



# Service Manual

**802.7** *Plus*

**802.7** *Super*

**803** *Plus*

**803** *Super*

**804** *Plus*

**804** *Super*

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## Introduction

This publication is designed for the benefit of JCB Distributor Service Engineers who are receiving, or have received, training by JCB Technical Training Department.

It is assumed that these personnel have a sound knowledge of workshop practice, safety procedures and general techniques associated with the maintenance and repair of hydraulic earthmoving equipment. Therefore, these basic subjects generally are omitted from this manual, the intention being to convey only more specialised information concerning particular aspects of a machine or component.

For example, renewal of oil seals, gaskets etc., and any component showing obvious signs of wear or damage is expected as a matter of course and, therefore, information of this nature is included only in the context of specialised procedures or where a range of wear tolerances is required. Similarly, it is expected that components will be cleaned and lubricated where appropriate, also that any opened hose or pipe connections will be blanked to prevent excessive loss of hydraulic fluid and ingress of dirt. Finally, please remember above all **SAFETY MUST COME FIRST!**

The manual is compiled in sections, the first three are numbered and contain information as follows:

**1** = **General Information** - includes torque settings and service tools  
**2** = **Care & Safety** - includes warnings and cautions pertinent to aspects of workshop procedures etc.  
**3** = **Routine Maintenance** - includes service schedules and recommended lubricants for the machine.

The remaining sections are alphabetically coded and deal with Dismantling, Overhaul etc. of specific components, for example:

**A** = **Optional Equipment**  
**B** = **Body & Framework** ... etc.

The page numbering in each alphabetically coded section may not be continuous. This allows for the insertion of new items in later issues of the manual.

Section contents, technical data, circuit descriptions, operation descriptions etc. are inserted at the beginning of each alphabetically coded section.

All sections are listed on the front cover; tabbed divider cards align directly with individual sections on the front cover for rapid reference.

Illustrations which show a dismantled component are numbered as a guide to the dismantling sequence, which generally can be reversed for assembly.

Torque settings are given as a 'mean' figure which may be varied by plus or minus 3%. Torque figures indicated are for dry threads, hence for lubricated threads may be reduced by one third.

'Left Hand' and 'Right Hand' are as viewed from the rear of the machine.

References to alternative servicing intervals are to be treated on a 'whichever occurs first' basis.

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### Identifying Your Machine

The machine has a Data Plate attached to the left hand front face of the machine.

The serial numbers of the machine, engine and gearboxes are stamped on this plate.

If the engine is replaced, stamp the new serial number in place of the old one.

### Explanation of Vehicle Identification Number (VIN)

Code	<b>SLP</b>	<b>0803</b>	<b>T</b>	<b>E</b>	<b>0765607</b>
Example	A	B	C	D	E

- A** World Manufacturer Identification      SLP = JCB
- B** Machine Model                                      0803 = 803
- C** Year of Manufacture
 

R = 1994	W = 1998	2 = 2002
S = 1995	X = 1999	3 = 2003
T = 1996	Y = 2000	4 = 2004
V = 1997	1 = 2001	5 = 2005
- D** Manufacturers Location                      E = England
- E** Machine Serial Number                      0765607

### Explanation of Engine Identification Number

Code	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
Example	KE	50390	J	000001	y

- A** Engine Type
- B** Engine Parts List
- C** Country of Manufacture
- D** Engine Serial Number
- E** Year of Manufacture





**J C BAMFORD EXCAVATORS LTD**  
ROCESTER, STAFFS, ENGLAND  
CONSTRUCTOR

OSEN ISO9001



FM 14063

VIN Vehicle Identification Number

Product Identification Number

ENGINE SERIAL NUMBER

LH TRACK GEARBOX SERIAL NUMBER

SLEW GEARBOX SERIAL NUMBER

RH TRACK GEARBOX SERIAL NUMBER

WEIGHT kg

ENGINE POWER kW @ RPM

YEAR OF MANUFACTURE

H04343

**Preparation for Storage**

The operations to place a machine into storage (-15°C to 44° C) are given below.

- 1 Park the machine safely with the bucket and dipper rams retracted and the dig end outstretched. Lower the boom until the bucket rests on the ground. Lower the dozer to the ground.
- 2 Switch off the engine. Operate controls to release pressure from the rams.
- 3 Disconnect battery to prevent discharge.
- 4 Ensure the fuel tank is filled to a maximum, leaving no air space.
- 5 Ensure hydraulic tank is filled to maximum on the sight gauge.
- 6 Spray exposed ram rods with Waxoyl.
- 7 Slacken off rubber tracks until no visible spring tension exists.

**Preparation after Storage**

The operations to remove a machine from storage (-15°C to 44°C) and prepare it for use are given below.

- 1 Lower the fuel level to ensure that sufficient air space exists in the tank.
- 2 Check all oil and water levels, adjust contents to correct levels as necessary.
- 3 Ensure the battery is fully charged.
- 4 Reconnect battery.
- 5 Remove electrical contact from fuel injection pump solenoid.
- 6 Crank engine for 20 seconds or until oil pressure warning light goes out.
- 7 Reconnect electrical supply to the fuel injection pump solenoid.
- 8 Start the engine. If the engine fails to start after several attempts, bleed the fuel system.
- 9 Adjust track tensions.
- 10 Grease all lubrication points.

## Introduction

This chapter is arranged to guide you step-by-step through the task of learning how to use the machine. Read it through from beginning to end. By the end of the chapter you should have a good understanding of the machine and how to operate it.

Pay particular attention to all safety messages. They are there to warn you of possible hazards. Do not just read them-think about what they mean. Understand the hazards and how to avoid them.

If there is anything you do not understand, ask your JCB dealer, he will be pleased to advise you.

When you have learned where the driving controls are and what they do, practise using them. Practise driving the machine in a safe, open space clear of other people.

Get to know the "feel" of the machine and its driving controls.

Move on to the attachment controls only when you can drive the machine confidently and safely.

Take great care when practising with the attachment controls. Practise in an open space, keep people clear. Do not jerk the controls: operate them slowly until you understand the effect they have on the machine.

Finally, do not rush the job of learning. Take your time and take it safely.

Remember

**BE CAREFUL  
BE ALERT  
SAFE**

## 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 swing lock is fitted before doing these checks.**

HOP26

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.

**Machine walk round inspection****1 Check for cleanliness:**

- a Clean the windows and light lenses.
- b Remove dirt and debris, especially from around the linkages, rams, pivot points and radiator.
- c Make sure the cab and handrails 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 teeth are secure and in good condition
- c Make sure that all the pivot pins are secured correctly in place

- d Inspect the windows for cracks and damage
- e Check for oil, fuel and coolant leakages beneath the machine.

 **WARNING**

**You could be killed or injured with damaged tracks. Do not use the machine with damaged or excessively worn tracks.**

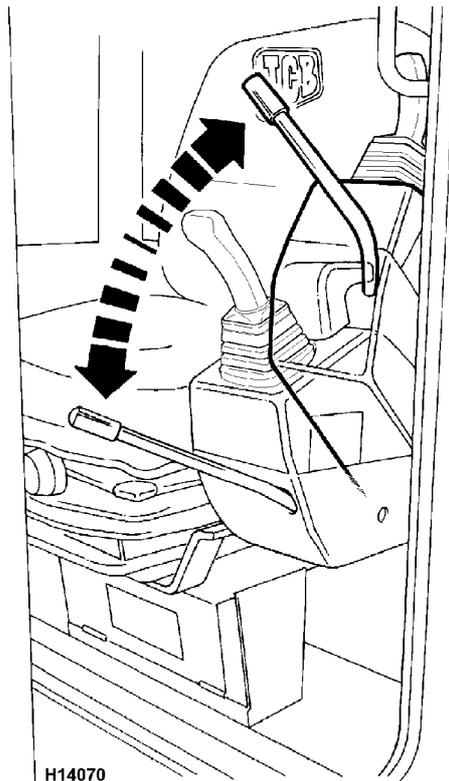
HOP27

**3 Check the Tracks (Rubber)**

Check for cut rubber and penetration by sharp objects. Do not use a machine with damaged tracks.

