OPERATOR'S MANUAL



BACKHOE LOADER
3CX, 4CX

EN - 9831/2250 ISSUE 3 - 03/2018

THIS MANUAL SHOULD ALWAYS STAY WITH THE MACHINE

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Contents **Page No.**

Acronyms Glossary ix

Introduction
About this Manual
Model and Serial Number 1
Using the Manual 1
Left-Hand Side, Right-Hand Side 1
Cab/Canopy 1
Cross References 2
Location of Manual 2
Safety
Safety - Yours and Others 3
Safety Warnings 3
General Safety 4
Clothing and Personal Protective Equipment (PPE) 5

About the Product
Introduction
General 7
Name and Address of the Manufacturer 7
Product Compliance 7
Description
General 8
Intended Use 8
Log Moving/Object Handling 8
Optional Equipment and Attachments 8
Danger Zone 8
Main Component Locations 8
Product and Component Identification
Machine 10
Engine 10
Axle 11
Gearbox 12
Operator Protective Structure 13
Safety Labels
General 14
Safety Label Identification 14
Operator Station
Component Locations 17
Interior Switches
Ignition Switch 19
Multi-Purpose Switch 19
Cab Interior Light 20
Console Switches
General 21
Road Lights 21
Rear Fog Lights 21
Hazard Warning Lights 21
Front Work Lights 22
Rear Work Lights 22

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Safety

Safety - Yours and Others

All machinery can be hazardous. When a machine is correctly operated and maintained, it is a safe machine to work with. When it is carelessly operated or poorly maintained it can become a danger to you (the operator) and others.

In this manual and on the machine you will find warning messages, you must read and understand them. They inform you of potential hazards and how to avoid them. If you do not fully understand the warning messages, ask your employer or JCB dealer to explain them.

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 of 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 work until you are sure that you and those around you will be safe.

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

Remember:

- Be careful
- Be alert
- Be safe.

Safety Warnings

In this manual there are safety notices. Each notice starts with a signal word. The signal word meanings are given below.

The signal word 'DANGER' indicates a hazardous situation which, if not avoided, will result in death or serious injury.

The signal word 'WARNING' indicates a hazardous situation which, if not avoided, could result in death or serious injury.

The signal word 'CAUTION' indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

The signal word 'Notice' indicates a hazardous situation which, if not avoided, could result in machine damage.

The safety alert system symbol (shown) also helps to identify important safety messages in this manual. When you see this symbol your safety is involved, carefully read the message that follows.

