



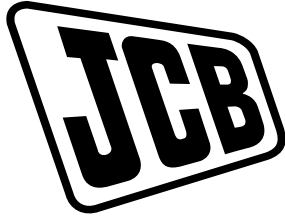
OPERATOR'S MANUAL

LOADALL (ROUGH TERRAIN VARIABLE REACH TRUCK)
525-60

EN - 9831/9350 ISSUE 3 - 06/2023

THIS MANUAL SHOULD ALWAYS STAY WITH THE MACHINE





OPERATOR'S MANUAL

LOADALL (ROUGH TERRAIN
VARIABLE REACH TRUCK)
525-60

EN - 9831/9350 - ISSUE 3 - 06/2023

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

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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.

California Proposition 65

▲ WARNING Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

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



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Acronyms Glossary

4WS	Four Wheel Steer
ARV	Auxiliary Relief Valve
CESAR	Construction Equipment Security and Registration
DPF	Diesel Particulate Filter
ECU	Electronic Control Unit
EGR	Exhaust Gas Recirculation
FEAD	Front End Accessory Drive
FOPS	Falling Object Protective Structure
HEST	High Exhaust System Temperature
HFC	Hydrofluorocarbon
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
NOx	Nitrogen Oxide
OECD	Organization for Economic Cooperation and Development
PAG	Polyalkylene Glycol
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
SAHR	Spring Applied Hydraulic Release
SRS	Smooth Ride System
SWL	Safe Working Load
USB	Universal Serial Bus



Introduction

About this Manual

Model and Serial Number

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

Table 1.

Model	VIN Prefix. Refer to: Machine (Page 10).
525-60 [STV]	JCB5A46, JCB5A56, JCB5A76

Using the Manual

The Quick Start Guide or Quick Reference Guide (if supplied) with the machine does not replace the Operator's Manual. You must read all the disclaimers and safety instructions in the Operator's Manual before initially operating the machine.

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.

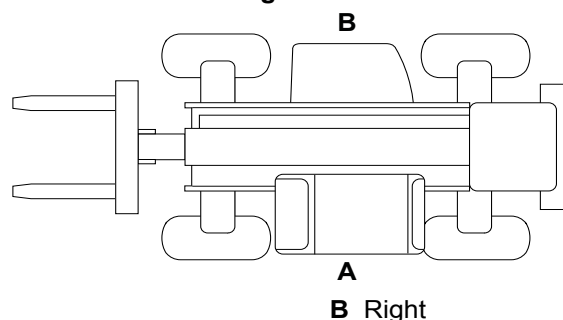
The manufacturer's policy is one of continuous improvement. The right to change the specification of the machine without notice is reserved. No responsibility will be accepted for discrepancies which may occur between specifications of the machine and the descriptions contained in this manual.

All 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: [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, you must read and understand them. They inform you of potential hazards and how to avoid them. If you do not fully understand the warning messages, ask your employer or JCB dealer to explain them.

Safety is not just a matter of responding to the warnings. All the time you are working on or with the machine you must be thinking of what hazards there might be and how to avoid them.

Do not work with the machine until you are sure that you can control it.

Do not start any work until you are sure that you and those around you will be safe.

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

Remember:

- Be careful.
- Be alert.
- Be safe.

Safety Warnings

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

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

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

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

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

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

Figure 2. The safety alert system symbol





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. Ensure that you receive the correct training before operating any machinery. Failing to do so will result in incorrect operation of the machine and you will be putting yourself and others at risk. 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 comply with relevant local laws and jobsite requirements – it is your responsibility.

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.

Care and Alertness

All the time you are working with or on the machine, take care and stay alert.

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.

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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 markings, and may have been supplied with a Declaration/Certificate of Conformity. These markings 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 markings 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

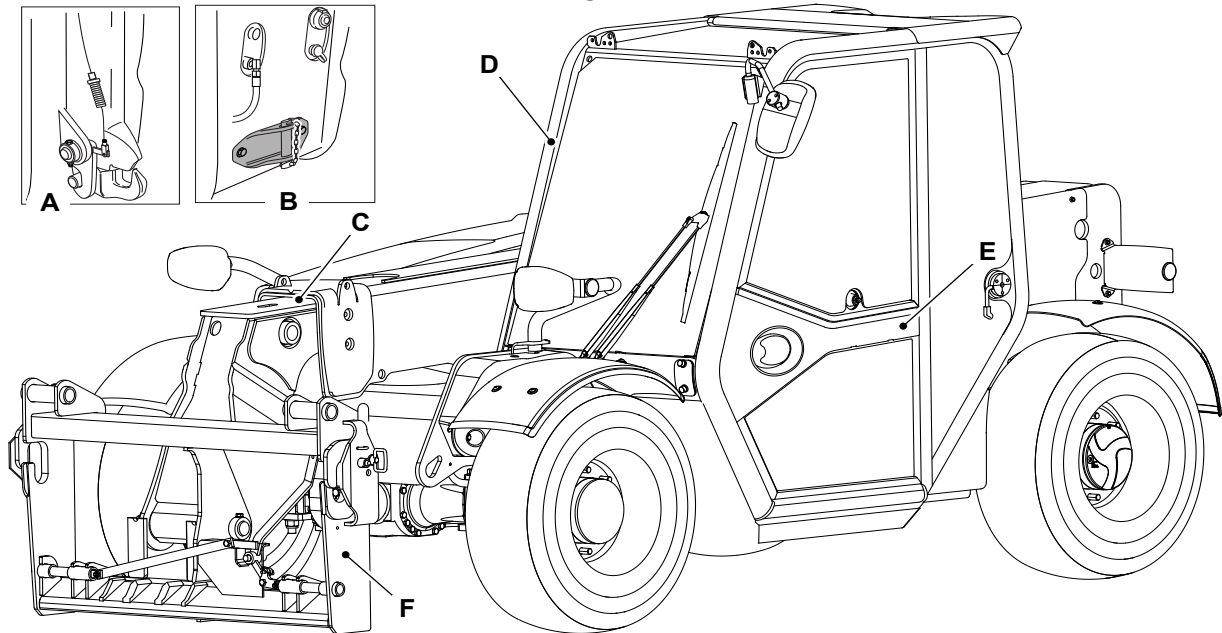
The danger zone is any zone within and/or around the machinery in which a person is subject to a risk to their health or safety. The danger zone includes the area in immediate proximity to any hazardous moving parts, areas into which working equipment and attachments can be moved to quickly, the machine 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)
- C Boom
- E Door

- B Mechanical tow hitch (option)
- D ROPS (Roll-Over Protective Structure)/FOPS (Falling Object Protective Structure) cab
- F Carriage



Product and Component Identification

Machine

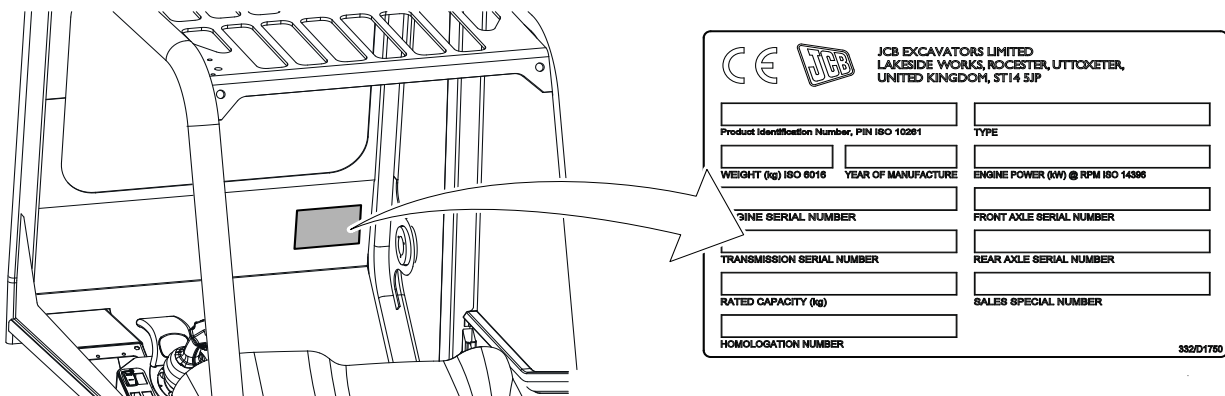
Machine Identification Plate

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 2. Typical PIN

JCB	5A5	6	R	C	12345678
-----	-----	---	---	---	----------

Table 3.

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 4.

Digit 4 to 6	Machine model
5A4	525-60 Hi-Viz
5A5	525-60 Agri Plus
5A7	525-60 Agri



About the Product
Product and Component Identification

Table 5.

Digit 7	Engine Model
6	55kW KOHLER stage V

Table 6.

Digit 8	Gearbox Model
P	HYDRO 20km/h (12.4mph)
R	HYDRO 25km/h (15.5mph)
V	HYDRO 30km/h (18.6mph)

Table 7.

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

Table 8.

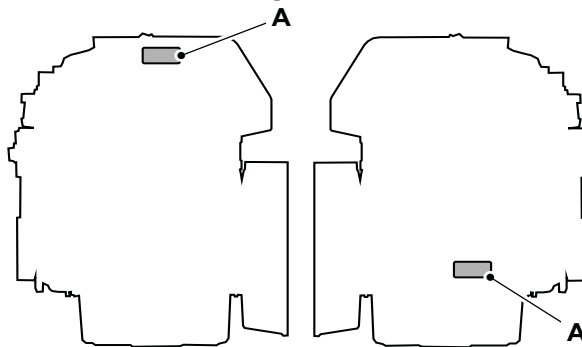
Digit 10 to 17
Machine serial number. Each machine has a unique serial number.

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.



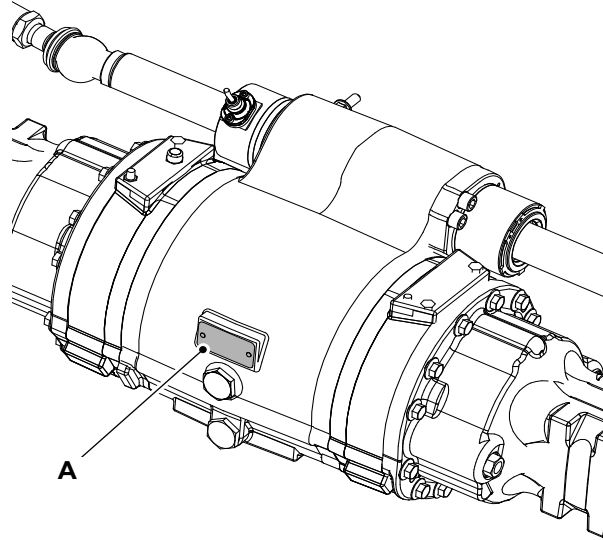
A Engine data label

Axle(s)

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

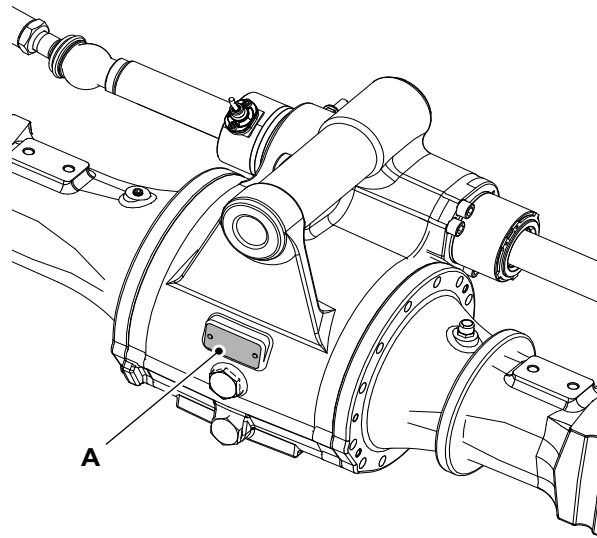


Figure 6.



A Data plate - front axle

Figure 7.



B Data plate - rear axle

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 machine.



About the Product
Product and Component Identification

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 installed 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 8.

J.C.B. CAB SYSTEMS LAKESIDE WORKS ROCHESTER UTTOXETER, STAFFS ST14 5JP ENGLAND 	LOADALL	ROPS: COMPLIES TO EN ISO 3471: 2008	FOPS: COMPLIES TO EN ISO 3449: 2008 LEVEL II
	MAX UNLADEN MASS		
	10000 KG		
	YEAR OF MANUFACTURE		
	XXXX	CAB WA PART NUMBER	
CAB WA SERIAL NUMBER	XXXXXXXXXXXXXXXXXX	XXX/XXXXX	
332/A4719			

Data plate - ROPS/FOPS standards

Figure 9.

J.C.B. CAB SYSTEMS LAKESIDE WORKS ROCHESTER UTTOXETER, STAFFS ST14 5JP ENGLAND 	LOADALL	  2070	OECD APPROVAL NUMBER
	MAX UNLADEN MASS		
	10250 KG		
	YEAR OF MANUFACTURE		
	XXXX	ROPS COMPLIANCE EN ISO 3471:2008 & 79/622/EEC	FOPS COMPLIANCE EN ISO 3449:2008 LEVEL II
WA SERIAL NUMBER	XXXXXXXXXXXXXXXXXX	WA PART NUMBER	
332/A4739..5		XXX/XXXXX	

Data plate - ROPS/FOPS and OECD
(Organization for Economic Cooperation and
Development) standards

Protection Offered by the Cab

Definition of 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.).



Definition of 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 A/C 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.

Personal protective equipment (PPE) 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 ensure that the filter is correctly installed.
- Check the condition of the sealing material and have it repaired when required.



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.

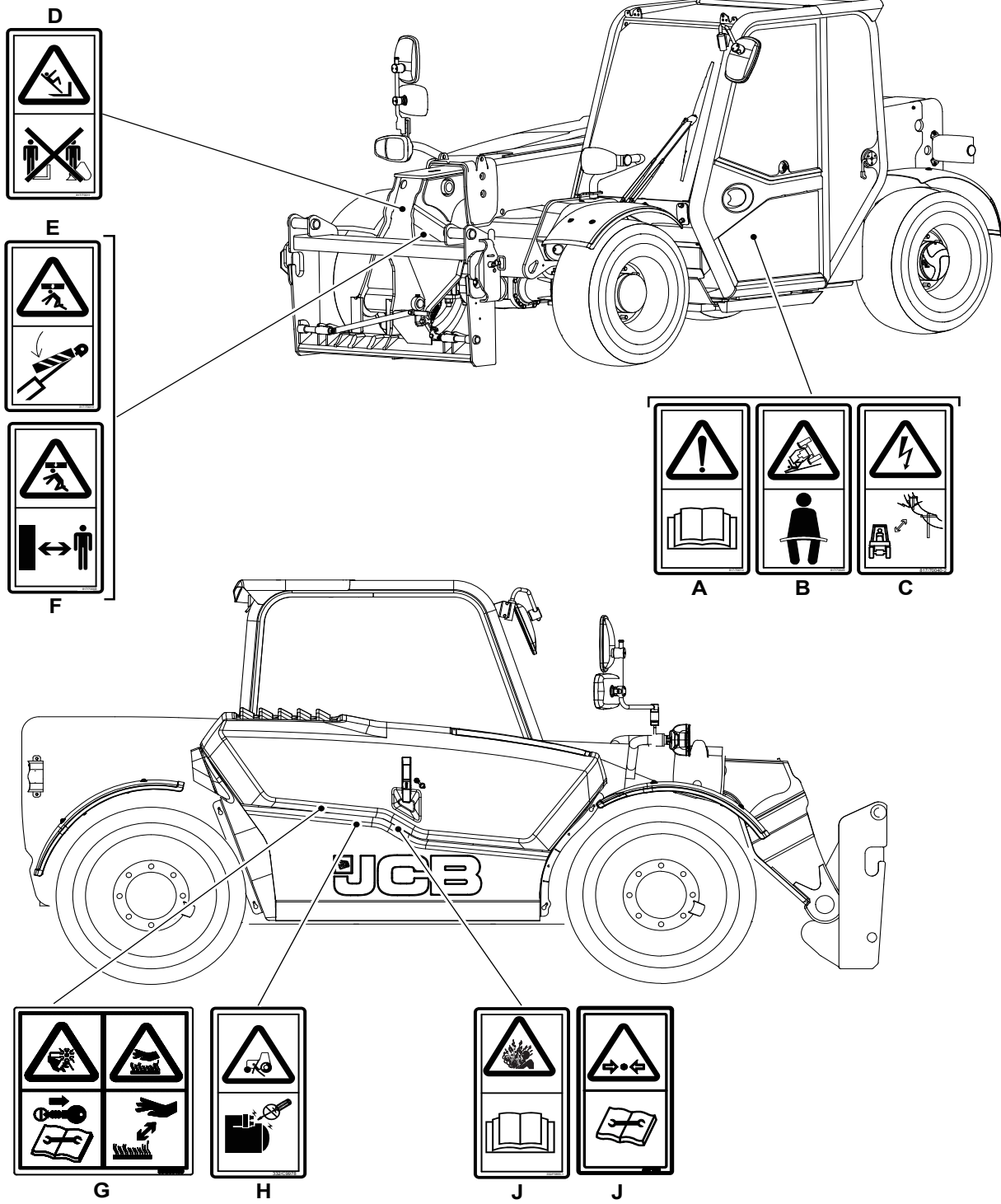
If you need eye-glasses for reading, make sure you wear them when reading the safety labels. Do not overstretch or put yourself in dangerous positions to read the safety labels. If you do not understand the hazard shown on the safety label, then refer to Safety Label Identification.

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 10.



