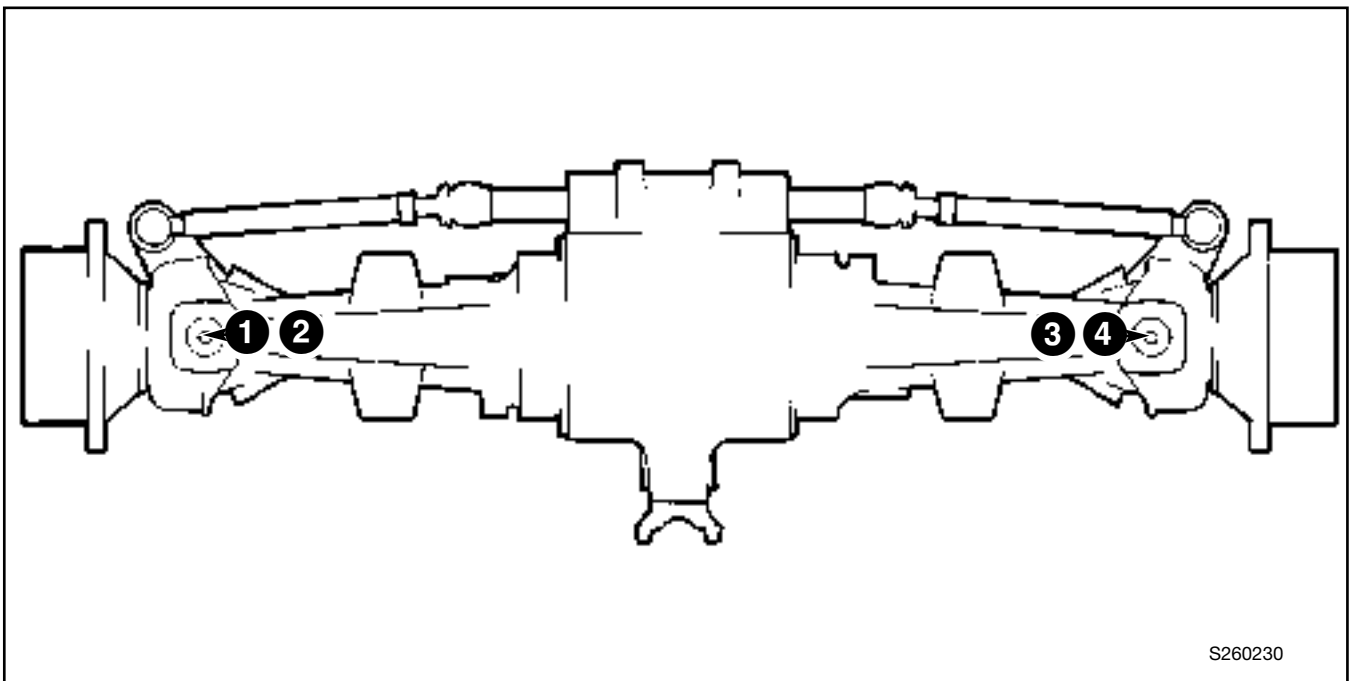
9 Grease Points

Note: Grease point 5 is a remote grease point mounted on the side of the mainframe chassis (near the left front wheel).