Figure 3. The safety alert system symbol



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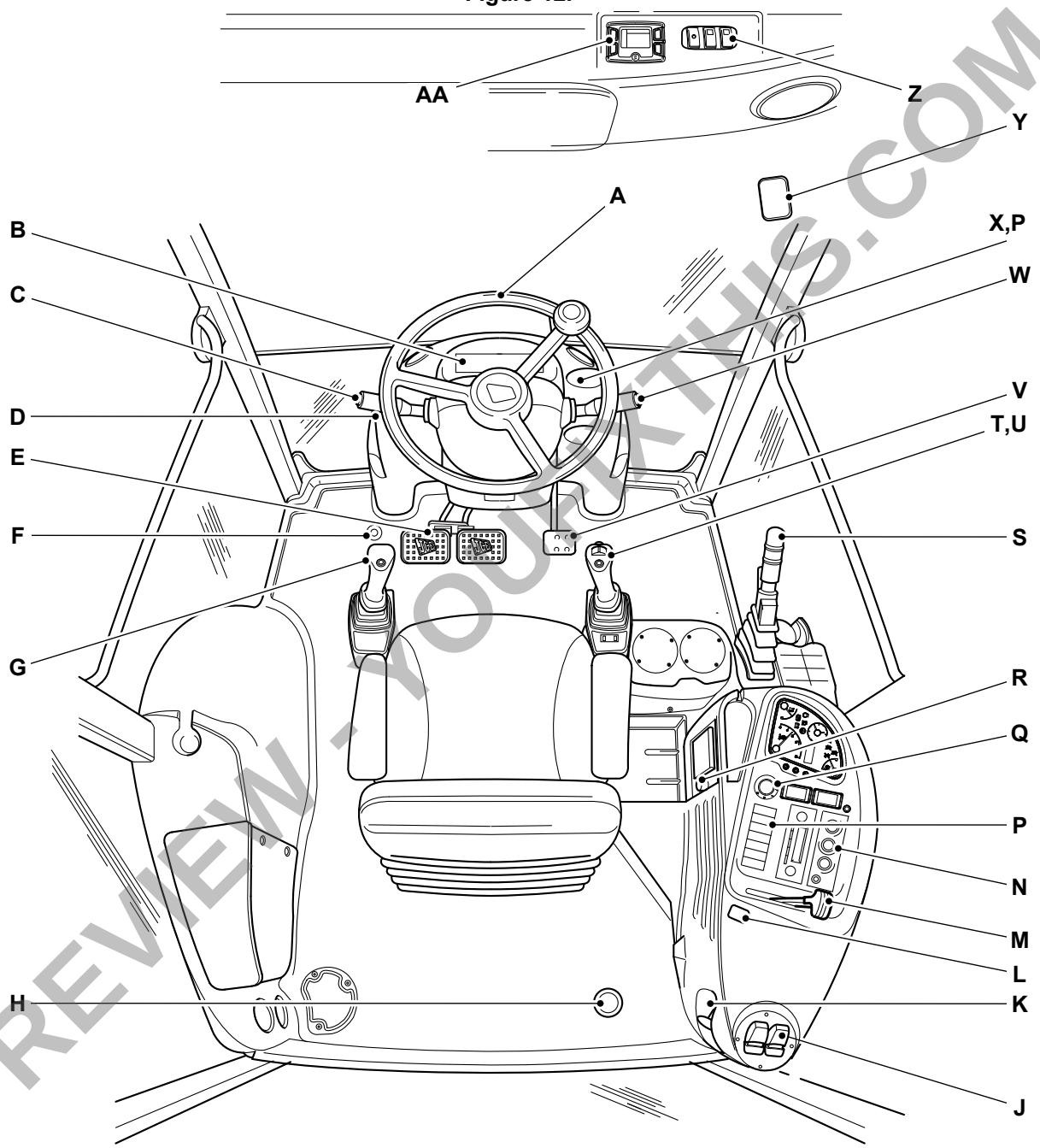
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Operator Station

Component Locations

(For: Advanced Easy Controls)

Figure 12.



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A Steering wheel Refer to: Steering Wheel (Page 65).
B Instrument panel Refer to: Instrument Panel (Page 75).
C Drive lever Refer to: Transmission Drive Lever (Page 67).
D Gear selection Refer to: Steering Wheel (Page 65).
E Service brake pedal Refer to: Service Brake Pedal (Page 67).
F Transmission kickdown switch Refer to: Transmission Kickdown Switch (Page 70).
G Excavator controls Refer to: Excavator End Controls (Page 98).
H Hammer switch
J Stabiliser controls Refer to: Stabiliser Controls (Page 102).
K Not applicable

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Operation
Introduction

General

The aim of this part of the manual 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.

The operator must always be aware of events happening in or around the machine. Safety must always be the most important factor when you operate the machine.

When you understand 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.

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.

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Maintenance Schedules

General

⚠ **WARNING** Maintenance must be done only by suitably qualified and competent persons.

Before doing any maintenance make sure the machine is safe, it must be correctly parked on solid, level ground.

To prevent anyone starting the engine, remove the ignition key. Disconnect the battery (by means of the battery isolator if installed) when you are not using electrical power. If you do not take these precautions you could be killed or injured.

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

To ensure the correct functioning of the engine and emissions control system all operation and maintenance must be conducted in accordance with the instructions in this manual. Incorrect operation, maintenance or repair of the engine and emissions control system may lead to reduced product life, loss of performance or malfunctions. It is the machine owner's responsibility to ensure maintenance is conducted properly in accordance with the requirements in this manual.

Apart from the daily tasks, the schedules are based on the machine running hours. Keep a regular check on the hourmeter readings to correctly gauge the service intervals. When there is no hourmeter installed, use the calendar equivalents to determine the service intervals.

Do not use a machine which is due for a service. Make sure any defects found during the regular maintenance checks are corrected immediately.

More frequent checks of engine components than the engine manufacturer recommends do not invalidate emissions warranty.

How to Use the Maintenance Schedules

The schedules show the service tasks which must be done and their intervals.