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About the Product
Safety Labels

Table 9. 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	Warning. 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	334/C9459	Warning. 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	Warning. Pressure hazard. Read the Operator's Manual.	1 ⁽¹⁾
J	401/P1171	Stored energy/Pressure hazard. Read Service Manual.	1

(1) Superseded

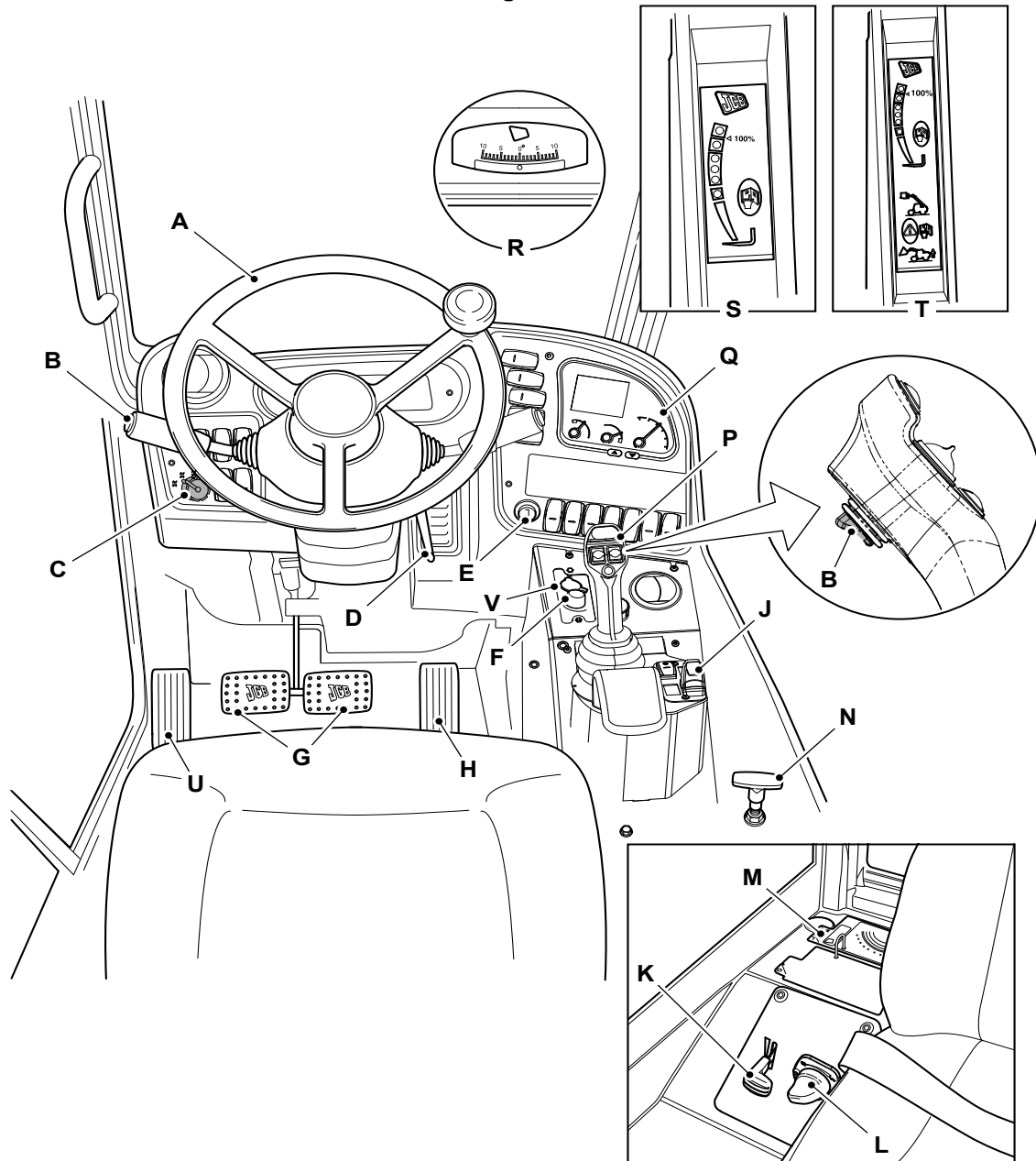
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Operator Station

Component Locations

Figure 11.



- | | |
|--|--|
| <p>A Steering wheel
Refer to: Steering Wheel (Page 65).</p> <p>C Steer mode selector
Refer to: Steer Mode Control (Page 71).</p> <p>E Starter switch
Refer to: Ignition Switch (Page 20).</p> <p>G Service brake pedal
Refer to: Service Brake Pedal (Page 67).</p> <p>J Handbrake/parkbrake mini lever
Refer to: Park Brake (Page 68).</p> | <p>B Transmission lever and gear selection</p> <p>D Steering column adjustment
Refer to: Steering Column (Page 65).</p> <p>F HVAC (Heating Ventilation Air Conditioning) controls
Refer to: Heating, Ventilating and Air-Conditioning (HVAC) (Page 127).</p> <p>H Accelerator pedal
Refer to: Accelerator Pedal (Page 65).</p> <p>K Hand throttle controls
Refer to: Hand Throttle Control (Page 65).</p> |
|--|--|



About the Product
Operator Station

- L** Travel speed selector
[Refer to: Travel Speed Selector \(Page 66\).](#)
- N** Hydraulic tow hitch
- Q** Instrument panel
[Refer to: Instrument Panel \(Page 72\).](#)
- S** LLMI (Longitudinal Load Moment Indicator) (if installed)
- U** Inching pedal
- M** Load charts
- P** Operating lever
[Refer to: Operating Levers/Pedals \(Page 103\).](#)
- R** Inclinator
- T** LLMC (Longitudinal Load Moment Control) (if installed)
- V** Auxiliary power socket (if installed)

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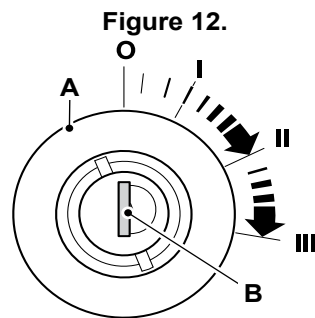
Interior Switches

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.



A Ignition switch

B Ignition key

Table 10. 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 on the engine. When the machine is auto stopped to restart turn the key from position I to III.

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.

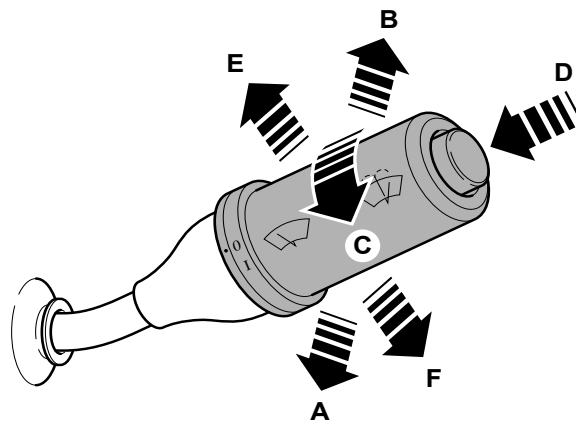
Headlights Flash

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 13.



- | | |
|--|--------------------------------|
| 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 |

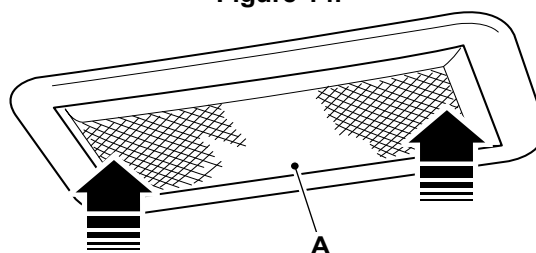
Cab Interior Light

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 14.



- A** Cab interior light



Console Switches

General

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

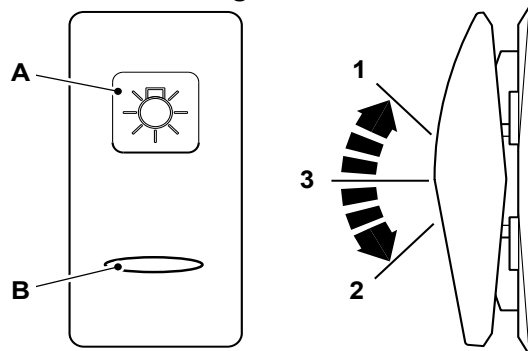
Each switch has a graphic symbol to show the function of the switch. Before you operate a switch, make sure that you understand its function.

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.

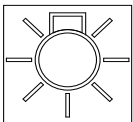
Figure 15.



A Graphic symbol

B Light bar

Road Lights



Three position rocker switch. The switch functions operate front silight, 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.

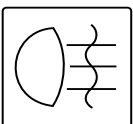
Position : 1 = Off

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.



About the Product
Console Switches

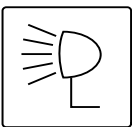
Work Lights



(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



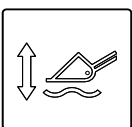
Two position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position 1: Off
Position 2: On (spring loaded - push then release to move to the next screen)

Tilt Lock



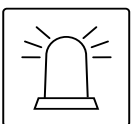
Two position rocker switch with backlight. The switch functions operate when the ignition switch is in the on position.
Position 1: Off (Backlight off)
Position 2: Tilt lock on (Backlight on)

Smooth Ride System (SRS)



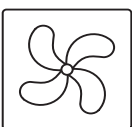
Three position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position 1: Off
Position 3: On
Position 2: Engage - Push and hold while you move the boom to the correct position.

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

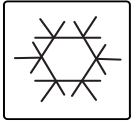


Three position rocker switch (spring loaded). The switch functions operate when the ignition switch is in the on position.
Position 1: Fan speed down (springloaded)
Position 3: Default position
Position 2: Fan speed up (springloaded)



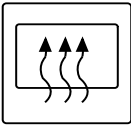
About the Product
Console Switches

Air-Conditioning



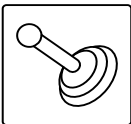
Two position push switch. The switch functions operate when the ignition switch is in the on position.
Position : 1 = Off
Position : 2 = On

Window Heater



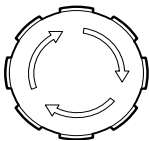
Two position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position 1: Heater rear/side windows off
Position 2: Heater rear/side windows on

Controls Isolation



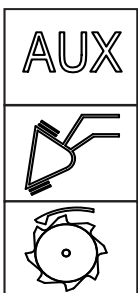
Two position rocker switch with backlight. The switch functions operate when the ignition switch is in the on position. Before you operate the switch, make sure you release the control lever locks.
Position 1: Off
Position 2: On

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).

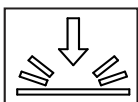
Hydraulic Mode



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

Refer to: [Operating Levers/Pedals \(Page 103\)](#).

Hydraulic Venting



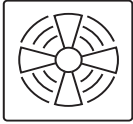
Two position rocker switch. The switch function differs depending on machine state.
Position 1: Off
Position 2: Service venting (ignition switch on, engine off) or:
Position 2: Aux venting (engine running)

Refer to: [Discharge \(Page 248\)](#).



About the Product
Console Switches

Reverse Fan



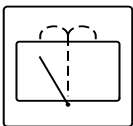
Three position rocker switch. The switch functions operate when the engine is running. An ECU controls the fan speed and direction. The cooling fan rotation can be reversed to help clear debris from the grilles. Always position the machine in a relatively clean area before reversing the fan to make sure that other debris (chaff, silage, etc.) is not drawn in.

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



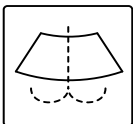
Three position rocker switch. The switch functions operate when the ignition switch is in the on position. The wiper will self park when switched off.

Position 1: Wiper off.

Position 3: Wiper on.

Position 2: Washer on (push and hold).

Roof Window Wiper



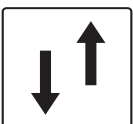
Three position rocker switch. The switch functions operate when the ignition switch is in the on position.

Position 1: Wiper off

Position 3: Wiper on

Position 2: Washer on (push and hold)

Auxiliary Hydraulic Circuit

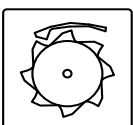


Two position rocker switch. The switch functions operate when the ignition switch is in the on position.

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



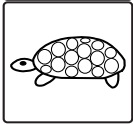
Two Speed Range



Two position rocker switch. The switch functions operate when the ignition switch is in the on position.

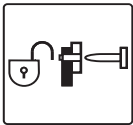
Position 1: High-speed range engaged

Position 2: Low-speed range engaged



Refer to: [Travel Speed Selector \(Page 66\)](#).

Locking Pin Isolator



Two position rocker switch. The switch functions operate when the ignition switch is in the on position.

Position 1: Off (Light bar off)

Position 2: On (Light bar on) Spring loaded, push and hold while you move locking pins.



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 thoroughly 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. Where applicable you may be required to show competency to a national certification scheme. Ensure you comply with local legislation and jobsite rules. 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 and increase the risk of the machine overturning. Do not operate the machine outside its limits. Do not try to upgrade the machine performance with unapproved modifications or additional equipment. Other factors may contribute to an increased risk of overturning, if in doubt stop immediately and request advice from your local JCB distributor.

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.

If the machine is used in coordination with other machines, vehicles and/or people on the jobsite the operator must follow jobsite organisation rules.

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.

You must stop the machine operation, isolate the controls and turn off the machine when persons are required to interact with it.

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.

Lighting

Ensure adequate lighting of the worksite during operation; where necessary additional lighting may be required to improve visibility of hazards around the machine.

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 outdoor 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, mirrors and cameras clean (when fitted).

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 or lift persons.

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.

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.

Overturning

Fast cornering, operating on slopes, high winds and unsecured loads increase the risk the machine overturning. This list is not exhaustive, other factors may contribute to an increased risk of overturning. If in doubt stop immediately and consult your JCB dealer.

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?
- In conditions of limited visibility, low light or at night, is the area adequately lit?

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.

Engine After Treatment DPF

- Is the machine in good working order? Is the fuel tank over 50% full? Are people/animals in close proximity?
- Is there flammable material present? Is the engine bay clean, no debris resting on hot surfaces? Is the machine indoors?
- Do you have time to complete a full regeneration? Is there a chance the machine will need to be moved during the process?
- Is it acceptable to have the machine running at a high RPM (Revolutions Per Minute), site supervisor/ neighbour complaints?

BS EN ISO 19353: 2019 provides guidance and information on fire prevention and protection for managers of machinery. This standard also advises when fire detection and automatic fire extinguishing systems maybe required.



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 operator station steps 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.
4. Make sure that all of the filler caps are installed correctly.
5. Make sure that all of the access panels are closed correctly.
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

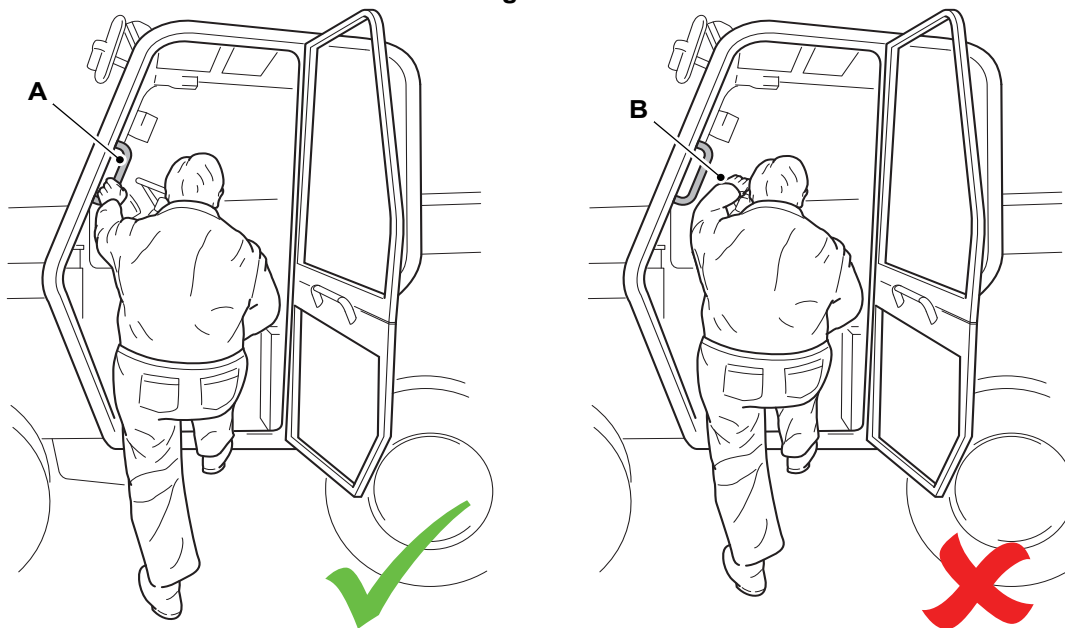
General

- ▲ **CAUTION** Entering or leaving the operator station must only be made where handrails are provided. Always face the machine when entering and leaving. Make sure the 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.

Make sure the machine is stopped and correctly parked before entering or leaving the cab.
Refer to: [General \(Page 57\)](#).

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 16.



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.

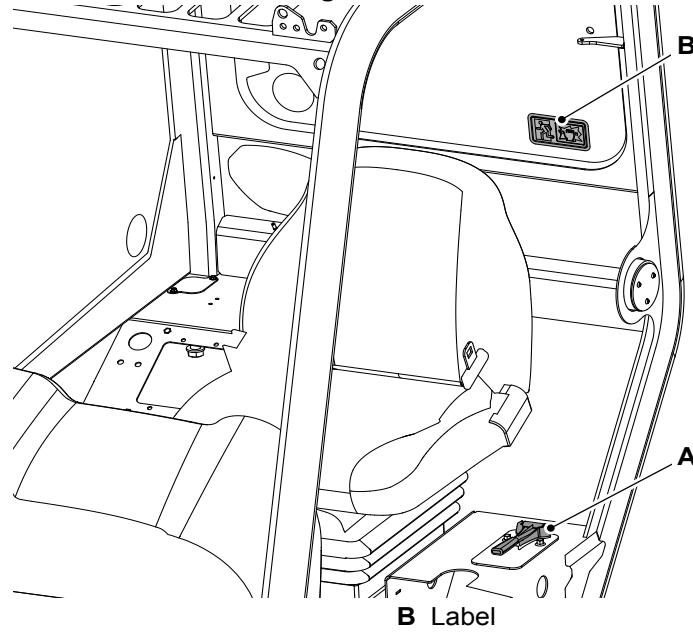
In the event of an emergency:

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.



Operation
Entering and Leaving the Operator Station

Figure 17.



A Glazing breaker

B Label

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Doors

Operator Door

Door

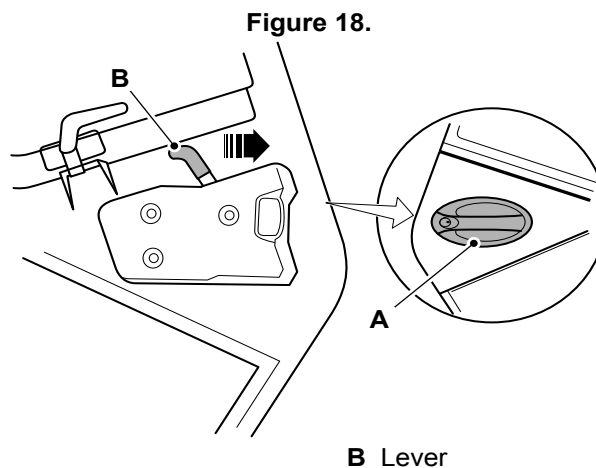
To open the door from the outside:

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.



A Handle

B Lever

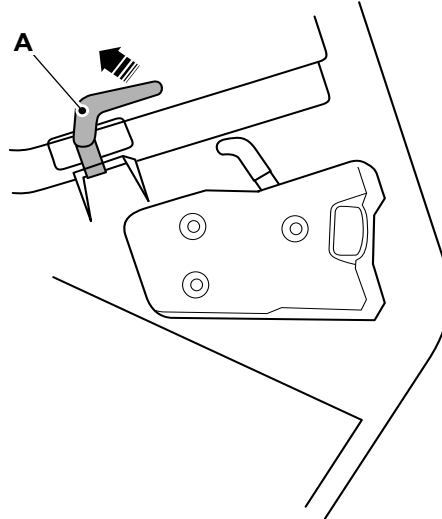
Upper Door Section

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 19.

