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Safety Notices

Important Information

T1-042

The Operator Manual

⚠ WARNING

You and others can be killed or seriously injured if you operate or maintain the machine without first studying the Operator Manual. You must understand and follow the instructions in the Operator Manual. If you do not understand anything, ask your employer or JCB dealer to explain it.

INT-1-4-2

Do not operate the machine without an Operator Manual, or if there is anything on the machine you do not understand.

Treat the Operator Manual as part of the machine. Keep it clean and in good condition. Replace the Operator Manual immediately if it is lost, damaged or becomes unreadable.

Safety Warnings



This safety alert system identifies important safety messages in this manual. When you see this symbol, be alert, your safety is involved, carefully read the message that follows, and inform other operators.

In this publication and on the machine, there are safety notices. Each notice starts with a signal word. The signal word meanings 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

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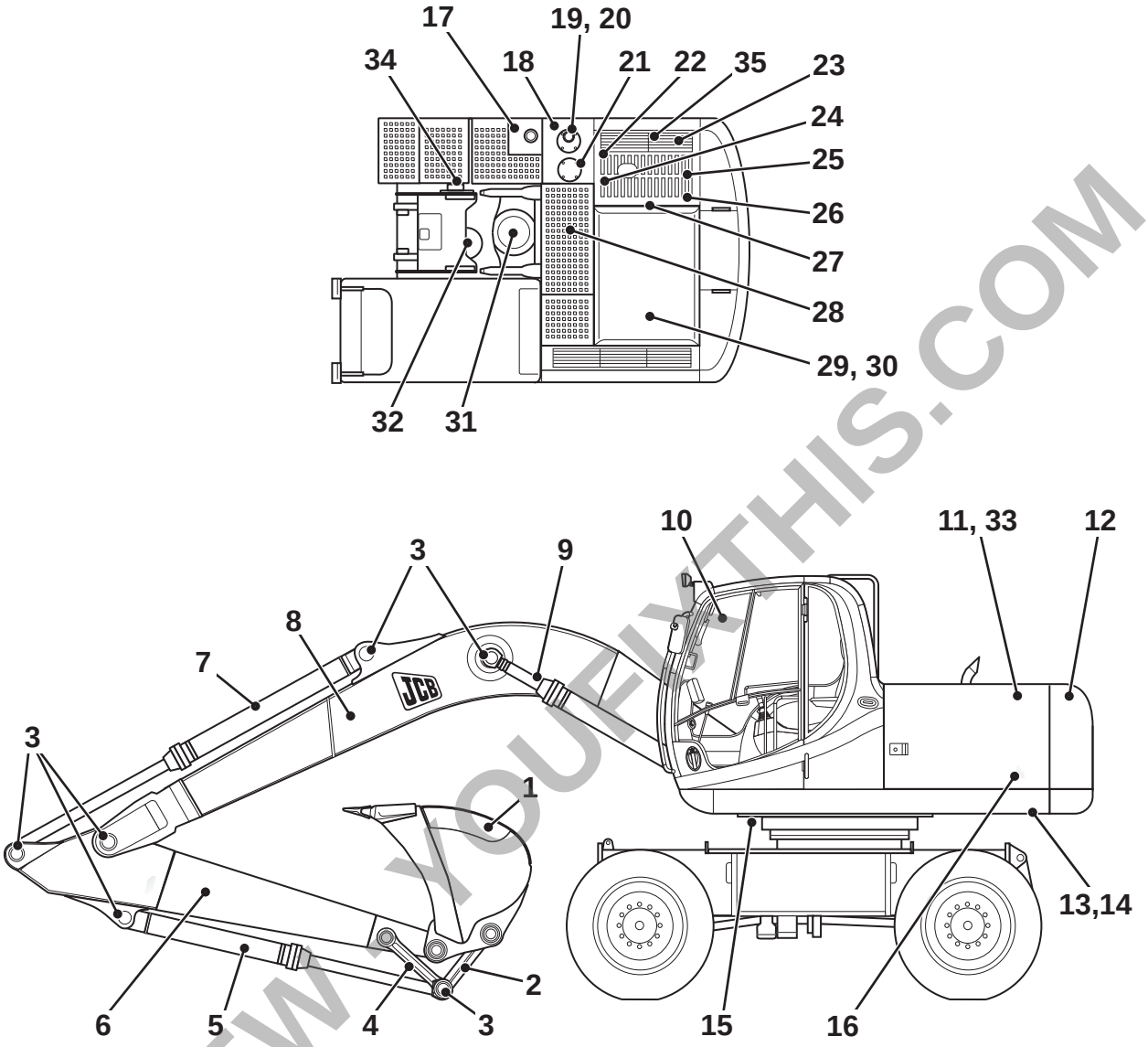


Fig 2.

