OPERATOR'S MANUAL

COMPACT LOADALL (ROUGH TERRAIN VARIABLE REACH TRUCK)

525-60

EN - 9821/9100
ISSUE 5 - 06/2016

THIS MANUAL SHOULD ALWAYS STAY WITH THE MACHINE

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This manual contains original instructions, verified by the manufacturer (or their authorized representative).

www.jcb.com

Foreword

The Operator's Manual

⚠

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

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

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

Machine Delivery and Installation

Even if you have operated this type of equipment before, it is very important that your new machines operations and functions are explained to you by a JCB Dealer Representative following delivery of your new machine.

Following the installation you will know how to gain maximum productivity and performance from your new product.

Please contact your local JCB dealer if the Installation Form (included in this manual) has not yet been completed with you.

Your local JCB Dealer is

Notes:

Contents **Page No.**

Technical Data

Acronyms Glossary

ARV	Auxiliary Relief Valve
CESAR	Construction Equipment Security and Registration
DEF	Diesel Exhaust Fluid
ECU	Electronic Control Unit
FEAD	Front End Accessory Drive
FOPS	Falling Object Protective Structure
HVAC	Heating Ventilation Air Conditioning
ISO	International Organization for Standardization
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LLMC	Longitudinal Load Moment Control
LLMI	Longitudinal Load Moment Indicator
LMI	Load Moment Indicator
MRV	Main Relief Valve
PIN	Product Identification Number
PPE	Personal Protective Equipment
RMS	Root Mean Square
ROPS	Roll-Over Protective Structure
RPM	Revolutions Per Minute
SAE	Society of Automotive Engineers
SRS	Smooth Ride System
SWL	Safe Working Load

Introduction
About this Manual

Model and Serial Number

This manual provides information for the following model(s) in the JCB machine range:

Model	From:	To:
525-60	1709724	

Using the Manual

This operator's manual is arranged to give you a good understanding of the machine and its safe operation. It also contains maintenance and technical data.

Read this manual from the front to the back before you use the machine for the first time, even if you have used machines of a similar/same type before as the technical specification, systems and controls of the machine may have changed. Particular attention must be given to all the safety aspects of operating and maintaining the machine.

If there is anything you are not sure about, ask your JCB dealer or employer. Do not guess, you or others could be killed or seriously injured.

The general and specific warnings in this section are repeated throughout the manual. Read all the safety statements regularly, so you do not forget them. Remember that the best operators are the safest operators.

The illustrations in this manual are for guidance only. Where the machines are different, the text and or the illustration will specify.

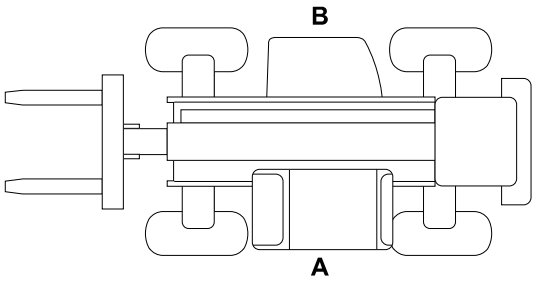
The manufacturer's policy is one of continuous improvement. The right to change the specification of the machine without notice is reserved. No responsibility will be accepted for discrepancies which may occur between specifications of the machine and the descriptions contained in this manual.

All of the optional equipment included in this manual may not be available in all territories

Left-Hand Side, Right-Hand Side

In this manual, 'left' and 'right' mean your left and right when you are seated correctly in the machine.

Figure 1.



A Left **B** Right

Cab/Canopy

This manual frequently makes references to the cab. For example, 'do not operate the machine without an operator's manual in the cab'. These statements also apply to canopy build machines.

Cross References

In this manual, cross references are made by presenting the subject title in blue (electronic copy only). The number of the page upon which the subject begins is indicated within the brackets. For example: Refer to: Introduction > About this Manual > Cross References (Page 2).

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, 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 and on the machine, 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 (shown) also helps to identify important safety messages in this manual and on the machine. When you see this symbol, be alert, your safety is involved, carefully read the message that follows, and inform other operators.

Figure 2. The safety alert system

General Safety

Training

To operate the machine safely you must know the machine and have the skill to use it. You must abide by all relevant laws, health and safety regulations that apply to the country you are operating in. The operator's manual instructs you on the machine, its controls and its safe operation; it is not a training manual. If you are a new operator, get yourself trained in the skills of using a machine before trying to work with it. If you don't, you will not do your job well, and you will be a danger to yourself and others. In some markets and for work on certain jobsites you may be required to have been trained and assessed in accordance with an operator competence scheme. Make sure that you and your machine complies relevant local laws and jobsite requirements - it is your responsibility.

Care and Alertness

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

Clothing

You can be injured if you do not wear the correct clothing. Loose clothing can get caught in the machinery. Keep cuffs fastened. Do not wear a necktie or scarf. Keep long hair restrained. Remove rings, watches and personal jewellery.

Alcohol and Drugs

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

Feeling Unwell

Do not attempt to operate the machine if you are feeling unwell. By doing so you could be a danger to yourself and those you work with.

Mobile Phones

Switch off your mobile phone before entering an area with a potentially explosive atmosphere. Sparks in such an area could cause an explosion or fire resulting in death or serious injury.

Switch off and do not use your mobile phone when refuelling the machine.

Lifting Equipment

You can be injured if you use incorrect or faulty lifting equipment. You must identify the weight of the item to be lifted then choose lifting equipment that is strong enough and suitable for the job. Make sure that lifting equipment is in good condition and complies with all local regulations.

Raised Equipment

Never walk or work under raised equipment unless it is supported by a mechanical device. Equipment which is supported only by a hydraulic device can drop and injure you if the hydraulic system fails or if the control is operated (even with the engine stopped).

Make sure that no-one goes near the machine while you install or remove the mechanical device.

Raised Machine

Never position yourself or any part of your body under a raised machine which is not correctly supported. If the machine moves unexpectedly you could become trapped and suffer serious injury or be killed.

Lightning

Lightning can kill you. Do not use the machine if there is lightning in your area.

Machine Modifications

This machine is manufactured in compliance with prevailing legislative requirements. It must not be altered in any way which could affect or invalidate its compliance. For advice consult your JCB dealer.

Clothing and Personal Protective Equipment (PPE)

Do not wear loose clothing or jewellery that can get caught on controls or moving parts. Wear protective clothing and personal safety equipment issued or called for by the job conditions, local regulations or as specified by your employer.

Notes:

About the Product
Introduction

General

Before you start using the machine, you must know how the machine operates. Use this part of the 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 dealer.

Name and Address of the Manufacturer

JCB Excavators Limited, Lakeside Works, Rocester, Uttoxeter, United Kingdom, ST145JP

Product Compliance

Your JCB product was designed to comply with the laws and regulations applicable at the time of its manufacture for the market in which it was first sold. In many markets, laws and regulations exist that require the owner to maintain the product at a level of compliance relevant to the product when first produced. Even in the absence of defined requirements for the product owner, JCB recommend that the product compliance be maintained to ensure safety of the operator and exposed persons and to ensure the correct environmental performance. Your product must not be altered in any way which could affect or invalidate any of these requirements. For advice consult your JCB dealer.

For its compliance as a new product, your JCB and some of its components may bear approval numbers and marking's, and may have been supplied with a Declaration/Certificate of Conformity. These marking's and documents are relevant only for the country/region in which the product was first sold to the extent that the laws and regulations required them.

Re-sales and import/export of products across territories with different laws and regulations can cause new requirements to become relevant for which the product was not originally designed or specified. In some cases, pre owned products irrespective of their age are considered new for the purposes of compliance and may be required to meet the latest requirements which could present an insurmountable barrier to their sale/use.

Despite the presence of any compliance related marking's on the product and components, you should not assume that compliance in a new market will be possible. In many cases it is the person responsible for import of a pre owned product into a market that becomes responsible for compliance and who is also considered the manufacturer.

JCB may be unable to support any product compliance related enquiry for a product which has been moved out of the legislative country/region where it was first sold, and in particular where a product specification change or additional certification would have been required in order for the product to be in compliance.

Description

General

The JCB Loadall is a self propelled, seated operator, wheeled machine for operation on unimproved natural terrain and disturbed terrain.

A main structural support is designed to carry an extending boom with a carriage mounted on the front to which forks or an approved attachment can be fitted.

When used normally the machine lifts and places loads by extending/retracting, raising/lowering the boom.

Intended Use

The machine is intended to be used in normal conditions for the applications described in this manual. If the machine is used for other applications or in dangerous environments, for example in a flammable atmosphere or in areas with dust containing asbestos, special safety regulations must be obeyed and the machine must be equipped for use in these environments.

Log Moving/Object Handling

Do not use the machine to move or handle logs unless sufficient log protection is installed. You could cause serious injury to yourself and damage to the machine. For more information, contact your JCB dealer.

Optional Equipment and Attachments

A wide range of optional attachments are available to increase the versatility of your machine. Only the JCB approved attachments are recommended for use with your machine. Contact your JCB dealer for the full list of approved attachments available.

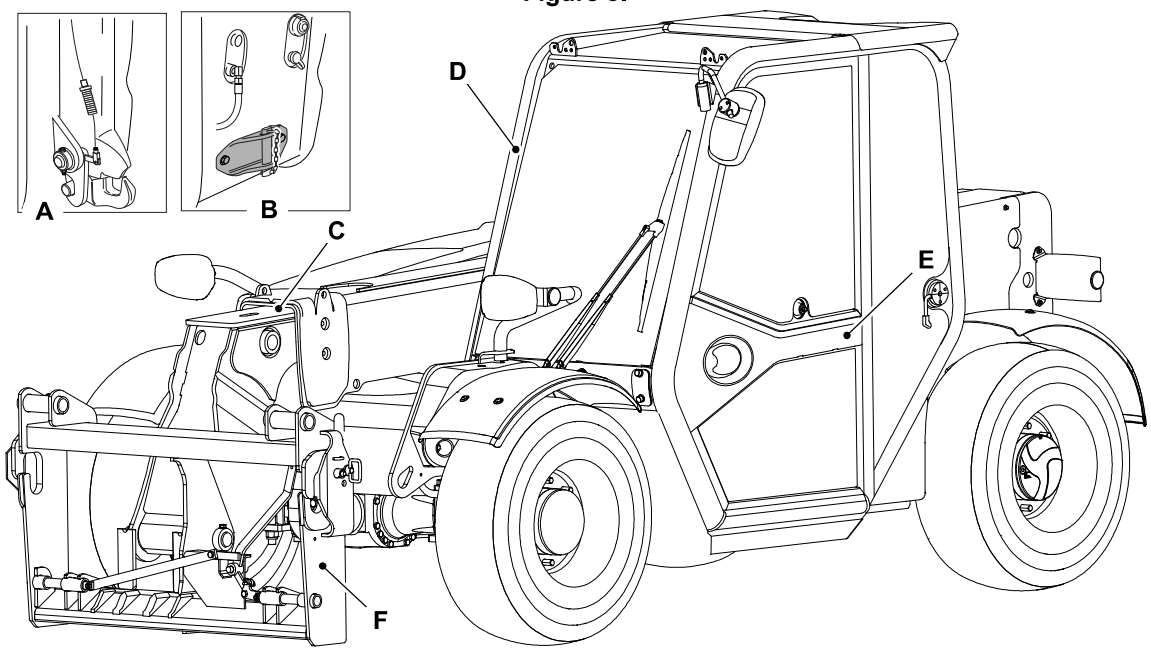
Danger Zone

The danger zone is any zone within and/or around the machinery in which a person is subject to a risk to their health or safety. The danger zone includes the area in immediate proximity to any hazardous moving parts, areas into which working equipment and attachments can be moved to quickly, the machine normal stopping distances and also areas into which the machine can quickly turn under normal conditions of use. Depending on the application at the time, the danger zone could also include the area into which debris, from use of an attachment or working tool, could be projected and any area into which debris could fall from the machine. During the operation of the machine, keep all persons out of the danger zone. Persons in the danger zone could be injured.

Before you do a maintenance task, make the product safe.

Main Component Locations

Figure 3.



A Hydraulic tow hitch (option)
B Mechanical tow hitch (option)
C Boom
D ROPS (Roll-Over Protective Structure)/FOPS (Falling Object Protective Structure) cab
E Door
F Carriage

Product and Component Identification

Machine

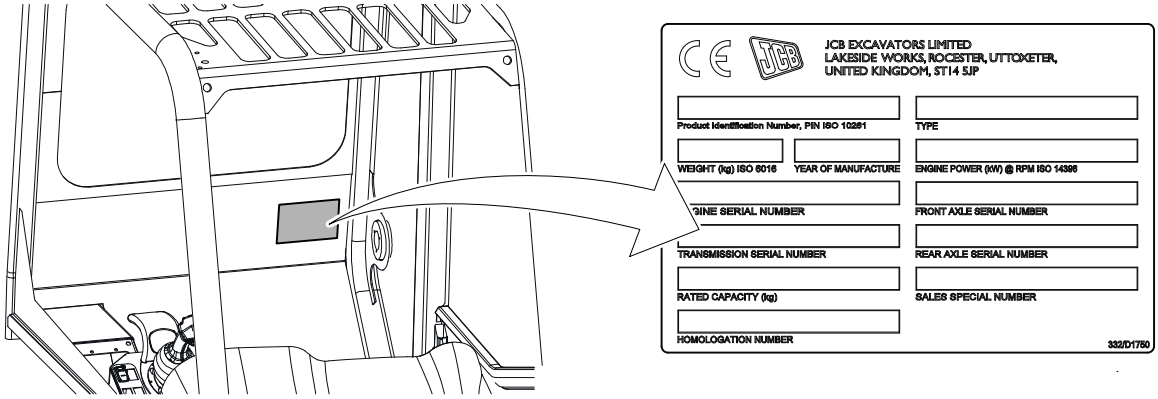
Machine Identification Plate

Your machine has an identification plate mounted as shown. The serial numbers of the machine and its major units are shown on the plate.

The machine model and build specification is indicated by the PIN (Product Identification Number)

The serial number of each major unit is also shown on the unit itself. If a major unit is replaced by a new one, the serial number on the identification plate will be wrong. Either get a replacement identification plate from your JCB Dealer or simply remove the old number. This will prevent the wrong unit number being quoted when replacement parts are ordered. The machine and engine serial numbers can help identify exactly the type of equipment you have.

Figure 4.



Typical Product Identification Number

The machine model and build specification are indicated by the PIN. The PIN has 17 digits and must be read from left to right.

Table 1. Typical PIN

JCB	5A4	1	R	C	12345678

Table 2.

Digit 1 to 3	World Manufacturer Identification
JCB	United Kingdom
GEO	Georgia, US
HAR	Haryana, India
SOR	Sorocaba, Brazil
GET	Gatersleben, Germany
PUN	Pune, India
SHA	Shanghai, China
JBP	JCB Branded Products

Table 3.

Digit 4 to 6
Machine model and type

Table 4.

Digit 7	Engine Model
1	55kW KOHLER T4F
2	81kW JCB T4F
3	93kW JCB T4F
4	108kW JCB T4F
5	58kW HAR N/A
6	Reserved: 68kW HAR TURBO
7	Reserved: 55kW JCB T4F
9	55kW KOHLER- Non-regulated
J	63kW JCB T2
K	74.2kW JCB T2
P	85kW JCB T3
R	97kW JCB T3
S	74.2kW JCB T3
T	83kW JCB T3
V	108kW JCB T3
W	55kW JCB T4
X	81kW JCB T4
Y	83kW JCB T4
Z	108kW JCB T4

Table 5.

Digit 8	Gearbox Model
E	3 Speed (PS750)
F	3 Speed (PS760)
G	4 Speed (PS750)
H	4 Speed (PS760)
J	6 Speed (PS760)
M	4 Speed (SS700)
N	4 Speed (PS750)
P	HYDRO 20km/h (12.4mph)
R	HYDRO 25km/h (15.5mph)
S	HYDRO 34km/h (21.1mph)
T	HYDRO 40km/h (24.9mph)
V	HYDRO 30km/h (18.6mph)

Table 6.

Digit 9
Random check letter. The check letter is used to verify the authenticity of a machine's PIN

Table 7.

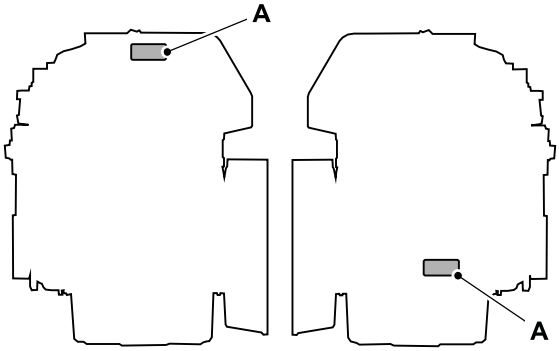
Digit 10 to 17
Machine serial number. Each machine has a unique serial number.

Engine

The engine data labels are attached to the cylinder block as shown. Refer to Figure 5.

The data label includes the engine identification number.

Figure 5.

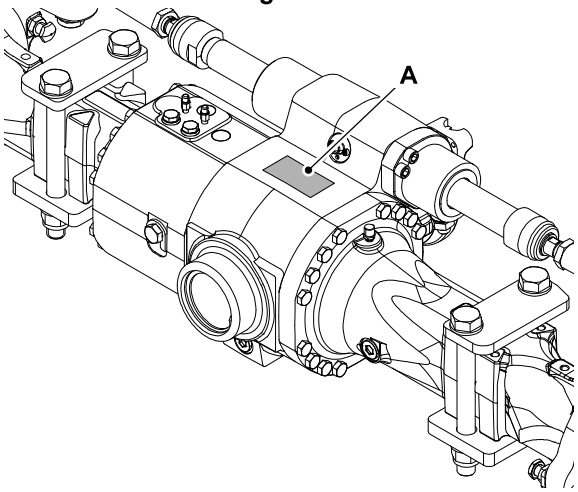


A Engine data label

Axle

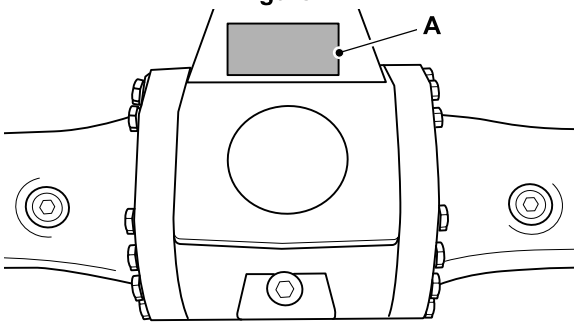
The axles have a serial number stamped on a data plate label as shown.

Figure 6.



A Data plate - front axle

Figure 7.

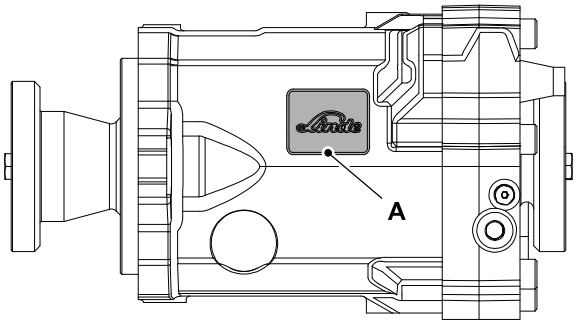


B Data plate - rear axle

Gearbox

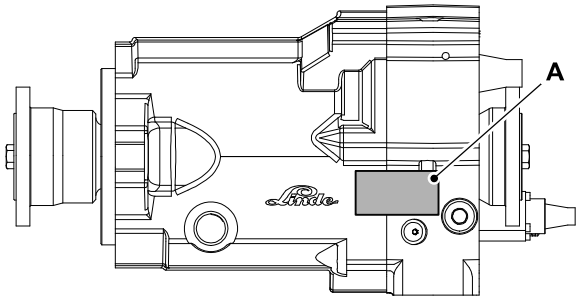
The gearbox has a serial number stamped on a data plate as shown.

Figure 8. Transmission - 135cc



A Data plate

Figure 9. Transmission - 165cc



A Data plate

Operator Protective Structure

⚠ **WARNING** You could be killed or seriously injured if you operate a machine with a damaged or missing ROPS/FOPS/FOGS. If the ROPS/FOPS/FOGS has been in an accident, do not use the machine until the structure has been renewed. Modifications and repairs that are not approved by the manufacturer may be dangerous and will invalidate the ROPS/FOPS/FOGS certification.

WARNING Machines with a ROPS, FOPS,FOGS or TOPS are equipped with a seat belt. The ROPS, FOPS,FOGS or TOPS is designed to give you protection in an accident. If you do not wear the seat belt you could be thrown off the machine and crushed. You must wear a seat belt when using the machine. Fasten the seat belt before starting the engine.

FOPS Data Plate

⚠ **WARNING** Do not use the machine if the falling objects protection level provided by the structure is not sufficient for the application. Falling objects can cause serious injury.

If the machine is used in any application where there is a risk of falling objects then a FOPS (Falling Object Protective Structure) must be installed. For further information, contact your JCB dealer.

The FOPS has a data plate attached. The data plate indicates what level of protection the structure provides.

There are two levels of FOPS:

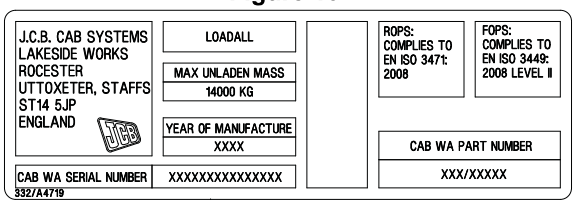
- Level I Impact Protection - impact strength for protection from small falling objects (e.g. bricks, small concrete blocks, hand tools) encountered in operations such as highway maintenance, landscaping and other construction site services.
- Level II Impact Protection - impact strength for protection from heavy falling objects (e.g. trees, rocks) for machines involved in site clearing, overhead demolition or forestry.

ROPS Data Plate

⚠ **WARNING** Your machine may be fitted with a Roll-Over Protective Structure (ROPS) indicating that the purchaser specified the machine for use in applications where there is risk of roll-over. ROPS is a device to protect the operator in the event of roll-over. Any damage or modification to the structure may invalidate the ROPS certification. If damage has occurred then an authorised JCB dealer should be consulted.

A machine with a ROPS (Roll-Over Protective Structure) can be identified by referring to the cab identification plate. Work place (work site, job site) risk assessment should facilitate the machine selection and the need for an machine with a ROPS.

Figure 10.



Data plate - ROPS/FOPS standards

The mass shown in these data plate are a test mass and the maximum operating mass of this machine may be lower.

Safety Labels

General

⚠ **WARNING** Safety labels on the machine warn you of particular hazards. You can be injured if you do not obey the safety instructions shown.

The safety labels are strategically placed around the machine to remind you of possible hazards.

If you need eye-glasses for reading, make sure you wear them when reading the safety labels. Do not over-stretch or put yourself in dangerous positions to read the safety labels. If you do not understand the hazard shown on the safety label, then refer to Safety Label Identification.

Keep all of the safety labels clean and readable. Replace a lost or damaged safety label. Make sure the replacement parts include the safety labels where necessary. Each safety label has a part number printed on it, use this number to order a new safety label from your JCB dealer.

Safety Label Identification

Figure 11.

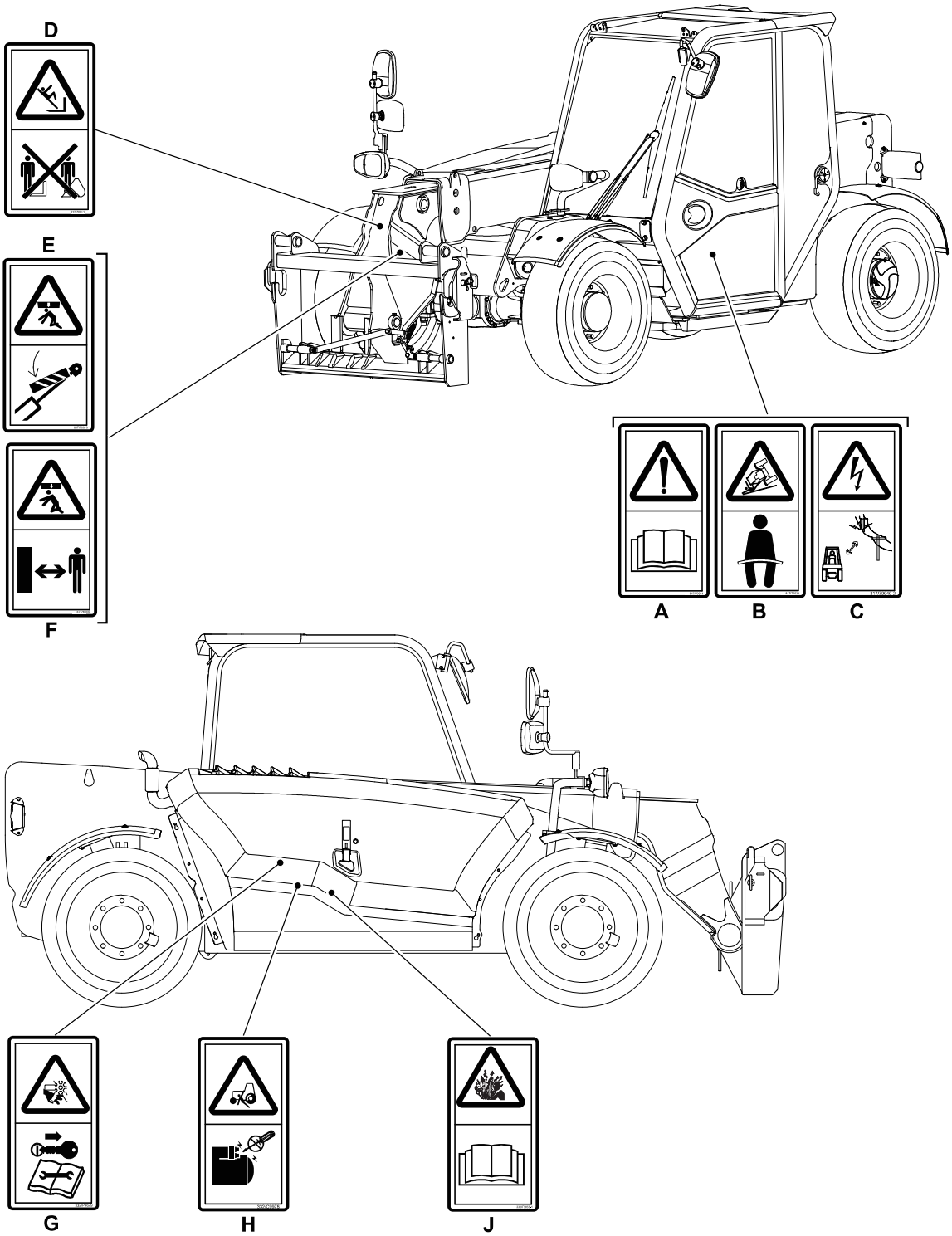


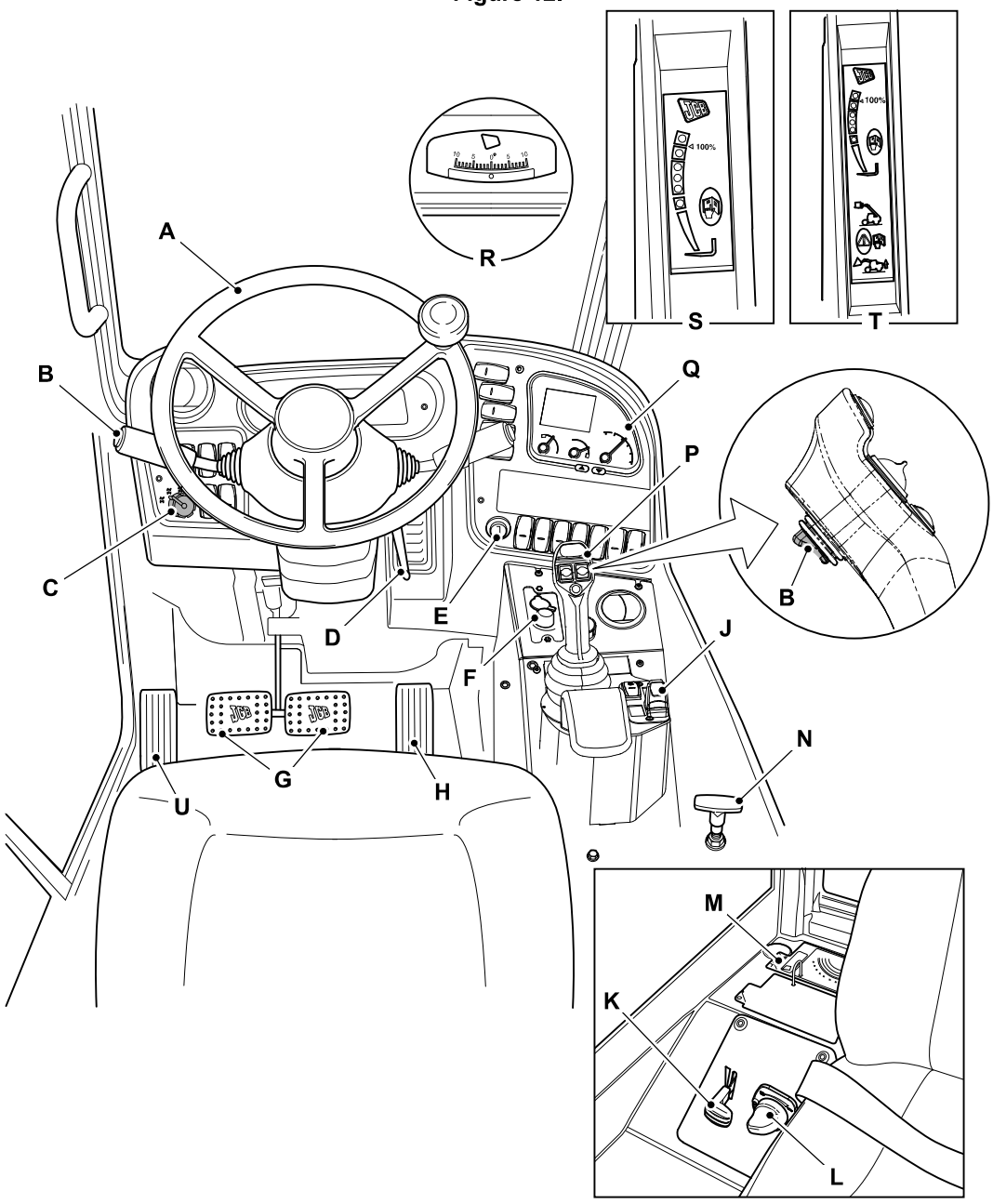
Table 8. Safety Labels

Item	Part No.	Description	Qty.
A	817/70014	Warning. Read the Operator’s Manual before you operate the machine.	1
B	817/70029	Crush hazard. Wear seat belt.	1
C	817/70040	Electrical hazard. Stay a safe distance away from power lines.	1
D	817/70011	Fall from raised attachment. Do not stand or ride on the bucket or forks.	1
E	817/70010	Crushing of whole body. Insert the boom support device before you complete any service or maintenance work underneath the boom.	1
F	817/70008	Crushing of whole body. Keep a safe distance from machine.	1
G	332/P4679	Severing of hands and fingers. Keep clear of/do not reach into rotating parts. Read the Service Manual.	1
H	332/C9978	Run over hazard. Start the engine from the operator's seat only. Do not short across the terminals.	1
J	332/F5855	Pressure hazard. Read the Operator’s Manual.	1

Operator Station

Component Locations

Figure 12.



A Steering wheel Refer to: Operation > Drive Controls > Steering Wheel (Page 62).

B Transmission lever and gear selection

C Steer mode selector Refer to: Operation > Drive Controls > Steer Mode Control (Page 67).

D Steering column adjustment Refer to: Operation > Drive Controls > Steering Column (Page 62).

E Starter switch Refer to: About the Product > Interior Switches > Ignition Switch (Page 25).

F HVAC (Heating Ventilation Air Conditioning) controls Refer to: Operation > Heating, Ventilating and Air-Conditioning (HVAC) (Page 116).

G Service brake pedal Refer to: Operation > Drive Controls > Service Brake Pedal (Page 64).

H Accelerator pedal Refer to: Operation > Drive Controls > Accelerator Pedal (Page 62).

J Handbrake/parkbrake mini lever Refer to: Operation > Drive Controls > Park Brake (Page 65).
K Hand throttle controls Refer to: Operation > Drive Controls > Hand Throttle Control (Page 62).
L Travel speed selector Refer to: Operation > Drive Controls > Travel Speed Selector (Page 63).
M Load charts
N Hydraulic tow hitch
P Operating lever Refer to: Operation > Operating Levers/Pedals (Page 89).
Q Instrument panel Refer to: Operation > Instruments > Instrument Panel (Page 69).
R Inclinometer
S LLMI (Longitudinal Load Moment Indicator)Refer to: Operation > Lifting and Loading > Longitudinal Load Moment Indicator (LLMI) (Page 98).
T LLMC (Longitudinal Load Moment Control)Refer to: Operation > Lifting and Loading > Load Motion Control System (Page 100).
U Inching pedal

Console Switches

General

The installed switches and their positions can change according to the specification of the machine.

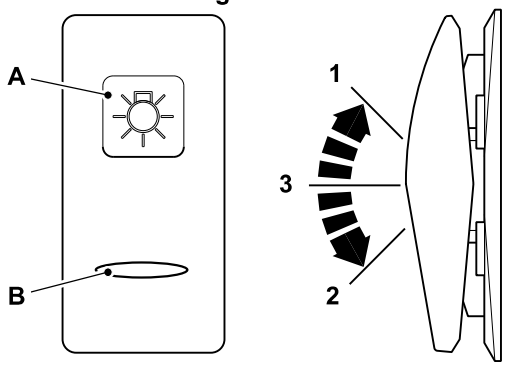
Each switch has a graphic symbol to show the function of the switch. Before you operate a switch, make sure that you understand its function.

The rocker switches have two or three positions (as shown).

If the switch has a backlight, then the graphic symbol illuminates when the ignition switch or side lights are in the on position.

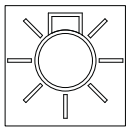
The light bar illuminates to show that the switch function is active.

Figure 13.



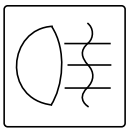
A Graphic symbol **B** Light bar

Road Lights



Three position rocker switch. The switch functions operate front sidelight, headlights and rear tail lights. Position 2 operates when the ignition is in the on and off positions. Position 3 operates when the ignition is in the on position. Machines without headlights or side lights are designed for site use. You may be breaking local laws if you travel on the road without headlights or side lights.
Position : 1 = Off
Position : 3 = Sidelights on.
Position : 2 = Headlights and rear tail lights on (ignition switch on).
Position : 2 = Sidelights and rear tail lights on (ignition switch off).

Rear Fog Lights



Two position rocker switch. The switch functions operate when the ignition switch is in the on position and the headlights are on.
Position **1**: Off
Position **2**: Rear fog light on

Hazard Warning Lights

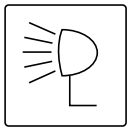
Two position rocker switch. The switch functions operate when the ignition switch is in the on and off positions.
Position : 1 = Off
Position : 2 = On. A light on the instrument panel flashes with the outside lights.

Work Lights

(If fitted) Three position rocker switch. The switch functions operate when the ignition switch is in the on position. The work lights work independently of the main circuit lights.
Position : 1 = Off
Position : 3 = Front work lights on
Position : 2 = Front/rear/hitch work lights on.

WARNING! *Do not drive on the road with the work lights switched on. You can interfere with other drivers visibility and cause an accident.*

Boom Work Light



Two position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: Off
Position **2**: Boom worklight on

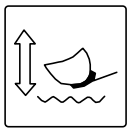
Information

Two position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: Off
Position **2**: On (spring loaded - push then release to move to the next screen)

Tilt Lock

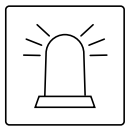
Two position rocker switch with backlight. The switch functions operate when the ignition switch is in the on position.
Position **1**: Off (Backlight off)
Position **2**: Tilt lock on (Backlight on)

Smooth Ride System (SRS)



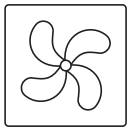
Three position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: Off
Position **3**: On
Position **2**: Engage - Push and hold while you move the boom to the correct position.

Beacon



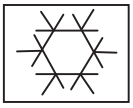
Two position rocker switch. The switch functions operate when the ignition switch is in the on and off positions.
Position : 1 = Off
Position : 2 = Beacon on

Heater



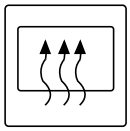
Three position rocker switch (spring loaded). The switch functions operate when the ignition switch is in the on position.
Position **1**: Fan speed down (springloaded)
Position **3**: Default position
Position **2**: Fan speed up (springloaded)

Air-Conditioning



Two position push switch. The switch functions operate when the ignition switch is in the on position.
Position : 1 = Off
Position : 2 = On

Window Heater

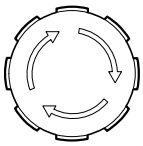


Two position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: Heater rear/side windows off
Position **2**: Heater rear/side windows on

Controls Isolation

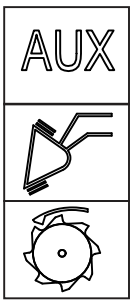
Two position rocker switch with backlight. The switch functions operate when the ignition switch is in the on position. Before you operate the switch, make sure you release the control lever locks.
Position **1**: Off
Position **2**: On

Hydraulic Function



Two position push switch. The switch functions operate when the engine is running.
Position **1**: Enable the hydraulic functions (turn the knob to the right then release).
Position **2**: Disable the hydraulic functions (push the knob).

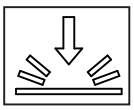
Hydraulic Mode



Three position rocker switch. The switch functions operate when the engine is running.
Position **1**: Aux/Aux II
Position **3**: Automatic bucket control system
Position **2**: Constant flow selector

Refer to: Operation > Operating Levers/Pedals (Page 89).

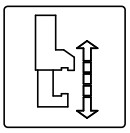
Hydraulic Venting



Two position rocker switch. The switch function differs depending on machine state.
Position **1**: Off
Position **2**: Service venting (ignition switch on, engine off) or:
Position **2**: Aux venting (engine running)

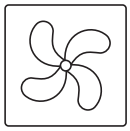
Refer to: Maintenance > Hydraulic System > General > Discharge (Page 234).

Hydraulic Tow Hitch



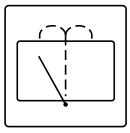
Three position rocker switch. The switch functions operate when the engine is running.
Position **1**: Raise tow hitch
Position **3**: Neutral
Position **2**: Lower tow hitch

Reverse Fan



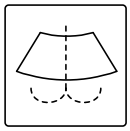
Three position rocker switch. The switch functions operate when the engine is running. An ECU Controls the fan speed and direction.
Position **1**: Off
Position **3**: Auto - With Auto selected, every 15 minutes the machine will automatically reduce the fan speed, change the direction and then increase the fan speed to maximum for 10 seconds. The machine will then reduce the fan speed, change back to the correct direction and then return to the optimum fan speed required to cool the machine.
Position **2**: Manual (spring-loaded) - A buzzer will sound while you reverse the fan manually, the dash should be displayed notifications on the main display. With Manual selected (press and hold) the machine will automatically reduce the fan speed, change the direction and then increase the fan speed. The fan will stay reversed until the switch is released, then the machine will reduce the fan speed, change back to the correct direction and then return to the optimum fan speed required to cool the machine. When you release the switch from manual mode the fan will then be in auto mode. You will have to move the switch to position 1 to ensure the fan does not auto reverse.

Rear Window Wiper



Three position rocker switch. The switch functions operate when the ignition switch is in the on position. The wiper will self park when switched off.
Position **1**: Wiper off
Position **3**: Wiper on
Position **2**: Washer on (push and hold)

Roof Window Wiper

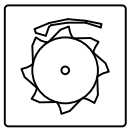


Three position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: Wiper off
Position **3**: Wiper on
Position **2**: Washer on (push and hold)

Auxiliary Hydraulic Circuit

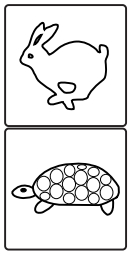
Two position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: Rear auxiliary circuit
Position **2**: Front auxiliary circuit

Constant Flow



Two position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: Off
Position **2**: On

Two Speed Range



Two position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: High-speed range engaged
Position **2**: Low-speed range engaged

Interior Switches

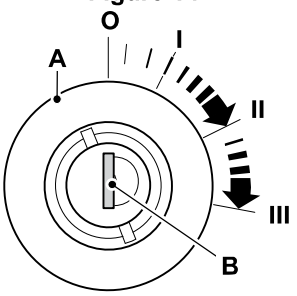
Ignition Switch

The ignition key operates the four-position ignition switch. The ignition key can only be inserted or removed in position 0.

If the engine fails to start, the ignition key must be returned to position 0 before the starter motor is re-engaged.

Do not operate the starter motor for more than 20s without the engine firing. If the engine fires but does not fully start, let the starter motor cool for at least 2min between starts.

Figure 14.



A Ignition switch **B** Ignition key

Table 9. Switch Positions

Position	Function
0	Off/Stop the Engine: Turn the ignition key to this position to stop the engine. Make sure the controls are in neutral and the boom is lowered before you stop the engine.
I	On: Turn the ignition key to this position to connect the battery to all of the electrical circuits. The ignition key will return to this position when it is released from position II or position III.
II	This position is not used .
III	Start: Turn the ignition key to this position to operate the starter motor and turn the engine. The ignition switch has an inhibitor to stop the ignition switch being turned ON when the engine is running.

Multi-Purpose Switch

Direction Indicators

Push the stalk forwards to indicate a left turn. Pull the stalk backwards to indicate a right turn. Place in central position to cancel.

Windscreen Wiper

Rotate the switch barrel to activate and cancel the windscreen wipers. The wiper speed can vary dependant on machine specification.

Single Speed (Standard)

0 = Off

I = On

Two Speed (Optional)

J = Intermittent Wipe

0 = Off

I = Slow

II = Fast

Windscreen Washer

Push the button to activate the windscreen washer. Allow the stalk to spring back to central position when finished.

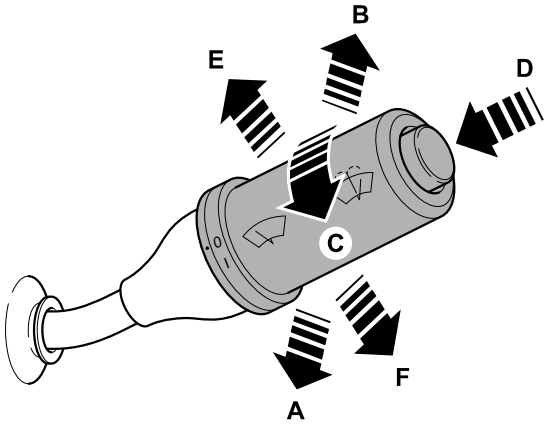
Headlights Flash

Lift the stalk upwards to flash the headlights. Allow the stalk to spring back to central position when finished.

Main Beam

When the road lights are switched on via main switch on console, push the stalk downwards to turn on the main beam. Pull the stalk upwards to the central position to turn off main beam. Switch off main beam for oncoming vehicles.

Figure 15.



A Backwards - Right turn
B Forwards - Left Turn
C Rotate - Wiper on and off or intermittent
D Push - Washer on
E Upwards - Headlights flash
F Downwards - Main beam

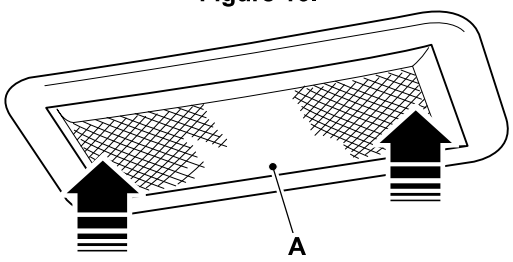
Cab Interior Light

Press either end of the light unit to turn on the cab interior light.

Press the other end of the light unit to turn off the cab interior light.

Make sure the cab interior light is turned off when you intend to leave the machine for a long period of time.

Figure 16.



A Cab interior light

Notes:

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.

Operating Safety

General

Training

Make sure that you have had adequate training and that you are confident in your ability to operate the machine safely before you use it. Practice using the machine and its attachments until you are completely familiar with the controls and what they do. With a careful, well trained and experienced operator, your machine is a safe and efficient machine. With an inexperienced or careless operator, it can be dangerous. Do not put your life, or the lives of others, at risk by using the machine irresponsibly. Before you start to work, tell your colleagues what you will be doing and where you will be working. On a busy site, use a signalman.

Before doing any job not covered in this manual, find out the correct procedure. Your local JCB distributor will be glad to advise you.

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.

Machine Condition

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

Machine Limits

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

Engine/Steering Failure

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

Exhaust Gases

Machine exhaust gases can harm and possibly kill you or bystanders if they are inhaled. Do not operate the machine in closed spaces without making sure there is good ventilation. If possible, install an exhaust extractor. If you begin to feel drowsy, stop the machine at once and get into fresh air.

Worksites

Worksites can be hazardous. Examine the site before working on it. You could be killed or injured if the ground gives way under your machine or if piled material collapses onto it. Check for potholes and hidden debris, logs, ironwork etc. Any of these could cause you to lose control of your machine. Check for utilities such as electric cables (overhead and underground), gas and water pipes etc. Mark the positions of the underground cables and pipes. Make sure that you have enough clearance beneath overhead cables and structures.

Communications

Bad communications can cause accidents. Keep people around you informed of what you will be doing. If you will be working with other people, make sure any hand signals that may be used are understood by everybody. Worksites can be noisy, do not rely on spoken commands.

Parking

An incorrectly parked machine can move without an operator. Follow the instructions in the Operator's Manual to park the machine correctly.

Banks and Trenches

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

Safety Barriers

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

Sparks

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

Hazardous Atmospheres

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

Regulations

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

Electrical Power Cables

You could be electrocuted or badly burned if you get the machine or its attachments too close to electrical power cables.

You are strongly advised to make sure that the safety arrangements on site comply with the local laws and regulations concerning work near electric power lines.

Before you start using the machine, check with your electricity supplier if there are any buried power cables on the site.

There is a minimum clearance required for working beneath overhead power cables. You must obtain details from your local electricity supplier.

Working Platform

Using the machine as a working platform is hazardous. You can fall off and be killed or injured. Never use the machine as a working platform unless with approved man-basket or man-crate (if applicable).

Machine Safety

Stop work at once if a fault develops. Abnormal sounds and smells can be signs of trouble. Examine and repair before resuming work.

Hot Components

Touching hot surfaces can burn skin. The engine and machine components will be hot after the unit has been running. Allow the engine and components to cool before servicing the unit.

Travelling at High Speeds

Travelling at high speeds can cause accidents. Always travel at a safe speed to suit working conditions.

Hillsides

Operating the machine on hillsides can be dangerous if the correct precautions are not taken. Ground conditions can be changed by rain, snow, ice etc. Check the site carefully. When applicable, keep all attachments low to the ground.

Visibility

Accidents can be caused by working in poor visibility. Use your lights to improve visibility. Keep the road lights, windows and mirrors clean.

Do not operate the machine if you cannot see clearly.

Modification of the machine's configuration by the user (e.g. the fitting of large and non-approved attachments) may result in a restriction of the machine visibility.

Hands and Feet

Keep your hands and feet inside the machine.

When using the machine, keep your hands and feet clear of moving parts. Keep your hands and feet within the operator compartment while the vehicle is in motion.

Controls

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

Passengers

Passengers in or on the machine can cause accidents. Do not carry passengers.

Fires

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

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

Roll Over Protection

If the machine starts to roll over, you can be crushed if you try to leave the cab. If the machine starts to roll over, do not try and jump from the cab. Stay in the cab, with your seat belt fastened.

Confined Areas

Pay extra attention to proximity hazards when operating in confined areas. Proximity hazards include buildings, traffic and bystanders.

Safe Working Loads

Overloading the machine can damage it and make it unstable. Study the specifications in the Operator's Manual before using the machine.

Lightning

If you are inside the machine during a lightning storm stay in the machine until the storm has passed. If you are outside of the machine during a lightning storm stay away from the machine until the storm has passed. Do not attempt to mount or enter the machine.

If the machine is struck by lightning do not use the machine until it has been checked for damage and malfunction by trained personnel.

Worksite Safety

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

WARNING There could be dangerous materials such as asbestos, poisonous chemicals or other harmful substances buried on the site. If you uncover any containers or you see any signs of toxic waste, stop the machine and advise the site manager immediately.

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

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

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

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

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

Leaking gas is highly explosive.

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

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

CAUTION Before you start using the machine, check with your local public water supplier if there are buried pipes and drains on the site. If there are, obtain a map of their locations and follow the advice given by the water supplier.

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

CAUTION If you cut through a fibre optic cable, Do not look into the end of it, your eyes could be permanently damaged.

An applicable worksite organisation is required in order to minimise hazards that are caused by restricted visibility. The worksite organisation is a collection of rules and procedures that coordinates the machines and people that work together in the same area. Examples of worksite organisation include:

- Restricted areas
- Controlled patterns of machine movement
- A system of communication.

You and/or your company could be legally liable for any damage you may cause to public utilities. It is your responsibility to make sure that you know the locations of any public utility cables or pipes on the worksite which could be damaged by your machine.

Risk Assessment

It is the responsibility of the competent people that plan the work and operate the machine to make a judgement about the safe use of the machine, they must take into account the specific application and conditions of use at the time.

It is essential that a risk assessment of the work to be done is completed and that the operator obeys any safety precautions that the assessment identifies.

If you are unsure of the suitability of the machine for a specific task, contact your JCB dealer who will be pleased to advise you.

The following considerations are intended as suggestions of some of the factors to be taken into account when a risk assessment is made. Other factors may need to be considered.

A good risk assessment depends on the training and experience of the operator. Do not put your life or the lives of others at risk.

Personnel

- Are all persons who will take part in the operation sufficiently trained, experienced and competent? Are they fit and sufficiently rested? A sick or tired operator is a dangerous operator.
- Is supervision needed? Is the supervisor sufficiently trained and experienced?
- As well as the machine operator, are any assistants or lookouts needed?

The Machine

- Is it in good working order?
- Have any reported defects been corrected?
- Have the daily checks been carried out?
- Are the tyres still at the correct pressure and in good condition and is there sufficient fuel to complete the job (if applicable)?

The Load

- How heavy is it? Is it within the capabilities of the machine?
- How bulky is it? The greater the surface area, the more affected it will be by wind speeds.
- Is it an awkward shape? How is the weight distributed? Uneven loads are more difficult to handle.
- Is there a possibility of the load shifting while being moved?

Loading/Unloading Area

- Is it level? Any slope of more than 2.5% (1 in 40) must be carefully considered.

- Is more than one direction of approach to the load possible? Approaching across the slope must be avoided, if possible.
- Is the ground solid? Will it support the weight of the machine when loaded?
- How rough is the ground? Are there any sharp projections which could cause damage, particularly to the tyres?
- Are there any obstacles or hazards in the area, for example, debris, excavations, manhole covers, power lines?
- Is the space sufficient for safe manoeuvring?
- Are any other machines or persons likely to be in or to enter the area while operations are in progress?

The Route to be Travelled

- How solid is the ground, will it provide sufficient traction and braking? Soft ground will affect the stability of the machine and this must be taken into account.
- How steep are any slopes, up/down/across? A cross slope is particularly hazardous, is it possible to detour to avoid them?

Weather

- How windy is it? High wind will adversely affect the stability of a loaded machine, particularly if the load is bulky.
- Is it raining or is rain likely? The ground that was solid and smooth when dry will become uneven and slippery when wet, and it will not give the same conditions for traction, steering or braking.

Walk-Around Inspection

General

⚠ **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. Also make sure that the park brake is engaged before doing these checks.

The following checks must 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.

1. Check for cleanliness.
   1.1. Clean the windows, light lenses and the rear view mirrors (where applicable).
   1.2. Remove dirt and debris, especially from around the linkages, rams, pivot points and radiator.
   1.3. Make sure the cab step and handrails are clean and dry.
   1.4. Clean all of the safety and instructional labels. Replace any label that is missing or cannot be read.
2. Check for damage.
   2.1. Examine the machine generally for damaged and missing parts.
   2.2. Make sure that the attachment is correctly attached and in good condition.
   2.3. Make sure that all of the pivot pins are correctly installed.
   2.4. Examine the windows for cracks and damage. Glass splinters can blind.
   2.5. Check for oil, fuel and coolant leakages below the machine.

   WARNING! *You could be killed or injured if a machine tyre bursts. Do not use the machine with damaged, incorrectly inflated or excessively worn tyres.*
3. Check the tyres.
   Refer to: Maintenance > Tyres (Page 232).
4. Make sure that all of the filler caps are installed correctly.
5. Make sure that all of the access panels are closed correctly.
   Refer to: Maintenance > Access Apertures (Page 207).
6. If the filler caps and access panels are installed with locks, we recommend that you lock them to prevent theft or tampering.

Entering and Leaving the Operator Station

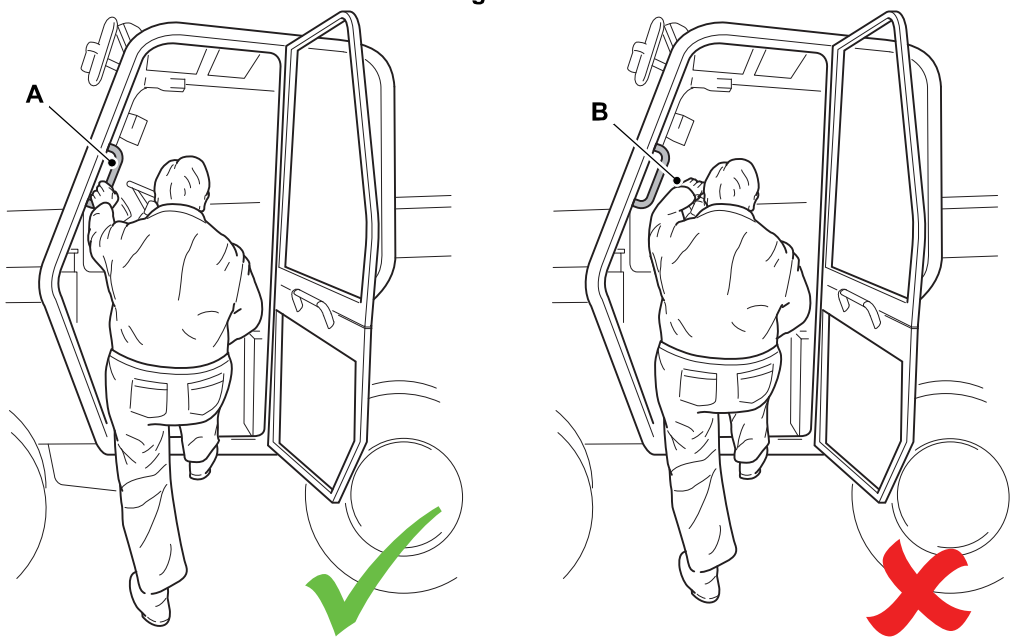
General

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

Make sure the machine is stopped and correctly parked before entering or leaving the cab. Refer to: Operation > Stopping and Parking > General (Page 55).

When you get 'on' and 'off' the machine always maintain a point contact with the handrail. Do not use the machine controls as handholds.

Figure 17.



A Handrail

B Steering wheel

Emergency Exit

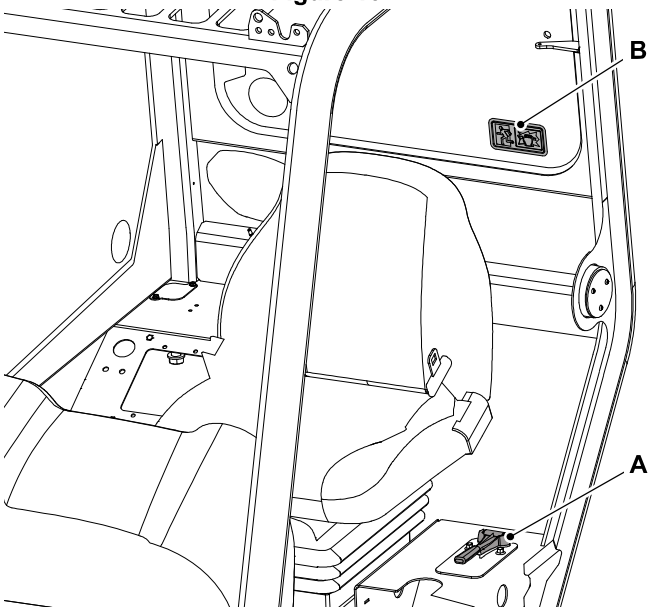
⚠ **WARNING** Do not obstruct the rear cab window, this is an emergency exit.

If the machine is installed with a glazing breaker, in an emergency use the glazing breaker to break the glass. Use the rear cab window as an emergency exit.

In the event of an emergency:

1. Remove the glazing breaker from it's stowage position.
2. Strike the rear cab window near the corner. This will shatter the screen, which can then be knocked out.

Figure 18.



A Glazing breaker

B Label

Doors

Operator Door

Door

To open the door from the outside:

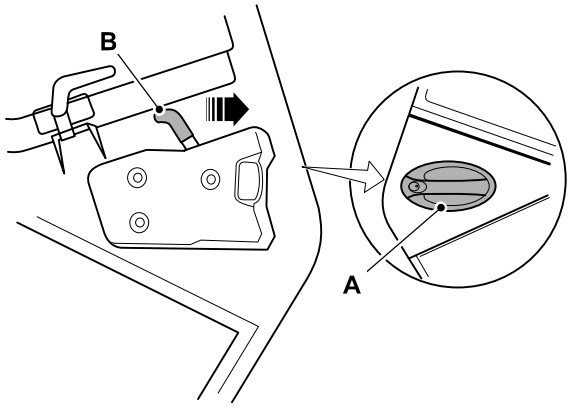
1. Unlock the door with the ignition key.
2. Pull the handle to release the latch.

To close the door:

Close the door from the inside by pulling the closing bar firmly; it will latch itself.

To open the door from the inside, pull lever to release the latch.

Figure 19.



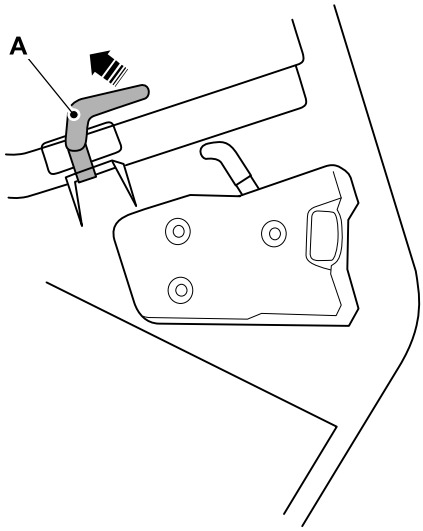
A Handle **B** Lever

Upper Door Section

To open the upper door section:

1. With the cab door closed, release the upper section by pulling lever to the rear.
2. Swing the door fully open until it latches.
3. Do not drive the machine with the upper door section unlatched.

Figure 20.

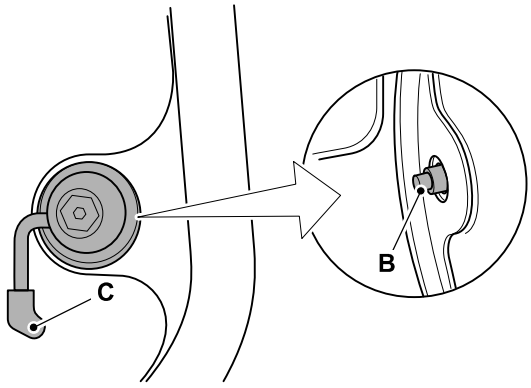


A Lever

To close the upper door section:

1. Press the button (if inside the cab) or release the catch (if outside the cab).
2. Swing the door closed.
3. Push the lever forward down to latch the upper door on to the lower door.

Figure 21.