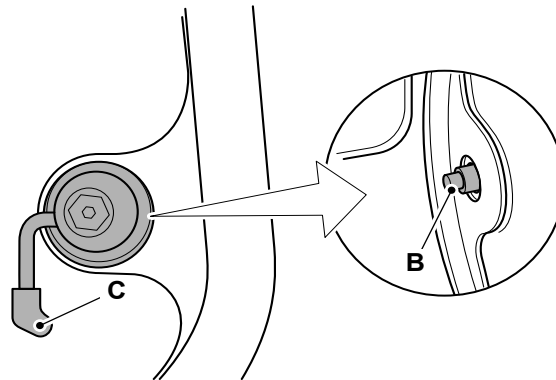


A Lever

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 20.



B Button

C Catch

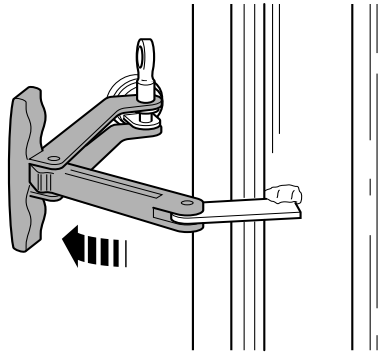


Windows

Rear Window

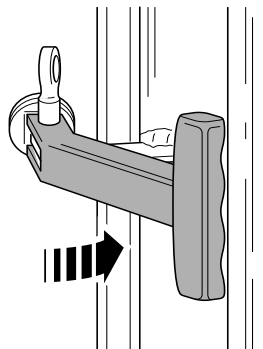
To open the window, swing the catch in the direction shown, as far as required.

Figure 21.



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

Figure 22.



Pull the pin from the hinge to use as an emergency exit.



Sun Visor/Sunblind

General

Roof Sunblind

The sunblind is installed in the cab roof and can be secured in given positions as required.

Front Sunblind

The sunblind is installed at the top of the cab front window and can be secured in given positions on the front window.



Battery Isolator

General

▲ **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 an explosive gas. Do not smoke when handling or working on the battery. Keep the battery away from sparks and flames. Battery electrolyte contains sulphuric acid. It can burn you if it touches your skin or eyes. Wear goggles. Handle the battery carefully to prevent spillage. Keep metallic items (watches, rings, zips etc) away from the battery terminals. Such items could short the terminals and burn you.

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 shut down correctly, you must wait 60s before you isolate the battery. The 60s period starts when you turn the ignition off.

Disconnect the Machine Electrics:

1. Turn the ignition key to the off position.
2. Wait for the engine ECU to shutdown correctly.
Duration: 60s
3. Get access to the battery isolator.
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.



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.

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.

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: Operating Environment \(Page 139\).](#)
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. 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.
 - 4.1. If you have not done it, do a walk-around inspection of the outside of the machine.
[Refer to: Walk-Around Inspection \(Page 33\).](#)
 - 4.2. Remove any dirt and rubbish from the cab interior, especially around the pedals and control levers.
 - 4.3. Remove any oil, grease and mud from the pedals and control levers.
 - 4.4. Make sure that your hands and shoes are clean and dry.
 - 4.5. Remove or stow all loose articles in the cab, for example tools.
 - 4.6. 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.
 - 4.7. Check around the cab for loose or missing bolts, screws etc. Replace or tighten where necessary.
 - 4.8. Examine the seat belt and its mountings for damage and excessive wear.
[Refer to: Seat Belt \(Page 225\).](#)
 - 4.9. Make sure that the following operate correctly: lights, horn, all switches, front window washer and wipers (if installed).
5. 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: Operator Seat \(Page 42\).](#)
6. Adjust the rear view mirrors (where applicable) to give you a good view close behind the machine, when you are correctly seated.
7. 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.

CAUTION The operator seat contributes to the operators comfort and the level of vibration felt by the operator. Ensure seat is maintained and replace if damaged with a JCB approved option.

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 Presence Switch

All seat options have been installed with an operator presence switch and has the following effects (dependant on software revision):

- 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 with an audible and visual warning on the dash.
- Alternatively neutral will be automatically selected.
- If there is no operator in the seat then the hand throttle will not function and all hydraulic functions are disabled including constant auxiliary, excluding auxiliary venting.

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

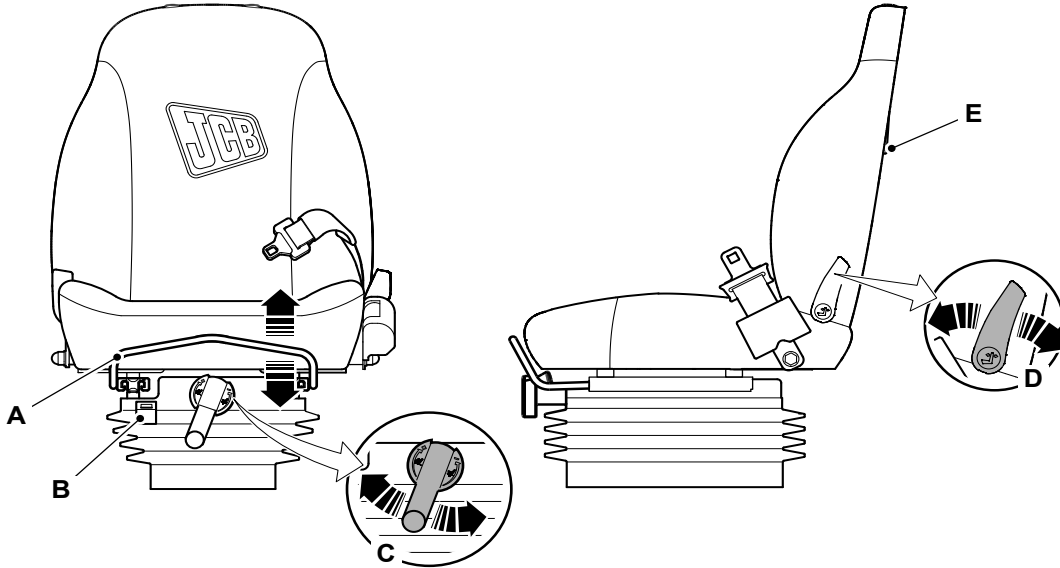
Turn the adjuster lever until the ride height indicator is in the green 'comfort' zone.

Backrest

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



Figure 23.



- A Horizontal adjustment lever
- C Height adjustment lever
- E Document cover

- B Ride height indicator
- D Backrest lever

Suspension Seat (KAB 100 Series - Air)

Horizontal Adjustment

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

Height

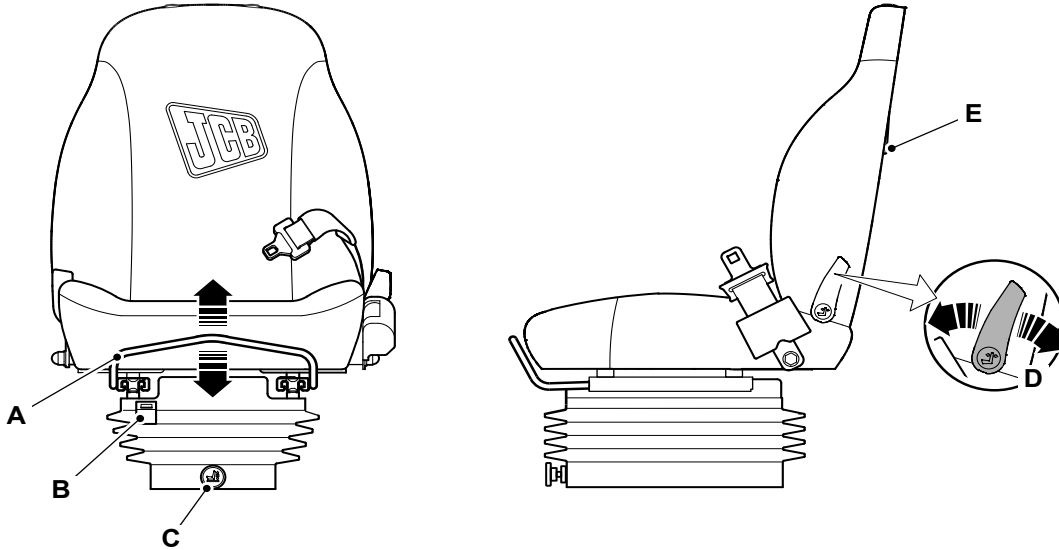
Turn the adjuster lever until the ride height indicator is in the green 'comfort' zone.

Backrest

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



Figure 24.



- A Horizontal adjustment lever
- C Height adjustment lever
- E Document cover

- B Ride height indicator
- D Backrest lever

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 checked for condition if it is damaged, if the fabric is worn, or if the machine has been in an accident, replace it with a complete seat belt assembly.

WARNING The seat belt life can be reduced by many factors such as severe working conditions, high usage, humidity, dust, chemicals and atmospheric conditions. Where the seat belt is exposed to any of these conditions it should be inspected more frequently than that specified in the maintenance schedules.

CAUTION In some operating conditions the specified noise emission levels may be different to those shown. Factors such as workplace, other machinery and duration of exposure may require additional personal protective equipment to be provided.

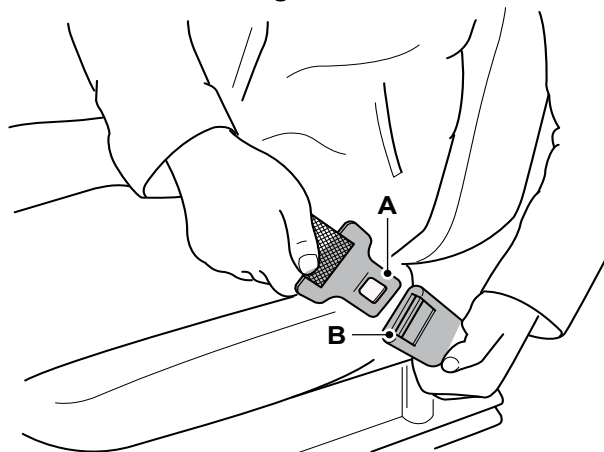
Inertia Reel Seat Belt

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 machine.

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 a slope.

Figure 25.



A Tongue

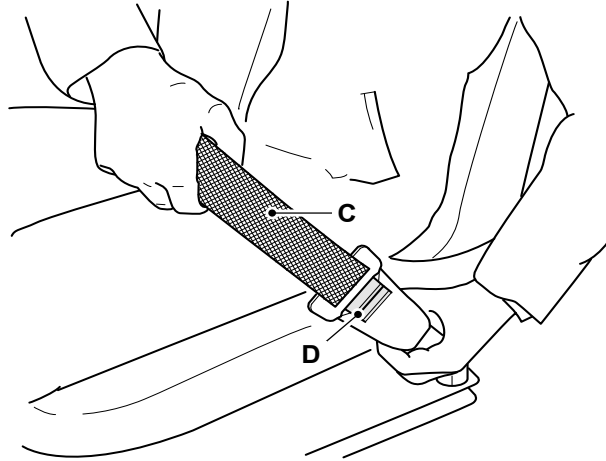
B Latch

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 26.



Figure 26.



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.

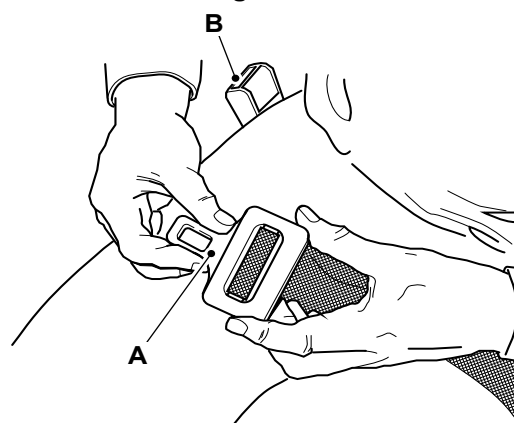
Static Seat Belt

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 machine.

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 27.



A Tongue

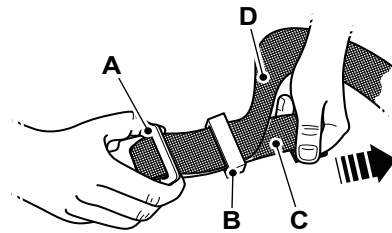
B Latch



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 28.



A Tongue
C Strap (pull here to lengthen)

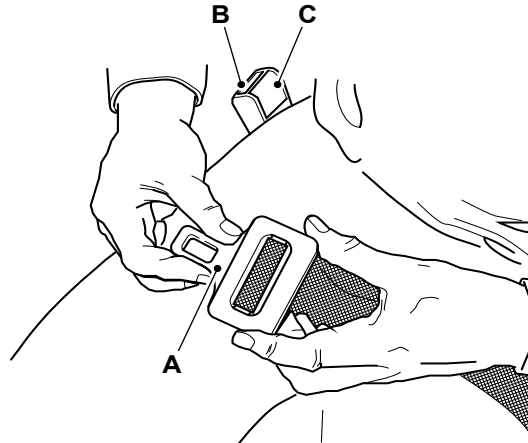
B Toggle
D Strap (pull here to shorten)

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 29.



A Tongue
C Button

B Latch



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 $500 \pm 50\text{mm}$ above the ground, and the load suspended 600mm beneath the forks while the forks are $2,200\text{mm}$ 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: Static Dimensions \(Page 257\).](#)

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 $1,000 \pm 50\text{mm}$ 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).



Visual Aids

General

Camera

The machine may be installed with one or more cameras to increase the operators forward/rearward visibility. For the one camera option a camera is installed at the rear of the machine. For the two camera option one camera is installed at the rear of the machine and another on the side roadlight arm. When the machine is put into reverse gear the reverse camera automatically shows on the display screen.

Figure 30.

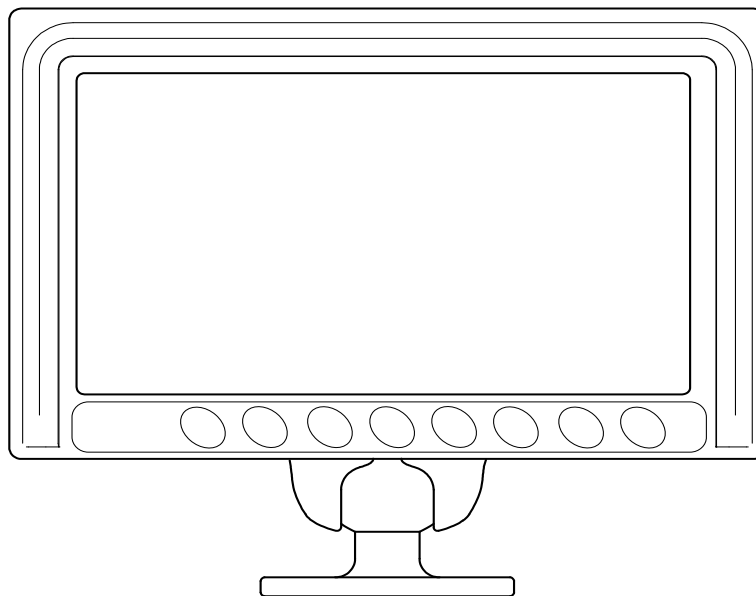


Figure 31. Camera Display Buttons

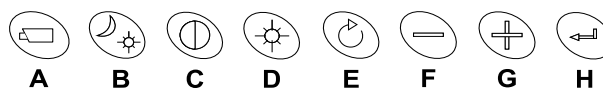


Table 11.

A	Camera selection	Press the camera selection button once. The camera LED flashes to indicate that manual camera selection is enabled. Use the minus and plus buttons to select the camera. Press the button again to disable manual camera selection.
B	Auto backlight control day/night settings	Press this button to switch between the auto backlight day and night settings.
C	Setting the contrast	Press the button once in order to enable the setting mode. Use the minus and plus buttons to set the required contrast. Press the button again to disable the setting mode.
D	Setting the brightness	Press the brightness button once in order to enable the setting mode. Set the required brightness using the minus and plus buttons. Press the button again to disable the setting mode.
C and D	Setting the color saturation	Press the contrast and brightness button simultaneously to enable the setting mode. Set the required color saturation using the minus and plus buttons. This setting must be set separately for each camera.
E	Option/previous menu	Return to the previous menu.



Operation
Visual Aids

F	Minus	Go to the next menu option or move left.
G	Plus	Go to the previous menu option or move right.
H	Enter	Switch to standby or in the menu, select or active the chosen option.

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Starting the Engine

General

▲ **Notice:** 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: Before Starting the Engine \(Page 41\).](#)
2. Put the forward/reverse lever in neutral.
[Refer to: Operating Levers/Pedals \(Page 103\).](#)
 - 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: General \(Page 40\).](#)
4. If the machine has an immobiliser then you must disarm the immobiliser before you can start the engine.
[Refer to: Immobiliser \(Page 53\).](#)
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: Instrument Panel \(Page 72\).](#)
 - 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: 18s
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: Instruments \(Page 72\).](#)
 - 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: 24s



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: Instruments \(Page 72\).](#)
 - 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: 40s
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: Instrument Panel \(Page 72\).](#)
 - 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 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: [Longitudinal Load Moment Control \(LLMC\) \(Page 114\)](#).

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.

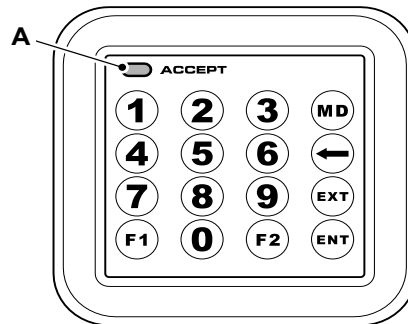
To Disarm the Immobiliser to Allow the Machine to be Used

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 32.



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.



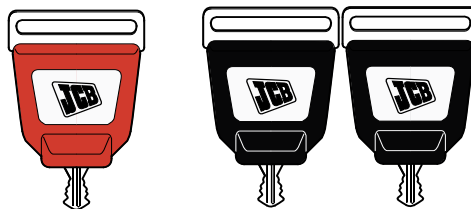
Unique Key Immobiliser System

The red key must not be kept on the same key ring as the black key, If the red key is too close to the key switch the antenna can pick up on the key transponder and cause the immobiliser ECU (Electronic Control Unit) to enter the key programme mode. If this happens it will prevent the machine from starting and the antenna LED will blink 3 times indicating the immobiliser ECU is in the key programme mode.

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.

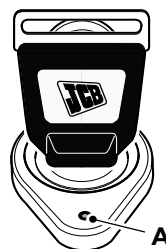
Figure 33.



To Disarm the Immobiliser

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

Figure 34.



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.
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 steps, handrails and your boot soles are clean and dry. Do not jump from the machine. Do not use the machine controls as handholds, only use the handrails.

WARNING 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. Whenever the park brake has been used in an emergency the brake pack must be checked. Contact your JCB dealer.