**4 Check the engine cover/panels and fuel filler cap**

- a Make sure the engine cover / panels are fitted and securely locked.
- b Make sure the fuel filler cap is tightly closed (we also recommend that you lock it).



**⚠ WARNING**

**Do not enter or exit the cab unless the arm rest or lever lock is fully engaged.**

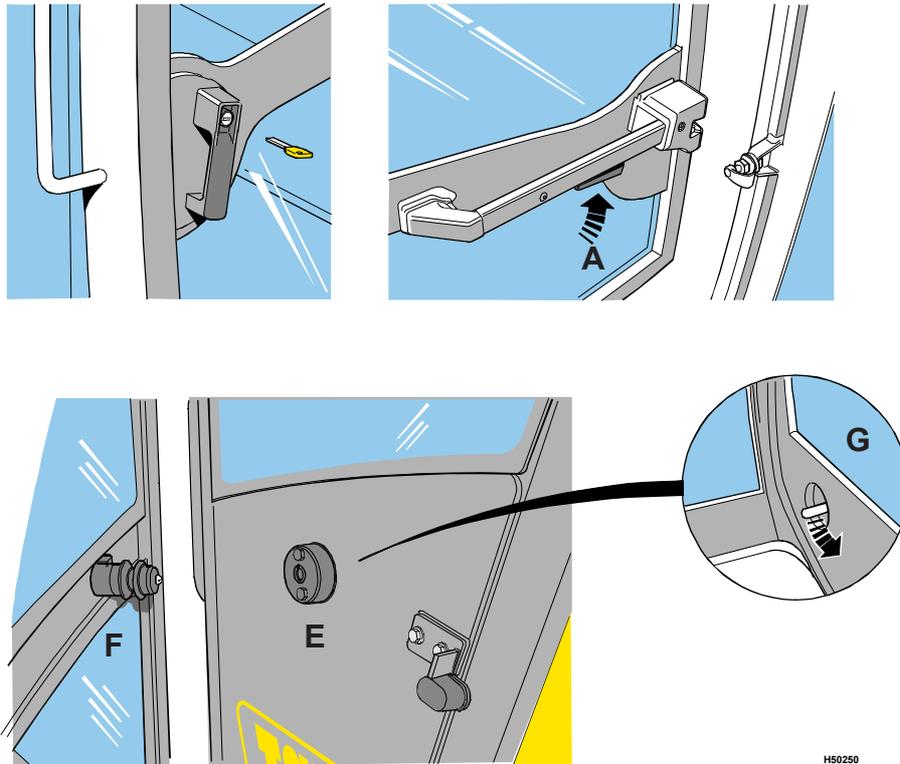
To give sufficient clearance to enter or leave the cab, the left lock must be raised.

When the lock is in the raised position the excavator controls cannot be operated. Lowering the lock to the normal position connects the excavator controls and allows the normal operation of the levers.

**Note:** When entering or leaving a canopy machine, both LH and RH locks must be raised.

**⚠ WARNING**

**Always face the machine when entering or leaving the cab. Use the step(s) and handrails. 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 or lever locks as handholds, use the handrails. Failure to follow these instructions could result in unexpected movement of the machine.**



H50250

The cab is bolted on top of the mainframe and is a welded steel construction. The cab has a sliding window on the right side, a hinged door and an up and over windscreen. All windows are of toughened glass. The cab is fitted with a windscreen wiper, heater fan, seat and all operating controls and instruments.

### CAUTION

**Do not drive the machine with the door unlatched. It must be correctly closed or secured fully open.**

HOP29

### Opening and closing the door

To open a door from the outside, unlock it with the key provided and press the lock barrel to release the catch. To open a door from inside, push lever **A**. Close the door from the inside by pulling it firmly, it will latch itself.

### Securing the door in the open position

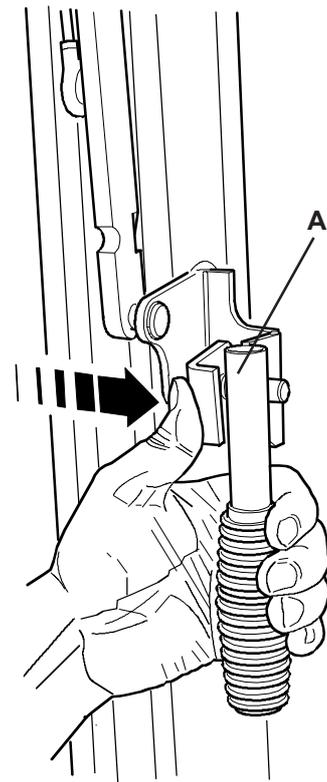
Swing the door fully open until the spigot **E** on the side of the cab locates securely in the socket **F** on the door.

To release the door when it is secured fully open, operate the button **G** on the inside of the door.

OPENING THE WINDSCREEN

To open the up and over window, disengage the latch pins **A** on both handles and lift the screen to a position parallel with the roof. Secure in place with the latch pins **A**.