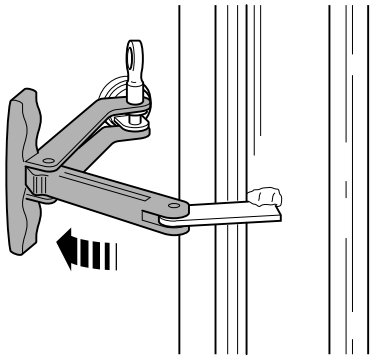
B Button **C** Catch

Windows

Rear Window

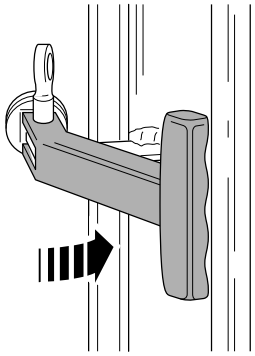
To open the window, swing the catch in the direction shown, as far as required.

Figure 22.



To close the window, swing the catch in the direction shown until it locks in position.

Figure 23.



Before Starting the Engine

General

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

WARNING Secure all loose articles. 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 could lose control of the machine.

CAUTION Machines installed with hose burst protection valves cannot have their attachments lowered with the engine stopped. Start the engine and lower the attachments before doing the walk-around inspection.

1. The park brake should have been engaged when the machine was last parked. If it is not already engaged, engage it now.
2. Read the Operating in Low Temperatures or Operating in High Temperatures procedures in the Operation section if you will be using the machine in very cold or very hot climates.

   Refer to: Operation > Operating Environment (Page 127).
3. If the fuel tank was empty or if any part of the fuel system has been drained or disconnected, the fuel system must be primed before you try to start the engine.
4. Lower the attachment to the ground
5. For your own safety (and others) and for the maximum service life of your machine, do a pre-start inspection before you start the engine.

   5.1. If you have not done it, do a walk-around inspection of the outside of the machine.

   Refer to: Operation > Walk-Around Inspection (Page 35).

   5.2. Remove any dirt and rubbish from the cab interior, specially around the pedals and control levers.

   5.3. Remove any oil, grease and mud from the pedals and control levers.

   5.4. Make sure that your hands and shoes are clean and dry.

   5.5. Remove or stow all loose articles in the cab, for example tools.

   5.6. Examine the ROPS (Roll-Over Protective Structure) and/or FOPS (Falling Object Protective Structure) for damage. Get your JCB dealer to repair any damage. Make sure all its securing bolts are installed and correctly tightened.

   5.7. Check around the cab for loose or missing bolts, screws etc. Replace or tighten where necessary.

   5.8. Examine the seat belt and its mountings for damage and excessive wear.

   Refer to: Maintenance > Operator Station > Seat Belt (Page 214).

   5.9. Make sure that the following operate correctly: lights, horn, all switches, front window washer and wipers (if installed).
6. Adjust the seat so that you can comfortably reach all the driving controls. You must be able to operate the control pedal with your back against the seat back. Make sure the seat locking lever has fully engaged.

   Refer to: Operation > Operator Seat (Page 42).
7. Adjust the rear view mirrors (where applicable) to give you a good view close behind the machine, when you are correctly seated.
8. Fasten the seat belt.

Operator Seat

General

⚠ **CAUTION** Position the seat so that you can comfortably reach the machine controls. Do not adjust the seat while the machine is moving. You could have an accident if you operate the machine with the seat in the wrong position.

The operator's seat can be adjusted for your comfort. A correctly adjusted seat will lower the operator fatigue.

Adjust the seat so that you can comfortably reach the machine controls.

For driving the machine, adjust the seat so that you can push the pedals fully down when your back is against the seat back.

Operator Present Switch

All seat options have been installed with an operator present switch. This switch ensures there is an operator present in the machine, and has the following effects:

- If there is no operator in the seat it is not possible to engage drive.
- If the operator leaves the seat, with the transmission engaged and the handbrake disengaged, then the machine will remain in drive, but an audible and visual warning will appear on the dash.
- If there is no operator in the seat then the hand throttle will not function.

Suspension Seat

Suspension Seat (KAB 100 Series - Mechanical)

Horizontal Adjustment

Lift the lever and slide the seat into the required position. Release the lever.

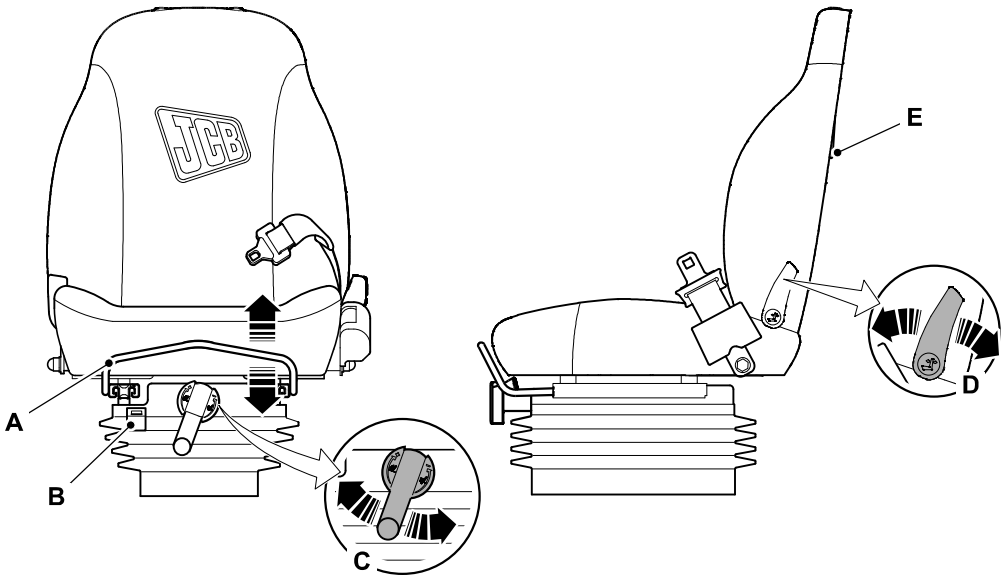
Height

Turn the adjuster lever until the ride height indicator is in the green 'comfort' zone.

Backrest

Lift the backrest lever and move the backrest to the required angle. Release the lever.

Figure 24.



A Horizontal adjustment lever
B Ride height indicator
C Height adjustment lever
D Backrest lever
E Document cover

Suspension Seat (KAB 100 Series - Air)

Horizontal Adjustment

Lift the lever and slide the seat into the required position. Release the lever.

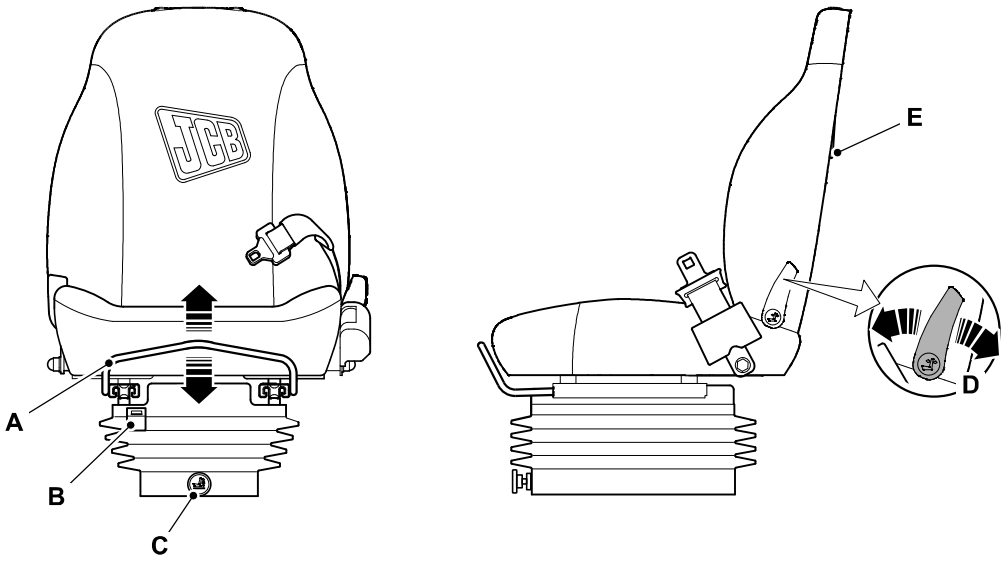
Height

Turn the adjuster lever until the ride height indicator is in the green 'comfort' zone.

Backrest

Lift the backrest lever and move the backrest to the required angle. Release the lever.

Figure 25.



A Horizontal adjustment lever
B Ride height indicator
C Height adjustment lever
D Backrest lever
E Document cover

Heated Seat Controls

The heated seat option is only available on the KAB 800 Series and Grammer Air Suspension Seats.

A manually operated switch is located on the rear of the backrest. Press heater switch to select on. Functions only with the ignition on.

The seat heater is thermostatically controlled and operates intermittently to achieve and maintain a predetermined temperature. No manual temperature adjustment is available.

Seat Belt

General

⚠ **WARNING** Operating the machine without a seat belt can be dangerous. Before starting the engine, make sure your seat belt is fastened. Check the tightness and condition of the seat belt securing bolts regularly.

WARNING When a seat belt is installed on your machine replace it with a new one if it is damaged, if the fabric is worn, or if the machine has been in an accident.

Inertia Reel Seat Belt

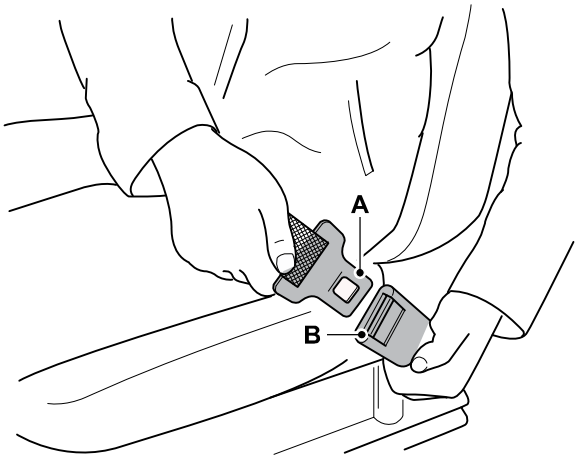
Fasten the Seat Belt

⚠ **WARNING** If you do not wear your seat belt you could be thrown about inside the machine, or thrown out of the machine and crushed. You must wear a seat belt when using the machine. Fasten the seat belt before starting the engine.

1. Sit correctly in the seat.
2. Pull the seat belt and the tongue from the inertia reel holder in one continuous movement.
3. Push the tongue into the latch. Make sure the seat belt worn is snug and properly located on the body. Make sure the seat belt is not twisted and that it is over your hips not your stomach.

   3.1. If the seat belt 'locks' before the tongue is engaged, let the seat belt retract into the inertia reel holder then try again. The inertia mechanism can lock if you pull the seat belt too quickly or if the machine is parked on an slope.

Figure 26.

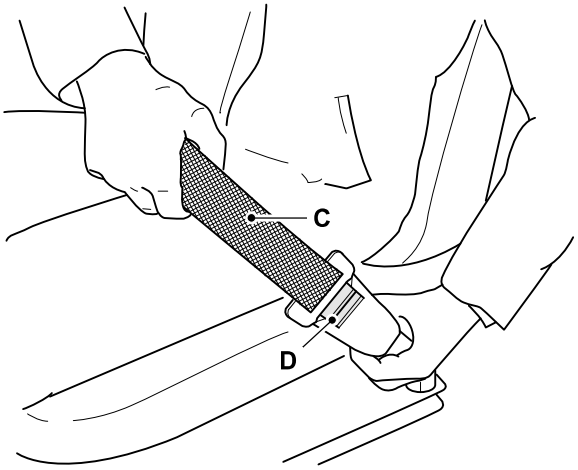


A Tongue **B** Latch

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

4. To make sure the seat belt operates correctly, hold the middle of the seat belt and pull quickly. The seat belt should 'lock'. Refer to Figure 27.

Figure 27.



C Seat belt

D Button

Release the Seat Belt

⚠ **WARNING** Release the seat belt only after safely stopping the machine, switching off the engine and engaging the park brake (if applicable).

1. Push the button and pull the tongue from the latch.
2. Carefully let the seat belt retract into the inertia reel holder.

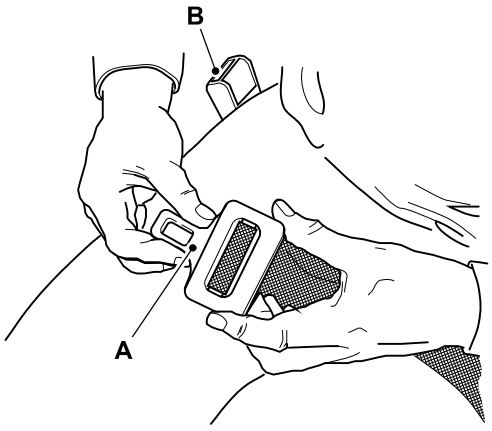
Static Seat Belt

Fasten the Seat Belt

⚠ **WARNING** If you do not wear your seat belt you could be thrown about inside the machine, or thrown out of the machine and crushed. You must wear a seat belt when using the machine. Fasten the seat belt before starting the engine.

1. Sit correctly in the seat.
2. Push the tongue into the latch. Make sure the seat belt is worn snug and properly located on the body. Make sure the seat belt is not twisted and that it is over your hips not your stomach.

Figure 28.

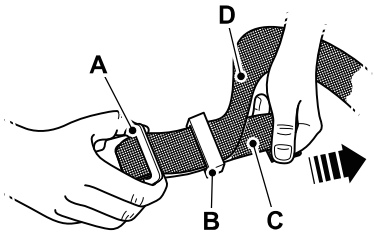


A Tongue
B Latch

Adjust

1. Move the toggle the required distance down the strap.
2. To make the strap longer, pull the end as far as it will go.
3. To make the strap shorter, pull the end as far as it will go.

Figure 29.



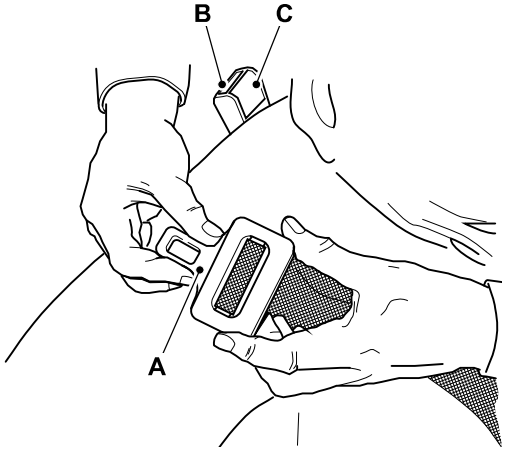
A Tongue
B Toggle
C Strap (pull here to lengthen)
D Strap (pull here to shorten)

Release the Seat Belt

⚠ **WARNING** Release the seat belt only after safely stopping the machine, switching off the engine and engaging the park brake (if applicable).

1. Push the button and pull the tongue from the latch.

Figure 30.



A Tongue
B Latch
C Button

Mirrors

General

The following information is provided so that the operator can minimise visibility hazards when operating the machine.

This machine meets the visibility requirements specified in FprEN 15830:2011. The machine has been subject to a static visibility assessment with a simulated load in two positions: the load on the forks 500 ± 50mm above the ground, and the load suspended 600mm beneath the forks while the forks are 2,200mm above the ground.

The test simulates operator visibility in establishing lines of sight between the operator's eyes and points on the ground at a 12m radius from the machine, and on a boundary line 1.5m above the ground and 1m away from the smallest rectangle that encompasses a plan view of the machine. Whilst based upon ergonomic data (binocular eye spacing, turning of the head and body torso movement), the standard sometimes purposefully restricts/removes movement which is ergonomically achievable in order to improve/maintain the current state of art. As a consequence, visibility diagrams in accordance with FprEN 15830:2011 often report visibility maskings which do not exist in practice.

Visibility diagrams according to FprEN 15830:2011 are provided. Refer to: Technical Data > Static Dimensions (Page 243).

When they operate the machine, the operator must continually survey their field of vision. It is important that the mirrors are securely installed and give maximum vision around the machine.

The machine should be used in accordance with appropriate jobsite organisation and persons should be kept outside of the immediate vicinity of the machine considering the working range of equipment/ attachment and speed of movement of the machine.

When a mirror is provided to supplement the operator's direct field of vision, it must be adjusted to give the field of view shown in order for it to serve as an aid to the operator in seeing people or obstacles around the machine. The mirror provides indirect vision to hidden areas and improves the effectiveness of the machines usage.

The visibility requirements of this machine has also been assessed in a lorry trailer loading condition as specified in FprEN 15830:2011. The machine has been subject to a static visibility assessment with the simulated load on the forks 1,000 ± 50mm above the ground.

Use of the machine with non-standard modifications, and/ or in non-standard configurations, and/or with attachments that result in restriction of the machine visibility should be assessed in accordance with FprEN 15830:2011 to determine if further devices and/or jobsite controls are required.

If a suspended load or the resulting geometry creates a substantial blockage to visibility, the operator should consider alternative means of carrying the load (e.g. palletised load).

Starting the Engine

General

⚠ **CAUTION** Do not use ether or other starting fluids to assist cold starting. Using these fluids may result in an explosion causing possible injury and/or damage to the engine.

1. Make sure that the machine is ready to start.

   Refer to: Operation > Before Starting the Engine (Page 41).

2. Put the forward/reverse lever in neutral.

   Refer to: Operation > Operating Levers/Pedals (Page 89).

   2.1. The engine will not start unless the forward/reverse lever is in neutral.

3. Make sure the battery isolator key is installed and switched on.

   Refer to: Operation > Battery Isolator > General (Page 118).

4. If the machine has an immobiliser then you must disarm the immobiliser before you can start the engine.

   Refer to: Operation > Starting the Engine > Immobiliser (Page 51).

5. Start the engine at normal engine start:

   5.1. Turn the ignition key to the start position (position III) and hold it there until the engine starts.

6. Start the engine at cold climate engine start:

   Temperature: -12–0°C (10.4–32.0°F)

   6.1. Turn the ignition key to the on position (position I), the cold start inlet manifold heater icon shows on the dash.

   Refer to: Operation > Instruments > Instrument Panel (Page 69).

   6.2. When the icon is extinguished, turn the ignition key to the start position (position III) and hold it there until the engine starts.

   6.3. There is an intentional delay of time specified prior to starting the engine to assist the priming of the engine lubrication system.

   Duration: 2s

   6.4. After you start the machine there is an intentional delay of time specified at idle during which time the throttle control is overridden to assist priming of the lubrication system.

   Duration: 14.5s

7. Start the engine at cold climate engine start: -20–-12°C (-4–10.4°F)

   7.1. When you start the machine at these ambient temperatures, a grid heater must be installed in to the inlet manifold of the engine.

   7.2. Turn the ignition key to the on position (position I), the cold start inlet manifold heater icon shows on the dash.

   Refer to: Operation > Instruments (Page 69).

   7.3. When the icon is extinguished, turn the ignition key to the start position (position III) and hold it there until the engine starts.

   7.4. There is an intentional delay of time specified prior to starting the engine to assist the priming of the engine lubrication system.

   Duration: 2s

   7.5. After you start the machine there is an intentional delay of time specified at idle during which time the throttle control is overridden to assist priming of the lubrication system.

   Duration: 26.5s

8. Start the engine at cold climate engine start: below

   Temperature: -20°C (-4.0°F)

   8.1. When you start the machine at these ambient temperatures, a grid heater must be installed in to the inlet manifold of the engine and block heaters must be installed in to the engine block coolant jacket.

   8.2. There is no detriment if the block heater is used in ambient temperatures of -20–-12°C (-4–10.4°F).

   8.3. Do not use the block heater in ambient temperatures of above the temperature specified.

   Temperature: 0°C (32.0°F)

   8.4. Regularly check the ambient temperature to determine if the block heater is necessary.

   8.5. Turn the ignition key to the on position (position I), the cold start inlet manifold heater icon shows on the dash.

   Refer to: Operation > Instruments (Page 69).

   8.6. When the icon is extinguished, turn the ignition key to the start position (position III) and hold it there until the engine starts.

   8.7. After you start the machine there is an intentional delay of time specified at idle during which time the throttle control is overridden to assist priming of the lubrication system.

   Duration: 34s

9. Do not operate the starter motor without the engine firing not more than the time specified.

   Duration: 15s

10. If the engine fires but does not fully start, do not operate the starter motor for more than the time specified.

    Duration: 45s

11. Before you try another start, let the starter motor cool down for at least the time specified.

    Duration: 60s

12. After engine start, the idle speed may be higher than normal in cold conditions, this is not a fault.

13. Release the ignition key when the engine starts.

    13.1. The ignition key will go back to the on position (position I).

14. When the engine has started, make sure that all the warning lights have gone off and that the audible alarm is silent.

    Refer to: Operation > Instruments > Instrument Panel (Page 69).

    14.1. Do not race the engine until the oil pressure low light has gone off.

    14.2. Racing the engine too soon could damage the turbo-charger due to under lubrication.

15. The engine noise and/or tone may be louder than usual when cold. This is normal and is due to the fuel injection pump being advanced. The engine will become quieter when the engine reaches normal operating temperature.

16. Machines which are installed with a vari-speed hydraulic cooling fan - the speed of the fan will vary according to operating conditions.

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

18. Operate the hydraulic services to make sure that each function is working correctly and to help warm up the hydraulic system.

    18.1. Do not operate the attachments until the hydraulic oil has reached its normal working temperature.

    18.2. The LLMC (Longitudinal Load Moment Control) system (if installed) requires the hydraulic oil temperature to be sufficiently warm for effective operation.

Refer to: Operation > Lifting and Loading > Load Motion Control System (Page 100).

New engines do not require a running-in period. The engine/machine should be used in a normal work cycle immediately; glazing of the piston cylinder bores resulting in excessive oil consumption, could occur if the engine is gently run-in. Under no circumstances should the engine be allowed to idle for extended periods; (e.g. warming up without load).

Immobiliser

(if installed)

There are two different JCB immobiliser systems, one uses a keypad and the other a unique key system.

If your machine has an immobiliser system installed, then your JCB dealer should enable the system as part of the standard machine Installation. If you prefer that the system is not enabled, then you must tell your JCB dealer. Your JCB dealer can enable the system at a later date. Machines with immobilisers installed should always be parked as per the instructions in the operators manual.

Introduction

Before attempting to disarm the immobiliser check that the machine is ready to start and that you have your four digit PIN (Product Identification Number) code available.

The green LED (Light Emitting Diode) will illuminate every time that a keypad button is fully depressed. Do not operate buttons with sharp objects, they may damage and disable the keypad.

If you make an error entering your PIN code and you realise this before pressing the ENT button then pressing the MD button cancels inputs and allows you to re-commence.

If the PIN code is incorrectly entered five times the immobiliser will lock for 15min. In this event it is recommended that you contact the machine owner for confirmation of the PIN code.

The PIN code will have to be entered every time that the ignition is switched off for longer than two minutes.

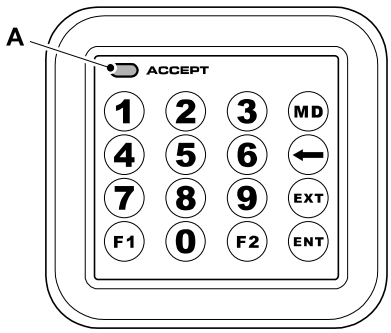
To Disarm the Immobiliser to Allow the Machine to be Used

1. Put the ignition key in the ignition switch. Turn the ignition key to position 1.
2. Enter your four digit PIN code using the keypad.
3. Push the 'ENT' button. The LED will come on for three seconds if the PIN code is correct and the machine can be started.
4. If an incorrect PIN code is entered the unit will lock. The LED will flash twice quickly, pause and then flash twice again and will continue this pattern until the ignition key is turned to the off position. In this event return to step 1 to try again.

   4.1. After five failed tries the system will lock.

   Duration: 15min

Figure 31.



A LED

To Arm the Immobiliser

1. Stop the engine. Remove the ignition key.
2. The immobiliser arms automatically after two minutes. The green LED flashes for 60 seconds, then goes off.
3. If you restart the engine within two minutes, the system disarms automatically.

To Add a New or Additional PIN Code

Before you try to add a new or additional PIN code, make sure that the machine is ready to start and that you have your six digit master code and your new four digit PIN code available.

If you are unsure of the master code or your new PIN code, then do not start this procedure.

The keypad immobiliser can be programmed to accept up to 14 different four digit PIN codes, any of which will let the machine be started.

1. Put the ignition key in the ignition switch. Turn the ignition key to position 1
2. Enter your six digit master code using the keypad. Push the 'ENT' button.
3. The LED will flash three times to indicate the acceptance of the master code.
4. Within 59 seconds of the three flashes, push the 'MD' button.
5. Enter your new four digit PIN code using the keypad. Push the 'ENT' button. The LED will flash four times to indicate that the new PIN code has been successfully entered.
6. Turn the ignition key to the off position, then a minimum of five seconds later, turn the ignition key to position 1. The new PIN code is now entered and recorded.
7. If another PIN code is to be entered, turn the ignition key to the off position, then return to step 1.

To Delete all of the PIN Codes

Deleting all the PIN codes does not allow the immobiliser to be bypassed. A four digit PIN code must be entered before the machine can be started.

If you are unsure of the master PIN code or your new PIN code, then do not start this procedure.

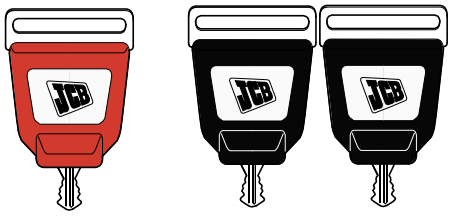
1. Put the ignition key in the ignition switch. Turn the ignition key to position 1.
2. Enter your six digit master PIN code using the keypad. Push the 'ENT' button. The LED will flash three times to indicate the acceptance of the code.
3. Push the buttons in the following sequence, 'MD', 'F1', 'ENT'. The LED will flash five times to indicate the acceptance of the delete command.

Unique Key Immobiliser System

Introduction

Each machine is supplied with a master key (red) and two ignition keys (black). The master key is used by the operator to program the ignition keys. You must use an ignition key to start or operate the machine.

Figure 32.



To Disarm the Immobiliser

1. Put the ignition key in the ignition switch.
2. Start the engine.

Figure 33.

A LED (The position may vary).

To Arm the Immobiliser

1. Stop the engine. Remove the ignition key.
2. The immobiliser immediately arms automatically.

To Add a New or Additional Ignition Key

The ignition keys can be programmed to start more than one machine.

1. Put the master key in the ignition switch.
2. Turn the master key to position 1. The LED will flash three times.
3. Turn the master key to position 0. Remove the master key.
4. Put a new or an additional ignition key in the ignition switch. Turn the ignition key to position 1. The LED will flash four times.
5. The new key has been added.

To Remove the Program From an Ignition Keys

The ignition keys can still be used on any other machine on which they have been programmed.

1. Put the master key in the ignition switch.

2. Turn the master key to position 1. The LED will flash three times.
3. Keep the master key in position 1 for 60 seconds. The ignition keys codes have now been deleted from the ECU (Electronic Control Unit).
4. Turn the master key to position 0. Remove the master key.
5. Add the required black keys in the system.

The starter keys will still be able to be used on any other machine on which they have been programmed.

If a non-programmed key or standard key is used, then a symbol will appear on the LCD (Liquid Crystal Display) screen, and the machine will not start.

Stopping and Parking

General

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

WARNING You or others can be killed or injured if you suddenly change from forward to reverse, or vice versa, when travelling. The machine will immediately reverse direction without warning to others. Always follow the recommended procedure for changing between forward and reverse drive.

WARNING Do not dismount a moving machine.

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 step(s), handrails and your boot soles are clean and dry. Do not jump from the machine. Do not use the machine controls as handholds, use the handrails.

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

1. Stop the machine on dry and level ground where the machine will not be a hazard or danger.
2. Ease up on the accelerator pedal and down on the brake pedal to bring the machine to a smooth stop. Keep the foot brake on until the park brake has been applied and the drive disengaged.
3. Activate the park brake.
4. Set the transmission to neutral. Make sure the lever is in its detent position. Make sure that the park brake indicator light is extinguished.
5. Retract and lower the boom, rest the forks flat on the ground.
6. Lock the controls.

   Refer to: Operation > Safety Equipment > Control Lock (Page 61).
7. It is recommended that turbocharged engines are run at 1000 RPM (approximately) and reduced load for a short of time before shut down to let the turbocharger to cool.

   Duration: 2–3min
8. If you are leaving the machine, make sure that all switches are set to off. If necessary, leave the hazard warning and/or side lights switched on. Remove the ignition key.
9. Use the handholds and step when you climb down from the machine. If you are leaving the machine, close and latch all windows and lock both doors. Make sure that the filler cap is locked on.
10. At the end of a working cycle or if the machine is being left unattended, provided the lights are not required remove the battery isolator key (if installed).

    Refer to: Maintenance > Electrical System > Battery Isolator (Page 238).

Preparing for Travel

General

When you travel on the road or on site there are usually local rules and safety regulations for the machine travel position.

This publication contains recommendations that may help you meet the requirements of these regulations, they are not necessarily the applied law.

If your machine is installed with a travel height label make sure you adhere to it.

Make sure that before you travel on public roads or site, you and your machine comply with all the relevant local laws - it is your responsibility.

UK Road Travel

In the U.K. before you travel on the public roads, it is your responsibility as a user to comply with The Road Vehicles (Construction and Use) (Amendment) Regulations 1997 (Bridge Bashing Regs.). By way of guidance only, follow the steps to take the vehicle on road:

Always assess your route for overhead structures such as bridges which could be damaged by your machine.

Use a restraint device to tie the bucket to the lower structure.

This information is believed to be correct, JCB cannot be aware of all circumstances in which JCB machines may be operated on a public highway and it is the responsibility of the user to make sure the compliance with the regulations.

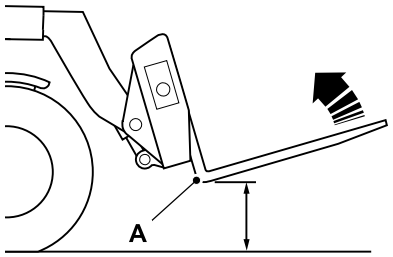
Other Territories Road Travel

This publication does not contain the rules and laws of the areas that the machine will be travelling. Contact your local authorities before you travel on public roads.

Preparing for Road Travel

1. Before you travel on public roads, remove the front windscreen guard if installed.
2. Fully retract the boom.
3. Lower the boom fully then raise it slightly.
4. Tilt the carriage back, to keep the heel of the forks to the specified length to above the ground.
   Length/Dimension/Distance: 300mm

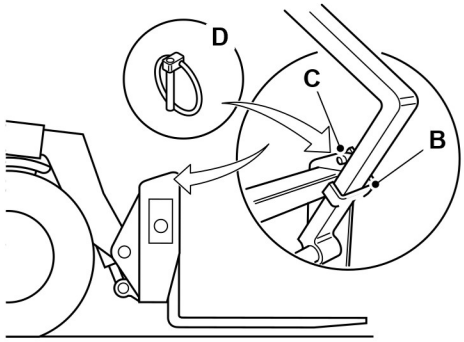
Figure 34.



A Fork

5. Install the fork retention brackets (as required) and secure with the retaining pin and locking pin.

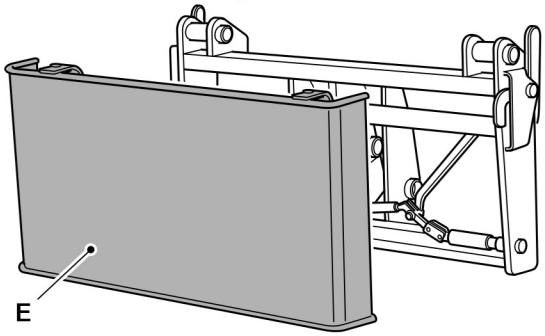
Figure 35.



B Retention brackets
C Retaining pin
D Locking pin

6. In certain countries, legislation requires forks to be removed and safety guard installed.

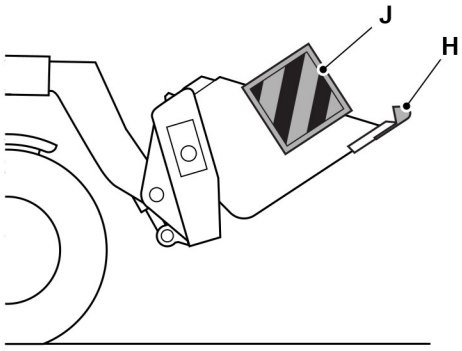
Figure 36.



E Safety guard

7. If any optional attachments are installed, make them safe.
   Refer to: Attachments (Page 131).
   7.1. Install the tooth guard if you travel the machine with bucket.
   7.2. In certain countries, legislation requires safety marker plate to be installed before you travel on the public roads.

Figure 37.



H Tooth guard
J Marker plate

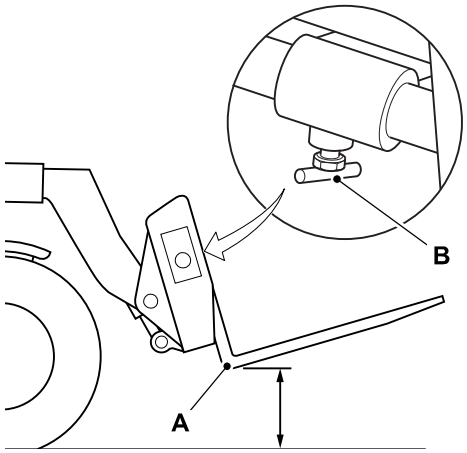
8. Do not travel on public roads with the machine loaded.

9. Lock the controls (as required).
10. Align the road wheels.
11. Select the 2-wheel drive.
12. Check that all road lights are working correctly.
13. The traffic regulations may require you to have a rotating beacon operating on some public roads.
    Refer to: Operation > Preparing for Travel > Beacon (Page 59).
14. Switch on the smooth ride system (if installed).
    Refer to: Operation > Preparing for Travel > Smooth Ride System (SRS) (Page 58).

Preparing for Worksite Travel

1. Fully retract the boom.
2. Lower the boom fully then raise it slightly.
3. Tilt the carriage back, to keep the heel of the forks above the ground.
   Length/Dimension/Distance: 300mm

Figure 38.



A Fork **B** Clamping screws

4. Tighten the clamping screws to prevent side movement of the forks (if installed).
5. Select the steer mode required.
6. If any optional attachments are installed, make them safe.
   Refer to: Attachments (Page 131).
7. Switch on the smooth ride system (if installed).
   Refer to: Operation > Preparing for Travel > Smooth Ride System (SRS) (Page 58).

Smooth Ride System (SRS)

⚠ **WARNING** Do not attempt to use the boom to raise the front of the machine. With the Smooth Ride System activated, the machine will drop suddenly when the control lever returns to the neutral position. Switch off SRS before working on the machine.

The SRS (Smooth Ride System) will enhance machine operation by smoothing the ride across uneven surfaces.

It is intended for use when travelling, but will also enhance machine operation when used in loading and re-handling operations.

The boom will move up and down independently of the machine with SRS selected. Make sure there is adequate ground clearance below the boom and attachment to allow for this movement.

The boom must be fully lowered, or the weight supported on the ground, before the system will engage.

Activate the system:

1. Press and hold the switch fully down (position 2).
2. Operate the boom lower control, until SRS icon appears on the dash.
3. The SRS is now applied.

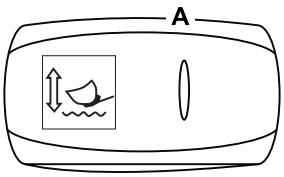
   3.1. If the SRS Icon does not appear, make sure the boom is fully lowered before repeating steps 1 and 2.
4. Release the boom lower control and the switch.

The SRS performance can be reduced if the carriage is fully crowded back, due to an interaction with the parallel lift ram.

Switch off the SRS before placing loads where greater precision is needed.

The SRS system will need to be re-selected every time the ignition key is switched off, or the power supply is interrupted.

Figure 39.



A Switch

Beacon

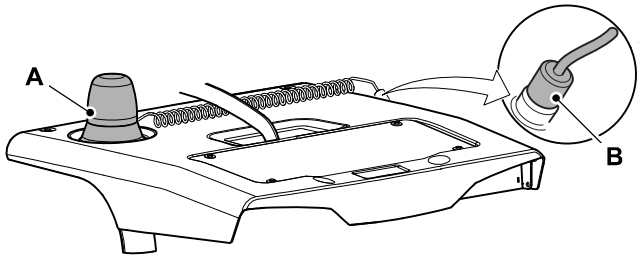
In certain territories you will break the law if you do not install a rotating beacon before you travel on site/public highways, make sure you comply with the local laws.

Be careful when you operate the machine with a beacon. The total height of the machine is increased when the beacon is in the operating position.

1. Put the beacon on the cab roof. A magnetic base keeps the beacon in position.
2. Put the plug into the cab roof socket.
3. Use the beacon switch in the cab to operate the beacon. The indicator light in the switch illuminates when the beacon is operating.

   Refer to: About the Product > Console Switches (Page 20).

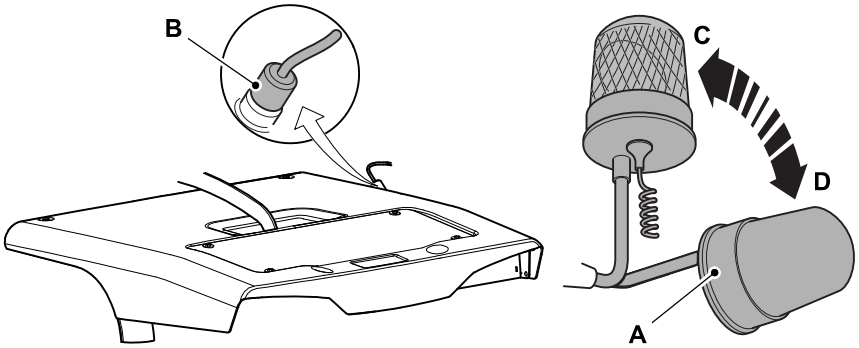
Figure 40. Magnetic Mount



A Beacon
B Plug

The beacon is permanently installed on the machine. When in use it must be raised in position. When not in use it must be lowered in position. Refer to Figure 41.

Figure 41. Hinged



A Beacon
B Plug
C Raised position
D Lowered position

Safety Equipment

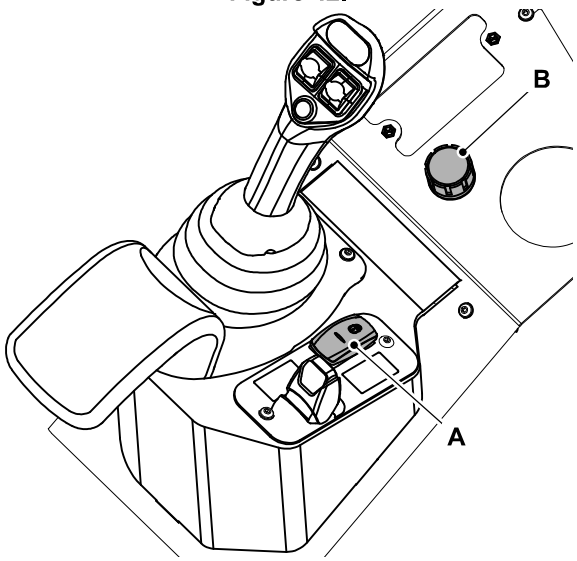
Control Lock

The requirement for control lever lock/isolation varies according to local legislation. You must comply with local legislation at all times.

The control locks/switches are designed to lock or isolate the control(s) in the neutral position.

You must lock the controls before you travel on public roads.

Figure 42.



A Control lock switch

B Machine hydraulic stop switch

All Lever Lock

Isolate the joystick functions before you travel on public roads.

To isolate the joystick functions, operate the joystick isolation switch to the on position. Refer to: About the Product > Console Switches (Page 20).

The joystick isolation switch isolates the joystick's electrical functions. If the switch fails to isolate the controls (i.e, because of sticking valve spool), press the machine hydraulic stop switch. Twist the knob in the direction of the arrows on the switch to release the stop switch. Do not release the switch until it is safe to do so.

Tilt Lever Lock

The tilt lever lock must be isolated when using a platform.

Operate the control lock switch to isolate the tilt lever function.

Drive Controls

Steering Wheel

Turn the steering wheel in the direction you want to go. Refer to: About the Product > Operator Station > Component Locations (Page 18).

The steering wheel incorporates an assister knob for single handed operation.

Steering Column

⚠ **CAUTION** Make sure the steering column is locked in position. Do not adjust the steering column while driving.

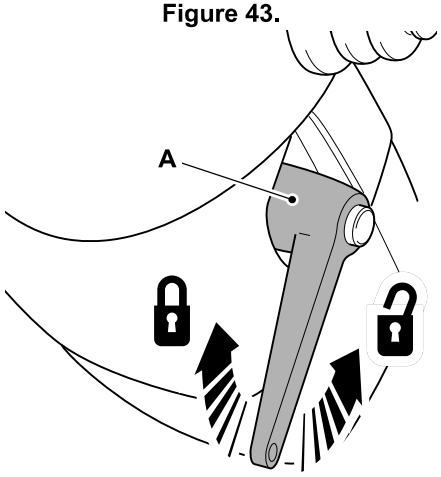
The steering column angle can be adjusted to suit the operator and to allow easier access for entering and leaving the cab.

To adjust the steering column:

1. Hold the steering wheel,complete turn the lever in a counter clockwise direction to unlock the steering column.
2. Adjust the steering column to the required position.
3. Turn the lever in a clockwise direction to lock the steering column.

To adjust the position of the lock lever, pull the lever and move to the required position.

Figure 43.



A Lever

Accelerator Pedal

The accelerator pedal is located on the floor of the cab, to the right of the steering column.

The travel speed is governed by depressing the accelerator pedal.

Release the pedal to decrease the travel speed. Refer to: About the Product > Operator Station > Component Locations (Page 18).

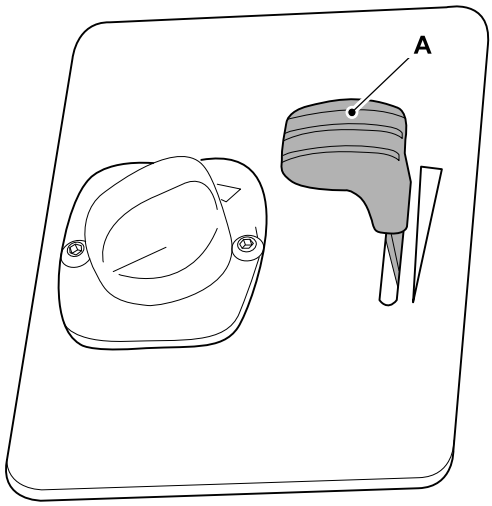
Hand Throttle Control

(If Installed)

⚠ **CAUTION** When driving the machine use the accelerator pedal to control the engine speed. Do not use the hand throttle lever to set the engine speed while driving.

Move the lever to increase or to decrease the engine speed.

Figure 44.



A Hand throttle lever

If the lever is not in the minimum position when the ignition switch is in the on position, the hand throttle control will not operate. Move the lever to the minimum position to restore hand throttle control.

Calibration

If the engine speed does not return to idle when the lever is set to the minimum position the hand throttle requires calibration.

1. Move the lever to the maximum setting.
2. Move back the lever to the minimum setting.

Travel Speed Selector

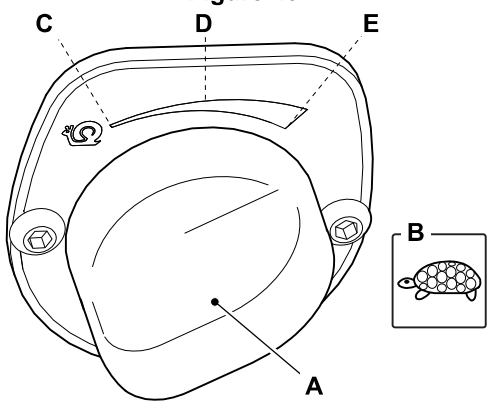
The travel speed will hold a road speed on a constant gradient. Machine speed will vary with changes in gradient.

The travel speed can be used when using a machine attachment that requires a high hydraulic flow and low transmission speed, such as a sweeper collector.

The warning light illuminates when the travel speed control knob is moved from the maximum position. The digital display indicates the position of the knob in % of maximum. Refer to Figure 45.

When the machine speed range switch is set to the low speed the dial on the travel speed represents 0–6km/h (0.0–3.7mph) for construction machines and 0–12km/h (0.0–7.5mph) for agricultural machines.

Figure 45.

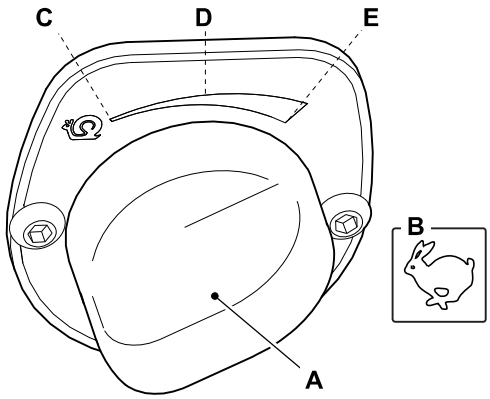


A Travel speed control knob
B Low speed
C 0% (0km/h (0.0mph))
D 50% (3km/h (1.9mph))
E 100% (6km/h (3.7mph))

The example shown is for 25km/h (15.5mph) machines only. For other machine variants the maximum speed of the machine is the maximum control knob setting. Refer to Figure 46.

When the machine speed range switch is set to the high speed the dial on the travel speed represents 0km/h (0.0mph) minimum machine speed and 25km/h (15.5mph) maximum machine speed.

Figure 46.



A Travel speed control knob
B High speed
C 0% (0km/h (0.0mph))
D 50% (12km/h (7.5mph))
E 100% (25km/h (15.5mph))

Service Brake Pedal

The brake pedal is located on the floor of the cab, to the left of the steering column.

Press the pedal to apply the brakes. The more the pedal is pressed, the sharper the braking action. Refer to: About the Product > Operator Station > Component Locations (Page 18).

Inching Pedal

The pedal is used to de-swash the transmission pump. As the pedal is pushed towards the floor the machine speed is reduced proportionally to desired pedal position. No Brake pedal inching is active on these machines.

No Inching Pedal

When the brake pedal is applied the transmission is disconnected from the axles to prevent the machine driving against the pressure of the brakes. This is useful in applications where high engine speed is required to be maintained the transmission does not drive through the brake.

Park Brake

⚠ **WARNING** Be careful, if the park brake is not functioning and the drive controls are in neutral the machine will roll down the slope. To stop the machine engage drive controls.

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

The park brake lever is located to the right of the operator seat by the joystick.

The transmission drive is automatically disconnected when the park brake is engaged.

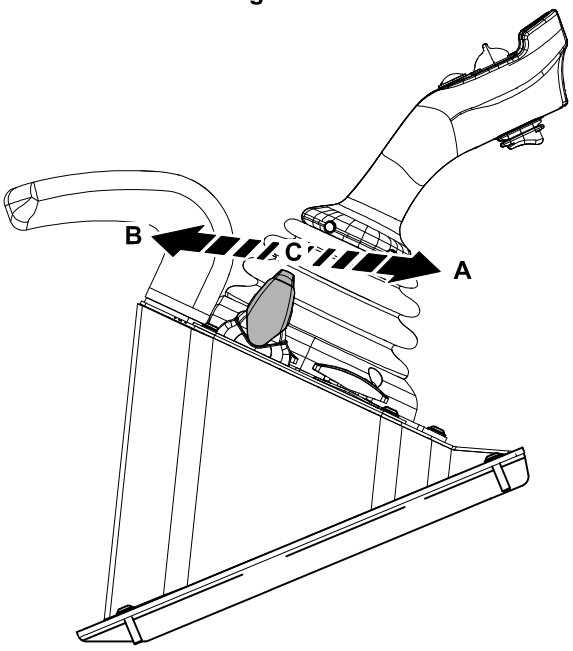
Pull the lever towards the operator to apply the park brake. The park brake indicator will come on.

The park brake indicator will come on when the forward/reverse is selected.

Push the lever away from the operator to release the park brake. The park brake indicator will goes off. Refer to: About the Product > Operator Station > Component Locations (Page 18).

if the park brake is partially applied, park brake indicator will come on. This will give operator the ability to modulate the park brake force in the event of emergency stop.

Figure 47.

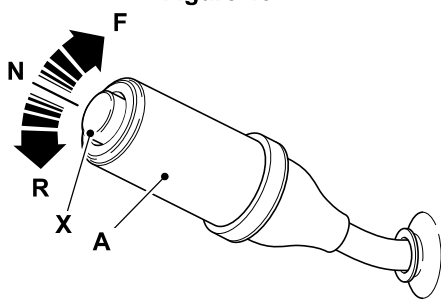


A Park brake off
B Park brake on
C Park brake partially on

Transmission Drive Lever

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

Figure 48.



A Drive lever
N Neutral
X Horn
F Forward direction
R Reverse direction

A hand operated drive lever controls the direction of the machine.

The drive lever has three positions forward (F), reverse (R) and neutral (N). Move the lever up to select the forward direction, down to select the reverse direction.

To select neutral, position the drive lever between the forward and reverse positions. The engine will only start if the lever is at neutral position.

The lever has detent positions in forward, reverse and neutral. Pull the lever towards you to move the lever from the detent position. When reverse is selected an alarm will sound.

If the park brake is engaged when forward/reverse is selected, the park brake indicator will illuminate and the warning buzzer will sound.

Horn

The horn button is at the end of the forward/reverse lever. Push the button to operate the horn. It functions only with the starter switch set to on.

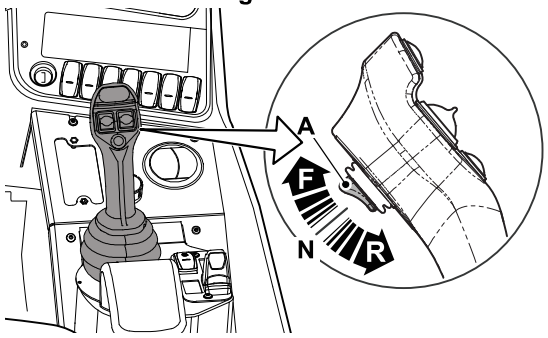
Drive Selection

To select the drive:

1. Stop the machine.
2. Apply the service brake.
3. Let the engine speed drop to idle.
4. Select the required direction.
5. Release the service brake and accelerate.

Drive Selection Switch (Option)

Figure 49.



A Drive selection switch

Your machine may be installed with a drive selection switch that controls the direction of the machine.

The drive selection switch has three positions forward (F), reverse (R) and neutral (N). Press the switch up to select the forward direction, down to select the reverse direction.

To select neutral, position the drive selection switch between the forward and reverse positions. The drive selection switch is disabled if the drive lever is moved from the neutral (N) position. Before you operate the switch, read and understand the principle of operation of the drive lever.

Drive Selection

To select the drive:

1. Stop the machine.
2. Apply the service brake.
3. Let the engine speed drop to idle.
4. Make sure the drive lever is set to neutral (N) position. The drive selection switch is disabled, when the drive lever is set to the forward (F) or reverse (R) position.
5. Make sure that the drive selection switch is set to the neutral (N) position. The machine will not recognise a change in direction unless the switch has first been set to neutral.
6. Press the switch to select the required direction.
7. Release the service brake and accelerate.

Steer Mode Control

⚠ **CAUTION** In 4-wheel steer, the back end of the machine will swing out when you make a turn. Check for clearance before making a turn.

CAUTION Failure to align the steering before selecting the required steer mode will cause the machine to steer incorrectly.

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

The steer mode selector is used to select the most suitable steer mode for the terrain and type of work you do.

This machine is a 4-wheel steer machine. Before you drive the machine, understand how the steer modes change the operation of your machine. Refer to: Operation > Driving the Machine > Steer Modes (Page 87).

For effective steering response you must re-phase the steering:

- At least once per day.
- If difficulty in steering.
- After travelling for 24km (15mi) or more on the road (in 2-wheel steer).

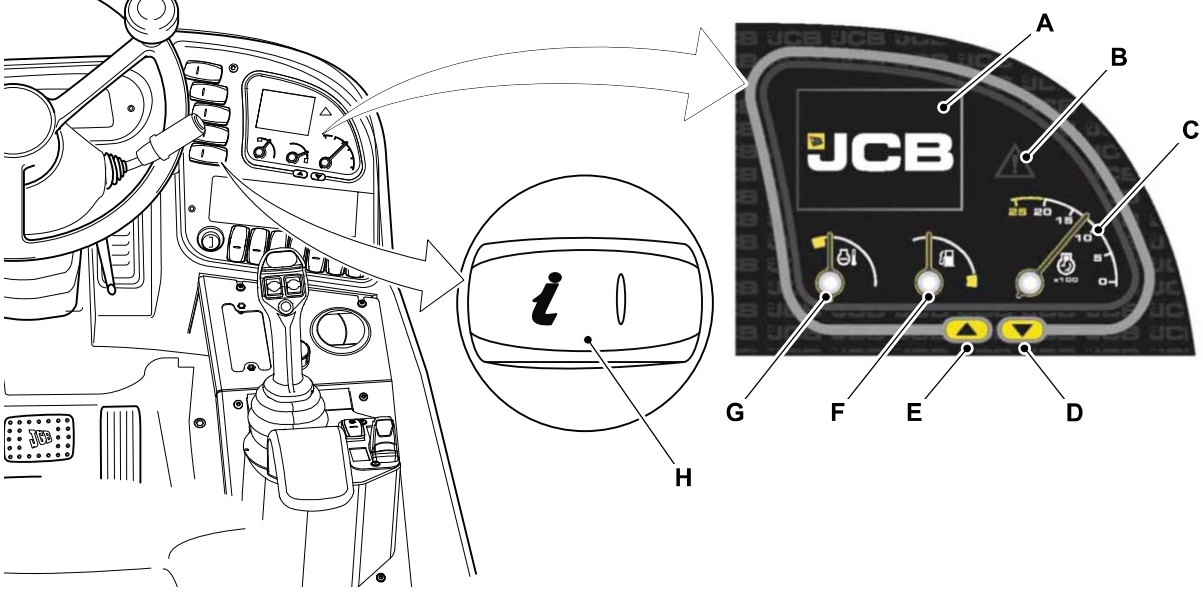
Instruments

Instrument Panel

The instrument panel is located at the front of the cab in the line of sight from the operator's seat.

It provides the interface with the machines electronic system.

Figure 50.



A Display screen
B Warning indicator
C Tachometer
D Navigation button - down
E Navigation button - up
F Fuel level gauge
G Coolant temperature gauge
H Information switch

Main Display Screens

Start-Up Screen

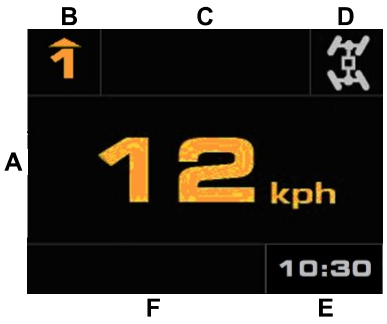
When the ignition switch is switched on the JCB logo is displayed. After 3s the display will show the normal operating mode screen.

Figure 51.

Default Operating Screen (Home Screen)

Displays the machine travel speed, transmission and gear information, steer mode, clock and machine status.

Figure 52.



A Travel speed
B Transmission FNR and gear information
C Transmission status tray
D Steer mode tray
E Clock
F Machine status tray

Transmission Status Symbols

Displays the current transmission status.

Table 10.

	Park brake active
	Driver not in seat
	Symbol shown if travel speed is altered

Auto Steer Mode Symbols (if installed)

Displays the active steer mode in the solid grey.

When changing between the steer modes the amber icons will flash at 1s intervals.

If there is a fault a symbol will flash rapidly, and a notification will be displayed.

Table 11.

	2 Wheel steer mode active
	4 Wheel steer mode active
	Crab steer mode active
	2WS to 4WS (symbol flashes during mode change)

	2WS to crab steer (symbol flashes during mode change)
	4WS to 2WS (symbol flashes during mode change)
	Crab steer to 2WS (symbol flashes during mode change)

Indicated Manual Steer Mode Symbols (if installed)

Displays when the wheels are aligned to straight ahead position.

If there is a fault a symbol will flash rapidly, and a notification will be displayed.

Table 12.

	No wheels are aligned
	Front wheels are aligned
	Rear wheels are aligned
	All wheels are aligned

Machine Status Symbols

Displays the status of various hydraulic systems of the machine.

Table 13.

	SRS (Smooth Ride System) active
	Constant auxiliary mode active
	Secondary auxiliary active
	Auto fan reverse active

	Tilt lock active
	Full lock active or Hydraulic function isolation active
	Loader Pattern Active

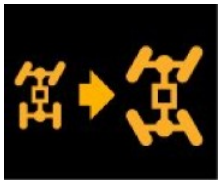
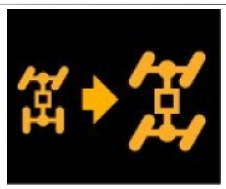
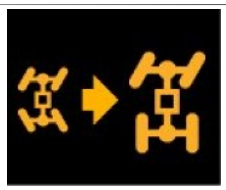
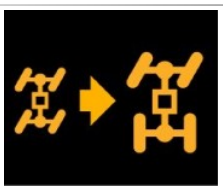
Notification Screens

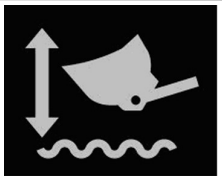
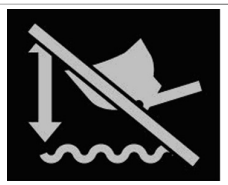
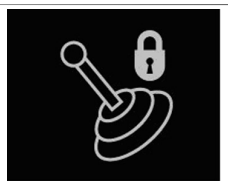
The notification screen displays temporary operator messages such as operator requested mode changes, user input screens, etc.

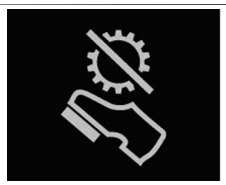
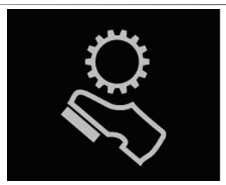
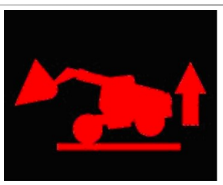
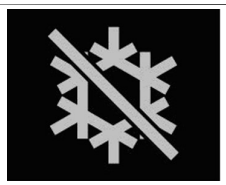
When a request becomes active, the primary information is displayed on the left half of the main display screen and the notification is displayed on the right side of the main display screen.

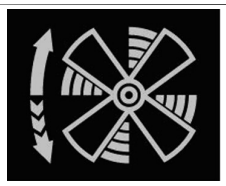
If multiple operator notifications become active, only the latest active notification is displayed.

Table 14.

Icon	Event	Buzzer
	Audible/Visual. Steer mode change from 2WS to 4WS	No
	Audible/Visual. Steer mode change from 2WS to crab steer	No
	Audible/Visual. Steer mode change from 4WS to 2WS	No
	Audible/Visual. Steer mode change from crab steer to 2WS	No
	Audible/Visual. Cab heater fan speed setting. Number of yellow bars corresponds to current fan speed setting	No

Icon	Event	Buzzer
	Audible/Visual. Constant auxiliary operational position	No
	Audible/Visual. Constant auxiliary stored position	No
	Audible/Visual. Constant auxiliary cancelled	No
	Audible/Visual. 2nd auxiliary active	No
	Audible/Visual. 2nd auxiliary cancelled	No
	Audible/Visual. SRS active	No
	Audible/Visual. SRS cancelled	No
	Audible/Visual. Hydraulic lock active	No

Icon	Event	Buzzer
	Audible/Visual. Hydraulic lock cancelled	No
	Audible/Visual. Tilt lock active	No
	Audible/Visual. Tilt lock cancelled	No
	Audible/Visual. Transmission disconnect active	No
	Audible/Visual. Transmission disconnect cancelled	No
	Audible/Visual. LLMC (Longitudinal Load Moment Control) override active	No
	Audible/Visual. Air conditioning system active	No
	Audible/Visual. Air conditioning system cancelled	No

Icon	Event	Buzzer
	Audible/Visual. Auto reverse fan active	No
	Audible/Visual. Auto reverse fan cancelled	No
	Audible/Visual. Grid heater active	No
	Audible/Visual. Immobiliser active	No
	Audible/Visual. Warning message active (operator has left the seat, with transmission engaged and park brake disengaged).	Yes

Secondary Level Display Screens

Pressing the information switch and navigation arrows will take the operator to the secondary level display screens.