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Cab Layout

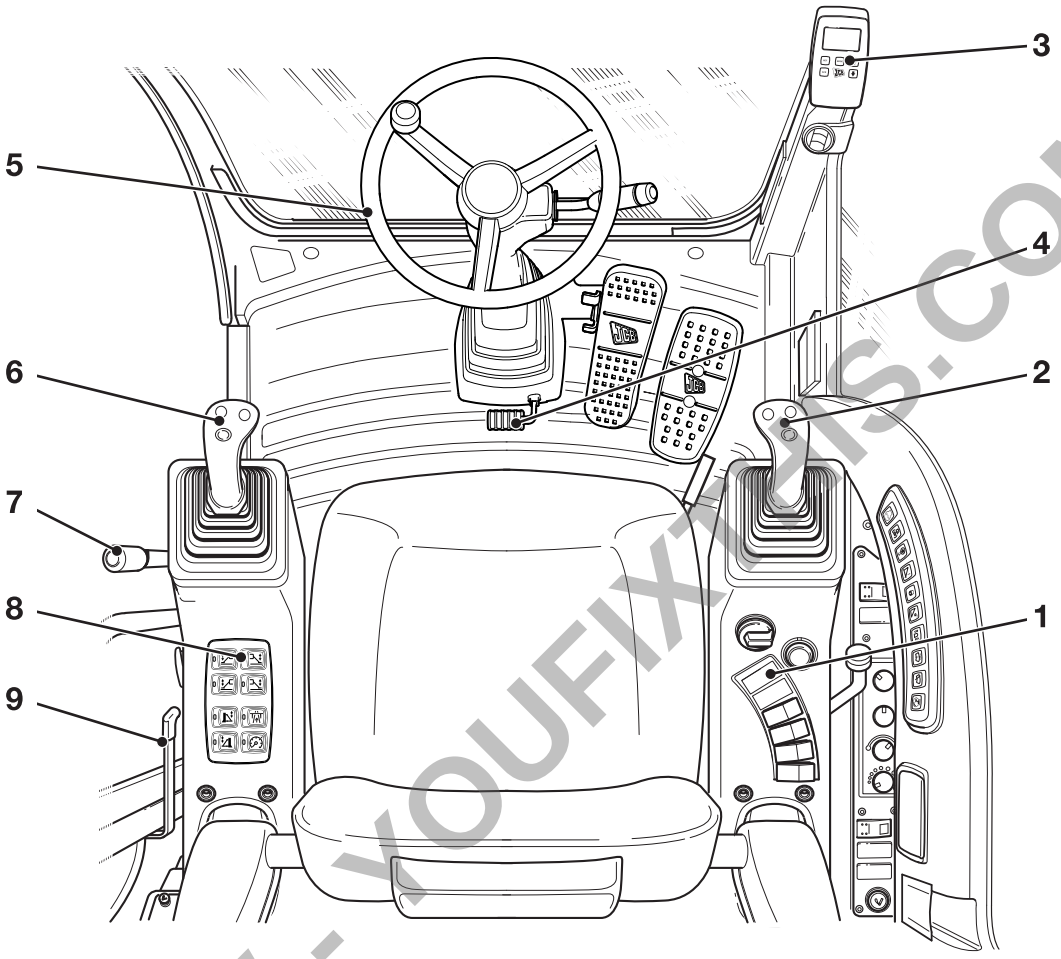


Fig 33.

Components Key

1 Right Console. ⇒ *Right Console (55)*.

2 Right Excavator Joystick Control. ⇒ *Right Console (55)*.

3 ⇒ *Monitor Panel (64)*.