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: Control Lock \(Page 64\).](#)
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: Battery Isolator \(Page 253\).](#)

Auto-stop

In this machine, auto-stop function is enabled as default.

The machine will shut down if the following conditions are met.

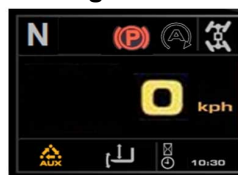
1. Auto-stop is enabled.
2. Park brake is applied.
3. Neutral selected.
4. Boom angle must be less than specified value.
Angle: 10°



5. Boom is fully retracted.
6. Side lights are in off condition.
7. Ambient temperature must be above the value specified.
Temperature: 5°C (41.0°F)
8. Battery is in good state.

When the above conditions are met, the instrument panel indicates that auto-stop process is started. Refer to Figure 35.

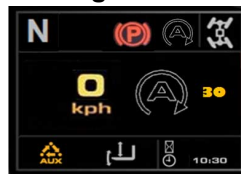
Figure 35.



Auto-stop

After approximately 2min, a countdown timer starts on display and the buzzer sounds once. 30–0s Refer to Figure 36.

Figure 36.



Auto-stop Countdown

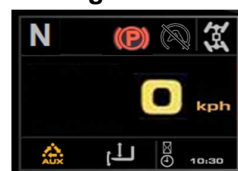
At the end of the countdown, the engine will shut down. After 10s the instrument panel will turn off.

To restart the engine, turn the ignition key to position III.

If the machine is installed with a keypad immobiliser and the engine is turned off, then the operator needs to re-enter the pin code.

To inhibit the auto-stop function through the machine setup screens, the below screen appears. Refer to Figure 37.

Figure 37.



Auto-stop Inhibited



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.

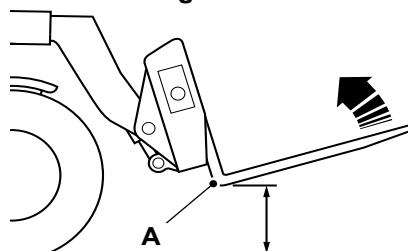
Other Territories Road Travel

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 38.

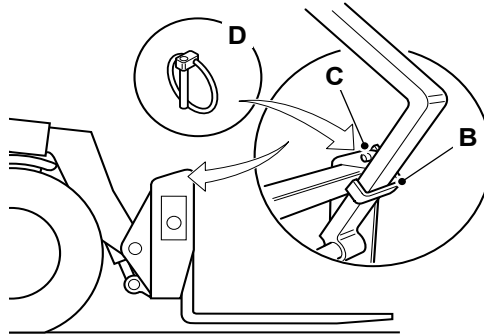


A Fork

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



Figure 39.

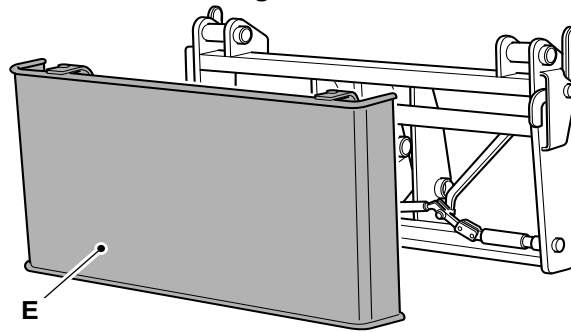


- B** Retention brackets
- D** Locking pin

C Retaining pin

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

Figure 40.



- E** Safety guard

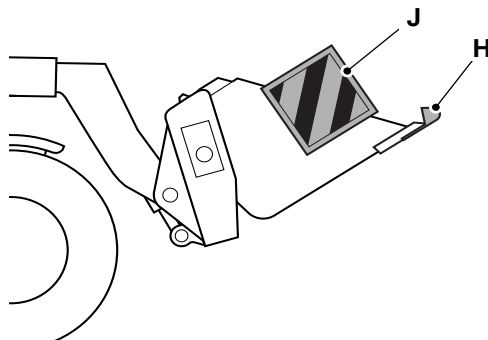
7. If any optional attachments are installed, make them safe.

[Refer to: Attachments \(Page 143\).](#)

- 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 41.



- H** Tooth guard

J Marker plate

8. Do not travel on public roads with the machine loaded.
9. Lock the controls (as required).

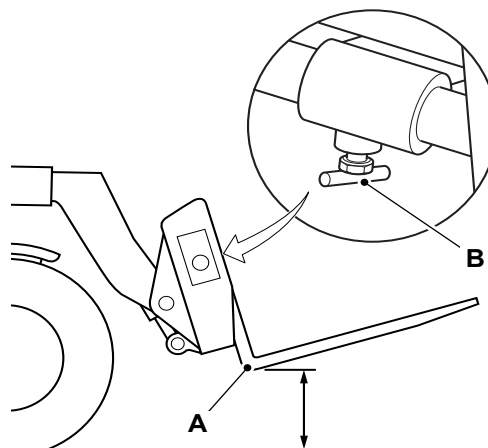


10. Align the road wheels.
11. Select the 2-wheel drive.
12. Check that all road lights are working correctly.
13. The traffic regulations may require you to have a rotating beacon operating on some public roads.
[Refer to: Beacon \(Page 62\).](#)
14. Switch on the smooth ride system (if installed).
[Refer to: Smooth Ride System \(SRS\) \(Page 61\).](#)

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 42.



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 \(Page 143\).](#)
7. Switch on the smooth ride system (if installed).
[Refer to: Smooth Ride System \(SRS\) \(Page 61\).](#)

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:

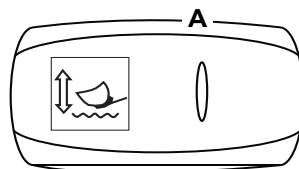
1. Press and hold the switch fully down (position 2).
2. Operate the boom lower control, until SRS icon appears on the dash.
3. The SRS is now applied.
 - 3.1. If the SRS Icon does not appear, make sure the boom is fully lowered before repeating steps 1 and 2.
4. Release the boom lower control and the 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 43.



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.

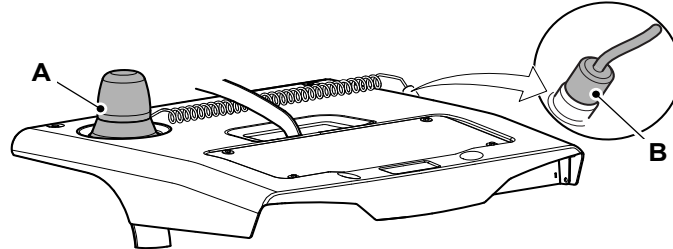
Be careful when you operate the machine with a beacon. The total height of the machine is increased when the beacon is in the operating position.

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: [Console Switches \(Page 22\)](#).



Figure 44. Magnetic Mount

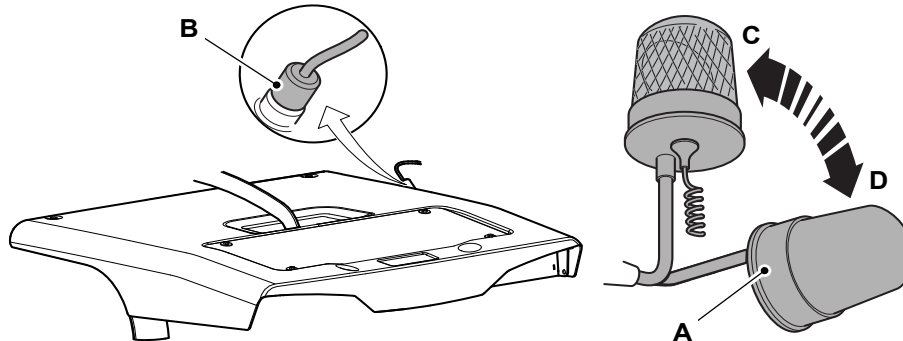


A Beacon

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 45.

Figure 45. Hinged



A Beacon

B Plug

C Raised position

D Lowered position

Green Beacon (option)

Your machine may be fitted with a green beacon and orange seatbelt. These safety features give a site supervisor visibility that the operator is wearing their seatbelt. In addition a start inhibitor function may be fitted. This feature prevents the operator from starting the engine until their seatbelt is fastened.

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.

Do not use green beacon when driving on roads. A green beacon is not compliant with road legislation.

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.



Safety Equipment

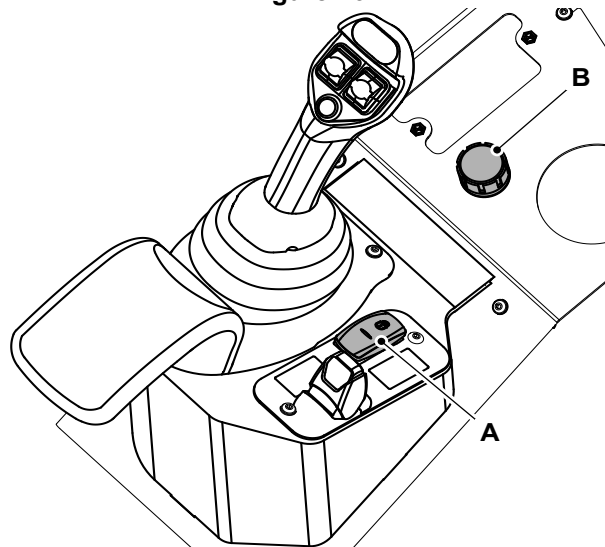
Control Lock

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 46.



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: Console Switches \(Page 22\).](#)

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: [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.

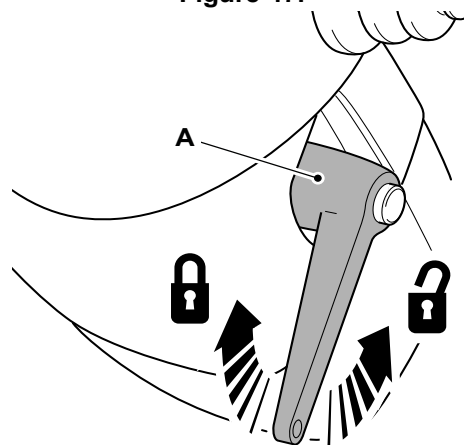
The steering column angle can be adjusted to suit the operator and to allow easier access for entering and leaving the cab.

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 47.



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: [Component Locations \(Page 18\)](#).

Hand Throttle Control

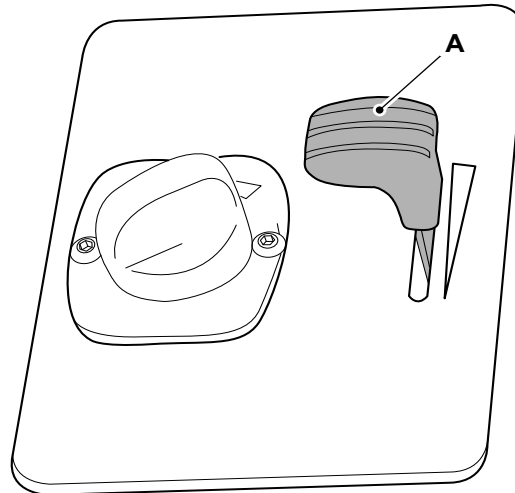
(If Installed)

▲ 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 48.



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.

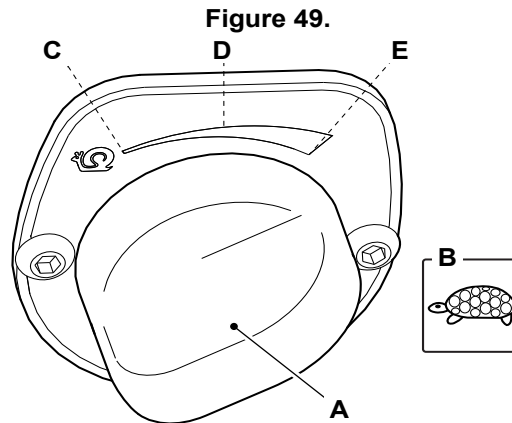
Travel Speed Selector

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 49.

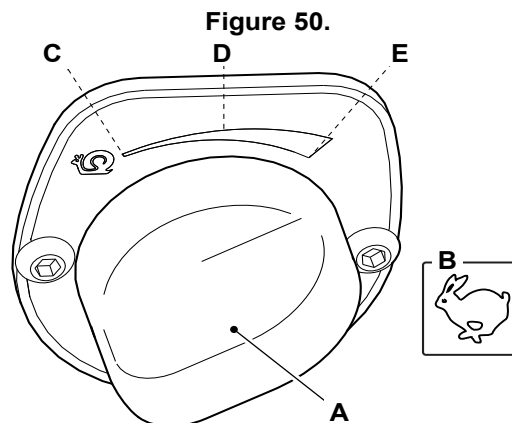
When the machine speed range switch is set to low speed, the dial on the travel speed represents 0–12km/h (0.0–7.5mph).



- A Travel speed control knob
- C 0% (0km/h (0.0mph))
- E 100% (12km/h (7.5mph))
- B Low speed
- D 50% (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 50.

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.



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

Two Speed Range (Agri Plus)

High Speed Range

Ideal for roading and placing duties where lower engine speed is required with higher travel speed. Ideal for feeding livestock and pallet work.

Low Speed Range

Ideal for re-handling and high tractive effort duties such as grain pushing or dozing duties where higher engine speed for increased hydraulic speed and lower travel speed is required.

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: Component Locations \(Page 18\).](#)

Inching Pedal

The pedal is used to de-slash 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.

WARNING 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. Whenever the park brake has been used in an emergency the brake pack must be checked. Contact your JCB dealer.

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.

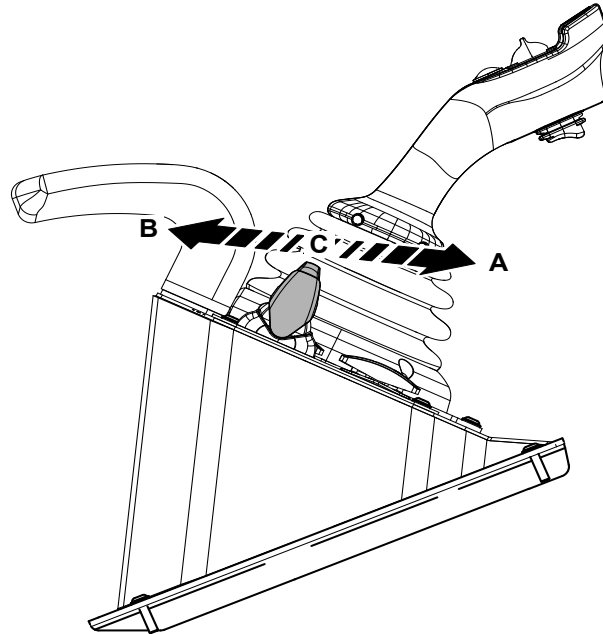
The park brake indicator will come on when the forward/reverse is selected.

Push the lever away from the operator to release the park brake. The park brake indicator will go off.
[Refer to: 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 51.



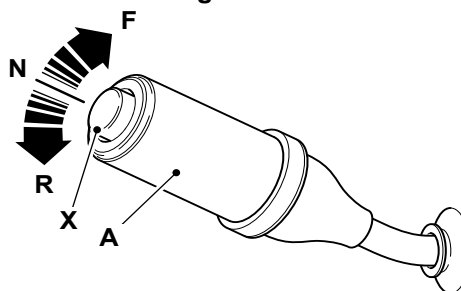
- A Park brake off
- C Park brake partially on

- B Park brake 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 below for proper use of this selector.

Figure 52.



- 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.

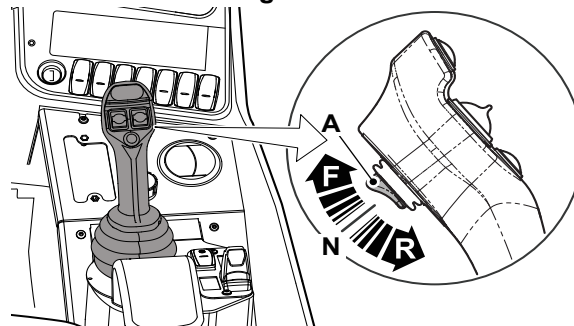
Drive Selection

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 53.



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 With 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: [Steer Modes \(Page 100\)](#).

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).



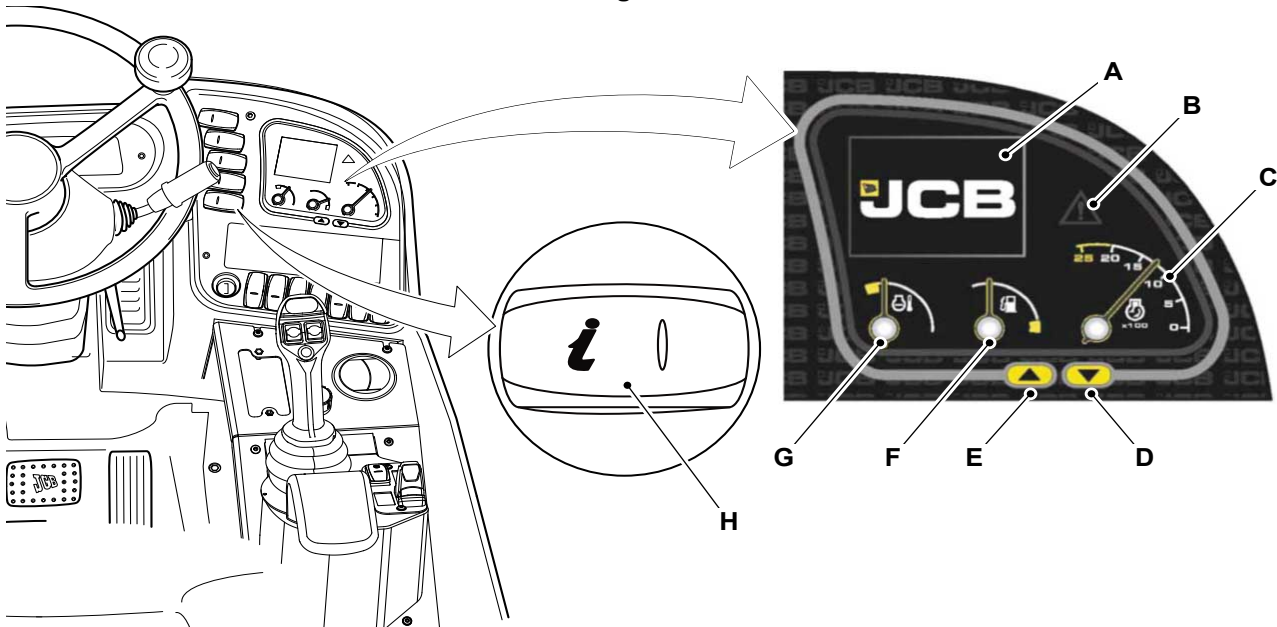
Instruments

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 machine's electronic system.

Figure 54.