Press the information switch for less than 2s to cycle through the main screens.

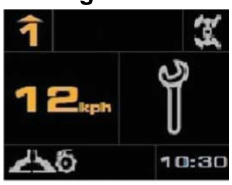
Figure 53.

Fuel information screen

Figure 54.

Machine status screen

Figure 55.

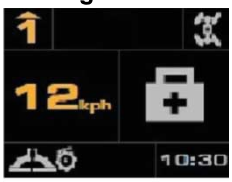


Service information screen

Figure 56.

Machine setup screen

Figure 57.



Fault log screen

Press the information switch for longer than 20s to enter the displayed screen.

Press the arrows to navigate up and down within the main screens.

Fuel Information

To see the fuel information:

Go to the fuel information screen.

Press the information switch for 20s to see the fuel information.

Figure 58.

A Fuel remaining
B Fuel used since last reset
C Fuel used since last fill
D Average fuel consumption

Press the information switch again for 2s to go to the exit screen.

Figure 59.

Exit screen

Press the information switch again for 20s to return to the default operating screen (home screen).

Machine Status

To see the machine status information:

Go to the machine status screen.

Press the information switch for 20s to see the machine status.

Figure 60.

A Battery voltage
B Coolant temperature
C Transmission temperature
D Engine RPM (Revolutions Per Minute)

Figure 61.

E Proportional fan speed
F Engine air intake temperature

Press the navigation arrows to switch between the screens.

Press the information switch again for 2s to the exit screen.

Figure 62.

Exit screen

Press the information switch again for 20s to return to the default operating screen (home screen).

Service Information

To see the service information:

Go to the service information screen.

Press the information switch for 20s to see the service information.

Press the navigation arrows to switch between the screens.

Figure 63.

A Engine hours
B Machine type
C Machine serial number
D Next service interval

Figure 64.

E Time to next service
F RHC (Right Hand Cluster) hardware version number
G RHC software version number
H Tyre diameter

Figure 65.

J Axle ratio

The machine option screens allow the dealer to identify the options installed and the status of each option.

Figure 66.

K Machine options screen 1

Figure 67.

L Machine options screen 2

Press the information switch again for 2s to display the last screen.

Figure 68.

Exit screen

Press the information switch again for 20s to return to the default operating screen (home screen).

Machine Setup

The machine setup screen allows the operator to configure the time, date, brightness, etc.

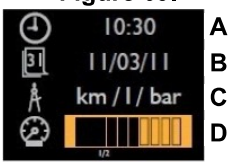
Press the information switch for 2s to display the main screen.

Press the navigation arrows to scroll down to the machine setup screen.

Press the information switch for 2s to active the machine setup screen.

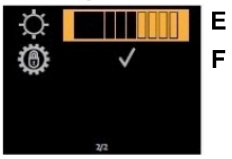
Press the navigation arrows to switch between the available options on the screen.

Figure 69.



A Clock
B Date
C Units of measure
D Gauge backlight brightness

Figure 70.



E Display screen brightness
F Auto torque converter lock-up

Press the information switch again for 2s to display the last screen.

Figure 71.

Exit screen

Press the information switch again for 20s to return to the default operating screen (home screen).

Time Setup

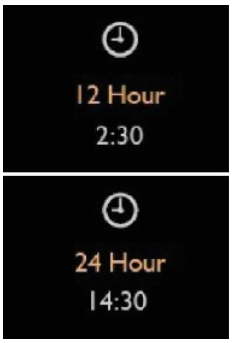
To setup/adjust the time:

1. Go to the machine setup screen.
2. Press the navigation arrows to select the clock.

Figure 72.

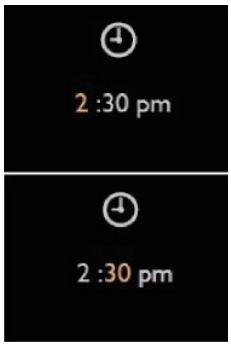
3. Press the information switch for specified time.
   Duration: 20s
4. Press the navigation arrows to select the time format.

Figure 73.



5. Press the information switch for the specified time to adjust the clock.
   Duration: 2s
6. Press the information switch for specified time to switch between the hours and minutes. Use the arrows to adjust the values.
   Duration: 2s

Figure 74.



7. Press the information switch for specified time to confirm the setup.
   Duration: 20s

Date Setup

To setup the date:

1. Go to the machine setup screen.

2. Press the navigation arrows to select the date.

Figure 75.

3. Press the information switch for the specified time.
   Duration: 20s
4. Press the navigation arrows to select the date format.

Figure 76.

5. Press the information switch for specified time to adjust the date.
   Duration: 2s
6. Press the information switch for specified time to switch between the day, month and year values. Use the arrows to adjust the values.
   Duration: 2s

Figure 77.

7. Press the information switch for the specified time to confirm the setup.
   Duration: 20s

Brightness

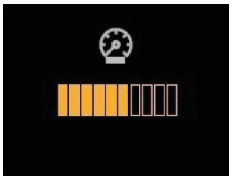
To adjust the brightness of gauge backlight or display screen:

1. Go to the machine setup screen.
2. Press the navigation arrows to select the brightness band.

Figure 78.

3. Press the information switch for the specified time.
   Duration: 20s
4. Press the navigation arrows to increase or decrease the brightness.

Figure 79.

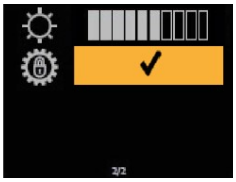


5. Press the information switch for the specified time to confirm the setup.
   Duration: 20s

Auto Torque Converter Lock-up

1. Go to the machine setup screen.
2. Press the navigation arrows to select the auto torque converter lock-up.

Figure 80.



3. Press the information switch for the specified time.
   Duration: 20s
4. Press the navigation arrows to activate or cancel the auto torque converter lock-up.

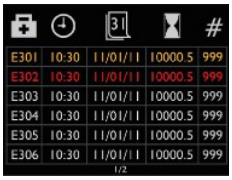
Figure 81.

5. Press the information switch for the specified time to confirm the setup.
   Duration: 20s

Fault Log

The fault log screen provide information on the active and previously active faults on the machine. The fault log display screen shows the fault code, time, date, engine hours and number of times that the fault has been active. By default, the fault log display shall only show the active faults. It shall be possible to view active and historical faults by going to the diagnostic menu. Faults shall be displayed in the colour of their severity (critical = red, warning = yellow, trivial = gray).

Figure 82.



If a service fault is recognised by the machine 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 a service fault is active. The code will remain until it is acknowledged by pressing the information button.

Figure 83.

When a critical fault is active, the left area of the main screen will show the fault icon and right area of the main screen will show the fault code. The fault indicator is illuminated red. The buzzer sounds when a critical fault is active. It sounds until the critical fault is no longer active.

Figure 84.

Figure 85.

Warning Lights

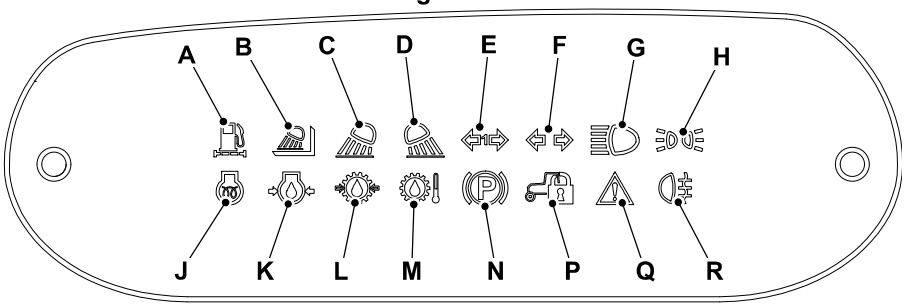
The warning lights are grouped together on a panel located on the dash board.

When a warning light comes on an alarm will sound (depending on security of the condition). The only way to cancel the alarm is to set the ignition switch to position '0'. The problem can then be rectified.

Do not use the machine if it has a fault condition, or you may damage the engine and/or the transmission.

All instruments and indicators will be turned off when the ignition switch is set to off (the hazard warning indicator will still operate if the hazard warning lights are switched on).

Figure 86.



A Low fuel indicator - Not used. Information displayed on instrument panel.

B Lift arm work light - Visual (Amber Light). Illuminates when the lift arm work lights are switched on.

C Front work light - Visual (Amber Light). Illuminates when the front work lights are switched on.

D Rear work light - Visual (Amber Light). Illuminates when the rear work lights are switched on.

E Trailer indicator - Visual Only (Green Light). Flashes with the trailer indicators.

F Direction indicators - Visual only (Green light). Flashes with the direction indicators.

G Main beam - Visual only (Blue light). Illuminates when the headlight main beams are switched on.

H Side lights - Visual only (Green light). Illuminates when the side lights are switched on.

J Grid heater - Not used. Information displayed on instrument panel.

K Engine oil pressure - Visual only (Red light). Operates if the engine oil pressure drops below the normal working pressure.

L Transmission oil pressure - Visual (Red light).Illuminates if the oil pressure drops below the normal working pressure.

M Transmission oil temperature - Not used. Information displayed on instrument panel.

N Park brake engaged - Visual (Red light). Illuminates when the park brake is engaged.

P Immobiliser - Not used. Information displayed on instrument panel.

Q Master warning - Not used. Information displayed on instrument panel.

R Fog lights - Visual only (Amber light). Illuminates when the fog lights are switched on.

Getting the Machine Moving

General

⚠ **WARNING** Operating the machine on hillsides can be dangerous if proper precautions are not taken. Ground conditions can be changed by rain, snow, ice etc. Check the site carefully. Going uphill, reverse when unloaded or travel forwards when loaded. Going downhill, travel forwards when unloaded or reverse when loaded. Take special care when moving across a slope. If the slope is too steep your machine could roll over. If you must drive across a slope, keep the attachments close to the ground.

WARNING Do not dismount a moving machine.

WARNING Always drive a loaded machine forward uphill and in reverse downhill. Always drive an unloaded machine in reverse uphill and forward downhill.

The machine can be put in motion in any gear. But do not over work the engine unnecessarily by using too high a gear for example, on a hill. Operating in too high a gear will overheat the torque converter fluid. When moving the machine, keep it under control at all times. Stay alert for obstructions and possible hazards.

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

Do not turn on or drive across a slope. Select the necessary gear before starting down a slope. Use the same gear you would use to go up the slope. Do not change gear on the slope.

If the load will be pushing the machine on a downslope, select first gear (1) before starting downhill. Use the brake pedal to prevent overspeeding down a slope.

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

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

1. Check your seat belt and seat.

   1.1. Make sure that your seat belt is correctly fastened.

   1.2. Make sure that the seat is correctly adjusted.

   CAUTION! *In 4-wheel steer, the back end of the machine will swing out when you make a turn. Check for clearance before making a turn.*

2. Select the required steer mode. Remember that the steering may temporarily remain in the last selected mode until the rear wheels pass through the 'straight ahead' position.

   WARNING! *You or others can be killed or injured if you suddenly change from forward to reverse, or vice versa, when travelling. Exaggerated and unnecessary movements of the lever(s) may rapidly reverse the travel direction of the machine without warning to others. Always follow the recommended procedure for changing between forward and reverse drive.*

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

3. Select Transmission Disconnect mode - on or off (if installed).

4. Check the boom is in the travel position.

5. Push the brake pedal(s) hard down.

6. Select forward or reverse. If the park brake is engaged when forward/reverse is selected, the Park Brake Engaged Indicator will come on and an audible alarm will sound.

7. Release the park brake.

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

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

Driving the Machine

Steer Modes

Wheel Alignment

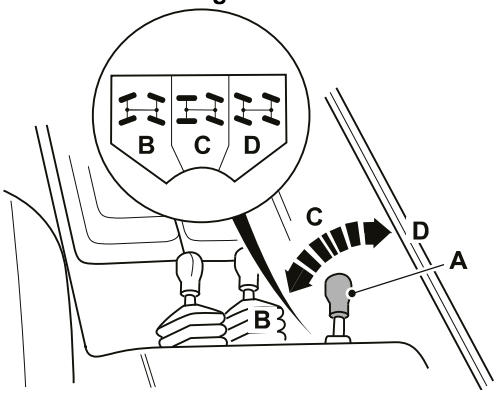
Indicated Manual

Before you select the required steer mode, make sure the wheels are aligned correctly.

To align the wheels:

1. Stop the machine. Set the gear lever to neutral position.
2. Use the lever to select 4-wheel steer.
3. Turn the steering wheel until the rear wheels are in the straight ahead position as shown.
   Refer to: Operation > Instruments > Instrument Panel (Page 69).
4. Use the lever to select 2-wheel steer.
5. Turn the steering wheel until the front wheels are in the straight ahead position as shown.
   Refer to: Operation > Instruments > Instrument Panel (Page 69).
6. All wheels are now aligned in the straight ahead position. Select the steer mode required and continue in the normal manner.

Figure 87.



A Steer mode selector lever
B 4-wheel steer
C 2-wheel steer
D Crab steer

Electronic Steer Mode

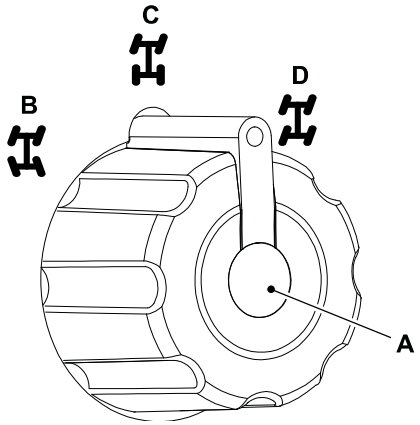
Before you select the required steer mode, make sure the wheels are aligned correctly.

To align the wheels:

1. Stop the machine. Set the gear lever to neutral position.
2. Use the switch to select 2-wheel steer.
   2.1. Sensors on the axles prevent the steer mode from changing until the wheels are aligned in the straight ahead position.
   2.2. A symbol will appear on the main screen display to show the requested change of mode. This will flash whilst the mode change takes place.
3. Turn the steering wheel until the rear wheels are in the straight ahead position.
   3.1. When the rear wheels are straight ahead position the machine will go to 2-wheel steer. The symbol stops flashing and change to indicate when 2-wheel steer is active.

4. Use the switch to select 4-wheel steer.
5. Turn the steering wheel until the front wheels are in the straight ahead position.
6. All wheels are now aligned in the straight ahead position. Select the steer mode required and continue in the normal manner.

Figure 88.



A Steer mode selector switch
B 4-wheel steer
C 2-wheel steer
D Crab steer

Operating Levers/Pedals

General

⚠ **WARNING** Make sure it is clear overhead before raising the boom. Keep an adequate safe distance from all electrical power lines. Contact your local power company for safety procedures.

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

Control Layouts

⚠ **WARNING** Control lever/switch action may vary on machines, instructional labels near the levers/switches show by symbols, which levers/switches cause what actions. Before operating control levers/switches check the instructional label to make sure you select the desired action.

The control levers and switches may vary on machines.

Boom Controls

⚠ **WARNING** Release the boom raise lever as soon as the boom is fully raised. Holding the control in the lift position can result in carriage slowly crowding back.

CAUTION Do not attempt to operate the machine immediately after starting in cold conditions, i.e. below 0°C (32.0°F). The machine may not respond properly to control movements. Allow at least 10min warm up time with the engine at half throttle. Operate the arm and bucket services to warm the hydraulic oil.

The right hand lever controls the movement of the boom and the shovel (or any other attachment which is installed on the boom).

The lever has four main movements and is spring-loaded to its central (hold) position.

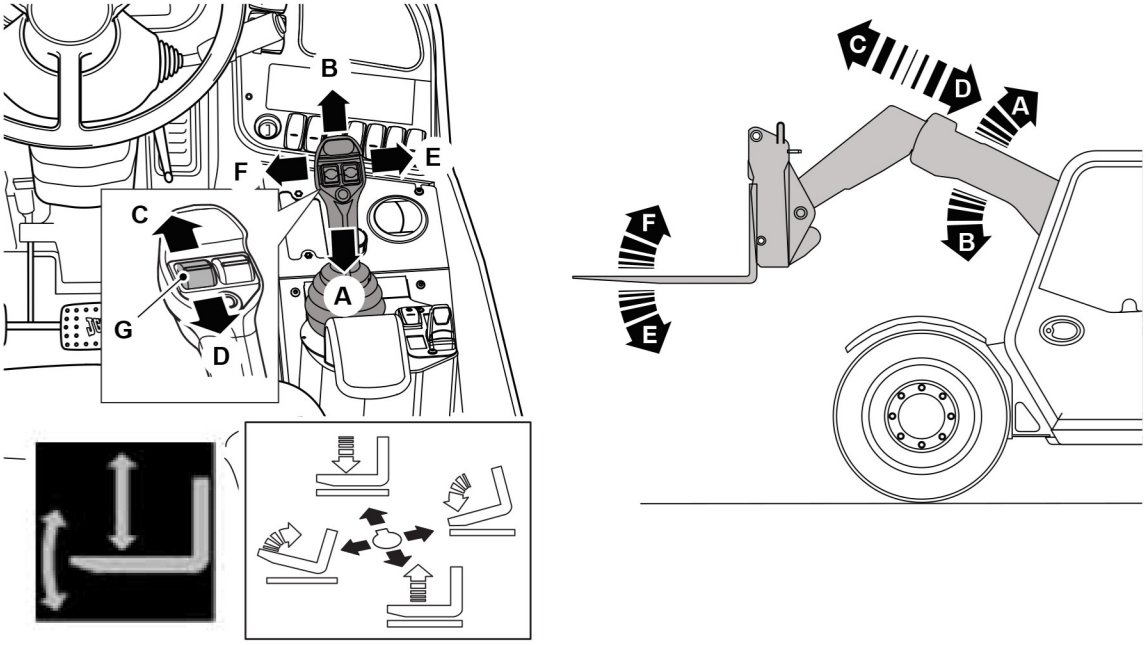
The speed of boom/carriage movement depends on how far you move the lever; the further you move the lever the faster the action.

The main lever movements and their effects are described below. Combined actions can be achieved by moving the lever diagonally.

Loading Pattern

1. To raise the boom pull the lever back.
2. To lower the boom, push the lever forward.
3. To tilt the carriage forward, push the lever to the right.
4. To tilt the carriage back, push the lever to the left.

Figure 89.



A Boom raise
B Boom lower
C Boom extend
D Boom retract
E Carriage tilt forward
F Carriage tilt back
G Extend/retract switch

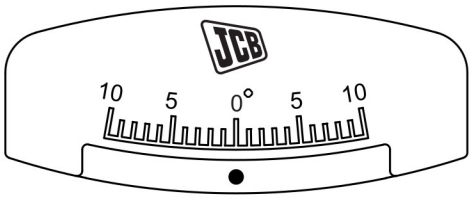
Chassis Levelling Controls

Before you start to operate the machine, make sure that the machine is level.

Use the inclinometer to check that the machine is level, when the inclinometer shows 0° the machine is level.

Before you start to drive, make sure that the body of the machine is square to the axles.

Figure 90.



Auxiliary Circuit Controls

⚠ **WARNING** Before operating the auxiliary control system make sure that you are aware of all safety notices that apply to the attachment you are using. Also make sure you have installed the attachment correctly and have read its operator's manual.

General

The machine is installed with a hydraulic mode switch and in combination with the control lever, this enables the operator to select and control 3 hydraulic modes; AUX selection, bucket control system and constant flow mode.

The machine is installed with one auxiliary circuit (AUX I). A second circuit (AUX II) is available as an option. An optional trailer pickup hitch is also available.

AUX I can be set to provide a constant flow to the attachment connected.

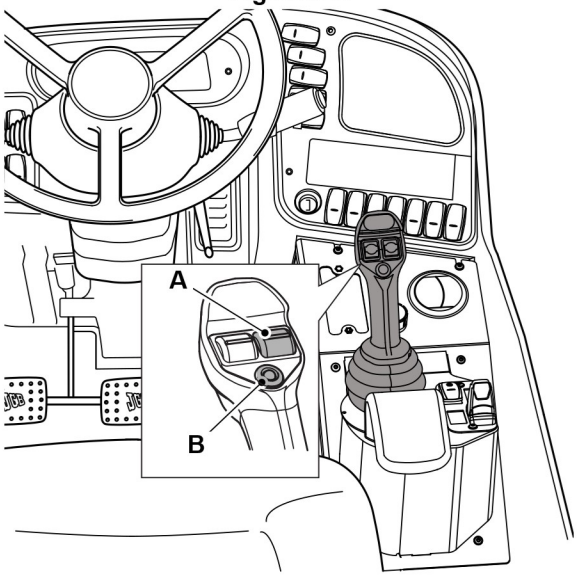
To enable the operator to identify which auxiliary mode is selected, the dash will display a series of icons. Refer to: Operation > Instruments (Page 69).

Before you operate the controls identify which auxiliary mode is selected.

Single Lever Control

The auxiliary control switch is a proportional roller type. It is spring loaded to it's central position. The speed of operation depends on how far the switch is moved.

Figure 91.



A Thumb switch

B Button - activate

Auxiliary I (AUX I)

1. Turn on the hitch/auxiliary selector switch, if installed.
   Refer to: About the Product > Console Switches (Page 20).
2. The dash should not display auxiliary symbol on the display.
3. Roll the thumb switch forwards or backwards depending on the attachment installed and the function required.

Constant Flow Mode

When using motorised attachments for a prolonged period (30min) a maximum constant flow of 65% should be selected.

1. Turn on the hitch/auxiliary selector switch, if installed.
   Refer to: About the Product > Console Switches (Page 20).
2. To activate the constant flow mode:
   2.1. Set the hydraulic mode switch to position 2.
   Refer to: About the Product > Console Switches (Page 20).

2.2. Press the button on the control lever, a symbol will be displayed on the screen.
Refer to: Operation > Instruments (Page 69).

2.3. On selecting the button the constant auxiliary system will resume to the speed and direction previously stored.

2.4. Use the thumb switch to adjust the speed and direction.

2.5. The main screen will display the percentage of flow available.

2.6. When in constant flow mode, pressing the button or moving the thumb switch will activate the display. Subsequent operations of button, will activate and then deactivate constant flow mode.

3. The constant flow mode symbol on the screen will indicate the active and inactive mode.
Refer to: Operation > Instruments (Page 69).

4. Use the thumb switch to adjust the speed and direction of the constant flow mode.

5. To exit the constant flow mode:

5.1. Press the button on the control lever. The symbol on the main display screen will go grey.

5.2. Set the hydraulic mode switch to position 1. The symbol on the main display screen will extinguish.

Auxiliary II (AUX II)

1. Turn on the hitch/auxiliary selector switch, if installed.
Refer to: About the Product > Console Switches (Page 20).

2. Set the hydraulic mode switch to position 1.
Refer to: About the Product > Console Switches (Page 20).

3. To enter the AUX II mode, press the button.

4. Roll the thumb switch forwards or backwards depending on the attachment installed and function required.

5. To exit the AUX II, press the button. The symbol on the main display screen will extinguish.

Bucket Control System

The bucket control system allows the operator to automatically oscillate the bucket, in order to assist with the discharge of material.

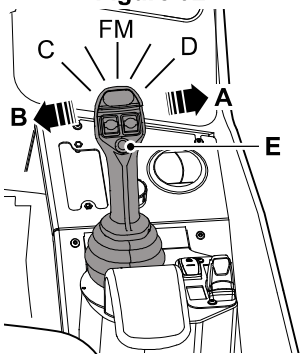
1. Set the hydraulic mode switch to position 3, a symbol will be displayed on the screen.

2. Press the button on the control lever.

3. Move the control lever to required direction.

The amount and type of oscillation will change depending on the distance or the direction selected with the control lever, and the amount of engine revs used. The oscillation varies in the ways as follows:

Figure 92.



A Control lever direction
B Control lever direction
E Button

Table 15.

C band	The bucket will oscillate with a larger amplitude, and tend to crowd more over time. This has been designed for assisting the operator with flicking material up and out of the bucket
D band	The bucket will oscillate with a larger amplitude, and tend to dump more over time. This has been designed for assisting the operator for discharging sticky material
FM band	Small amount of oscillation, the bucket will tend to oscillate around the original position of the bucket (this will depend on the type and amount of material). This has been designed to assist the operator with the fine metering of material

The oscillation will cease at any point when the operator releases the button, but the bucket will continue to move in the selected joystick direction.

Lifting and Loading

General

⚠ **WARNING** A high load can block your view and reduce the machine's stability. Travel with the load low to the ground. Travel slowly and with caution over rough, muddy or loose surfaces.

WARNING When transporting a load on a slope, drive slowly and keep the load uphill of the machine. This will increase stability.

WARNING Do not use the machine for object handling unless it is equipped for this purpose. Without the relevant devices the machine can become unstable and tip over. You and others could be seriously injured or killed.

WARNING Before you lift a load with the machine, you must read and understand this section. Failure to take the precautions shown can result in death or injury.

If your machine is not installed with a lifting point (for example a hook or shackle), hose burst check valves, load charts and an overload warning system then it must not be used for object handling.

If your machine is not installed with this equipment you must only use the machine for earthmoving purposes.

Lifting (Object Handling) Regulations

The owner and/or operator must make sure that they fully understand the laws and regulations concerning the use of the JCB machine as an earthmover and for lifting. Consult your JCB dealer for more information.

In certain countries safety regulations in force call for the application of specific safety factors. Consult your JCB dealer for more information.

All figures and lift capacities (if applicable) in this publication are based on the machine being on level, solid ground.

Safe Working Loads

The maximum load which may be lifted depends on the equipment attached to the machine and the laws and regulations in force at the time and in the country in which the machine is being used.

If your machine is equipped to be operated under 'Exemption Certificate' rules, your Exemption Certificate will specify the safe working loads.

Fit for Purpose Tests for Lifting Equipment

All lifting equipment (for example forks, lifting hooks and shackles) needs regular inspections and testing by a competent person to make sure they are fit for purpose. These may be needed every six months or at least annually in some countries to meet and comply with legislation and for insurance purposes. Refer to: Maintenance > Maintenance Schedules > Functional Tests and Final Inspection (Page 199). Check with your local JCB dealer for further advice.

Load Charts

⚠ **WARNING** The limits shown on the load charts are for a stationary level machine. Do not raise or extend the boom while the machine is moving. Retract the boom fully and lower it as far as possible before you travel with a load.

CAUTION The load chart shown is only an example. Do not use it to find the loading limits on your machine. Before lifting or placing loads, refer to the load charts in the cab of your machine.

The SWL (Safe Working Load) of the machine depends on how far the boom is extended and the angle it is raised to.

The SWL at different boom positions is shown on the load charts in the cab.

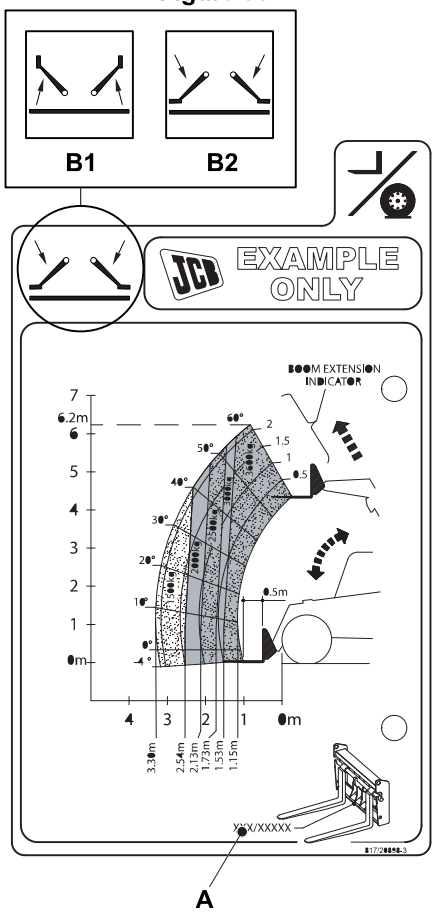
The load charts show how far you can raise and extend a load without exceeding the safe working load. Each machine model has its own load chart for a standard fork carriage, and alternative charts for use when stabilisers or chassis levelling (sway) are used. Some other load charts for use when a different carriage or attachment is installed on the boom.

The limits shown on the load chart only apply to a machine installed with JCB approved tyres. To obtain the limits shown the tyres must be in good condition and inflated to the correct pressure. If you are in doubt, contact your JCB dealer.

Check the relevant load chart is available for any alternative carriage or attachment. Where appropriate, the load chart shows the part number of the carriage or attachment it refers to. If you are not sure of the correct load chart to use, contact your JCB distributor for advice.

Renew any damaged or missing charts.

Figure 93.



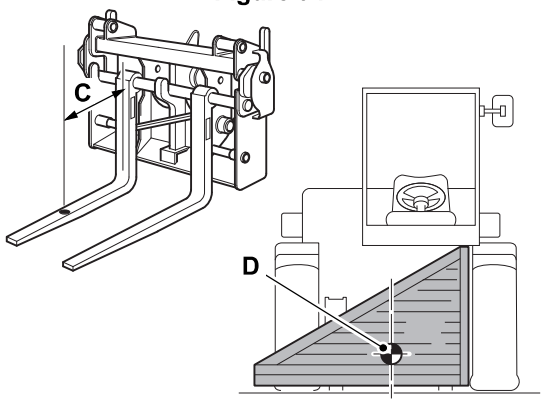
A Attachment part number
B1 Stabiliser up
B2 Stabiliser down

Using the Load Charts

1. Check what boom attachment is installed on your machine, then refer to the correct load chart in the cab.
2. You must know the weight of a load before picking or placing it.
3. Check that the loads centre of gravity in front of the fork uprights will not be more than. 500mm (19.7in)

   3.1. The loads centre of gravity may not be in the middle of the load. You will have to find out where it is.

Figure 94.



C Length =500mm (19.7in)

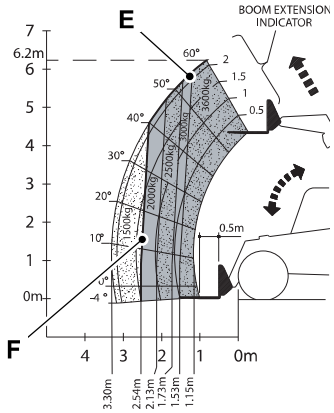
D Centre of gravity

4. When you know the weight of the load, look on the load chart and find the coloured segment with the next highest weight.

   4.1. For example, if your load weight is 1800kg (3968lb), find the 2000kg (4409lb) segment. This is the maximum load segment for your load.

   4.2. The left hand edge and the upper edge of this segment show the machine stability limits for your load. You must not angle or extend the boom beyond these limits.

Figure 95.



E Left hand edge

F Upper edge

5. After installing the forks beneath the load, and before lifting the load, check the readings on the boom angle and extension indicators. Find the same readings on the load chart.

   5.1. You will see on the chart that lines run from the boom angle and extension scales, through the coloured area of the chart. Find where the lines for your readings cross. If they cross inside your maximum load segment or to the right of it the load is within safe limits.

   5.2. If the lines cross above or on the left of the segment, do not try to pick up the load. Withdraw the forks, retract the boom and try again. If even with the boom fully retracted, the boom angle and extension readings still cross outside your maximum load segment do not try to lift the load.

6. When the load is on the forks, retract the boom before raising or lowering it. This will reduce the risk of getting the machine unstable. While moving the boom, watch the boom angle and extension indicators. Keep inside the limits for your load.

   6.1. When the load is high up (say on a scaffolding) you will have to get it clear before fully retracting the boom.

7. Before you place a load, use the load chart to find how close you should get the machine to the unload point. You must be able to place the load without crossing the left hand or upper boundaries of your maximum load segment.

Boom Indicators

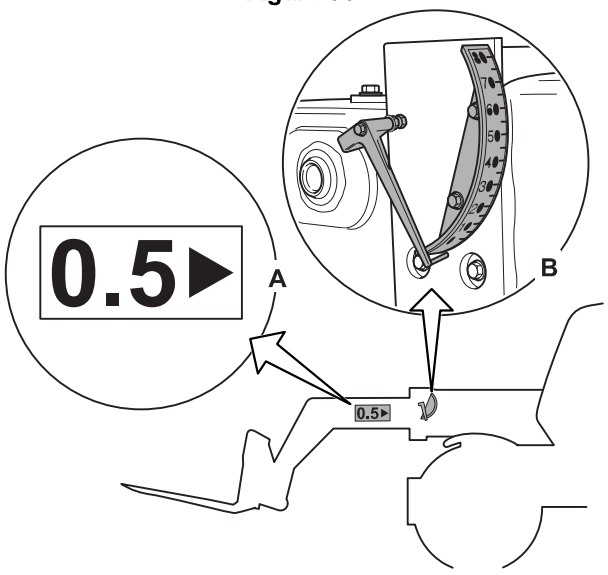
The SWL (Safe Working Load) at different boom positions shown on the load charts in the cab. Refer to the charts in the cab before lifting or placing a load. Refer to: Operation > Lifting and Loading > Load Charts (Page 94).

The boom angle and extension indicators are installed on the boom itself. It is indicated by numbered labels, the numbers represent boom extension in metres.

The boom angle is indicated by an indicator. It has a scale marked in degrees.

Always refer to the charts in the cab before lifting or placing a load. Refer to: Operation > Lifting and Loading > Load Charts (Page 94). .

Figure 96.



A Label **B** Indicator

Inclinometer

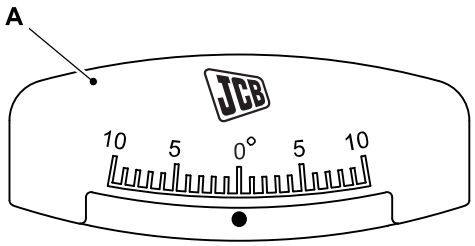
The lateral position of the machine is indicated by an inclinometer installed in the cab.

Use the inclinometer to check that the machine is level before operating the boom. The machine is level when the inclinometer shows 0°.

Reposition the machine if a level position cannot be achieved.

Refer to: Operation > Slopes (Page 113).

Figure 97.



A Inclinometer

Longitudinal Load Moment Indicator (LLMI)

The longitudinal load moment is a product of the load on the boom and the distance the load is moved forward from the centre of gravity of the machine. As the load is moved forward so the load moment increases to a value where the machine will tip forwards.

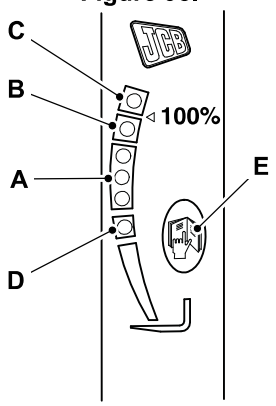
The LLMI (Longitudinal Load Moment Indicator) warns the operator when the machine is nearing its maximum forward longitudinal load moment (when the load moment could cause the machine to tip forward).

The system does not warn the operator when the machine is at risk of tipping or overturning sideways or rearwards. The system is not intended to warn the operator of tipping or overturning when the machine is travelling, operating on unsuitable ground or subjected to sudden overloading.

The system is an enhancement to the devices that JCB currently install as standard, for example load charts and boom extension markers. The system must not to be relied upon as the primary source of protection for the machine. The duty of care is still with the operator/site agent to:

- Know the mass and load centre of loads being handled.
- Know the boom angle and extension that will be required to place the load (this can be checked by doing a dry run first without the load).
- While moving the load, obey lift charts and boom extension markers.

Figure 98.



A Green colour LED (Light Emitting Diode)'s (x3)
B Amber colour LED (x1)
C Red colour LED (x1)
D Green colour LED (x1)
E Display button

Operation

⚠ **WARNING** Look at the indicator lights frequently while lifting or handling loads. As more lights show, take extra care with control lever movements. Do not jerk the levers or make sudden changes of direction.

WARNING The Load Moment Indicator shows forward machine stability only. Do not use it as a guide to the weight being lifted. Refer to the load charts in the cab. The maximum working load indicated by the load moment indicator does not correspond to the SWL specified on the load charts in the cab.

WARNING The readout display will be affected by extreme steer lock and extreme axle pivot angles. Before lifting a load, always ensure that the steering is not on full lock and that the rear axle is not fully pivoted.

The system is permanently on when the ignition is on. The green LED is lit to confirm the unit is on.

A sensor measures the load exerted on the rear axle and sends a signal to the indicator unit. The indicator unit converts the signal into a display in the form of three green LED, one amber LED and one red LED. The LED will illuminate progressively as the load increases. Refer to Figure 98.

The amber LED will flash as the load nears the maximum working limit. If this happens, move the load into a stable position by raising or retracting the boom.

If the load exceeds the maximum working limit, the red LED will illuminate and an audible warning will activate.

The display brightness and audible warning levels can be adjusted.

If a system fault is detected, a combination of LED will indicate a fault code.

Testing

⚠ **WARNING** If the Load Moment Indicator is faulty, contact your JCB dealer. Do not try to repair it yourself.

Test the LLMI unit daily:

1. Park the machine on solid, level ground with the engine running.
2. Apply the park brake and place the forward/reverse lever in the neutral position.
3. The green LED at the bottom of the display illuminates to show that the indicator is receiving power. Refer to Figure 98.
4. Press the display button and release.
5. All LED on the indicator flash and the audible alarm sounds if the unit is functioning correctly.
6. Do not use the machine if the fault does not clear. Stop and park the machine as soon as safety permits. Switch off the engine. Contact your JCB distributor.

Setting the Volume and Brightness

The volume of the audible alarm, and the brightness of the display LED can be set by the operator using display button. The system will reset to the default setting when the ignition key is switched to the off position. This allows the volume and brightness to be reduced for night time use. The possible options are:

- Full volume and full brightness (default setting)
- Reduced volume and full brightness
- Full volume and reduced brightness
- Reduced volume and reduced brightness

1. Park the machine on solid, level ground with the engine running.
2. Apply the park brake and place the forward/reverse lever in the neutral position.
3. The green light at the bottom of the display will illuminate to show that the indicator is receiving power. Refer to Figure 98.
4. Press and hold the display button.

4.1. The display will cycle through the volume and brightness options, pausing for a short period of time to demonstrate each option.

Duration: 3s

5. Release the button during the required demonstration to select the option.

The system will reset to the default setting when the ignition key is switched to the off position.

Diagnostic Fault Codes

⚠ **WARNING** If the Load Moment Indicator is faulty, contact your JCB dealer. Do not try to repair it yourself.

If the system detects a fault, the audible alarm will sound and a combination of LED illuminate to indicate a fault code for approximately 10s. Refer to Figure 98.

The audible alarm and the fault code display cancel after 10s and all LED on the display will flash continuously as long as the fault remains. Press and release display button to show the fault code for a further 10s.

If a fault code is displayed, switch the ignition key off and on again. If the fault clears, the display will return to normal. Do not use the machine if the fault does not clear. Stop and park the machine as soon as safety permits. Switch off the engine. Contact your JCB distributor.

Figure 99. Calibration faults

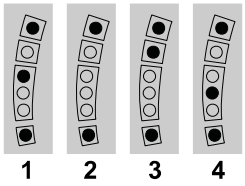


Figure 100. LLMI Unit faults

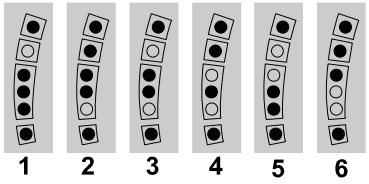
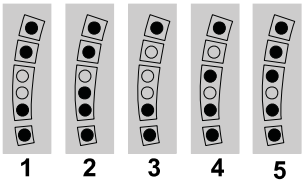


Figure 101. LLMI External faults



Load Motion Control System

⚠ **WARNING** Load Control monitors forward machine stability only. Do not use it as a guide to the weight being lifted. Refer to the load charts in the cab. The maximum working load indicated by the Load Control System does not necessarily correspond to the SWL specified on the load charts in the cab.

WARNING The readout display will be affected by extreme steer lock and extreme axle pivot angles. Before lifting a load, always ensure that the steering is not on full lock and that the rear axle is not fully pivoted.

The longitudinal load moment is a product of the load on the boom and the distance the load is moved forward from the centre of gravity of the machine. As the load is moved forward so the load moment increases to a point where the machine will tip forwards.

The LLMC (Longitudinal Load Moment Control) system slows the operation of all hydraulic services as the machine gets closer to its maximum working limit (i.e, when the load moment could cause the machine to tip forward) when performing loading and placing operations. Automatic isolation of the hydraulic services inhibits the operator from exceeding the maximum longitudinal load moment.

The system does not warn or prevent the machine tipping or overturning sideways or rearwards. The system is not intended to warn, or prevent tipping or overturning when the machine is travelling, operating on unsuitable ground or subjected to sudden overloading.

The system is an enhancement to the devices that JCB currently install as standard, for example loadcharts and boom extension markers. The system must not to be relied upon as the primary source of protection for the machine. Duty of care is still with the operator/site agent to:

- Know the mass and load centre of loads being handled.
- Know boom angle and extension that will be required to place the load (this can be checked by doing a dry run first without the load).
- While moving the load, obey lift charts, boom extension markers and LLMI (Longitudinal Load Moment Indicator) indications.

The use of handling attachments for unit loads (for example, bales or bulk bags) can cause a significant increase in the overturning moment through use of the crowd and dump operations. Make sure that use of such attachments does not take the machine beyond its stability limit. Refer to: Operation > Lifting and Loading > Load Charts (Page 94).

Operation

The system is permanently on when the ignition is on. The system automatically switches between active (green symbol illuminated) and not active (amber symbol illuminated) depending on the machine status. The LLMI system functions as normal.

Be aware that the LLMC system is not active when the machine is travelling or when the boom is fully retracted.

As the machine gets closer to its stability limit the boom hydraulic services slow down and then stop. When the boom raise and retract services will operate. Move the load into a stable position by raising or retracting the boom. When a load has been recovered to a more stable condition, it will only be possible to use other hydraulic services after the lever has been returned to the neutral position. If there is a system fault the boom hydraulic services are automatically isolated.

Warm Up Procedure

For the machine hydraulic system to work efficiently, the machine hydraulic oil temperature should be a minimum of 10°C (50.0°F). If the air temperature is below freezing, do as follows:

1. Park the machine on solid, level ground with the engine running.
2. Apply the park brake and place the forward/reverse lever in the neutral position.
3. The engine at approximately 1500 rpm.
   - 3.1. Raise and lower the boom five times.
   - 3.2. Extend and retract the boom five times.
   - 3.3. Dump and crowd the carriage five times.
4. Perform the LLMC functional check.

System Override

⚠ **WARNING** In override mode the machine is not protected. Only use it to reduce the load moment of the machine. Never exceed the limits set by the load chart, extension markers or angle indicator.

WARNING Incorrect operation of the crowd/dump functions (when laden) can cause the machine to become unstable and a loss of the load. The LLMC does not prevent such operation and you must operate within the machines limits.

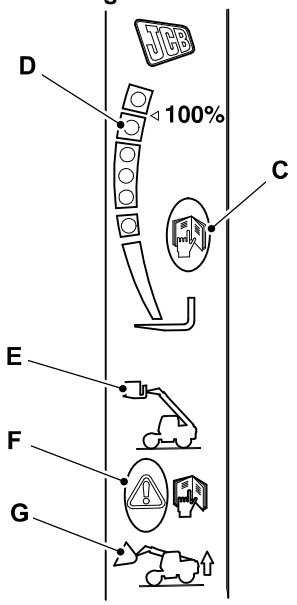
If it is not possible to recover the load by raising or retracting the boom, the system can be temporarily overridden.

1. Press and hold the mode button.
2. An audible alarm will sound when all the LED (Light Emitting Diode) flash the override function is enabled for a maximum specified time of

   Duration: 60s
3. Operate the controls to recover the load and then release the button. The override function can not be selected again until the specified time

   Duration: 5s

Figure 102.



C Release button
D Amber colour LED
E boom raise
F Mode button
G boom lower

Functional Check

⚠ **WARNING** If the Load Moment Indicator is faulty, contact your JCB dealer. Do not try to repair it yourself.

WARNING Do not tamper, modify or try to disable the LLMC as this can damage the operation of both the LLMI and LLMC permanently. A defective LLMI or LLMC may allow the operator to exceed the limits of stability and can cause the machine to overturn, serious injury or death.

Test the LLMC system at the start of each shift.

1. Complete the LLMI unit daily check.
2. Park the machine on solid, level ground with the engine running.

3. Fully retract and lower the boom. The symbol G should illuminate. Refer to Figure 102.
4. Complete the test procedure in the sequence as shown. Refer to Table 16.

Table 16.

S.No.	Operation	Result
1	Partly raise and extend the boom	Symbol G = Off, Symbol E = On
2	Drive the machine forwards	Symbol E = Off, Symbol G = On
3	Stop the machine	Symbol E = On, Symbol G = Off
4	Press and release button. When the LED flash on the LLMI, operate the boom lower	The boom should not lower
5	Press and release button. When the LED flash on the LLMI, operate the boom extend	The boom should not extend
6	Press and release button. When the LED flash on the LLMI, operate the boom raise	The boom should raise
7	Press and release button. When the LED flash on the LLMI, operate the boom retract	The boom should retract
8	Select a suitable load (for example a pack of blocks). Make sure the machine is on solid, level ground and apply the park brake. With the stabilisers up, position the boom so that the load is just clear of the ground. Extend the boom slowly and carefully. Watch the LED progress up the scale	Hydraulic operation should slow and then stop when the amber LED flashes

Working with the Boom

General

⚠ **WARNING** Stop the machine and apply the park brake before conducting any lifting operations.

WARNING Under no circumstances should personnel be lifted into the air without using an approved and properly secured platform. Failure to follow this warning could result in death or serious injury.

WARNING Maintain correct tyre pressures to avoid upsetting the lateral stability of the machine. Inspect tyres daily for signs of damage, cuts or embedded objects which could cause loss of pressure.

WARNING Loading and unloading on soft or uneven ground can be hazardous. The machine could tip over and you could be killed or injured. Make sure that the ground is level and firm before loading and unloading. Whenever possible, avoid soft or uneven ground when carrying a load.

WARNING Overloaded scaffolding can collapse. Never load scaffolding beyond the regulation capacity.

WARNING Operating the boom while you travel can cause accidents. You will not have total control of the machine. Never operate the boom when you travel.

WARNING A high load can block your view and reduce the machine's stability. Travel with the load low to the ground. Travel slowly and with caution over rough, muddy or loose surfaces.

WARNING When transporting a load on a slope, drive slowly and keep the load uphill of the machine. This will increase stability.

WARNING Keep yourself and all others away from the lifting mechanism. Never allow persons to walk below a raised cab at any time. Do not carry passengers.

WARNING In the event of a breakdown with the boom not in the normal travel position, contact your local JCB dealer for assistance with getting the boom and load back to a safe position.

CAUTION Make sure you know the weight of the load before trying to lift it. Raise the load only a few centimetres at first, to check that the machine is stable. Lower the load straight away if the machine begins to feel unstable. Do not exceed the loading limits shown on the Load Charts.

CAUTION Travelling too fast or with the load too high can make the machine tip over. Keep the load close to the ground when travelling. Do not go faster than walking pace when the machine is carrying a load. Drive carefully over bumps and curbs. Do not operate the boom/carriage controls while the machine is moving.

CAUTION Loads stacked on uneven ground can topple. Never stack loads on uneven ground.

CAUTION A raised boom can strike overhead objects. Always check for overhead clearance before raising the boom.

Practice with palleted loads first. Do not handle awkward loads until you can handle palleted loads safely and confidently.

Make sure that any location where a load is to be placed is strong enough to hold the weight of the load.

Look in the direction of travel and keep a clear view of the way ahead. Seek assistance if forward vision is obscured by a bulky load. Particular care is required when driving off level ground.Refer to: Operation > Slopes (Page 113).

Do not carry stacked loads that are higher than the fork carriage.

Drive at a speed consistent with conditions. Slow down when travelling on wet, slippery or loose surfaces.

Drive with care to minimise bouncing over rough surfaces. This can result in loss of load.

Lifting and Loading Operations

Ensure that all local and national legislation governing operations such as lifting and loading are fully satisfied before operating the machine. This should include the selection of the correct model of machine for the operation, and the planning of the lifting operation itself.

Further information concerning the safe use of lifting and other equipment in the UK is available from the HSE information line on 0541 545500 or on the world wide web at: http://www.hse.gov.uk

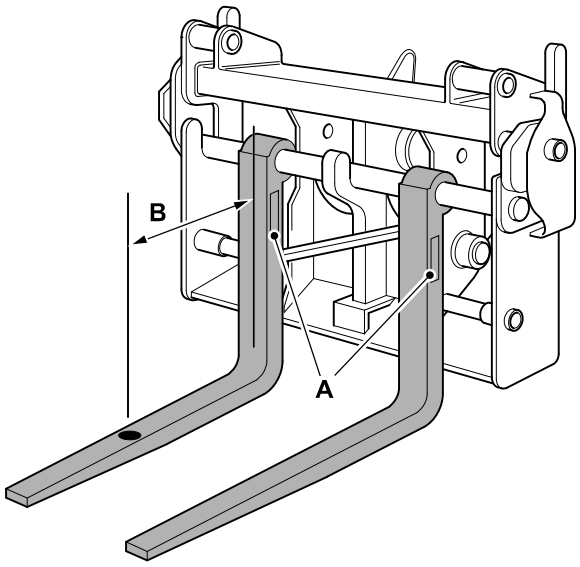
Other countries and territories have their own legislation similar to the above. Be sure that you are aware of all local and national legislation governing lifting and loading operations where you are operating.

Fork Ratings

⚠ **CAUTION** Do not exceed the total rated load capacity of the forks being used. Forks can break resulting in a loss of load and possible injury.

The JCB approved forks for this machine have a plate which shows their maximum load capacity rating. The rating shows the maximum load capacity in kilograms that the forks can carry safely at the maximum load centre of 500mm.

Figure 103.



A Plate

B Maximum load centre

The total load rating for two forks will be the addition of their single rated capacity.

The forks must be used in matched pairs.

To get the maximum rated load capacity of the machine, Refer to: Technical Data > Performance Dimensions (Page 248).

The forks used on this machine must have a total load rating which is equal to, or exceeds the rated load capacity of the machine.

If the load rating of the machine is different to the load capacity of the forks, the lower value must be used as the overall load capacity.

All lifting equipment, including the forks and their mountings, need regular inspections and testing by a competent person to make sure they are fit for purpose. For more information, contact your JCB dealer.

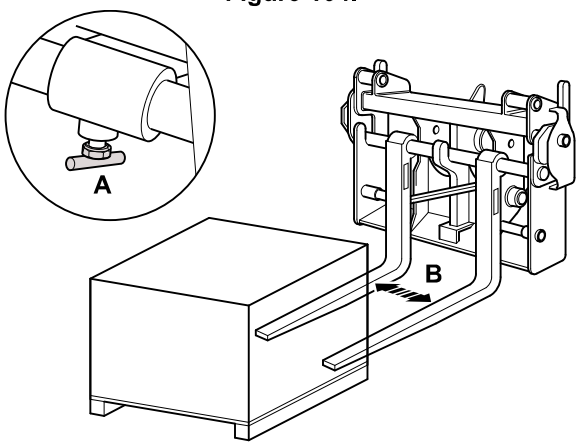
Repositioning the Forks

⚠ **WARNING** Loads can fall off incorrectly spaced forks. Always space the forks correctly for the load. Make sure the forks are completely under the load before lifting.

CAUTION The forks are heavy. Make sure suitable lifting equipment is used to support and transport them.

1. Loosen the fork clamping screws.
2. Space the forks as wide as possible to suit the load.
3. Tighten the fork clamping screws.

Figure 104.



A Clamping screws **B** Fork space adjustment

Working with Pallets

Loading

⚠ **WARNING** If the machine starts to feel unstable when you begin lifting the load, lower the load immediately.

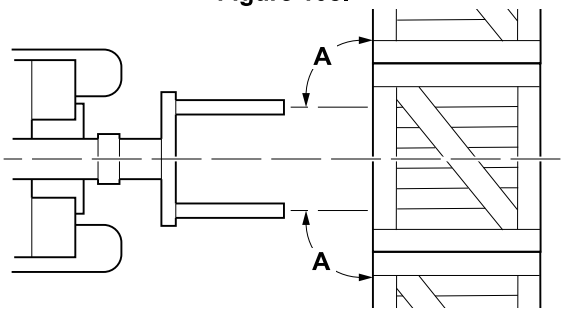
WARNING Load and unload on firm, level ground. Always be alert for possible hazards. Take special care when turning or reversing.

CAUTION A load lifted on one fork can slip off. Never lift a load with one fork.

When carrying a palletised load, the height above the ground to the underside of the load should not be more than 300mm.

1. Put the forks in the horizontal position.
   Refer to: Operation > Operating Levers/Pedals > Boom Controls (Page 89).
2. Retract the boom.
3. Approach the load straight-on, with all wheels straight.
4. Stop the machine and leave enough room to manoeuvre the boom.

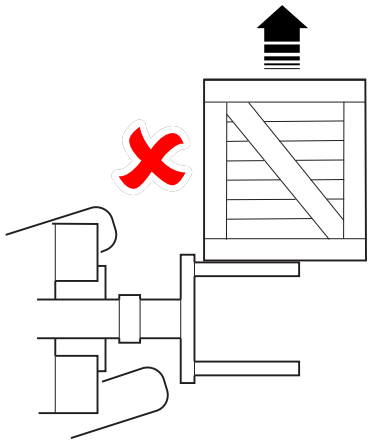
Figure 105.



A Angle = 90°

5. Engage the park brake and put the transmission in neutral.
6. Do not use the side of the forks or carriage to move the load, this can cause damage to the forks.

Figure 106.

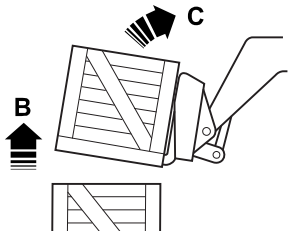


7. If the load is on a high platform you may have to raise the boom to allow you to get the machine close enough to the load.
8. Extend the boom or drive the machine, to insert the forks under the load.
9. Stop the machine, when the carriage touches the load.
10. Check the boom extension/angle(s) are in limits.

    WARNING! *If the machine starts to feel unstable when you begin lifting the load, lower the load immediately.*

11. Raise the load slightly, then tilt the carriage back.

Figure 107.



B Load raise **C** Carriage tilt

12. Retract the boom, then lower it into the travel position.
13. Carefully drive the machine to the unloading point.

Unloading

⚠ **CAUTION** Never unload the forks by stopping the machine suddenly. Follow the procedures in the Operator Manual for unloading.

1. Approach the unload straight-on, with all wheels straight.
2. Stop the machine and leave enough room to manoeuvre the boom.
3. Make sure the loading should not exceed the limits.

Refer to: Operation > Lifting and Loading > Load Charts (Page 94).

4. Engage the park brake and put the transmission in neutral.
5. Move the load above its required position.
6. Lower the load into position. Make sure the load is level.
7. Carefully withdraw the forks. Depending on the height of the load, you may have to raise or lower the boom as the forks come out.
8. When the forks are clear of the load, fully retract the boom.
9. Lower the boom into the travel position.

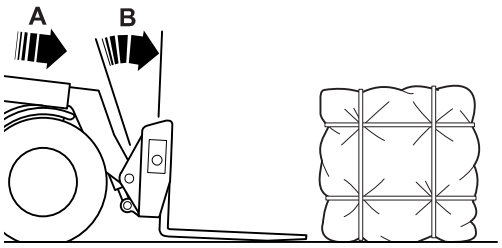
Working with Bales

⚠ **WARNING** The bale may have to be manhandled off the forks. If so, stop the engine before allowing anyone to approach the forks.

Lifting Bales

1. Lower the boom and tilt the carriage forward.
   Refer to: Operation > Operating Levers/Pedals > Boom Controls (Page 89).

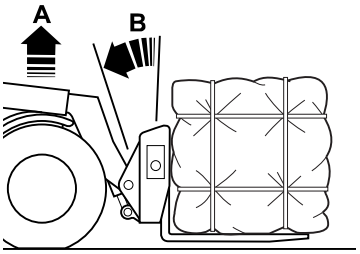
Figure 108.



A Boom extend **B** Carriage lower

2. Extend and raise the boom to insert the forks under the load.
3. Tilt the carriage back and put the boom in the travel position.

Figure 109.

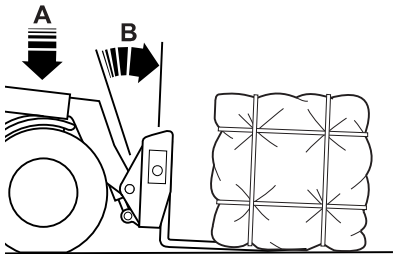


A Boom raise **B** Carriage retract

Lowering Bales

1. Move the boom so that the bale is directly above its required position.
2. Lower the boom and tilt the carriage forward, so that the forward edge of the bale rests on the ground.

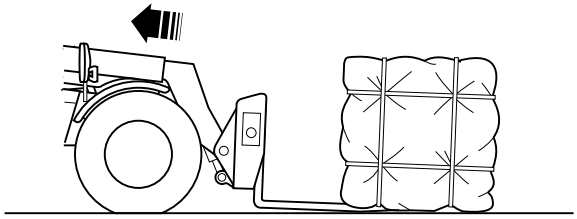
Figure 110.



A Boom lower **B** Carriage extend

3. Retract the boom and withdraw the forks from under the bale.
4. When the forks are clear, return the boom and carriage to the road travel position.

Figure 111.

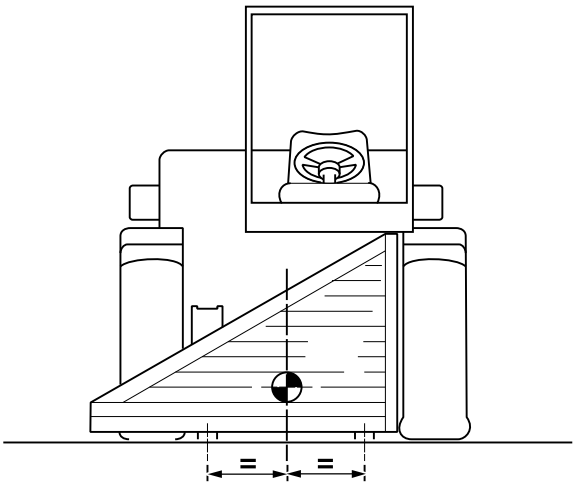


Working with Irregular Loads

Be careful when you operate the boom and carriage with an uneven load.

1. Find the load's centre of gravity. On packaged loads it may be marked on the box. If you cannot find out the load's centre of gravity:
   1.1. Do trial lifts at different positions until you are sure the load is stable on the forks.
   1.2. Do not raise the load more than a few centimetres when you do a trial lift.
2. Move the machine so that the load's centre of gravity is halfway between the forks.
3. Pick/place the load, this will depend on the type of load.
   3.1. If it is palleted, follow the procedure for palleted loads.
   3.2. If it is not palleted, it may be necessary to secure the load to the forks using suitable chains.
4. Stop the engine before allowing anyone to approach the forks.

Figure 112.

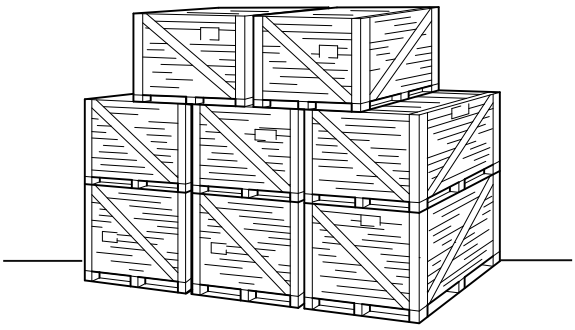


Stacking Loads

Box Pallets

Stack the box pallets straight and square. For extra stability, stagger the top row as shown.

Figure 113.

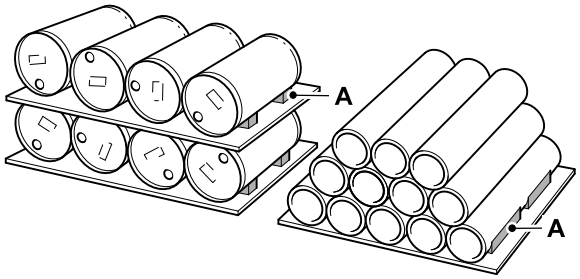


Cylindrical Loads

Stack the cylindrical loads tightly together and level. Put wedges at both ends of each row.