**Note:** Care must be taken when lowering the window not to bump the top edge of the lower front window.



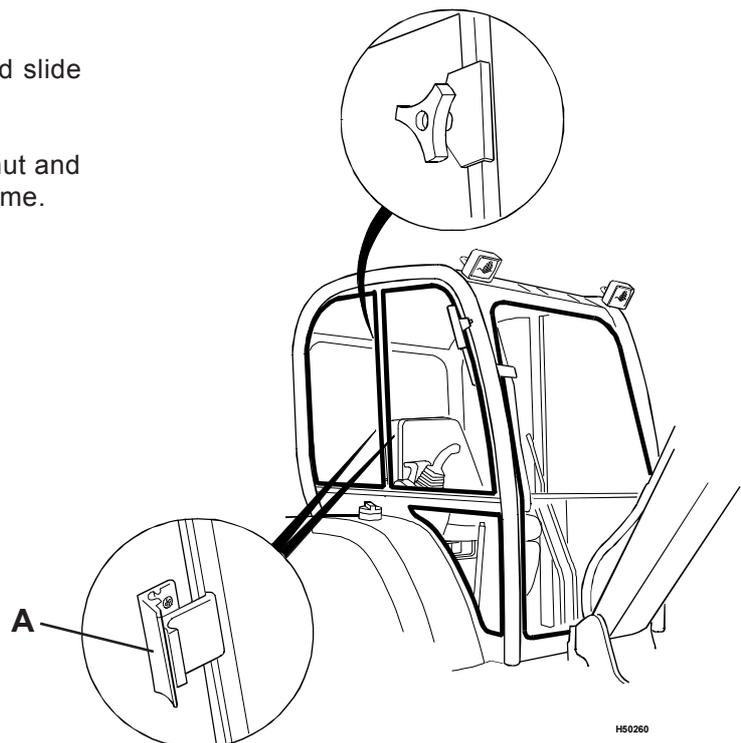
H14080

OPENING THE SIDE WINDOW

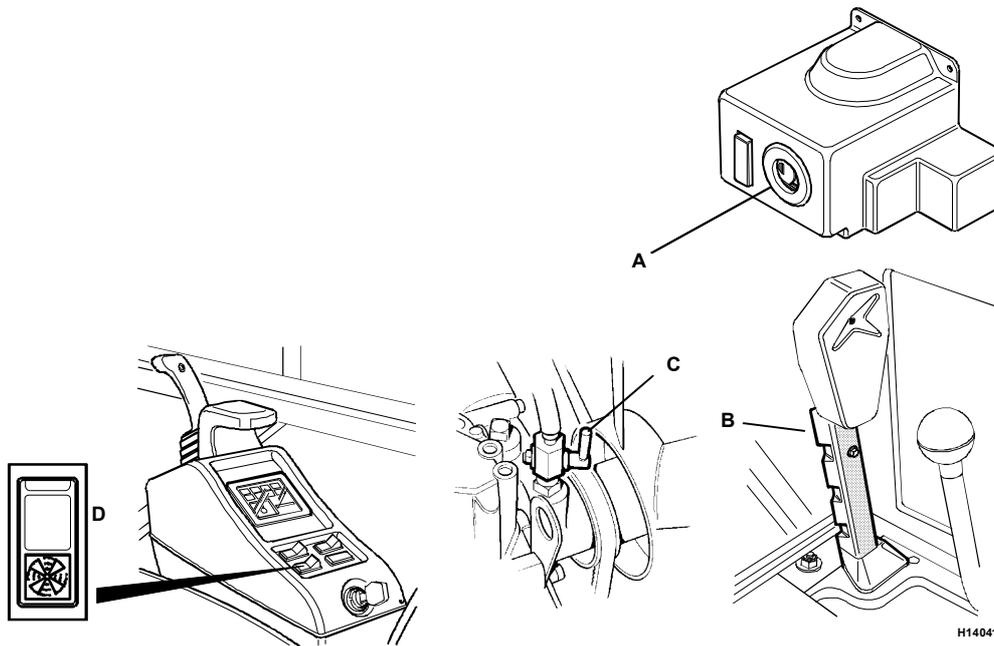
The side window is held closed by catch **A** operated from inside the cab.

To open the window, operate the catch **A** and slide the window to the desired position.

To close the window, slide the window fully shut and check that the catch **A** has located on the frame.



H50260



Hot air can be directed to the cab floor by closing / opening flap **A**. Hot air is directed to the windscreen via a fixed vent system **B**.

For the summer use, the heater element can be turned off at the water valve **C** on the engine.

### **WARNING**

**Stop the engine before lifting the engine cover to operate valve **C**.** HOP30

### Heater fan

Press the rocker switch **D** located on the right hand instrument console, down to switch the fan on. Return the switch to the first position to turn the fan off.

### WARNING

Do not adjust the seat with the engine running otherwise your legs could knock the control levers. HOP31

Depending on the type of machine various adjustments can be made to the positions of the control levers and the seat consoles/armrests.

The operators 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 controls with your feet on the cab floor. The seat is adjustable for height and reach.

### CAUTION

Having adjusted the seat position, ensure the seat locking lever has engaged fully.

### Suspension seat - when fitted

### WARNING

Whilst seated, adjust the dial below 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

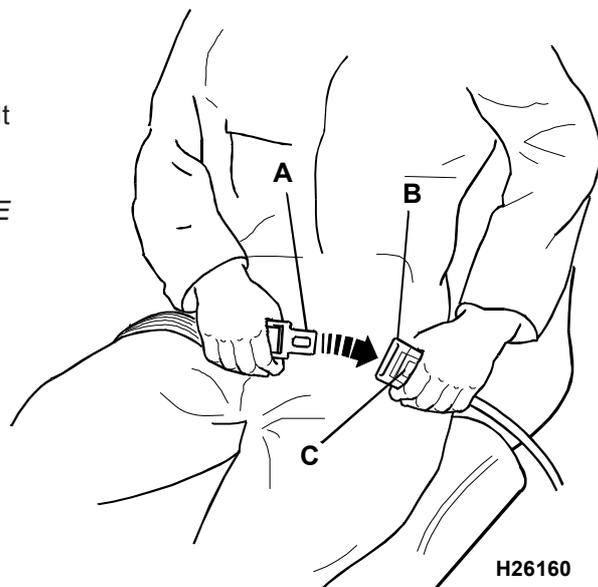
### Fasten the seat belt

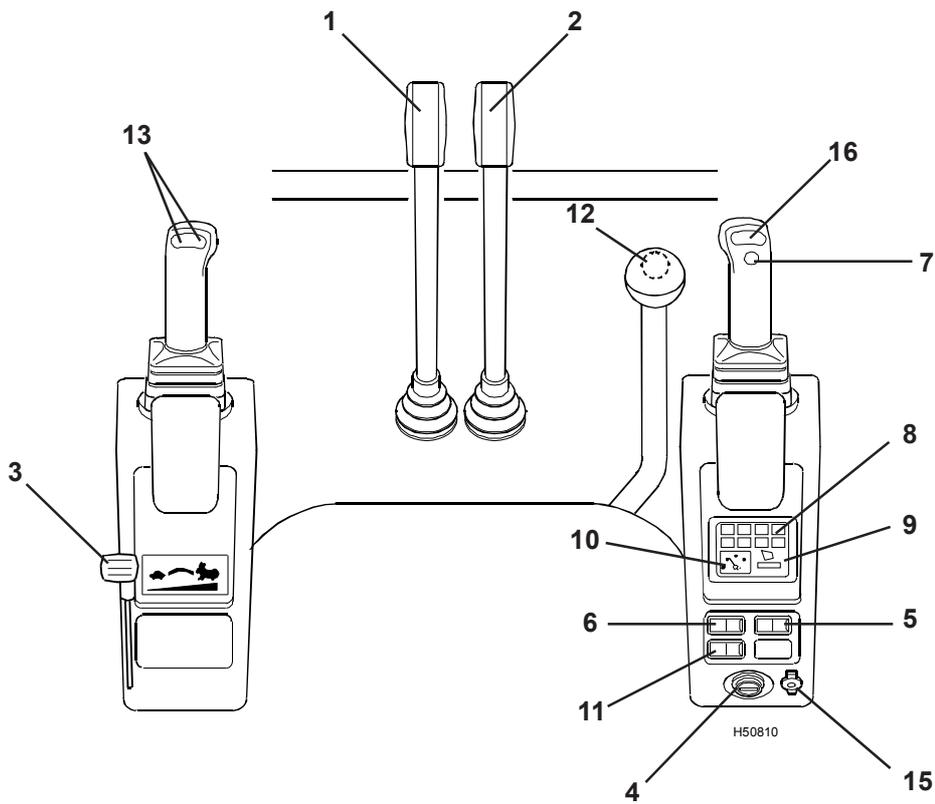
Sit correctly in the seat. Make sure the belt is not twisted. Push the male fitting **A** into the buckle **B** until it latches.