Rear Axle

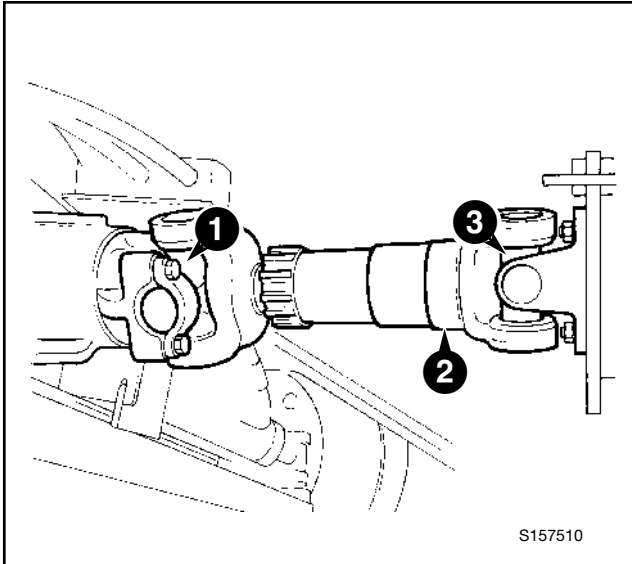
4 Grease Points



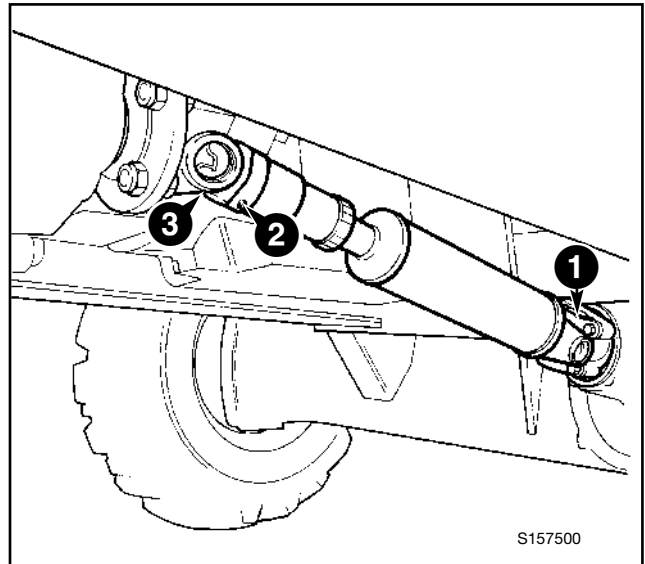
GREASING (continued)

Driveshafts

Rear Driveshaft 3 Grease Points

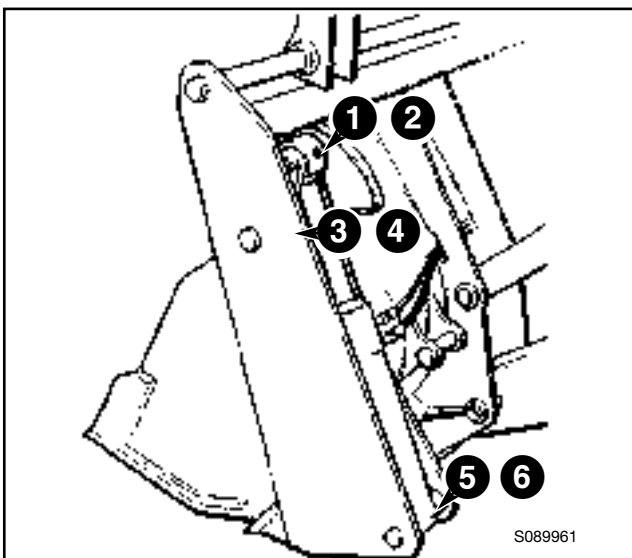


Front Driveshaft 3 Grease Points



Multi-Purpose Shovel

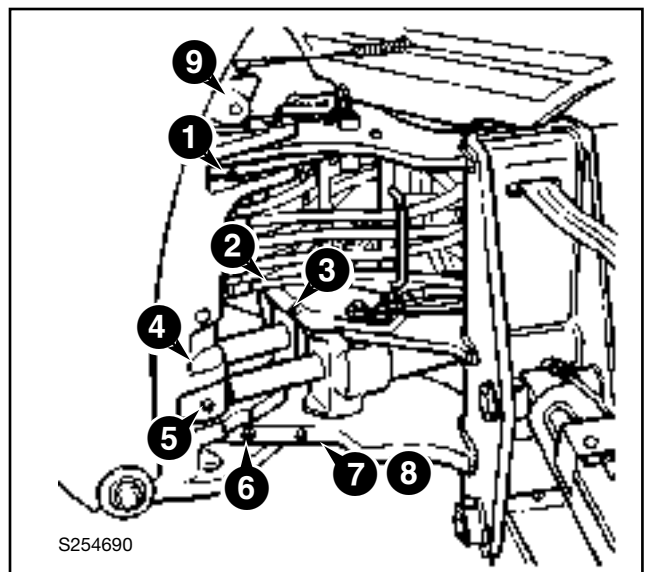
3 grease points each end - Total 6 Grease Points