If you are building a pyramid stack, put wedges at both ends of the bottom row.

Figure 114.



A Wedge

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.

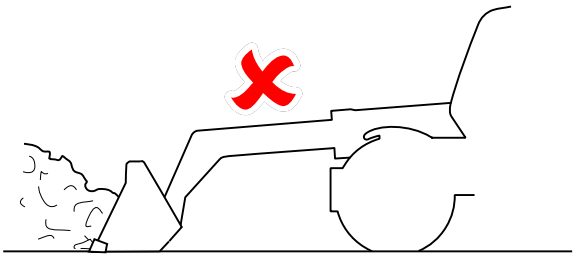
Your machine can be used with a wide variety of attachments, for example shovels. Refer to: Attachments (Page 131).

This information is not intended to be comprehensive, nor to be a substitute for adequate training. Make sure you are trained before you use an attachment.

Notice: *Do not load a shovel with the boom extended. This may cause serious damage to the boom.*

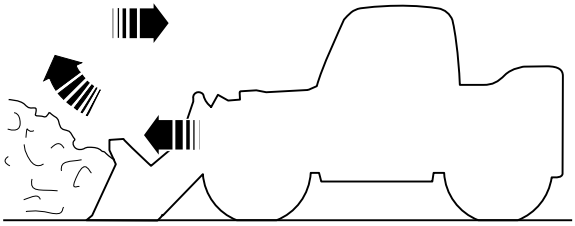
1. Approach the pile with the shovel level and skimming the ground.

Figure 115.



2. When you are loading from a pile of loose material, start at the bottom and follow up its face.
3. When you are loading from a pile of tightly packed material, start at the top and work down.
4. When you are removing material from a high pile, start at a shovel's height from the base. When the height of the pile has been reduced, begin loading from the base.
5. As the shovel enters the pile, start rolling the shovel back while raising it at the same time. This will sweep the shovel up the pile, gathering material as it goes.
6. More power can be given to the loader and speed the operation, by using transmission dump.

Figure 116.



7. Try to fill the shovel in one pass. Half full shovels are less productive.
8. When moving the load, roll the shovel fully back to prevent spillage.

Loading a Truck

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

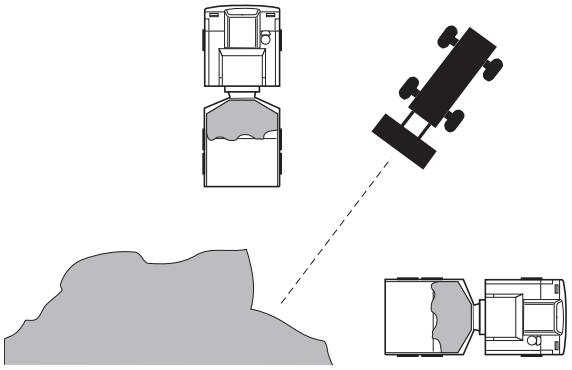
Keep the wind on your back. This keeps dust away from you and your machine.

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

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

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

Figure 117.



Slopes

General

⚠ **WARNING** Make sure that you have been trained and are familiar with the use of machines on slopes, and understand the adverse affects that slopes and site conditions can have on stability. Never use the machine on a slope if you do not understand the recommended practices for the use of machines in such applications.

There are a number of factors which can adversely affect the stability of the machine and the safety of the machine and operator when used on a slope.

It is essential that a risk assessment of the work to be done is completed and that the operator complies with any safety precautions that the assessment identifies.

Driving on Slopes

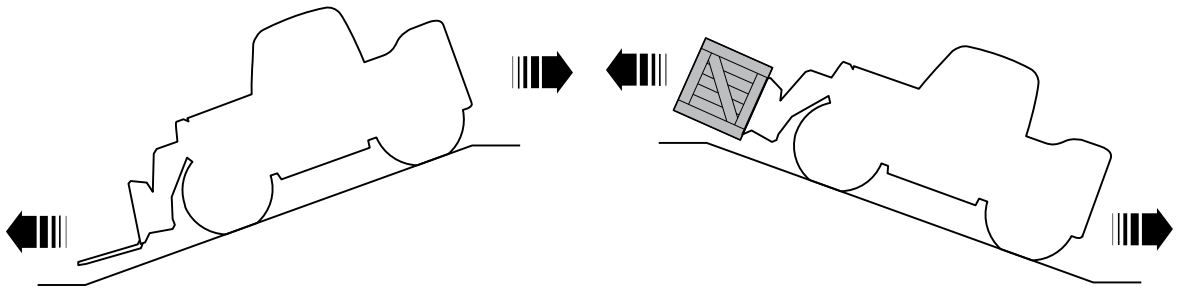
Driving Up and Down Slopes

⚠ **WARNING** Operating the machine on hillsides can be dangerous if proper precautions are not taken. Ground conditions can be changed by rain, snow, ice etc. Check the site carefully. Going uphill, reverse when unloaded or travel forwards when loaded. Going downhill, travel forwards when unloaded or reverse when loaded. Take special care when moving across a slope. If the slope is too steep your machine could roll over. If you must drive across a slope, keep the attachments close to the ground.

To get the maximum traction when you drive on a slope:

- Drive an unladen machine forward down a slope and in reverse up a slope
- Drive a laden machine forward up a slope and in reverse down a slope.

Figure 118.



Driving Across Slopes

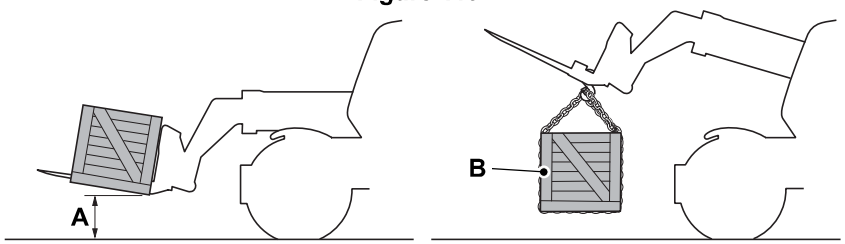
To get the maximum stability, operate the machine on solid, level ground. The stability of the machine is decreased when it is driven across a slope.

When you drive across a slope, fully retract the boom and drive slowly at walking pace.

Do not lift the carriage more than necessary. This is normally when the lowest point of the load is not more than 500mm (19.7in) above the ground, with a load which is carried on top of the forks. Some loads may be carried suspended below the forks, as shown. In this case, assess the risk involved before raising the carriage sufficiently to achieve ground clearance.

Remember, be careful and be safe. Your life or the lives of others can be in danger if you take unnecessary risks.

Figure 119.



A Lowest point of the load

B Load suspended below forks

Working on Slopes

Lifting Operations on Slopes

⚠ **WARNING** Conducting lifting operations on slopes can be dangerous. The machine can become laterally unstable and tip over. You and others can be seriously injured or killed.

WARNING Stop the machine and apply the park brake before conducting any lifting operations.

It is recommended that the machine is operated on solid, level ground where possible for the maximum machine stability.

A lifting operation should not be done on a slope, unless the machine is level across its width (laterally level).

The longitudinal and lateral stability are the two important safety factors that must be considered if the boom is to be extended, or raised by more than 500mm above the ground with the machine on a slope.

Longitudinal Stability

The longitudinal (forward) stability is measured and indicated by the LLMI (Longitudinal Load Moment Indicator) in the cab, if installed.

Read and understand the section that describes the operation of the LLMI before you do a lifting operation with the machine. Refer to: Operation > Lifting and Loading > Longitudinal Load Moment Indicator (LLMI) (Page 98).

Always operate the machine within the longitudinal stability limits indicated by the LLMI (if installed) or the load chart.

Lateral Stability

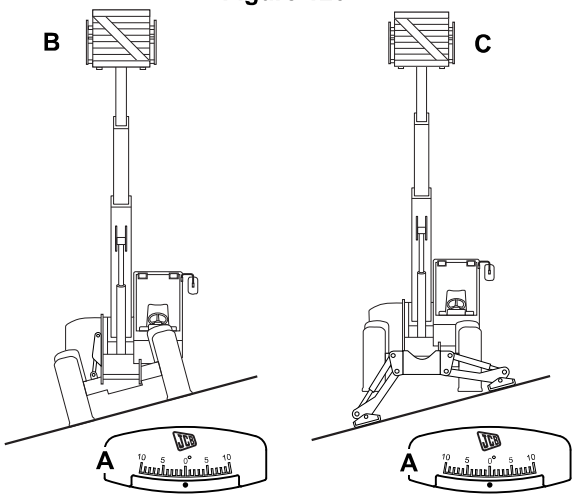
Make sure the machine is level across its width to maintain lateral (sideways) stability.

An inclinometer can be used to check if the machine is level. Refer to: Operation > Lifting and Loading > Inclinometer (Page 97).

Machines with chassis levelling (sway) option can be made level across their width using the sway control facility.

Machines with stabilisers can be made level across their width using the stabilisers.

Figure 120.

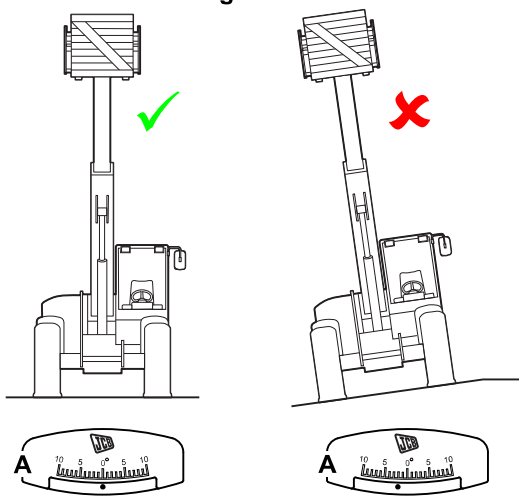


A Inclinometer
B Chassis level
C Stabilisers level

It is recommended that the machine should be operated on firm, level ground wherever possible for maximum machine stability.

If the machine cannot be made level across its width, the operator must complete a risk assessment before attempting a lifting operation.

Figure 121.



A Inclinometer

Heating, Ventilating and Air-Conditioning (HVAC)

General

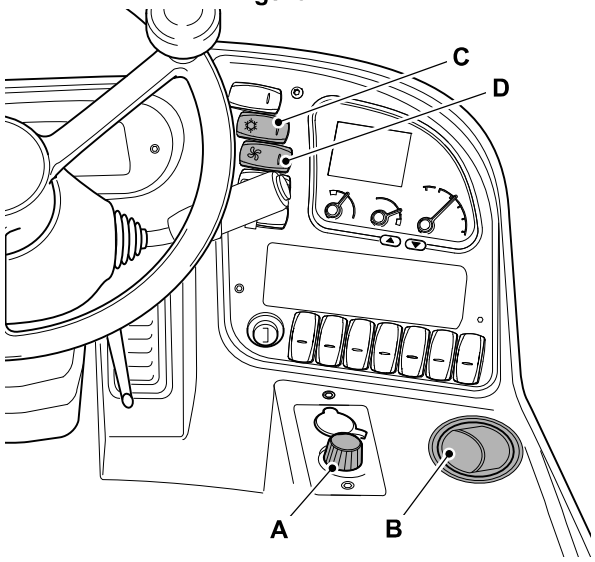
The operator must set the controls to obtain the best working environment in the operator station.

Close doors and windows for best HVAC (Heating Ventilation Air Conditioning) performance and in dusty conditions.

Poor ventilated air can cause tiredness. Do not operate the machine for long periods without ventilation or with the operator station fully closed and the fan turned off.

Air-Conditioning Controls

Figure 122.



A Temperature control switch
B Vent
C Air-conditioning switch
D Two speed fan switch

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

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.

Operate the air conditioning for at least 10min per month.

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.

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

The temperature is adjusted by the control switch and the heater fan controls.

Before starting the engine make sure the air conditioning is switched off.

Turn the knob to the cold position to turn the air conditioning on.

To obtain the best results from the air conditioning system make sure that all doors and windows are closed.

Heater Control

Turn the temperature control switch clockwise to increase the temperature.

Turn the temperature control switch counterclockwise to decrease the temperature.

Fan Speed Control

Push down the two speed fan switch to on position.

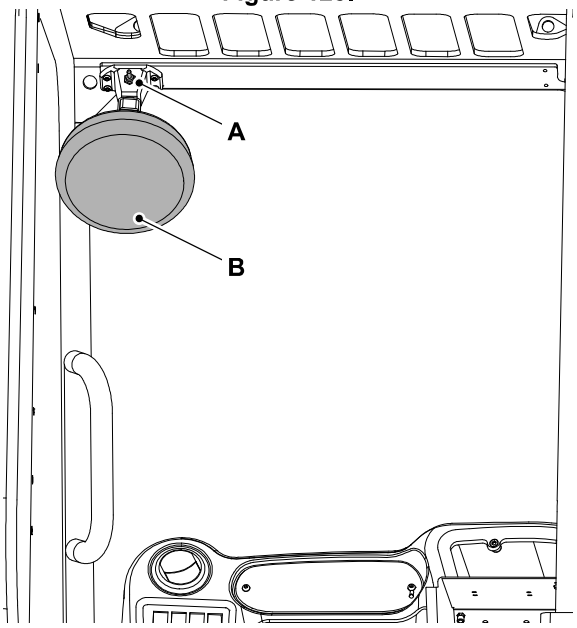
Press further down to increase the fan speed. This functions only when the ignition key is in position I.

Face Level Fan

The face level fan is installed on the left upper corner of the cab.

Press the switch to turn on/off the face level fan. This functions only when the ignition key is in position I.

Figure 123.



A Switch - fan on/off

B Face level fan

Battery Isolator

General

⚠ **Notice:** Before carrying out arc welding on the machine, disconnect the battery and alternator to protect the circuits and components. The battery must still be disconnected even if a battery isolator is installed.

Notice: Do not isolate the machine electrics when the engine is running, this may cause damage to the machine electrics.

To allow the engine ECU (Electronic Control Unit) to shutdown correctly, you must wait 30s before you isolate the battery. The 30s period starts when you turn the ignition off. If a radio is fitted, you may loose any settings.

Disconnect the Machine Electrics:

1. Turn the ignition key to the off position.
2. Wait for the engine ECU to shutdown correctly.

   Duration: 30s
3. Get access to the battery isolator.

   Refer to: Maintenance > Service Points (Page 204).
4. Turn the battery isolator key in a counter-clockwise direction and remove.

Connect the Machine Electrics:

1. Make sure the ignition is switched off.
2. Insert the battery isolator key and turn in a clockwise direction.

Fire Extinguisher

General

Location

The fire extinguisher is stowed in a bracket to the right of the operator seat. Keep the fire extinguisher in the bracket until you need to use it.

Operation

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

WARNING After any use, the extinguisher must be replaced or serviced.

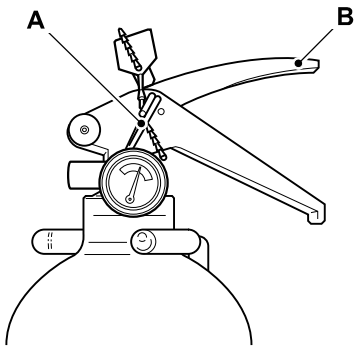
Make sure that you understand how to use the fire extinguisher. If necessary, refer to the instructions found on the fire extinguisher.

Only try to extinguish a fire if the circumstances permit and your safety is not endangered. If necessary, contact your nearest fire department.

Using the fire extinguisher:

1. Move the machine to a safe area to prevent the fire from spreading.
2. Remove the fire extinguisher from its bracket.
3. Remove the safety pin.
4. Aim directly at the fire from an upwind position, if possible.
5. Squeeze the trigger to operate the fire extinguisher, release the trigger to stop the flow.

Figure 124.



A Safety pin **B** Trigger

Moving a Disabled Machine

General

If the machine becomes disabled, the machine must be made safe, lifted onto a transporter and moved to a location where it can be repaired.

You must contact your nearest JCB dealer before you try to tow, winch or push the machine.

Towing, winching or pushing the machine without following the correct procedure will damage parts of the hydraulic system. If possible, repair the disabled machine where it stands.

Jump-Starting the Engine

⚠ **WARNING** In temperatures below freezing, the battery electrolyte may freeze if the battery is discharged or poorly charged. Do not use a battery if its electrolyte is frozen. To prevent the battery electrolyte from freezing, keep the battery at full charge.

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

Batteries produce a flammable gas, which is explosive. Do not smoke when checking the electrolyte levels.

When jump-starting from another vehicle, make sure that the two vehicles do not touch each other. This prevents any chance of sparks near the battery.

Switch off all circuits which are not controlled by the ignition key.

Do not connect the booster (slave) supply directly across the starter motor.

Use only sound jump leads with securely attached connectors. Connect one jump lead at a time.

The machine has a negative earth electrical system. Check which battery terminal is positive (+) before making any connections. Keep metal watch straps and jewellery away from the jump lead connectors and the battery terminals - an accidental short could cause serious burns and damage equipment. Make sure you know the voltage of the machine. The booster (slave) supply must not be higher than that of the machine. Using a higher voltage supply will damage your machine's electrical system. If you do not know the voltage of your booster (slave) supply, then contact your JCB dealer for advice. Do not attempt to jump-start the engine until you are sure of the voltage of the booster (slave) supply. The negative (-) terminal on the battery is connected to frame earth.

1. Set all switches in the cab to their off positions.
2. Get access to the battery.

   Refer to: Maintenance > Access Apertures (Page 207).
3. Connect the booster cables:
   - 3.1. 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.
   - 3.2. Connect the negative (-) booster cable to a good frame earth on the machine, away from and below the battery. A good frame earth is a part of the machine frame, free from paint and dirt. Do not use a pivot pin for an earth.
   - 3.3. Connect the other end of this cable to the negative (-) terminal on the booster supply.
4. Do the pre-start checks.
5. Start the engine.
6. Disconnect the booster cables:
   - 6.1. Disconnect the negative booster cable from the machine frame earth. Then disconnect if from the booster supply.
   - 6.2. Disconnect the positive booster cable from the positive (+) terminal on the battery. Then disconnect it from the booster supply.

Retrieval

Towing

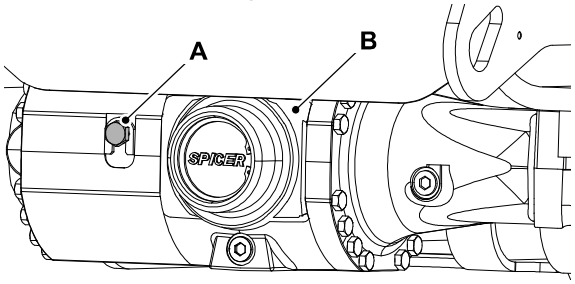
Towing a machine too far or too fast can damage the transmission. When towing prepare the machine as described below. Failure to comply will result in lack of lubrication and seizure of the transmission motor and pump.

The vehicle may only be towed out of the immediate area (maximum 100m) at a maximum speed of 1km/h (0.6mph), without removing the prophafts.

Use a rigid drawbar. If a towing chain must be used, then use two towing vehicles. One towing vehicle should be coupled to the front of the disabled machine. The other towing vehicle should be coupled to the rear of the disabled machine, to provide braking power. The towing vehicle must have enough pulling and braking power to move and stop the machine.

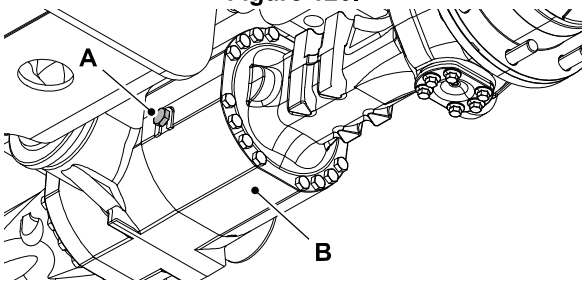
1. Using suitable lifting equipment, remove any payload from the machine.
2. Place chocks both sides of each wheel.
3. Attach a rigid tow bar between a suitable connection point on the machine and the towing vehicle.
4. When the propshafts are disconnected, the hand brake is still applied, before towing you must put the hand brake into the emergency released state.
5. In the case of emergency handbrake release:
   5.1. Make sure the axles are chocked.
   5.2. Release the parking brake on the front axle.
   5.3. Slacken the brake screws from the front axle.

Figure 125.



A Screw **B** Front of front axle

Figure 126.



A Screw **B** Rear of front axle

   5.4. Remove the shims.
   5.5. Tighten the screws.

6. When the towing is complete:
   6.1. Slacken the screws on the front axle.
   6.2. Install the shims.
   6.3. Tighten the screws to the required torque value.
   Torque: 95–115N·m
   6.4. Remove the wheel chocks from each wheel.

Propshaft Removal and Installation

⚠ **WARNING** Make sure that the blocks and towing vehicle will prevent the machine from moving because when the driveshafts have been disconnected the park brake cannot prevent the machine from moving. It is necessary to work under the machine to remove the driveshafts. This job should be done by a qualified mechanic. Anyone working underneath, or near the machine, could be killed or seriously injured if the machine moves.

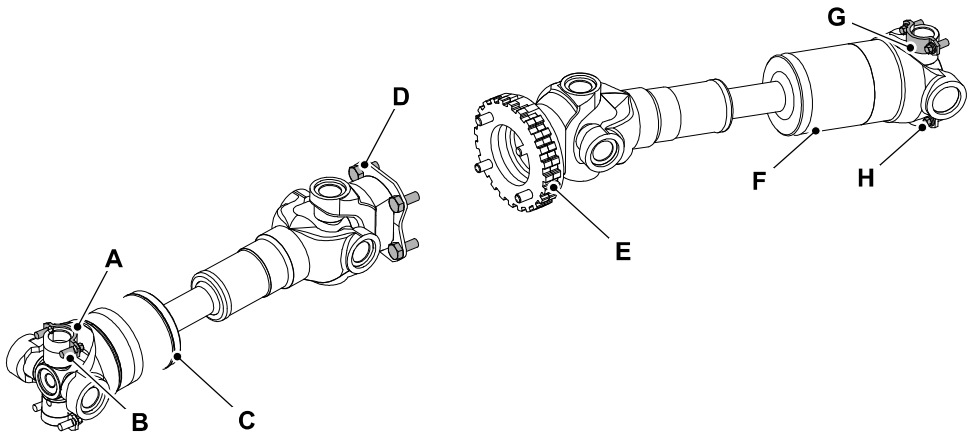
Removal

This procedure should only be carried out by a qualified engineer. If you have any queries concerning this procedure, consult your local JCB dealer.

When disconnecting the propshafts the park brake is still active but as an advisory it is recommended to chock all 4 wheels.

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Before you remove the propshafts, always mark both companion flanges and sliding joints prior to removal.
3. Remove the front, centre and rear undershields when you work under the machine.
   Refer to: Maintenance > Access Apertures > Undershield (Page 207).
4. Support the front propshaft and remove the strap retaining bolts and the straps from the axle yoke.
5. Use a crows foot ring spanner to remove the nuts.
6. Support the rear propshaft.
7. Use a crows foot ring spanner to remove the nuts.
8. Remove the nuts and slide the propshaft off the securing studs.

Figure 127. Constructional Propshaft

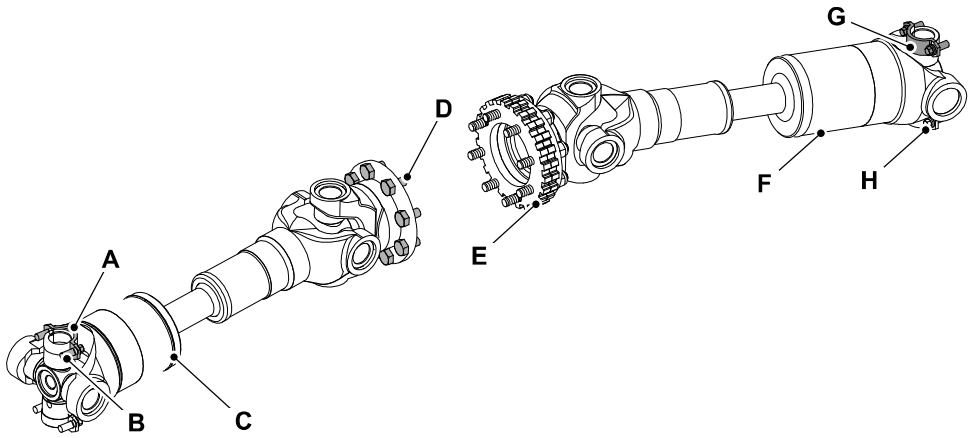


A Front propshaft bearing strap

B Front propshaft screws

C Front propshaft
D Screws (x4)
E Speed sensor ring
F Rear propshaft
G Rear propshaft bearing strap
H Rear propshaft screws

Figure 128. Agricultural Propshaft



A Front propshaft bearing strap
B Front propshaft screws
C Front propshaft
D Set screws (x8)
E Speed sensor ring
F Rear propshaft
G Rear propshaft bearing strap
H Rear propshaft screws

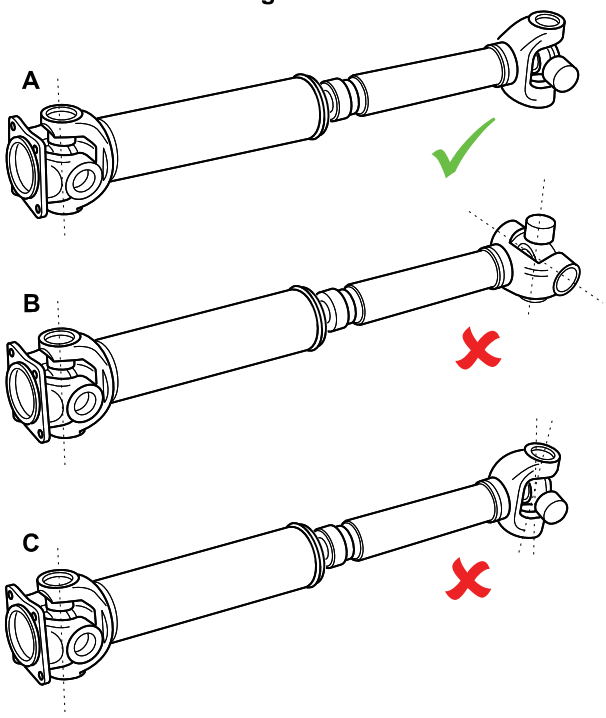
Installation

Installation is the opposite of the removal procedure.

During the replacement procedure do this work also:

- On installation, after lubricating sliding joints with JCB HP or MPL grease, align the shafts against identification marks previously made or, in the case of a shaft being renewed, use the manufacturer's alignment markings. Apply JCB threadlocker and sealer to threads of all flange bolts.
- The front propshaft retaining straps stretch with use, therefore these straps must always be installed with new ones.
- The propshaft must have both ends exactly on the same plane. The yokes must not be at right angles or at an intermediate angle.
- Tighten the screws to the required torque value. Refer to: Technical Data > Torque Values > General (Page 259).
- If the studs are damaged install with the new studs. Apply JCB threadlocker and sealer to the stud threads.

Figure 129.



A Equal angle propshaft
B Right angle propshaft
C Intermediate propshaft

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: Technical Data > Static Dimensions (Page 243).

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

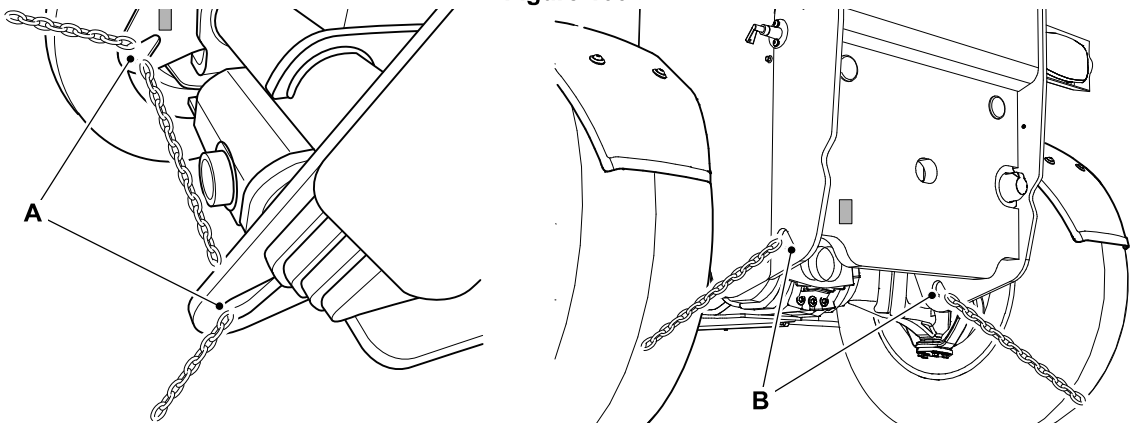
⚠ **WARNING** The safe transit of the load is the responsibility of the transport contractor and driver. Any machine, attachments or parts that may move during transit must be adequately secured.

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 tracks. Make sure the machine will not foul on the ramp angle.

1. Stop the transport vehicle on solid, level ground.
2. Put blocks at the front and rear of the wheels on the transport trailer.
3. Move the machine onto the transport vehicle.
   - 3.1. Make sure the ramps are in their correct positions, then secure them.
   - 3.2. Set the boom.
   - 3.3. Slowly and carefully drive the machine onto the transport trailer.
   - 3.4. Make the machine safe with the boom lowered.

     Refer to: Maintenance > Maintenance Positions > Maintenance Position - Boom Lowered (Page 201).
   - 3.5. Put blocks at the front and rear of all four tyres.
   - 3.6. Check that the overall height of the load is within regulations. Adjust if necessary.
   - 3.7. Secure the cab.
   - 3.8. Cover the exhaust stack.
4. Anchor the machine to the trailer with chains.

Figure 130.

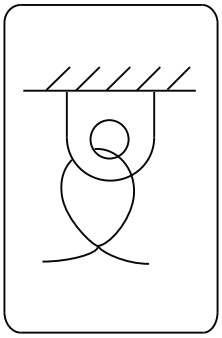


A Front position anchor point

B Rear position anchor point

5. The correct tie down positions are identified on the machine by their labels.

Figure 131.



6. Measure the maximum height of the machine from the ground. Make sure that the transporter driver knows the maximum height before he drives away.

Operating Environment

General

Operating in Dusty or Sandy Areas

1. Air Cleaner. Frequently check, clean or replace the elements regardless of the inspection interval. (Not the safety element).
2. Securely tighten the hydraulic oil tank filler cap to prevent sand and dust from entering the hydraulic system.
3. Check for debris accumulation below the engine.

Operating in Coastal Regions

1. Check that all the plugs, bolts and fasteners are all tightened properly.
2. After daily operations, wash the machine thoroughly and take special care when cleaning the electrical devices and hydraulic cylinders to prevent salt entry and eventual corrosion.

Operating on Wet or Soft Ground

1. Clean the Machine. Moisture or mud will cause the paint, wiring and metallic parts to deteriorate. When operating the machine keep it as dry as possible and regularly grease the machine.
2. Check for debris accumulation below the engine.

Operating in Low Temperatures

⚠ **Notice:** Do not connect two batteries in series to give 24V for starting as this can cause damage to the electrical circuits.

1. Use the correct viscosity engine lubricating oil.

   Refer to: Technical Data > Fluids, Lubricants and Capacities (Page 253).
2. Use the correct viscosity hydraulic oil.
3. If available, use a low temperature diesel fuel.
4. Use the correct coolant mixture.
5. Keep the battery at full charge.
6. Fill the fuel tank at the end of each work period, this will help to prevent condensation forming on the tank walls.
7. Protect the machine when its not in use. Park the machine inside a building or cover it with a tarpaulin.
8. Install a cold weather starting aid. In very low temperatures (less than the value shown) additional starting aids may be needed. For example are fuel, oil and coolant heaters. Ask your JCB dealer for advice.

   Temperature: -18°C (-0.4°F)
9. Remove snow from the engine compartment before starting otherwise snow could get into the air filter.
10. Always follow the starting procedure applicable to the current ambient temperature.

    Refer to: Operation > Starting the Engine (Page 49).

Operating in High Temperatures

The machine is designed to self regulate the hydraulic oil temperature to ensure full temperature protection is provided to the hydraulic components on the machine. The regulation is in the form of slowing the machine speed (transmission) proportionally to oil temperature when the machine is being used in either high ambient

temperatures or in a heavy duty application. If the hydraulic oil continues to increase in temperature the machine critical warning will be activated. Refer to: Operation > Instruments (Page 69).

1. Use the correct viscosity engine lubricating oil.
2. Use the correct coolant mixture.
3. Check the coolant system regularly, keep the coolant at the correct level. Make sure there are no leaks.
4. Keep the cooling pack and engine clean, regularly remove dirt and debris from the cooling pack and the engine.
5. Check the fan belt regularly.
6. Check the air vents. Make sure that the air vents to and from the engine compartment are not blocked.
7. Check the engine pre-cleaner regularly (if installed).
8. Check the battery electrolyte level.

Cab Filters

Category 1

The cab meets the requirements defined in EN 15695-1. This means that the air delivery and filtration system does not provide a specified level of protection against hazardous substances but only from external atmospheric conditions (e.g. rain, wind, snow etc.).

Category 2

The Cab meets the requirements defined in EN 15695-1. This means that the air delivery and filtration system provides protection against dust and the minimum differential pressure. The necessary filtered fresh air flow rate can be obtained using air-conditioning system and by adjusting the maximum fan speed provided that doors, windows and hatches are closed and the recirculation device is deactivated.

Comfort and Safety Inside the Cab

The cab category 1 does not guarantee full protection against dust, aerosols and vapours.

The cab category 2 cab offers protection against dust but only partially for aerosols and vapours: for application of plant protection products (e.g. pesticides, fungicides, herbicides), refer to the instructions provided by the supplier of the chemical agent as well as instructions provided by the sprayer's manufacturer.

PPE (Personal Protective Equipment) must be used inside the cab when specified by those directions.

- The air delivery system cannot offer a full protection, but a partial protection can be achieved by following some basic rules:
- Keep doors windows and hatches closed during the spraying operation.
- Keep the cab interior clean.
- Do not enter the cab with contaminated shoes and/or clothing.
- Keep all used personal protective equipment outside the cab.
- Bring the wire harness of the remote spray control box into the tractor cab.
- Remove the outside air delivery cab filter after the spraying operation and store it in a dry dust free room. Reserve it for the next spraying operation; replace with a service part filter.
- Active carbon filters must be properly stored in a sealed plastic bag to preserve their functionality.
- Use only genuine JCB filters and make sure that the filter is correctly installed.
- Check the condition of the sealing material and have it repaired when required.

Refuelling

General

⚠ **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.

Notice: Consult your fuel supplier or JCB dealer about the suitability of any fuel you are unsure of.

Low Fuel Levels

If you operate the machine on very low fuel levels, then air can enter the fuel system. To prevent the entry of air, always add more fuel when the fuel gauge shows a low level of fuel.

If air enters the fuel system, the engine speed will vary dramatically and low power will be experienced. The symptoms may be made worse when the machine operates on steep slopes.

If you increase the engine speed or load when there is air in the fuel system, then damage to the engine can occur.

If the fuel supply contains air, you must stop the engine, fill the fuel tank then bleed the fuel system to remove the air. Refer to: Maintenance > Fuel System > General > Bleed (Page 221).

You must bleed the fuel system after changing the fuel filter(s).

Filling the Tank

Before you add the fuel to the machine, Refer to: Technical Data > Fluids, Lubricants and Capacities (Page 253). If you use the incorrect type of fuel or fuel which is contaminated, then damage to the fuel injection system can occur.

WARNING! *Do not use petrol in this machine. Do not mix petrol with the diesel fuel. In storage tanks the petrol will rise to the top and form flammable vapours.*

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.

1. Make the machine safe.

   Refer to: Maintenance > Maintenance Positions (Page 201).

2. Remove all unwanted material around the fuel cap.
3. Remove the fuel cap.

   Refer to: Maintenance > Service Points (Page 204).

4. Add the fuel through the filler neck as necessary.
5. Install the fuel cap.
6. Lock the fuel cap to prevent theft and tampering.

Notes:

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 will have limits on their operation for example, the lifting capacity, speeds, hydraulic flow rates. Always check the instructions supplied with the attachment or in the Specification section of this manual. 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** Some attachments (e.g. muck fork/push-off) can cause damage to the front tyres when the boom is lowered and the carriage is tilted forward. Exercise caution when lowering the boom with the carriage tilted forward when a muck fork/push-off type attachment is fitted.

Notice: Do not extend the boom when an attachment is connected to the high flow auxiliary connectors (if fitted). Severe damage to the hoses will result.

All standard machines are installed with a Q-Fit carriage.

If the Q-Fit Carriage is changed or modified it may alter the setting of the LMI (Load Moment Indicator). Always consult your JCB distributor.

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

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

For the Sideshift Carriage, Fork Mounted Hook, Extension Jib and Roof Truss Jib, the information in this book includes installation/removal, operation and routine maintenance.

For other attachments, please refer to the manufacturer's manual for the attachment (if supplied). General installation and removal procedures for other attachments are, however, included here.

Do not operate attachments until the hydraulic oil has reached its normal working temperature.

Do not use this machine in conjunction with a sweeper/collector unless the attachment is connected to optional high flow equipment auxiliary connections. Allow the hydraulic system to cool between each period of use.30min

An approved removable load back rest extension can be used when using forks to stop loose objects from falling to help protect the operator and machine.

Connecting/Disconnecting Hydraulic Hoses

Some attachments are hydraulically powered. The following procedures show how to connect and disconnect the hydraulic hoses safely.

Connecting the Hydraulic Hoses

1. Make the machine safe.

   Refer to: Maintenance > Maintenance Positions (Page 201).

2. Vent the hydraulic system.

   Refer to: Maintenance > Hydraulic System > General > Discharge (Page 234).

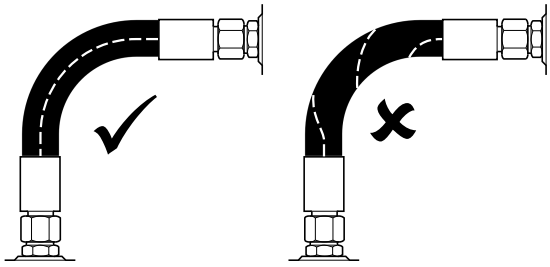
3. Check the hoses and adaptors for damage.

   Refer to: Maintenance > Hydraulic System > General > Check (Condition) (Page 234).

4. Connect the hoses:

   4.1. Make sure that the hose is not twisted. Pressure applied to a twisted hose can cause the hose to fail or the connections to loosen.

Figure 132.

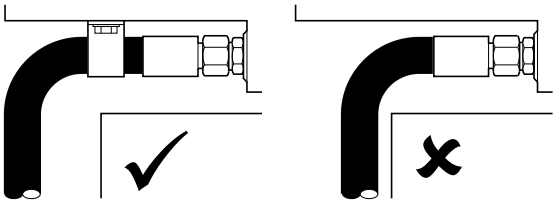


   4.2. Make sure that the hose does not touch hot parts. High ambient temperatures can cause the hose to fail.

   4.3. Make sure that the hose does not touch parts which can rub or cause abrasion.

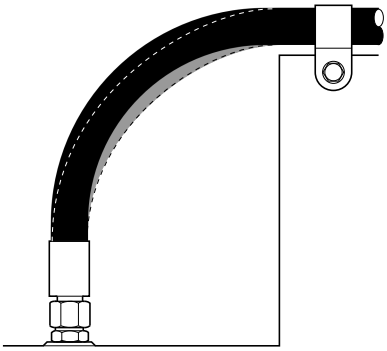
   4.4. Use the hose clamps (where possible) to support long hose runs and keep the hoses away from moving parts, etc.

Figure 133.



4.5. To allow for length changes when the hose is pressurised, do not clamp at the bend. The curve absorbs the change.

Figure 134.



5. Check for leaks:
   5.1. Start the engine.
   5.2. Operate the related controls to increase the pressure in the hydraulic system.
   5.3. Stop the engine then remove the ignition key.
   5.4. Check for indications of leakage at the hose connections. Correct, as necessary.

Disconnecting the Hydraulic Hoses

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Vent the hydraulic system.
   Refer to: Maintenance > Hydraulic System > General > Discharge (Page 234).
3. Disconnect the hoses.
4. Check the hoses and adaptors for damage.
   Refer to: Preservation and Storage > Checking For Damage (Page 185).
5. If necessary, install the blanking caps.
6. Check for leaks:
   6.1. Start the engine.
   6.2. Operate the related controls to increase the pressure in the hydraulic system.
   6.3. Stop the engine then remove the ignition key.
   6.4. Check for indications of leakage at the hose connections. Correct, as necessary.

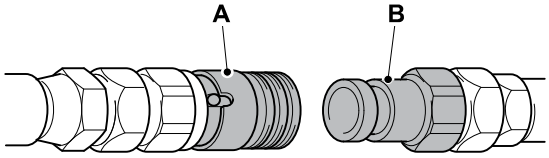
Quick Release Couplings

⚠ **WARNING** The external surfaces of the couplings must be clean before connecting or disconnecting. Ingress of dirt will cause fluid leaks and difficulty in connecting or disconnecting. You could be killed or seriously injured by faulty quick release couplings.

The flat face quick release couplings allow the operator to remove and install attachments swiftly and efficiently.

Generally, your machine pipework will be installed with a female coupling and a male coupling. The optional attachment hoses will also be installed with a female coupling and a male coupling.

Figure 135.



A Female coupling **B** Male coupling

The quick release couplings will be trouble free and relatively easy to connect and disconnect, if they are kept clean and used correctly. The recommendations listed below must always apply when using flat face quick release couplings.

Read the correct connecting and releasing procedures before you install or remove any optional attachment connected with quick release couplings.

Essential do's:

- Before connecting or removing any hydraulic hose, the 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 the hoses.
- Always wipe the two mating faces clean before connecting.
- Use caps and plugs when the couplings are disconnected.
- Always align the external locking ball (if used) with the notch in the locking sleeve and then pull the locking sleeve back fully to disconnect.
- If a coupling sticks, first check that pressure has been released. Make sure the locking ball and notch in the locking sleeve are aligned, pull back the sleeve and twist the couplings apart. Sticking is normally caused by dirt in the coupling or physical damage due to abuse.
- Connect and disconnect the new couplings two or three times to work the PTFE seals. Sometimes a new coupling will stick if the seal has not been worked.
- When connecting the couplings, only apply the spanner or grips to the hexagon and nowhere else.
- Avoid damage to the coupling faces. Burrs and scratches cause damage to the seals and cause leaks. They can also impede connection and disconnection of the couplings.
- Periodically lubricate the internal locking balls on the female half of the coupling with silicone grease.

Essential don'ts:

- Never try to reconnect using a damaged half coupling as this will destroy the seals in the mating half and necessitate replacement of both halves.
- Do not leave the coupling where it may be run over by a machine or otherwise crushed, this will distort the sleeve and prevent connection and disconnection.
- Never try to turn the sleeve when the coupling is disconnected as this will cause the locking ball to jam under the locking sleeve and damage the coupling.
- Never try to strip the coupling down, there are no user serviceable parts. If the coupling is damaged it must be replaced with a new one.
- Never hit the centre poppet of the coupling to try and release the locked in pressure. This can cause irreparable damage to the coupling and serious injury.
- When connecting the couplings, never clamp on the sleeve of the female or nose of the male, this will cause distortion and/or damage.
- Never subject the couplings to external forces, especially side load. This can decrease the life of the coupling or cause failure.

- Never allow the torsional forces transmitted from the hoses to unscrew/screw together the couplings.
- Never use a coupling as a plug.
- Do not connect and disconnect with pressure in the line unless the coupling type is specifically designed to do so.

Connecting Quick Release Couplings

1. Remove any residual hydraulic pressure trapped in the service line hose.

   Refer to: About the Product > Console Switches (Page 20).

   1.1. Press and hold the hydraulic venting switch. A notification will appear on the instrument panel and the buzzer will sound.

   Duration: 2–3s

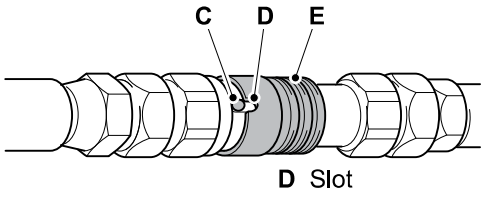
   1.2. Some attachments may require the hydraulic venting switch to be pressed for longer.

   1.3. If installed auxiliary II will be automatically vented, and does not need to be pre-selected.

   1.4. Release the switch to stop the venting function.

2. Wipe the two faces of the male and female couplings and make sure they are clean.
3. Make sure that ball in the female coupling is located in one of its slots.
4. Connect the male coupling into the female coupling.
5. Where applicable, rotate the sleeve half a turn and make sure that the locking ball does not align with the slot.

Figure 136.



C Ball
D Slot
E Sleeve

Disconnecting Quick Release Couplings

1. Remove any residual hydraulic pressure trapped in the service line hose.

   Refer to: About the Product > Console Switches (Page 20).

   1.1. Press and hold the hydraulic venting switch. A notification will appear on the instrument panel and the buzzer will sound.

   Duration: 2–3s

   1.2. Some attachments may require the hydraulic venting switch to be pressed for longer.

   1.3. If installed auxiliary II will be automatically vented, and does not need to be pre-selected.

   1.4. Release the switch to stop the venting function.

2. Where applicable, align the slot with ball.
3. Pull back the sleeve to release the coupling.

Tool Carrier

General

⚠ **WARNING** Do not retract the locking pins when the attachment is raised, the attachment could fall and kill or seriously injure someone. Retract the locking pins only after the attachment has been placed on the ground.

WARNING Keep other people clear of the area while you disengage the attachment. If a second person is to be involved in this procedure, ensure that he keeps clear of the machine and attachment until signalled by you to proceed.

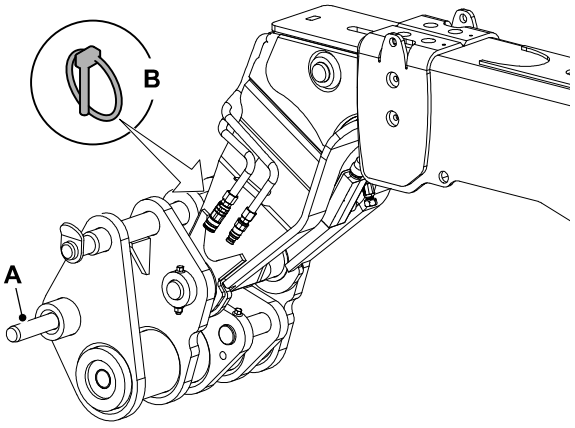
Mechanical Pin Locking

Installing Attachments

1. Position the attachment.
   1.1. Make sure the attachment is on firm, level ground.
   1.2. Make sure the attachment will not roll over.
2. Remove the existing attachment.
3. Leave the tool carrier lock pin disengaged or remove from stowage position.
4. Engage the attachment.
   4.1. Make sure that the carrier lock pin is withdrawn.
   4.2. Use the control levers to align the carrier with the attachment and just below the attachment hook plates.
   4.3. Apply the park brake.
   4.4. Set the transmission to neutral.
   4.5. Use the boom controls to engage the support bar on the carrier into the hook plates on the attachment.
   4.6. Make sure that both hook plates are engaged equally.
   4.7. Lift and tilt the carrier back, to align the locking holes in the carrier with those in the attachment.
5. Insert the lock pin.
   5.1. Make sure that the transmission is set to neutral and that the park brake is on.
   5.2. Stop the engine.
   5.3. Remove the ignition key.
   5.4. At the carrier, insert the lock pin into the locking holes in the carrier and attachment.
   5.5. Secure with lynch pin.
   5.6. If a second person is to do this job keep your hands and feet away from the controls until he is clear of the machine.
6. If the attachment is hydraulically operated, connect the hoses.

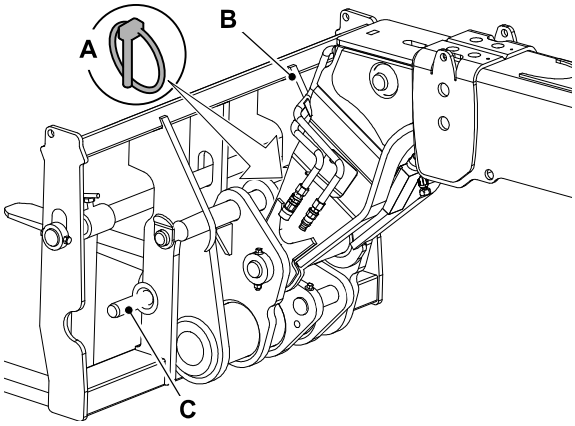
   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

Figure 137.



A Lock pin
B Lynch pin

Figure 138.



A Lynch pin
B Hook plates
C Lock pin

Removing Attachments

1. Lower the attachment to the ground.
2. If the attachment is hydraulically operated, connect the hoses.

   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
3. Make sure the transmission is set to neutral and the park brake is applied.
4. Stop the engine.
5. Remove the ignition key.
6. Remove the locking pin.
   - 6.1. Remove the lynch pin and withdraw the locking pin.
   - 6.2. Install the locking pin in stowage position.
   - 6.3. Start the engine.
   - 6.4. Tilt the carrier forward slowly to withdraw the lower end of the carrier from the attachment.
   - 6.5. Then lower the boom slowly to withdraw the carrier from the attachment hook plates.
   - 6.6. Carefully reverse the machine away from the attachment or retract the boom.

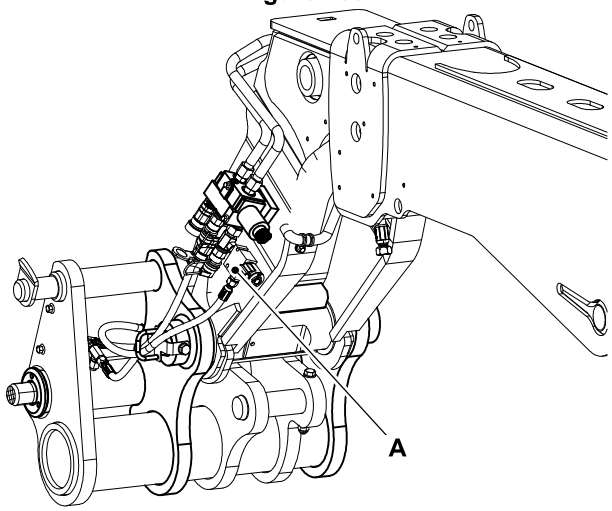
Hydraulic Pin Locking

Installing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. The isolation valve is installed to all machines that have a hydraulic pin lock option.
5. Use the boom controls to engage the support bar on the carriage in to the hook plates.
6. Make sure that both hook plates are engaged equally.
7. Lift and tilt the carriage back, to align the locking holes in the carriage with those in the attachment.
8. Turn on the hitch/auxiliary switch.
9. Move the thumb switch backwards to engage the locking pins.
10. If the attachment is hydraulically operated, connect the hoses.

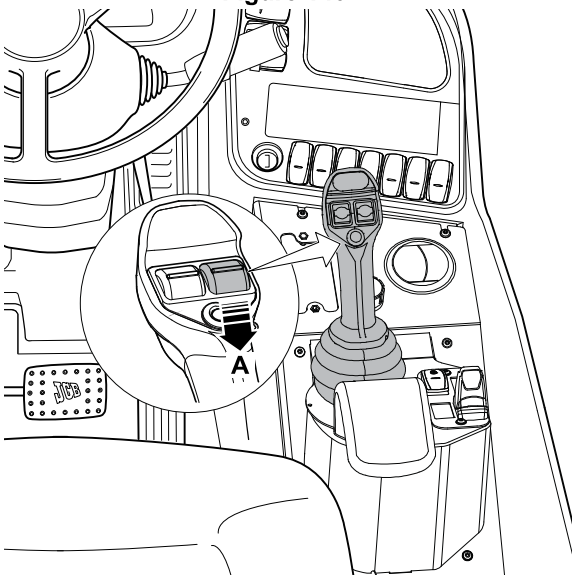
    Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

Figure 139.



A Hose(s) couplings

Figure 140.



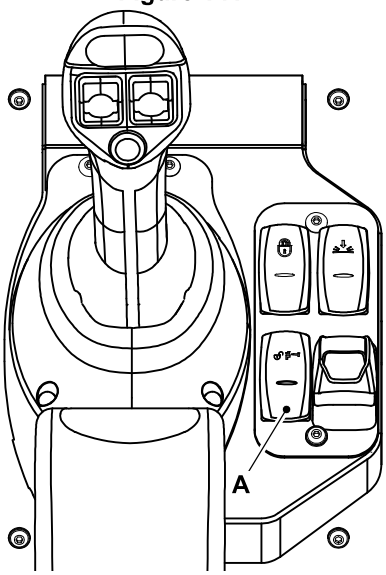
A Backward - engage locking pins

Removing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. If the attachment is hydraulically operated, then disconnect the hoses.

   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

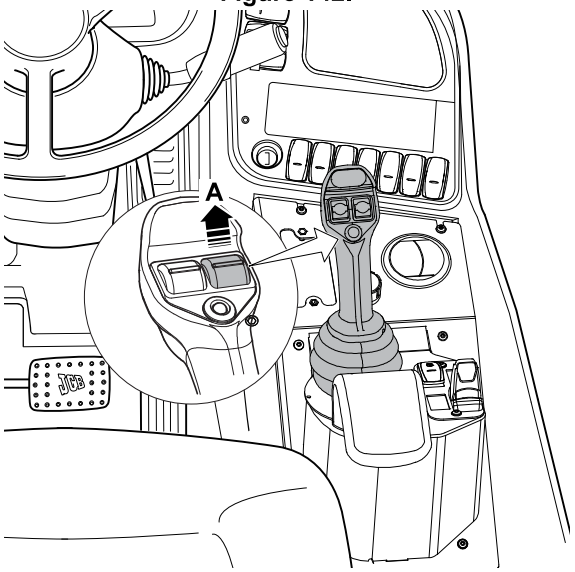
Figure 141.



A Unlock switch

7. Move the thumb switch forwards to disengage the locking pins.
8. Tilt the carriage forward slowly to withdraw the lower end of the carriage from the attachment.
9. Lower the boom slowly to withdraw the carriage from the attachment hook plates.
10. Carefully reverse the machine away from the attachment or retract the boom.

Figure 142.



A Forward - disengage locking pins

Skid Steer

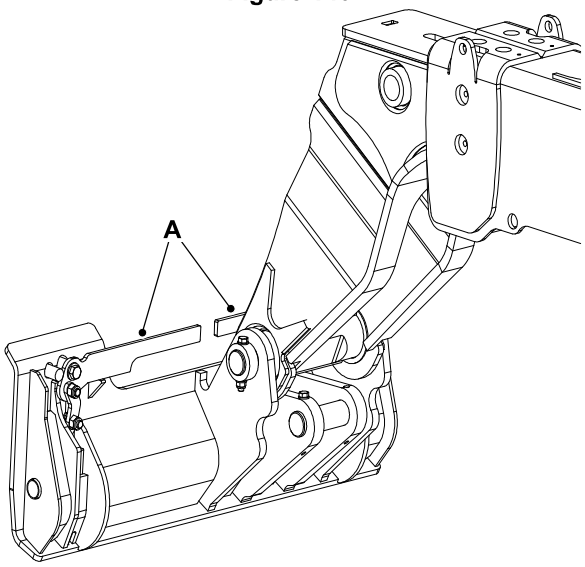
Mechanical Pin Locking

Installing Attachments

1. Position the attachment.
   1.1. Make sure the attachment is on firm, level ground.
   1.2. Make sure the attachment will not roll over.
2. Remove the existing attachment.
3. Leave the skid steer lock pins disengaged.
4. Engage the attachment.
   4.1. Use the control levers to align the carrier with the attachment and just below the attachment hook plates.
   4.2. Apply the park brake.
   4.3. Set the transmission to neutral.
   4.4. Use the boom controls to engage the support bar on the carrier into the hook plates on the attachment.
   4.5. Make sure that both hook plates are engaged equally.
   4.6. Lift and tilt the carrier back, to align the locking holes in the carrier with those in the attachment.
5. Insert the lock pins.
   5.1. Make sure that the transmission is set to neutral and that the park brake is on.
   5.2. Stop the engine.
   5.3. Remove the ignition key.
   5.4. At the carrier, move the handles to push the locking pins into the locking holes in the carrier and attachment.
   5.5. If a second person is to do this job keep your hands and feet away from the controls until he is clear of the machine.
6. If the attachment is hydraulically operated, connect the hoses.

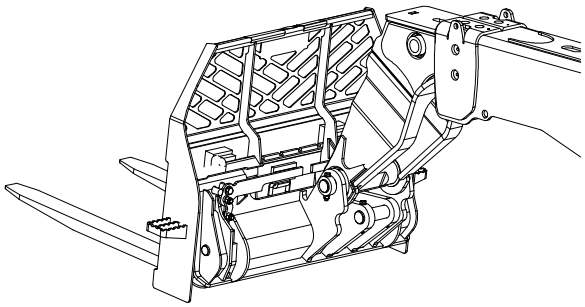
   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

Figure 143.



A Locking handles

Figure 144.



Removing Attachments

1. Lower the attachment to the ground.
2. If the attachment is hydraulically operated, connect the hoses.

   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
3. Make sure the transmission is set to neutral and the park brake is applied.
4. Stop the engine.
5. Remove the ignition key.
6. Remove the locking pin.
   - 6.1. Move the handles to withdraw the locking pins.
   - 6.2. Start the engine.
   - 6.3. Tilt the carrier forward slowly to withdraw the lower end of the carrier from the attachment.
   - 6.4. Then lower the boom slowly to withdraw the carrier from the attachment hook plates.
   - 6.5. Carefully reverse the machine away from the attachment or retract the boom.

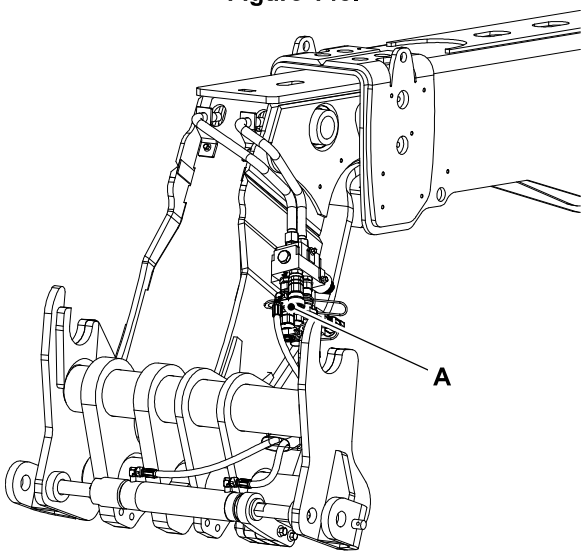
Hydraulic Pin Locking

Installing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. The isolation valve is installed to all machines that have a hydraulic pin lock option.
5. Use the boom controls to engage the support bar on the carriage in to the hook plates.
6. Make sure that both hook plates are engaged equally.
7. Lift and tilt the carriage back, to align the locking holes in the carriage with those in the attachment.
8. Turn on the hitch/auxiliary switch.
9. Move the thumb switch backwards to engage the locking pins.
10. If the attachment is hydraulically operated, connect the hoses.

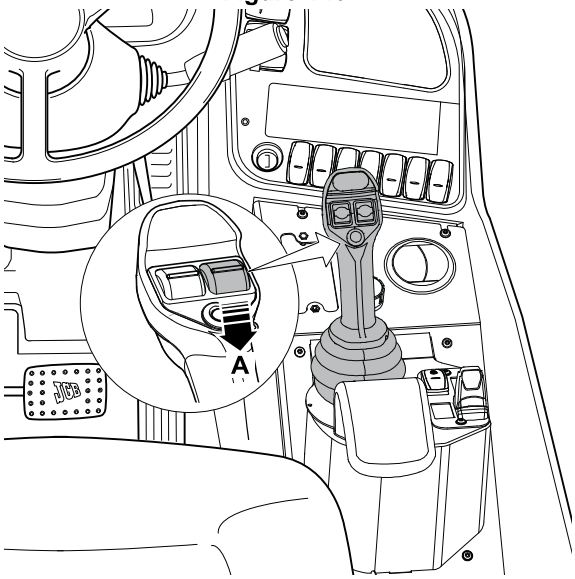
    Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

Figure 145.