### Release the seat belt

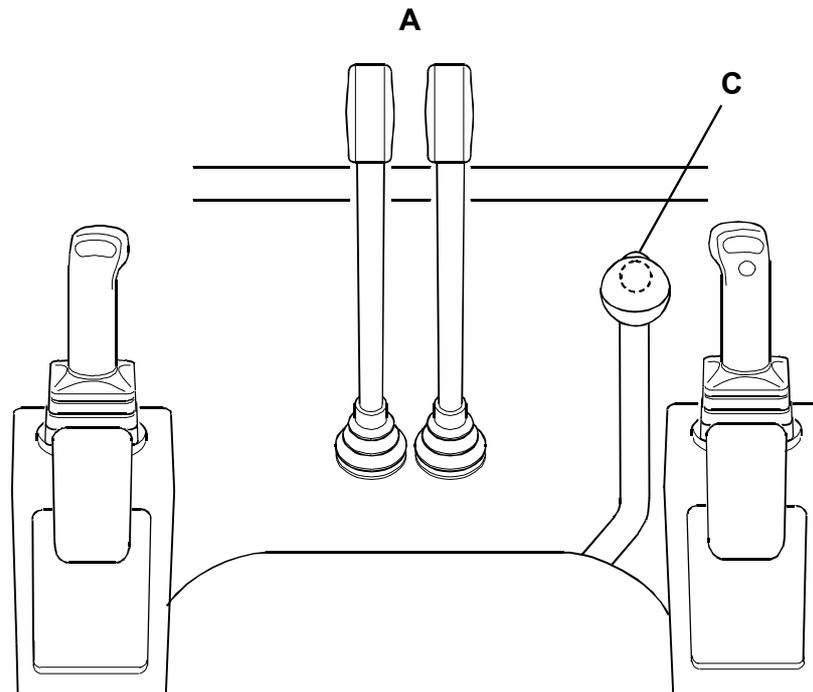
Press button **C** and pull the recoil side of the belt outwards.

**Note:** If your machine is fitted with a seat belt, USE IT.





- 1 Left Track Control Lever
- 2 Right Track Control Lever
- 3 Hand Throttle Lever
- 4 Starter Switch
- 5 Working Lights Switch
- 6 Windscreen Wiper Switch
- 7 Horn Button
- 8 Warning Lights
- 9 Hourmeter
- 10 Fuel Gauge
- 11 Heater Fan
- 12 Two Speed Tracking Switch
- 13 Slew Switches
- 15 Beacon Socket
- 16 Boom Boost Switch (optional)



H50280

### Track controls

The two tracks are controlled by a pair of control levers **A** in front of the seat. Each lever controls one track and is spring loaded to a central position. In this position the track does not operate. The left side lever controls the left track. The right side lever controls the right track. The two levers can be operated individually or together as necessary to move the machine as required. This can be done using one hand or both. An increase in speed can be achieved by operating the push button switch **C** located in the dozer lever if fitted.

#### **WARNING**

**Make sure that all persons are clear before moving.**

#### **WARNING**

**The track controls operate as described when the dozer is located in front of the windscreen. If the dozer is positioned behind the cab, the lever operation will be reversed. It is advisable when tracking to always position the dozer to the front of the machine.**

### Forward

To move the machine forward, push both levers forward. Release the levers to stop.

### Reverse

To move the machine backward, pull both levers backward. Release the levers to stop.

### Turn

To turn the machine whilst travelling, move the lever back towards the central position on the side towards which you want to go e.g. move the left lever back to turn left. This causes one of the tracks to move slower than the other. The faster moving track will push the machine around. Release the lever to stop.

### Spin

To spin the machine around though 360°, without moving it, operate one lever, in a forward position and the other in a reverse position. This will cause the tracks to drive in opposite directions and hence push the machine around.

## Engine Controls

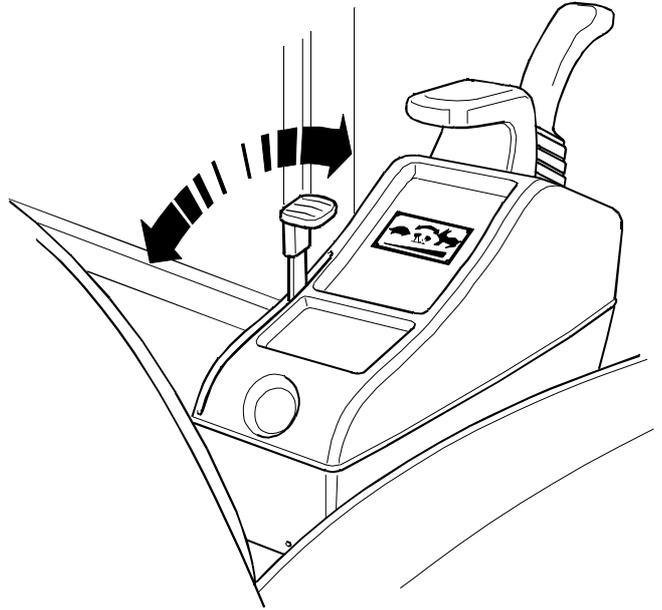
### Engine speed

A hand operated throttle lever in the cab, controls the speed of the engine.

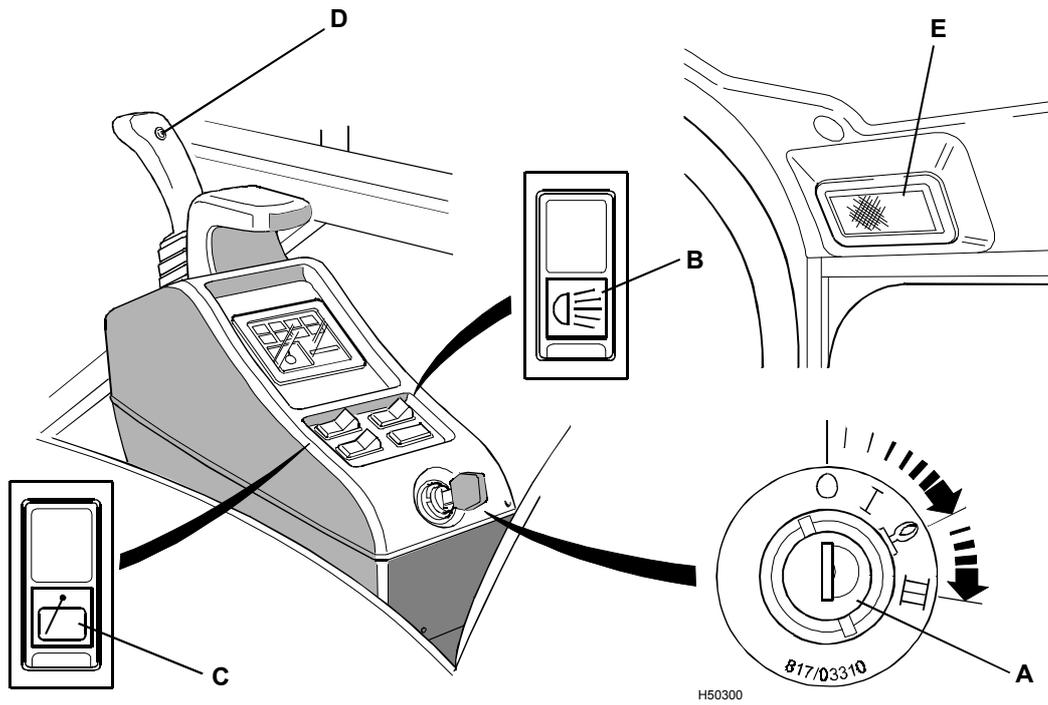
Move the lever to increase or decrease the engine speed. The lever can be left in any position between idle and maximum as required.

### Engine start / stop

To start and stop the engine use the starter switch, see **Switches** on the following page.



H50290



## Switches

### Starter Switch A

This is operated by the starter key. It has four positions. The key can only be removed when in the 'O' position.

#### O Off/Stop Engine

Turn the key to this position to stop the engine. Make sure the controls are in neutral and the excavator and dozer are lowered before stopping the engine.

#### I On

Turning the key in this position connects the battery to the electrical circuits. The key will spring back to this position when released from II.