Kingpost

9 Grease Points

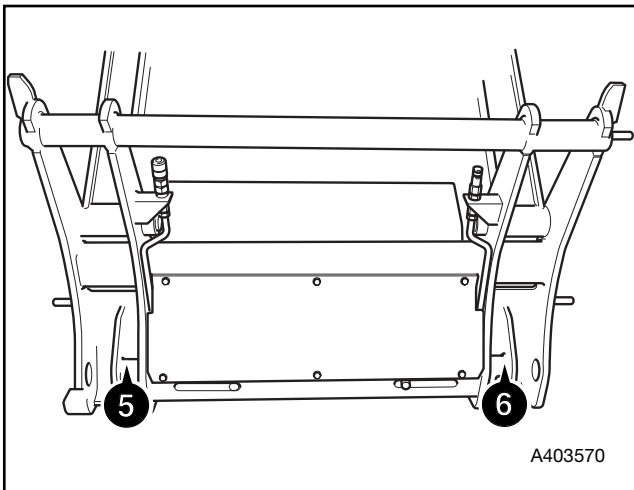
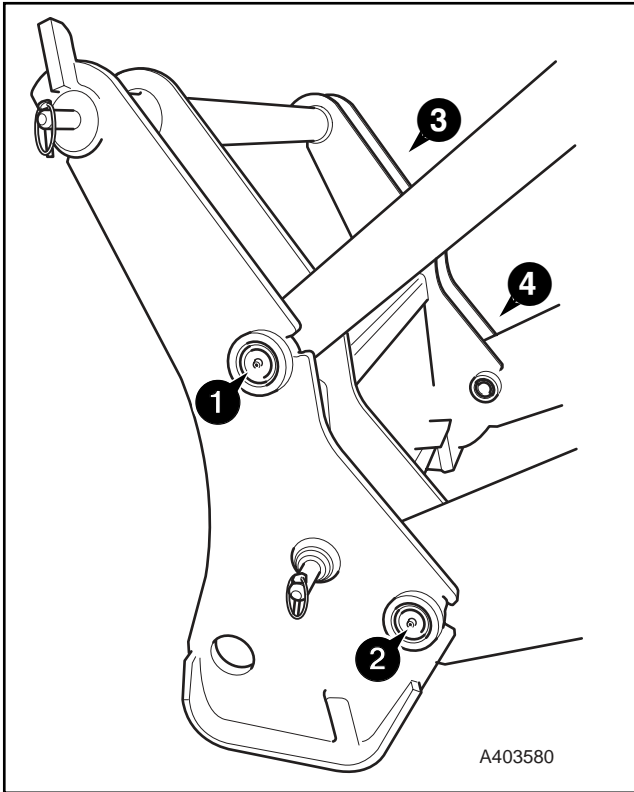
Note: Figure shows a centremount kingpost, greasing is same for sideshift kingpost.



GREASING (continued)

Loader Quick-Hitch (Hydraulic)

6 Grease Points



Backhoe Quick-Hitch (Hydraulic)

⚠ CAUTION

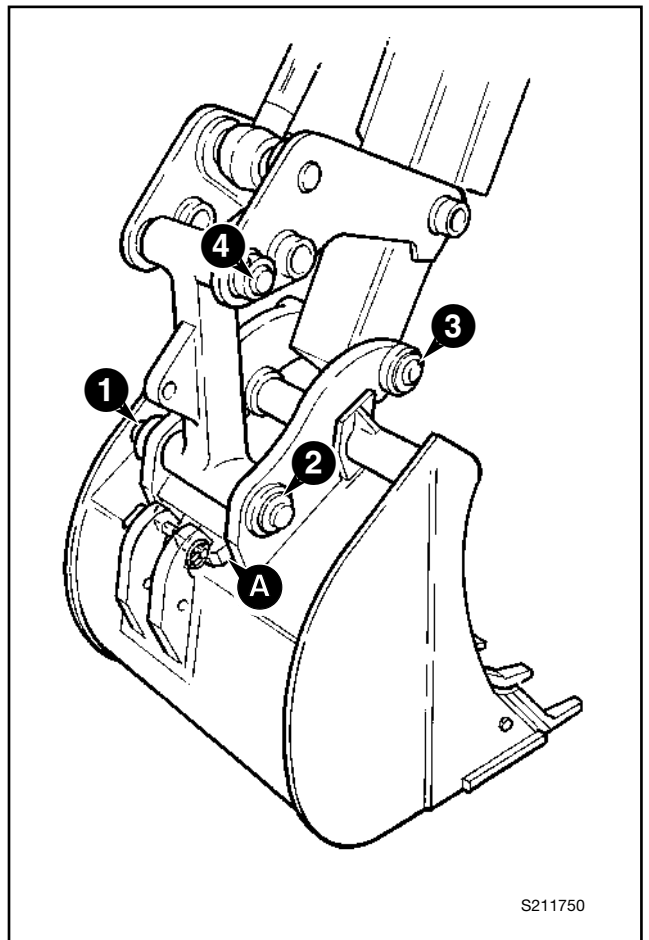
Waxoyl contains turpentine substitute, which is flammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period.

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

5-3-1-9

Coat the slide **A** with Waxoyl.

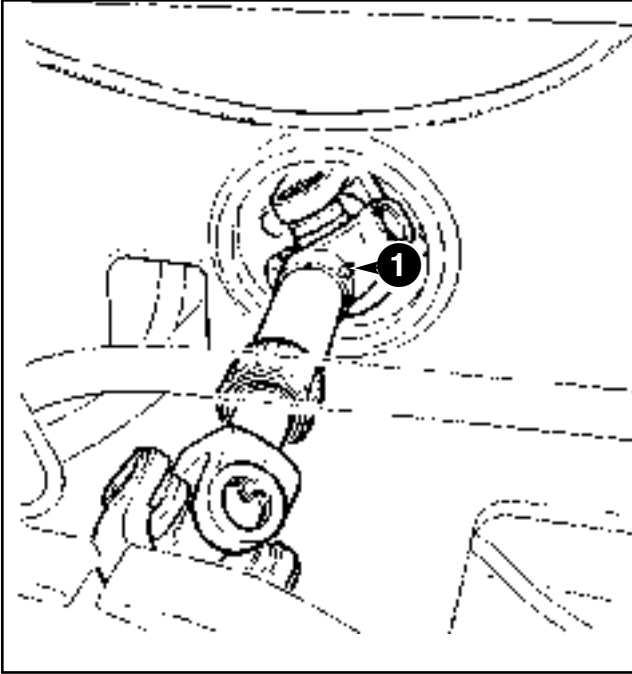
4 Grease Points



GREASING (continued)