A Hose(s) couplings

Figure 146.



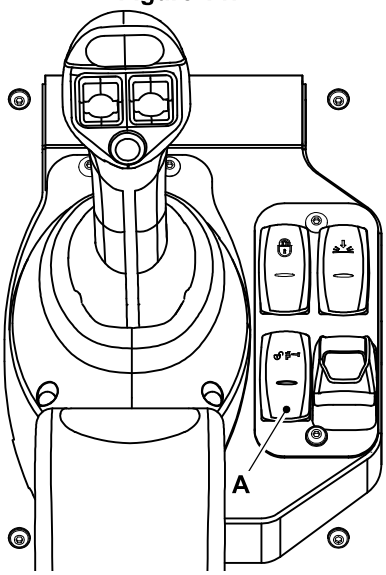
A Backward - engage locking pins

Removing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. If the attachment is hydraulically operated, then disconnect the hoses.

   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

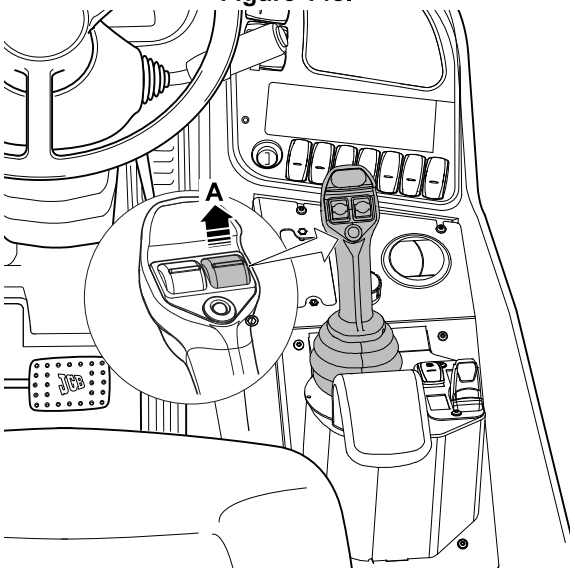
Figure 147.



A Unlock switch

7. Move the thumb switch forwards to disengage the locking pins.
8. Tilt the carriage forward slowly to withdraw the lower end of the carriage from the attachment.
9. Lower the boom slowly to withdraw the carriage from the attachment hook plates.
10. Carefully reverse the machine away from the attachment or retract the boom.

Figure 148.



A Forward - disengage locking pins

Manitou

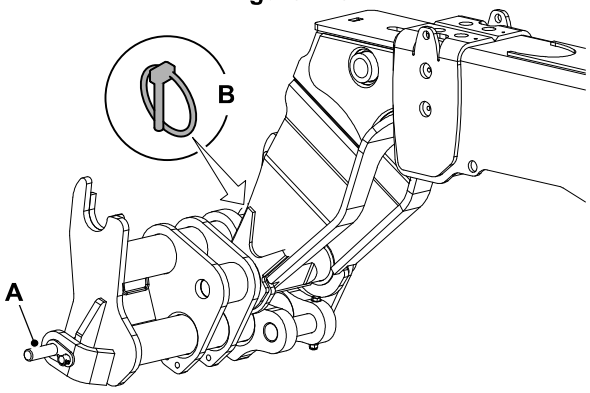
Mechanical Pin Locking

Installing Attachments

1. Position the attachment.
   1.1. Make sure the attachment is on firm, level ground.
   1.2. Make sure the attachment will not roll over.
2. Remove the existing attachment.
3. Leave the manitou lock pins disengaged or remove from the stowage position.
4. Engage the attachment.
   4.1. Use the control levers to align the carrier with the attachment and just below the attachment hook plates.
   4.2. Apply the park brake.
   4.3. Set the transmission to neutral.
   4.4. Use the boom controls to engage the support bar on the carrier into the hook plates on the attachment.
   4.5. Make sure that both hook plates are engaged equally.
   4.6. Lift and tilt the carrier back, to align the locking holes in the carrier with those in the attachment.
5. Insert the lock pins.
   5.1. Make sure that the transmission is set to neutral and that the park brake is on.
   5.2. Stop the engine.
   5.3. Remove the ignition key.
   5.4. At the carrier, move the handles to push the locking pins into the locking holes in the carrier and attachment.
   5.5. If a second person is to do this job keep your hands and feet away from the controls until he is clear of the machine.
6. If the attachment is hydraulically operated, connect the hoses.

Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

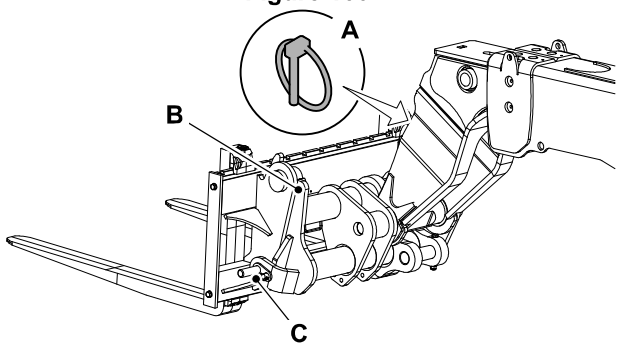
Figure 149.



A Lock pin

B Lynch pin

Figure 150.



A Lynch pin
B Hook plates
C Lock pin

Removing Attachments

1. Lower the attachment to the ground.
2. If the attachment is hydraulically operated, connect the hoses.

   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
3. Make sure the transmission is set to neutral and the park brake is applied.
4. Stop the engine.
5. Remove the ignition key.
6. Remove the locking pin.
   6.1. Remove the lynch pin and withdraw the locking pin.
   6.2. Install the locking pin in stowage position.
   6.3. Start the engine.
   6.4. Tilt the carrier forward slowly to withdraw the lower end of the carrier from the attachment.
   6.5. Then lower the boom slowly to withdraw the carrier from the attachment hook plates.
   6.6. Carefully reverse the machine away from the attachment or retract the boom.

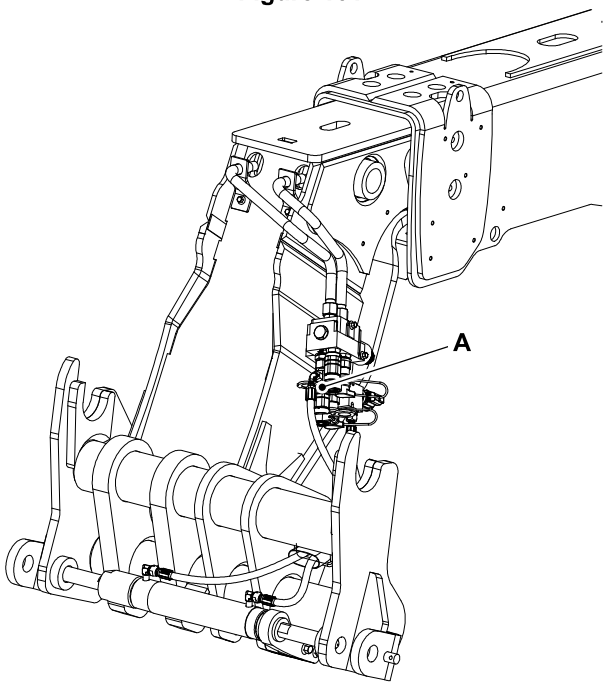
Hydraulic Pin Locking

Installing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. The isolation valve is installed to all machines that have a hydraulic pin lock option.
5. Use the boom controls to engage the support bar on the carriage in to the hook plates.
6. Make sure that both hook plates are engaged equally.
7. Lift and tilt the carriage back, to align the locking holes in the carriage with those in the attachment.
8. Turn on the hitch/auxiliary switch.
9. Move the thumb switch backwards to engage the locking pins.
10. If the attachment is hydraulically operated, connect the hoses.

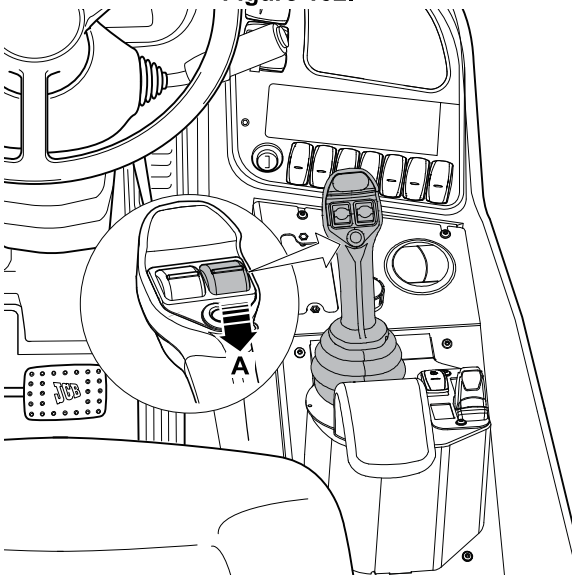
    Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

Figure 151.



A Hose(s) couplings

Figure 152.



A Backward - engage locking pins

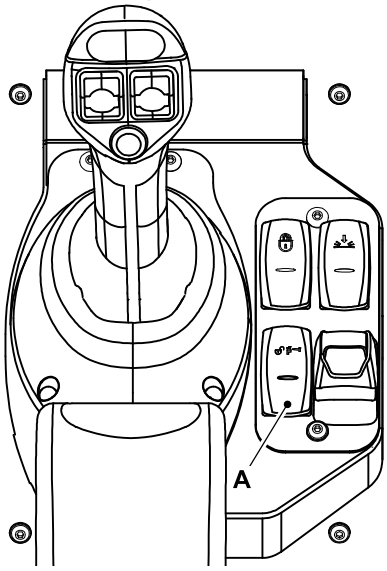
Removing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. If the attachment is hydraulically operated, then disconnect the hoses.

   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

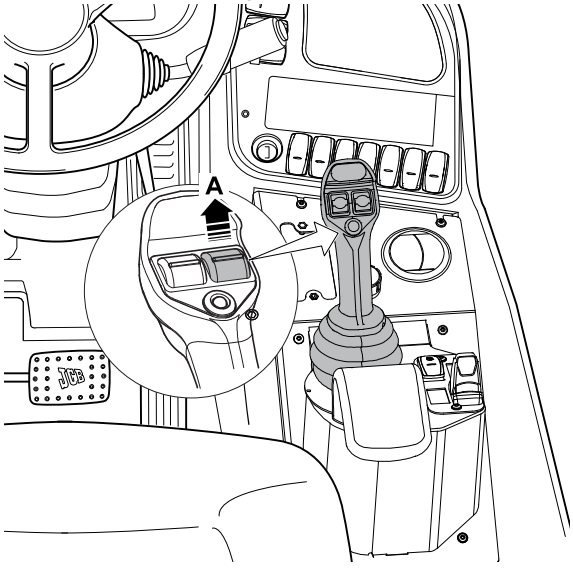
Figure 153.



A Unlock switch

7. Move the thumb switch forwards to disengage the locking pins.
8. Tilt the carriage forward slowly to withdraw the lower end of the carriage from the attachment.
9. Lower the boom slowly to withdraw the carriage from the attachment hook plates.
10. Carefully reverse the machine away from the attachment or retract the boom.

Figure 154.



A Forward - disengage locking pins

Merlo

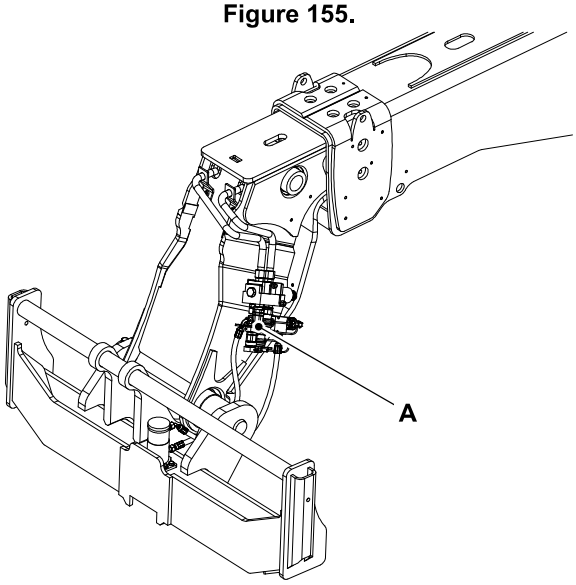
Hydraulic Pin Locking

Installing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. The isolation valve is installed to all machines that have a hydraulic pin lock option.
5. Use the boom controls to engage the support bar on the carriage in to the hook plates.
6. Make sure that both hook plates are engaged equally.
7. Lift and tilt the carriage back, to align the locking holes in the carriage with those in the attachment.
8. Turn on the hitch/auxiliary switch.
9. Move the thumb switch backwards to engage the locking pins.
10. If the attachment is hydraulically operated, connect the hoses.

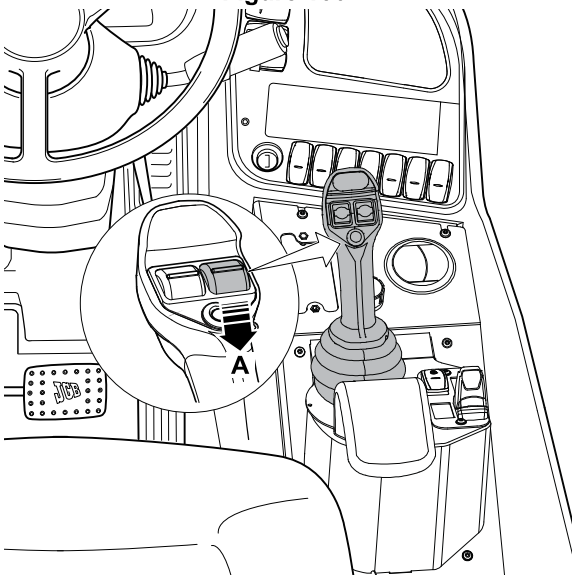
    Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

Figure 155.



A Hose(s) couplings

Figure 156.



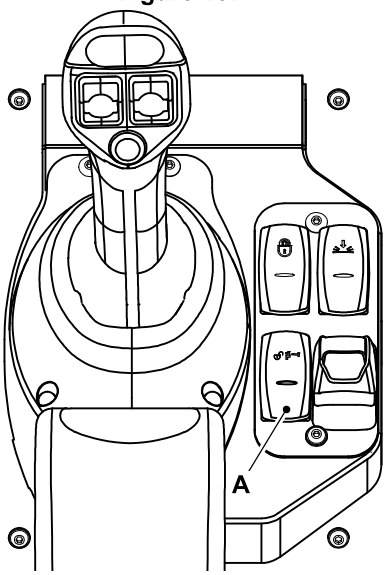
A Backward - engage locking pins

Removing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. If the attachment is hydraulically operated, then disconnect the hoses.

   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

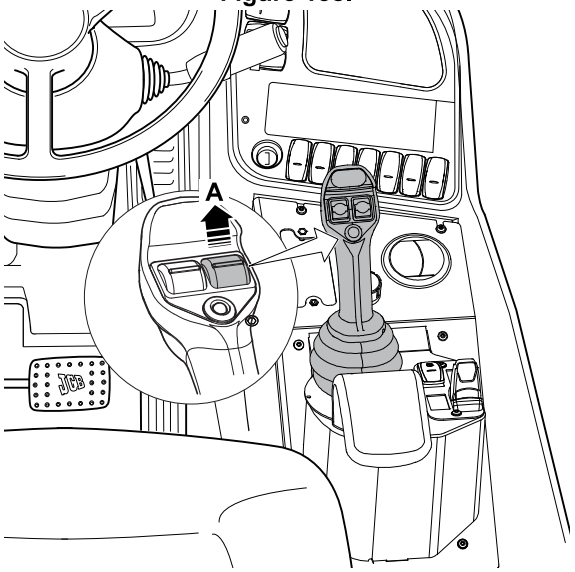
Figure 157.



A Unlock switch

7. Move the thumb switch forwards to disengage the locking pins.
8. Tilt the carriage forward slowly to withdraw the lower end of the carriage from the attachment.
9. Lower the boom slowly to withdraw the carriage from the attachment hook plates.
10. Carefully reverse the machine away from the attachment or retract the boom.

Figure 158.



A Forward - disengage locking pins

Pin and Cone

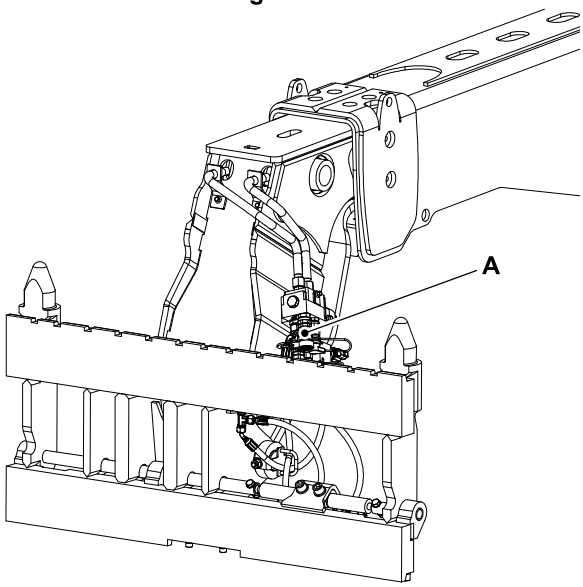
Hydraulic Pin Locking

Installing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. The isolation valve is installed to all machines that have a hydraulic pin lock option.
5. Use the boom controls to engage the support bar on the carriage in to the hook plates.
6. Make sure that both hook plates are engaged equally.
7. Lift and tilt the carriage back, to align the locking holes in the carriage with those in the attachment.
8. Turn on the hitch/auxiliary switch.
9. Move the thumb switch backwards to engage the locking pins.
10. If the attachment is hydraulically operated, connect the hoses.

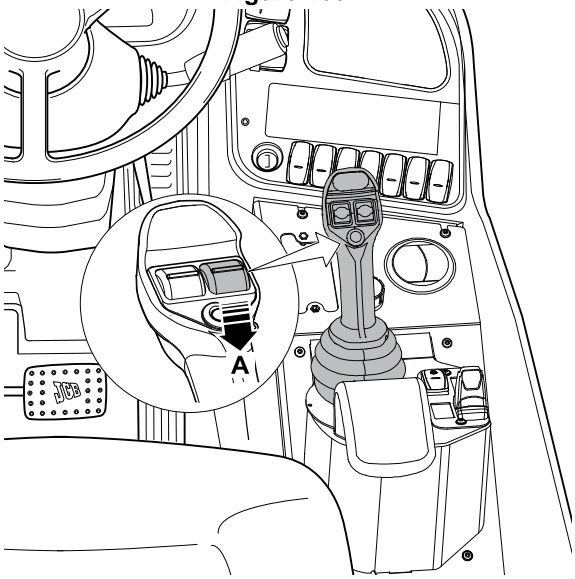
    Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

Figure 159.



A Hose(s) couplings

Figure 160.



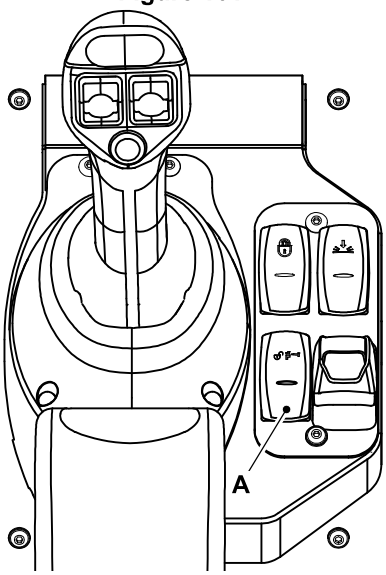
A Backward - engage locking pins

Removing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. If the attachment is hydraulically operated, then disconnect the hoses.

   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

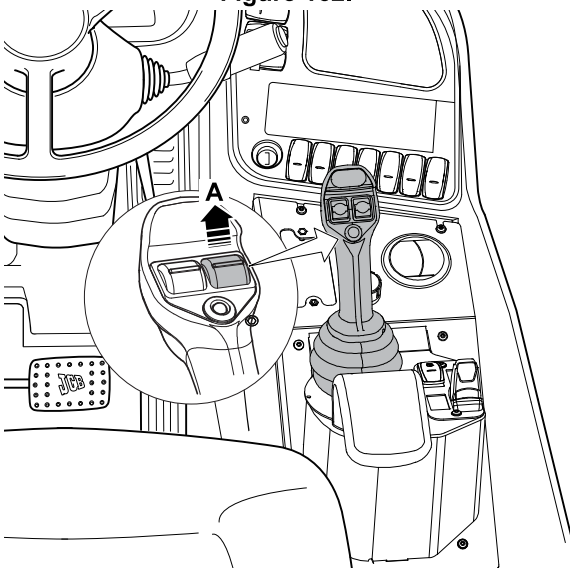
Figure 161.



A Unlock switch

7. Move the thumb switch forwards to disengage the locking pins.
8. Tilt the carriage forward slowly to withdraw the lower end of the carriage from the attachment.
9. Lower the boom slowly to withdraw the carriage from the attachment hook plates.
10. Carefully reverse the machine away from the attachment or retract the boom.

Figure 162.



A Forward - disengage locking pins

Eurohitch

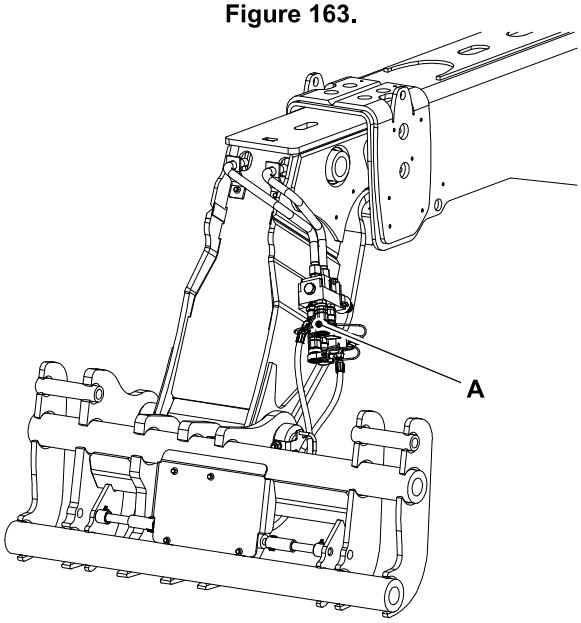
Hydraulic Pin Locking

Installing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. The isolation valve is installed to all machines that have a hydraulic pin lock option.
5. Use the boom controls to engage the support bar on the carriage in to the hook plates.
6. Make sure that both hook plates are engaged equally.
7. Lift and tilt the carriage back, to align the locking holes in the carriage with those in the attachment.
8. Turn on the hitch/auxiliary switch.
9. Move the thumb switch backwards to engage the locking pins.
10. If the attachment is hydraulically operated, connect the hoses.

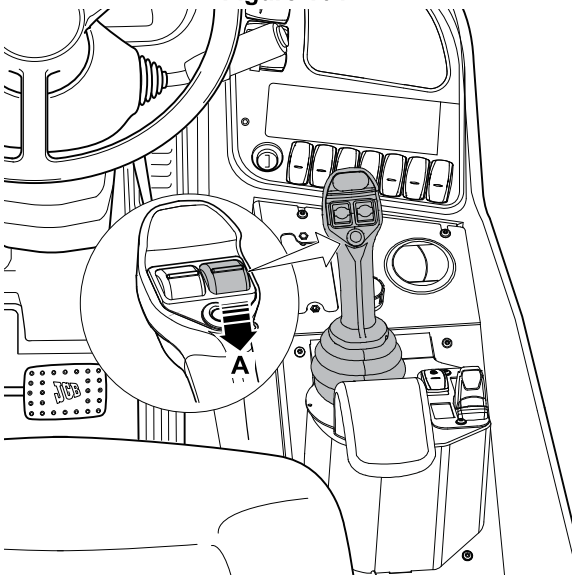
    Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

Figure 163.



A Hose(s) couplings

Figure 164.



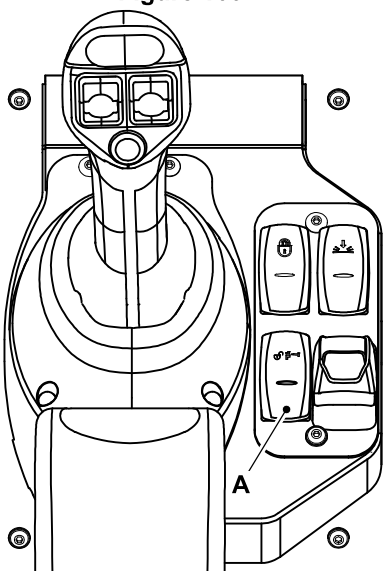
A Backward - engage locking pins

Removing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. If the attachment is hydraulically operated, then disconnect the hoses.

   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

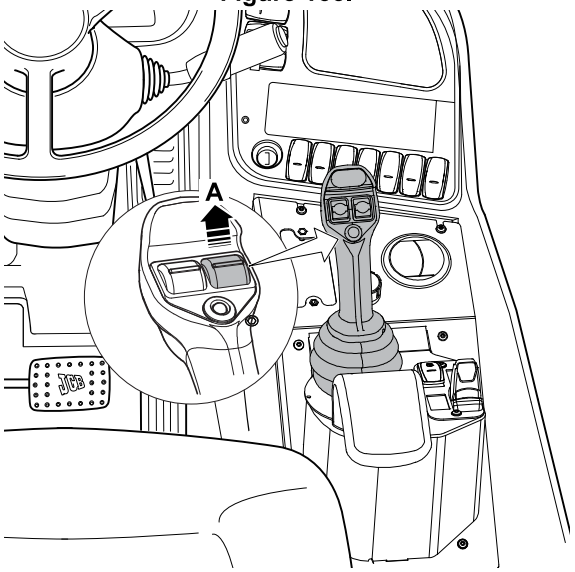
Figure 165.



A Unlock switch

7. Move the thumb switch forwards to disengage the locking pins.
8. Tilt the carriage forward slowly to withdraw the lower end of the carriage from the attachment.
9. Lower the boom slowly to withdraw the carriage from the attachment hook plates.
10. Carefully reverse the machine away from the attachment or retract the boom.

Figure 166.



A Forward - disengage locking pins

Quick-fit Carriage

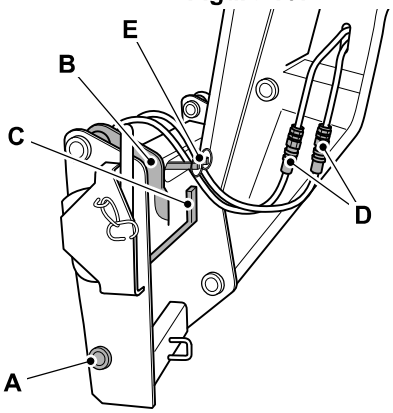
General

⚠ **WARNING** Do not retract the locking pins when the attachment is raised, the attachment could fall and kill or seriously injure someone. Retract the locking pins only after the attachment has been placed on the ground.

WARNING Keep other people clear of the area while you disengage the attachment. If a second person is to be involved in this procedure, ensure that he keeps clear of the machine and attachment until signalled by you to proceed.

Mechanical Pin Locking

Figure 167.



A Carriage lock pins
B Hook plates
C Manual locking lever
D Hoses
E Locking pins - hydraulic hoses

Installing Attachments

1. Make the machine safe.
   Refer to: Operation > Stopping and Parking (Page 55).
2. Position the attachment on solid, level ground. Make sure the attachment will not roll over.
3. Remove the existing attachment.
4. Engage the attachment. Refer to Figure 167.
   4.1. Make sure that the carrier lock pin is withdrawn.
   4.2. Use the control levers to align the carrier with the attachment and just below the attachment hook plates.
   4.3. Apply the park brake.
   4.4. Set the transmission to neutral.
   4.5. Use the boom controls to engage the support bar on the carrier into the hook plates on the attachment.
   4.6. Make sure that both hook plates are engaged equally.
   4.7. Lift and tilt the carrier back, to align the locking holes in the carrier with those in the attachment.
5. Lower the attachment to the ground.
6. Stop the engine.
7. Remove the ignition key.
8. At the carriage, operate the manual locking lever to engage the locking pins. Refer to Figure 167.

9. Make sure the locking pins are fully engaged. If a second person is to do this job keep your hands and feet away from the controls until he is clear of the machine.
10. If the attachment is hydraulically operated, connect the hoses. Refer to Figure 167.

    Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
11. Secure the hydraulic hose(s) to the carriage with locking pins. Refer to Figure 167.

Removing Attachments

1. Make the machine safe.

    Refer to: Operation > Stopping and Parking (Page 55).
2. Lower the attachment to the ground.
3. If the attachment is hydraulically operated, disconnect the hoses. Refer to Figure 167.

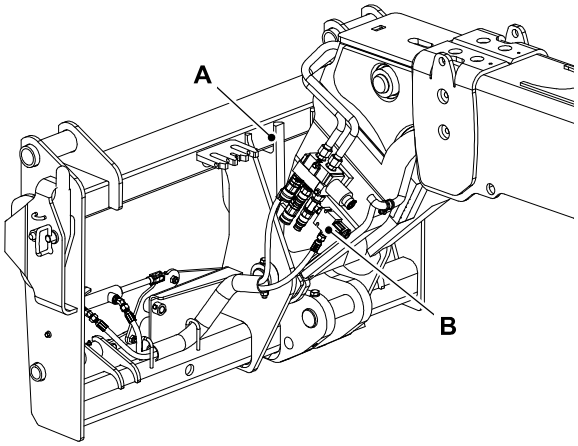
    Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
4. Remove the locking pins to release the attachment hydraulic hoses from the carriage. Refer to Figure 167.
5. Move the locking lever to the unlock position to disengage the locking pins. Refer to Figure 167.
6. Start the engine.
7. Tilt the carrier forward to withdraw the lower end of the carrier from the attachment. Then lower the boom slowly to withdraw the carrier from the attachment hook plates.
8. Carefully reverse the machine away from the attachment or retract the boom.

Hydraulic Pin Locking

⚠ **WARNING** The hydraulic pin locking isolation valve must returned to the fully closed position otherwise the locking pins could be inadvertently disengaged.

The hydraulic pin locking option allows attachments to be installed or removed without leaving the cab.

Figure 168.



A Hook plates

B Hose(s) couplings

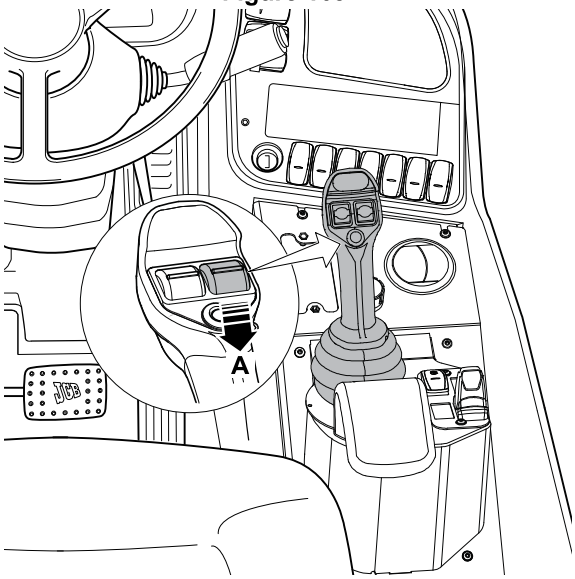
Installing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.

3. Lower the boom to the ground.
4. The isolation valve is installed to all machines that have a hydraulic pin lock option.
5. Use the boom controls to engage the support bar on the carriage in to the hook plates.
6. Make sure that both hook plates are engaged equally.
7. Lift and tilt the carriage back, to align the locking holes in the carriage with those in the attachment.
8. Turn on the hitch/auxiliary switch.
9. Move the thumb switch backwards to engage the locking pins.
10. If the attachment is hydraulically operated, connect the hoses.

    Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).

Figure 169.



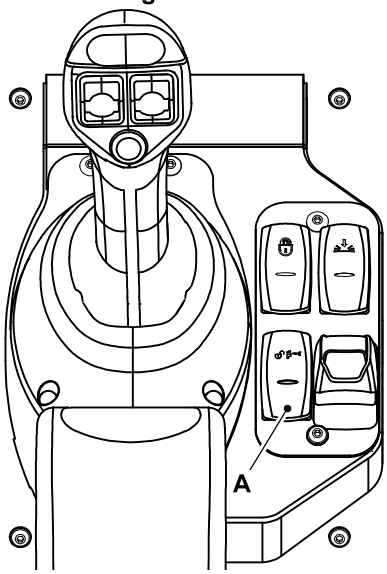
A Backward - engage locking pins

Removing Attachments

1. Park the machine on firm level ground.
2. Apply the park brake and set the transmission to neutral.
3. Lower the boom to the ground.
4. If the attachment is hydraulically operated, then disconnect the hoses.

   Refer to: Attachments > Working with Attachments > Connecting/Disconnecting Hydraulic Hoses (Page 132).
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

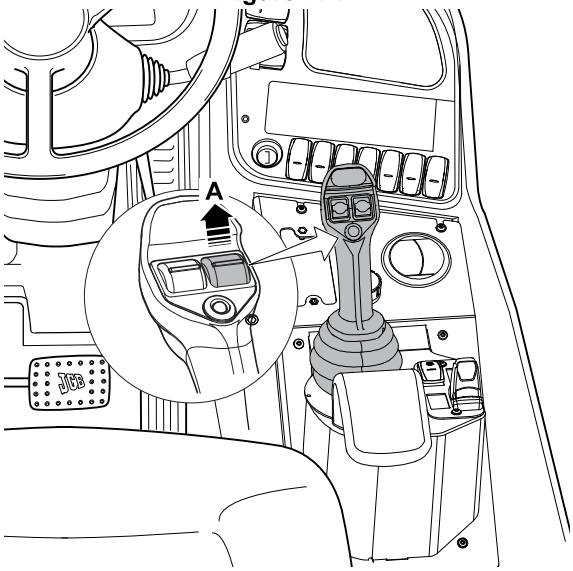
Figure 170.



A Unlock switch

7. Move the thumb switch forwards to disengage the locking pins.
8. Tilt the carriage forward slowly to withdraw the lower end of the carriage from the attachment.
9. Lower the boom slowly to withdraw the carriage from the attachment hook plates.
10. Carefully reverse the machine away from the attachment or retract the boom.

Figure 171.



A Forward - disengage locking pins

Tow Hitches

General

Introduction

⚠ **WARNING** Do not exceed the permitted limits on trailer gross weight or hitch load. The machine may become unstable.

WARNING Examine the tow hitch and the trailer draw bar towing ring for signs of wear before each use. A badly fitting or worn hitch or towing ring could cause loss of the trailer and injury to yourself or other people.

Your machine may be equipped with an optional trailer towing hitch.

You must identify the type of towing hitch installed and follow the appropriate operating instructions.

Make sure that the trailer draw bar is suitable for your machine and has sufficient clearance to enable the machine to turn without fouling. The table shows the recommended trailer ring for each hitch type.

Make sure that before you tow with the machine, you and your machine obey with all the pertinent laws and regulations.

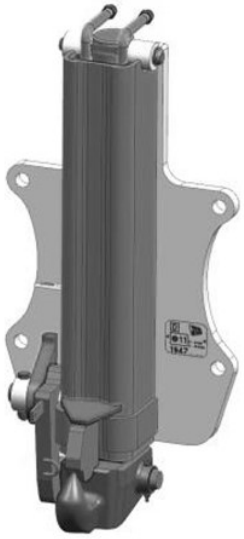
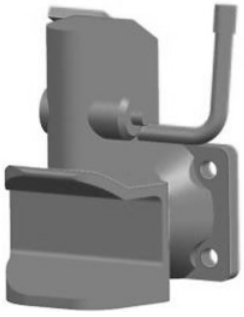
Make sure the machine tyre pressures are correct and that the loaded trailer does not exceed the maximum gross trailer weight and vertical hitch load. Refer to: Technical Data > Wheels and Tyres (Page 263).

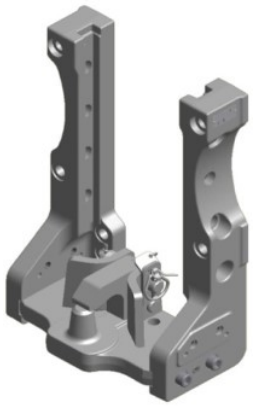
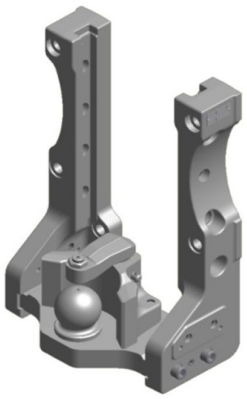
When towing, the machine must be unladen (without ballast).

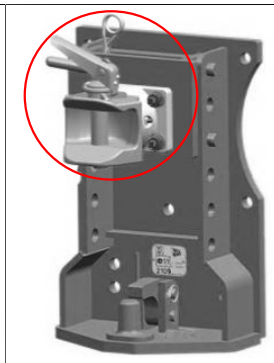
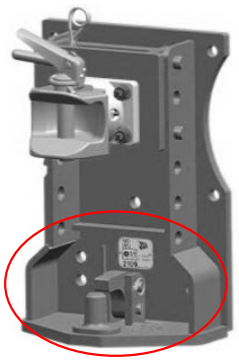
Hitch Identification

Use the following table to identify your tow hitch and trailer connection. Some machines are installed with a fixed hitch piton or ball and a ladder mounted clevis hitch.

Table 17.

Hydraulic pick-up hitch	H1		Ring (ISO (International Organization for Standardization) 5692-1:2004) Internal Ø 50, OuterØ110, Section Ø30. Ring (ISO 20019-1:2001) Internal Ø 50, OuterØ110 - 132, Section Ø 30 to 41	160/02038
Rockinger fixed clevis hitch - automatic	H2		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	331/29312
Rockinger fixed clevis hitch - manual	H3		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	331/26986
Rockinger automatic hitch ø 38mm	H4[1]		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	333/H1305

Rockinger automatic hitch ø 30.6mm	H5[1]		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	333/H1358
Rockinger manual hitch	H6[1]		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	333/H1359
Rockinger ladder hitch - piton	H7		Ring (ISO 5692-1:2004) Internal Ø 50, OuterØ110, Section Ø 30	333/H1235
Rockinger ladder hitch - ball	H8		Socket (ISO 24347) Internal Ø 80, Outer Ø125	333/H1241

Ladder hitch with Rockinger fixed clevis hitch	H9		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	160/15242
Ladder hitch - piton	H10		Ring (ISO 5692-1:2004) Internal Ø 50, OuterØ110, Section Ø 30	160/13344
Rockinger ladder hitch (only)	H11[(1)]		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42, Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42 or Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	333/H1239

(1) Installed on to Rockinger ladder hitch - piton, Rockinger ladder hitch - ball or Rockinger ladder hitch (only).

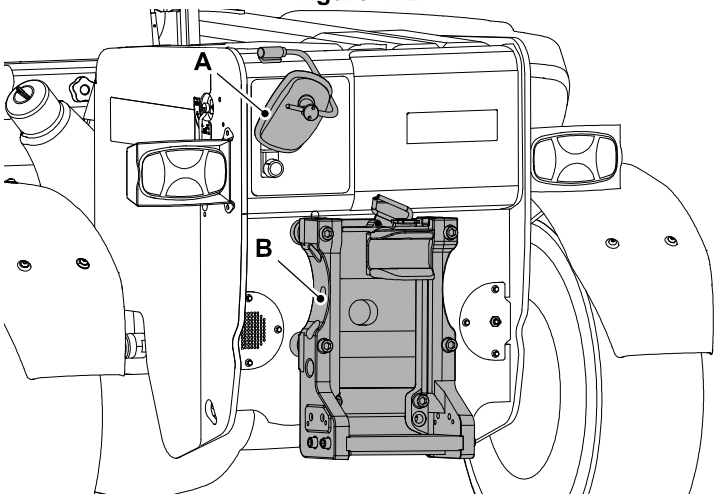
Ladder Hitch

⚠ **WARNING** Ensure that no person is between the machine and trailer when the machine is reversing up to the trailer.

Manual Rockinger Hitch

1. Apply the park brake.
2. Adjust the mirror (s) to obtain a good view of the pickup hitch.
3. Remove the retaining pin to adjust the hitch height.

Figure 172.



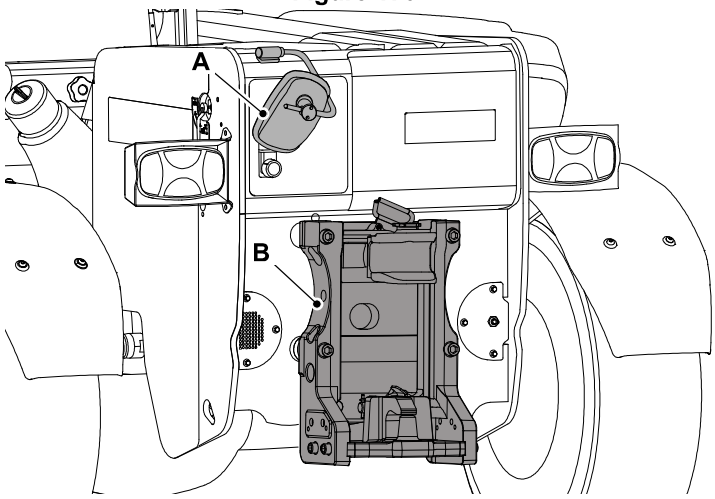
A Mirror **B** Rocking hitch

4. Support the hitch and remove the locating pins.
5. The hitch can be moved up or down until the holes for the locating pins align with the holes in the hitch.
6. Install the locating pin and retaining pins.
7. Remove the trailer securing pin.
8. Engage the Trailer:
   - 8.1. Make sure that the trailer and its draw bars are correctly positioned for engagement before the machine begins to approach it.
   - 8.2. If a helper is available to manoeuvre the trailer he should stand well clear of the machine until the tow hitch is correctly aligned with the trailer towing eye.
   - 8.3. The helper should not approach the trailer or machine until the machine has been stopped, with the park brake engaged and the engine switched off.
   - 8.4. When the trailer has been engaged, with pin secured in position, the machine operator must not start the engine until the helper is clear of the machine and trailer.

Manual Piton Hitch

1. Apply the park brake.
2. Adjust the mirror (s) to obtain a good view of the pickup hitch.
3. Remove the safety pin.

Figure 173.



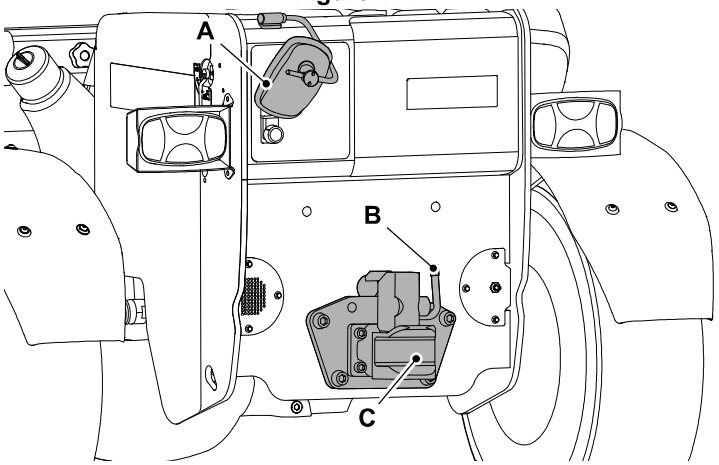
A Mirror **B** Piton hitch

4. Remove the securing arm pin.
5. Lift up the securing arm.
6. Engage the trailer onto the hitch:
   6.1. Make sure that the trailer and its draw bars are correctly positioned for engagement before the machine begins to approach it.
   6.2. If a helper is available to manoeuvre the trailer he should stand well clear of the machine until the tow hitch is correctly aligned with the trailer towing eye.
   6.3. The helper should not approach the trailer or machine until the machine has been stopped, with the park brake engaged and the engine switched off.
   6.4. When the trailer has been engaged, replace the pins and make sure they are secured in position, the machine operator must not start the engine until the helper is clear of the machine and trailer.

Rockinger Automatic Tow Hitch

1. Apply the park brake.
2. Adjust the mirror (s) to obtain a good view of the pickup hitch.
3. Move the locking lever to the position as shown.

Figure 174.



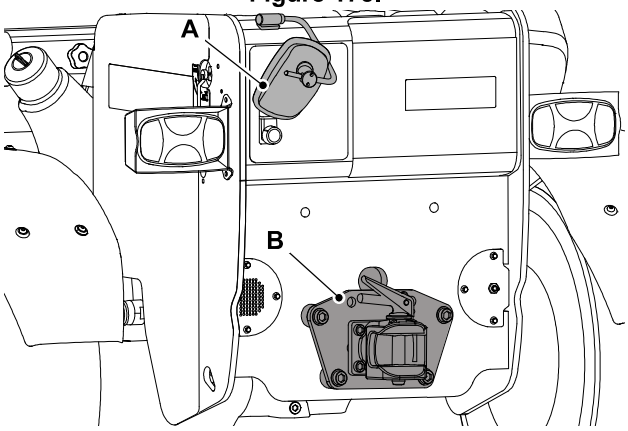
A Mirror
B Locking lever
C Funnel

4. Engage the trailer in the funnel:
   4.1. Make sure that the trailer and its draw bars are correctly positioned for engagement before the machine begins to approach it.
   4.2. If a helper is available to manoeuvre the trailer he should stand well clear of the machine until the tow hitch is correctly aligned with the trailer towing eye.
   4.3. The helper should not approach the trailer or machine until the machine has been stopped, with the park brake engaged and the engine switched off.
   4.4. When the trailer has been engaged, the lever will automatically return to the locked position.

Clevis Hitch

1. Apply the park brake.
2. Adjust the mirror (s) to obtain a good view of the pickup hitch.
3. Move the clevis hitch lever to the position as shown.

Figure 175.



A Mirror
B Clevis hitch

4. Engage the trailer in the funnel:

4.1. Make sure that the trailer and its draw bars are correctly positioned for engagement before the machine begins to approach it.

4.2. If a helper is available to manoeuvre the trailer he should stand well clear of the machine until the tow hitch is correctly aligned with the trailer towing eye.

4.3. The helper should not approach the trailer or machine until the machine has been stopped, with the park brake engaged and the engine switched off.

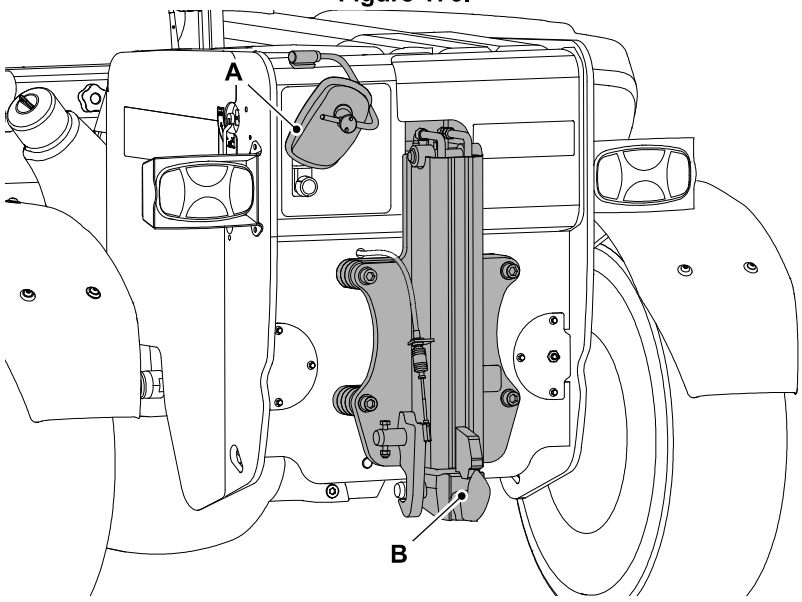
4.4. When the trailer has been engaged, the lever will automatically return to the locked position.

Hydraulic Tow Hitch

To operate the pickup hitch, use the procedure as follows:

1. Apply the park brake.
2. Adjust the mirror (s) to obtain a good view of the tow hitch area.

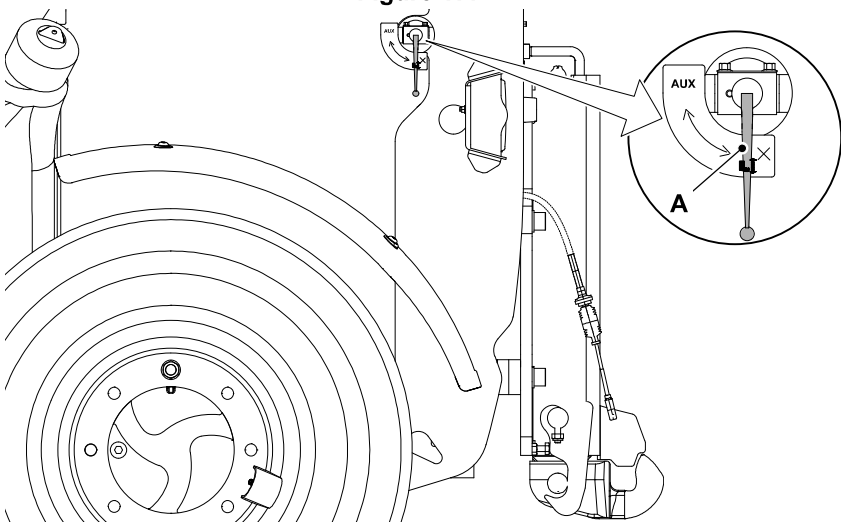
Figure 176.



A Mirror **B** Locking lever

3. Make sure the auxiliary/hitch switchover lever is in the position shown.

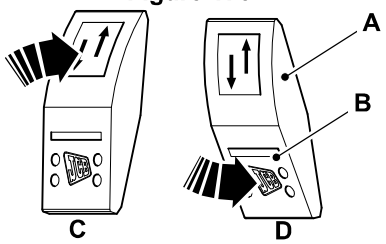
Figure 177.



A Auxiliary/hitch switchover lever

4. To select the rear auxiliary circuit, set switch to position I. The switch light should be extinguished.

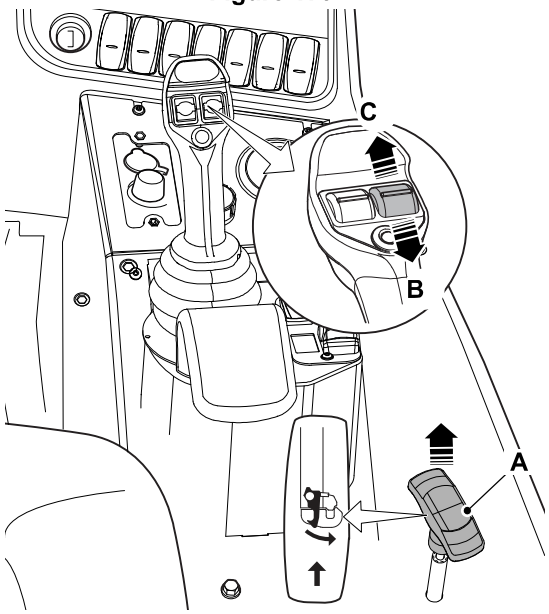
Figure 178.



A Set switch
B Switch light
C Position I
D Position II

5. Operate the switch to raise the hitch, this will remove the load on locking lever.

Figure 179.



A Lever
B Lower the hitch position
C Raise the hitch position

6. Pull up the lever and hold to release the pickup hitch locking lever.
7. Operate the control in backward direction to lower the hitch.

   WARNING! *Ensure that no person is between the machine and trailer when the machine is reversing up to the trailer.*

8. Engage the trailer.

   8.1. Make sure that the trailer and its draw bars are correctly positioned for engagement before the machine begins to approach it.

   8.2. It is essential that the tow bar is parallel with the machine when the pickup hitch is raised and locked.

   8.3. If a helper is available to manoeuvre the trailer he should stand well clear of the machine until the tow hitch is correctly aligned with the trailer towing eye.

   8.4. The helper should not approach the trailer or machine until the machine has been stopped, with the park brake engaged and the engine switched off.

9. Operate the switch to raise the hitch. The locking lever will automatically spring back to the engaged position when the hitch is raised.
10. When the trailer has been engaged, with locking lever secured in position, the machine operator must not start the engine until the helper is clear of the machine and trailer.

Mechanical Tow Hitch

Connecting the Trailer

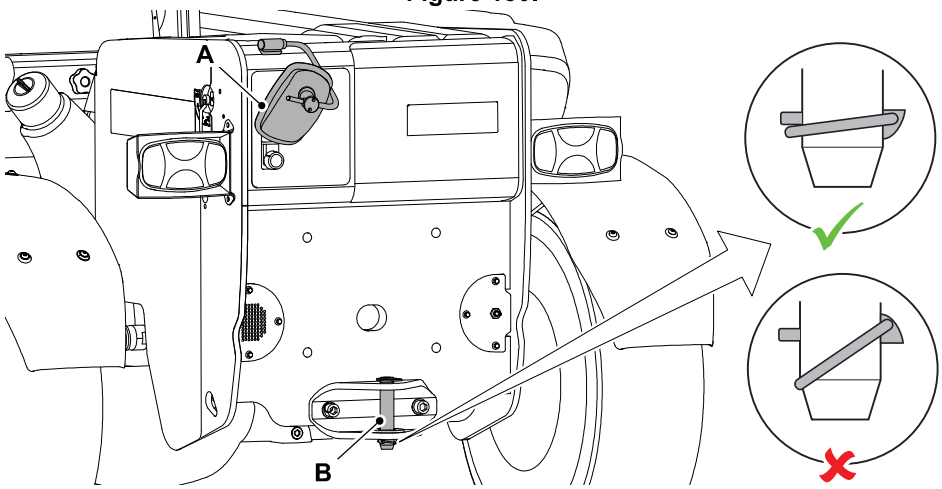
⚠ **WARNING** Ensure that no person is between the machine and trailer when the machine is reversing up to the trailer.

To operate the pickup hitch, use the procedure as follows:

1. Apply the park brake.

2. Adjust the mirror(s) to obtain a good view of the pickup hitch.
3. Engage the Trailer:

Figure 180.



A Mirror **B** Secure pin

3.1. Make sure that the trailer and its draw bars are correctly positioned for engagement before the machine begins to approach it.

3.2. If a helper is available to manoeuvre the trailer he should stand well clear of the machine until the tow hitch is correctly aligned with the trailer towing eye.

3.3. The helper should not approach the trailer or machine until the machine has been stopped, with the park brake engaged and the engine switched off.

3.4. When the trailer has been engaged, with pin secured in position, the machine operator must not start the engine until the helper is clear of the machine and trailer.

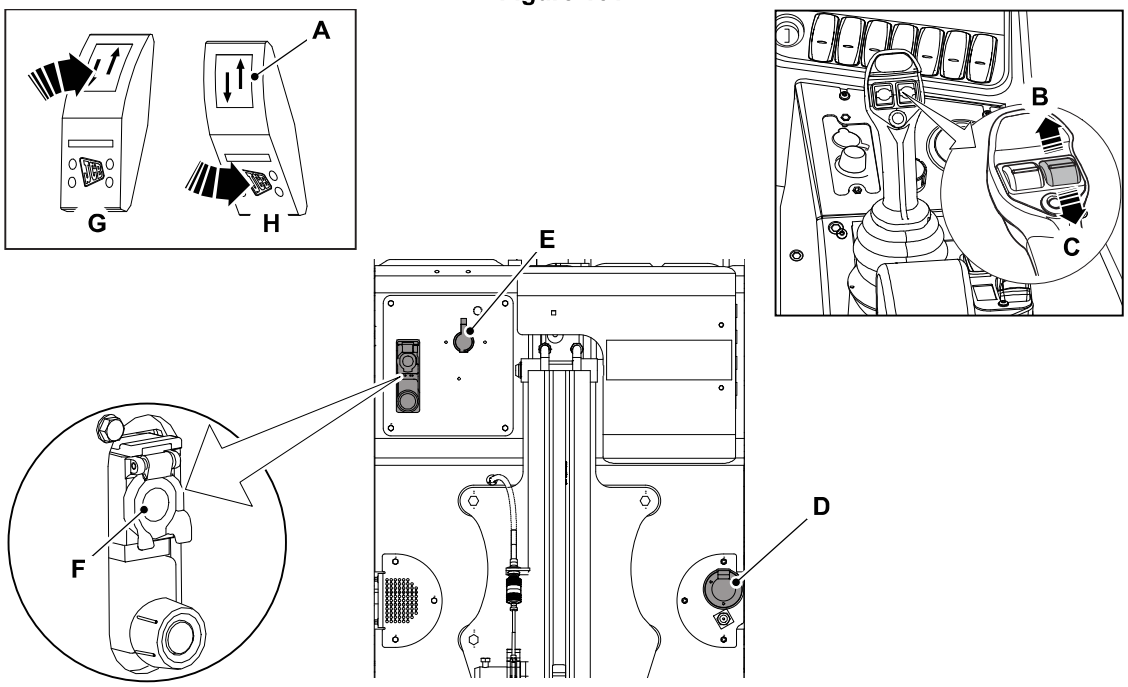
Prepare the Trailer for Towing

⚠ **WARNING** Make sure that the hitch/auxiliary selector switch is in the correct position or the lever operated brake circuit will be inoperable.

WARNING Make sure the trailer hitch has correctly engaged and locked before driving off.

WARNING If the hose for auxiliary braking is temporarily disconnected to allow the use of the trailer's auxiliary service (ie. tipping), make sure the hose for auxiliary braking is connected to adaptor before driving the machine.

Figure 181.



A Set switch
B Control direction - forward
C Control direction - backward
D Electric socket
E Trailer brake connector
F Rear auxiliary connector
G Position 1
H Position 2

1. To select the rear auxiliary circuit, set switch to position 1. The switch light should be extinguished.
2. Connect the trailer lights into the socket. Make sure that all the trailer lights are working correctly and are visible by other road users.
3. Make sure the trailer direction indicator lights are working correctly.
4. Connect the trailer brakes to connector (if installed):
   4.1. If an optional trailer brake valve is installed: to apply the brakes push the brake pedal.
   4.2. Before you travel on the public highway check that the brakes work correctly and get used to the braking effect.
5. For auxiliary operation, i.e. trailer tipping, connect the service to adaptor. If using the auxiliary service for braking, after disconnecting the brake/hitch hose, reconnect the brake/hitch hose prior to moving off.
6. Operate the control in direction (s) depending on the attachment installed and the function required.
7. To prevent contamination of the machine hydraulics, close all rams on the attachment/trailer before disconnecting the hydraulic service to exhaust the trailer ram of oil.

Jibs

General

⚠ **WARNING** This attachment has a maximum safe working load. Do not exceed the safe working load. Do not exceed the machine stability limits shown on the load chart(s) in the cab.

WARNING Load and unload on firm, level ground. Always be alert for possible hazards. Take special care when turning or reversing.

Safety

Read and understand all the warning messages. Follow all the safety instructions given in this Operator Manual. Do not install/operate an attachment until you are sure that you can operate it.

Use the attachment only if it carries up to date test certificates.

Operation

You must obey the following precautions when using this attachment.

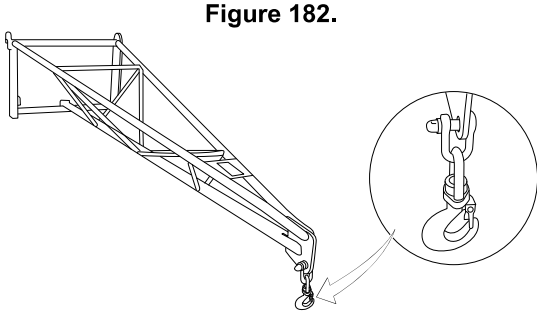
- Before you lift or manoeuvre a load with the attachment, check the appropriate load chart in the cab and understand the lift capacities.
- Make sure the machine is in a level position. If necessary, reposition the machine using chassis levelling control or stabilisers (if fitted).
- Use the lifting shackle which is suitable for the job, in good condition and proof tested where necessary.
- Always sling the load safely and in accordance with any local regulations.
- Make sure that the hook safety catch is closed correctly to prevent the sling(s) from slipping off the hook.
- Always lift the load carefully, to avoid snatching the sling(s).
- Keep yourself and other people clear of a suspended load, especially from beneath the load.
- Always remember that the effective length of the boom is increased when an attachment is installed. Before manoeuvring the machine with an attachment make sure you have sufficient clearance.
- You must be careful while carrying a suspended load. Keep the load as low to the ground as possible. If necessary, use guide ropes to prevent the load from swinging.
- Always travel in 1st gear at walking speed when carrying a suspended load. Wherever possible, travel on firm, level ground. Avoid rough or excessively uneven ground.
- Do not carry suspended loads on public roads.
- Always be aware of the affects of wind velocity on the load being handled.

