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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 2. The safety alert system symbol



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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.

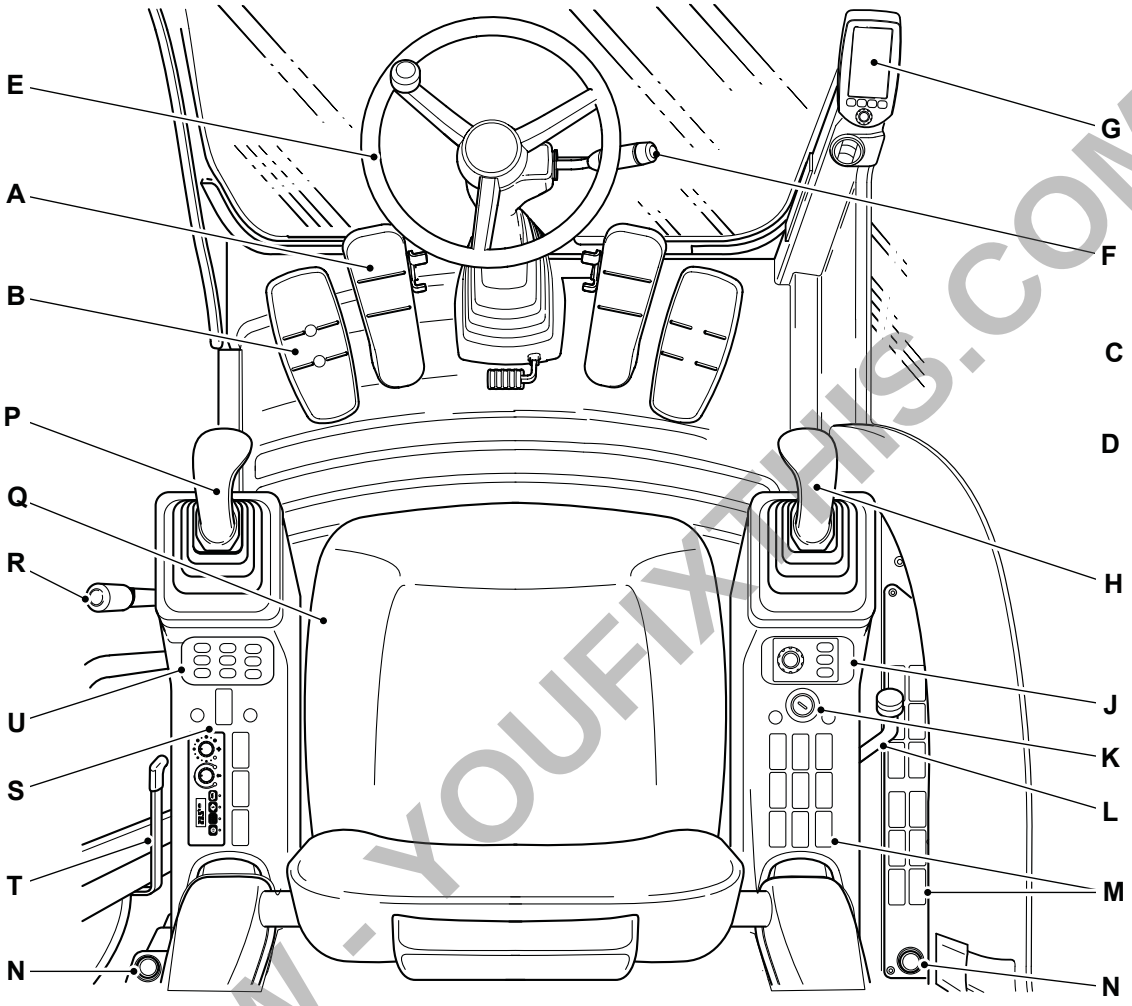
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Operator Station

Component Locations

Figure 12.