Hydraulic Pump Driveshaft

1 Grease Point



TYRES AND WHEELS

Tyre Inflation

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.

If using a puncture sealant, refer to the manufactures instructions for correct use and limitations, restrict the speed limit to 10 kph (6 mph).

⚠ WARNING

An exploding tyre can kill, inflated tyres can explode if overheated. Do not cut or weld the rims. Use a tyre/wheel specialist for all repair work.

2-3-2-7

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

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. See *Tyre Sizes and Pressures (SPECIFICATION Section)* for recommended tyres and pressures for your machine.

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

3 Add the Air

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.

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

TYRES AND WHEELS (continued)

Using the Tyre Inflator

On the rear right hand fender of the machine there is an electrically operated compressor.

- 1 Switch OFF the engine and remove the starter key, open pannier panel and lock the support strut.
- 2 Connect the air hose to the quick connect fitting **A**.
- 3 Use switch **B** to turn the compressor ON. With the compressor on, the refuel pump is inoperative.

CAUTION

After prolonged use the compressor casing can get hot, keep hands and equipment away until the compressor has cooled.

- 4 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.

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

Checking the Wheel Nut Torques

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

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

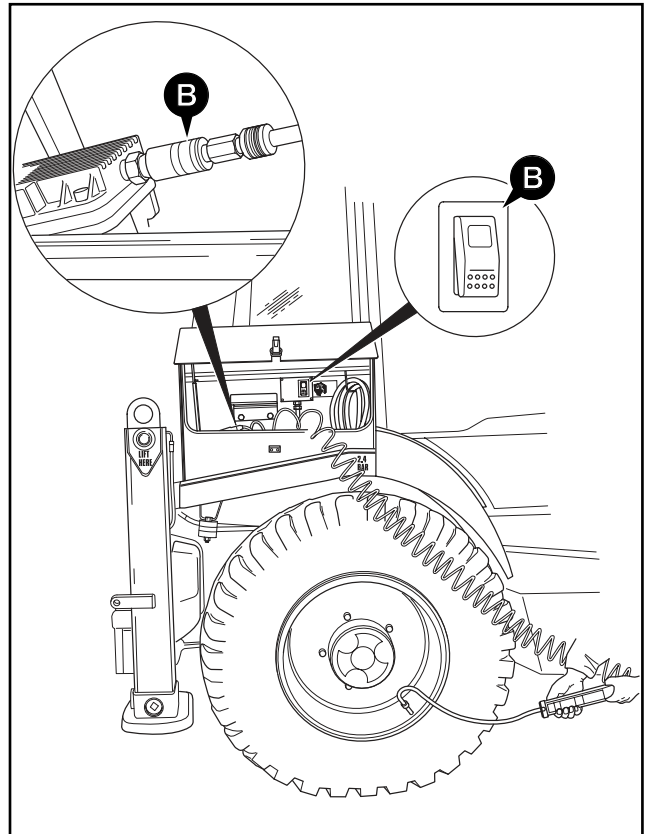
The correct torques are shown in the table below.

Front - Nm	lbf ft
680	500
Rear - Nm	lbf ft
680	500

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



BRAKES

Parking Brake Adjustment

If you are not confident or technically qualified to carry out this procedure, contact your JCB Dealer.

CAUTION

The parking brake must not be used to slow the machine from travelling speed, except in an emergency, otherwise the efficiency of the brake will be reduced.

Whenever the parking brake has been used in an emergency, always renew both brake pads.

4-2-1-1/2

WARNING

Before adjusting the parking brake, make sure that the machine is on level ground. Put chocks each side of all four wheels. Disconnect the battery so that the engine cannot be started. If you do not take these precautions the machine could run over you.