Extension Jib

⚠ **WARNING** The attachment is heavy. Take care when lifting and handling it. Use suitable lifting equipment. Make sure the lifting equipment is in good condition. Make sure the lifting equipment complies with all pertinent regulations. Wear gloves and safety shoes.

This is a Q-fit attachment. It gives your machine greater reach and height. This attachment is supplied with test certificates for its fabrication, its hook and its shackle. The safe working load is stamped on a plate mounted on the attachment. Refer to: Operation > Working with the Boom (Page 104).

Figure 182.



Extension jib

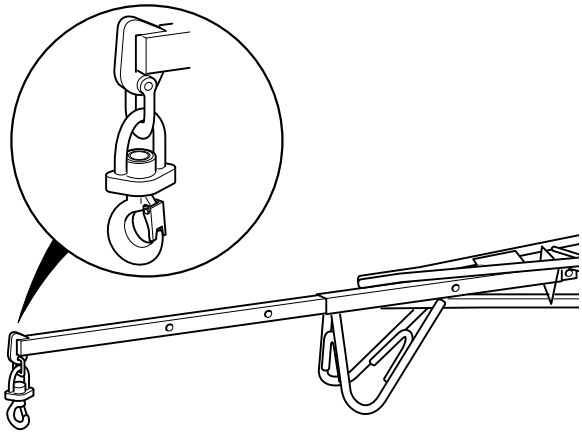
Roof Truss Jib

⚠ **WARNING** The attachment is heavy. Take care when lifting and handling it. Use suitable lifting equipment. Make sure the lifting equipment is in good condition. Make sure the lifting equipment complies with all pertinent regulations. Wear gloves and safety shoes.

WARNING Refer to the load chart in the cab for permissible loading for each position of the jib extension.

This a Q-fit attachment. It gives your machine greater reach and height. This attachment is supplied with test certificates for its fabrication, its hook and its shackle. The safe working load is stamped on a plate mounted on the attachment.

Figure 183.



Roof truss jib

Installing/Removing

The attachment is heavy. Take care when lifting and handling it. Use suitable lifting equipment. Make sure the lifting equipment is in good condition. Make sure the lifting equipment complies with all pertinent regulations. Wear gloves and safety shoes.

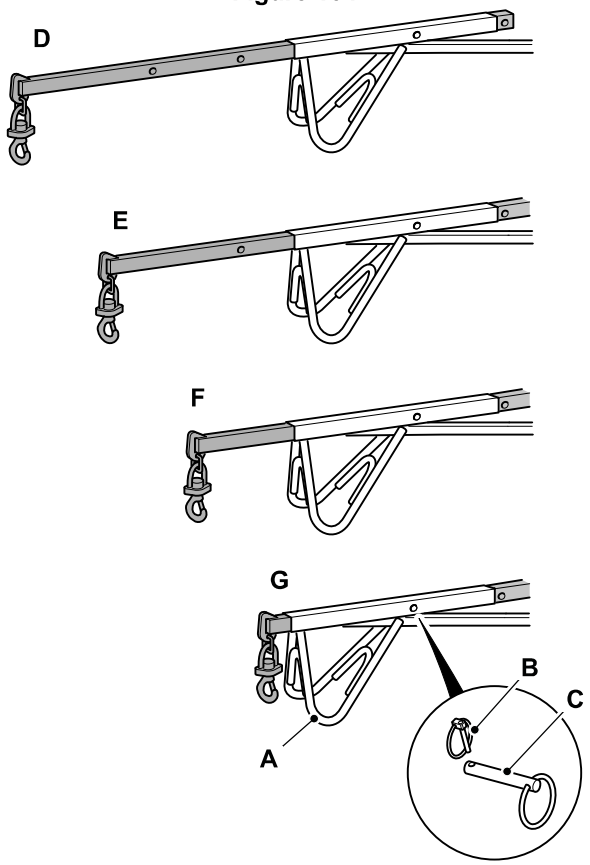
The installation will be easier if the attachment is rested on wooden blocks.

Store the attachment carefully to prevent damage and corrosion.

Extending the Jib

The jib may be extended to one of four positions:

Figure 184.



A Skid
B Lynch pin
C Pin
D Jib - fully extended
E Jib - extended position 1
F Jib - extended position 2
G Jib - fully retracted

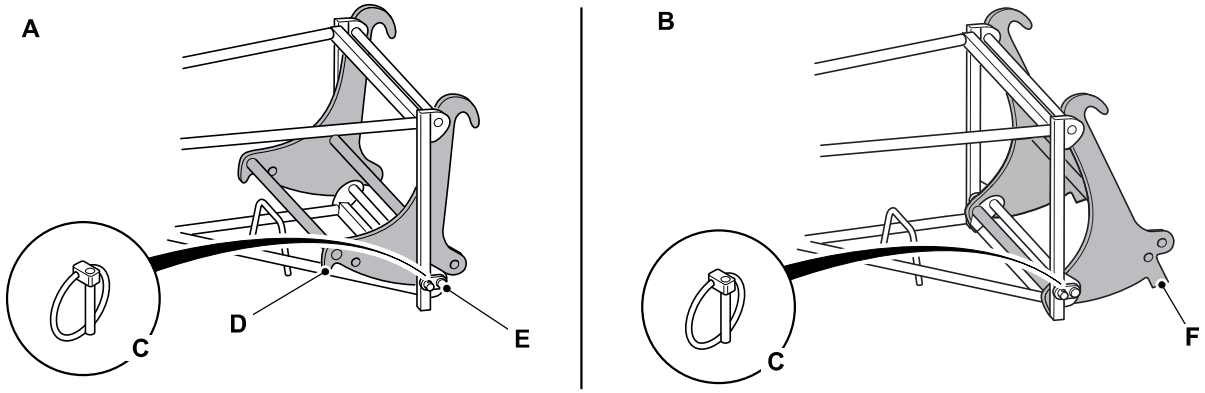
1. Remove the load and lower the jib to the ground.
2. Make sure the skid is supporting the weight of the jib.
3. Remove the lynch pin, then pin.
4. Move the jib extension to the required position; fully extended or fully retracted.
5. Insert the pin and secure with lynch pin.

Changing the Jib Angle

The angle of the jib may be set in one of two positions.

- Placing position
- Travel position

Figure 185.



A Placing position
C Lynch pin
E Bar
B Travel position
D Stops
F Stops

When in the travel position, do not extend the boom and do not raise the boom more than 45°

To change the jib position:

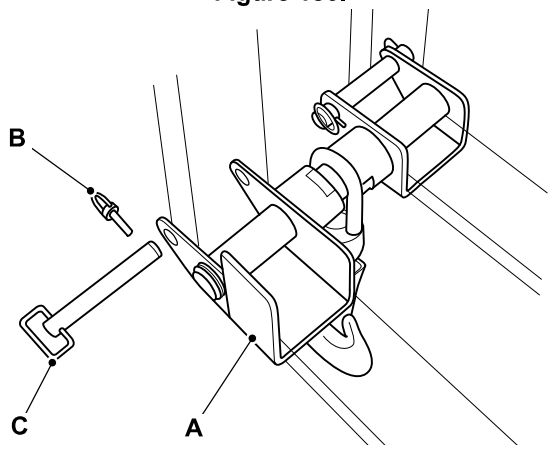
1. Remove the load and lower the jib to the ground.
2. Make sure the skid is supporting the weight of the jib.
3. Remove the lynch pin, then pin.
4. Use the tilt control in the cab to rotate the carriage until the holes align in the required position. Stops will prevent excessive movement of the jib.
5. Insert the bar and secure with lynch pin.

Hooks

Fork-Mounted Hook

The fork mounted hook allows the machine to carry slung loads with safety. It incorporates a swivel hook with a spring-loaded safety catch. This attachment is supplied with test certificates for its fabrication and its hook. Its safe working load is stamped on a plate mounted on the attachment.

Figure 186.



A Mounting sockets
B Lynch pin
C Locking bar

Installing

1. Make the machine safe. Refer to (PIL 01-03).
2. Space the forks, equally on either side of the machine centreline, so that the mounting sockets can be slid onto them.
3. Tighten the fork clamping screws to prevent movement.
4. Install the attachment.
   4.1. Remove the lynch pin and locking bar.
   4.2. Slide attachment over the forks so that the rear of the attachment butts against the heels of the forks.
   4.3. Install the locking bar and secure with lynch pin.
   4.4. Make sure both mounting brackets are installed securely.

Removing

1. Lower the attachment so that it just clears the ground.
2. Apply the park brake and stop the engine.
3. Remove the attachment.
   3.1. Remove the lynch pin and locking bar.
   3.2. Carefully slide the attachment off the forks.
   3.3. Install the locking bar and secure with lynch pin.
   3.4. Store the attachment carefully to prevent damage and corrosion.

Work Platforms

General

⚠ **DANGER** Using the forks alone as a working platform is hazardous; you can fall off and be killed or injured. Never use the forks as a working platform.

The use of work platforms with this machine is subject to legislation which varies from territory to territory. It is the responsibility of the owner/operator and supplier of the work platform to ensure compliance with the relevant legislation in the relevant territory. In the case of uncertainty, guidance should be sought from the relevant local or government authority.

JCB supply integrated work platforms solely for use in Europe which comply with the requirements of European Directive 2006/42/EC. Contact your dealer for further details. Health and safety legislation also varies from territory to territory. Customers should check the latest health and safety legislation for the territory in which the work platform is to be used prior to operation.

Preservation and Storage
Cleaning

General

⚠ **WARNING** When using cleaning agents, solvents or other chemicals, you must adhere to the manufacturer's instructions and safety precautions.

CAUTION To avoid burning, wear personal protective equipment when handling hot components. To protect your eyes, wear goggles when using a brush to clean components.

Notice: Cleaning metal parts with incorrect solvents can cause corrosion. Use only recommended cleaning agents and solvents.

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

Notice: Never use water or steam to clean inside the cab. The use of water or steam could damage the on-board computer and render the machine inoperable. Remove dirt using a brush or damp cloth.

Clean the machine with water and/or steam. Do not let mud, debris etc. to collect on the machine.

Before you do any service procedures that require components to be removed:

- The cleaning must be done either in the area of components to be removed, or in the case of major work, or work on the fuel system, the whole engine and the surrounding machine must be cleaned.
- When cleaning is complete, move the machine away from the wash area or alternatively, remove the material washed from the machine.

When you remove components, be aware of exposure to dirt and debris. Cover any open ports and remove the deposits before proceeding.

Refer to the individual clean procedures throughout the Maintenance section. Refer to: Maintenance > Maintenance Schedules (Page 196).

Detergents

Do not use a full strength detergent. Always dilute the detergents as per the manufacturer's recommendations, or damage to the paint finish can occur.

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

Pressure Washing and Steam Cleaning

⚠ **CAUTION** When using a steam cleaner, wear safety glasses or a face shield as well as protective clothing. Steam can cause personal injury.

Notice: The engine and other components could be damaged by high pressure washing systems. Special precautions must be taken if the machine is to be washed using a high pressure system.

Make sure that the alternator, starter motor and any other electrical components are shielded and not directly cleaned by the high pressure cleaning system. Do not aim the water jet directly at bearings, oil seals or the engine air induction system.

Use a low pressure water jet and brush to remove dried mud or dirt.

Use a pressure washer to remove soft dirt and oil.

The machine must always be greased (if appropriate) after pressure washing or steam cleaning.

Preparation

1. Make the machine safe.

   Refer to: Maintenance > Maintenance Positions (Page 201).

2. Stop the engine and let it cool for at least one hour. Do not try to clean any part of the engine while it is running.
3. Make sure that all of the electrical connectors are correctly coupled. If the connectors are open, attach the correct caps or seal with water proof tape.

Checking For Damage

General

Refer to the individual condition checks throughout the Maintenance section. Refer to: Maintenance > Maintenance Schedules (Page 196).

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 the grease or petroleum jelly from the ram piston rods.
2. Examine all fluid levels. If necessary, add more fuel.

3. Install a charged battery.
4. Start the engine.
5. Operate the hydraulic controls. Make sure that the hydraulic functions operate correctly.
6. Prepare the machine for storage.

Take out of Storage

1. Examine the coolant condition. Replace if necessary.
2. Examine all fluid levels. If necessary, add more fluid.
3. Clean the machine to remove all unwanted material and corrosive products. Dry the machine to remove solvents and moisture
4. Remove the grease or petroleum jelly from the ram piston rods.
5. Install a charged battery.
6. Start the engine.
7. Operate the hydraulic controls. Make sure that the hydraulic functions operate correctly.

Security

General

Vandalism and the theft of unattended machines is an ever increasing problem and JCB is doing everything possible to help stop this.

Your JCB dealer will be pleased to provide information on any of these sensible precautions. Act now!

JCB Plantguard

JCB Plantguard is a comprehensive package available to help you safeguard your machine. It includes such devices as vandal proof covers, window etching, immobiliser, concealed serial number, battery isolator, tracker security system etc.

Remember that the installation of any one of these security devices will help to minimise not only the damage or loss of your machine, but also subsequent lost productivity. It could also help to reduce insurance premiums.

Construction Equipment Security and Registration Scheme (CESAR)

CESAR (Construction Equipment Security and Registration) is a simple, effective method of machine identification and registration that operates throughout the United Kingdom and Ireland and across the whole spectrum of JCB products.

CESAR is a scheme to help decrease plant theft, and was developed by the Metropolitan Police and the Home Office Plant Theft Action Group.

The key to the scheme is its simplicity and it will mean that every police officer in the country will know how to identify construction machinery and verify ownership. This will provide a major leap forward in both protecting machinery, and recovering it.

The Construction Equipment Association is managing the scheme, and Datatag are providing the security material and support. JCB is fully supportive of the CESAR initiative and will offer it as a factory option across the range.

The CESAR kit includes 2 tamper proof triangular identification plates installed on either side of the machine, a unique transponder, mini radio frequency identification tags concealed throughout the machine, Datatag micro dots, and a unique DNA coded chemical painted on the machines major components. Plus a registration certificate logged onto the CESAR or DVLA databases, and a change of keeper form.

LiveLink

Your JCB machine may be installed with LiveLink, JCB's advanced machine monitoring system. LiveLink monitors a range of information about your machine and sends it through cellular and satellite communication back to JCB's secure monitoring centre.

The machine owners and JCB dealers can then view that information through the LiveLink website, by email and even through text message. If you want to know how LiveLink can help manage your JCB machines, contact your local dealer for more information.

Maintenance
Introduction

General

Your machine has been designed and built to give maximum performance, economy and ease of use under a wide variety of operating conditions. Prior to delivery, your machine was inspected both at the factory and by your dealer to make sure that it reaches you in optimum condition. To maintain this condition and trouble free operation it is important that the routine services, as specified in this manual, are done by an approved JCB dealer at the recommended specified intervals and it is recommended that this is done by an approved JCB dealer using genuine JCB parts. Servicing/repairs carried out by unauthorised personnel or the use of non-genuine inferior quality parts could limit machine warranty.

This section of the manual gives full details of the service requirements necessary to maintain your JCB machine at peak efficiency. A service manual for your machine is available from your JCB dealer. The service manual contains information on how to repair, disassemble and assemble your machine correctly.

It can be seen from the service schedules on the following pages that many essential service checks must only be done by a JCB trained specialist competent person. Only JCB dealer service engineers have been trained by JCB to do such specialist tasks, and only JCB dealer service engineers are equipped with the necessary special tools and test equipment to do such tasks, thoroughly, safely, accurately and efficiently.

JCB regularly updates its dealers to advise them of any machine developments, changes in specifications and procedures. Therefore only a JCB dealer is fully able which makes them best placed to maintain and service your machine.

A service record sheet or book is provided which will enable you to plan your service requirements and keep a service history record. It must be dated, signed and stamped by your dealer each time your machine is serviced.

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

When the machine is removed from service, local regulations for machine decommissioning and disposal will vary. Contact your nearest JCB dealer for further information.

Owner/Operator Support

JCB together with your dealer wants you to be completely satisfied with your new JCB machine. However, if you do have a problem, you can contact your dealers service department who are there to help you!

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

To get the most from your dealer please help them to satisfy you by providing them with:

1. Your name, address and telephone number.
2. Your machine model and serial number.
3. The date of purchase and hours of work.
4. The nature of the problem.

Remember, only your JCB dealer has access to the vast resources available at JCB to help support you. In addition, your dealer is able to offer a variety of programmes covering warranty, fixed price servicing, safety inspections, including weight tests, covering both legal and insurance requirements.

Service/Maintenance Agreements

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

Please consult your JCB dealer for details.

Initial Service and Inspection

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

Obtaining Spare Parts

If you use non-genuine JCB parts or consumables, then you can compromise the health and safety of the operator and cause machine failure.

A parts book for your machine is available from your JCB dealer. The parts book will help you identify parts and order them from your JCB dealer.

Your dealer will need to know the exact model, build and serial number of your machine. Refer to: About the Product > Product and Component Identification (Page 10).

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

Maintenance Safety

General

Raised Machine

Never position yourself or any part of your body under a raised machine which is not correctly supported. If the machine moves unexpectedly you could become trapped and suffer serious injury or be killed.

Air Conditioning Maintenance

The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system should be disconnected until the system has been discharged by a refrigeration engineer or a suitably trained person. You can be severely frostbitten or injured by escaping refrigerant.

Compressed Air

Compressed air is dangerous. Wear personal protective equipment. Never point a compressed air jet at yourself or others.

Springs

Always wear personal protective equipment when dismantling assemblies containing components under pressure from springs. This will protect against eye injury from components accidentally flying out.

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.

Communications

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

Repairs

If your machine does not function correctly in any way, get it repaired straight away. Neglect of necessary repairs could result in an accident or affect your health. Do not try to do repairs or any other type of maintenance work you do not understand. To avoid injury and/or damage get the work done by a specialist engineer.

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.

'O' rings, Seals and Gaskets

Badly installed, damaged or rotted 'O' rings, seals and gaskets can cause leakages and possible accidents. Renew whenever disturbed unless otherwise instructed. Do not use Triochloroethane or paint thinners near 'O' rings and seals.

Arc Welding

To prevent the possibility of damage to electronic components, disconnect the battery and the alternator before arc-welding on the machine or attached implements.

If the machine is equipped with sensitive electrical equipment, i.e. amplifier drivers, electronic control units (ECUs), monitor displays, etc., then disconnect them before welding. Failure to disconnect the sensitive electrical equipment could result in irreparable damage to these components.

Parts of the machine are made from cast iron, welds on cast iron can weaken the structure and break. Do not weld cast iron. Do not connect the welder cable or apply any weld to any part of the engine.

Always connect the welder earth (ground) cable to the same component that is being welded to avoid damage to pivot pins, bearings and bushes. Attach the welder earth (ground) cable a distance from the part being welded no more than 0.6m.

Counterweights

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

Accumulators

The accumulators contain hydraulic fluid and gas at high pressure. Prior to any work being carried out on systems incorporating accumulators, the system pressure must be discharged by a JCB dealer, as the sudden release of the hydraulic fluid or gas may cause injury.

Hot Components

Touching hot surfaces can burn skin. The engine and machine components will be hot after the unit has been running. Allow the engine and components to cool before servicing the unit.

Soft Ground

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

Working Under the Machine

Make the machine safe before getting beneath it. Make sure that any attachments on the machine are correctly attached. Engage the park brake (if installed), remove the ignition key, disconnect the battery. If the machine has wheels use blocks to prevent unintentional movement.

Lifting the Machine

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

Chemicals

Certain seals and gaskets (e.g. crankshaft oil seal) on JCB machines contain fluoroelastomeric materials such as Viton®, FluorelTM and Technoflon®. Fluoroelastomeric materials subjected to high temperatures can produce highly corrosive hydrofluoric acid. This acid can severely burn. New fluoroelastomeric components at ambient temperature require no special safety precautions. Used fluoroelastomeric components whose temperatures have not exceeded 300°C (571.6°F) require no special safety precautions. If evidence of decomposition (e.g. charring) is found, refer to the next paragraph for safety instructions. Do not touch component or surrounding area. Used fluoroelastomeric components subjected to temperatures greater than 300°C (571.6°F) (e.g. engine fire) must be treated using the following safety procedure. Make sure that heavy duty gloves and special safety glasses are worn: Thoroughly wash contaminated area with 10% calcium hydroxide or other suitable alkali solution, if necessary use wire wool to remove burnt remains. Thoroughly wash contaminated area with detergent and water. Contain all removed material, gloves etc. used in this operation in sealed plastic bags and dispose of in accordance with Local Authority Regulations. Do not burn fluoroelastiometric materials.

Hydraulic Hoses

Never re-use hydraulic hose end crimps or use reusable hose end crimps.

Personal Protective Equipment

Use the appropriate personal protective equipment before performing maintenance on the machine, otherwise you could be injured.

Working at Height

Use appropriate access equipment such as ladders or a working platform if it is necessary to work at height to perform maintenance tasks on the machine. If you do not use suitable access equipment there is a risk of falling, resulting in personal injury.

Fluids and Lubricants

Oil

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

Fluid Under Pressure

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.

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 closed acid proof 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 engine. 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

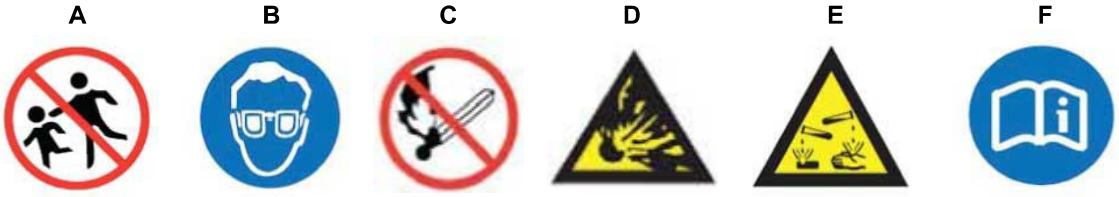
  - Using a nail brush will help
  - Use special hand cleansers to help clean dirty hands
  - Never use petrol, diesel fuel, or paraffin for washing
- Avoid skin contact with oil soaked clothing
- Don't keep oily rags in pockets
- Wash dirty clothing before re-use
- Throw away oil-soaked shoes

Battery

Warning Symbols

The following warning symbols may be found on the battery.

Figure 187.



A Keep away from children
B Shield eyes
C No smoking, no naked flames, no sparks
D Explosive gas
E Battery acid
F Note operating instructions

First Aid - Oil

Eyes

In the case of eye contact, flush with water for 15min. If irritation persists, get medical attention.

Swallowing

If oil is swallowed do not induce vomiting. Get medical advice.

Skin

In the case of excessive skin contact, wash with soap and water.

Spillage

Absorb with sand or a locally approved brand of absorbent granules. Scrape up and remove to a chemical disposal area.

Fires

⚠ **WARNING** Do not use water to put out an oil fire. This will only spread it because oil floats on water.

Extinguish oil and lubricant fires with carbon dioxide, dry chemical or foam. Fire fighters must use self contained breathing apparatus.

First Aid - Electrolyte

Eyes

In the case of eye contact, flush with water for 15min. always get medical attention.

Swallowing

Do not induce vomiting. Drink large quantities of water or milk. Then drink milk of magnesia, beaten egg or vegetable oil. Get medical help.

Skin

Flush with water, remove affected clothing. Cover burns with a sterile dressing then get medical help.

First Aid - DEF (if applicable)

Do not drink or inhale DEF (Diesel Exhaust Fluid). If large quantities of DEF have been swallowed a doctor should be called immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

Avoid prolonged or repeated skin contact. After contact with skin wash thoroughly with plenty of soap and water. If irritation develops seek medical advice.

Avoid contact with eyes, skin and clothing. Wear chemical resistant gloves, overalls and safety goggles complying with an approved standard. If in contact with eyes, rinse immediately with plenty of clean water. If irritation occurs seek medical attention. Always wash hands and arms thoroughly after handling before eating, drinking, smoking or using the lavatory.

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 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.

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 18.

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 19.

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

Table 20.

Component	Task	10	50	100[1]	500	1,000	1,500	2,000
Attachments								
Carriage lock pins	Lubricate		O		□	□	□	□
Hydraulic tow hitch inner leg (if installed)	Lubricate				□	□	□	□
Hydraulic tow hitch pivot pin (if installed)	Lubricate				□	□	□	□

Component	Task	10	50	100[1]	500	1,000	1,500	2,000
Hydraulic tow hitch release cable/return spring/retaining latch (if installed)	Check (condition)		O		□	□	□	□
Body and Framework								
General	Clean	O	O	□	□	□	□	□
General	Check (condition)	O	O	□	□	□	□	□
Lift/Displacement/Tilt/Steer ram pivot pins	Lubricate		O		□	□	□	□
Extension ram piston rod pivot pin	Lubricate					□	□	□
Boom wear pad runways	Check (condition)				□	□	□	□
Boom wear pad clearance[2]	Check (condition)				□	□	□	□
Boom wear pad condition and security (replace if required)[2]	Check (condition)			□	□	□	□	□
Wing mirrors condition and security	Check (condition)	O	O		□	□	□	□
Doors and hinges	Lubricate			□	□	□	□	□
Cab heater fresh air filter (if installed)	Change				□	□	□	□
Pivot pins	Lubricate		O	□	□	□	□	□
ROPS (Roll-Over Protective Structure)/FOPS (Falling Object Protective Structure) Structure	Check (condition)	O	O	□	□	□	□	□
Inner boom hoses	Lubricate				□	□	□	□
Operator Station								
Operator protective structure	Check (condition)	O	O	□	□	□	□	□
Seat, seat belt	Check (condition)	O	O	□	□	□	□	□
Engine								
Oil	Check (Leaks)	O	O	□	□	□	□	□
Oil	Check (level)	O	O	□	□	□	□	□
Oil and Filter[3]	Replace				□	□	□	□
FEAD (Front End Accessory Drive) Belt	Check (condition)		O	□	□	□	□	□
FEAD Belt	Replace					□	□	□
Air inlet security/air cleaner elements	Check (condition)	O	O	□	□	□	□	□
Security of engine and pump mountings	Check (condition)				□	□	□	□
Fuel level	Check	O	O	□	□	□	□	□
Air Filter								
Air filter (outer)[4]	Replace				□	□	□	□
Air filter (inner)	Replace							□
Air filter (dust valve)	Clean				□	□	□	□
Fuel system								
Fuel system	Clean	O	O		□	□	□	□
Main fuel filter/water separator	Replace				□	□	□	□
Main fuel filter/water separator	Clean (drain)		O	□	□	□	□	□
Secondary fuel filter[5]	Replace					□	□	□
Fuel injectors[6, 7]	Replace							

Component	Task	10	50	100[1]	500	1,000	1,500	2,000
Fuel injectors leak off rail[6, 7]	Replace							
High pressure fuel lines[6, 7]	Replace							
Cooling System								
Coolant	Check (leaks)	O	O	□	□	□	□	□
Coolant	Check (condition)	O	O	□	□	□	□	□
Coolant	Check (level)	O	O	□	□	□	□	□
Coolant	Replace						□	□
Cooling pack	Check (condition)		O	□	□	□	□	□
Wheels and Tyres								
Wheel nuts security	Check (condition)	O	O	□	□	□	□	□
Tyre pressures	Check (condition)	O	O	□	□	□	□	□
Wheel alignment	Check (condition)	O	O	□	□	□	□	□
Hydraulics								
Hose and pipework	Check (Leaks)	O	O	□	□	□	□	□
Oil	Check (level)	O	O	□	□	□	□	□
Oil	Replace							□
Hydraulic oil filters	Replace				□	□	□	□
Hydraulic tank oil filters	Replace							□
Rams	Check (condition)		O	□	□	□	□	□
Motor mounting bolts security	Check (condition)				□	□	□	□
Motor mountings security	Check (condition)				□	□	□	□
Transmission								
Axles	Lubricate		O	□	□	□	□	□
Axle mount security	Check (condition)			□		□	□	□
Axle breather(s)	Check (condition)			□	□	□	□	□
Axle oil	Check (level)		O	□				
Axle oil	Replace			□	□	□	□	□
Axle pivots[8]	Lubricate		O	□	□	□	□	□
Propshaft and universal joints[8]	Lubricate			□	□	□	□	□
Transmission mount security	Check (condition)			□				
Hub oil (without oil immersed brakes)	Check (level)			□	□	□	□	□
Hub oil (without oil immersed brakes)	Replace			□	□	□	□	□
Steering stops (if installed)	Check (condition)			□	□	□	□	□
Brakes								
Brake system fluid level[9]	Check (level)	O	O	□	□	□		
Brake system fluid	Replace						□	□
Electrics								
Battery terminals	Check (condition)			□	□	□	□	□
Window washer fluid level	Check (level)	O	O	□	□	□	□	□

Component	Task	10	50	100[1]	500	1,000	1,500	2,000
Miscellaneous								
Fire extinguisher (if installed)	Check (condition)	○	○		□	□	□	□

(1) First 100h service only, to be completed by your JCB dealer.
(2) If operating under arduous conditions, check the boom wear pads every250h.
(3) If operating under arduous conditions, do an engine oil flush (use the normal recommended engine oil) every 250h and replace the engine oil and filter.
(4) If operating in dusty condition do these tasks more frequently.
(5) Main fuel filter must be drained weekly. If the warning light illuminates the main and secondary filter must be drained.
(6) Jobs which should be done by a specialist.
(7) Replace every 8,000h.
(8) The axles and propshafts are factory greased with a high performance grease, if during service a standard grease is used, then the interval must be reduced to every 50h, contact your JCB dealer for advice.
(9) The axles and propshafts are factory greased with a high performance grease, if during service a standard grease is used, then the interval must be reduced to every 50h, contact your JCB dealer for advice.

Functional Tests and Final Inspection

Table 21.

Component	Task	10	50	100[1]	500	1,000	1,500	2,000
Body and Framework								
General	Check (condition)		○	□	□	□	□	□
Seat/seat belts	Check (condition)	○	○	□	□	□	□	□
Inclinometer (if installed)[2]	Check (condition)			□	□	□	□	□
Air conditioning (if installed)	Check (condition)			□	□	□	□	□
Glazing	Check (leaks)			□				
Forks	Check (condition)	○	○	□	□	□	□	□
Engine								
Idle and maximum speed	Check (operation)				□	□	□	□
General	Check (condition)	○	○	□	□	□	□	□
Hydraulics								
Services	Check (operation)	○	○	□	□	□	□	□
Hose burst protection valves (if installed)				□	□	□	□	□
MRV (Main Relief Valve) pressure[2]	Check (operation)			□	□	□	□	□
ARV (Auxiliary Relief Valve) pressure[2]	Check (operation)			□	□	□	□	□
Attachment operation/remote servo (if installed)	Check (operation)			□	□	□	□	□
Parallel lift/lower	Check (operation)			□	□	□	□	□
Steer circuit MRV pressure[2]	Check (operation)			□	□	□	□	□
Fan motor speed (if installed)[2]	Check (operation)				□	□	□	□
Piston rod chrome	Check (operation)			□	□	□	□	□
Brakes								
Foot brake	Check (operation)	○	○	□	□	□	□	□

Component	Task	10	50	100[1]	500	1,000	1,500	2,000
Park brake	Check (operation)	O	O	□	□	□	□	□
Transmission								
Steering	Check (operation)	O	O	□	□	□	□	□
Transmission	Check (operation)	O	O	□	□	□	□	□
Forward/reverse gear	Check (operation)			□	□	□	□	□
High/low speed	Check (operation)			□	□	□	□	□
Neutral start	Check (operation)			□	□	□	□	□
Varispeed control knob	Check (operation)			□	□	□	□	□
Electrics								
Alternator - output[2]	Check (condition)			□	□	□	□	□
All electrical equipment	Check (operation)	O	O	□	□	□	□	□
LMI (Load Moment Indicator)[2]	Check (condition)	O	O	□	□	□	□	□

(1) First 100 hours service only, to be completed by your JCB dealer.
(2) Tasks which must be done by a specialist.

Maintenance Positions

General

Communications

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

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 when you are not using electrical power. If you do not take these precautions you could be killed or injured.*

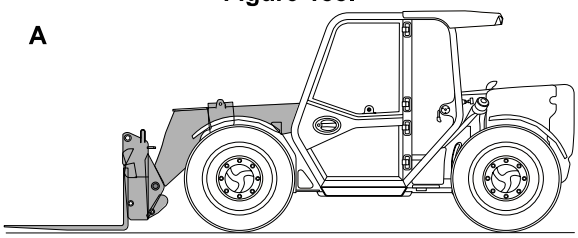
WARNING! *Make the machine safe before getting beneath it. Make sure that any attachments on the machine are correctly attached. Engage the park brake (if installed), remove the ignition key, disconnect the battery.*

Make the machine safe before you start a maintenance procedure.

You can complete most of the maintenance procedures with the lift arm lowered. Unless a maintenance procedure instructs you differently, you must lower the lift arm.

Maintenance Position - Boom Lowered

Figure 188.



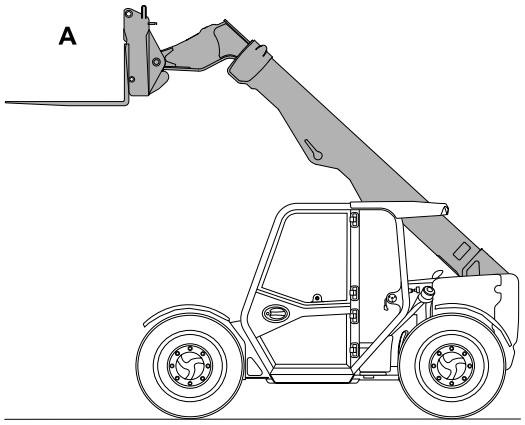
A Boom lowered

1. Park the machine on level, solid ground.
   Refer to: Operation > Stopping and Parking (Page 55).
2. Lower the boom.
3. Put the attachment flat on the ground.
4. Stop the engine and remove the starter key.
5. Disconnect the battery to prevent accidental operation of the engine.
6. Make sure there are no loose articles in the enclosure.
7. If necessary, put chocks against the two sides of the wheels before you get below the machine.

Maintenance Position - Boom Raised

If you raise the boom to get access for maintenance, you must install the maintenance strut on the boom.

Figure 189.

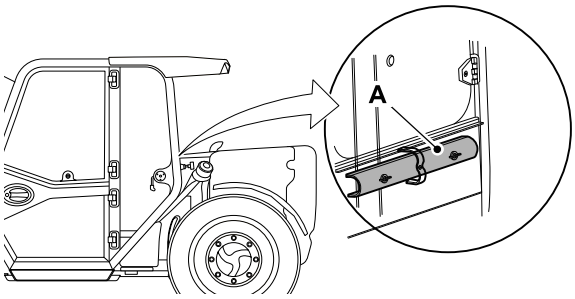


A Boom raised

Installing the Maintenance Strut

1. Park the machine on level, solid ground.
   Refer to: Operation > Stopping and Parking (Page 55).
2. Retract the boom.
3. Raise the boom.
4. Stop the engine and remove the ignition key.
5. Remove the maintenance strut from its stowage position.

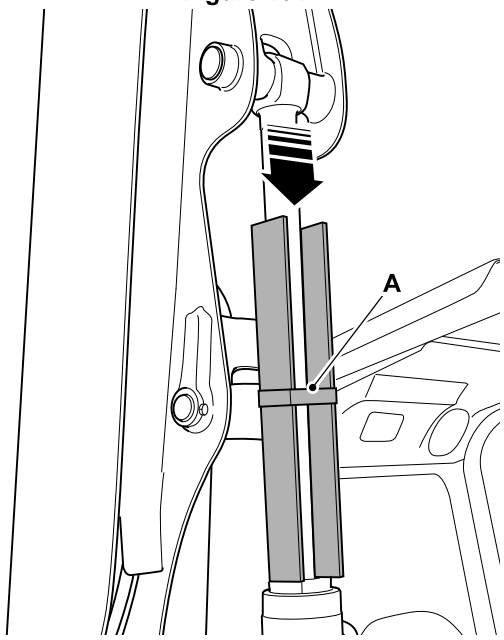
Figure 190.



A Maintenance strut

6. Install the maintenance strut.
7. Place the strut around the lift ram piston rod. Secure it in position with the strap.

Figure 191.



A Strap

8. To prevent any chance of the boom creeping down and trapping your fingers, the boom should be lowered onto the strut. Lower the boom carefully, to prevent possible damage to the strut. Stop as soon as the weight of the boom is on the strut.
9. Disconnect the battery to prevent accidental operation of the engine.
   Refer to: Maintenance > Electrical System > Battery Isolator (Page 238).
10. If necessary, put blocks against the two sides of the wheels before you get below the machine.

Removing the Maintenance Strut

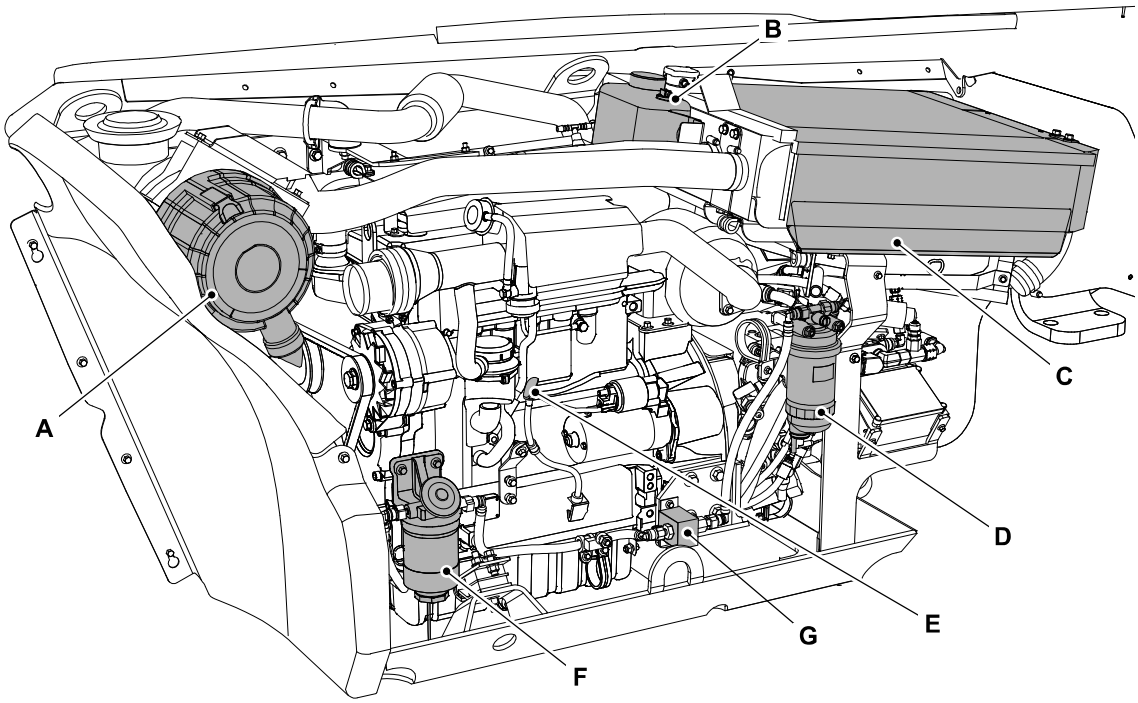
1. Raise the boom to take the weight off of the strut.
2. Stop the engine and remove the ignition key.
3. Remove the maintenance strut.
4. Secure the strut in its stowage position.
5. Lower the boom to the ground.

Service Points

General

Engine Compartment

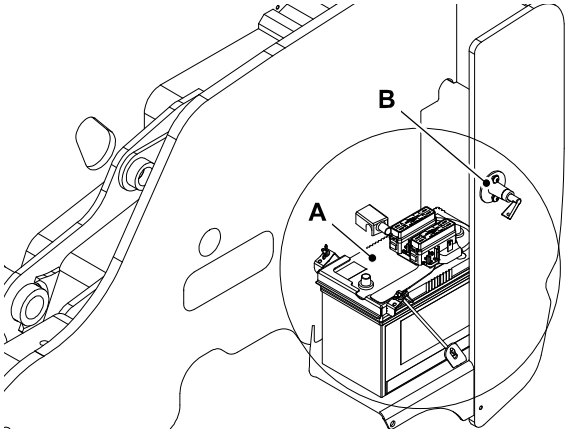
Figure 192.



A Air filter
B Expansion bottle
C Radiator
D Fuel filter
E Engine oil dipstick
F Engine fuel filter
G Fuel pump

Battery Compartment

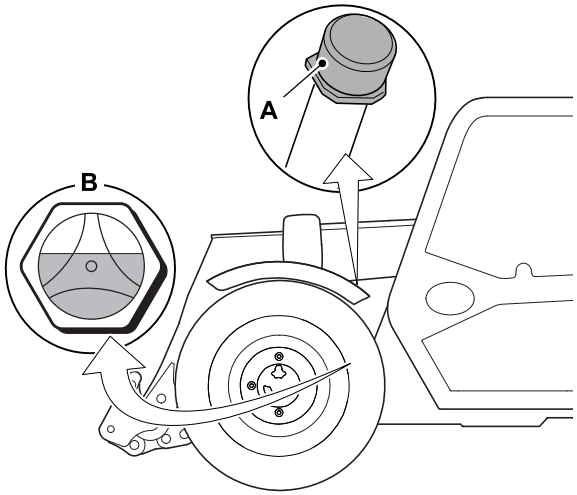
Figure 193.



A Battery
B Battery isolator

Hydraulic Oil Level Indicator

Figure 194.



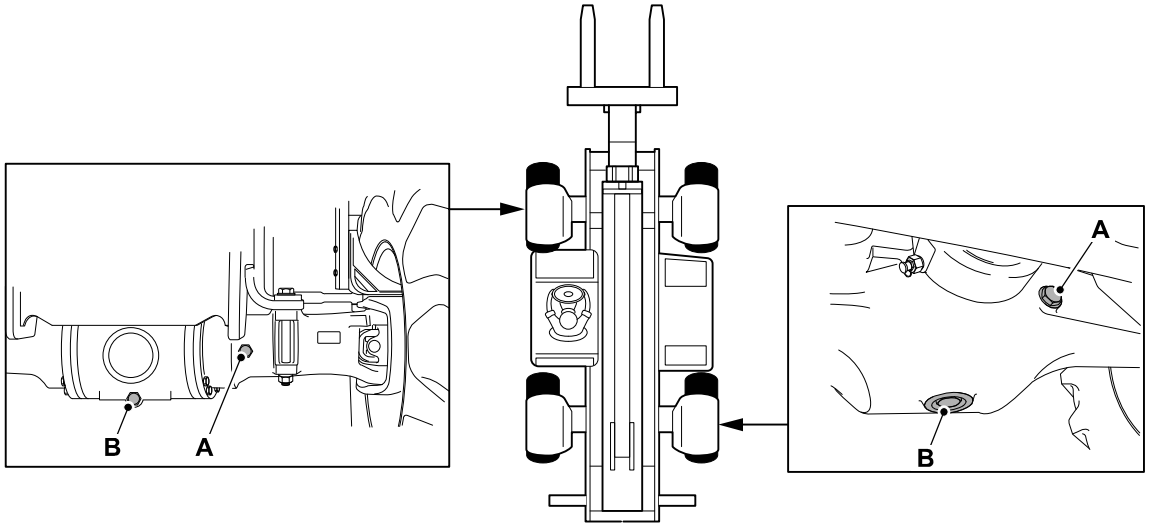
A Hydraulic tank filler cap

B Hydraulic oil level indicator

Axles

For: 525-60

Figure 195.



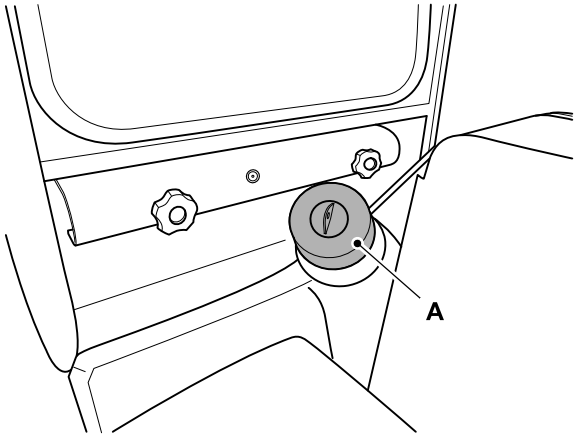
A Axle fill/level plug

B Beneath plug

Filling the Fuel Tank

For: 525-60

Figure 196.



A Fuel cap

Access Apertures

General

When moved to their maintenance position, the access panels give you access to parts or areas of the machine that are not required during machine operation.

Before you operate the machine, make sure that all of the access panels are correctly in their closed or installed positions.

Engine Compartment Cover

Open

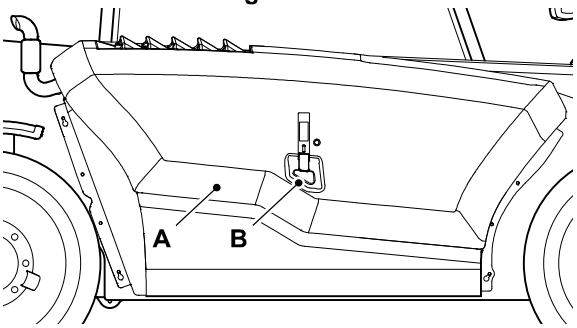
⚠ **WARNING** The engine has exposed rotating parts. Switch off the engine before working in the engine compartment. Do not use the machine with the engine cover open.

Access to the engine compartment is provided by opening the engine cover.

Before you stop the engine, you must let the engine run at low idle for 4min. The delay lets the coolant temperature to stabilise before you open the engine cover.

1. Make the machine safe.
2. Unlock and release the latch. Allow the cover to raise on its gas strut. Keep hold of the cover while it rises.

Figure 197.



A Engine cover **B** Latch

Close

1. Push the cover down.
2. Make sure the cover is correctly latched.
3. Make sure to lock the engine cover.

Undershield

Removal

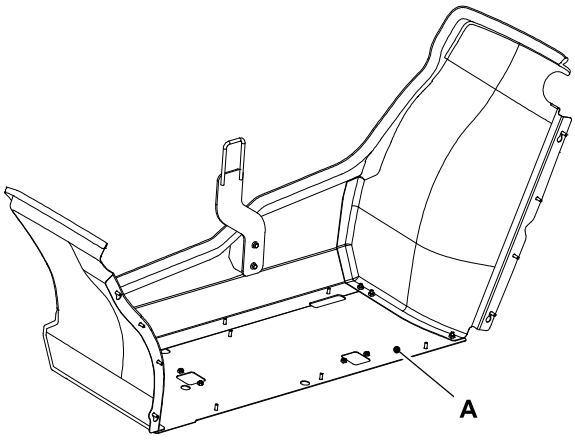
⚠ **WARNING** You will be working close into the machine for these jobs. Lower the attachments. Remove ignition key and disconnect the battery. This will prevent the engine being started.

When you clean around the engine and radiator, debris will be released more easily if the undershields are removed.

1. Make the machine safe.
2. Working under the engine compartment, support each of the undershields in turn and remove the bolts.

3. Lower the undershields to the ground.

Figure 198.



A Undershields

Install

1. Install the undershields.
2. Before you install the bolts, make sure the lips on the smaller undershields are located above the frame.

Tools

General

When you carry tools onto the machine, you must keep three points of contact with the machine at all times.

If necessary, lift the tools on to the machine in intervals.

Put the tools down before you adjust your grips on the machine. Do not try to adjust your grips on the machine while holding tools.

Lubrication

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.

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

Refer to the individual condition checks throughout the Maintenance section.

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

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

Use only the recommended type of grease. Do not mix different types of grease, keep them separate.

Attach the dust caps after greasing (if installed).

Preparation

⚠ **WARNING** You will be working close into the machine for these jobs. Lower the attachments. Remove ignition key and disconnect the battery. This will prevent the engine being started.

Make the machine safe before you start a greasing procedure.

You can complete most of the greasing procedures with the boom lowered. If you raise the boom to get access for greasing, you must install the maintenance strut on the boom.

Attachments

General

Lubricate

Where applicable, refer to the specific manufacturers manual for instructions on the lubrication of optional attachments.

Check (Condition)

Where applicable, refer to the specific manufacturers manual for instructions on the maintenance of optional attachments.

Body and Framework

General

Clean

Keep all intakes and grilles clear from snow, ice and debris.

Debris can collect under the boom. Remove all debris from under the boom.

Thoroughly dry the piston rams and protect them with clean transmission or hydraulic oil if necessary.

Check (Condition)

1. Make sure that all of the guards and protective devices are in position, secured by their locking devices and free from damage.
2. Inspect all of the steelwork for damage. Include the following:
   2.1. Examine all of the lifting point welds.
   2.2. Examine all of the pivot point welds.
   2.3. Examine the condition of all the pivot pins.
   2.4. Check that the pivot pins are correctly in position and secured by their locking devices.
3. Check the steps and handrails are undamaged and correctly attached.
4. Check for broken, cracked or crazed window glass and mirrors. Replace the damaged items.
   4.1. The right hand side cab glass is installed for the operators protection. If the cab glass becomes damaged, the machine should not be operated until it has been replaced.
5. Check that the lamp lenses are undamaged.
6. Check that all of the attachment teeth are undamaged and correctly attached.
7. Check that all of the safety and instructional labels are undamaged and in position. Install new labels where necessary.
8. Note any damaged paintwork for future repair.
9. Inspect the machine for broken or loose fasteners.

Boom

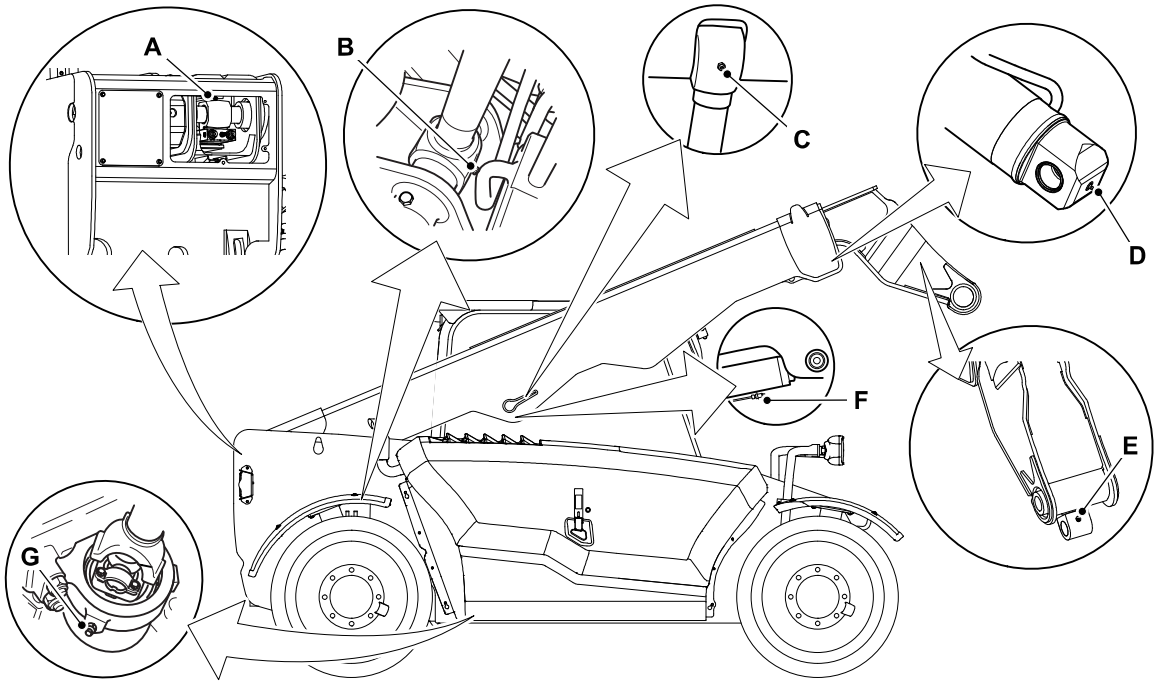
General

Lubricate

Make the machine safe. Refer to: Maintenance > Maintenance Positions (Page 201).

Apply grease to all the points and linkages.

Figure 199.



Operator Station

General

Clean

⚠ **Notice:** Never use water or steam to clean inside the cab. The use of water or steam could damage the on-board computer and render the machine inoperable. Remove dirt using a brush or damp cloth.

Remove debris and loose articles from inside the cab.

Operator Protective Structure

Check (Condition)

⚠ **WARNING** You could be killed or seriously injured if you operate a machine with a damaged or missing ROPS/FOPS/FOGS. If the ROPS/FOPS/FOGS has been in an accident, do not use the machine until the structure has been renewed. Modifications and repairs that are not approved by the manufacturer may be dangerous and will invalidate the ROPS/FOPS/FOGS certification.

A failure to adhere to these precautions can cause death or injury to the operator. For assistance, contact your JCB dealer.

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Check the structure for damage.
3. Make sure that all of the ROPS/FOPS mounting bolts are undamaged and in position.
4. Make sure that the ROPS/FOPS mounting bolts are tightened to the correct torque setting.
   Refer to: Technical Data > Torque Values (Page 259).

Seat

Check (Condition)

Check that the seat adjustments operate correctly.

Check the seat is undamaged.

Check the seat mounting bolts are undamaged, correctly installed and tight.

Make sure the seat is clear from unwanted materials and hazards at all times.

Seat Belt

Check (Condition)

⚠ **WARNING** When a seat belt is installed on your machine replace it with a new one if it is damaged, if the fabric is worn, or if the machine has been in an accident.

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

Make sure the seat belt can be adjusted.

Examine the seat belt for signs of fraying and stretching.

Check that the stitching is not loose or damaged.

Check that the belt mounting bolts are undamaged, correctly installed and tight.

Check that the buckle assembly is undamaged and operates correctly.

Controls

Check (Operation)

Check the operation of the non-hydraulic and non-electrical operator station controls.

Engine

General

Check (Condition)

Start the engine and check for:

- Excessive smoke
- Excessive vibration
- Excessive noise
- Overheating
- Performance
- Unusual smells.

Oil

Check (Leaks)

Before you start the machine, do a check for oil leaks:

1. Make the machine safe.
2. Get access to the engine compartment (if applicable)
3. Check the engine and the area below for oil leaks.
4. Close the engine cover (if applicable).
5. If necessary, contact your JCB dealer.

Check (Level)

⚠ **WARNING** Never check the oil level or add oil with the engine running. Be careful of hot lubricating oil. Danger of scalding.

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

1. Make the product safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
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 (if applicable).
   Refer to: Maintenance > Access Apertures (Page 207).
4. Remove and clean the dipstick.
   Refer to: Maintenance > Service Points (Page 204).
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.
   Refer to: Maintenance > Service Points (Page 204).
   8.2. Add the recommended oil slowly through the filler point

Refer to: Technical Data > Fluids, Lubricants and Capacities (Page 253).

8.3. Replace the dipstick.

8.4. Remove the dipstick.

8.5. Check the oil level, if necessary add more oil.

8.6. Replace the dipstick

8.7. Replace the filler cap.

9. Close and secure the engine cover (if applicable).

Replace

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

WARNING Hot oil and engine components can burn you. Make sure the engine is cool before doing this job.

Used engine crankcase lubricants contain harmful contaminants. In laboratory tests it was shown that used engine oils can cause skin cancer.

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.

1. Make the machine safe.
2. Get access to the engine compartment.
3. Remove the oil filler cap.
4. Remove the engine oil drain plug. Drain the oil in to a suitable container.
5. Clean the drain plug. Install the drain plug. Tighten the drain plug to the correct torque value.
6. Remove the cap from the oil filter housing (if applicable).
7. Remove and discard the oil filter cartridge.
8. Fit a new filter with new gaskets.
9. Fit and tighten the cover on the oil filter housing (if applicable). Tighten the cover to the correct torque value.
10. Add the correct specification and quantity of oil.
11. Check the oil level.
12. Install the oil filler cap.
13. Close and secure the engine cover.
14. Operate the engine at idle speed until the oil pressure low warning light has extinguished and the new filter has primed before the engine speed is increased above idle speed.
15. Check for leaks.
16. Check the oil level when the oil has cooled.

    16.1. Fill with clean engine oil, if necessary.

Drive Belt

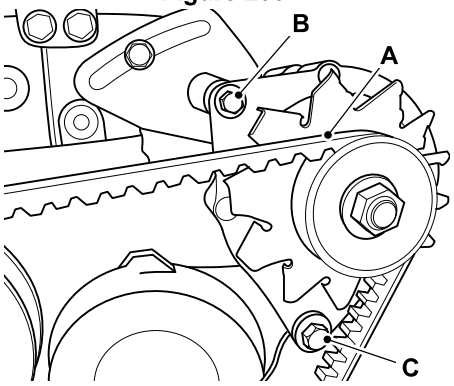
Check (Condition)

Checking the Fan Belt Tension

⚠ **CAUTION** Make sure the engine cannot be started. Disconnect the battery before doing this job, otherwise you could be injured.

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions > Maintenance Position - Boom Lowered (Page 201).
2. Get access to the drive belt.
   Refer to: Maintenance > Access Apertures (Page 207).
3. The belt should have the required length of slack at the longest part of the belt.
   Length: 7mm

Figure 200.



A Fan belt
B Bolt
C Bolt

Adjusting the Fan Belt

1. Loosen the bolts which secure the alternator. Refer to Figure 200.
2. Reposition the alternator until belt deflection is correct. Any leverage required to position the alternator must be applied at the drive end bracket only, using a wooden lever. Do not over-tighten the fan belt otherwise the water pump and alternator bearings may be damaged.
3. Tighten the bolts which secure the alternator.
4. Check the fan belt tension.

Air Filter

General

Check (Condition)

⚠ **Notice:** Do not modify or fit non JCB approved components to the engine induction system, otherwise the engine emissions will be compromised.

1. Make the machine safe.
2. Get access to induction system.
3. Check the system hoses for:
   3.1. Condition.
   3.2. Damage.
   3.3. Security.
4. Replace the system hoses if necessary.

Outer Element

Replace

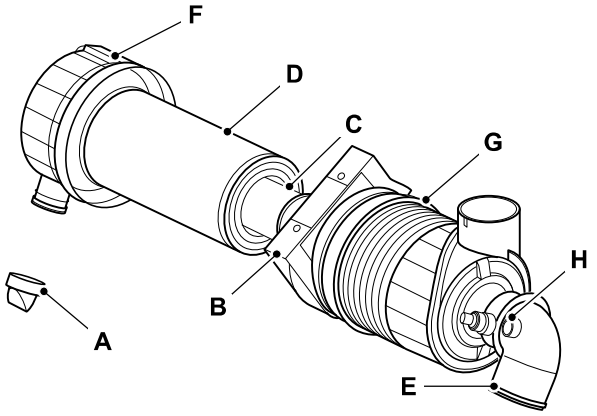
⚠ **Notice:** The outer element must be renewed immediately if the warning light on the instrument panel illuminates.

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

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

1. Get access to the engine.
2. Unclip and remove the prefilter element.
3. Remove the main element. Take care not to tap or knock the element.
4. If the safety element is to be changed, lift up pulls and remove the safety element.
5. Clean the prefilter element housing and main element housing. Make sure that the air holes on the prefilter housing are clear.
6. Make sure that the aspirator hose is securely installed and is in good condition.
7. Put the new safety element and main element into the housing. Push them firmly in so that they seated correctly.
8. Install the prefilter element. Make sure that the aspirator hose mates with the spigot.

Figure 201.



A Vacuator valve
B Bracket assembly
C Safety element assembly
D Main element assembly
E Tube elbow
F Cover assembly
G Body 8in. twist lock
H Indicator

Dust Valve

Check (Condition)

- Check the dust valve for rips/tears.
- Check there are no obstructions.
- Check that the dust valve is free of dirt and dust.
- Check that the dust valve securely attached to the air filter housing.