#### II Heat Position

Holding the key in this position switches on the glow plugs. The glow plugs warm the engine combustion chambers for cold weather starting. Do not hold in this position for more than 15 seconds. The key will spring back to O when released.

#### III Start

Operates the starter motor to turn the engine.

**Note:** Do not operate the starter for more than 20 seconds at one time.

## Switches - continued

### Working Light Switch B

Press the switch down to switch the working lights on. Press the switch again to switch the working lights off.

### Windscreen Wiper Switch C

Press the switch down once to switch the windscreen wiper on to the slower speed.

Press the switch down again to switch the windscreen wiper on to the fast speed. Put the switch to the off position to switch off the windscreen wiper, which will then self park.

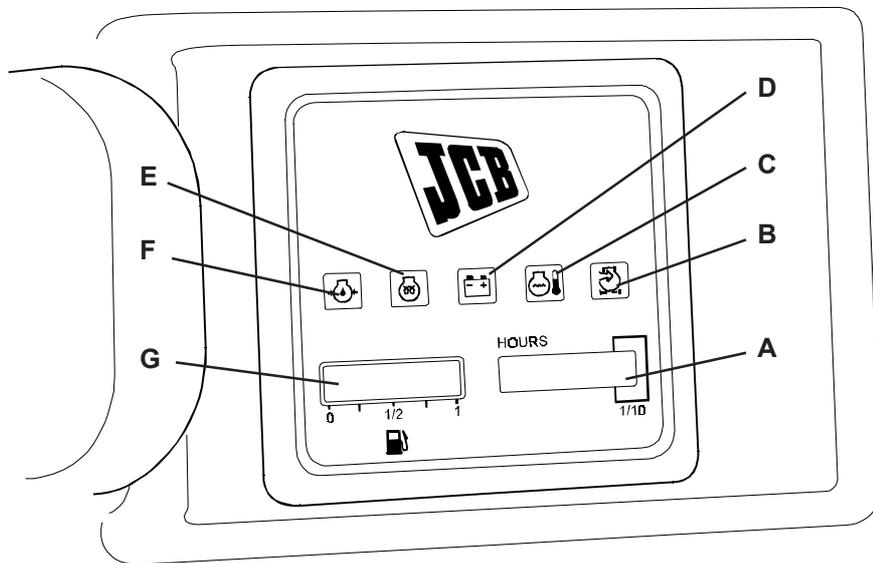
Functions only with the starter switch at I.

### Horn Button D

This is a push button switch located in the R.H. excavator control lever or positioned in the instrument console. Press the switch to activate the horn.

### Cab Light E

A cab light is situated on the right side of the cab, above the rear window. It is operated by pressing either end of the light lens.



H50860

### Instrument cluster

Indicators for the engine and related systems are mounted in the instrument cluster in the R.H. console.

#### Hourmeter (A)

Indicates the accumulative machine operating hours.

#### Blocked Air Cleaner (B) Optional

Illuminated when the air flow through air cleaner is restricted

#### Coolant Temperature (C)

Illuminated when the engine coolant becomes overheated.

#### Alternator (D)

Illuminated when the alternator supply current to the battery is defective and/or the fan belt is broken. It will also illuminate initially with the starter key at position I before the engine is cranked.

#### Glow Plug (E)

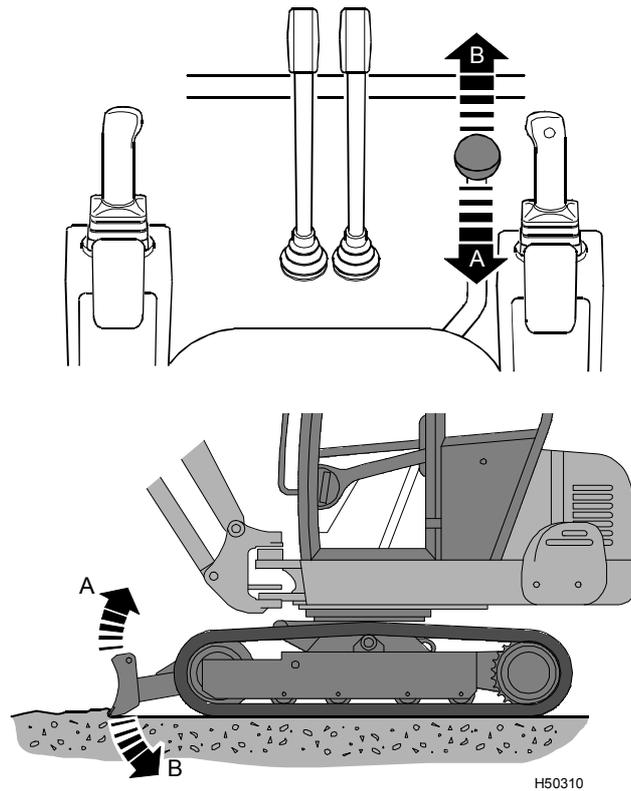
Illuminated with the starter key at positions II and III. Extinguished at all other times.

#### Engine Oil Pressure (F)

Illuminated when the pressure of the oil in the engine is too low, and initially with the starter at position I before the engine is cranked.

#### Fuel Gauge (G)

Indicates the amount of fuel in the tank.



The dozer is operated by a single control lever on the right side of the cab. This lever is spring loaded to the central position. In this position the dozer will not move.

#### CAUTION

**Before operating the dozer, make sure that large rocks or other objects are not between it and the tracks that can jam the mechanism.** HOP34

#### CAUTION

**Before stopping the engine lower the dozer blade to the ground.** HOP35

#### Raise dozer 'A'

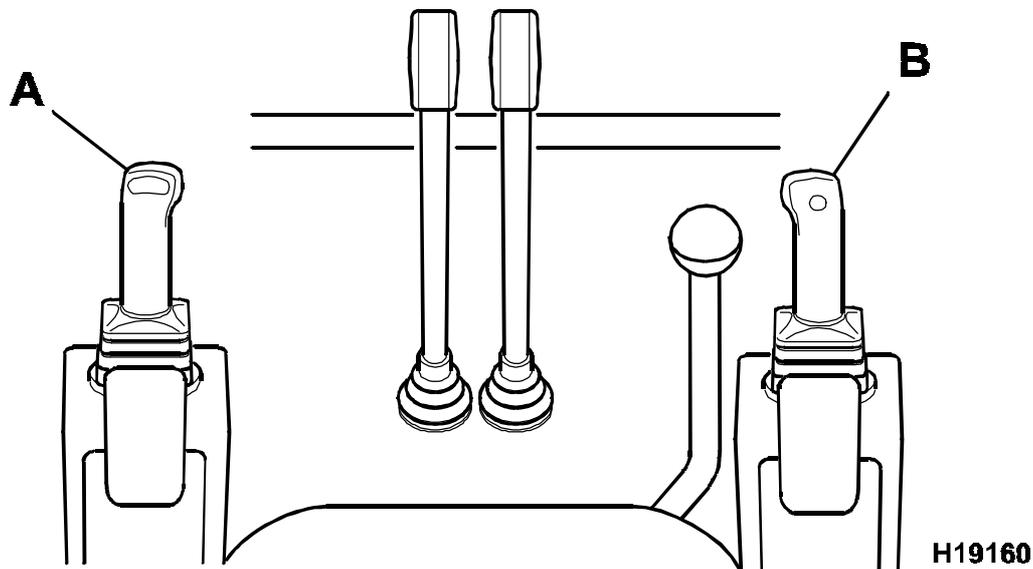
To raise the dozer pull the lever backward. At the required position release the lever.

#### Lower dozer 'B'

To lower the dozer push the lever forward until an increased resistance is felt and the blade moves. At the required position release the lever.