The services must be done at either the hourly interval or the calendar equivalent, whichever occurs first.

The intervals given in the schedules must not be exceeded. If the machine is operated under severe conditions (high temperature, dust, water, etc.) shorten the intervals.

Table 23.

O	Service task can be completed by a competent operator. Details of how to complete the service task are given in the Operator's Manual.
□	We recommend that a Service Engineer completes the service task. Details of how to complete the service task are given in the Service Manual.

Maintenance Intervals

Table 24.

Interval (h)	Calendar Equivalent
10	Daily
50	Weekly
500	Six months
1000	Yearly
2000	Two years

Pre-start Cold Checks, Service Points and Fluid Levels

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⚠ **Notice:** Do not exceed the maximum level of engine oil in the sump. If the maximum is exceeded, the excess must be drained to the correct level. An excess of engine oil could cause the engine speed to increase rapidly without control.

Electronic Check

The machine has an electronic daily check system. If the ignition has been turned off for more than the time specified, the machine will perform a check as soon as the ignition is switched to position I. 85 s

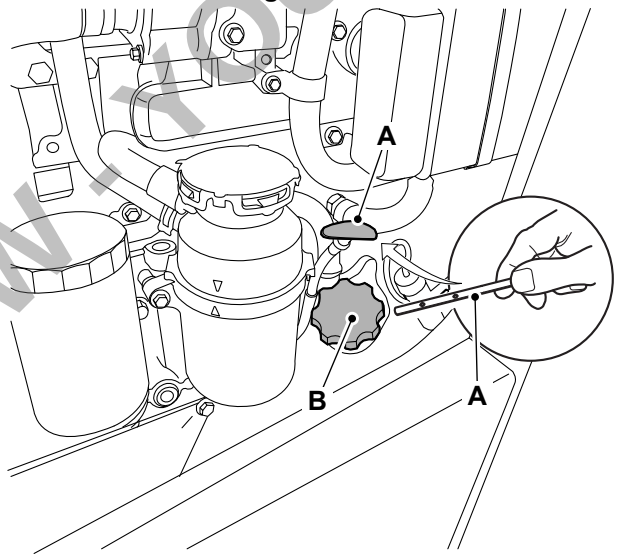
If the oil level is low a warning message and amber warning lamp will light up to alert the operator. Check the engine oil dipstick to confirm.

The message and warning lamp will automatically go out after the next electronic check when the level is above the minimum.

Manual Check

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 223).
2. Wait for the oil to drain back into the engine sump before you take a reading. If not, a false low reading may be recorded which can cause the engine to be overfilled.
3. Get access to the engine compartment.
   Refer to: Access Apertures (Page 228).
4. Remove and clean the dipstick.

Figure 231.



A Dipstick **B** Filler Point

5. Replace the dipstick.
6. Remove the dipstick.
7. Check the oil level. The oil should be between the two marks on the dipstick.
8. If necessary, add more oil:
   8.1. Remove the filler cap.
   8.2. Add the recommended oil slowly through the filler point.
   Refer to: Fluids, Lubricants and Capacities (Page 329).

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Fluids, Lubricants and Capacities

General

⚠ **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.

JCB recommend that you use the JCB lubricants shown as they have been verified by JCB for use on JCB machines. However, you could use other lubricants that are equivalent to the JCB standards and quality or offer the same machine component protection.

No warranty liability will be accepted for engine failures where unacceptable fuel grades (or their equivalent) have been used at any stage.

Table 71.