2-3-2-4

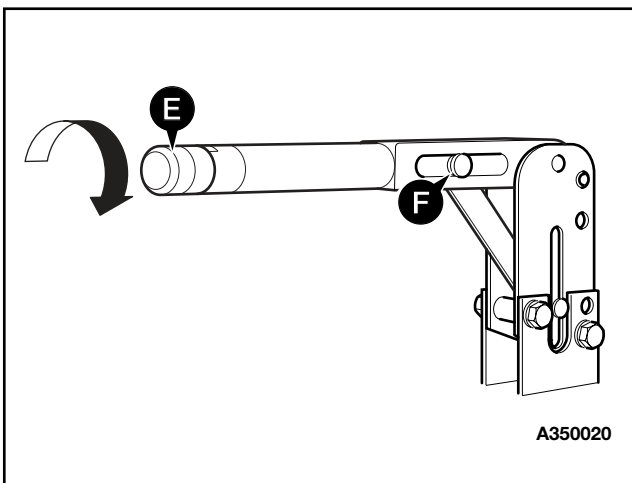
The parking brake should be fully engaged when the lever is vertical. The parking brake indicator light should light when the brake is engaged with the forward/reverse lever away from neutral (starter switch at IGN).

WARNING

Over adjustment of the parking brake could result in the parking brake not fully releasing

0011

- 1 Disengage the parking brake (lever horizontal).
- 2 Turn handle grip **E** clockwise, half a turn.
- 3 Test the parking brake, see **Testing the Parking Brake** in *OPERATION* Section.
- 4 If the brake fails the test, repeat steps 2 and 3. If there is no more adjustment and pin **F** is at the end of its travel get the brake checked by your JCB Dealer.



Checking the Foot Brake Fluid Level

WARNING

Faulty brakes can kill. If you have to add oil to the brake reservoir regularly 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 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Raise and chock the loader arms. Lower the backhoe to the ground and stop the engine.
- 2 Remove the reservoir cap **A** and check the level. The MAX and MIN marks are marked on the side of the reservoir **B**. If necessary, add fluid as in Step 3.

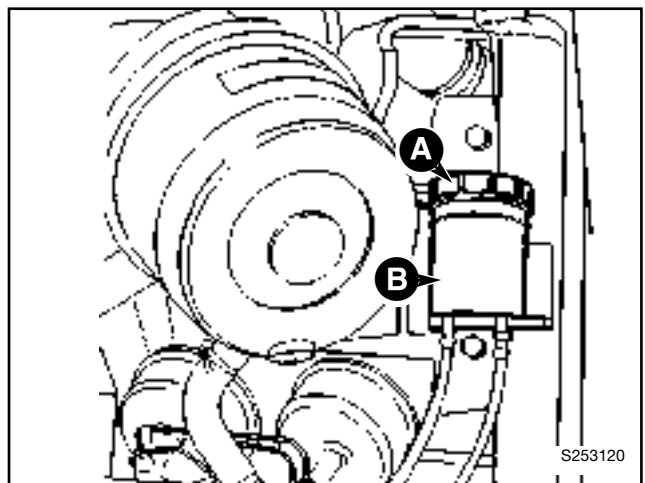
If the level has fallen below the MIN mark, get the system checked by your JCB Dealer.

WARNING

Using incorrect brake fluid could damage the system. See **Service Capacities and Lubricants** in **MAINTENANCE** Section. The fluid can harm your skin. Wear rubber gloves. Cover cuts and grazes.

4-3-2-3

- 3 If required, carefully pour the recommended fluid (DO NOT USE ORDINARY BRAKE FLUID) until it reaches the correct level.
- 4 Refit the reservoir cap. Wipe up any spillage.