4 Steering Column Lock Latch. ⇒ *Adjusting the Steering Column (51)*.

5 Steering Wheel. ⇒ *Steering Wheel (51)*.

6 Left Excavator Joystick Control. ⇒ *Left Console (53)*.

7 Control Lock Lever. ⇒ *Control Lock Lever (80)*.

8 Left Console. ⇒ *Left Console (53)*.

9 Door Lock Release Lever. ⇒ *Opening and Closing the Door (35)*.

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Operation

Introduction

T2-006_2

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.

Before you start the machine, you must know how the machine operates. Use your manual 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 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.

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

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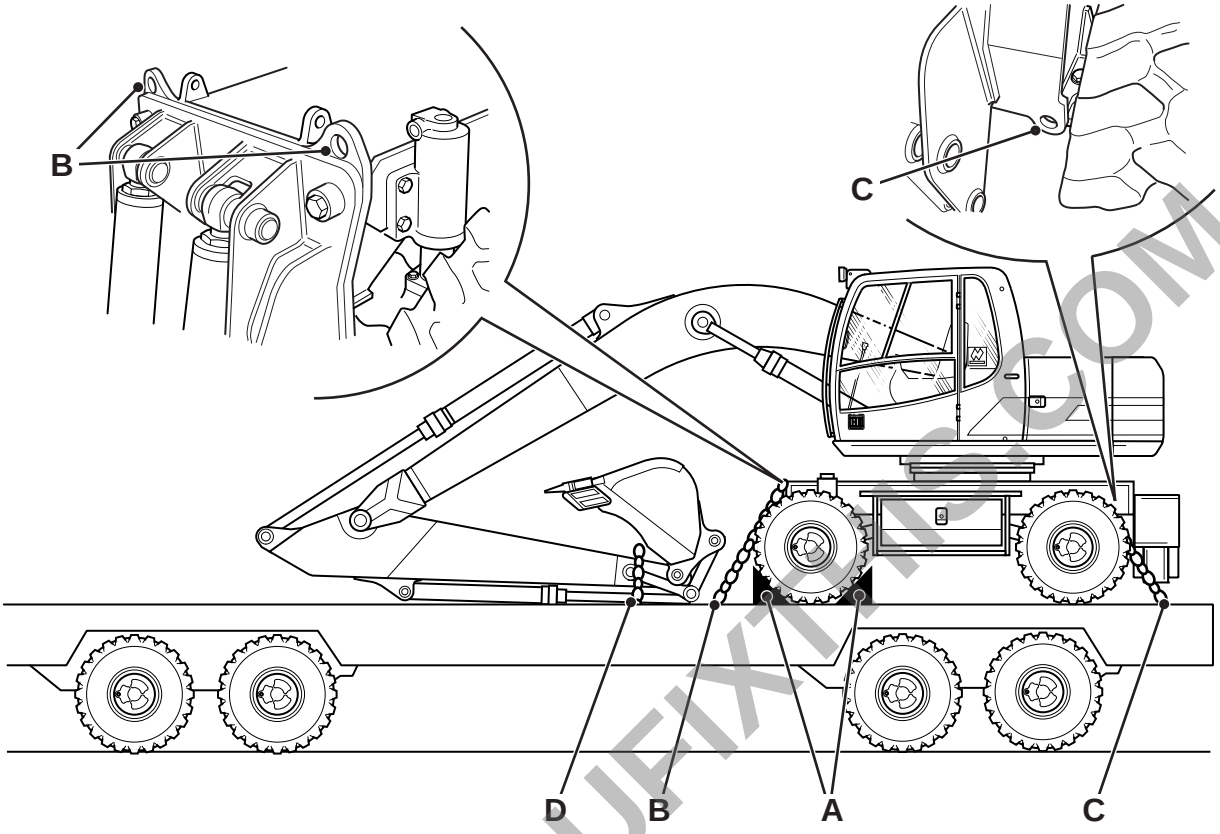


Fig 128.