- A Display screen
- C Tachometer
- E Navigation button - up
- G Coolant temperature gauge

- B Warning indicator
- D Navigation button - down
- F Fuel level gauge
- H Information switch

Display Screen

The LCD (Liquid Crystal Display) screen displays information such as current machine status, machine setup, service information and fault logs.

Warning Indicator

The warning indicator will light up amber whenever there is a warning error. Refer to Figure 54. A buzzer shall sound for 1s when there is a service fault. This fault can be cancelled via the Fault Log Screen.

The warning indicator will light up red whenever there is a critical fault. A buzzer will permanently sound when there is a critical fault. This fault cannot be cancelled and you should contact your dealer.

Tachometer

Indicates the engine speed in revolutions per minute. Refer to Figure 54.

Navigation Button (Down)

Used to navigate through the various options on the LCD screen. Refer to Figure 54.

Navigation Button (Up)

Used to navigate through the various options on the LCD screen. Refer to Figure 54.



Fuel Level Gauge

Indicates the level of diesel fuel in the tank. Do not let the tank run dry, or air will enter the fuel system. When the fuel level enters the red zone, an alarm will sound and the Warning Indicator Lamp will illuminate. Refer to Figure 54.

Coolant Temperature Gauge

Indicates the temperature of the engine coolant. The gauge pointer will gradually swing upwards as the coolant temperature increases. When the coolant temperature enters the red zone, an alarm will sound and the Warning Indicator Lamp will illuminate. Refer to Figure 54.

Information Switch

The information switch is used to perform different actions:

- Short Press - Press the information button for less than 2s allows the operator to cycle through the main screens.
- Long Press - Press the information button longer than 2s allows the operator to enter the displayed screen.

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 55.



Default Operating Screen (Home Screen)

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

Figure 56.



A Travel speed - normally displays the speed of the machine. This section is also used when a notification is activated.

C Transmission status tray

B Transmission FNR information

D Steer mode tray



E Clock/machine hours

F Machine status tray

Transmission Status Symbols

Displays the current transmission status.

Table 12.

	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 13.

	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 14.

	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 15.

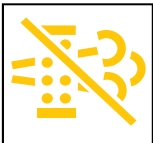
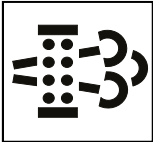
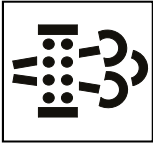
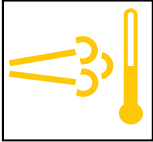
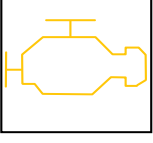
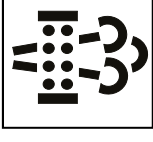

	SRS (Smooth Ride System) active
	Constant auxiliary mode active
	Auto fan reverse active
	Tilt lock active
	Full lock active or Hydraulic function isolation active
	Loader Pattern Active
	Front auxiliary I active (yellow)
	Front auxiliary II active (grey)



	Rear auxiliary I active (green)
	Rear auxiliary II active (blue)

Exhaust After Treatment Symbols

Table 16.

	(Amber) Manual regeneration inhibited
	(Amber) Manual regeneration required
	(Amber-flashing) Manual regeneration running
	(Amber) High exhaust outlet temperature
	(Amber) Engine fault
	(Red) Service regeneration required
	(Red) Stop engine



Auto-stop Symbols

Table 17.

	Auto-stop Active
	Auto-stop Inhibited

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 18.

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



Operation
Instruments

Icon	Event	Buzzer
	Audible/Visual. Cab heater fan speed setting. Number of yellow bars corresponds to current fan speed setting. Either single press or press and hold for rapid increase.	No
	Audible/Visual. Constant auxiliary operational position	No
	Audible/Visual. Constant auxiliary stored position	No
	Audible/Visual. Constant auxiliary cancelled	No
	Audible/Visual. SRS active	No
	Audible/Visual. SRS cancelled	No
	Audible/Visual. Hydraulic lock active	No
	Audible/Visual. Hydraulic lock cancelled	No








Operation
Instruments

Icon	Event	Buzzer
	Audible/Visual. Tilt lock active	No
	Audible/Visual. Tilt lock 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
	Audible/Visual. Auto reverse fan active	No
	Audible/Visual. Auto reverse fan cancelled	No
	Audible/Visual. Grid heater active	No

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Icon	Event	Buzzer
	Audible/Visual. Warning message active (operator has left the seat, with transmission engaged and park brake disengaged)	Yes
	Audible/Visual. Snail mode active or, snail percent adjusted	No
	Audible/Visual. Auto-stop counter	Yes
	Notification: regeneration commencing. Use the arrow keys to select inhibit option if necessary	No
	Notification: regeneration commencing. Regeneration inhibit available	No

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 57.



Fuel information screen



Figure 58.



After treatment menu screen. Menu only appears if manual regeneration is available

Figure 59.



Machine status screen

Figure 60.



Service information screen

Figure 61.



Machine setup screen

Figure 62.



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 63.



- 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 64.



Exit screen

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

Manual Regeneration Status

Figure 65.



- A Water temperature
- B Neutral drive
- C Park brake engaged
- D Regeneration status

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 66.



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



Figure 67.



E
F
G

E Proportional fan speed
G Boom angle

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 68.



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 69.



A
B
C
D

A Engine hours
C Machine serial number

B Machine type
D Next service interval

Figure 70.



E
F
G
H

E Time to next service
G RHC software version number

F RHC (Right Hand Cluster) hardware version number
H Tyre diameter



Figure 71.



J Axle ratio

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

Figure 72.



K Machine options screen 1

Figure 73.



L Machine options screen 2

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

Figure 74.



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.

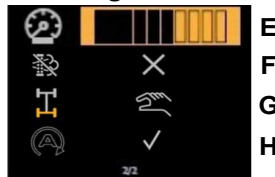


Figure 75.



- A Clock
- B Date
- C Units of measure
- D Display screen brightness

Figure 76.



- E Gauge backlight brightness
- F Inhibit DPF (Diesel Particulate Filter)
- G Steer mode override
- H Auto-stop inhibit

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

Figure 77.



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

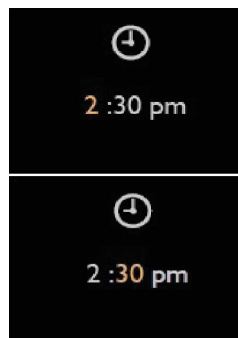
Figure 78.





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 79.



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

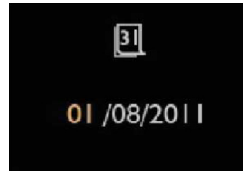
Figure 80.



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 81.



- Press the information switch for the specified time to confirm the setup.

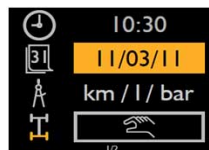
Duration: 20s

Steer Mode Override

The steer mode override function allows sufficient front steering movement to bring the rear wheels back to the central position. Once the rear axle is centralised, the steer mode override function will return to normal 4WS (Four Wheel Steer) once the front wheels go through their central position.

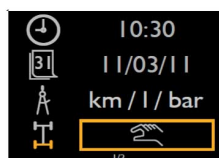
- Go to the machine setup screen.
- Press the navigation arrows to select the mode override

Figure 82.



- Apply the footbrake and apply the handbrake. Once this has been done, the hand symbol will illuminate.

Figure 83.



- Select Steer Mode Override. The hand symbol must be illuminated and the criteria must be met in 3.

Figure 84.



Figure 85.



- Bring rear wheels to straight ahead position.



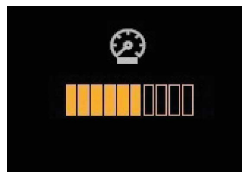
- 5.1. Turn the steering wheel in the appropriate direction to turn rear wheels back to straight ahead position.
- 5.2. Continue turning the steering wheel until the rear wheels stop in the straight ahead position.
- 5.3. The rear steering will stop with the rear wheels in the straight ahead position.
6. Bring the front wheels to the straight ahead position.
 - 6.1. Turn the steering wheel in the appropriate direction to turn the front wheels back to the straight ahead position.
 - 6.2. Continue turning the steering wheel until the front wheels pass through the straight ahead position.
7. Once step 6 has been completed, the machine will automatically exit the steer mode override function, have correctly phased steering and resume the steer mode selected on the rotary steer mode selector switch.

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

Figure 86.



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

Auto-stop

Auto-stop function is enabled as default.

Operator can turn on or off the auto-stop whilst operating the machine.

The timing of the auto-stop system can not be altered.

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 87.

Icon	Time	Date	Value	Code
+	10:30	11/01/11	10000.5	999
+	10:30	11/01/11	10000.5	999
+	10:30	11/01/11	10000.5	999
+	10:30	11/01/11	10000.5	999
+	10:30	11/01/11	10000.5	999
+	10:30	11/01/11	10000.5	999
+	10:30	11/01/11	10000.5	999

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 88.



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 89.



Figure 90.



Warning/Fault Icons

▲ CAUTION If any of the audible/visual warnings operate while the engine is running, stop the engine as soon as it is safe to do so and rectify the fault.

There are three levels of warnings each is represented by a different colour. Depending on the level of severity it may or may not be acknowledgeable by the operator. Some icons are available at all three levels but are not shown below:

- Yellow - acknowledgeable
- Critical red - not acknowledgeable
- Critical red (50% screen size) - acknowledgeable



Table 19.

	Transmission		Joystick		Transmission pressure
	Telematics		Immobiliser		Brake
	Coolant temperature		Engine		Engine oil pressure
	Transmission temperature		Hydraulics		Steer
	Fuel level		CAN		Reverse alarm
	Water in fuel		Air filter		Ground speed
	HVAC		Battery		

Warning Lights

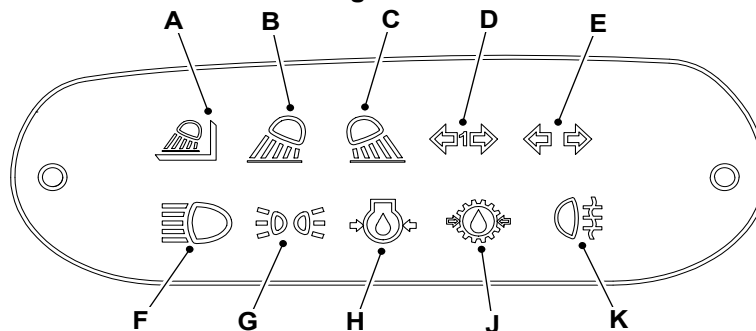
The warning lights are grouped together on a panel located on the dash board.

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 91.



- A** Lift arm work light - Visual (Amber Light). Illuminates when the lift arm work lights are switched on.
- C** Rear work light - Visual (Amber Light). Illuminates when the rear work lights are switched on.
- E** Direction indicators - Visual only (Green light). Flashes with the direction indicators.
- G** Side lights - Visual only (Green light). Illuminates when the side lights are switched on.

- B** Front work light - Visual (Amber Light). Illuminates when the front work lights are switched on.
- D** Trailer indicator - Visual Only (Green Light). Flashes with the trailer indicators.
- F** Main beam - Visual only (Blue light). Illuminates when the headlight main beams are switched on.
- H** Engine oil pressure - Visual only (Red light). Operates if the engine oil pressure drops below the normal working pressure.



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

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

Emission Control System

During regeneration the operator may experience changes in engine noise and smell emitted from the machine, which is normal.

If the exhaust temperature reaches a certain limit during a regeneration, then the HEST (High Exhaust System Temperature) lamp will illuminate, this is not a fault. The operator needs to be aware of the increased exhaust temperatures, as the increased temperatures may be hazardous in a flammable environment. If it is not safe to allow a regeneration to complete, the operator should cancel/inhibit/ stop the regeneration or move the machine to a safe place.

To help aid a decision if regeneration should be allowed or not please refer to 'Operating Safely' in this manual under 'Regeneration'.

Refer to: [Risk Assessment \(Page 31\)](#).

Regeneration

There are three types of regeneration.

1. Automatic regeneration - Occurs automatically, no action is required by the operator and machine can be used as normal.
2. Manual regeneration - Operator initiated. The machine cannot be used for normal work whilst regeneration is taking place.
3. Service regeneration - Must be performed by a qualified service representative.

Automatic Regeneration

During an automatic regeneration no changes in machine functionality or performance should be observed.

On entry into a automatic regeneration a pop-up is displayed and the operator can acknowledge or inhibit by pressing the info button. Refer to Figure 92.

Figure 92.



A Regeneration pop-up

B Regeneration inhibit

Automatic regeneration can also be inhibited by navigating and selecting it in the display. When inhibited an acknowledgement is displayed. Refer to Figure 93.

Figure 93.





Only cancel/inhibit if it is not safe to carry out the regeneration, ensuring you perform the regeneration at the next available opportunity.

The cancel/ inhibit option can be used on several consecutive occasions. However, this will prevent the automatic regeneration from running and risks clogging the DPF. A manual or service regeneration may then be required.

During an automatic regeneration the HEST lamp may illuminate.

When the machine has a requirement to perform an automatic regeneration, it is possible to perform a manual regeneration. See 'Manual Regeneration'. This is useful if you are in particular application where your risk assessment has determined an automatic regeneration would be a risk.

Manual Regeneration

Repeated cancelling/inhibiting of an automatic regeneration or the machines duty cycle may lead to the requirement for a manual regeneration.

When a manual regeneration is required an amber symbol will appear on the display. Refer to Figure 94. Further action is required. The operator should park machine in a safe place and carry out a manual regeneration via the in-cab display/ info switch.

Figure 94.



Ensure the machine is in a safe area to help aid a decision if regeneration should be allowed or not. Refer to 'Operating Safely' in this manual under 'Regeneration'.

Refer to: [Risk Assessment \(Page 31\)](#).

Once the machine is safe to do manual regeneration, operator can navigate through the machine display menus to the regeneration menu. Refer to Figure 95.

Figure 95.



To commence the manual regeneration the following entry conditions need to be met:

- Neutral must be selected.
- Park brake must be applied.
- Warm the engine by running at high revs.
- DPF lamp must be green. If not, continue to use the machine and re-attempt after few minutes.

When a regeneration is available the display will show four green ticks in the menu. Refer to Figure 96.

Press the info button to activate the regeneration.



Figure 96.



The engine will automatically increase its speed and start the regeneration process. This is indicated by the amber DPF icon flashing. This process typically takes 45 minutes to complete. If required this process can be manually aborted by turning the engine off or automatically aborted if one of the entry conditions is no longer valid. The operator should only stop the regeneration if it is no longer safe to continue.

If the amber prompts for a manual regeneration are ignored or continually inhibited then the engine will further derate with limited power and torque. Refer to Figure 97.

Figure 97.



If the amber DPF lamp prompts for a manual regeneration are ignored the engine will de-rate and operate with limited power and torque indicated by an error code on the display. A manual regeneration must be performed to clear the error.

Service DPF Regeneration

Continually ignoring the requests for a manual regeneration will result in a severe de-rate of the engine and a service regeneration will be required using specialist software. An error code will be displayed on the display. The red regeneration symbol will be displayed. Contact your JCB dealer. At the end of a service regeneration it is necessary to replace the engine oil. A service regeneration will not be supported under warranty. Refer to Figure 98.

Figure 98.





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.

Take particular care when reversing. If the machine has mirrors, make sure your view of the mirrors is not obstructed. Ensure that the way behind is clear before reversing. Ensure that the reverse alarm is functioning correctly and can be heard clearly by people around the machine.

Various types of reverse alarm can be installed on your machine, to suit different operating environments. There may be local regulations which control the type of reverse alarm which may be used in particular areas. Make sure the correct type of reverse alarm is installed on your machine.

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! With 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).



Operation
Getting the Machine Moving

6. Release the park brake, continuing to apply the foot brake. The park brake must be released before selecting forward or reverse.
7. Select forward or reverse. Dependant on software version, you cannot engage drive or operate the hydraulic controls unless you are sat in the seat.
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.

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

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.



Slopes

General

- ▲ **WARNING** Make sure that you have been trained and are familiar with the use of machines on slopes, and understand the adverse effects 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

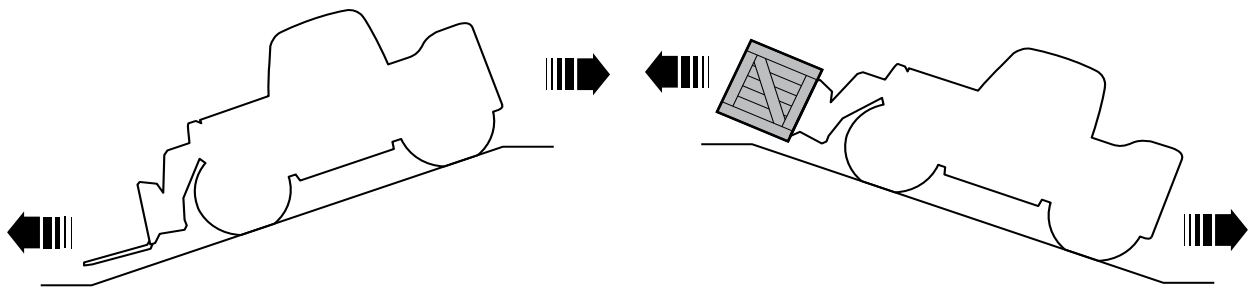
Fixed Loads

- ▲ **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 99.



Suspended Loads

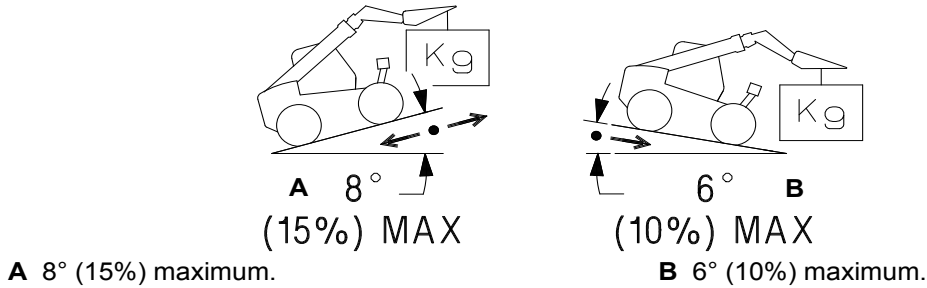
A suspended load has the ability to swing about its attachment point and cause serious damage to the machine and cause the machine to easily become unstable and roll over. To prevent this when traveling with suspended loads additional care should be taken with respect to the positioning of the load, the angle of the slope and the boom angle. The maximum limits for these parameters can be found on the suspended load flip chart for each attachment.

To maximize machine traction and stability when you drive with a suspended load on a slope:

- Drive a laden machine forward up a slope and in reverse down a slope when the slope angle is a maximum of 8° (15%).
- Only drive a laden machine forward down a slope when the slope angle is a maximum of 6° (10%).
- As stated in the moving with suspended loads section ensure that the load is not carried higher than 300mm from the ground and the boom is not elevated above 45°.



Figure 100.