ENGINE AIR FILTER

Changing the Elements

⚠ CAUTION

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

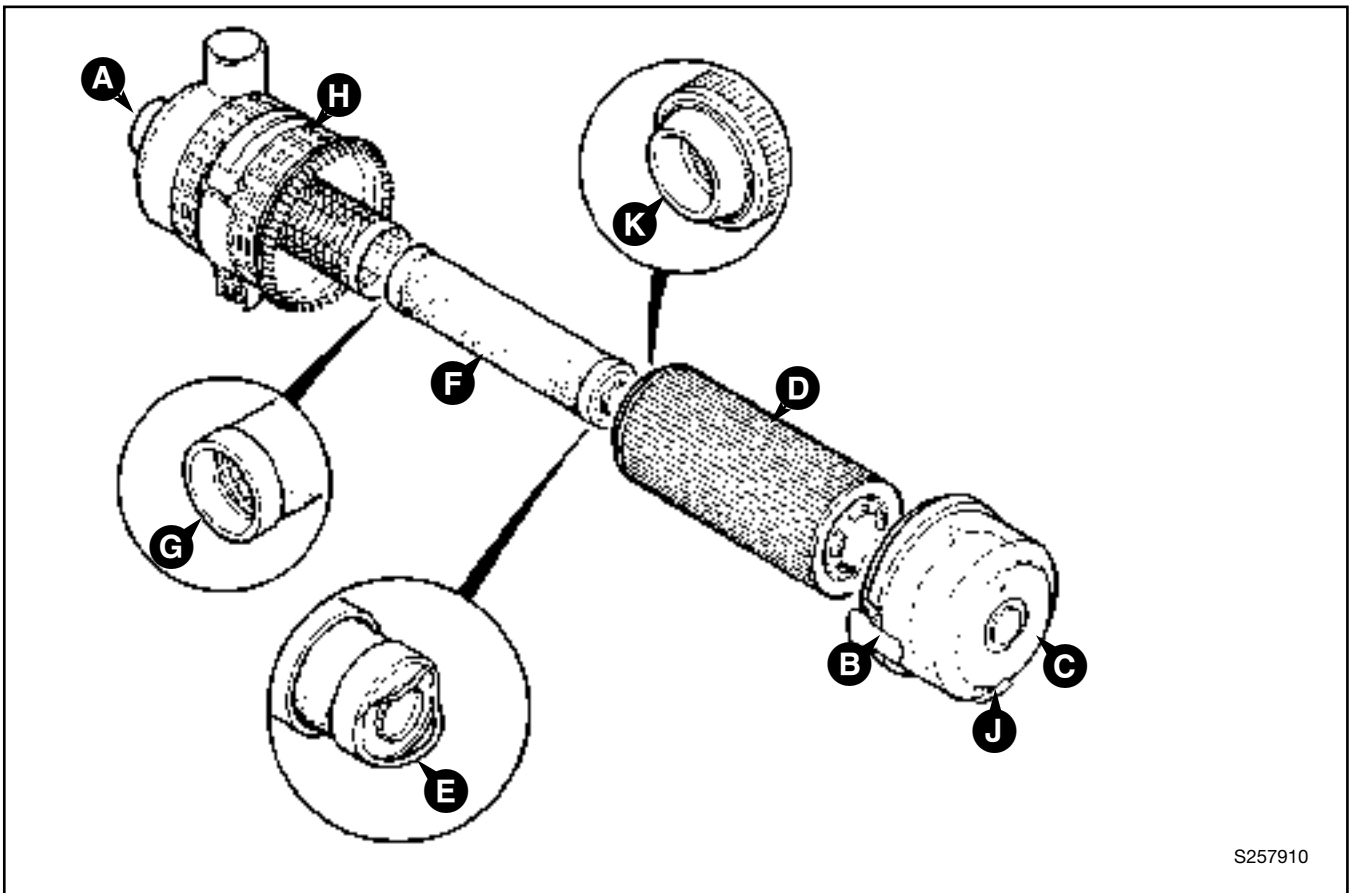
2-3-3-1

Note: Do not attempt to wash or clean the elements - they must only be renewed.

Note: Do not run the engine with the dust valve **J** removed.

Note: A new inner element must be fitted at least every third time the outer element is changed. As a reminder, mark the inner element with a felt tipped pen each time the outer element is changed.

- 1 Stop the engine.
- 2 Remove the engine side panel (left hand side).
- 3 If changing the inner element, cover the end of the hose to prevent rain and dirt from getting into the engine.
- 4 Depress clips **B** and lift off cover **C**. Remove outer element **D**. Take care not to tap or knock the element. If the inner element is to be changed, lift up pulls **E** and remove inner element **F**.
- 5 Clean inside the canister **H**, cover **C** and dust valve **J**.
- 6 Insert the new elements into the canister, pushing them firmly in so that seals **G** and **K** are fully seated. Fit cover **C** with dust valve **J** at the bottom. Push the cover firmly into position and make sure it is secured by clips **B**.
- 7 Refit the induction hose to stub pipe **A**. Make sure that the wire is connected to the **Air Filter Blocked** switch.



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ENGINE OIL AND FILTER

Checking the Oil Level

- 1 Make sure the park brake is engaged and the transmission set to neutral. If the loader arms are raised, lower them under their own weight, or fit the safety strut.
- 2 Remove the dipstick access panel.
- 3 Check that the oil level is between the two marks on the dipstick **A**. Add oil if necessary, through filler **B**. Make sure that the dipstick and filler cap are fully inserted and tightened.