Fuel System

General

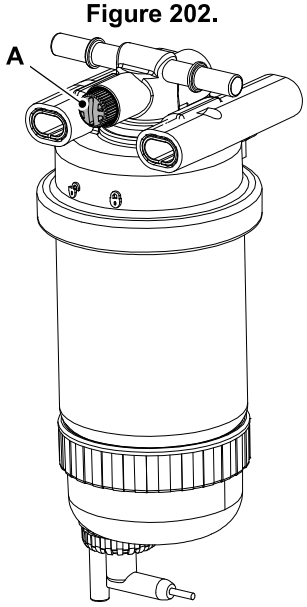
Bleed

⚠ **CAUTION** Do not allow dirt to enter the system. Before disconnecting any part of the system, thoroughly clean around the connection. When a component has been disconnected, always install protective caps and plugs to prevent dirt ingress.

Failure to follow these instructions will lead to dirt entering the system. Dirt in the system will seriously damage the systems components and could be expensive to repair.

1. Make the machine safe.
2. Get access to the fuel filter.
3. Make sure there is sufficient fuel in the tank.
4. Loosen the bleed screw on the fuel filter.
5. Turn on the ignition until fuel with no air flows freely from the valve, then close the bleed screw.
6. Check the engine for smooth running.
7. If the engine continues to run roughly, check again the bleeding procedure.

Figure 202.



A Bleed screw

Check (Leaks)

1. Make the machine safe.
2. Get access to the engine compartment (if applicable).
3. Check the engine compartment (if applicable), fuel lines and the area below for leaks.
4. If necessary, contact your JCB dealer.

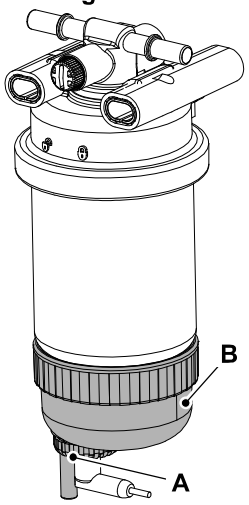
Tank

Clean

Draining the Water Separator

1. Make the machine safe.
2. Get access to the engine compartment
3. If there is water but no sediment, open the tap to drain the water. If there is any sediment in the bowl replace the fuel filter element.
4. Close the engine cover.

Figure 203.



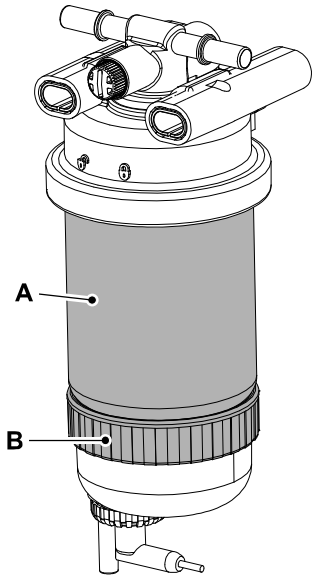
A Tap **B** Bowl

Fuel Filter

Replace

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Get access to the engine compartment
   Refer to: Maintenance > Access Apertures (Page 207).
3. Drain and remove the water separator bowl. To remove the water separator bowl release the locking ring.
   Refer to: Maintenance > Fuel System > Water Separator (Page 224).
4. Unscrew and remove the filter element.
5. Fit a new element.
6. Refit water separator bowl and secure in position with the locking ring.
7. Bleed the fuel system.
   Refer to: Maintenance > Fuel System > General > Bleed (Page 221).
8. Close the engine cover.

Figure 204.



A Filter element

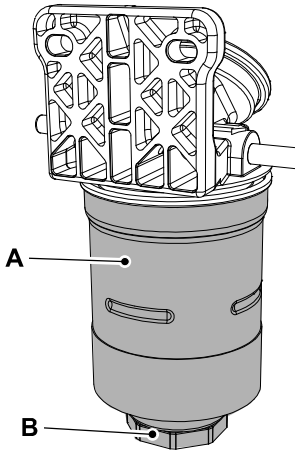
B Locking ring

Engine Fuel Filter

Replace

1. Make the machine safe.
2. Get access to the engine compartment
3. Remove the sensor housing.
4. Unscrew and remove the filter element.
5. Fit a new element. Lubricate the gasket of the new cartridge. Do not fill the new cartridge with fuel.
6. Refit the sensor housing.
7. Bleed the fuel system.
8. Close the engine cover.

Figure 205.



A Filter element

B Sensor housing

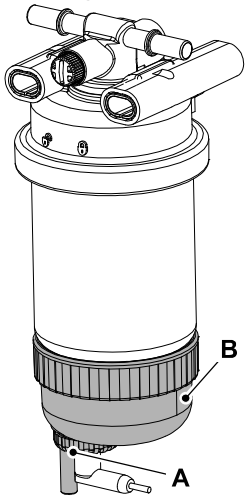
Water Separator

Clean

Draining the Water Separator

1. Make the machine safe.
2. Get access to the engine compartment
3. If there is water but no sediment, open the tap to drain the water. If there is any sediment in the bowl replace the fuel filter element.
4. Close the engine cover.

Figure 206.



A Tap

B Bowl

Cooling System

General

Check (Leaks)

Before you start the machine, inspect the system for leaks:

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Get access to the cooling pack.
   Refer to: Maintenance > Access Apertures (Page 207).
3. Check the cooling system for leaks.
4. If necessary, contact your JCB dealer.

Coolant

Check (Condition)

Refer to: Technical Data > Fluids, Lubricants and Capacities > Coolant (Page 258).

Check (Level)

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Let the engine cool.
3. Get access to the radiator filler cap and expansion bottle.
   Refer to: Maintenance > Service Points (Page 204).

   CAUTION! *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.*
4. Check the level of coolant in the radiator and in the expansion bottle. If necessary, top-up the system:
   4.1. Carefully remove the filler cap.
   4.2. If necessary top-up the coolant to the neck of the expansion tube.
   4.3. If necessary top-up the coolant in the expansion bottle so that it is half full.
   4.4. Install the filler cap, make sure that it is tight.

Cooling Pack

Clean

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Let the engine cool.
3. Get access to the cooling pack.
   Refer to: Maintenance > Access Apertures (Page 207).
4. If necessary, use a soft bristle brush or compressed air to remove all debris from the cooling pack.

Check (Condition)

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Let the engine cool.
3. Get access to the cooling pack.
   Refer to: Maintenance > Access Apertures (Page 207).
4. Check the condition of the hoses, radiator and fan for:
   4.1. Condition.
   4.2. Damage.
   4.3. Security.
5. Replace the system hoses/radiator if necessary.

Brakes

Park Brake

Check (Operation)

⚠ **WARNING** Before testing the park brake make sure the area around the machine is clear of people.

WARNING Be careful, if the park brake is not functioning and the drive controls are in neutral the machine will roll down the slope. To stop the machine engage drive controls.

WARNING Do not use a machine with a faulty park brake.

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

1. Make sure your seat belt is securely fastened.
2. Position the machine on a suitable slope. Make sure the machine is safely held in position using the drive controls.
3. Engage the park brake. Release hold of the drive controls, the machine should not move. If the machine does start to move immediately disengage the park brake and use the drive controls to hold the machine in position.

If the machine moved during the test, drive the machine to a suitable flat location and contact your JCB dealer to inspect the brake.

Service Brake

Check (Operation)

1. Before you start the machine, check the brake system hydraulic hoses for any signs of damage or leaks.
2. Start the engine.

Gearbox

Oil

Check (Level)

1. Make the machine safe with the boom lowered.
2. Start the engine and operate at low idle for few minutes. This allows the oil to fill the filter, pump, torque converter, oil cooler and hoses.

   Duration: 4min
3. Stop the engine.
4. Remove the ignition key.
5. Open the engine compartment cover.
6. Before you complete a check of the oil level, you must wait as shown on the instructional label. The instructional label shows the time in seconds.
7. Check the gearbox oil level on the dipstick. The oil level must be between the end of the dipstick and maximum mark on the dipstick.
8. If necessary add oil through the dipstick tube.

Axles

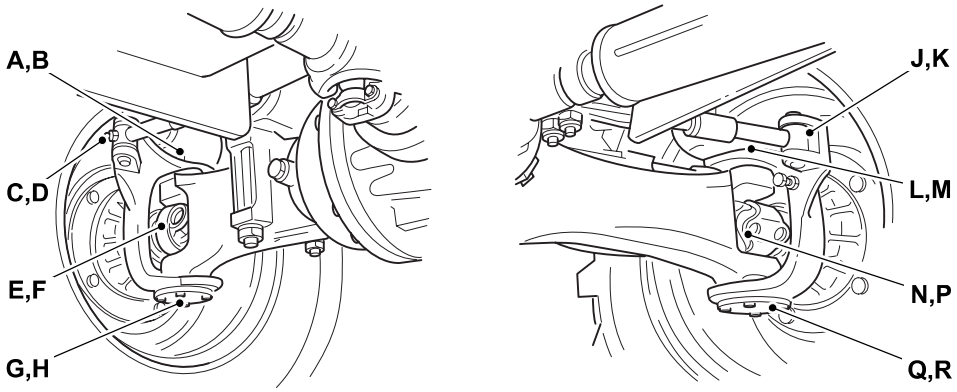
General

Lubricate

Make the machine safe. Refer to: Maintenance > Maintenance Positions (Page 201).

Apply grease to all the points and linkages shown.

Figure 207.



Oil

Check (Level)

⚠ **Notice:** The oil level must be checked with the machine level, otherwise a false indication of the amount of oil will be given.

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Get access to the axle fill/level plug.
   Refer to: Maintenance > Service Points (Page 204).
3. Clean the area around the fill/level plug.
4. Remove the plug with its sealing washer.
5. Make sure the oil is level with the bottom of the hole.
6. If necessary add oil.
   Refer to: Technical Data > Fluids, Lubricants and Capacities (Page 253).
7. Clean the fill/level plug.
8. Install the plug with its sealing washer.

Wheels

General

Check (Condition)

⚠ **WARNING** A raised and badly supported machine can fall on you. Position the machine on a firm, level surface before raising one end. Ensure the other end is securely chocked. Do not rely solely on the machine hydraulics or jacks to support the machine when working under it. Disconnect the battery, to prevent the engine being started while you are beneath the machine.

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. Also make sure that the park brake is engaged before doing these checks.

WARNING Whenever a wheel has been changed, check the nut torques every two hours. When the nuts stay tight for 8h, the interval for checking can revert to the period stated in the servicing schedule.

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

WARNING Wheels and tyres are heavy. Take care when lifting or moving them. Store with care to ensure that they cannot fall and cause injury.

Changing a Wheel

If for whatever reason a wheel bolt is renewed, all the bolts for that wheel must be replaced as a set, since the remaining bolts may have been damaged.

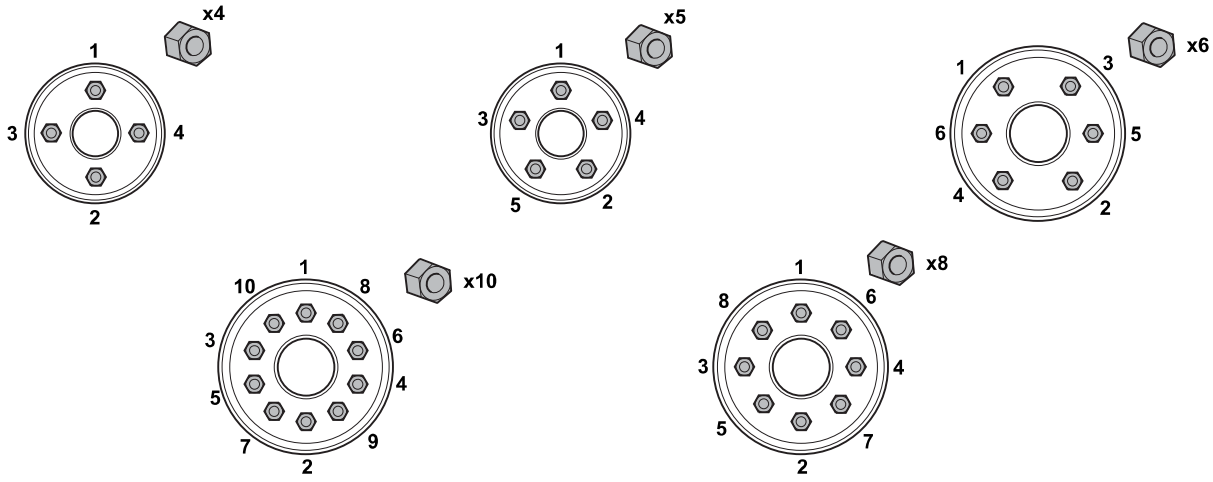
Remove

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Jack up the machine to gain access to whichever wheel you wish to change.
3. Remove the nuts then remove the wheel

Replace

1. Inspect the wheel for any damage, i.e. elongated holes.
2. Clean the hub, wheel mounting face and nut cones thoroughly if they are contaminated with paint, rust or debris.
3. Ensure the wheel stud thread surface is maintained dry and is free from all lubricants.
4. Position the wheel on the hub.
5. Lightly tighten the nuts to ensure the wheel is correctly seated onto the hub.
6. Tighten the nuts in the sequence shown.

Figure 208.



7. Lower the machine to the ground.
8. Torque tighten the nuts in the sequence shown.
   Refer to: Technical Data > Torque Values (Page 259).

Checking the Wheel Nut Torques

⚠ **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.

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.

Refer to: Technical Data > Torque Values (Page 259).

Tyres

General

Check (Condition)

⚠ **WARNING** Do not use the machine with damaged, incorrectly installed, incorrectly inflated or excessively worn tyres. Recognise the speed limitation of the tyres fitted and do not operate at more than their recommended maximum speed.

WARNING An exploding tyre can kill. Inflated tyres can explode if over-heated or over-inflated. Follow the instructions given when inflating the tyres. Do not cut or weld the rims. Use a tyre/wheel specialist for all repair work.

WARNING Wheels and tyres are heavy. Take care when lifting or moving them. Store with care to ensure that they cannot fall and cause injury.

Checking the Tyre Condition

Always drive with consideration for the condition of the tyres. Incorrect tyre pressures will affect the stability of the machine. Check the tyres daily for the correct tyre pressure and signs of damage. For example:

- Signs of distortion (bulges)
- Cuts or wear
- Embedded objects (nails, etc.)

Install the valve caps firmly to prevent dirt from entering the valve. Inspect for leaks when you check the tyre pressures.

Inspect the tyre valve for leaks, when you check the tyre pressures.

Tyre Inflation

Always try to maintain your tyre pressure to the recommended settings. Using your machine with under-inflated tyres means:

- Decreasing the machines stability
- Higher tyre temperatures
- Excessive strain of the tyre fabric
- More bulging of the sidewalls
- Shortens the tyres life.

Using the machine with over-inflated tyres is dangerous:

- It causes excessive tensile loads in the fabric: this makes a tyre more susceptible to cuts and punctures.

Do not cut or weld on the rim of an inflated tyre.

After checking or amending the tyre pressure always replace and secure the valve cap.

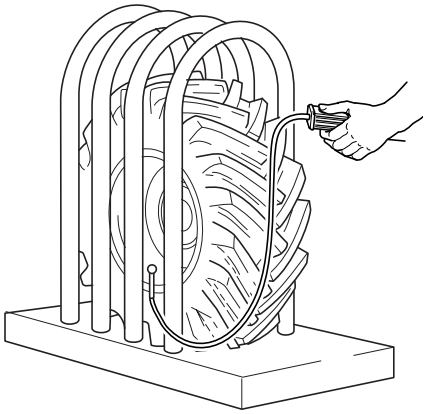
Always deflate the tyre before removing foreign obstacles from the tread.

Procedure

These instructions are for adding air to a tyre which is already inflated. If the tyre has lost all its air pressure, call in a qualified tyre mechanic. The tyre mechanic should use a tyre inflation cage and the correct equipment to do the job.

1. Prepare the wheel. Before you add air to the tyre, make sure it is correctly fitted on the machine or installed in a tyre inflation cage. Refer to Figure 209.

Figure 209.



2. Prepare the equipment.
   2.1. Use only an air supply system which includes a pressure regulator. Set the regulator no higher than 1.38 bar (20 psi) above the recommended tyre pressure.
   Refer to: Technical Data > Wheels and Tyres (Page 263).
   2.2. Use an air hose fitted with a self-locking air chuck and remote shut-off valve.
3. Add the air.
   3.1. Make sure that the air hose is correctly connected to the tyre valve. Clear other people from the area. Stand behind the tread of the tyre while adding the air.
   3.2. Inflate the tyre to the recommended pressure. Do not over-inflate.

Hydraulic System

General

Discharge

⚠ **CAUTION** Allow the hydraulic fluid temperature to cool before removing the hydraulic tank filler cap. Open the cap slowly to prevent oil being forced out of the filler neck.

CAUTION Do not run the engine with the hydraulic tank filler cap removed.

1. Make the machine safe.
2. Operate the controls to remove the hydraulic pressure from the service hose lines
   2.1. For manually operated services, operate the controls of the service(s) to be disconnected.
   2.2. For electrical hydraulic services, turn the ignition key to the on position. Press and hold the hydraulic venting switch. The notification will appear on the dash and buzzer will sound. Operate the controls of the service(s) to be disconnected.
   2.3. If the boom is raised and or extended, then the boom will retract and lower when these services are selected.
3. Turn the ignition key to the off position.
4. Remove the ignition key.
5. Carefully remove the hydraulic tank filler cap to vent residual tank hydraulic pressure.
6. 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.
2. Open the access covers.

3. Check the hydraulic hoses for damage.
4. Close the access covers.
5. If necessary, contact your JCB dealer.

Services

Check (Operation)

Check the operation of all the hydraulic services. Check for:

- Speed of operation
- Strength of operation
- Juddering
- Abnormal noises.

Do not use the machine if one or more of these faults are found. You must make sure that the hydraulic service is repaired immediately.

Oil

Check (Level)

External Sight Gauge

1. Make the machine safe with the boom lowered.
2. Get access to the hydraulic oil level indicator and hydraulic oil filler cap.
3. Check the hydraulic oil level indicator. The hydraulic oil level must be visible in the level indicator.
4. Top up oil level if necessary:
   4.1. Remove the hydraulic oil filler cap.
   4.2. Add hydraulic oil.
   4.3. Install the filler cap.

Cylinder Rams

Check (Condition)

Extend each ram fully, one at a time and visually examine for score marks, dents, leaks or similar defects. Make the machine safe before inspecting each ram.

If a ram piston appears defective, contact your service engineer or JCB dealer.

Hose Burst Check Valves

Check (Operation)

⚠ **WARNING** Keep people clear of the machine while you do these checks.

The hose burst check valves 'lock' to prevent the uncontrolled movement of the ram pistons if the hydraulic pressure fails or a hose bursts. The valves are installed directly on the rams.

Keep people clear of the machine while you do these checks.

The machine must have an attachment installed for the test to operate correctly.

1. Park the machine is on solid, level ground.
2. Raise and extend the boom to its maximum position, then move the attachment to a horizontal position.
   Refer to: Operation > Operating Levers/Pedals (Page 89).
3. Stop the engine.
4. Turn the ignition key to the on position.
5. Use the control lever to try to lower the boom and tip the attachment. If there is any movement, get the hydraulic system checked by your JCB dealer.
6. Use the extend/retract function to try to retract the boom. If there is any movement, get the hydraulic system checked by your JCB dealer.

Electrical System

General

Check (Operation)

Make sure all of the electrical equipment operates correctly, for example:

- Switches
- Warning lights
- Beacon
- Alarms
- Horn
- Wipers
- Hourmeter/display
- Battery
- Lights

All defective equipment must be repaired before the machine is used.

Check (Condition)

⚠ **WARNING** Battery electrolyte is toxic and corrosive. Do not breathe the gases given off by the battery. Keep the electrolyte away from your clothes, skin, mouth and eyes. Wear safety glasses.

DANGER Batteries give off explosive gases. Keep flames and sparks away from the battery. Do not smoke close to the battery. Make sure there is good ventilation in closed areas where batteries are being used or charged. Do not check the battery charge by shorting the terminals with metal. Use a hydrometer or voltmeter.

CAUTION Understand the electrical circuit before connecting or disconnecting an electrical component. A wrong connection can cause injury and/or damage.

Examine the electrical circuits regularly for:

- Damaged connectors
- Loose connections
- Chafing on the wiring harnesses
- Corrosion
- Missing insulation
- Incorrect routing of the wiring harnesses.

Do not use the machine if one or more of these faults are found. You must make sure that the electrical circuit is repaired immediately.

Battery

Clean

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

1. Make the machine safe.

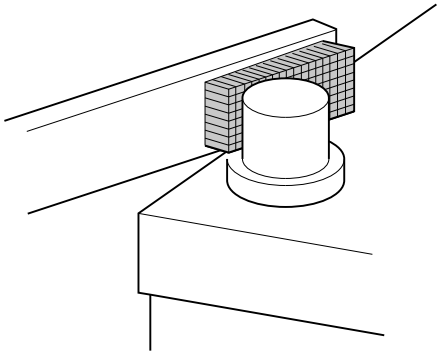
   Refer to: Maintenance > Maintenance Positions (Page 201).

2. Get access to the battery.

   Refer to: Maintenance > Access Apertures (Page 207).

3. If the terminal posts are corroded and covered with white powder wash them with hot water. If there is considerable corrosion, clean the terminal posts with a wire brush or abrasive paper. Refer to Figure 210.

Figure 210.



4. Apply a thin layer of petroleum jelly to the terminal posts.

Connect

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

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

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

1. Get access to the batteries.
   Refer to: Maintenance > Electrical System > Battery > Disconnect (Page 238).
2. Connect the battery leads. Connect the earth (-) terminal last.
3. If the machine has a battery isolator, move the switch to the on position.
   Refer to: Operation > Battery Isolator (Page 118).

Disconnect

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

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

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

Notice: Do not disconnect the battery while the engine is running, otherwise the electrical circuits may be damaged.

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Get access to the batteries.
   Refer to: Maintenance > Access Apertures (Page 207).
3. If the machine has a battery isolator, move the switch to the off position then remove the key.
   Refer to: Operation > Battery Isolator (Page 118).
4. Disconnect the battery leads. Disconnect the earth (-) terminal first.

Battery Isolator

Check (Operation)

⚠ **Notice:** Do not isolate the machine electrics when the engine is running, this may cause damage to the machine electrics.

1. Isolate the machine electrics.
   Refer to: Operation > Battery Isolator (Page 118).
2. Make sure that the machine electrics are isolated.

A defective isolator must be repaired before the machine is used. For more information, contact your JCB dealer.

Fuses

Replace

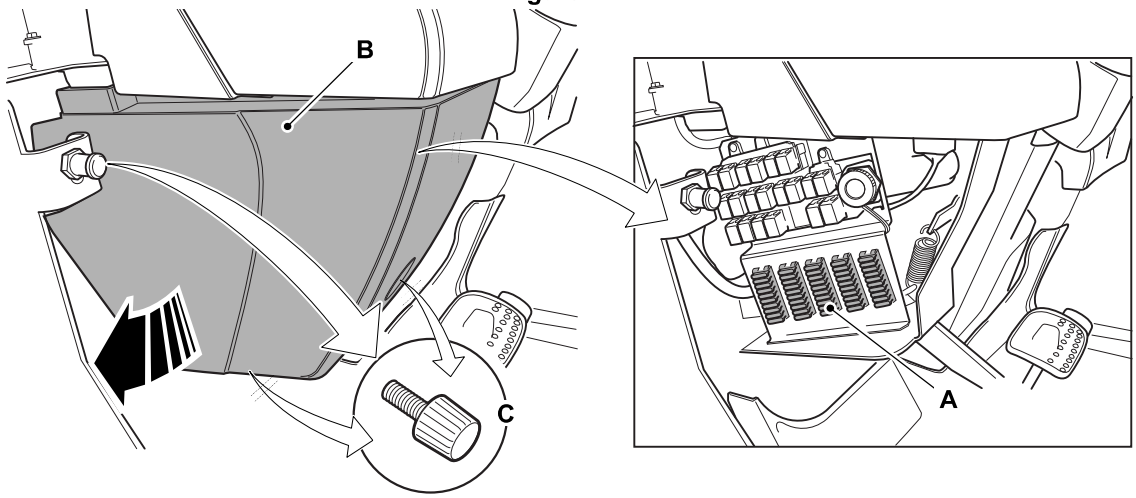
⚠ **Notice:** Always replace fuses with ones of correct ampere rating to avoid electrical system damage.

The electrical circuits are protected by fuses. If a fuse blows, find out why before a new one is installed. Refer to: Technical Data > Electrical System > Fuses (Page 260).

Secondary Fuses

The secondary fuses are situated in a fuse box inside the door. Refer to Figure 211.

Figure 211.



A Fuses
B Cover
C Screws (x3)

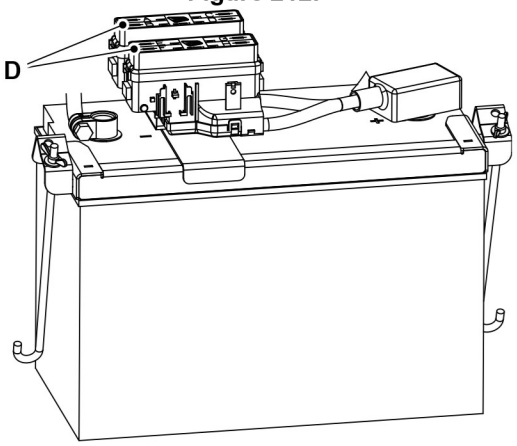
1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Open the cab door.
3. Hold the cover and remove the screws.
4. Remove the cover.

Primary Fuses

The primary fuse box is situated above the battery. Refer to Figure 212. Additional secondary fuses are installed to the right of the engine in the engine compartment.

The additional fuse links are installed at the battery positive terminal.

Figure 212.



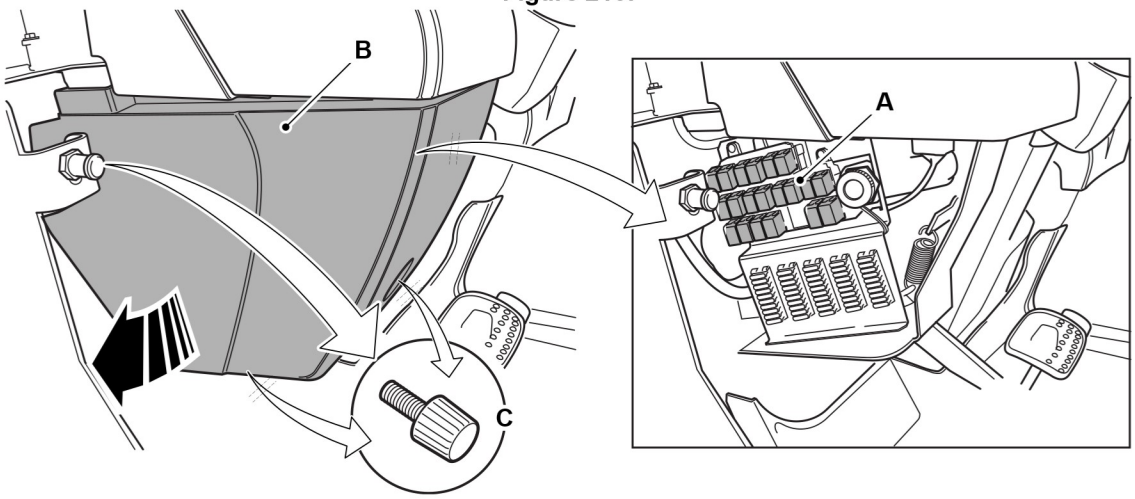
D Primary fuses

Relays

Replace

The relays are situated in a fuse box inside the door.

Figure 213.



A Relays
B Cover
C Screws (x3)

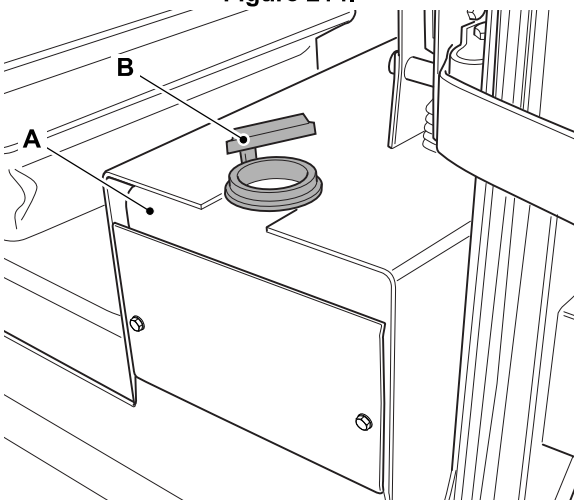
The relays are separated into banks. Each relay position in each bank is numbered. Refer to: Technical Data > Electrical System > Relays (Page 262).

1. Make the machine safe.
   Refer to: Maintenance > Maintenance Positions (Page 201).
2. Open the cab door.
3. Hold the cover and remove the three screws.
4. Remove the cover.

Window Washer

Check (Level)

Figure 214.



A Washer bottle **B** Filler cap

1. Make the machine safe.
   Refer to: Operation > Stopping and Parking (Page 55).
2. Get access to the washer bottle to the left of the operator seat. Refer to Figure 214.
3. Remove the washer bottle filler cap. Refer to Figure 214.
4. Check the water level. If necessary, fill in the washer bottle with clean water. Add de-icing fluid to prevent it freezing.
   Refer to: Technical Data > Fluids, Lubricants and Capacities (Page 253).
5. Replace the washer bottle filler cap

Do not use engine coolant antifreeze.

Do not use the window washer when there is no liquid in the washer bottle as it will cause damage to the motor.

Miscellaneous

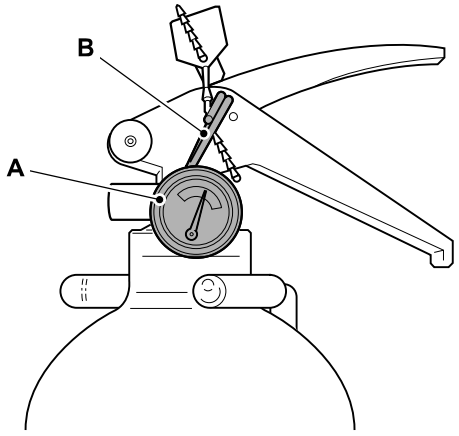
Fire Extinguisher

Check (Condition)

In addition to the operator check the extinguisher must be serviced every 12 months by a suitably qualified person.

1. Examine the fire extinguisher for damage and leaks.
2. Make sure the fire extinguisher is correctly attached.
3. Make sure that the gauge indicates that the extinguisher is charged i.e. the needle is in the green segment
   3.1. If the needle is in or very near the red segment at either end of the gauge, the extinguisher must be serviced or replaced.
4. Make sure the safety pin is correctly installed.

Figure 215.



A Gauge **B** Safety Pin

Technical Data
Static Dimensions

Dimensions

Figure 216.

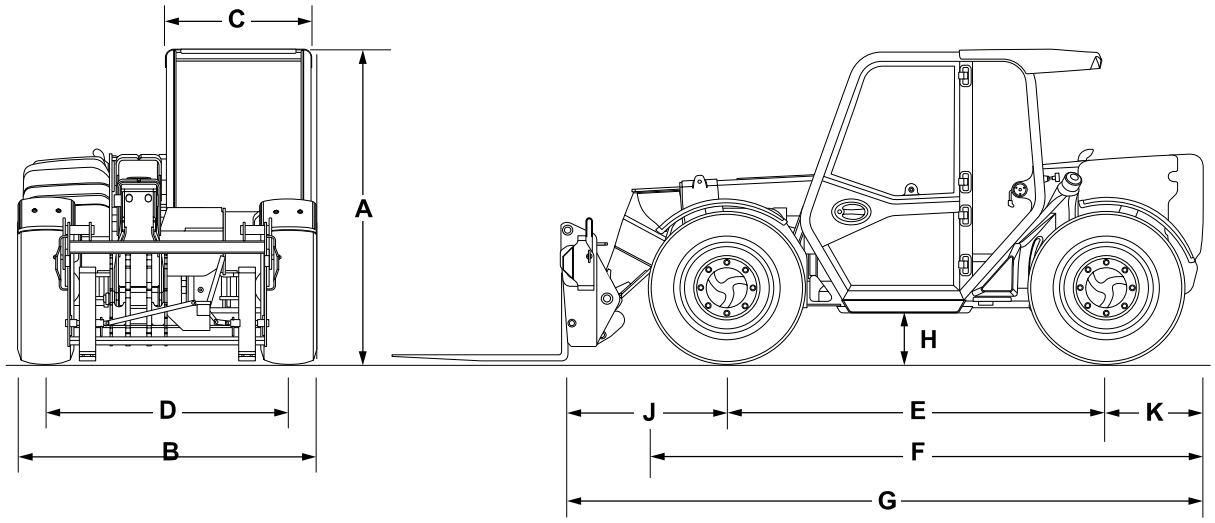


Table 22.

Item	Description	0.42m Wheel	0.46m Wheel
A	Overall height	1.89m	1.97m
B	Overall width (over tyres)	1.84m	1.89m
C	Inside width of cab	0.88m	0.88m
D	Front track	1.53m	1.52m
E	Wheelbase	2.39m	2.39m
F	Overall Length to front tyres	3.38m	3.48m
G	Overall length to front carriage	4m	4m
H	Ground clearance	0.23m	0.33m
J	Front wheel centre to carriage	1.02m	1.02m
K	Rear wheel centre to rear face	0.6m	0.6m
	Carriage roll back angle	11°	11°
	Carriage dump angle	114°	114°

Figure 217.

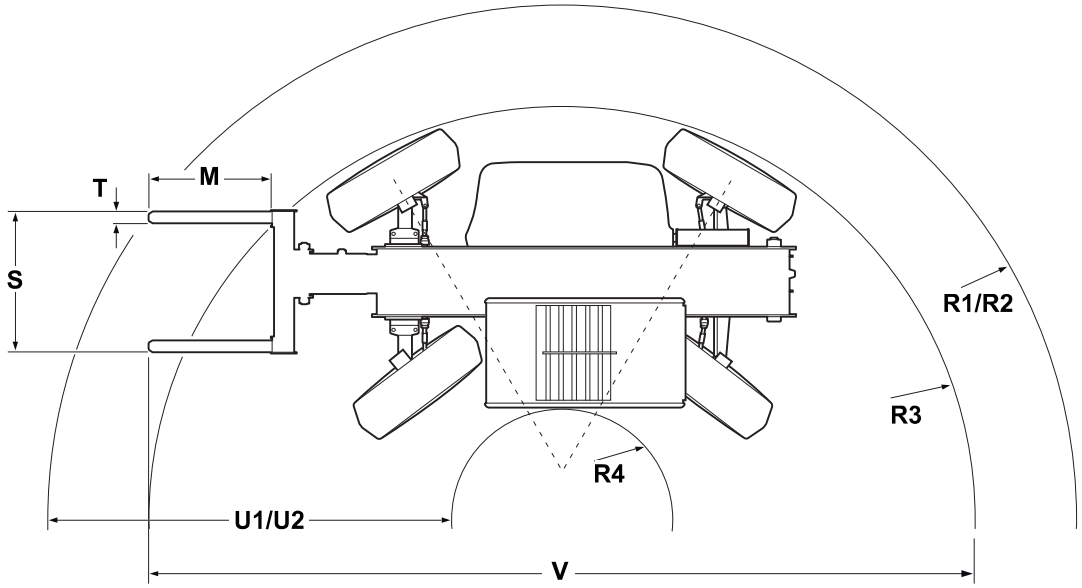


Table 23.

Item	Description	Dimension[1]
M		1,067mm
R1	1,067mm forks	4,450mm
R2	1,200mm forks	4,575mm
R3		3,700mm
R4		1,360mm
S		1,200mm
T		100mm
U1	1,067mm forks	3,090mm
U2	1,200mm forks	3,215mm
V	1,067mm forks	7,210mm

(1) Machine installed with Alliance 12-16.5 tyres.

Weights

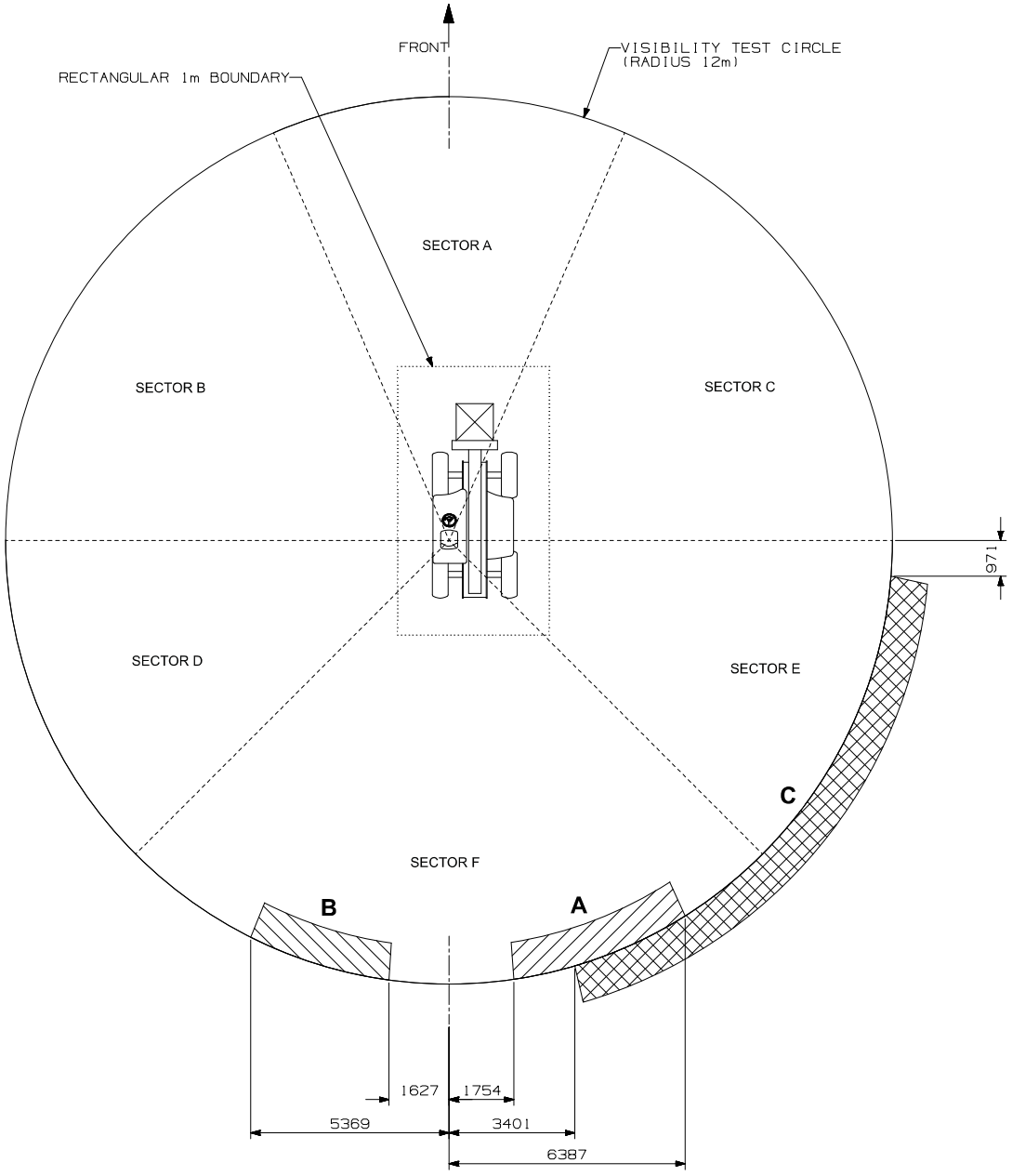
The figures are based on the machine with the boom in the load carrying position (boom retracted, fork heel 300mm above the ground), a full tank of fuel and driver of 75kg.

Table 24.

Model	Axle Loads		Total	Lift Capacity	Laden Axle Loads		Total
	Front	Rear			Front	Rear	
Construction	2,900kg	2,420kg	5,320kg	2,500kg	7,035kg	785kg	7,820kg
Agricultural	2,909kg	2,551kg	5,460kg	2,500kg	7,044kg	916kg	7,960kg

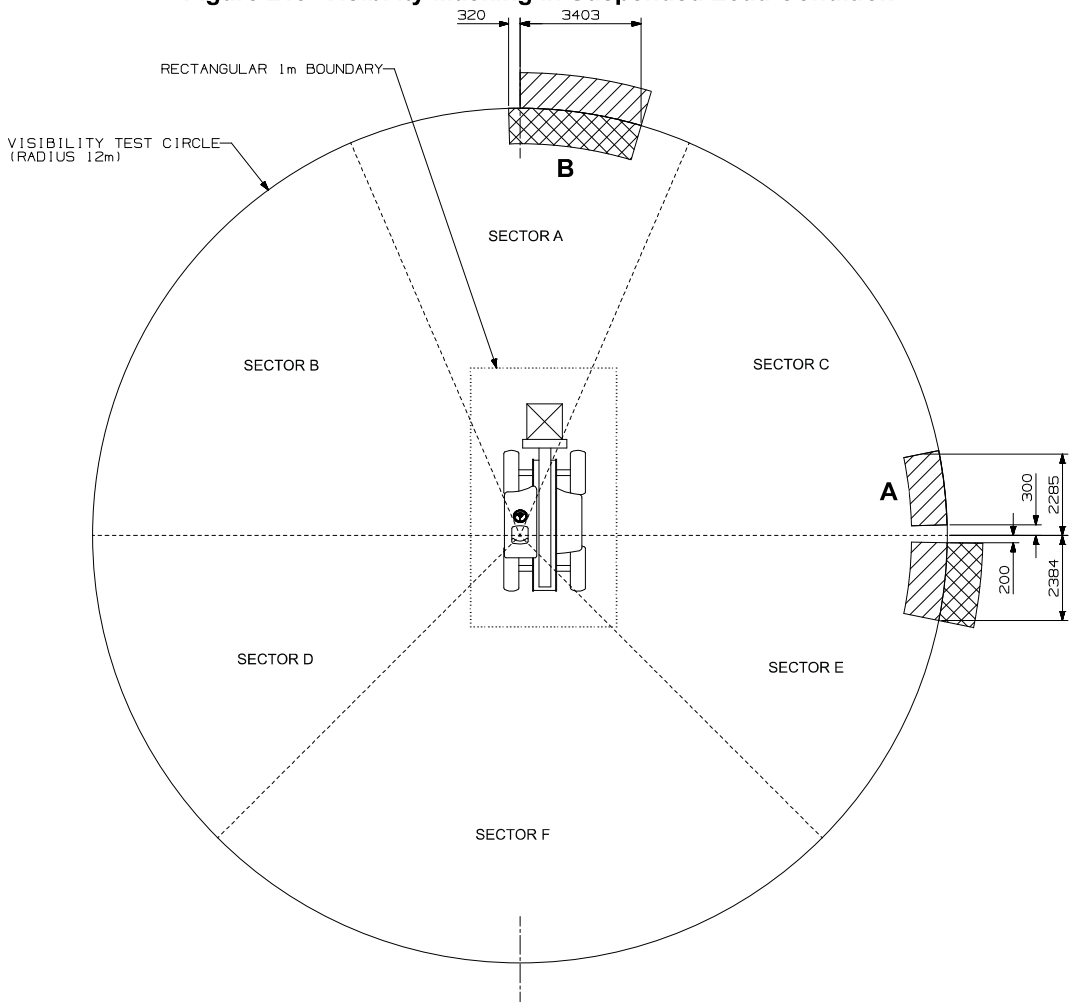
Visibility Diagrams

Figure 218. Mirror Setup



A Right hand road mirror
B Left hand road mirror
C Right hand wide angle

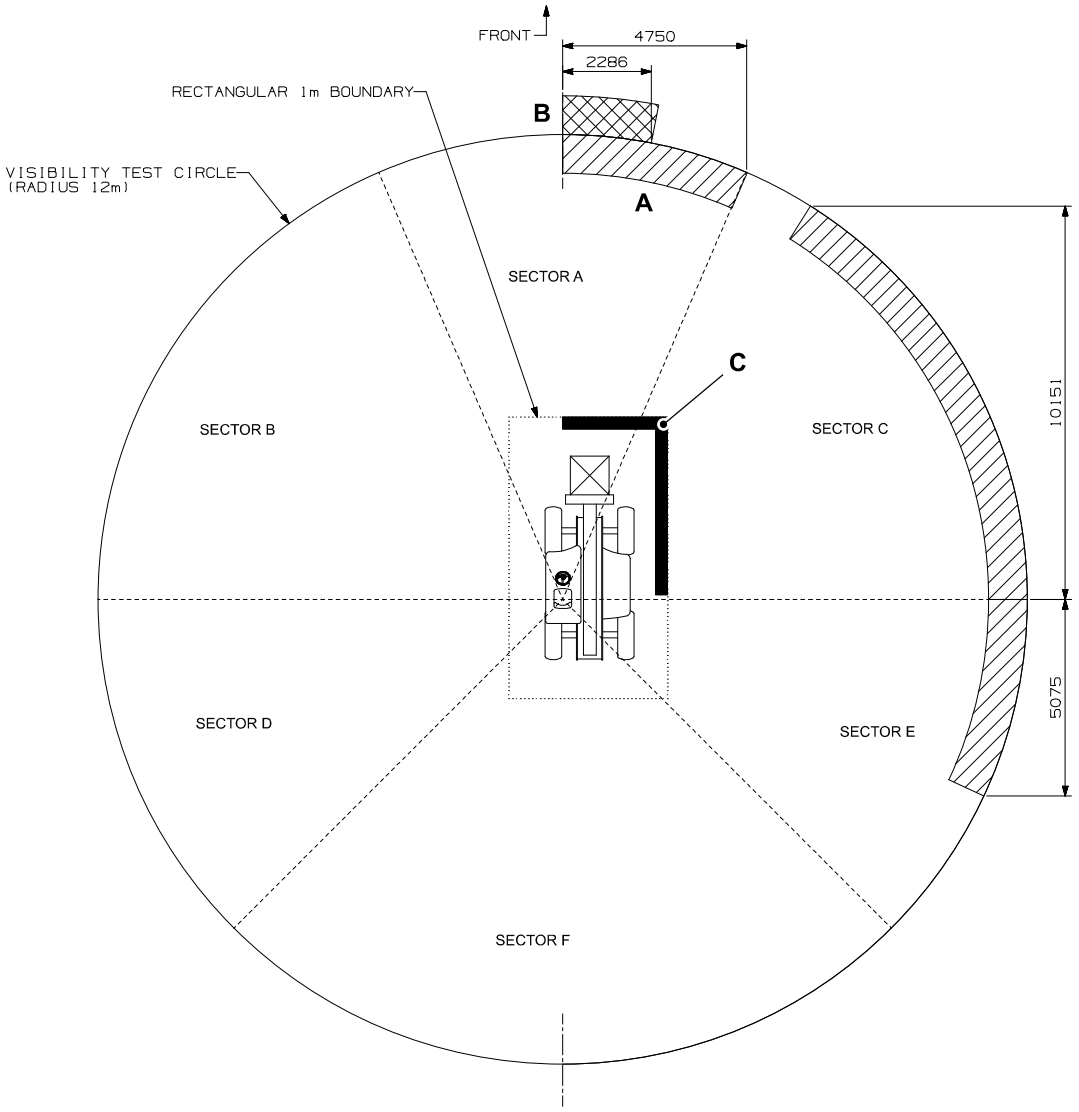
Figure 219. Visibility Masking in Suspended Load Condition



A Masking at 12m radius measured at ground level

B Masking at 12m radius measured at 0.75m above ground level

Figure 220. Visibility Masking in Lorry Trailer Loading Condition



A Masking at 12m radius measured at ground level

B Masking at 12m radius measured at 0.75m above ground level

C Masking at 1m boundary (>200m width) measured between ground level and 1.5m above ground level

Performance Dimensions

General

Tow Hitch Capacity

The tow hitch capacity details the maximum allowable horizontal and vertical hitch loads for your machine. The information should be used to establish the correct maximum loadings for your machine.

Identifying maximum allowable trailer mass to tow with your machine

1. Identify the relevant tables for your machine.
   Refer to: Technical Data > Performance Dimensions > Towing Weights (Page 248).
2. Select the correct column table for your machine speed.
3. Select the correct column, which corresponds with the hitch type on your machine.
4. Select the correct row, which corresponds with the breaking type of trailer breaking system you are able to use with the trailer.

Identifying maximum allowable vertical hitch download for your machine

1. Use the same table previously identified.
2. Select the correct column, which corresponds with the hitch type on your machine.
3. Select the row, which corresponds to the tyres installed to your machine.
4. Look at the inflation pressure column, to ensure the correct tyre pressure has been used.

Maximum Wading Depth

The maximum wading depth of the machine is 300mm. Water can enter the engine and axles and the cooling fan can be damaged if the machine is operated in deeper water.

Boom Dimensions and Performance

Table 25.

Description	Construction and Agricultural Weight
Maximum lift capacity	2,500kg
Lift capacity to full height	1,750kg
Lift capacity at full reach	800kg

Table 26.

Description	Construction Dimension	Agricultural Dimension
Maximum lift height	6m	6m
Reach at maximum lift height	-0.15m	-0.25m
Maximum forward reach (to front of carriage)	3.06m	3m
Reach with 1.2t load	2.64m	2.58m

Towing Weights

Towing Limitations

⚠ **WARNING** Do not exceed the permitted limits on trailer gross weight or hitch load. The machine may become unstable.

Maximum Gross Trailer Weight

The maximum gross trailer weight permitted to be towed by your machine (when fitted with JCB approved towing equipment) is shown. Refer to: Technical Data > Wheels and Tyres (Page 263).

Tyre Pressures and Hitch Loads

The correct tyre pressures and maximum speeds relative to trailer hitch loads MAX KG are shown on a tyre chart (found in the cab). Refer to: Technical Data > Wheels and Tyres (Page 263).

Make sure that the tyre pressures are correct and do not exceed the speed or loads shown against the size of tyres fitted.

Trailer Braking Systems

The maximum gross trailer weight is restricted by the type of braking system fitted.

Up to 750kg gross trailer weight, trailer brakes are not essential.

Above 750kg and not exceeding 3,500kg gross trailer weight, over-run brakes must be fitted to the trailer. Inertia brakes are those that are automatically operated if the trailer exerts a force on the towbar of the towing vehicle.

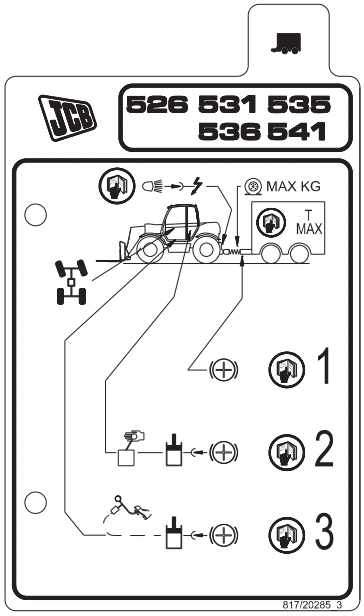
Above 3,500kg and not exceeding 6,000kg gross trailer weight, independent brakes must be fitted. Independent brakes are those that are applied by the operator.

Above 6,000kg and not exceeding the maximum gross trailer weight permitted, close-coupled brakes must be fitted to the trailer. Close-coupled brakes are those that are operated when the foot brake pedal is depressed in the towing vehicle.

In all cases the towing Loadall must have 2-wheel steering engaged and trailer lighting must be operative.

The towing chart gives a visual summary of the requirements for towing with the machine. Always refer to the chart in your machine.

Figure 221. Example Towing Chart



1 Over-run brakes
2 Independent brakes
3 Close-coupled brakes

Noise Emissions

General

To assist in compliance with European Directives 2000/14/EC and 2005/88/EC, the noise data values for this type of machine have been provided on the following page(s) and may be used for the assessment of risks to exposure from noise.

The noise data values shown only apply to CE marked machines.

For information relating to this machine when used with other JCB approved attachments, please refer to the literature accompanying the attachments.

Table 27. Definition of terms

Term	Definition	Notes
LpA	A-weighted sound pressure level measured at the operator's station.	Determined in accordance with the test method defined in ISO 6396 and the dynamic test conditions defined on 2000/14/EC.
LwA	Equivalent A-weighted sound power level emitted by the machine.	Guaranteed equivalent sound power (external noise) determined in accordance with the dynamic test conditions defined in 2000/14/EC.

Noise Data

Table 28.

Engine rating[1]	LpA	LwA
55kW	76	104

(1) Net installed power.

Vibration Emissions

General

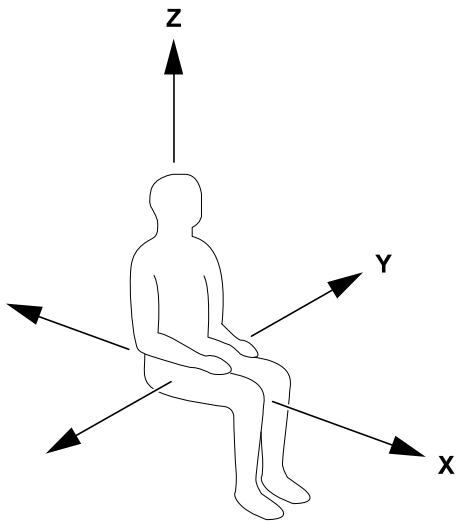
To assist in compliance with the European Directive 2002/44/EC, the duty specific vibration emission values for this machine type have been provided on the following page(s) and may be used for the assessment of risks to exposure from vibration.

Unless otherwise indicated for a specific operating condition, the vibration values are calculated with the machine equipped with the standard attachments (for example bucket, shovel, fork, etc.) for the respective operating condition.

The vibration values are calculated from measurements in three perpendicular axes (X, Y and Z). The highest weighted (RMS (Root Mean Square)) value is used to specify the vibration emission.

The axis upon which the highest weighted (RMS) value occurs is shown on the vibration chart for each of the machine operating duties, see dominant axis (X, Y or Z).

Figure 222.



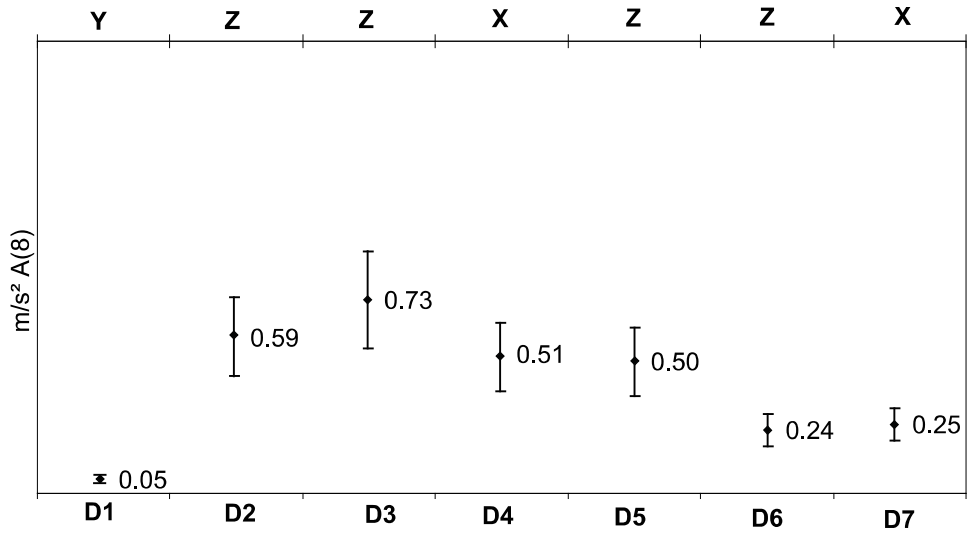
Exposure to Vibration

Exposure to vibration can be minimised through:

- Selection of the correct size and capacity of machine, equipment and attachments for a particular application
- Use of a machine equipped with an appropriate seat, keeping the seat maintained and adjusted
- Checks to make sure that the machine is correctly maintained, reporting and correcting any faults
- Steering, braking, accelerating, shifting gears, moving the attachments and load smoothly
- Adjusting the machine speed and travel path to minimise the vibration level
- Keeping the terrain on worksites where the machine works and travels in good condition, removing any large rocks or obstacles and filling in any ditches and holes
- Choosing routes that avoid rough surfaces and, if this is not possible, drive more slowly to avoid bumping and jolting
- Travel over longer distances at an adjusted (medium) speed
- Avoiding bad postures, i.e. slumping in your seat, constantly leaning forward or sideways or driving with your back twisted.

Vibration Data

Figure 223.



X-Z Dominant axis
D1 Machine operating duty: Low idle
D2 Machine operating duty: Roading (tarmac)
D3 Machine operating duty: Roading (rough terrain)
D4 Machine operating duty: Loader work (soil)
D5 Machine operating duty: Loader work (stone)
D6 Machine operating duty: Lift cycles
D7 Machine operating duty: Pick and place cycles

The whole-body vibration emission under representative operating conditions (according to the intended use) are shown.

Whole-body vibration emission determined in accordance with ISO 2631-1:1997 for this machine type is 0.37m/s² normalised to an 8h reference period [A(8)] and based upon a test cycle 'defined in SAE (Society of Automotive Engineers) J1166'.

Hand-arm vibration determined in accordance with dynamic test conditions defined in ISO (International Organization for Standardization) 5349-2: 2001 does not exceed 2.5m/s².

Errors bars are due to variations in vibration emissions due to measurement uncertainty (50% in accordance with EN 12096:1997).

Fluids, Lubricants and Capacities

General

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 29.

Item	Capacity	Fluid/Lubricant	JCB Part Number	Container Size[1]	Specification
Fuel tank	75L	Diesel oil			
Engine (oil)	Minimum 6.5L, Maximum 11.2L	JCB engine oil UP 10W30 (ultra performance) -19°C (-2.2°F) to 50°C (121.9°F)	4001/3005	20L	API CH-4/ CG-4, CF-4,CF,SJ.ACEA, E2, B3, A3
		JCB cold climate engine oil OP 5W-30 (optimum performance) -19°C (-2.2°F) and below	4001/3105	20L	ASTM D3306, ASTM D4985, ASTM D6210, SAE (Society of Automotive Engineers) J1034, BS6580 (1992), AFNOR NF R15- 601
		JCB engine oil UP 5W-40 (ultra performance) -19°C (-2.2°F) and below	4001/3405	20L	
Engine (coolant)[2]	11L	JCB antifreeze HP/coolant + water	4006/1120	20L	
Front axle housing	4.2L	JCB Gear Oil LS Plus	4000/3905[3]	20L	
Rear axle housing	4.2L				
Hubs	0.9L				
Brake system		JCB hydraulic fluid HP 15[4]	4002/0503	5L	
Hydraulic tank[5]	48.7L	JCB optimum performance hydraulic fluid 68, -12°C (10.4°F) to 46°C (114.7°F)	4002/2720, 4002/2703	20L, 200L	
		JCB ultra performance hydraulic fluid 32, -20°C (-4.0°F) to 27°C (80.6°F)	4002/2820, 4002/2803	20L, 200L	
Grease points		JCB special HP grease[6]	4003/2017	0.4kg	
		JCB special MPL EP grease[6]	4003/1501	0.4kg	

Item	Capacity	Fluid/Lubricant	JCB Part Number	Container Size(1)	Specification
Wear pad runways		JCB waxoyl	4004/0502	5L	
Boom hoses		JCB special slide lubricant	4003/1115	0.4kg	

(1) For information about the different container sizes that are available (and their part numbers), contact your JCB Dealer.
(2) It is recommended that the cooling system be filled at a maximum rate of 6L per minute. If the fill rate is any higher than this then there is a possibility of air becoming trapped in the system.
(3) Must be suitable for use with oil immersed brakes and LSD (Limited Slip Differentials).
(4) Do not use ordinary brake fluid.
(5) This is nominal tank capacity. The total hydraulic system capacity depends on the equipment being used. Fill with all cylinders closed. Watch level sight glass when filling.
(6) JCB special HP Grease is the recommended specification grease. If JCB Special MPL-EP Grease is used, all 50h greasing operations must be carried out at 10h intervals; all 500h greasing operations must be carried out at 50h intervals.