#### Dozer float position 'C'

The float operation is selected by pushing and holding the lever fully forward.



The slew lock is situated forward of the seat. Lift and turn it through 90° to unlock. Ensure it is UNLOCKED before operating the excavator controls.

The excavator controls consist of those levers which operate the boom, dipper and bucket and swing the machine.

There are two excavator controllers **A** and **B** which control all the functions. The controls are situated in the operators seat armrests. Raising the left armrest when leaving the cab prevents the services operating. When re-entering the cab, ensure the armrest is replaced firmly to ensure correct operation.

The left side controller **A** controls swing, and dipper functions. The right side controller **B** controls boom and bucket functions as standard.

It is possible to specify SAE style operating functions i.e. left controller **A** controlling swing and boom. The right hand controller **B** controlling dipper and bucket operation. Both controllers are spring loaded to the central position. In this position related services will not operate.

Most excavating movements are achieved using a combination of both controllers at the same time. Practise such movements until you are familiar with the operations that can be achieved safely.

### **⚠ WARNING**

When using the boom and dipper fully extended, take the following precautions, otherwise the machine could get damaged or become unstable and a danger to you and other people.

**Make sure you do not exceed the working capacity of the boom at maximum reach.**

**Swing the boom slowly to prevent any chance of the machine becoming unstable. For the same reason avoid dumping downhill if possible.**

HOP36

### **CAUTION**

**Do not excavate on hard or rocky ground with the boom set diagonally across the undercarriage. This induces a rocking motion that can cause damage to the track gearbox sprockets and tracks.**

HOP37

Before slewing the cab ensure the slew lock **D** is disengaged, (the up position).

The machine should be set for slew operation. Ensure you are in slew mode by carefully operating the left hand control lever and noting the movement.

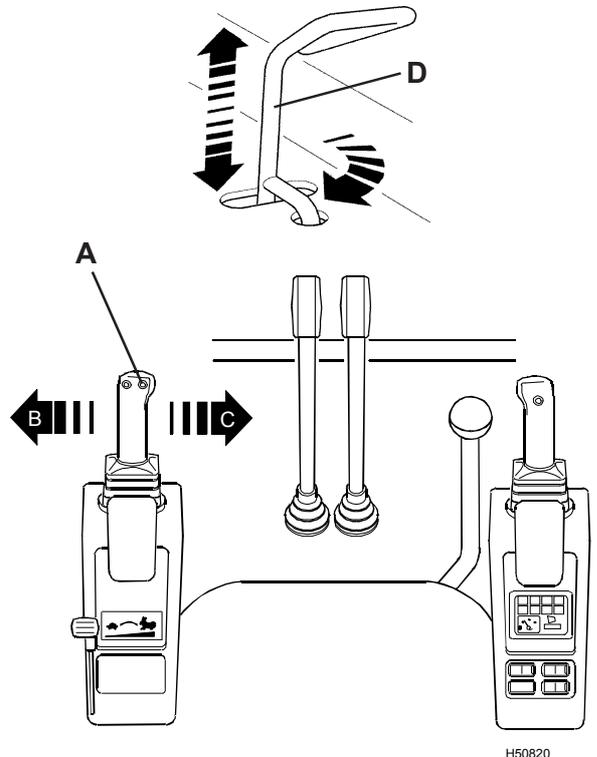
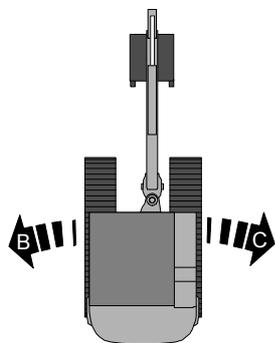
Select Slew on the Slew/Swing switch **A** on the left hand controller.

**Slew cab left**

To slew the cab to your left, move the left controller to the left **B**. Release the controller when you have moved to the desired position.

**Slew cab right**

To slew the cab to your right, move the left controller to the right **C**. Release the controller when you have moved to the desired position.



H50820

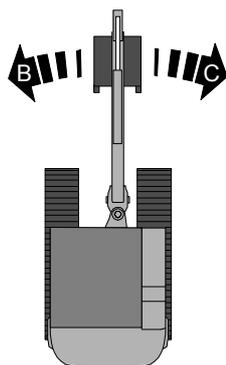
Select Swing on the Slew/Swing switch **A** on the left hand controller.

**Swing boom left**

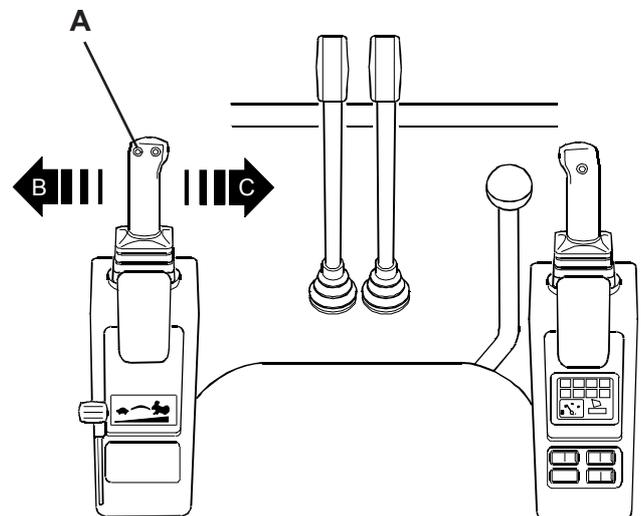
To swing the boom to your left, move the left controller to the left **B**. Release the controller when you have reached the desired position.

**Swing boom right**

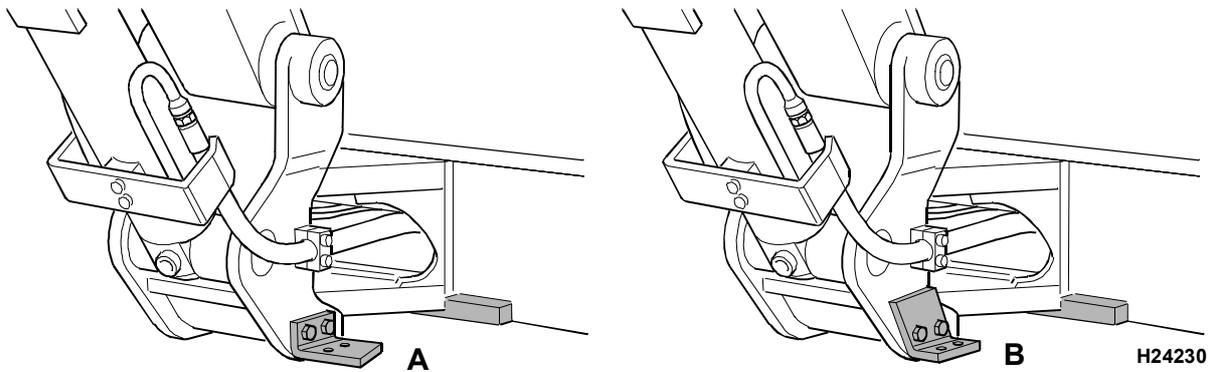
To swing the boom to your right, move the left controller to the right **C**. Release the controller when you have reached the desired position.



**CAUTION**  
When the requirement for boom swing has finished, position boom to the straight ahead configuration and reset machine to 360 deg. slew by operating switch **A**.



H50820



**⚠ WARNING**

Before repositioning swing stop, lower the boom until the bucket is on the ground. Stop the engine.

**Boom swing stop**

The boom swing can be adjusted to allow an increased swing to the left from 60° to 90° by repositioning the swing stop.