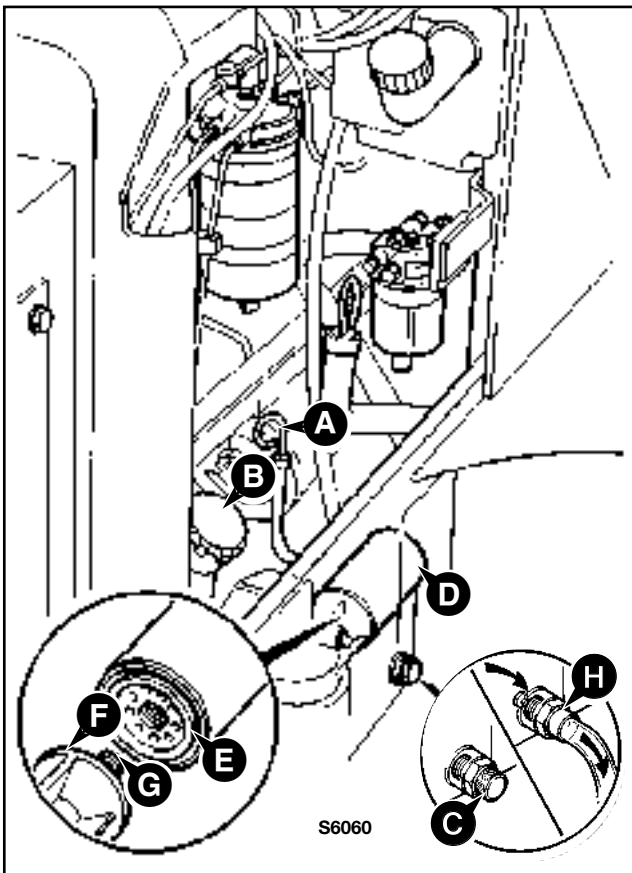
Changing the Oil and Filter

- 1 Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil. Park the machine on firm ground.

⚠ WARNING

Make the machine safe before getting beneath it. Lower the attachments to the ground; engage the parking brake; remove the starter key, disconnect the battery.

2-3-2-2



- 2 Make sure the park brake is engaged and the transmission set to neutral. If the loader arms are raised, lower them under their own weight, or fit the safety strut.
- 3 Remove the dipstick access panel.
- 4 Drain the oil:

⚠ CAUTION

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

13-3-1-15

- a Place a container that can hold at least 12 litres (3 gal) beneath the engine (to catch the oil).
 - b Remove dust cap **C** from the sump drain port, attach the drain tube assembly **H**. With the free end of the tube in the oil container, screw in the drain tube assembly to open the valve.
 - c When all the oil has drained, unscrew the drain tube assembly and fit the dust cap **C**.
- 5 Change the filter:
 - a Unscrew the filter canister **D**. Remember that it will be full of oil.
 - b Check that adapter **G** is secure.
 - c Clean the filter head **F**.
 - d Add clean engine lubricating oil to the new filter canister. Allow enough time for the oil to pass through the filter element.
 - e Smear the seal **E** on the new filter with oil. Screw in the new filter canister - hand tight only.
 - 6 Fill the engine to the max mark on the dipstick with new oil through the filler. See the chart at the end of the MAINTENANCE section for recommended oil grades. Wipe off any spilt oil. Check for leaks. Make sure the filler cap is correctly refitted.
 - 7 Start the engine, run at idle rpm until the engine oil low pressure light is extinguished.
 - 8 Switch engine OFF, check the oil level.

ENGINE COOLING SYSTEM

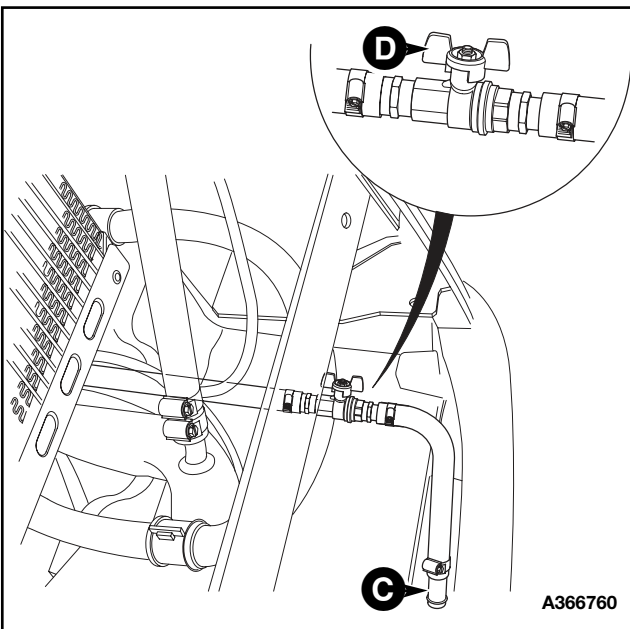
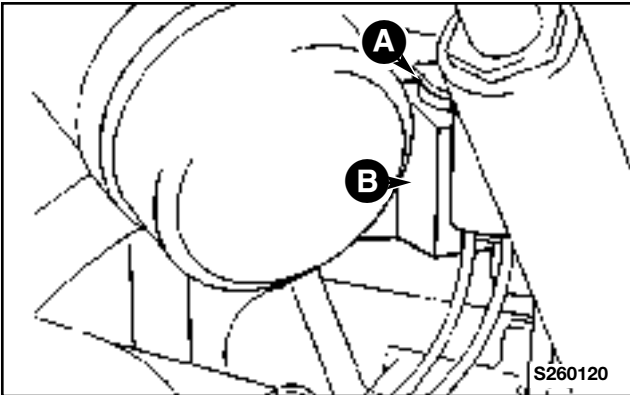
Checking the Coolant

⚠ WARNING

The cooling system is pressurised when the coolant is hot. Hot coolant will burn you. Make sure the engine is cool before checking the coolant level or draining the system.