Item	Capacity	Fluid/Lubricant	JCB Part Number	Container Size[1]	Specification
Diesel fuel tank	150 L	Diesel oil	-	-	
DEF (Diesel Exhaust Fluid) tank	20 L	DEF	4007/1008	18 L	
Engine (oil)[2]	Minimum 12 L Maximum 15 L	JCB UP 5W40 -30 °C (-22.0 °F) to 30 °C (86.0 °F)	4001/3105	20 L	API CJ-4
		JCB UP 10W30 -15 °C (5.0 °F) to 46 °C (114.7 °F)	4001/3005	20 L	
Engine (coolant)[3]	20.5 L Wet	JCB Antifreeze HP Coolant/ Water	4006/1120	20 L	ASTM D6210
	23.5 L Dry				
Syncro shuttle (2WD (Two Wheel Drive))[4]	14.4 L Dry				
	10 L Wet	JCB Extreme Performance EP 10W -32 °C (-25.6 °F) to 40 °C (103.9 °F)	4000/2505	20 L	
		JCB Extreme Performance EP SAE (Society of Automotive Engineers)30 -5 °C (23.0 °F) to 46 °C (114.7 °F)	4000/2605	20 L	
Syncro shuttle (4WD (Four Wheel Drive))[3]	15.4 L Dry				
	11 L Wet	JCB Extreme Performance EP 10W -32 °C (-25.6 °F) to 40 °C (103.9 °F)	4000/2505	20 L	
	11 L Wet	JCB Extreme Performance EP SAE30 -5 °C (23.0 °F) to 46 °C (114.7 °F)	4000/2605	20 L	
Powershift 6 speed[3]	16 L Dry				
	11.5 L Wet	JCB Extreme Performance EP 10W -32 °C (-25.6 °F) to 40 °C (103.9 °F)	4000/2505	20 L	
		JCB Extreme Performance EP SAE30 -5 °C (23.0 °F) to 46 °C (114.7 °F)	4000/2605	20 L	
Powershift 4 speed[3]	15.5 L Dry				

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Warning Lights

Figure 55.

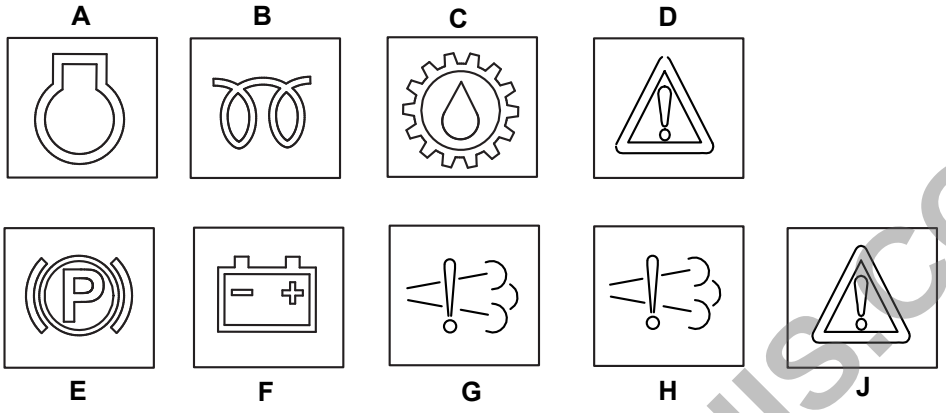


Table 9.

A	Engine oil pressure low/ coolant temperature high.	Red MIL (Malfunction Indicator Lamp) lamp - illuminates if the engine oil pressure drops too far or the engine coolant overheats. The light should go out after the engine is started. Amber MIL lamp flashes SERVICE, a buzzer tone for 1 s if engine oil pressure, coolant temperature or the engine speed is faulty.
	Water in fuel	Illuminates when senses water in the fuel. LCD (Liquid Crystal Display) message WATER IN FUEL displayed. Warning light on continuously. Amber MIL lamp and 1 s buzzer. Fault code raised. Drain water from water separator bowl.
	Air filter blocked.	Illuminates if the engine air filter is blocked. If the air filter warning light comes on, stop the machine and switch off the engine. After a short pause start the engine. If the warning light has extinguished carry on operating the machine in the normal manner. If the warning light is still illuminated after the engine has been started check that the engine air filter elements are not blocked. If amber MIL lamp flashes SERVICE, a buzzer tone for 1 s if a fault occurs. Change the air filter element.
B	Wait to Start	Illuminates if the the outside air temperature is -10 °C (14.0 °F) or below indicating that the manifold heater (if installed) is on. When the light extinguishes the engine is ready to start. MIL lamp flashes if a fault occurs (Where this option is installed).
C	Transmission oil (Pressure low/Temperature high)	Red MIL lamp - illuminate if the transmission oil pressure drops too far / oil temperature rises too far. The light should go out after the engine is started. Amber MIL lamp flashes SERVICE, a buzzer tone for 1 s if a fault occurs.
D	Amber MIL- service fault	The LCD flashes SERVICE, a buzzer tone for 1 s when a fault occurs. Certain operator faults will display an instruction.
E	Park brake engaged	Illuminate when the park brake is engaged with the machine in forward or reverse. The buzzer will also sound if forward or reverse drive is selected.
F	No charge	Amber MIL lamp - illuminate if the battery charging circuit fails while the engine is running. The LCD flashes SERVICE, a buzzer tone for 1 s when a fault occurs. The light should go out a few seconds after the engine is started.
G	After treatment warning	Amber after treatment warning.
H	After treatment warning	Red after treatment warning
J	Red MIL- critical fault	The digital display LCD will show STOP NOW and a continuous buzzer will sound. Stop the machine immediately, rectify the fault or contact your JCB dealer for advice.