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Pre Start Cold Checks, Service Points and Fluid Levels

	Operation	10	50	250	500	1000	2000	4000	5000
ENGINE									
Oil level	- Check	☐	☐	☐	☐	☐	☐	☐	☐
Oil and Filter	- Sample/Change				☐	☐	☐	☐	☐
Pre Cleaner (if fitted)	- Clean			☐	☐	☐	☐	☐	☐
Air Cleaner Outer Element	- Change					☐	☐	☐	☐
Air Cleaner Inner Element	- Change						☐	☐	
Air Cleaner Dust Valve	- Check and Clean			☐	☐	☐	☐	☐	☐
Fuel Level	- Check	☐	☐	☐	☐	☐	☐	☐	☐
Fuel Filter Element	- Change				☐	☐	☐	☐	☐
Fuel Tank - Water and Sediment	- Drain		☐	☐	☐	☐	☐	☐	☐
Coolant Quality/Level	- Check	☐	☐	☐	☐	☐	☐	☐	☐
Coolant	- Change							☐	
Fuel Pump Filter Element(1)	- Change				☐	☐	☐	☐	☐
Primary Fuel Filter/Sedimenter	- Drain and Clean		☐	☐	☐	☐	☐	☐	☐
Primary Fuel Filter/Sedimenter-filter(1)	- Change				☐	☐	☐	☐	☐
Main Fuel Filter/Sedimenter	- Drain and Clean		☐	☐	☐	☐	☐	☐	☐
Main Fuel Filter/Sedimenter-filter(1)	- Change				☐	☐	☐	☐	☐
Fuel Filler Cap	- Check and Clean			☐	☐	☐	☐	☐	☐
Fuel Filler Cap (Dusty conditions)	- Check and Clean		☐	☐	☐	☐	☐	☐	☐
Fan Belt Tension/Condition	- Check			☐	☐	☐	☐	☐	☐
Valve Clearances	- Check and Adjust					☐	☐	☐	☐
Engine Mounting Bolts for Tightness	- Check				☐	☐	☐	☐	☐
Exhaust System Security	- Check				☐	☐	☐	☐	☐
Air Inlet System Security	- Check			☐	☐	☐	☐	☐	☐
Radiator	- Clean and Check			☐	☐	☐	☐	☐	☐

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Checking the Wheel Nut Tightness

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 ⇨ ***Bolt and Nut Torque Specifications (185)***.

⚠ 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

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Axles

Front Axle

Checking the Differential Oil Level

WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

CAUTION

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

16-3-5-3

1 Prepare the machine. Position the machine on level ground. Engage the park brake. Lower the attachments to the ground. Stop the engine and remove the starter key.

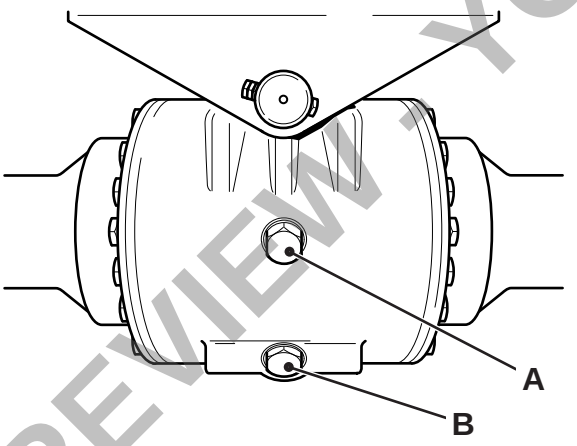


Fig 70.

2 Check/Add oil.

a Clean the area around the fill/level plug **A**, then remove plug and its sealing washer. Oil should be level with the bottom of the hole.

Note: *If the oil gives off a foul smell it is a sign that the oil has degraded and should be changed.*

b Add recommended oil if necessary ⇨ ***Fluids, Lubricants and Capacities (156)*** for oil type.

3 Clean and refit the plug and sealing washer, tighten firmly.

Changing the Differential Oil

WARNING

Make the machine safe before working underneath it. Park the machine on level ground, lower the attachments to the ground. Apply the park brake, put the transmission in neutral and stop the engine. Block both sides of all four wheels.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-4-1_1

Note: *This job should be done with the oil at operating temperature.*

1 Prepare the machine. Position the machine on level ground. Engage the park brake. Lower the attachments to the ground. Stop the engine and remove the starter key.