2-3-3-3

- 1 Park the machine on level ground. Engage the parking brake. Stop the engine and let it cool down.
- 2 The coolant level should be between the COLD/MIN and the HOT/MAX marks on coolant reservoir **B**. Fill with pre-mixed water/antifreeze if necessary.



Changing the Coolant

⚠ WARNING

The cooling system is pressurised when the coolant is hot. Hot coolant will burn you. Make sure the engine is cool before checking the coolant level or draining the system.

2-3-3-3

- 1 Park the machine on level ground. Engage the parking brake. Stop the engine and let it cool down.
- 2 Carefully loosen cap **A**. Let any pressure escape. Remove the cap.

⚠ CAUTION

Keep your face away from the drain hole when removing the drain plug.

2-3-3-4

- 3 Attach a drain tube to drain extension **C**. With the free end of the tube in a container, open the drain valve **D**.
- 4 When all the coolant has drained, flush the system using clean water.
- 5 Shut the drain valve **D** and remove drain tube.
- 6 Use the necessary mix of clean, soft water and antifreeze. See **Coolant Mixtures** (MAINTENANCE section). Fill to the COLD/MIN level on coolant reservoir **B**.
- 7 Start the engine and run at idle to circulate the coolant, top up with coolant as necessary.
- 8 Refit the filler cap. Make sure it is tight.
- 9 Run the engine for a while, to raise the coolant to working temperature and pressure. Stop the engine. Check for leaks.

Note: Make sure the cab heater control is in the hot position. This will ensure the coolant mixture circulates through the entire cooling system.

ENGINE COOLING SYSTEM (continued)

Adjusting the Fan Belt

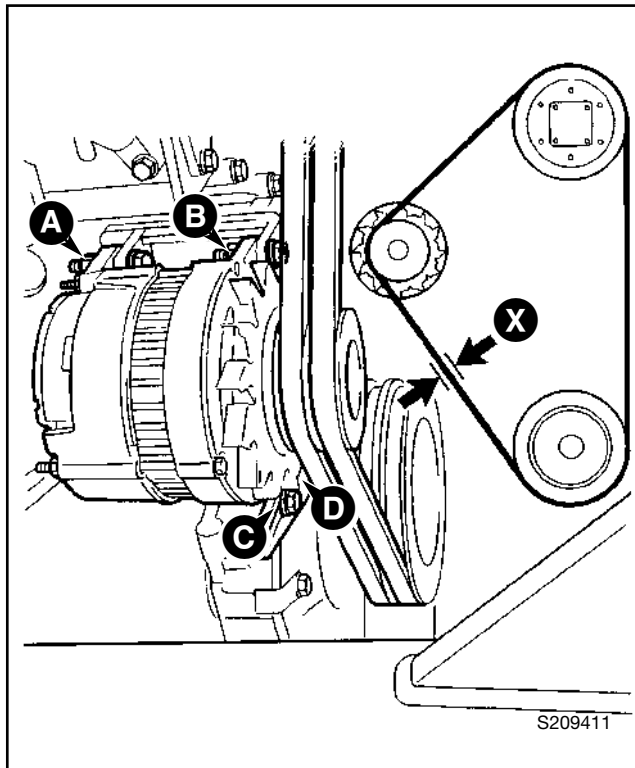
WARNING

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, engage the parking brake and set the transmission to neutral. Raise and block the loader arms. Lower the backhoe to the ground and stop the engine.
- 2 Loosen pivot fastening bolts **A** and **B**. Loosen adjustment link fastening bolts **C** and **D**.
- 3 Position the alternator so that there is 10 mm (3/8 in) slack at point **X**.
- 4 Tighten bolts **C** and **D**, then bolts **A** and **B**.

Note: If a new belt is fitted, the belt tension must be checked again after the first 20 hours of operation.



Cleaning the Cab Heater Filter

- 1 Park the machine on firm level ground, engage the parking brake and set the transmission to neutral. Lower the attachments to the ground and stop the engine.
- 2 Remove the panel retaining screw and then remove the panel **E**.
- 3 Remove the filter cover retaining screws and then remove the filter cover **F**.
- 4 Knock loose dust off the filter **G**. Carefully blow compressed air through all the folds of the filter, blow in the opposite direction to the arrows marked on the filter.

Note: The compressed air must be set at a pressure no greater than 7 bar (100 lb/in²).

- 5 Refit the filter cover **F** and panel **E**, secure with the retaining screw.