A TAB (Triple Articulated Boom) pedal, Refer to: Excavator End Controls (Page 113).
B Auxiliary pedal, Refer to: Auxiliary Circuit Controls (Page 138).
C Service brake pedalRefer to: Service Brake Pedal (Page 79).
D Travel pedalRefer to: Accelerator Pedal (Page 77).
E Steering wheel, Refer to: Steering Wheel (Page 76).
F Multi purpose steering column switch, Refer to: Steering Column (Page 77).
G DECU (Display Electronic Control Unit) Refer to: Instrument Panel (Page 83).
H Right joystick, Refer to: Excavator End Controls (Page 113).
J Machine power band controller, Refer to: General (Page 81).
K Ignition switch, Refer to: Ignition Switch (Page 18).
L Dozer lever, Refer to: Dozer Blade Controls (Page 137).
M Right switch console, Refer to: General (Page 21).
N 12 V auxiliary power socket, Refer to: Auxiliary Power Socket (Page 161).
P Left joystick, Refer to: Excavator End Controls (Page 113).
Q Seat, Refer to: General (Page 49).
R Controls isolation lever, Refer to: Control Lock (Page 74).
S Left switch console, Refer to: General (Page 21).
T Door lever, Refer to: Operator Door (Page 40).
U Wheeled switch panelRefer to: General (Page 81).

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Attachments
Working with Attachments

Introduction

Attachments

Use only the JCB approved attachments that are specified for your machine. Operating with non-specified attachments can overload the machine, causing possible damage and machine instability which could result in injury to yourself or others.

The use of non-approved attachments could invalidate your warranty.

Metal Splinters

You can be injured by flying metal splinters when driving metal pins in or out. Use a soft faced hammer or copper drift to remove and install metal pins. Always wear personal protective equipment.

Attachments

If you have an attachment which is not covered in the Operator's Manual do not install it, use it or remove it until you have obtained, read and understood the pertinent information. Install attachments only on the machines for which they were designed.

Some attachments are supplied with the instructions on the safety, installation, removal, operation and maintenance procedures. Read and fully understand these procedures before the attachment is installed, used and serviced. If there is anything you do not understand, ask your JCB dealer.

Before you use an attachment, make sure you understand how the attachment will affect the operational safety.

When an attachment is installed, there may be changes in the machines centre of gravity or overall dimensions. These change can effect for example, the machine stability, the gradients on which it is safe to operate or the safe distance from power lines.

Practice with an attachment off the job before you work with it for the first time.

A JCB attachment is designed and manufactured specifically to suit the machines hydraulic system, mounting components and safe load requirements.

An attachment which is not designed for use with the machine can cause damage and create a safety hazard for which JCB cannot be held responsible. Also the machines warranty and any other legislative compliance can be affected by the use of non JCB approved attachments.

If your machine needs the hydraulic system adapting to use an auxiliary attachment, you must consult your JCB dealer. Only suitably qualified personnel must re-route the hydraulic hoses.

All optional attachments must be used within the limits for the machine and will have limits on their operation, for example, the lifting capacity, speeds, hydraulic flow rates. Always check the instruction supplied with the attachment, or if in doubt check with a JCB Dealer for advice. Some specification limits may also be shown on the data/rating plate on the attachment.

This section of the Operator's Manual includes general information on the operation of the attachment and the procedures for the installation and removal of the attachment.

Attachments for your Machine

⚠ **CAUTION** Operation of this machine with an earth drill or breaker attached will alter machine stability.

Attachments will help increase the productivity of your machine, for more information contact your JCB dealer.

Remember, do not operate an attachment until you have read and fully understand the attachment operating instructions.

Do not operate or work with attachments until the machine hydraulic oil has reached its normal working temperature.

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Storage

General

If the machine will not be used for an extended period, you must store the machine correctly. If you prepare the machine carefully and apply on-going care you can prevent deterioration and damage to the machine while it is in storage.