Driving Across Slopes

Fixed Loads

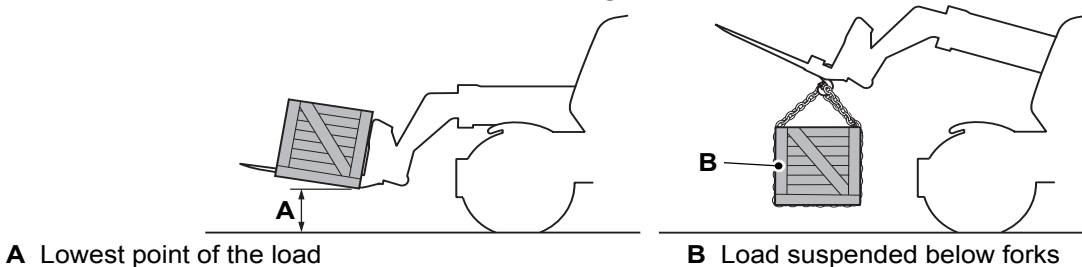
To get the maximum stability, operate the machine on solid, level ground. The stability of the machine is decreased when it is driven across a slope.

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 101.

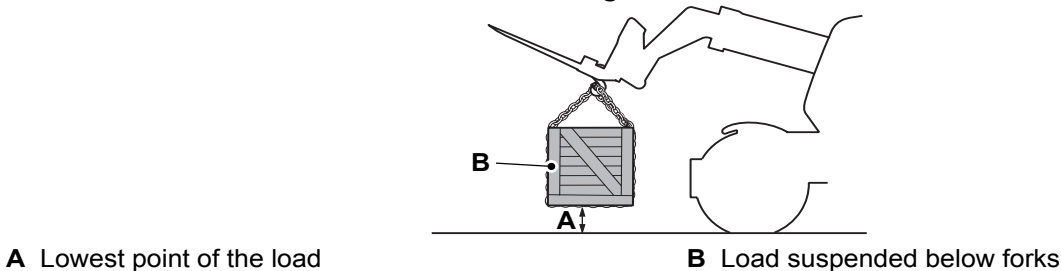


Suspended Loads

When you drive across a slope with a suspended load, fully retract the boom and ensure the boom is not elevated above 45°. Drive slowly at walking pace no greater than 2km/h (1.2mph).

Do not lift the carriage more than necessary. This is normally when the lowest point of the load is not more than 300mm above the ground.

Figure 102.





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 (if installed).

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.

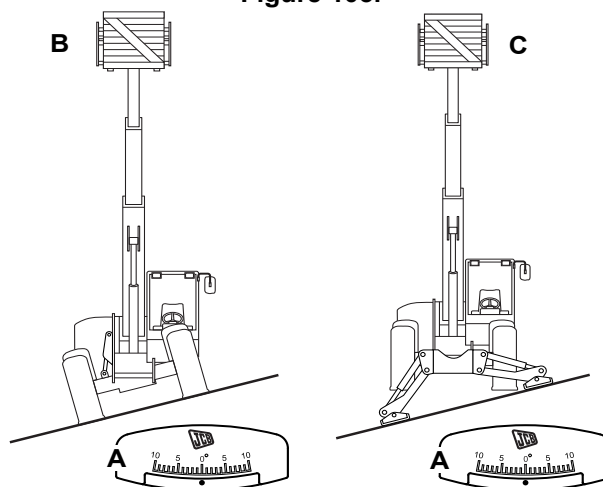
An inclinometer can be used to check if the machine is level.

Refer to: [Inclinometer \(Page 111\)](#).

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 103.



A Inclinometer
C Stabilisers level

B Chassis level

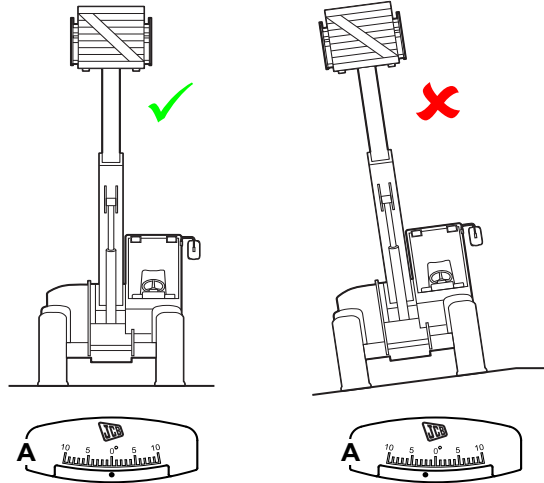


Operation
Slopes

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 104.



A Inclinometer



Driving the Machine

Steer Modes

Wheel Alignment

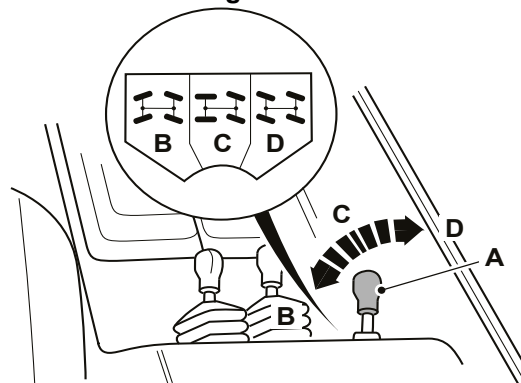
Indicated Manual

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: Instrument Panel \(Page 72\).](#)
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: Instrument Panel \(Page 72\).](#)
6. All wheels are now aligned in the straight ahead position. Select the steer mode required and continue in the normal manner.

Figure 105.



A Steer mode selector lever
C 2-wheel steer

B 4-wheel steer
D Crab steer

Electronic Steer Mode

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

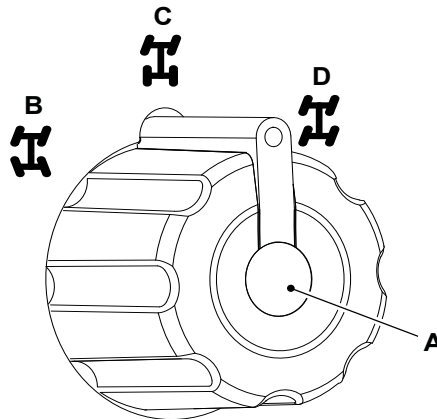
To align the wheels:

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 106.



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

Steer Mode Override

In the event of being unable to change steering modes, follow the steer mode override function.

1. With 4WS (Four Wheel Steer) or crab mode selected align the rear wheels so they are in the straight forward position.
 - 1.1. If the steering wheel cannot be turned to align the rear wheels continue with the procedure.
2. Select steer mode override in the menu.

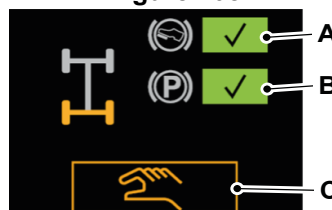
Figure 107.



- A Steer mode override

3. Apply the foot brake and apply the handbrake, the hand symbol will then illuminate.

Figure 108.



- A Foot brake applied confirmation
- B Park brake applied confirmation
- C Hand symbol



4. Press and hold the information switch to select steer mode override. The hand symbol must be illuminated and the foot brake and handbook must be applied.
5. Bring the front wheels to the straight ahead position.
 - 5.1. Turn the steering wheel in the appropriate direction to turn the front wheels back to the straight ahead position. Continue turning the steering wheel until the front wheels pass through the straight ahead position.
6. The machine will now automatically exit the steer mode override function and resume the steer mode selected on the rotary steer mode selector switch.
7. If the rear wheels could not be aligned repeat the procedure.



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.

Never operate a machine with a broken side window. If the side window is broken stop using the machine until it is replaced. Your machine may be fitted with a safety device which will prevent the boom controls from operating if the side window is broken. In this instance it is possible to use the LLMI (Longitudinal Load Moment Indicator) override function to lower the boom for recovery purposes only.

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.

Some control levers and/or switches may or may not be fitted to your machine depending on machine specification.

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 °F). The machine may not respond properly to control movements. Allow at least 1 min warm up time for every 1 °C (34 °F) below 0 °C (32 °F) with the engine at half throttle. Operate the boom and carriage services to warm the hydraulic oil.

The right hand lever controls the movement of the boom and the carriage.

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.

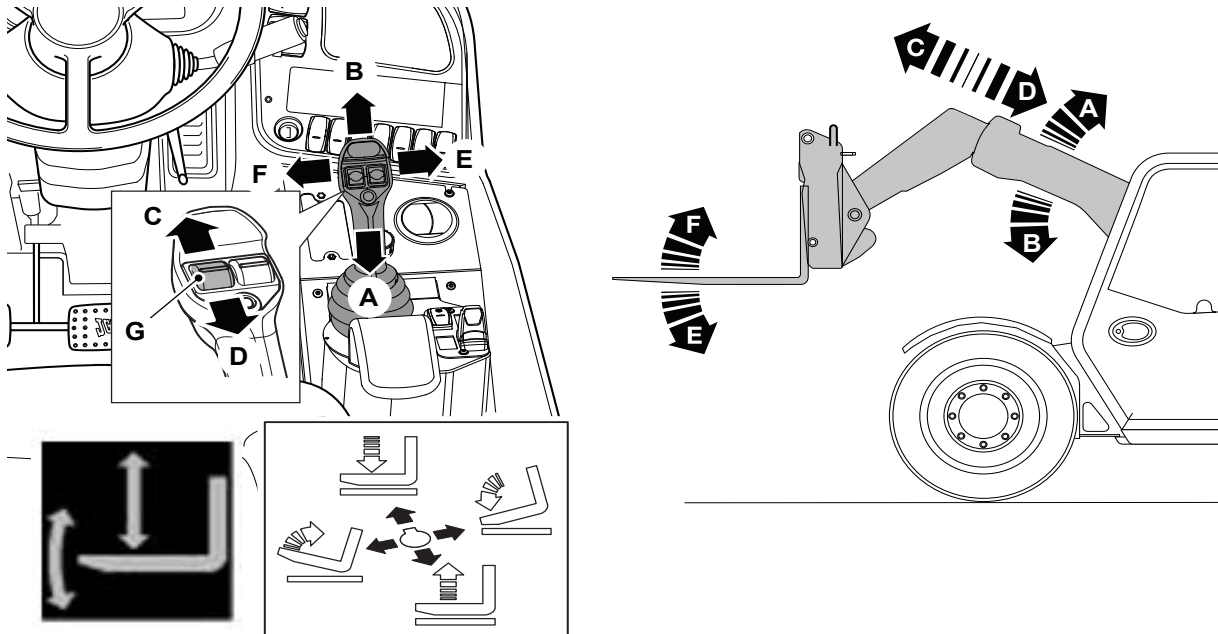
The main lever movements and their effects are described below. Combined actions can be achieved by moving the lever diagonally.

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 109.



- A Boom raise
- C Boom extend
- E Carriage tilt forward
- G Extend/retract switch

- B Boom lower
- D Boom retract
- F Carriage tilt back

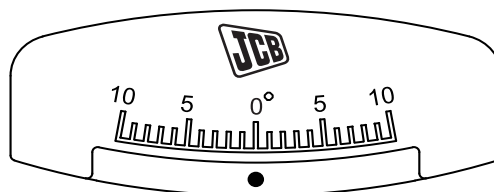
Chassis Levelling Controls

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 110.



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.

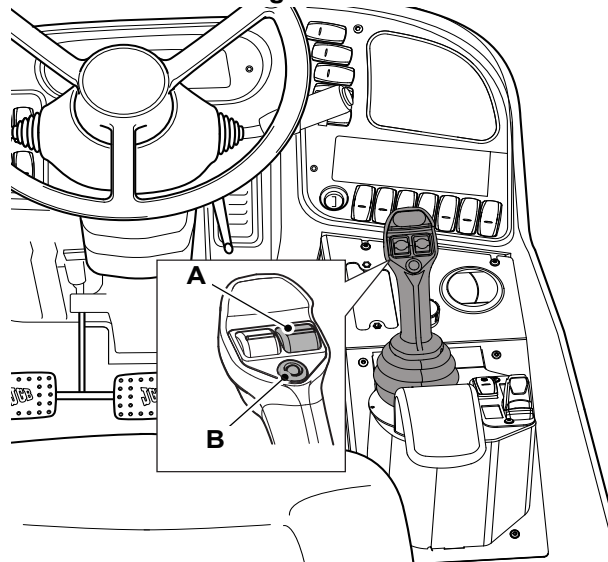
To enable the operator to identify which auxiliary mode is selected, the dash will display a series of icons. [Refer to: Instruments \(Page 72\).](#)

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 111.



A Thumb switch

B Button - activate

Auxiliary I (AUX I)

1. Turn on the hitch/auxiliary selector switch, if installed.
[Refer to: Console Switches \(Page 22\).](#)
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: Console Switches \(Page 22\).](#)
2. To activate the constant flow mode:
 - 2.1. Set the hydraulic mode switch to position 2.
[Refer to: Console Switches \(Page 22\).](#)



- 2.2. Press the button on the control lever, a symbol will be displayed on the screen.
[Refer to: Instruments \(Page 72\).](#)
- 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: Instruments \(Page 72\).](#)
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)

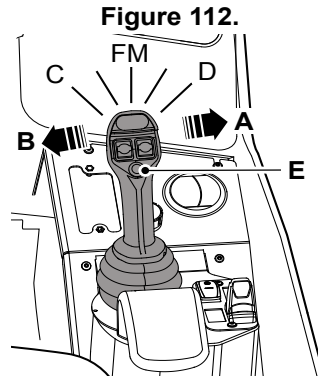
1. Turn on the hitch/auxiliary selector switch, if installed.
[Refer to: Console Switches \(Page 22\).](#)
2. Set the hydraulic mode switch to position 1.
[Refer to: Console Switches \(Page 22\).](#)
3. To enter the AUX II mode, press the button.
4. Roll the thumb switch forwards or backwards depending on the attachment installed and function required.
5. To exit the AUX II, press the button.

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:



A Control lever direction
E Button

B Control lever direction

Table 20.

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. Do not drive across a slope as this will reduce machine 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.

WARNING If your machine has not been installed with a lifting kit, an approved lifting point such as a hook or shackle and hose burst check valves then it must not be used for object handling. Using a machine for object handling without these devices could lead to injury. Use the machine for earth-moving purposes only.

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 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. 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



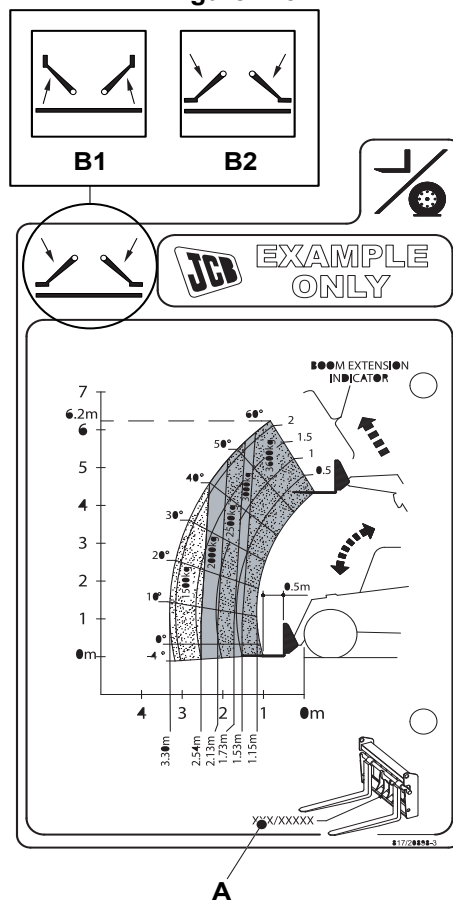
stabilisers or chassis levelling (sway) are used. Some other load charts for use when a different carriage or attachment is installed on the boom.

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 113.



A Attachment part number
B2 Stabiliser down

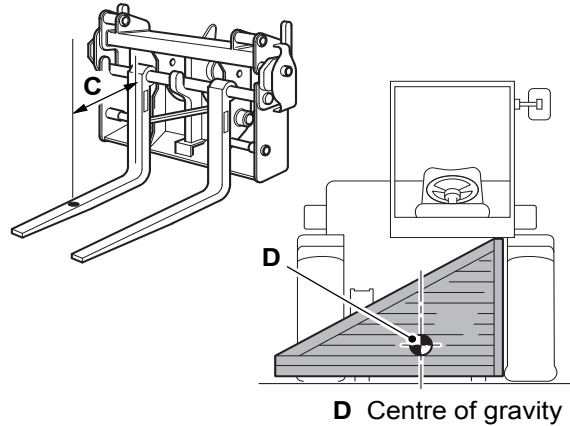
B1 Stabiliser up

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 114.

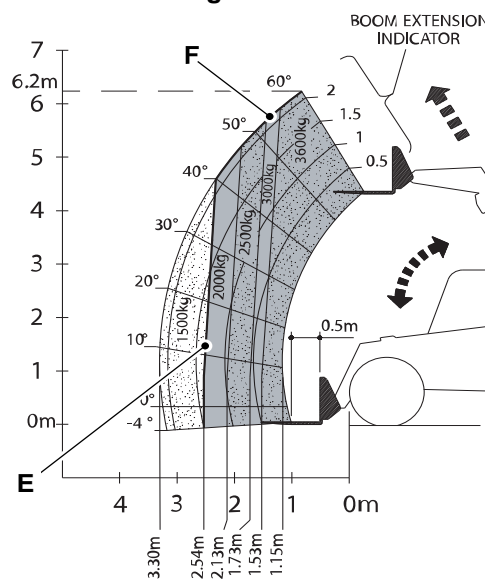


C Length =500mm (19.7in)

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 115.



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: Load Charts \(Page 108\).](#)

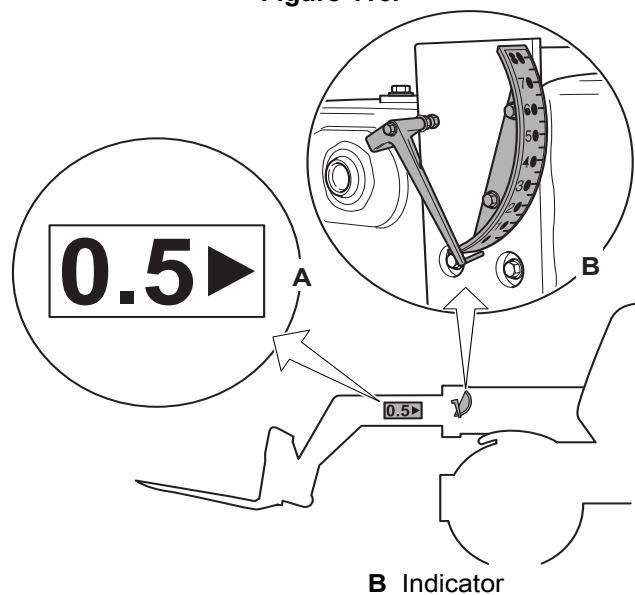
The boom angle and extension indicators are installed on the boom itself. It is indicated by numbered labels, the numbers represent boom extension in metres.