2 Drain the oil.

a Place a container of suitable size beneath plug **B** to catch the oil.

b Remove the drain plug **B** and its washer. Allow oil to drain out. Wipe it clean (metallic particles should be carefully removed).

c Fit the plug and sealing washer, tighten firmly.

3 Fill with new oil.

a Add recommended oil ⇨ ***Fluids, Lubricants and Capacities (156)*** for oil type.

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Monitor Display - Fault Messages

Note: *For further information refer to Monitor Panel,* *⇒ Monitor Panel (64)*.

Table 26. Water and Hydraulic oil temperature

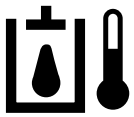
Message	Cause	Remedy
WATER TEMP   HYD TEMP	Water leakage	Repair
	Belt elongation, soiled with oil	Clean or replace
	Defective radiator	Repair or replace(1)
	Broken fan	Replace(1)
	Improper anti-freeze mixture	Replace
	Defective thermostat	Replace(1)
	Defective water pump	Replace(1)
	Dirty oil cooler (clogged)	Clean
	Dirty radiator (clogged)	Clean
	Defective dust protection net (clogged)	Clean
	Defective monitor	Replace(1)

Table 27. Low oil pressure

Message	Cause	Remedy
OIL PRESS 	Low Engine oil	Refill
	Oil leakage at connections	Repair
	Defective engine oil pressure sensor	Replace(1)
	Engine oil viscosity low	Replace with oil of viscosity matching the temperature
	Defective engine oil pump	Adjust, clean, replace(1)
	Defective monitor	Replace(1)

Table 28. Air filter

Message	Cause	Remedy
AIR FILTER 	Air filter element clogged	Clean, replace
	Intake system clogged, foreign matter inside.	Clean

Table 29. Low fuel

Message	Cause	Remedy
LOW FUEL	Fuel low	Refill
	Defective sensor	Replace(1)

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Table 19. Exhaust gas from engine is white or blue

Cause	Remedy
Excessive oil consumption	Disassemble and repair, replace parts(1)
Excessively low oil viscosity	Replace with correct oil
Excessive cooling by radiator	Adjust
Improper fuel injection timing	Adjust or replace if necessary(1)
Low compression	Disassemble and repair, replace parts(1)

Table 20. Exhaust gas from engine is black or dark grey

Cause	Remedy
Improper fuel	Replace with correct fuel
Improper valve clearance	Adjust
Defective fuel injection pump	Adjust or replace if necessary(1)
Low compression	Disassemble and repair, replace parts(1)
Insufficient air intake (air cleaner clogged)	Clean or replace the element

Table 21. Excessive fuel consumption

Cause	Remedy
Defective fuel injection pump	Replace(1)
Improper spray from fuel injection nozzle	Replace(1)
Improper fuel injection timing	Adjust or replace if necessary(1)
Improper fuel	Replace with correct fuel
Low compression	Disassemble and repair, replace parts(1)
Insufficient air intake	Clean or replace element

Table 22. Excessive engine oil consumption

Cause	Remedy
Excessive oil	Drain oil to proper level
Low oil viscosity	Replace with oil of viscosity matching temperature
Oil leakage	Retighten and replace parts if necessary
Worn cylinder piston rings	Disassemble and repair, replace parts(1)

Table 23. Abnormal noise (fuel or mechanical)

Cause	Remedy
Bad fuel	Replace
Damage inside muffler	Replace

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Operating Attachments

⚠ WARNING

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before connecting or removing any hydraulic hose, residual hydraulic pressure trapped in the service hose line must be vented. Make sure the hose service line has been vented before connecting or removing hoses. Make sure the engine cannot be started while the hoses are open.

INT-3-1-11_2

Your machine may be equipped with one of four systems, items **1** and **2** for operating attachments requiring high flow, or item **3** for operating attachments requiring both standard and high flow. An optional low flow two-way circuit (item **4**) is available in addition to or as an alternative to one of items **1 - 3**.