Storage Area

The machine can be stored in a temperature range of: -40 °C (-39.9 °F) to 54 °C (129.1 °F)

When possible, you must keep the machine in a dry building or shelter.

If only an outdoor storage area is available, look for a storage area with good drainage.

Prepare the Machine for Storage

1. Clean the machine to remove all unwanted material and corrosive products.
2. Dry the machine to remove solvents and moisture.
3. Touch-up any damaged paint.
4. Apply grease to the moving parts (if applicable).
5. Examine the machine for worn or damaged parts. Replace if necessary.
6. Fill the fuel tank to prevent a build up of condensation in the tank (if applicable).
7. Examine the coolant condition. Replace if necessary.
8. Examine all fluid levels. Top up if necessary.

Put into Storage

1. Park the machine on solid, level ground.
    1.1. Park the machine in an area where it is easy to access. (In case the machine does not start at the end of the storage period).
    1.2. Put suitable timbers under the machine to eliminate direct contact with the ground.
2. Retract all of the rams and lower the attachment to the ground.
3. Vent the hydraulic system.
4. Remove the ignition key.
5. Apply a thin layer of grease or petroleum jelly to all of the exposed ram piston rods.
6. Remove the battery.
    6.1. Keep the battery in warm, dry conditions.
    6.2. Charge the battery periodically.
7. If you keep the machine outdoors, cover the machine with tarpaulins or plastic sheets.

During Storage

Operate the machine functions each week to prevent a build up of rust in the engine and hydraulic circuits, and to minimise the deterioration of the hydraulic seals.

1. Remove any air cleaner covers or exhaust covers.
2. Remove the grease or petroleum jelly from the ram piston rods.

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Drive Gearbox

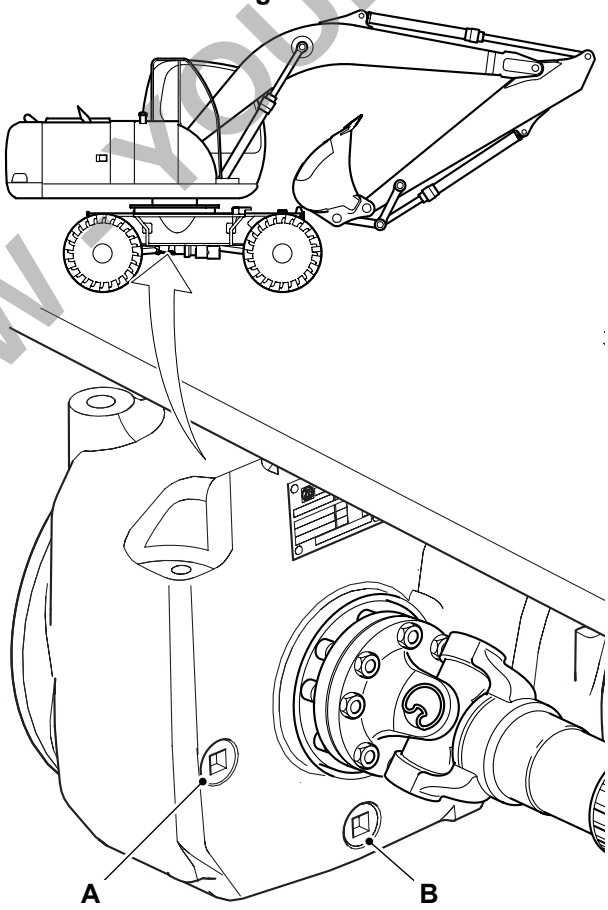
Oil

Check (Level)

⚠ **WARNING** Make the machine safe before working on it. Park the machine on level ground and lower the loader arm. Stop the engine and remove the ignition key. Make sure the park brake is engaged. Disconnect the battery to prevent the engine being started. Block all four wheels.