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: Load Charts \(Page 108\).](#)

Figure 116.



A Label

B Indicator

Inclinometer

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

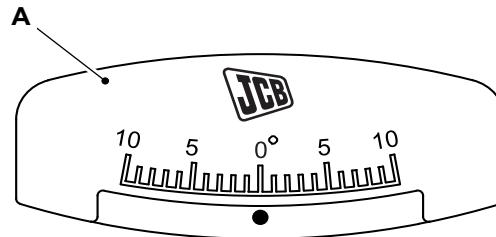
Use the inclinometer to check that the machine is level before operating the boom. The machine is level when the inclinometer shows 0°.

Reposition the machine if a level position cannot be achieved.

[Refer to: Slopes \(Page 96\).](#)



Figure 117.



A Inclinometer

Longitudinal Load Moment Indicator (LLMI)

▲ 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 LLMI (Longitudinal Load Moment Indicator) warns the operator when the machine is nearing its maximum working limit (i.e. when the load moment could cause the machine to tip forward).

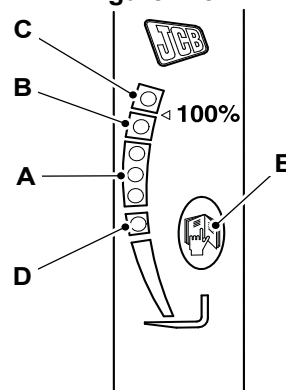
A sensor measures the load exerted on the rear axle and sends a signal to the indicator unit. The indicator unit converts the signal into a display in the form of three green LED (Light Emitting Diode), one amber LED and one red LED. The LED will illuminate progressively as the load increases. Refer to Figure 118.

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.

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

Figure 118.



A Green colour LED's (x3)
C Red colour LED (x1)
E Display button

B Amber colour LED (x1)
D Green colour LED (x1)

The following checks and adjustments must only be done while the engine is running. Apply the park brake and set the forward/reverse lever to neutral.



Checking the Indicator

▲ 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 118.
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

Setting Procedure

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 118.
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 118.

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 119. Calibration faults

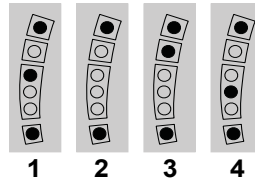


Figure 120. LLMI Unit faults

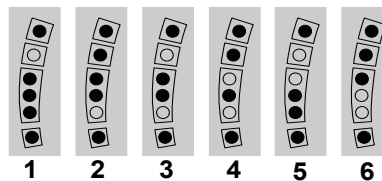
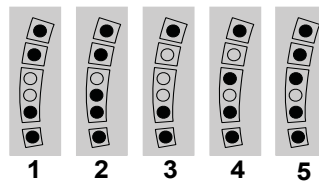


Figure 121. LLMI External faults



Longitudinal Load Moment Control (LLMC)

▲ WARNING The longitudinal load moment control system 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 longitudinal load moment 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 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: Load Charts \(Page 108\).](#)

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.

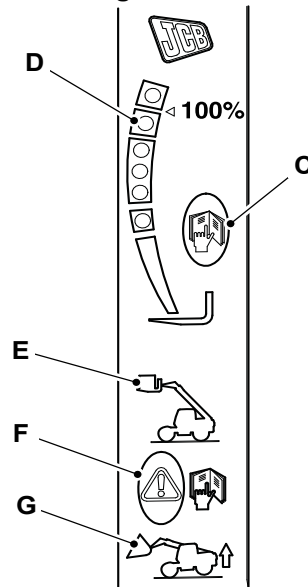
WARNING Incorrect operation of the crowd/dump functions (when laden) can cause the machine to become unstable and a loss of the load. The LLMC does not prevent such operation and you must operate within the machines limits.

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 122.



- C Release button
- E boom raise
- G boom lower

- D Amber colour LED
- F Mode button

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 122.
4. Complete the test procedure in the sequence as shown. Refer to Table 21.

Table 21.

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



Operation
Lifting and Loading

S.No.	Operation	Result
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

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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. Do not drive across a slope as this will reduce machine stability.
- WARNING** Keep yourself and all others away from the lifting mechanism. Never allow persons to walk below a raised boom 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 palletted loads first. Do not handle awkward loads until you can handle palletted 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: Slopes \(Page 96\).](#)

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>



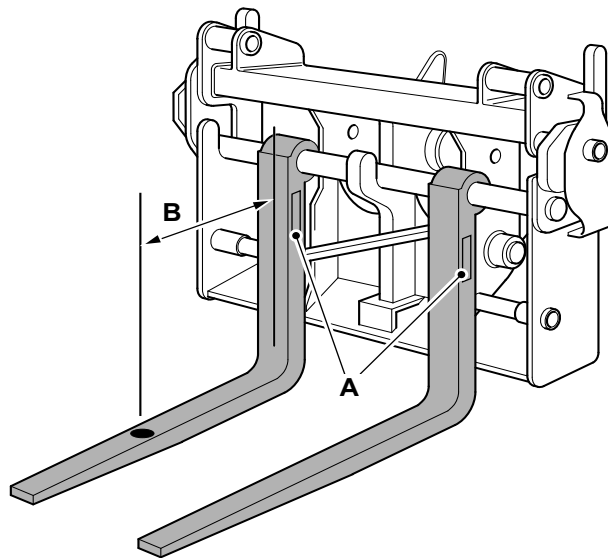
Other countries and territories have their own legislation similar to the above. Be sure that you are aware of all local and national legislation governing lifting and loading operations where you are operating.

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 123.



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: Performance Dimensions \(Page 262\).](#)

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

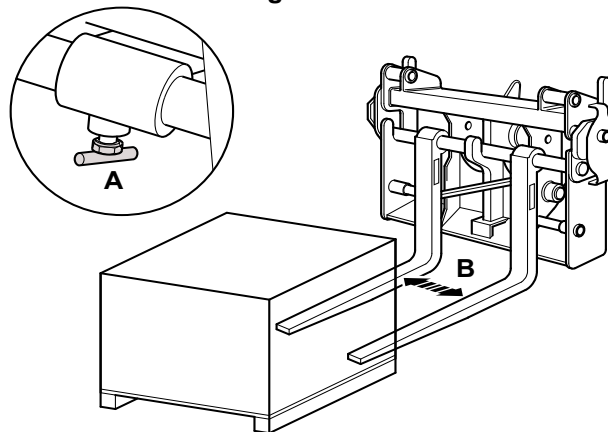
▲ WARNING Loads can fall off incorrectly spaced forks. Always space the forks correctly for the load. Make sure the forks are completely under the load before lifting.

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 124.



A Clamping screws

B Fork space adjustment

Working with Pallets

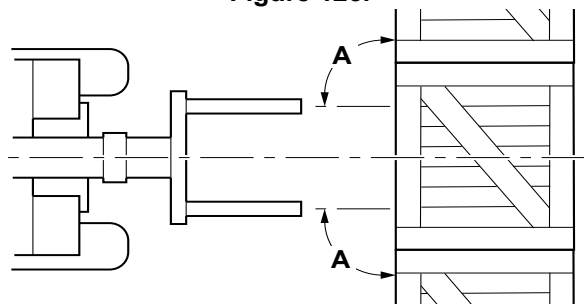
Loading

- ▲ **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 (11.81 in).

1. Put the forks in the horizontal position.
[Refer to: Boom Controls \(Page 103\).](#)
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 125.



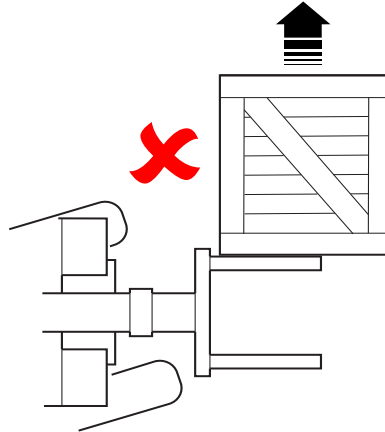
A Angle = 90°

5. Engage the park brake and put the transmission in neutral.



- Do not use the side of the forks or carriage to move the load, this can cause damage to the forks.

Figure 126.

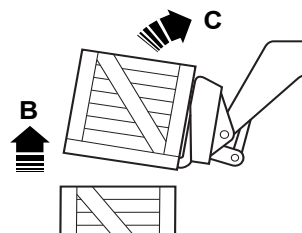


- If the load is on a high platform you may have to raise the boom to allow you to get the machine close enough to the load.
- Extend the boom or drive the machine, to insert the forks under the load.
- Stop the machine, when the carriage touches the load.
- Check the boom extension/angle(s) are in limits.

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

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

Figure 127.



B Load raise

C Carriage tilt

- Retract the boom, then lower it into the travel position.
- 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.

- Approach the unload straight-on, with all wheels straight.
- Stop the machine and leave enough room to manoeuvre the boom.
- Make sure the loading should not exceed the limits.
[Refer to: Load Charts \(Page 108\).](#)
- 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.

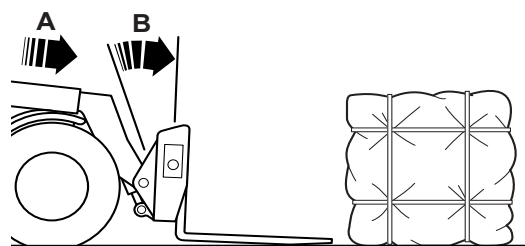
Working with Bales

▲ 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: [Boom Controls \(Page 103\)](#).

Figure 128.

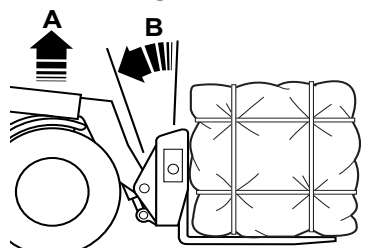


A Boom extend

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 129.



A Boom raise

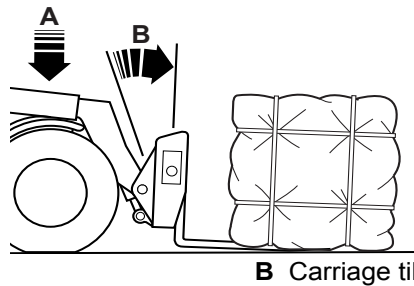
B Carriage retract

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 130.

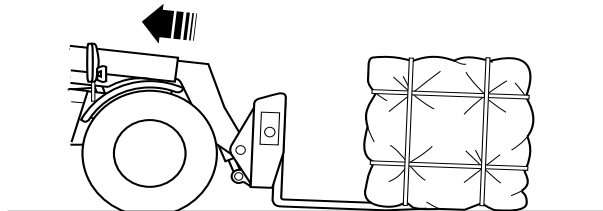


A Boom lower

B Carriage tilt

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 131.



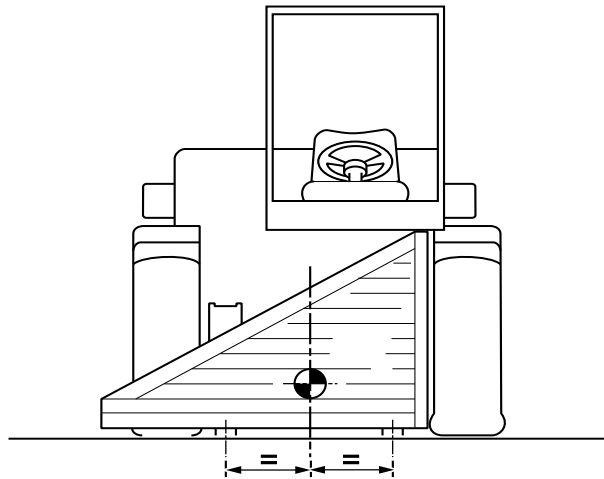
Working with Irregular Loads

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 palletted, follow the procedure for palletted loads.
 - 3.2. If it is not palletted, 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 132.

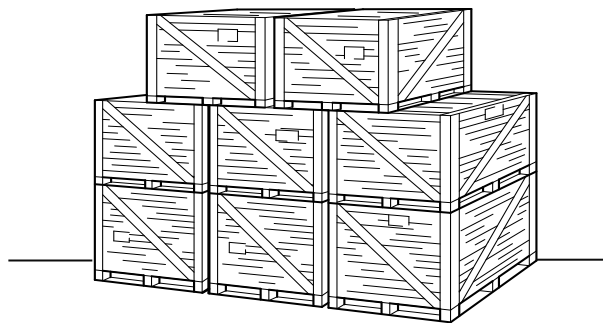


Stacking Loads

Box Pallets

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

Figure 133.



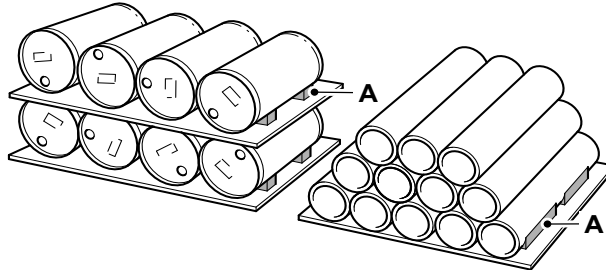
Cylindrical Loads

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 134.



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.

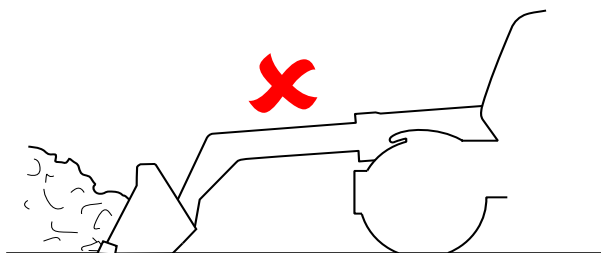
Your machine can be used with a wide variety of attachments, for example shovels.
[Refer to: Attachments \(Page 143\).](#)

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 drive the shovel at full speed into the stockpile with the boom extended. This may cause serious damage to the boom.

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

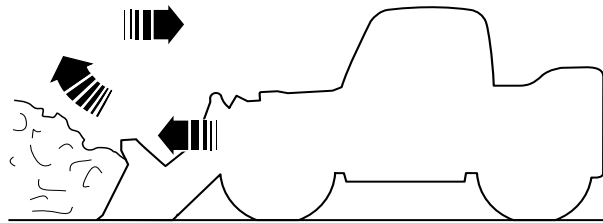
Figure 135.



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 136.



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.

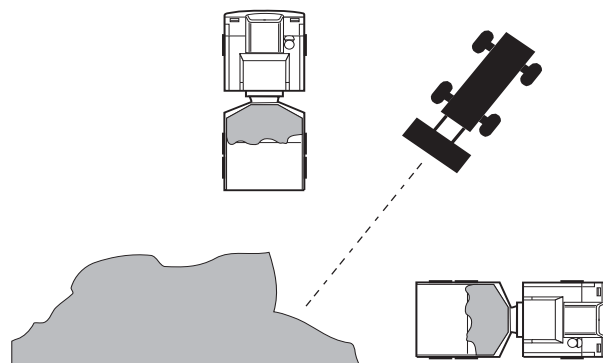
Keep the wind on your back. This keeps dust away from you and your machine.

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 137.





Heating, Ventilating and Air-Conditioning (HVAC)

General

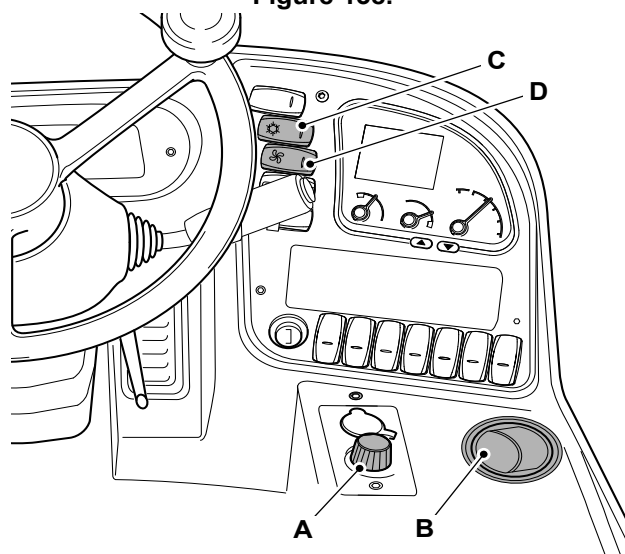
The operator must set the controls to obtain the best working environment in the operator station.

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 138.



A Temperature control switch
C Air-conditioning switch

B Vent
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.

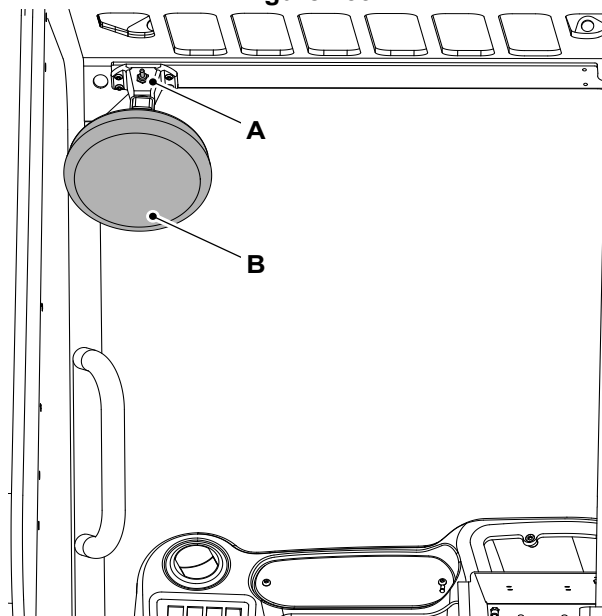
Press further down to increase the fan speed. This functions only when the ignition key is in position I.

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 139.



A Switch - fan on/off

B Face level fan



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.

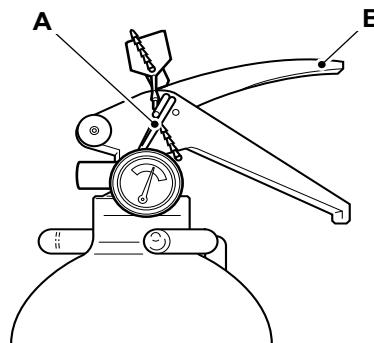
Make sure that you understand how to use the fire extinguisher. If necessary, refer to the instructions found on the fire extinguisher.

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 140.



A Safety pin

B Trigger



Moving a Disabled Machine

General

If the machine becomes disabled, the machine must be made safe, placed 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.

Do not connect the booster (salve) supply directly to the alternator.

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.

CAUTION When the engine is running, there are rotating parts in the engine compartment. Before disconnecting the cables, make sure that you have no loose clothing (cuffs, ties etc.) which could get caught in rotating parts.

1. Set all switches in the cab to their off positions.
2. Get access to the battery.
[Refer to: Access Apertures \(Page 218\).](#)
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.