**60° Operation (normal operation)**

Set the swing stop to position **A** this enables the machine to operate in an arc of 60° to the left and 50° to the right.

**90° Operation (for specific jobs only)**

Set the swing stop to position **B** this enables the machine to operate in an arc of 90° to the left and 50° to the right.

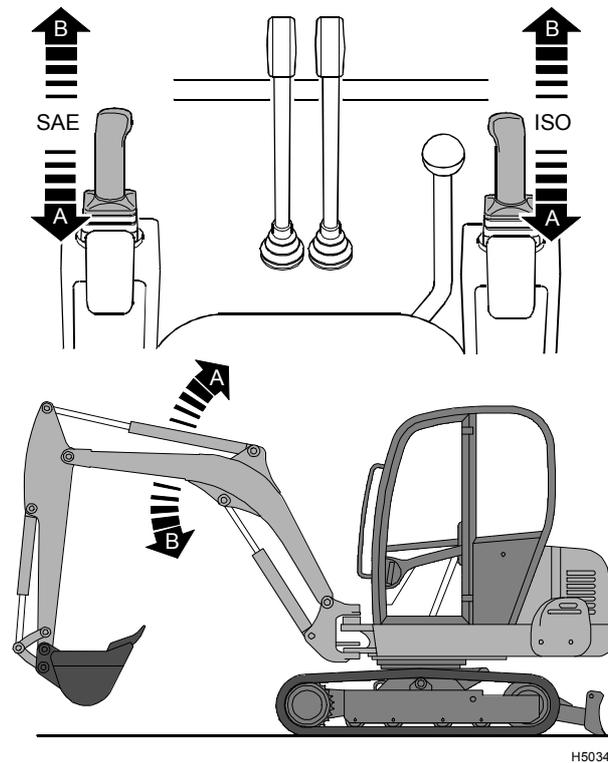
**CAUTION**

With certain digging configurations with the boom stop set to 90° the bucket can contact the cab. Care should be taken whenever operating with the boom stop set to 90° especially at the extremes of position. The machine can become unstable with a fully laden bucket.

HOP39

**CAUTION**

The boom stop should only be used in the 90° position for the duration of the job. Return the boom stop to the 60° position for normal operating.



H50340

### WARNING

Thoroughly warm the hydraulic oil before operating the excavator services. To ensure smooth boom operation damping is incorporated into the boom lift circuit, this means when boom raise is released, the boom may continue to rise for a fraction of a second. Before selecting boom up, check there are no overhead obstructions or electric power cables.

HOP40

**Note:** Boom damping is an option and not fitted as standard.

### CAUTION

The boom service is operated by the R.H. controller on standard ISO control machines or by the L.H. controller on the optional SAE control pattern machines.

HOP41

### Raise boom

To raise the boom pull the respective controller backwards **A**. Release the controller when the boom has reached the desired position. The boom ram incorporates damping at the limit of boom raise, reducing the speed of the ram, eliminating shock loadings.

### Boom boost

Partial selection of the controller will limit the speed of boom raise. Boom Boost is automatically engaged when controller is fully selected. An optional switch is available on the LH controller which will disable the boom boost operation.

### Lower boom

To lower the boom, push the respective controller forwards **B**. Release the controller when the boom has reached the desired position.

**CAUTION**

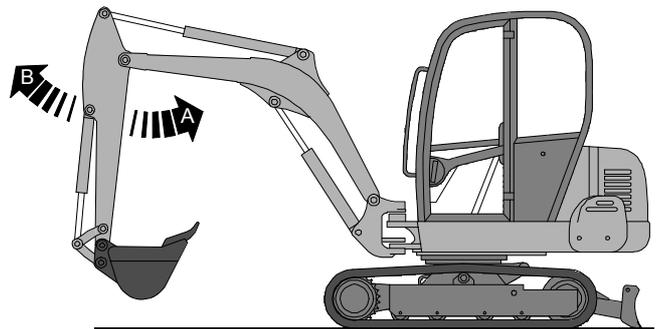
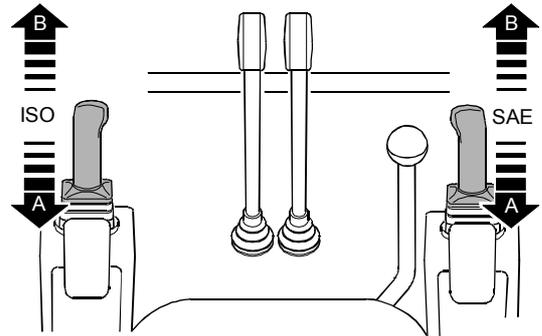
The dipper service is operated by the L.H. controller on standard ISO control machines or by the R.H. controller on the optional SAE control pattern machines. HOP42

**Dipper In**

To bring the dipper in, pull the respective controller backward **A**. Release the controller when the dipper is at the desired position.

**Dipper Out**

To push the dipper out, push the respective controller forward **B**. Release the controller when the dipper is at the desired position.



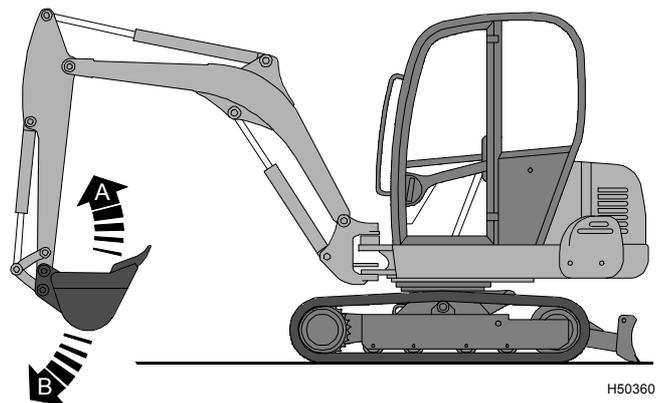
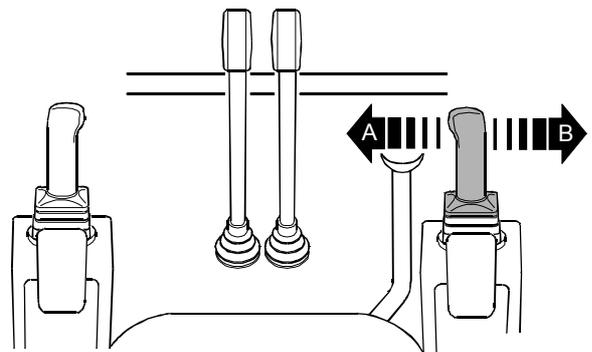
H50350

**Close bucket**

To close the bucket (to gather a load), move the right controller to the left **A**. Release the controller when the bucket is closed sufficiently.

**Open bucket**

To open the bucket (to dump a load), move the right controller to the right **B**. Release the controller when the bucket is open far enough.



H50360

**WARNING**

Diesel fuel is flammable. Keep flames away from the machine. **DO NOT** smoke while fuelling the machine or working on the engine. Do not refuel with the engine running. There could be a fire and injury if you do not follow these precautions.

INT-3-2-2

**CAUTION**

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

Do not use fuel to clean the machine.

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

At the end of every working day, fill the tank with the correct type of fuel. This will prevent overnight condensation from developing in the fuel. Do not fill the tank completely, leave some space to allow the fuel to expand

**Note:** Read *Operating in Low Temperatures* or *Operating in High Temperatures in operation* section if you will be using the machine in very hot or cold climates.