1. Make the machine safe with the excavator arm lowered.
2. Engage the park brake.
3. Stop the engine and remove the ignition key.
4. Check/add oil on the gearbox:
   - 4.1. Clean the area around the fill/level plug, then remove the plug and its sealing washer. Oil should be level with the bottom of the hole.
   - 4.2. Add recommended oil if necessary.
     Refer to: Fluids, Lubricants and Capacities (Page 303).
5. Clean and then install the plug and sealing washer.
6. Tighten the drain plug to the correct torque value.
   Torque: 60 N·m

Figure 261.



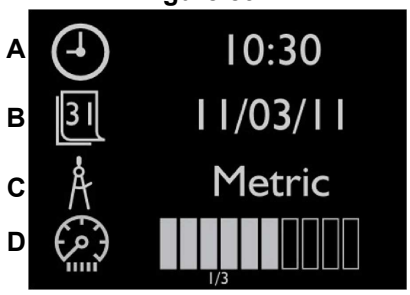
A Level plug

B Drain plug

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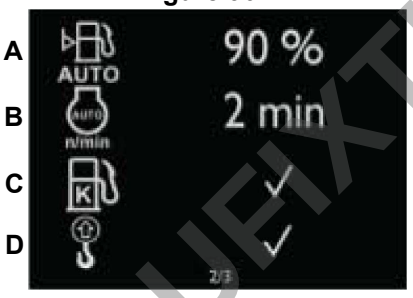
Press the rotary control again to display user/machine information. Turn the rotary control to switch between screens 1, 2 and 3. Press the back button to return. Press the rotary control again on screens 1 to 3 to change settings.

Figure 89.



A Time
B Date
C Units
D Display brightness

Figure 90.



A Auto refuel maximum level
B Auto idle time
C Kerosene
D Overload warning system

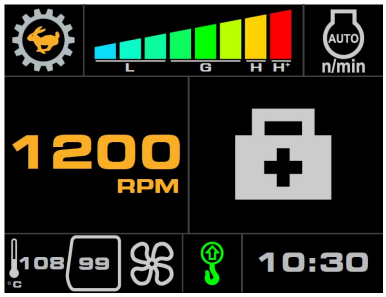
Figure 91.



A Slew/boom priority default (JS200W only)
B Dipper arm limiter setup
C ISO/SAE controls selection

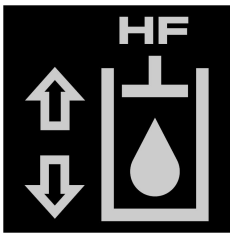
Error Log

Figure 92.



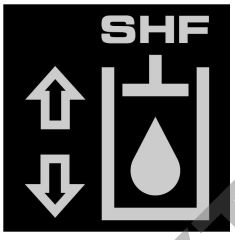
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Figure 116.



- Dual direction super high-flow

Figure 117.



- High-Flow operating flow- This is normally set according to the recommended flow rating on the attachment data sheet but can be adjusted lower to optimize attachment performance.
- High-Flow operating pressure- This is set normally between 20 –50 bar (289.9 –724.6 psi) below the ARV (Auxiliary Relief Valve) pressure and can be adjusted to optimize attachment performance.
- High-Flow ARV pressure- This is set according to the recommended pressure rating on the attachment data sheet.

To edit the Low-Flow settings:

Figure 118.



- Low-Flow operating flow- This is normally set according to the recommended flow rating on the attachment datasheet but can be adjusted lower to optimize attachment performance.
- Low-Flow operating pressure- This is set normally between 10 –30 bar (144.9 –434.8 psi) below the ARV pressure and can be adjusted to optimize attachment performance.
- Low-Flow ARV pressure- This is set according to the recommended pressure rating on the attachment data sheet.

Make the attachment active in the attachment overview screen to be begin operation.

Faults

If a service fault is recognised by the machines electronic system a fault icon and fault code is displayed on the right side of the home screen. The fault indicator is illuminated amber. The buzzer sounds momentarily when

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Fluids, Lubricants and Capacities

General

For: JS145W [T4F] ..... Page 303
For: JS160W [T4F], JS20 MH [T4F] ..... Page 304

(For: JS145W [T4F])

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.