If no charge, engine oil pressure low / coolant temperature high, transmission oil (pressure low/temperature high), air filter blocked and wait to start light come on while the engine is running, stop the engine as soon as

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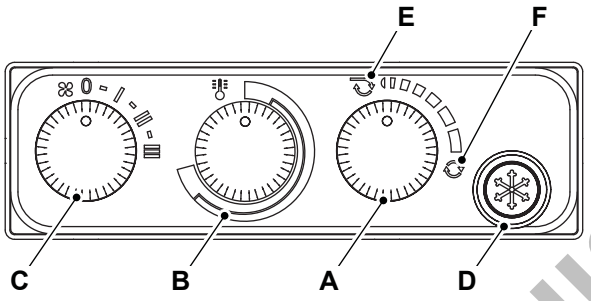
Heating, Ventilating and Air-Conditioning (HVAC)

Air-Conditioning Controls

Heater/Air Conditioning Controls

Introduction

Figure 119.



A Recirculation switch
B Temperature control switch
C Three speed fan switch
D Air conditioning button
E Fresh air position
F Recirculate position

The heater/air conditioning control panel is installed on the right console.

The temperature is adjusted by the recirculation switch, a 3-speed fan switch, the temperature control switch and air conditioning switch.

Adjust the air vents in the cab to direct the air flow to the front window (for demisting) and/or the cab floor.

Recirculation Switch

Turn the recirculation switch to the fresh air position to let fresh air enter the cab.

Turn the recirculation switch to the recirculate position to recirculate the air in the cab. This switch should be used when you operate in a dusty working environment. The recirculate position can also be used to increase the heater and air conditioning performance during cab warm-up or cab cool-down.

Temperature Control Switch

Turn the temperature control switch clockwise to increase the temperature.

Turn the temperature control switch counterclockwise to decrease the temperature.

Three Speed Fan Switch

Turn the three speed fan switch to adjust the speed of the heater fan.

Air Conditioning Switch

To provide cool air in warm climates and during hot seasons the air conditioning system delivers cool dehumidified air into the cab. Air conditioning reduces moisture from the air and can be used to demist windows quickly in damp weather. Used in conjunction with the heater, it also makes the interior of the cab warm and dry. To obtain best results from the air conditioning system ensure that all doors and windows are closed.

Push the air conditioning button to turn on the air conditioning. Push the button again to turn off the air conditioning.

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Entering and Leaving the Operator Station

General

⚠ **CAUTION** Entering or leaving the operator station must only be made where steps and handrails are provided. Always face the machine when entering and leaving. Make sure the steps, handrails and your boot soles are clean and dry. Do not jump from the machine. Do not use the machine controls as handholds, only use the handrails.