Fuel

Acceptable and Unacceptable Fuels

⚠ **Notice:** No warranty liability whatsoever will be accepted for failure of fuel injection equipment where the failure is attributed to the quality and grade of the fuel used.

WARNING Do not use petrol in this machine. Do not mix petrol with the diesel fuel. In storage tanks the petrol will rise to the top and form flammable vapours.

Fuel Groups

The major world fuels standards are divided into four categories. Those that are fully accepted as suitable fuels, those that are acceptable from a "warranty" point of view, but may have undesirable affects on the expected life of the engine performance, those that will reduce the expected life, and lastly those that are viewed as unacceptable for use (fuels shown on the same line as each other are considered equivalents).

The lists below are not exhaustive of all diesel fuel standards encountered in the marketplace. If comment is required on the suitability of fuel standards not on the list, requests with, if possible, specification details showing at least the key characteristics described above should be forwarded to JCB Service for assessment and comment.

Table 30. Group 1

Fuel	Advice	Service Requirements
EN590 Diesel fuel types - Auto/C0/C1/C2/C3/C4	Preferred and may be used with no restrictions or conditions.	For fuel with unspecified parameters, EN590 values apply. Fuel grades within each standard must be appropriate to the ambient temperature. The appropriate level of fuel cleanliness at the FIE inlet after filtration has to be ensured by the customer.
BS2869 Class A2		
ASTM D975-076 2-D, US DF1, US DF2, US DFA		
JIS K2204 Grades 1, 2, 3 and Special Grade 3		

Table 31. Group 2

Fuel	Advice	Service Requirements
Group1 fuels with HFFR WSD in the range 460 to 520	Not preferred and may be used but may lead to reduced FIE life and / or loss of performance.	
ASTM D975-91 Class 1-1DA		
B20 Biodiesels can cause serious problems for engines. JCB Ecomax Stage 3b / Tier 4i engines have been developed to run with biodiesels up to 20 mix (B20), but NOT with higher biodiesel proportion. The biodiesel content of this mix must be to ASTM D6751, DIN 51606, or ISO 14214 standards. Using a B20 blend of biodiesel requires caution and additional servicing of the engine is required.(1)		The Ecomax dealer, or JCB Power Systems Applications department, should be consulted for further guidance. Biodiesel is very problematic to store; fuel in storage has to be very carefully managed to ensure that it does not deteriorate during this period. No warranty liability will be accepted for failure of fuel injection equipment where the failure is attributed to the quality and grade of the fuel used.

(1) See your JCB dealer for advice on service requirements.

Table 32. Group 3

Fuel	Advice
AVTUR FS11 (NATO F34, JP8, MIL T83133, DEF STAN 91-87, DERD 2463)	Not preferred and may be used only with appropriate additives and will lead to reduced FIE life and / or loss of performance.
AVCAT FS11 (NATO F44, JP5, MIL T5624, DERD 2452, AVTOR))	
JET A1 (NATO F35, DEF STAN 91-91, DERD 2494)	
AVCAT (NATO F43, JP5 without additives)	
JET A (ASTM D1655)	
ASTM D3699 Kerosene	
JP7 (MIL T38219 XF63)	
NATO F63	

Table 33. Group 4

Fuel	Advice
Unmodified Vegetable Oils and Biodiesels over 20% concentration	Unacceptable

Additives

The additives listed below are advertised as being suitable for bringing the lubricity levels of kerosene/low sulphur fuels up to those of diesel fuels.

These products are given as examples only. The information is derived from the manufacturers data. The products are not recommended or endorsed by JCB. Contact your JCB dealer for further advice.

- Elf 2S 1750. Dosage 1000-1500 ppm (0.1% to 0.15%), specifically for Indian Superior Kerosene (SKO) but may be applicable to other fuels.
- Lubrizol 539N. Dosage (on Swedish low sulphur fuel) 250 ppm.
- Paradyne 7505 (from Infineum). Dosage 500 ppm (0.05%).

These products are given as examples only. The information is derived from the manufacturers data. The products are not recommended or endorsed by JCB.

Service Requirements for use of B20 Biodiesel

- The engine oil must be a grade CH4 as minimum specification.
- Do not leave unused B20 biodiesel in the fuel tank for extended periods (top up each day).

- Make sure that 1 in 5 fuel tank fills use standard diesel to EN590 specification, this will help to prevent 'gumming'.
- Make sure regular oil sampling is completed (look for excessive unburnt fuel content, water or wear particles.
- Change the engine oil and filter more frequently (as a minimum half the recommended intervals), or as indicated by oil sampling.
- Change the fuel filters more frequently (as a minimum half the recommended intervals), or if there are engine performance related issues.
- Make sure the fuel is stored correctly, care must be taken to make sure no water enters the machine fuel tank (or the storage tank). Water will encourage micobacterial growth.
- Make sure that the fuel pre-filter is drained daily (not every week as currently advised).
- Use heater kits in low ambient temperature territories.
- The biodiesel must meet the following standards: ASTM D6751, DIN 51606, ISO 14214.

If necessary use a test kit to confirm the fuel specification. Testing kits are available (not from JCB currently), use the internet as a source for the kits.

If performance related issues are to be reported to JCB Service, and the engine has been run on biodiesel, then the fuel system must be filled with standard diesel (at least 2 x tank fills) to EN590 specification and relevant stall speeds recorded prior to making the report.

Warranty

JCB have shown a commitment to support the environment by approving the use of biodiesel blended fuels.

Using a B5 blend of biodiesel requires caution and additional servicing of the engine is required.

Failure to follow the additional recommended service requirements may lead to a warranty claim being declined.

Failures resulting by the incorrect use of biodiesels or other fuel additives are not defects of the engine workmanship and therefore will not be supported by JCB Warranty.

Usage and Effects of Fuels

The information that follows indicates types of fuel that are acceptable or unacceptable.

Acceptable Fuels

Ultra Low Sulphur Diesel (EN590)

Available throughout the UK, Europe and North America since March 1999. This fuel has a maximum sulphur content of 0.001% (0.0015% in North America) by weight and a further reduction in the natural lubricity and aromatic content than experienced with low sulphur diesel. Major oil producers will add lubrication improvers and also maintain the total aromatic content to an acceptable level.

B20 Biodiesel

Biodiesel refers to pure fuel before it is blended with diesel fuel. When biodiesel is blended with diesel fuel it is referred to as B5, B20 etc., where the number indicates the percentage of biodiesel in the fuel, for example B5 contains 5% biodiesel.

Biodiesel has different characteristics than mineral based fuels, this could lead to seals swelling, fuel system corrosion and seal damage.

Biodiesels will 'cloud' at higher temperatures than mineral based fuels. To explain Cloud Point - the lowest temperature at which fluid can flow and performs its functions is referred to as Pour Point. Just prior to reaching its Pour Point the diesel fluid becomes 'cloudy' due to crystallization of waxy constituents - this is know as Cloud Point. Using diesel at temperature below its cloud point can result in filter clogging. To prevent this happening preheating will be required.

Using B20 biodiesel can result in unburnt fuels accumulating in the engine oil, ultimately this can affect the engine oil efficiency and lead to engine damage (with standard diesel any unburnt fuel evaporates off the lubricating oil).

The natural properties of biodiesel make it a good medium for micro bacterial growth, these microbes can cause fuel system corrosion and early fuel filter blocking. Biodiesels must be stored to exclude water absorption and oxidation. It will be necessary to consult and seek advice from your fuel supplier, the effectiveness of conventional antibacterial additives when used in biodiesel is still being investigated in the fuel industry. A high percentage biodiesel mixture (>205%) can lead to fuel gelling and filter blocking in low temperature operation, it may also effect the power and performance of the engine.

To minimise the risk of engine damage when using a B20 mix, there are additional service requirements.

If the recommended actions are not taken there may be the following consequences:- low temperature filter clogging- injectors lacquering / sticking deterioration of seals and rubber hoses- corrosion of metal parts in the fuel system- engine performance problems. These risks will be increased if the fuel has been poorly stored, that is deteriorated through oxidation and / or water absorption.

Unacceptable Fuels

B100 - Chemically Modified Vegetable Oils (FAME/ VOME)

These fuels have been derived from a wide range of vegetable oils and animal fats, resulting in better stability, viscosity and cetane number than those produced from unmodified vegetable oils, but it is recognised that there are potential problems associated with the finished fuel characteristics. These oils are less stable than mineral oil derived fuels when stored and they will readily degrade producing fatty acids, methanol and water, none of which are desirable in the FIE. These effects are known to be accelerated when the fuel is stored in the presence of air and water together.

An extract 'common statement' from the FIE manufactures specifies that "The fuel injection equipment manufacturers can accept no liability whatsoever for failure attributable to operating their products with fuels for which the products were not designed, and no warranties or representations are made as to the possible effects of running these products with such fuels".

Unmodified Vegetable Oils

Burned in diesel engines neat or used as an extender to mineral derived fuel. When these are subjected to heat in the fuel injection system they form sticky deposits that can be found inside the fuel pump and a hard lacquer in the injectors where exposure to even higher temperatures takes place.

Sulphur Content

⚠ **CAUTION** A combination of water and sulphur will have a corrosive chemical effect on fuel injection equipment. It is essential that water is eradicated from the fuel system when high sulphur fuels are used.

Effects of Fuel Contaminates

The effect of dirt, water and other contaminants in diesel can be disastrous for injection equipment:

Dirt

A severely damaging contaminant. Finely machined and mated surfaces such as delivery valves and distributor rotors are susceptible to the abrasive nature of dirt particles - increased wear will almost inevitably lead to greater leakage, uneven running and poor fuel delivery.

Water

Water can enter fuel through poor storage or careless handling, and will almost inevitably condense in fuel tanks. The smallest amounts of water can result in effects that are just as disastrous to the fuel injection pump as dirt, causing rapid wear, corrosion and in severe cases, even seizure. It is vitally important that water is prevented from reaching the fuel injection equipment. The filter/water trap must be drained regularly.

Wax

Wax is precipitated from diesel when the ambient temperature falls below that of the fuel's cloud point, causing a restriction in fuel flow resulting in rough engine running. Special winter fuels may be available for engine operation at temperatures below 0°C (32.0°F). These fuels have a lower viscosity and limit wax formation.

Chemical Contamination

It should be noted that exposure of fuel to surfaces containing Copper (Cu), Zinc (Zn) or Lead (Pb) can adversely affect fuel quality and should be minimised.

Coolant

⚠ **CAUTION** Antifreeze can be harmful. Obey the manufacturer's instructions when handling full strength or diluted antifreeze.

Check the strength of the coolant mixture at least once a year, preferably at the start of the cold period.

Replace the coolant mixture according to the intervals shown in the machine's Service Schedule.

You must dilute full strength antifreeze with clean water before use. Use clean water of no more than a moderate hardness (pH value 8.5). If this cannot be obtained, use de-ionized water. For further information advice on water hardness, contact your local water authority.

The correct concentration of antifreeze protects the engine against frost damage in winter and provides year round protection against corrosion.

The protection provided by JCB High Performance Antifreeze and Inhibitor is shown below.

Table 34.

Concentration	Level of protection
50% (Standard)	Protects against damage down to -40°C (-40°F)
60% (Extreme Conditions Only)	Protects against damage down to -56°C (-69°F)

Do not exceed a 60% concentration, as the freezing protection provided reduces beyond this point.

If you use any other brand of antifreeze:

- Make sure that the antifreeze complies with International Specification ASTM D6210
- Always read and understand the manufacturer's instructions
- Make sure that a corrosion inhibitor is included. Serious damage to the cooling system can occur if corrosion inhibitors are not used
- Make sure that the antifreeze is ethylene glycol based and does not use Organic Acid Technology (OAT).

Torque Values

General

ROPS/FOPS

Table 35.

Mounting bolts torque	205N·m

Wheels

Table 36.

Front Wheel Nut Torque	Rear Wheel Nut Torque
650N·m	650N·m

Engine

Table 37.

	Torque
Oil filter cartridge cap	25N·m
Fuel filter cartridge	17N·m
Engine oil drain plug	35N·m
Alternator belt adjustment bolt	25N·m

Axles

Table 38.

Fill/level plug torque	35–50N·m

Propshafts

Table 39.

Constructional propshaft bolts (x4)	M10 10.9 grade	60N·m
Agricultural propshaft bolts (x8)	M10x20 8.8 grade	43N·m
Agricultural propshaft double ended studs	M10 8.8 grade (zinc coating)	47N·m

Electrical System

General

Table 40.

Item	Specification
Battery voltage/system voltage	12V

Bulbs

Table 41.

Lamp Position	Lamp Description
Rear side lamps	12V, 55W, H3
Headlamps	12V, 55W, H7
Front side lamps	12V, 4W, BA 9s
Front and side Indicator lamps	12V, 21W, BA 15s
Rear indicator lamps	12V, P21W
Stop lamps	10W/P21W
Rear number plate lamp	12V, 5W, BA 15s
Rear fog lamp	P21W
Reverse lamp	P21W

Fuses

Figure 224.

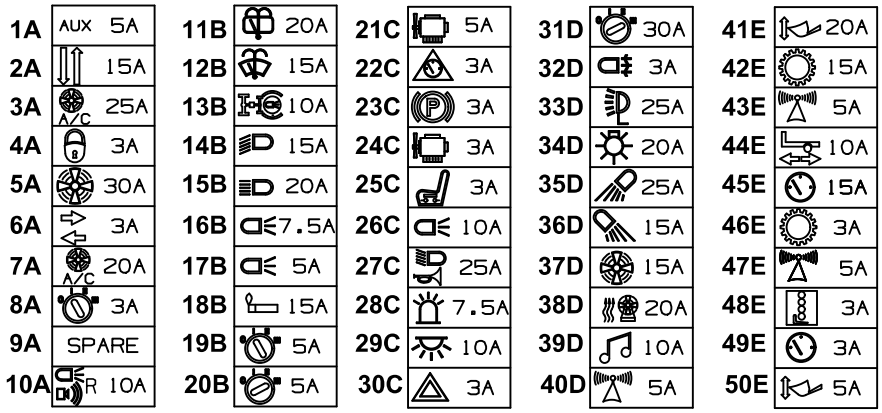


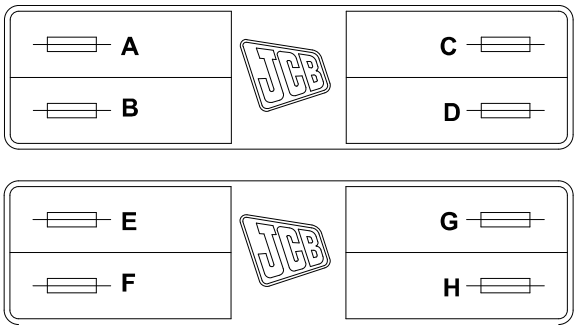
Table 42.

Fuse	Circuits	Rating
		A
1A	Auxiliary	5
2A	Auxiliary/hitch hydraulics	15
3A	Air-conditioning	25
4A	Immobiliser	3
5A	Heater	30
6A	Directional indicators	3
7A	Air-conditioning	20
8A	Ignition	3
9A	Spare	
10A	Reverse alarm/lights	10
11B	Rear and roof wash/wipe	20
12B	Front wash/wipe	15

Fuse	Circuits	Rating
		A
13B	Brake lights	10
14B	Dipped headlights	15
15B	Main beam lights	20
16B	Side lights	7.5
17B	Side lights	5
18B	12V Power socket	15
19B	Ignition	5
20B	Crank signal	5
21C	Engine fuse	5
22C	Warning cluster	3
23C	Park Brake	3
24C	Engine fuse	3
25C	Seat switch	3
26C	Road lights	10
27C	Horn and headlight flash	25
28C	Beacon	7.5
29C	Interior light and radio	10
30C	Hazards	3
31D	Starter solenoid	30
32D	Fog lights	3
33D	Boom work lights	25
34D	Road lights	20
35D	Front work lights	25
36D	Rear work lights	15
37D	Bonnet fan	15
38D	Heated seat/air suspension seat	20
39D	Radio	10
40D	Livelink	5
41E	Hydraulics ECU (Electronic Control Unit)	20
42E	Transmission	15
43E	LiveLink	5
44E	Trailer electrics	10
45E	Instrument panel	15
46E	Transmission	3
47E	LiveLink	5
48E	LLMI (Longitudinal Load Moment Indicator)	3
49E	Clocks	3
50E	Hydraulic ECU	5

Primary Fuses

Figure 225.



Relays

Figure 226.

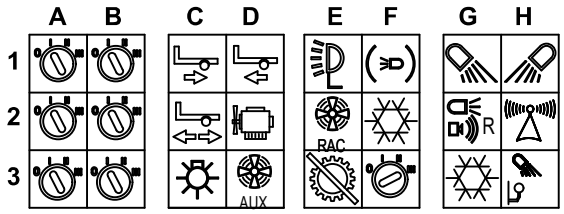


Table 43.

Relay	Circuit
A1	Ignition
A2	Ignition
A3	Ignition
B1	Ignition
B2	Ignition
B3	Ignition
C1	Trailer directional
C2	Trailer directional
C3	Road light
D1	Trailer directional
D2	Starter motor solenoid
D3	Cooling fan
E1	Boom work lights
E2	Roof air-conditioning
E3	Transmission
F1	Brake lights
F2	Air-conditioning pump
F3	Starter motor solenoid
G1	Work lights
G2	Reverse alarm/lights
G3	Air-conditioning
H1	Work lights
H2	Livelink
H3	Hitch lights

Wheels and Tyres

General

⚠ **WARNING** Do not use the machine with damaged, incorrectly installed, incorrectly inflated or excessively worn tyres. Recognise the speed limitation of the tyres fitted and do not operate at more than their recommended maximum speed.

Before you operate the machine, make sure that the correct tyres are installed and they are inflated to the correct pressure.

You must refer to the chart in the machine for correct tyre and pressure rating. Do not use the maximum pressure marked on the tyre.

The pressures shown on the chart are agreed with the tyre manufacturer(s) according to the European Tyre and Rim Technical Organisation (ETRTO) standards to satisfy the machine stability performance.

If the chart does not show the tyres installed on your machine, then contact your JCB dealer for instruction. Do not guess the tyre pressures.

Non-approved tyre ballast can cause damage to the machine's drive train and structures. It will also affect manufacturer's warranty. Contact your JCB dealer for more details.

Specifications

The Effect of Tyres on Stability

Because tyres deflect and distort under load they have a significant effect on machine stability.

Although tyres from different manufacturers may be of the same specification in terms of size, number of piles and load/speed ratings their deflection and distortion under load may vary significantly.

Hence when establishing the machine load chart, through performance and stability testing, JCB works with tyre manufacturers to agree suitable tyres and tyre pressures for the machine and its application.

The use of tyres not approved by JCB may effect the stability of the machine and its ability to conform to its load chart.

Even when a machine is installed with JCB's approved tyres its performance may be adversely affected by issues such as:

- Mixing of tyres from different manufacturers
- Incorrect ply rating
- Differences in diameter of tyres on the same axle due to differential wear
- Low tyre pressure
- High tyre pressure
- Uneven tyre pressure
- Poor repairs

Since JCB approve wheel and tyre assemblies by performance and stability testing, replacement tyres should be the same size, ply and brand as originally installed unless a set of four alternative manufacturer approved tyres and rims are installed.

Due to size variations between tyre brands and reduction in diameter due to wear, both tyres on axle must be replaced at the same time with identical tyres.

If the tyres in opposite sides are different sizes the machine will not be vertical when standing on level ground. This will cause the combined centre of gravity of the machine and load to move sideways, which may lead to instability.

Tyre Sizes and Pressures

Figure 227.

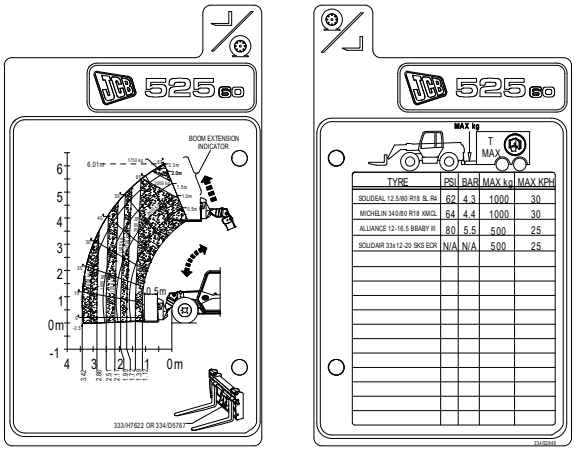


Table 44.

Size (in) width x diameter	Make	Pressure	Maximum Weight	Maximum Speed
12.5/80 R18 SL R4	Solideal	4.3bar (62psi)	1,000kg	30km/h (18.6mph)
12-16.5 BBABY III	Alliance	5.5bar (80psi)	500kg	25km/h (15.5mph)
33x12-20 SKS ECR	Solidair	N/A	500kg	25km/h (15.5mph)

Hitch Options (JCB)

Table 45. Maximum Laden Mass

Hitch Type	Mechanical Hitch H0[1]	Hydraulic Pick-up Hitch H1	JCB Ladder with Rockinger Clevis H9		Piton H10
Brake System			Top	Bottom	
	Maximum Laden Mass kg[2]				
Unbraked	750	750	750	750	750
Inertia braked	750	3,500	3,500	3,500	3,500
Independently braked	750	6,000	6,000	6,000	6,000
Proportional assisted braking	750	9,463	9,463	9,463	9,463

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass.

Table 46. Maximum Tractor-Trailer Combination Mass

Hitch Type	Mechanical Hitch H0[1]	Hydraulic Pick-up Hitch H1	JCB Ladder with Rockinger Clevis H9		Piton H10
Brake System			Top	Bottom	
	Maximum Tractor-Trailer Mass kg[2]				
Unbraked	6,485	6,485	6,485	6,485	6,485
Inertia braked	6,485	9,235	9,235	9,235	9,235
Independently braked	6,485	11,735	11,735	11,735	11,735
Proportional assisted braking	6,485	15,198	15,198	15,198	15,198

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass.

Table 47. Maximum Allowable Vertical Hitch Load

Hitch Type	Mechanical Hitch H0[1]	Hydraulic Pick-up Hitch H1	JCB Ladder with Rockinger Clevis H9		Piton H10
JCB Tyre Part Number			Top	Bottom	
	Maximum Allowable Vertical Hitch Load kg[2]				
42/925246	500	1,150	-	-	-
333/H3169	500	-	-	-	-
334/C4274334/C4270	500	-	-	-	-

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass.

Hitch Options (Rockinger)

Table 48. Maximum Laden Mass

Hitch Type	Fixed Clevis (Auto/Manual) H2/H3	Ladder Clevis H4/H5/H6		Ladder with Piton/Ball 80mm H7/H8
Brake System		Top	Bottom	
	Maximum Laden Mass kg[1]			
Unbraked	750	750	750	750
Inertia braked	3,500	3,500	3,500	3,500
Independently braked	6,000	6,000	6,000	6,000
Proportional assisted braking	9,463	9,463	9,463	9,463

(1) Local legislation may limit the maximum trailer mass.

Table 49. Maximum Tractor-Trailer Combination Mass

Hitch Type	Fixed Clevis (Auto/Manual) H2/H3	Ladder Clevis H4/H5/H6		Ladder with Piton/Ball 80mm H7/H8
Brake System		Top	Bottom	
	Maximum Tractor-Trailer Mass kg[1]			
Unbraked	6,485	6,485	6,485	6,485
Inertia braked	9,235	9,235	9,235	9,235
Independently braked	11,735	11,735	11,735	11,735
Proportional assisted braking	15,198	15,198	15,198	15,198

(1) Local legislation may limit the maximum trailer mass.

Table 50. Permissible Vertical Hitch Load

Hitch Type	Fixed Clevis (Auto/Manual) H2/H3	Ladder Clevis H4/H5/H6		Ladder with Piton/Ball 80mm H7/H8
JCB Tyre Part Number		Top	Bottom	
	Maximum Allowable Vertical Hitch Load kg[1]			
42/925246	1,200	1,200	-	1,200
333/H3169	-	-	-	-
334/C4274334/C4270	-	-	-	-

(1) Local legislation may limit the maximum trailer mass.

Declaration of Conformity

General

A completed copy of the EC Declaration of Conformity is supplied with all machines manufactured according to EC type examination and/or self-certification requirements.

A sample copy of the EC Declaration of Conformity and a summary of the information that can appear is provided. Refer to: Technical Data > Declaration of Conformity > Data (Page 266).

Data

Table 51.

A	Refer to: About the Product > Introduction > Name and Address of the Manufacturer (Page 7).
B	Lift Truck, Combustion-Engine Driven, Counterbalanced (Rough Terrain Trucks)
C	Refer to: Introduction > About this Manual > Model and Serial Number (Page 1).
D	Refer to: About the Product > Product and Component Identification > Machine (Page 10).
E	EN 1459:1998
F	Engineering Director, JCB Excavators Limited, Lakeside Works, Rocester, Staffordshire, United Kingdom, ST14 5JP
G	Principal Engineer NVH, JCB Excavators Limited, Lakeside Works, Rocester, Staffordshire, United Kingdom, ST14 5JP
H	ANNEX VI PROCEDURE 1
J	A. V. Technology, A. V. House, Birdhall Lane, Stockport, Cheshire, United Kingdom, SK3 0XU
K	Refer to: Technical Data > Noise Emissions (Page 250).
L	Refer to: Technical Data > Noise Emissions (Page 250).
M	Rocester
N	Managing Director
P	Variable reach truck

Figure 228.

DECLARATION OF CONFORMITY

NAME AND ADDRESS OF MANUFACTURER:	A
HEREBY DECLARES THAT THE MACHINERY / EQUIPMENT DESCRIBED BELOW:	
DESIGNATION OF MACHINERY/EQUIPMENT:	P
DESCRIPTION OF MACHINERY / EQUIPMENT:	B
TRADE NAME:	JCB
MODEL NAME:	C
SERIAL NUMBER OF MACHINERY / EQUIPMENT	D

COMPLIES WITH THE PROVISIONS OF THE "MACHINERY DIRECTIVE" (DIRECTIVE 2006/42/EC AS AMENDED).

THE FOLLOWING STANDARDS HAVE BEEN USED:	E
NAME AND ADDRESS OF THE PERSON WHO COMPILES THE TECHNICAL DOCUMENTATION:	F

COMPLIES WITH THE PROVISIONS OF THE "ELECTRO-MAGNETIC COMPATIBILITY DIRECTIVE" (DIRECTIVE 2004/108/EC AS AMENDED).

COMPLIES WITH THE PROVISIONS OF THE "NOISE EMISSIONS IN THE ENVIRONMENT BY EQUIPMENT FOR USE OUTDOORS DIRECTIVE" (DIRECTIVE 2000/14/EC AS AMENDED).

NAME AND ADDRESS OF THE PERSON WHO KEEPS THE TECHNICAL DOCUMENTATION:	G
CONFORMITY ASSESSMENT PROCEDURE:	H
NAME AND ADDRESS OF NOTIFIED BODY:	J
MEASURED SOUND POWER LEVEL ON EQUIPMENT REPRESENTATIVE FOR THIS TYPE:	K
GUARANTEED SOUND POWER LEVEL FOR THIS EQUIPMENT:	
NET INSTALLED POWER / MASS OF APPLIANCE:	L

PLACE OF DECLARATION:	M
DATE OF DECLARATION:	XX/XX/XXXX
NAME OF AUTHORISED SIGNATORY:	
POSITION:	N
SIGNATURE:	XXXXXX

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Warranty Information

Service Record Sheet

Table 52.

	Signature and stamp		Date
	Annual Insurance (Yes)		Hours

Figure 229. Installation Checklist

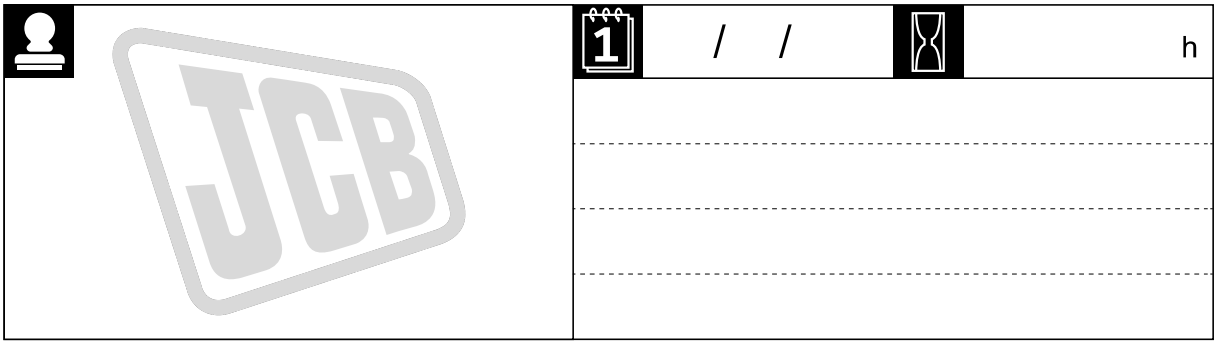

Figure 230. 1st 100h/1 Month

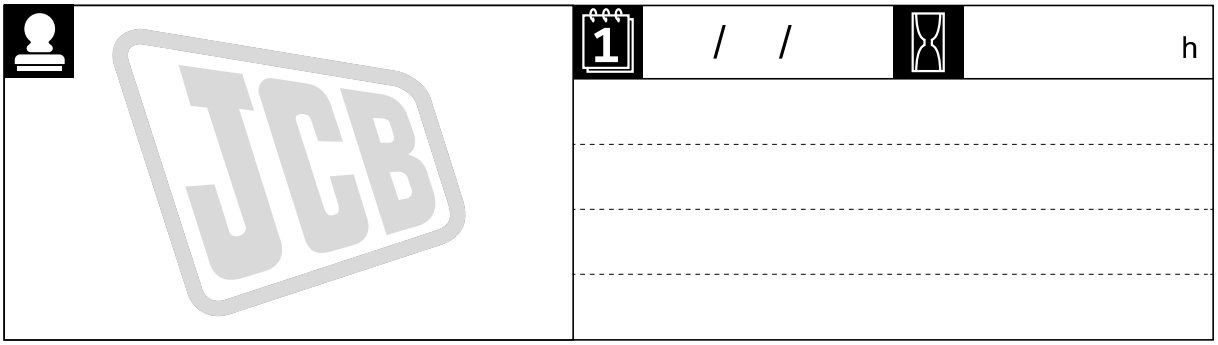

Figure 231. 500h/6 Month

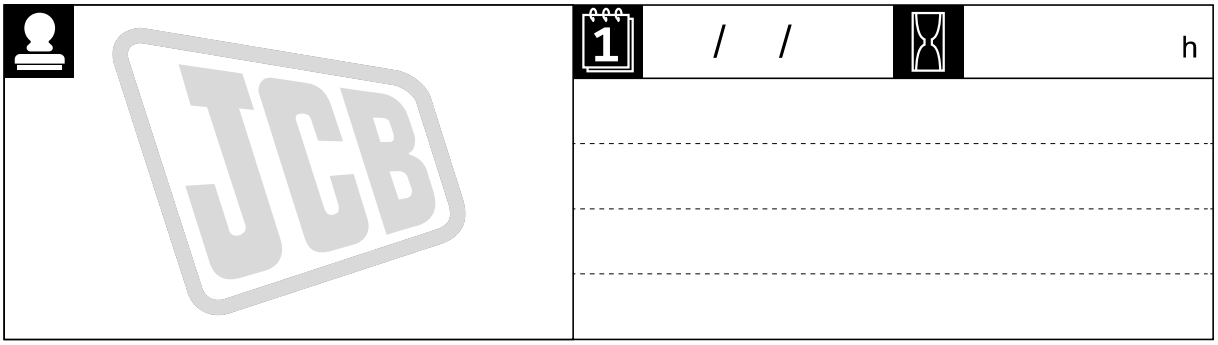

Figure 232. 1000h/12 Month

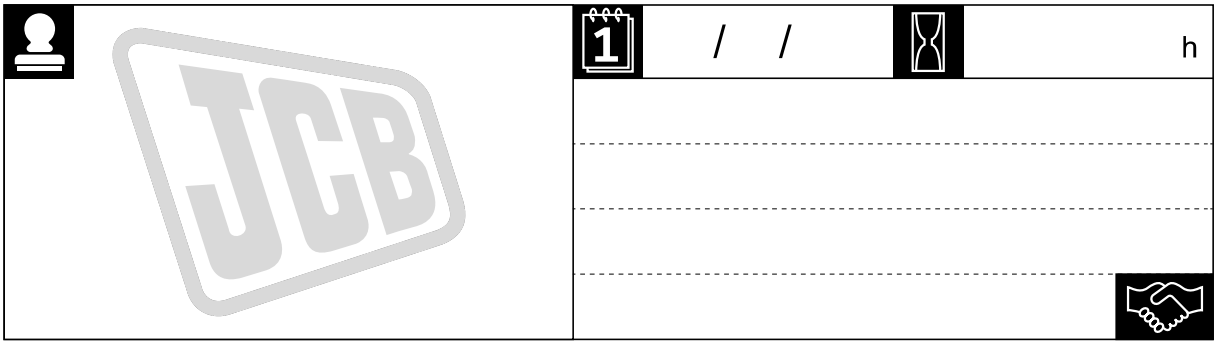

Figure 233. 1500h/18 Month

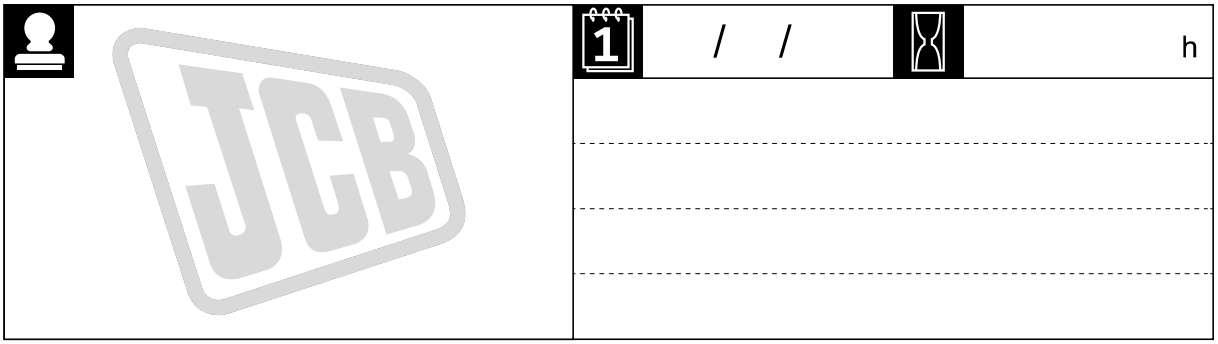

Figure 234. 2000h/24 Month

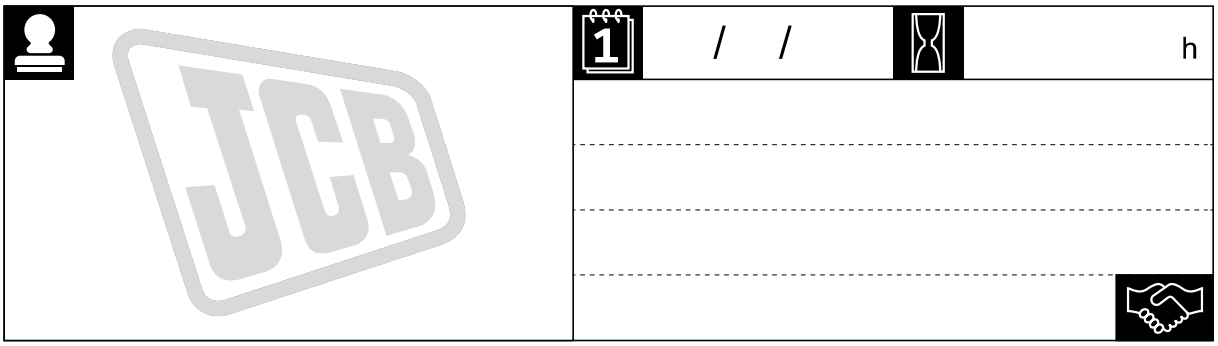

Figure 235. 2500h/30 Month

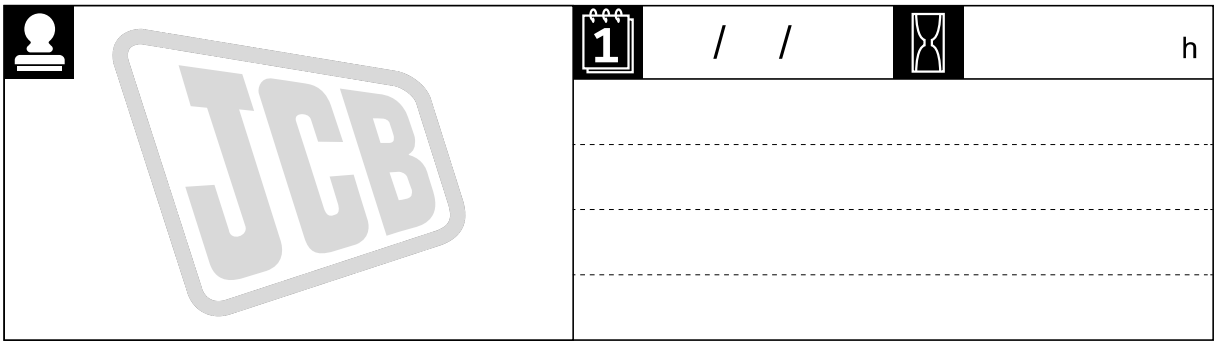

Figure 236. 3000h/36 Month

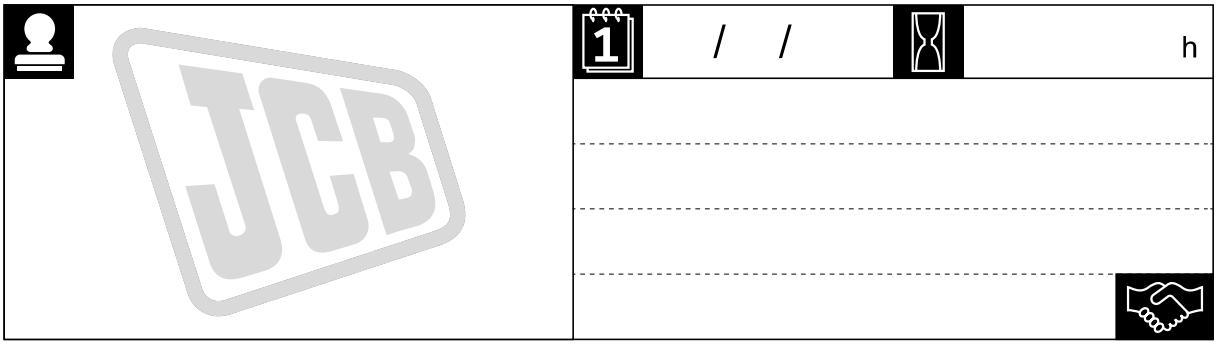

Figure 237. 3500h/42 Month

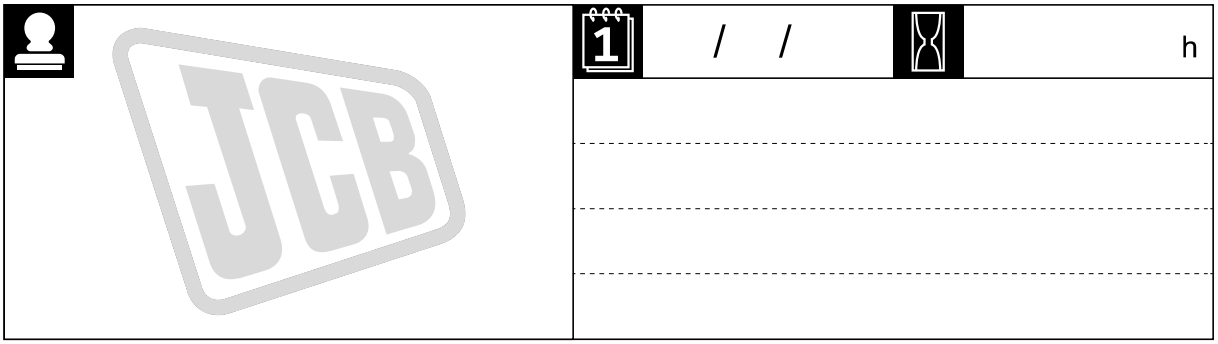

Figure 238. 4000h/48 Month

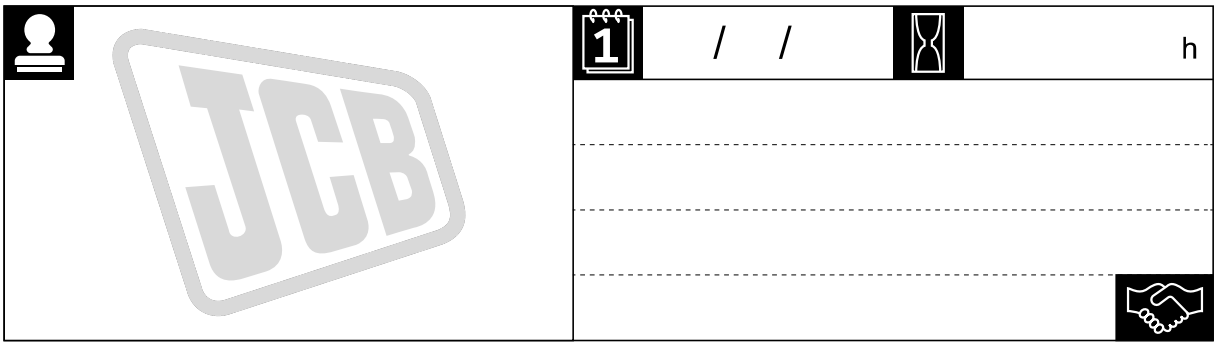

Figure 239. 4500h/54 Month

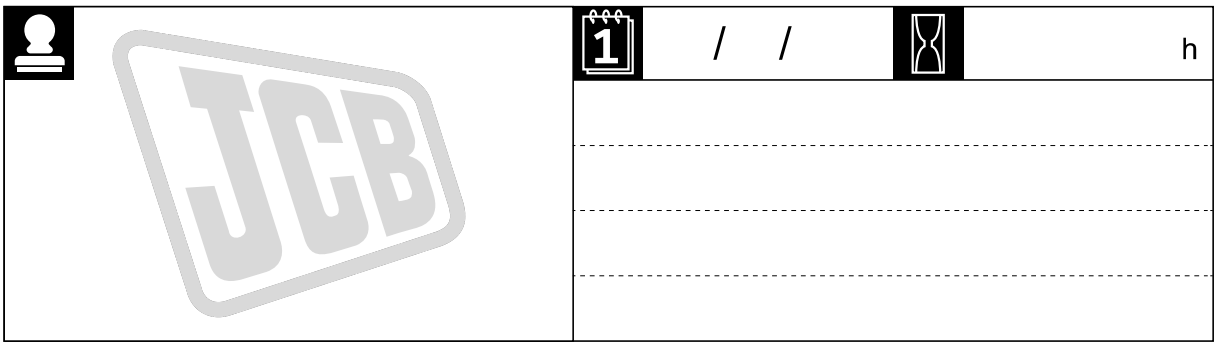

Figure 240. 5000h/60Month

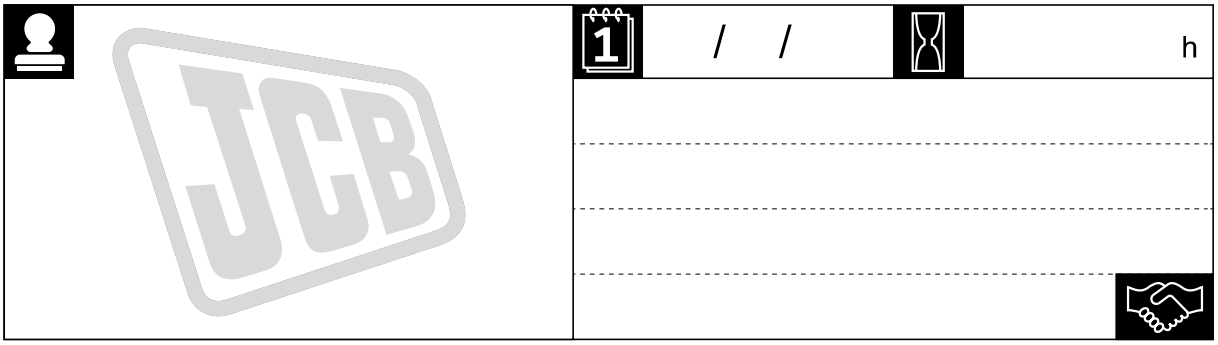

Figure 241. 5500h/66 Month

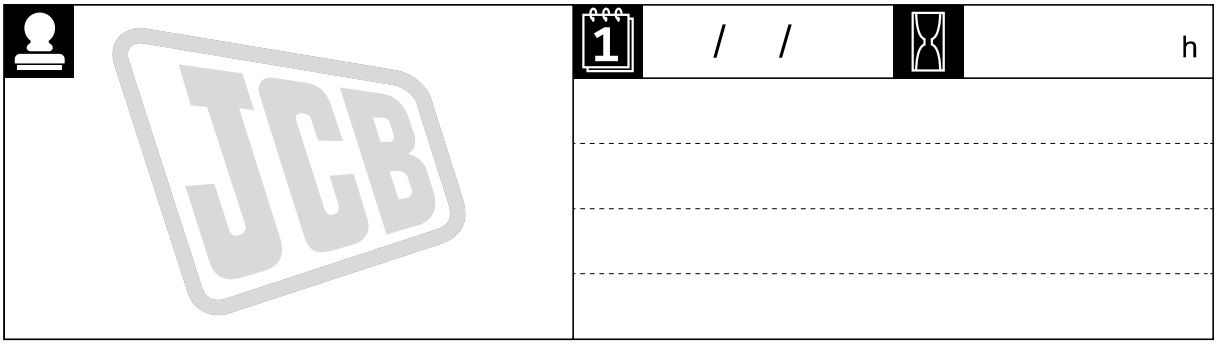

Figure 242. 6000h/72 Month

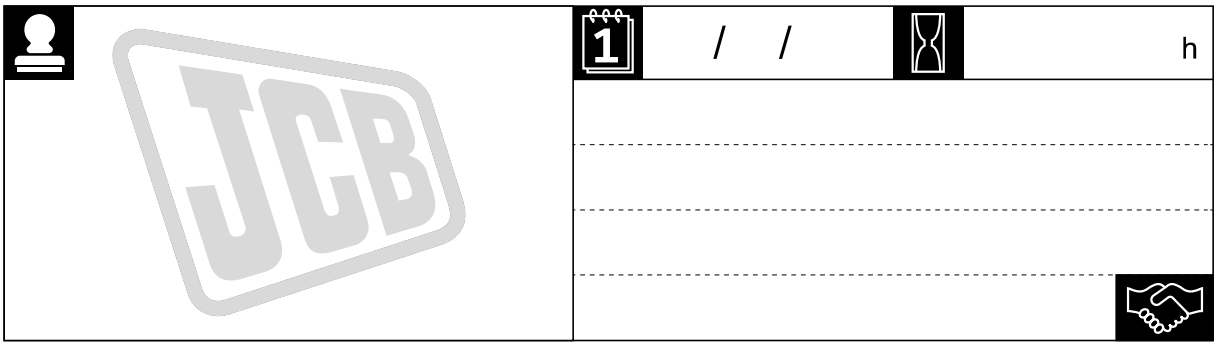

Figure 243. 6500h/78 Month

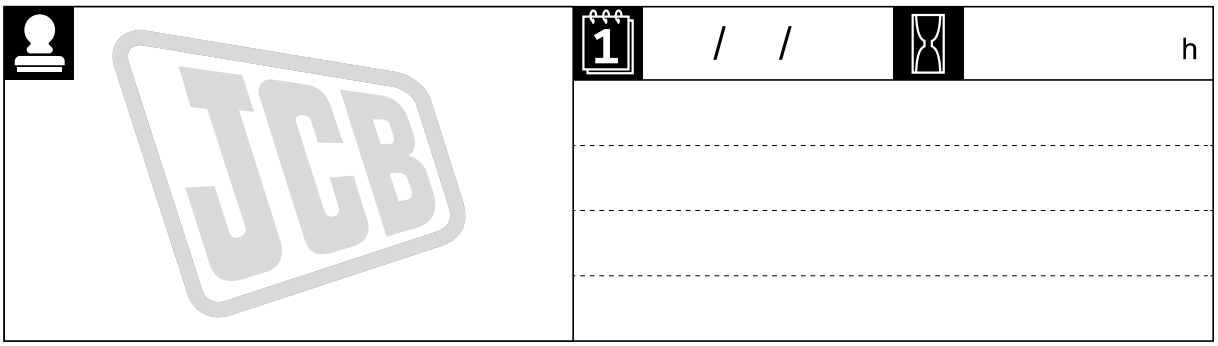

Figure 244. 7000h/84 Month

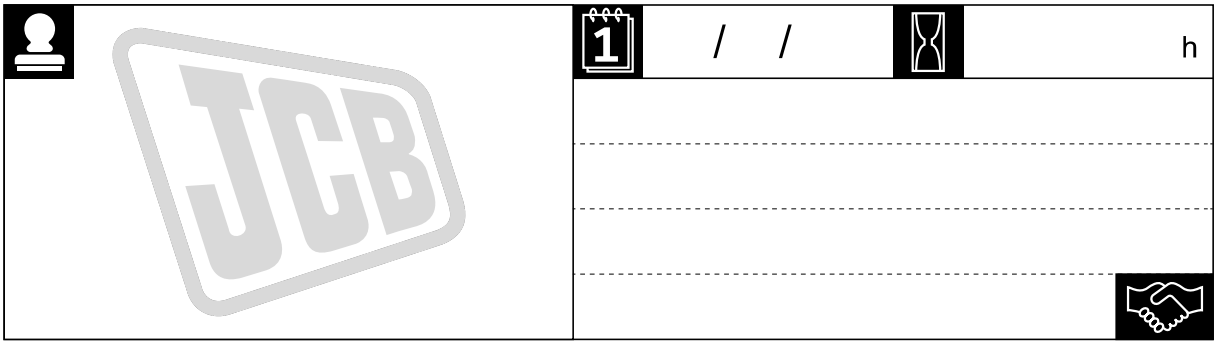

Figure 245. 7500h/90 Month

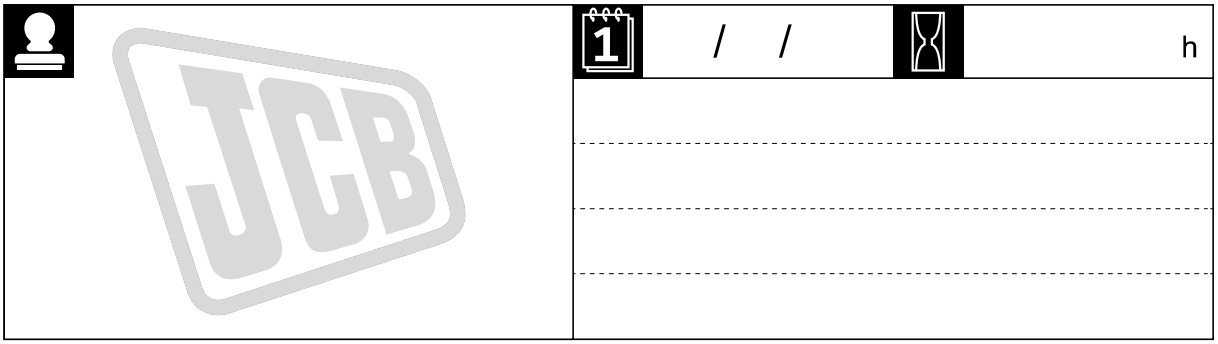

Figure 246. 8000h/96 Month

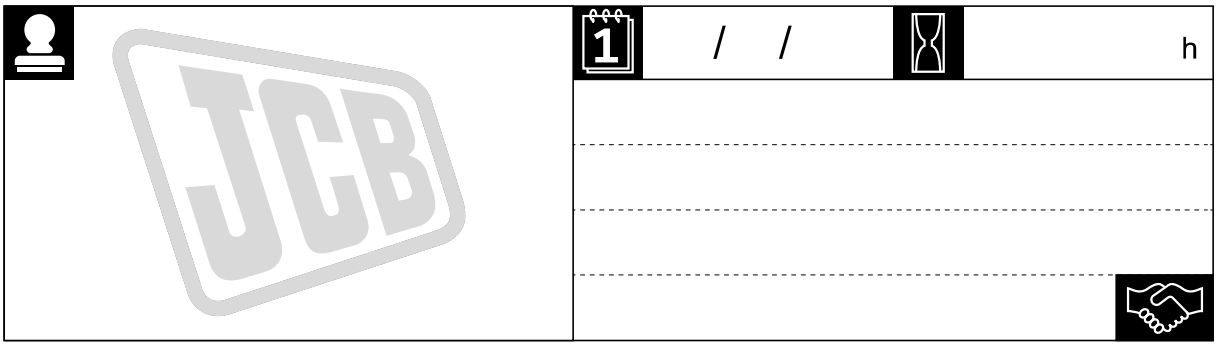

Figure 247. 8500h/102 Month

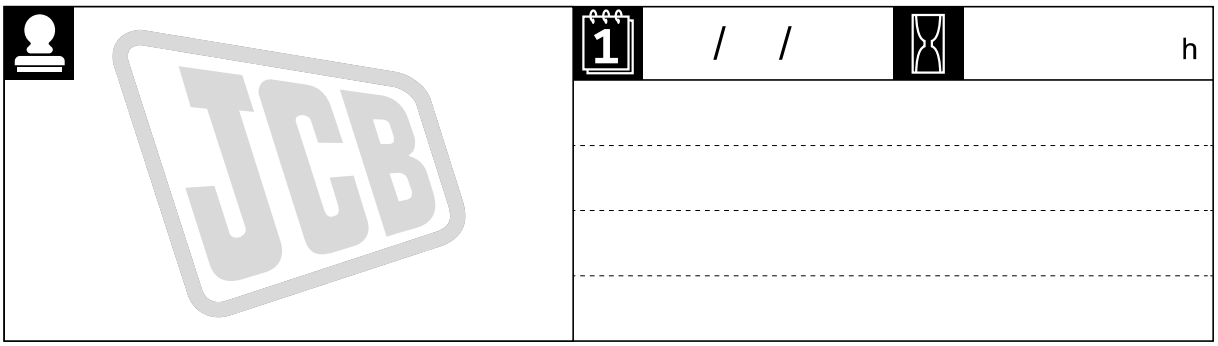

Figure 248. 9000h/108 Month

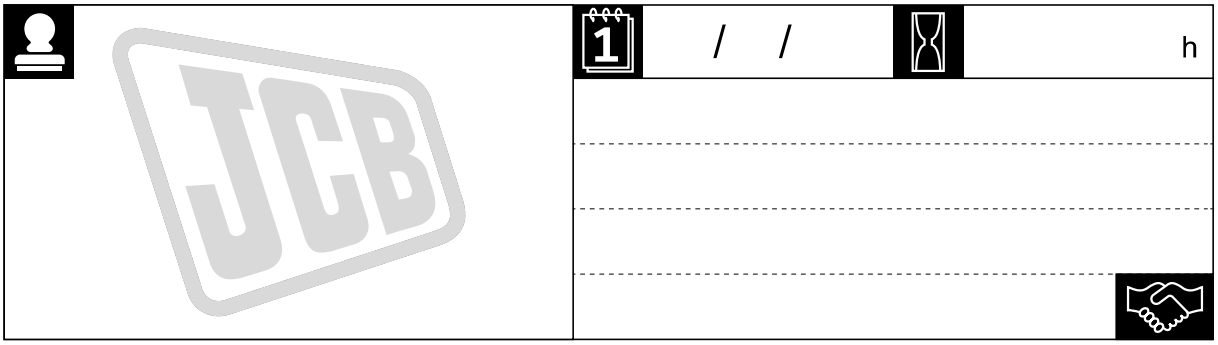

Figure 249. 9500h/114 Month

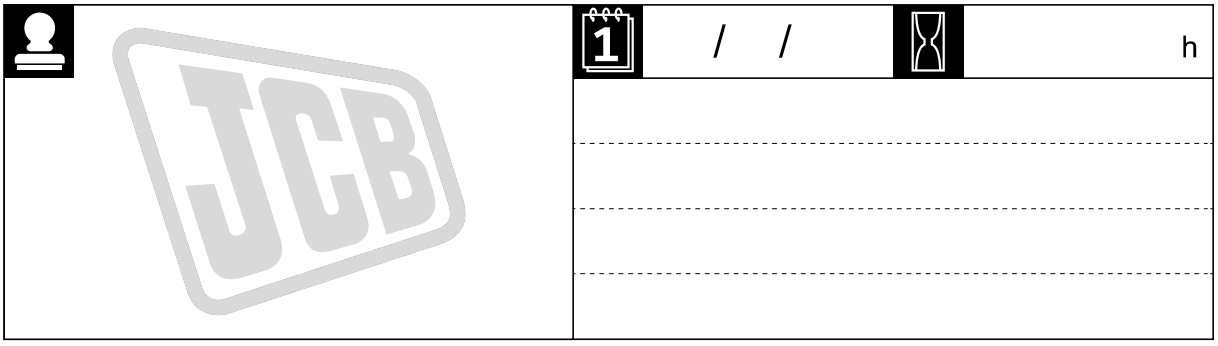

Figure 250. 10000h/120 Month

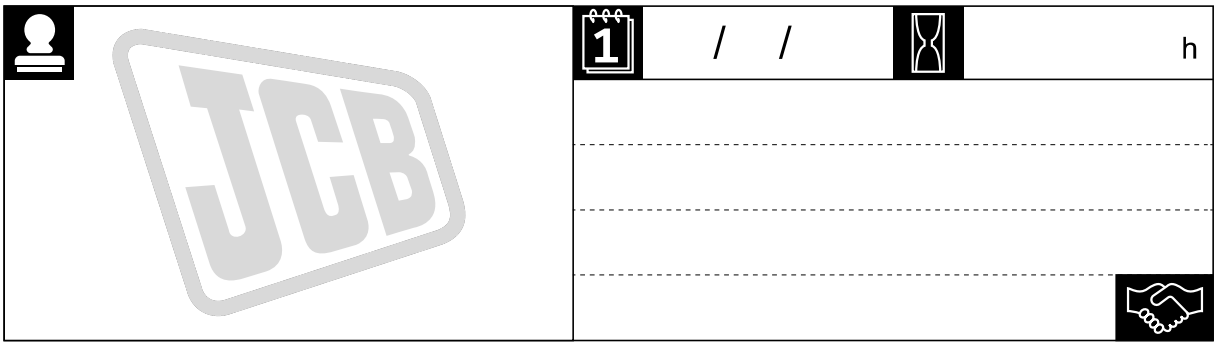

Figure 251. 10500h/126 Month

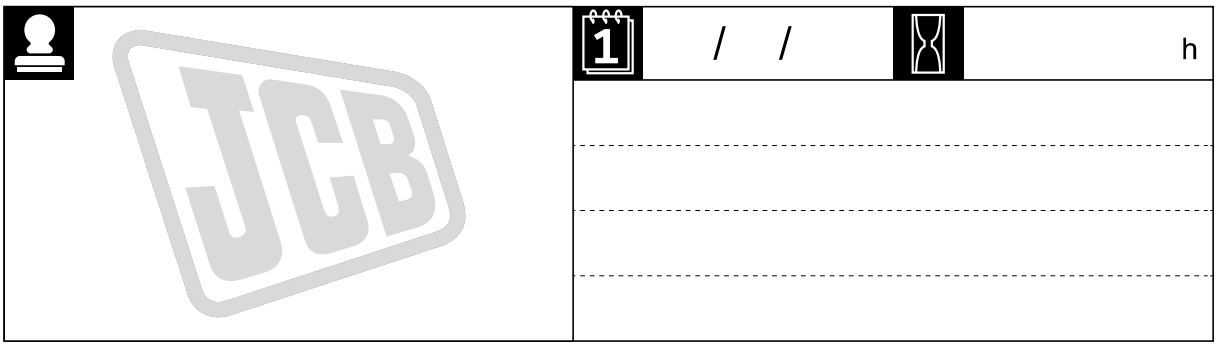

Figure 252. 11000h/132 Month