Table 55.

Item	Capacity	Fluid/Lubricant	JCB Part Number	Container Size [1]	Specification
Fuel Tank	220 L	Diesel			
DEF (Diesel Exhaust Fluid)	31.4 L	DEF			
Engine (Oil)[2]	20.4 L	JCB Engine Oil EP 15W40 -10 °C (14 °F) to 50 °C (122 °F)	4001/1805	20 L	API CH4, ACEA E5
		JCB Cold Climate Engine Oil EP 5W40 -20 °C (-4 °F) to 50 °C (122 °F)	4001/2705	20 L	API CH4, ACEA E5
Cooling System	19.7 L	JCB Antifreeze HP/ Coolant	4006/1120	20 L	ASTM D6210
Slew Gearbox	2.2 L	JCB HP90 Gear Oil	4000/0301	5 L	
			4000/0305	20 L	
Hydraulic System	124 L	JCB Hydraulic Fluid HP32 -20 °C (-4 °F) to 15 °C (59 °F)	4002/1024	200 L	
		JCB Hydraulic Fluid HP46 -10 °C (14 °F) to 30 °C (86 °F)	4002/0803	200 L	
		JCB Hydraulic Fluid HP68 0 °C (32 °F) to 40 °C (104 °F)	4002/0701	200 L	
Slew Ring Bearings	0.75 kg	JCB Special HP Grease	4003/2017	0.4 kg	
Slew Ring Gear Teeth	11 kg	JCB Special HP Grease	4003/2006	12.5 kg	
Drive Shafts		JCB Special HP Grease	4003/2006	12.5 kg	
All Other Grease		JCB Special HP Grease	4003/2006	12.5 kg	
Differential Axle	12 L Rear, 14 L Front	JCB Gear Oil HP90	4000/0305	20 L	
Hub Axle (x2)	2 L	JCB Gear Oil HP Plus	4000/2205	20 L	
Drive Gearbox	2.5 L	JCB Engine Oil HP 15W40 -15 °C (5.0 °F) to 40 °C (103.9 °F)	4001/1501	5 L	

(1) For information about the different container sizes that are available (and their part numbers), contact your local JCB dealer.
(2) Do not use ordinary engine oil.

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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 12.

○	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

General

Table 13.

Interval (h)	Calendar Equivalent
10	Daily
50	Weekly
250	Monthly
500	Three months
1000	Six months
2000	Yearly

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Entering and Leaving the Operator Station

General

General

⚠ **WARNING** For safety reasons, machines installed with single access canopies from new must not have the barrier removed. The machine must always be entered/exited with the left hand isolator raised via the left hand side.

WARNING Do not enter or exit the cab unless the controls isolation lever is in the fully raised position.

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.

Standard Cab Machines

Entering the Cab

1. Open the cab door and if necessary, latch it in the open position.
   Refer to: Operator Door (Page 40).
2. Make sure that the controls lock lever is in the raised position.
   Refer to: Control Lock (Page 74).
3. Hold the two handrails (one each side of the cab entrance), then use the bottom step and middle step to climb onto the top step.
4. Keep hold of the left handrail, then climb into the cab and swing yourself into the operators seat.
5. Close the cab door.

Leaving the Cab

1. Park the machine on solid, level ground with the upper structure parallel to the undercarriage.
2. Lower the attachment.
   Refer to: Excavator End Controls (Page 113).
3. Stop the engine.
4. Turn the ignition key to the 'on' position.
5. Operate the hydraulic controls several times to release any residual hydraulic pressure in the system.
   Refer to: Excavator End (Emergency Operation) (Page 168).
6. Turn the ignition key to the 'off' position.
7. Raise the controls lock lever.
8. Open the cab door and latch it in the open position.
9. Hold the left handrail and turn your back towards the step.