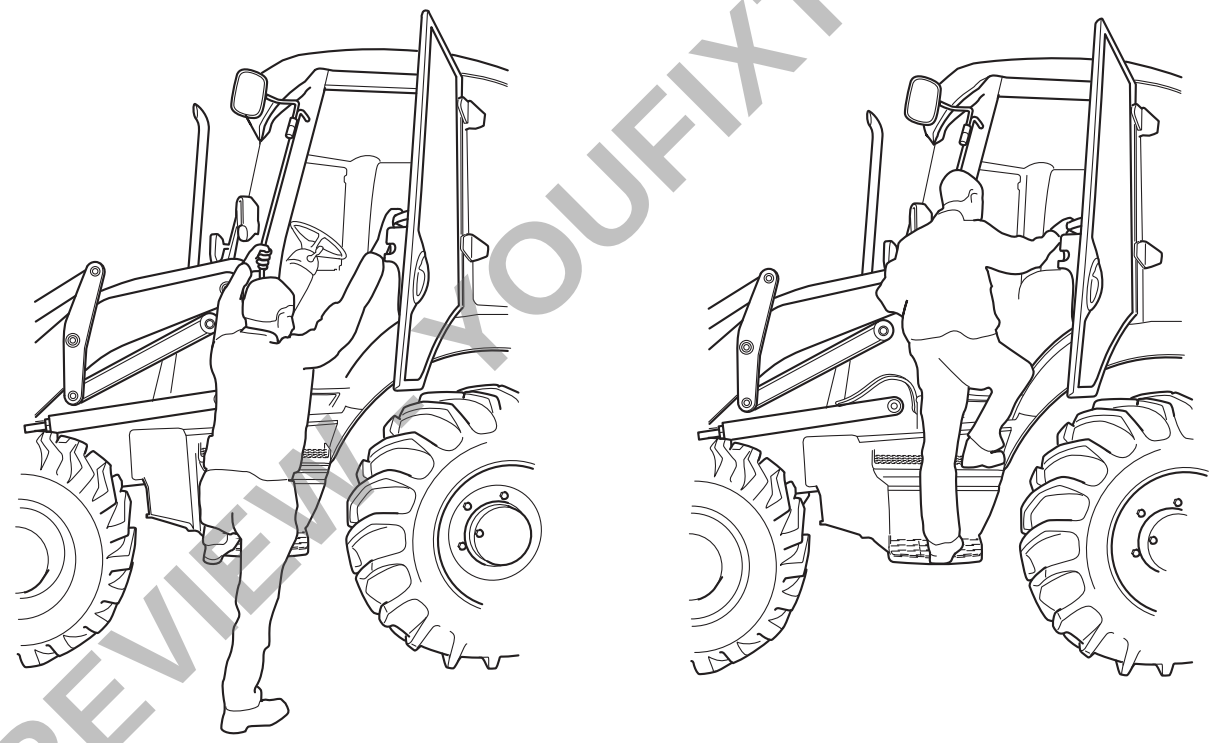
Make sure the machine is stopped and correctly parked before entering or leaving the cab. If necessary refer to Refer to: Stopping and Parking (Page 53).

When you get 'on' and 'off' the machine always maintain a three point contact with the handrails and step(s). Do not use the machine controls as handholds. Refer to Figure 17.

The primary access system is as shown. Refer to Figure 17.

There is also a secondary access system on the opposite side of the machine, used for ascending from the ground to the operator station or descending from the operator station to the ground during situations in which the primary access system cannot be used. Extreme care should be taken when using the secondary exit.

Figure 17.



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Torque Values

General

ROPS/FOPS

Table 77.

Mounting bolts torque	205 N·m

Engine

Table 78.

Sump Drain Plug	Filter Housing Drain Plug	Engine Fuel Filter
40 –60 N·m	40 –60 N·m	30 N·m

Hydraulic System

Table 79.

Hydraulic Tank Filter Cover Plate	Suction Strainer Filter	Drain Plug
24 N·m	15 –20 N·m	100 N·m

Transmission/Axles

Table 80.

Transmission Suction Strainer	Axle Drain Plug
10 N·m	79 N·m

Wheels

Table 81.

Wheel nuts	680 N·m

Body and Framework

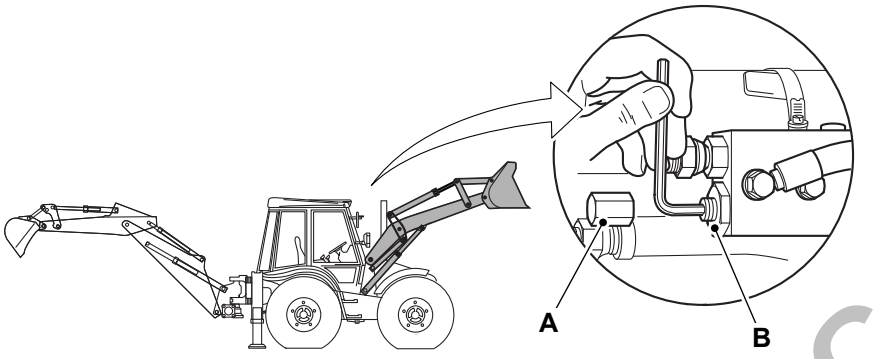
Table 82.