1 Rockbreaker Circuit.

This system provides a one-way, regulated hydraulic flow to operate a breaker. The flow to the breaker is controlled by a pedal **A** at the operator's feet. Automatic engine speed reduction is incorporated, to prevent breaker damage due to excess oil flow.

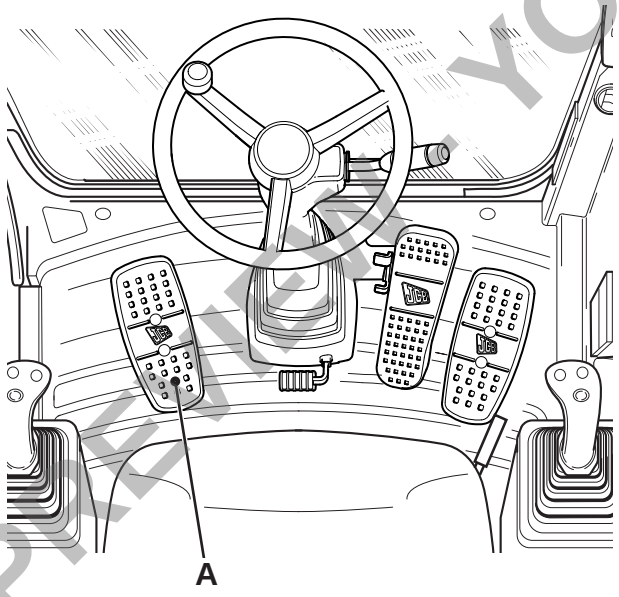


Fig 5.

2 Combined Rockbreaker and Two-Way Auxiliary Circuit.

As well as the control pedal this system incorporates a switch **B**. The system enables the operator to operate rockbreakers and two-way attachments without changing pipework. The switch should be set as follows:

a Before Operating a Breaker.

Set switch **B** to position **2**.

b Before Operating a Two-Way Attachment.

Set switch **B** to position **1**.

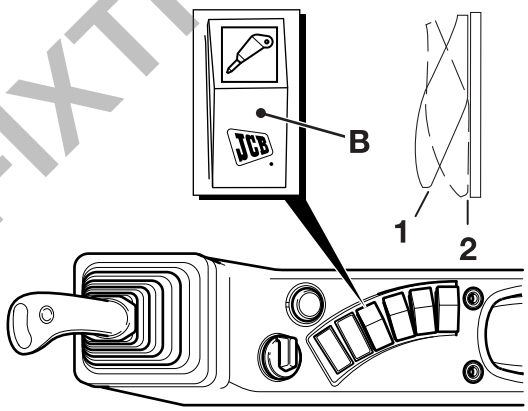


Fig 6.

3 Rockbreaker, Two-Way Auxiliary and Merged Flow System.

As well as allowing operation of rockbreakers and 'standard flow' two-way attachments, this system allows the outputs of both pumps to be 'merged' to give greater flow for high capacity attachments such as large demolition cutters and crushers. The system incorporates the pedal **A** and switch **C** should be set as follows:

a Before Operating a Standard Flow Double-Acting Attachment.

Set switch **C** to position **2**.

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Operating Environment

Maintenance in Cold Climates

When the temperature drops, the engine may become difficult to start or the coolant may freeze. So certain precautions need to be taken.

1 Fuel and Lubricants.

Use a low temperature fuel and lubricants. ⇨ *Fluids, Lubricants and Capacities (156)*

2 Keep the battery at full charge.

a When the temperature lowers, the battery charge also lowers. If the battery charge is low, the battery solution may freeze, keep the charge rate to 100% to prevent freezing.

b When adding distilled water do this just before beginning operations to prevent freezing overnight.

3 Coolant.

The mix is used to prevent the engine coolant from freezing during the winter months or in cold areas, ⇨ *Coolant Mixtures (161)*

On Completion of Work

1 Clean the machine on completion of work.

2 Remove accumulated mud from the tracks.

3 Thoroughly clean and dry the ram cylinder rods. Frozen water droplets can damage the cylinder seals.

4 Drain any water accumulated in the fuel tank, ⇨ *Draining Fuel Tank Impurities (206)*

5 Drain any water accumulated in the fuel filters. ⇨ *Draining the Primary Filter/ Sedimenter (207)*.

6 Protect the machine when not In use.

Put the machine inside a building or cover it with a tarpaulin.