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Torque Values

General

For: JS145W [T4F] ..... Page 311
For: JS160W [T4F], JS20 MH [T4F] ..... Page 312

(For: JS145W [T4F])

JS145W and Variants

Before and after daily work, check for loose or missing nuts and bolts. Tighten if loose and replace if missing.

Tighten the nuts and bolts after the first 50 h of the running-in stage and then every 250 h.

Tighten the nuts and bolts, Refer to Table 62.

For the tightening torques of the bolts and nuts not listed, Refer to Table 63.

Table 62.

	Tightening Point	Bolt Diameter	Wrench (mm)	Tightening Torque (N.m)	Checking Torque (N.m)
1(1)	Counter weight	M30	46	1147	1050
2(1)	Turntable bearing (under-carriage)	M16/M20	24/30	296/525	265/470
3(1)	Turntable bearing (slew frame)	M16/M20	24/30	296/525	275/470
4(1)	Slew equipment	M16/M20	24/30	296/525	275/470
5(1)	Engine (engine mount)	M16	24	290	265
6(1)	Engine bracket	M10/M12	17/19	68/118	62/107
7	Radiator	M12	19	104	94
8(1)	Hydraulic pump	M10	17	68	62
9(1)	Hydraulic oil tank	M16	24	250	225
10(1)	Fuel tank	M16	24	250	225
11(1)	Control valve	M16	24	290	265
12(1)	Rotary coupling	M12	19	116	105
13	Battery	M6	10	7	6
14(1)	Propeller shaft	3/8 UNC/ M10	3/8UNC/ 17	55/68	55/62
15(1)	Stab leg frame	M30	46	1147	1050
16(1)	Axle lock cylinders	M18	27	330	297
17(1)	Drive motor	M16	24	94	85
18	Rear axle mounts	M20	30	550	515
19	Transmission	M16	24	94	85
20	Cab	M16	24	132	125
21	Wheel nuts	M24	36	500	475

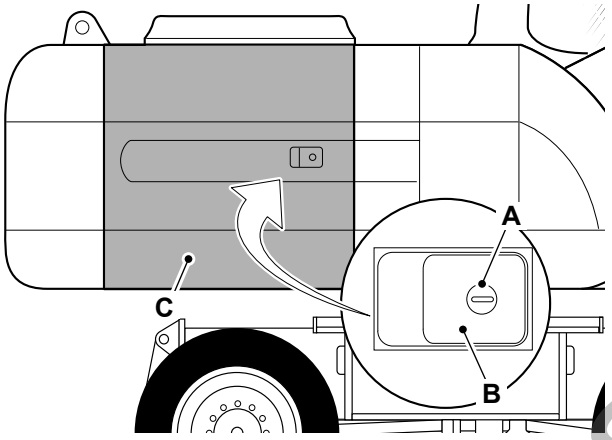
(1) Use JCB Threadlocker and sealer (High Strength) and tighten to the torque listed.

Table 63.

Bolt Diameter (size)			M6	M8	M10	M12	M14	M16	M18	M20
Hex. bolt	Wrench	(mm)	10	13	17	19	22	24	27	30
	Tightening torque	(N.m)	12.5	30	60	104	167	259	506	874

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Figure 244.



A Lock
B Handle
C Cover

Close

1. To release the latch pull it up.
2. Close the cover.
3. Make sure the cover is closed correctly.
4. Use the ignition key to lock the cover.

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Transporting the Machine

General

⚠ **WARNING** 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.

CAUTION 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.

Check the condition of the transport vehicle before the machine is loaded on to its trailer.

Make sure that the transport trailer is suitable for the dimensions and weight of your machine. Refer to: Static Dimensions (Page 273).

Before transporting the machine make sure you will be obeying the local rules and laws regarding machine transportation of all the areas that the machine will be carried through.