Extending Dipper Top Wear Pads	Extending Dipper Bottom Wear Pads
49 N·m	100 N·m

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Figure 145.



A Cap - loader arm HBCV

B Screw - loader arm HBCV

Loader Arms Without Hose Burst Check Valves

Manual Control Machines

1. Sit in driving position and apply parkbrake.
2. Make sure the area around the machine is clear of people.
   Refer to: Danger Zone (Page 8).
3. Carefully select loader control down and allow loader arms to slowly fall to the ground.

Advanced Easy Control Servo Machines

1. Sit in driving position and apply parkbrake.
2. Make sure the area around the machine is clear of people.
   Refer to: Danger Zone (Page 8).
3. Turn starter key to on position.
4. Select the excavator/loader control switch to the loader position.
   Refer to: Excavator/Loader Control Selector (Page 25).
5. Energise the joystick controls.
6. Carefully select loader control down and allow loader arms to slowly fall to the ground.

Excavator End (Emergency Operation)

⚠ **DANGER** Do not stand underneath the raised load during the lifting/lowering procedure. 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.

During normal operation, the engine must be running before a load can be lowered.

The following information describes how to safely and correctly lower a load in the event of engine failure or a hose burst; we recommend that only a competent maintenance engineer perform the procedures.

After lowering a load do not use the machine until a new end cap and valve assembly has been installed by a qualified engineer, otherwise the valve will not operate as intended.

1. Remove the cap and pierce the warning label.
2. If a hose has burst, position a suitable container to catch the oil.

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Power Sockets

Auxiliary Power Socket

Your machine may be installed with one or more 12V auxiliary power sockets, which can be used for mobile phone chargers or other 12V powered devices.

Only connect items which are compatible with the power rating of the socket and have the correct plug.

Always operate the engine during the prolonged use of the electrical accessories, or the battery can discharge.

Make sure that the socket cap is closed when the socket is not in use.

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Hydraulic System

General

Discharge

Discharge the Hydraulic Pressure

1. Make the machine safe with the loader arm lowered.
   Refer to: Maintenance Positions (Page 223).
2. Operate the controls to remove the hydraulic pressure from the service hose lines. To release the hydraulic pressure from the electrical and servo operated services the battery must be connected while you operate the controls.
   2.1. For manually operated services, operate the controls (several times) of the service(s) to be disconnected.
   2.2. For electrical and servo operated services, turn the starter key to the on position.
   2.3. Press the relevant console switch (to make the relevant service active).
   Refer to: Console Switches (Page 21).
   2.4. For AEC hammer only option, turn the starter key to the on position, set the hammer switch to off position, operate the foot button several times to vent the auxiliary lines, then set the hammer switch to the on position, operate the foot button several times to vent the auxiliary lines.
3. Carefully remove the hydraulic tank filler cap to vent residual tank hydraulic pressure.
   Refer to: Check (Level) (Page 276).
4. Install the hydraulic tank filler cap.

Check (Condition)

Hydraulic Hoses

⚠ **WARNING** Damaged hoses can cause fatal accidents. Examine the hoses regularly. Do not use the machine if a hose or hose fixture is damaged.

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

Examine the hoses for:

- Damaged hose ends
- Worn outer covers
- Ballooned outer covers
- Kinked or crushed hoses
- Exposed armouring in the outer covers
- Displaced hose end fittings.
- Worn cover sheathing or hose burst protection covering

Replace a damaged hose before you use the machine again.

The replacement hoses must be of the same size, standard and pressure rating. If necessary, for more information contact your JCB dealer.

Check (Leaks)

⚠ **Notice:** If the fluid is cloudy, then water or air has contaminated the system. This could damage the hydraulic pump. Contact your JCB dealer immediately.