Operating in a Cold Climate (Below 0°C)

In extremely low temperatures special care should be taken. Extend the warm up time and cover the front faces of the radiator and oil cooler, after warm up remove the covers.

1 Before operating the machine after warm-up, ensure that the boom, dipper bucket, slew and travel services all operate correctly. A time lag may occur when selecting these services if the hydraulic oil is not sufficiently warm.

Operating in a Hot Climate (Above 35°C)

1 Coolant.

Fill the cooling system with the specified amount of coolant and check its level. Periodically replace the coolant and flush the system.

2 Use the correct viscosity engine oil, ⇨ *Fluids, Lubricants and Capacities (156)*.

3 Keep the radiator clean.

Regularly remove dirt and debris from the radiator and engine.

4 Check the fan belt regularly. ⇨ *Engine (188)*.

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The monitor will show 'LOW IDLE' when the engine is in the low idle state.

Automatic

Press the switch **B** to activate the automatic engine idle system, ⇒ ***Fig 63. (77)***.



When the operating levers are put into neutral (temporary stop of machine operation) the engine will be automatically put into low idle after 5 seconds (this time can be adjusted), ⇒ ***Monitor Panel (64)***. Full engine RPM will be resumed once any of the excavator functions are operated.

Note: *This function is permanently engaged in auto mode.*

Operation Levers

The boom, arm, bucket and slew operations can be controlled individually or simultaneously. The operation speed varies according to the operation lever stroke. When the hand is released from the operation lever, the lever returns automatically to neutral.

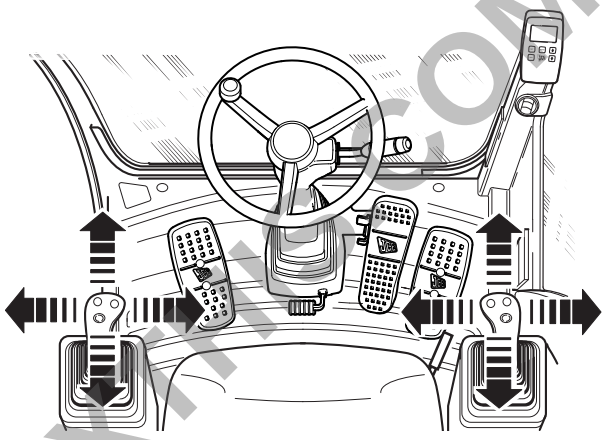


Fig 64.

Note: *When the slew lever is returned to neutral, the machine will still not stop rotating immediately due to inertia.Take this into consideration when performing swing operations. The operation of the bucket attachment is reversed when it is fitted in the reverse position; care must be observed.*

Slewing

The left hand joystick controls the slewing of the superstructure and the movements of the dipper ⇒ ***Fig 65. (79)***. When released the joystick returns to the neutral position. The superstructure will slew within its limits for as long as you hold the joystick over to one side. It will stop automatically when you release the joystick due to application of the slew park brake.

1 To slew to the left.

Move the joystick to the left.

2 To slew to the right.

Move the joystick to the right.

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Engine Shutdown

Press the engine shutdown switch and the engine will be stopped. The switch lamp is illuminated and the message 'ENG SHUTDWN' is displayed.



Note: *When the switch is pressed again, the engine shutdown is cancelled. Turning the ignition key OFF and ON will not cancel the engine shutdown.*

If the ignition key is turned to the START position, during engine shutdown the engine will crank but not start.

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a Simultaneously press the SET and MODE buttons on the EMS.

b Press the UP or DOWN arrow until ‘WATER TEMP’ is displayed on the EMS.

c Press the ACK button on the EMS.

The coolant temperature is displayed in °C.

11 Switch the engine OFF.

12 Remove the ignition key.

13 Let the engine cool down.

⚠ WARNING

The cooling system is pressurised when the coolant is hot. When you remove the cap, hot coolant can spray out and burn you. Make sure that the engine is cool before you work on the cooling system.

9-3-3-1_2

14 Re-check the levels in the radiator and expansion bottle. Top up if necessary.

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