Loading the Machine onto the Transporting Vehicle/Trailer

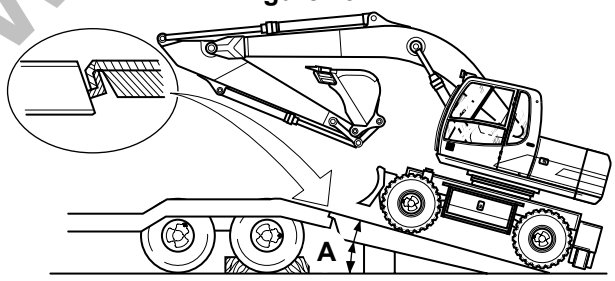
(For: JS145W [T4F], JS160W [T4F])

⚠ **CAUTION** The machine must be securely tied down to the transport vehicle to prevent lateral movement, fore-and-aft movement, and slewing of the superstructure. Failure to do so could cause injury to yourself or others.

1. Stop the transport vehicle on solid, level ground.
2. Apply the park brakes.
3. Lower any stability jacks.
4. Put blocks at the front and rear of the wheels on the transport trailer.
5. Make sure the ramps are in their correct positions and angle, then secure them. The ramps should not be at more than the specified angle:

   Angle: 15 °

Figure 194.



A Angle of the ramp

6. Before the machine is driven on to the transport trailer, make sure that the machine will not catch on the ramp/trailer angle. Refer to Figure 194.
7. Start the machine.

   Refer to: General (Page 60).
8. Slew the cab to make sure the excavating equipment is in a position where it will not interfere with your view of the ramp and the transport trailer.

   Refer to: Control Layouts (Page 113).
9. Lift the bucket/attachment.

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Notes:

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	Park brake enabled (park brake switch pressed or controls isolation lever raised
	Foot brake (latched) request

Buzzer

The buzzer is activated to notify the operator of a message or a fault. Some messages/faults are acknowledgeable and will silence the buzzer and some messages/faults are not acknowledgeable and the buzzer will continue until the message/fault clears. If a message/fault is acknowledgeable, it can be silenced by pressing the enter button on the display.

The buzzer will come on constantly while the Quickhitch mode is enabled and is not acknowledgeable. The buzzer will change to an intermittent signal while the Quickhitch is unlocked and is not acknowledgeable.

SCR Exhaust After Treatment

Notification Symbols

Table 10.

	After treatment system critical failure/malfunction - red icon. Contact your JCB dealer.
	After treatment system failure/malfunction - amber icon. Contact your JCB dealer.
	DEF (Diesel Exhaust Fluid) level low - amber icon. Refill with DEF as soon as possible.
	DEF level critical - red icon on a black background. Refill as soon as possible. Engine de-rate commencing.

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Fuel

Fuel is flammable, keep naked flames away from the fuel system. Stop the engine immediately if a fuel leak is suspected. Do not smoke while refuelling or working on the fuel system. Do not refuel with the engine running. Completely wipe off any spilt fuel which could cause a fire. There could be a fire and injury if you do not follow these precautions.

Hygiene

JCB lubricants are not a health risk when used correctly 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 must 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

⚠ **CAUTION** It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.

Used fluids and/or lubricants, filters and contaminated materials must be disposed of in accordance with local regulations. Use authorised waste disposal sites.

CAUTION Damaged or spent batteries and any residue from fires or spillage must be put in a suitable closed receptacle and must be disposed of in accordance with local environmental waste regulations.

All waste products must be disposed of in accordance with all the relevant regulations.

The collection and disposal of used oil must be in accordance with any local regulations. Never pour used engine oil into sewers, drains or on the ground.

Handling

⚠ **CAUTION** The temperature of the hydraulic oil will be high soon after stopping the machine. Wait until it cools before beginning maintenance.

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:

- Avoid prolonged, excessive or repeated skin contact with used oil
- Apply a barrier cream to the skin before handling used oil. Note the following when removing engine oil from skin:
  - Wash your skin thoroughly with soap and water

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