1. Make the machine safe.

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Notes:

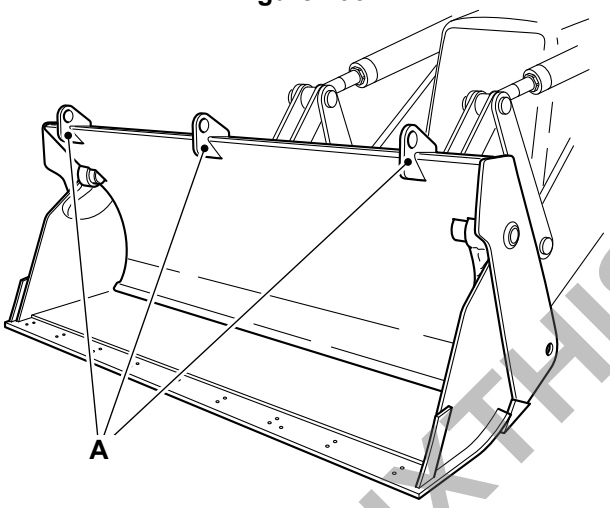
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If SRS (Smooth Ride System) is installed and selected on the loader cannot power down. For duties other than light handling the system should be selected off or auto position (if installed).

Loader shovels without forks fitted, lugs must not be used for lifting, towing or tie down points under any circumstances. Refer to Figure 106.

Figure 106.



A Lugs

Filling the 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.

On hard surfaces select float, as the shovel enters the pile, start rolling back (crowding) the shovel while raising the loader arm at the same time. This will sweep the shovel up the pile, gathering material as it goes. Refer to: Operating Levers/Pedals (Page 94).

When entering a stockpile, pressing the hydraulic flow rate selector switch to LO (if installed) will give more tractive force.

Pressing the transmission dump switch will give more power to operate the shovel and speed of 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. Refer to Figure 107. Approach the pile with the shovel level and skimming the ground.

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

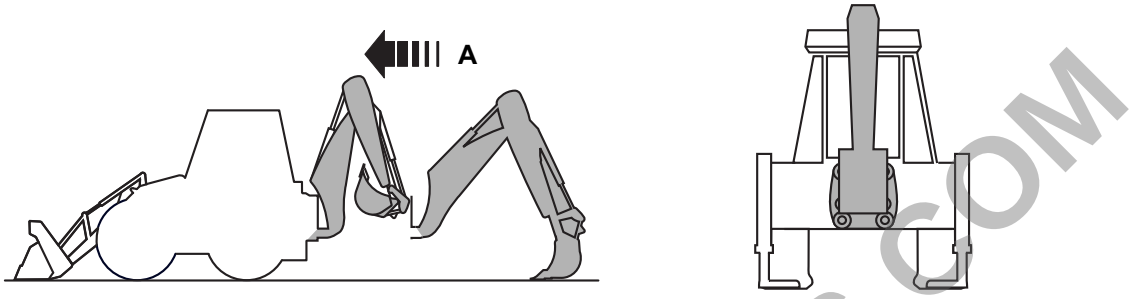
When removing material from a stockpile, start at a shovel's height from the base. Once the height of the stockpile has been reduced, begin loading from the base.

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3. Deactivate the excavator controls.
4. Visually check the boom lock is engaged.

Figure 223.



A Boom raise

Kingpost

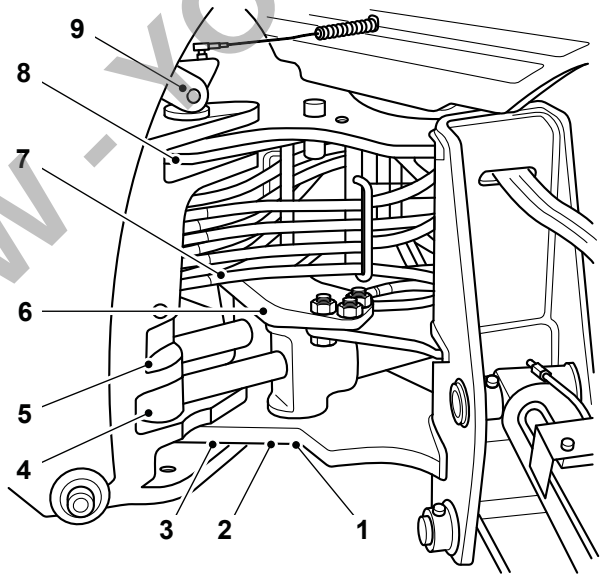
Lubricate

Apply grease to all the points and linkages.

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

It is recommended that grease points 6 and 7 are lubricated using a hand grease gun. The use of a power grease gun may result in the mounting plate being distorted.

Figure 224.



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