### WARNING

**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.**

HOP43

#### 1 Lower the attachments to the ground.

Lower the excavator bucket and dozer to the ground, if they are not already there. They will lower themselves under their own weight when you operate the controls. Operate the controls carefully to control the rate of descent.

#### 2 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. See *before entering the cab* in operation section
- b Remove dirt and rubbish from the cab interior, especially round the pedal and control levers.
- c Remove oil, grease and mud from 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.** HOP44

- 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.**

HOP45

- e Remove or secure all loose articles in the cab, such as lunch boxes, tools etc.
- f Check round the cab for loose or missing bolts, screws etc. Fit new ones or tighten where necessary.
- g Inspect the seat belt (if fitted) and its mountings for damage and excessive wear.
- h Check that the following are in working order: Lights, Horns all Switches and Wiper
- j Check the excavator lever gaiters are not damaged or loose, replace or secure as required with new fasteners.

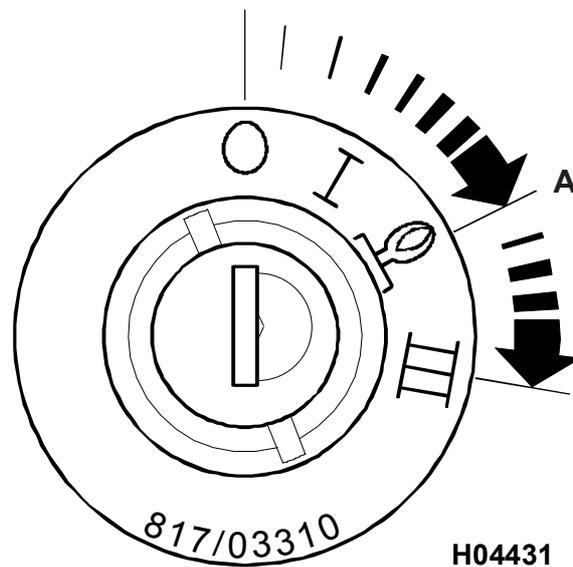
#### 3 Adjust the Seat

Adjust the seat so that you can comfortably reach all driving controls. You should be able to operate the control pedal with your back against the seat back.

Ensure the seat locking lever has engaged fully.

#### 4 Set the hand Throttle Lever

Set the hand throttle lever to idle.



### 1 Start the engine

Move the throttle lever to full speed position. Turn the starter key to the glow plug position **A** for approximately 6 seconds to warm the engine combustion chambers.

**Note:** *outside temperatures below 32°F (0°C) will require extended times.*

Turn the starter key further to position **III** and hold it there until the engine starts; do not exceed 20 seconds. If the engine does not start, turn the starter switch to position **A** and repeat step 1.

### 2 Check the indicators

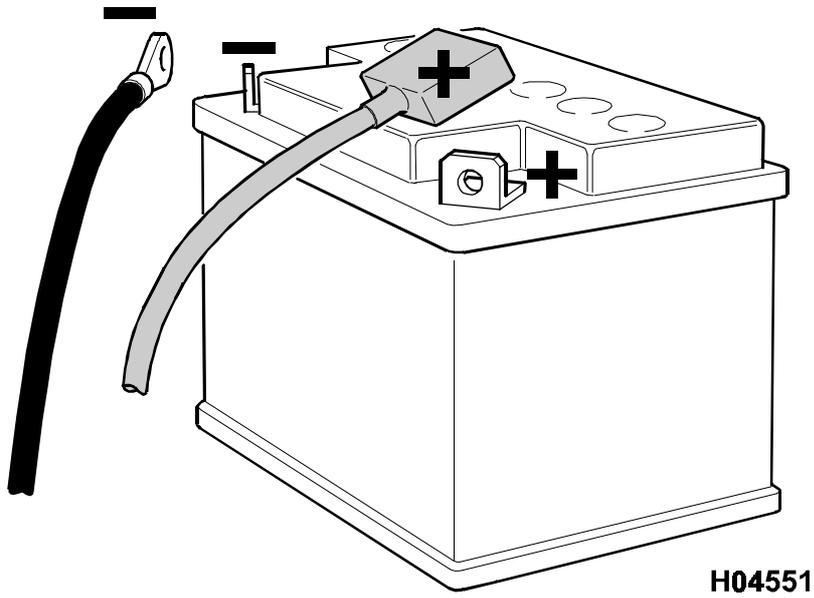
### CAUTION

Once the engine has started, move the throttle lever to the idle position. Check that all the warning lights have gone out. Do not race the engine until the oil pressure low light has extinguished.

If any indicator fails to extinguish, or if they illuminate while the engine is running, make the machine safe, stop the engine and investigate the cause. HOP46

### 3 Warm up the engine and hydraulics

Allow the engine to warm up at idle speed for five minutes. If the engine has been jump-started, remove the booster cables (see jump starting the engine). Operate the excavator a few times to help warm up the hydraulic system.



B45

**JUMP STARTING THE ENGINE**

B45

**Note:** Read battery pages in section C of this handbook before carrying out any work with the battery.

Follow the instructions on this and the following page to start the engine using booster cables. Your machine has a 12V starting system. The negative (-) terminal on the battery is connected to frame earth.

**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.

**WARNING**

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

HOP43

**1 Lower the Attachments to the Ground**

Lower the excavator bucket and dozer to the ground. If they are not already there. They will lower themselves under their own weight when you operate the control. Operate the control carefully to control the rate of descent.

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

The booster supply should not be higher than 12V. Using a welder or higher voltage supply will damage your machine's electrical system.

**CAUTION**

Do not connect two batteries together to give 24V. This could burn out the glow plugs and damage the starter motor.

**3 Open the engine cover**

B46

**JUMP STARTING THE ENGINE - continued**

B46

**4 Connect the Booster Cables**

- a Remove battery cover if fitted.
- b Connect the positive booster cable to the positive (+) terminal on the machine battery. Connect the other end of this cable to the positive (+) terminal of the booster supply.
- c Connect the negative (-) booster cable to a good frame earth on the machine, away from and below the battery.

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

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

**5 Do the pre-start checks**

See before starting the engine

**6 Start the engine - see starting the engine****7 Disconnect the Booster Cables**

- a Disconnect the cable from the machine frame earth, then disconnect if from the booster supply.
- b Disconnect the positive booster cable from the positive (+) terminal on the battery, then disconnect it from the booster supply.

**8 Fit battery cover (if required).****9 Refit items removed to gain access to the battery.****WARNING**

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

Make sure that the fuel filler cap is tightly fitted. Make sure that all spilt fuel is cleaned away from the battery area.

HOP48

Before starting work in temperatures below -15°C, hydraulic fluid must be warmed.

**1 Warm up Engine**

After starting the engine (see starting engine) set the throttle lever to mid position and run for 10 minutes.

DO NOT operate any services. After the warm up period make sure that everyone is clear of the machine.

**2 Warm up Hydraulic Oil**

**a** Increase engine speed to maximum. Warm the hydraulic oil by repeatedly selecting bucket crowd by moving the right hand lever to the left for 5 seconds. Repeat for several minutes.

**b** Select dozer up by moving dozer control lever backwards, keep selected for one minute.

**3 Warm up Hydraulic Circuit**

**a** Reduce engine speed by moving throttle lever to mid position.

**b** Raise and lower boom from ground level to full height five times.

**c** Stroke the dipper fully in both directions, five times

**d** Rotate the bucket fully in both directions, five times

**e** Swing the upper structure clockwise for one revolution and stop. Swing the upper structure anti-clockwise for one revolution and stop.

**f** Repeat step 3c three times

**4** The machine should now operate correctly. Should operation still appear slow, then steps 3b and 3c may be repeated.