Recovery

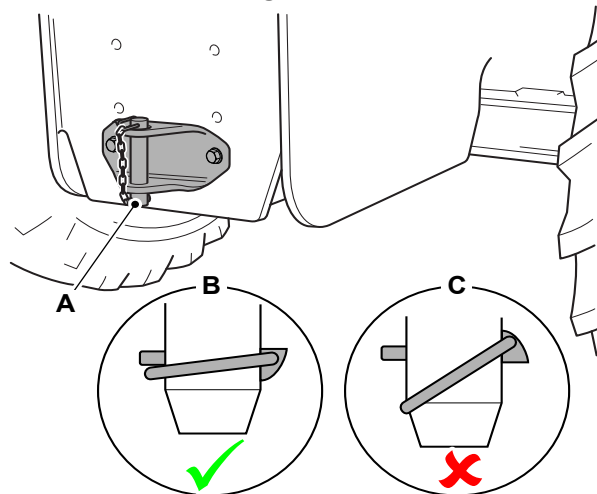
▲ WARNING Use a rigid drawbar. If a towing chain must be used, then use two towing vehicles. One towing vehicle should be coupled to the front of the disabled machine. The other towing vehicle should be coupled to the rear of the disabled machine, to provide braking power. The towing vehicle must have enough pulling and braking power to move and stop the machine.

Notice: Towing a machine too far or too fast can damage the transmission. When towing prepare the machine as described. Failure to comply will result in lack of lubrication and seizure of the transmission motor and pump.

Make sure you will be obeying all pertinent laws and regulations before towing.

1. Install the lock pin at the rear of the machine as shown.
2. Use the lock ring to secure the pin in position.

Figure 141.



A Recovery hitch

C Lock pin - incorrectly secured

B Lock pin - correctly secured

Preparing the Machine for Recovery

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 prophasts.

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. Make sure you understand what the towing driver will be doing. Obey his instructions and all relevant regulations.

In event of hydraulic power failure on your machine, SAHR (Spring Applied Hydraulic Release) park brake installed on this axle can be released mechanically. This enables the recovery of the machine.

If the engine cannot be run, the boom may have to be hoisted into the transport position and secured. The procedure for doing this will depend on the machine's condition and its hydraulic circuits. For assistance, contact your JCB dealer.

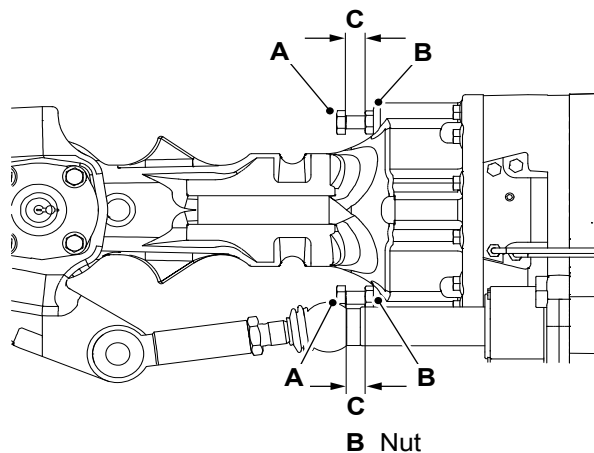
If the engine cannot be started, the effort required to steer the machine is greatly increased.



The following procedure is for the right side SAHR park brake. The procedure for the left side SAHR park brake is similar.

1. Using suitable lifting equipment, remove any payload from the machine.
2. Place chocks both sides of each wheel.
3. Attach the draw-bars or chains to the points marked with a recovery decal. Do not use the trailer hitch or any part of the machine other than those marked with a recovery decal.
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 the machine safe.
 - 5.2. Block the wheels on both sides.
 - 5.3. Loosen the nut.
 - 5.4. Tighten the bolt simultaneously and progressively until the wheels start to rotate freely. It is recommended to turn bolts alternatively by half turn at a time.

Figure 142.



- A Bolt
B Nut
C Gap between nut and bolt (20mm)

- 5.5. Check the wheels are free to move. If not, do the step 5.3 to step 5.4 again.
6. When towing is complete:
 - 6.1. Apply Loctite 501 on the mating faces of the nut, bolt threads and the axle arm surface.
 - 6.2. Tighten the nut to the correct torque value.
 - 6.3. Tighten the bolt until there is the specified gap between the nut and bolt.
Distance: 20mm

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.



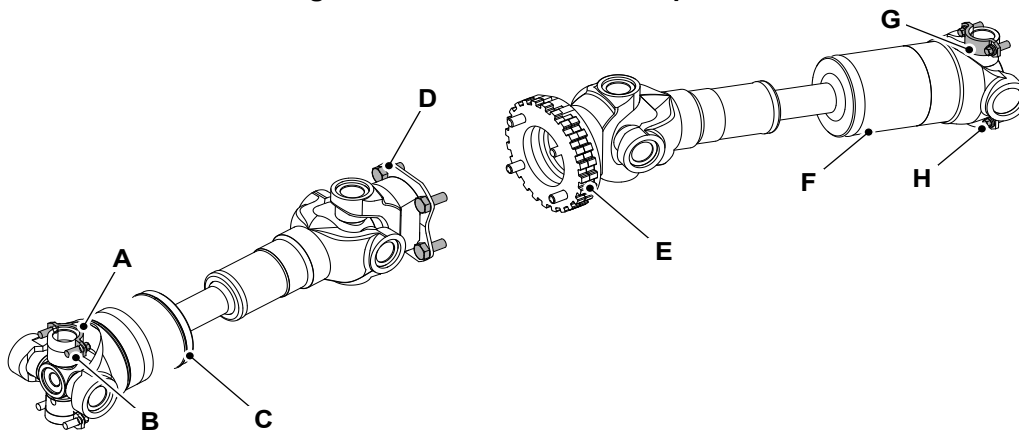
Removal

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 Positions \(Page 211\).](#)
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: Undershield \(Page 218\).](#)
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 143. Constructional Propshaft

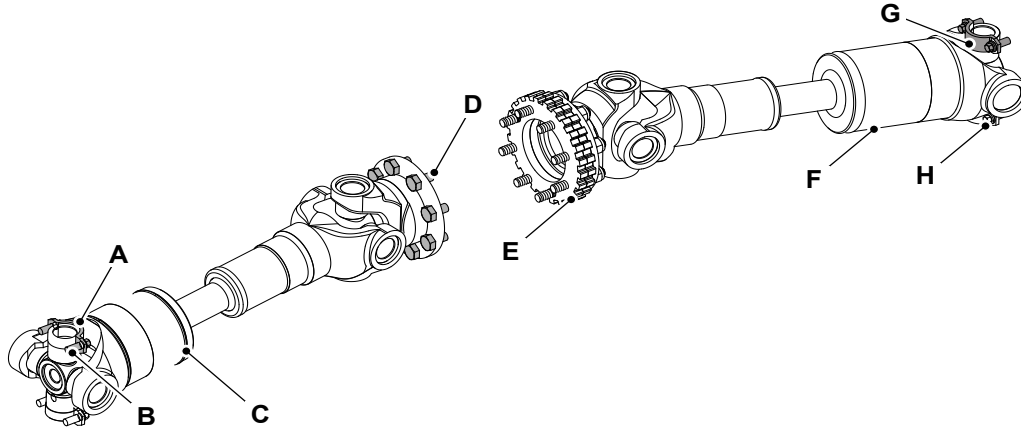


A Front propshaft bearing strap
B Front propshaft screws
C Front propshaft

D Screws (x4)
E Speed sensor ring
F Rear propshaft
G Rear propshaft bearing strap
H Rear propshaft screws



Figure 144. Agricultural Propshaft



- A** Front propshaft bearing strap
- C** Front propshaft
- E** Speed sensor ring
- G** Rear propshaft bearing strap

- B** Front propshaft screws
- D** Set screws (x8)
- F** Rear propshaft
- H** Rear propshaft screws



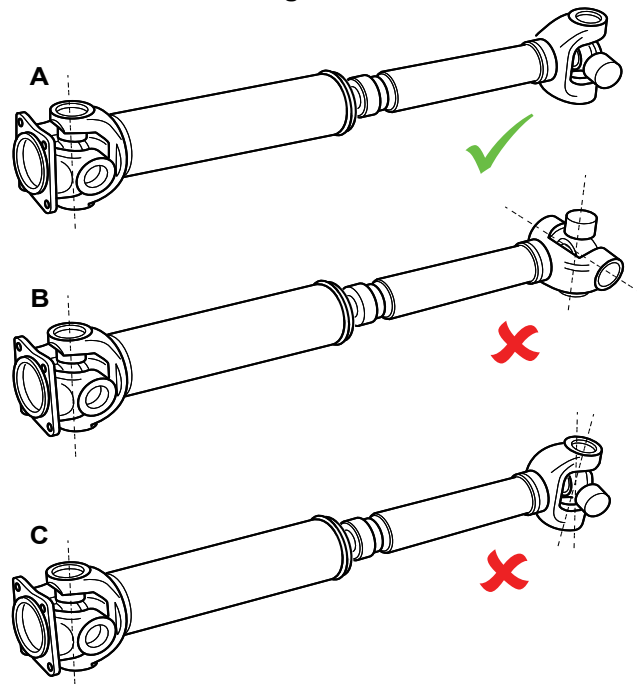
Installation

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: General \(Page 275\).](#)
- If the studs are damaged install with the new studs. Apply JCB threadlocker and sealer to the stud threads.

Figure 145.



A Equal angle propshaft
C Intermediate propshaft

B Right angle propshaft



Lifting the Machine

General

There are no lifting points on this machine. If a lift is required consult with an appropriate authorised lifting company.

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Transporting the Machine

General

▲ WARNING The safe transit of the load is the responsibility of the transport contractor and driver. Any machine, attachments or parts that may move during transit must be adequately secured.

CAUTION Before moving the machine onto the trailer, make sure that the trailer and ramp are free from oil, grease and ice. Remove oil, grease and ice from the machine tyres. Make sure the machine will not foul on the ramp angle.

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

Make sure that the transport trailer is suitable for the dimensions and weight of your machine.

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 Position - Boom Lowered \(Page 211\).](#)
 - 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.

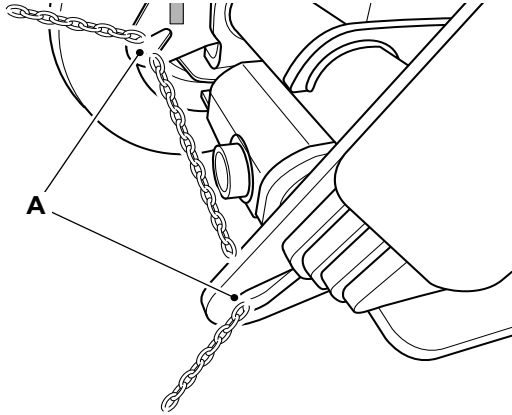
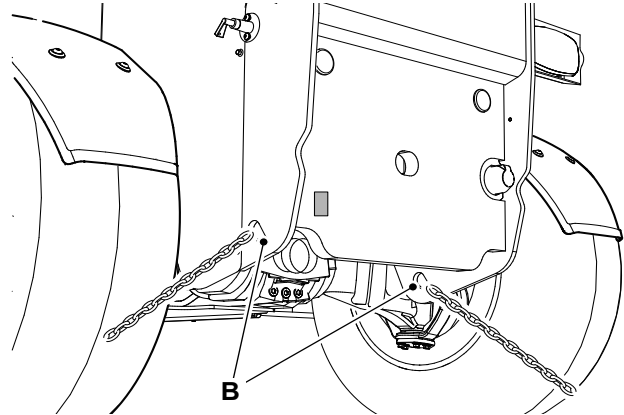


Figure 146.

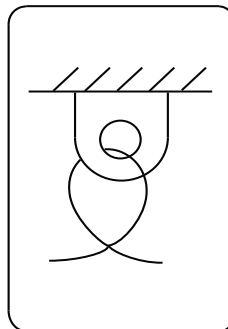


A Front position anchor point

B Rear position anchor point

- The correct tie down positions are identified on the machine by their labels.

Figure 147.



- 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. Remove debris accumulation below the engine. Remove debris accumulation trapped underneath heat shields and exhaust jackets.

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 24 V for starting as this can cause damage to the electrical circuits.

1. Use the correct viscosity engine lubricating oil.
[Refer to: Fluids, Lubricants and Capacities \(Page 269\).](#)
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: Starting the Engine \(Page 51\).](#)

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: [Instruments \(Page 72\)](#).

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: Bleed \(Page 233\).](#)

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: Fluids, Lubricants and Capacities \(Page 269\).](#) 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 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 Positions \(Page 211\).](#)
2. Remove all unwanted material around the fuel cap.
3. Remove the fuel cap.
[Refer to: Service Points \(Page 214\).](#)
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:

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Attachments Working with Attachments

Introduction

Attachments

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

The use of non-approved attachments could invalidate your warranty and cause damage to both machine and attachments.

Metal Splinters

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

Attachments

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

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

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

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

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

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

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

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

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

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

Attachments for your Machine

▲ Notice: 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 installed.

Notice: Do not extend the boom when an attachment is connected to the high flow auxiliary connectors (if installed). 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.

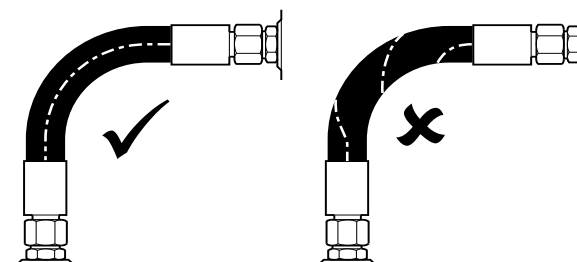
Connecting/Disconnecting Hydraulic Hoses

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 Positions \(Page 211\).](#)
2. Vent the hydraulic system.
[Refer to: Discharge \(Page 248\).](#)
3. Check the hoses and adaptors for damage.
[Refer to: Check \(Condition\) \(Page 248\).](#)
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 148.

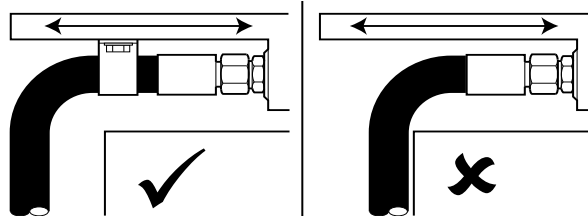


- 4.2. Make sure that the hose does not touch hot parts. High ambient temperatures can cause the hose to fail.
- 4.3. Make sure that the hose does not touch parts which can rub or cause abrasion.



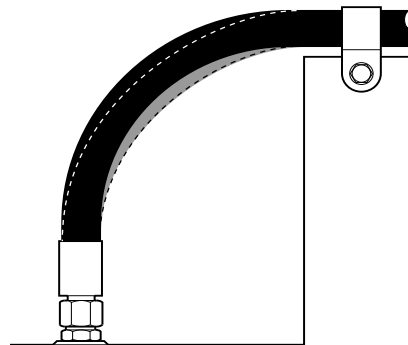
- 4.4. Use the hose clamps (where possible) to support long hose runs and keep the hoses away from moving parts, etc.

Figure 149.



- 4.5. To allow for length changes when the hose is pressurised, do not clamp at the bend. The curve absorbs the change.

Figure 150.



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 Positions \(Page 211\).](#)
2. Vent the hydraulic system.
[Refer to: Discharge \(Page 248\).](#)
3. Disconnect the hoses.
4. Check the hoses and adaptors for damage.
[Refer to: Checking For Damage \(Page 195\).](#)
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.

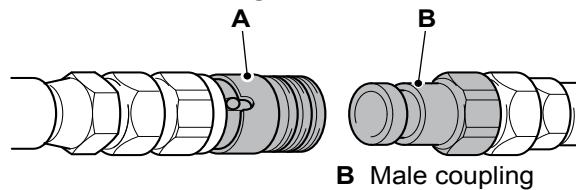
Quick Release Couplings

▲ 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 151.



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.

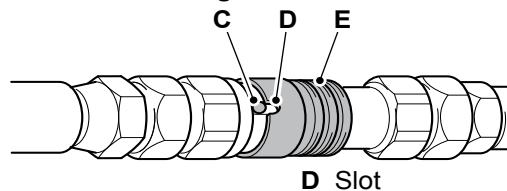


- Never subject the couplings to external forces, especially side load. This can decrease the life of the coupling or cause failure.
- Never allow the torsional forces transmitted from the hoses to unscrew/screw together the couplings.
- Never use a coupling as a plug.
- Do not connect and disconnect 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: [Console Switches \(Page 22\)](#).
 - 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 152.



- C Ball
- E Sleeve

Disconnecting Quick Release Couplings

1. Remove any residual hydraulic pressure trapped in the service line hose.
Refer to: [Console Switches \(Page 22\)](#).
 - 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 they keep clear of the machine and attachment until signalled by you to proceed.

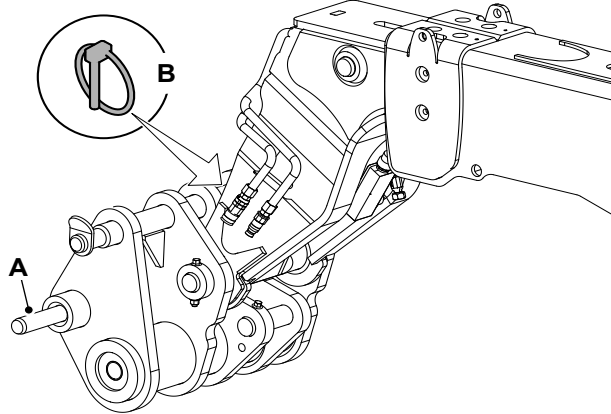
Mechanical Pin Locking

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.



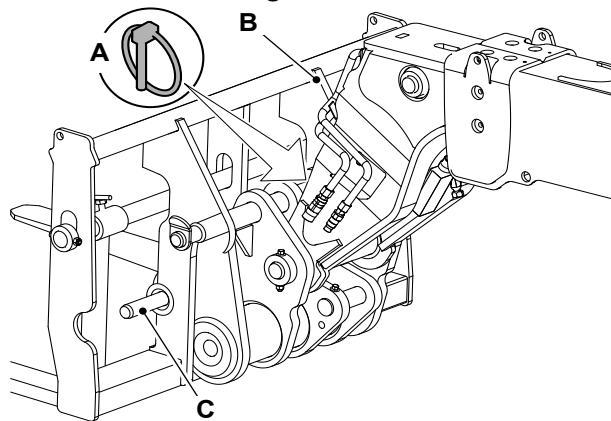
Figure 153.



A Lock pin

B Lynch pin

Figure 154.



A Lynch pin
C Lock pin

B Hook plates

Removing Attachments

1. Lower the attachment to the ground.
2. If the attachment is hydraulically operated, connect the hoses.
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.

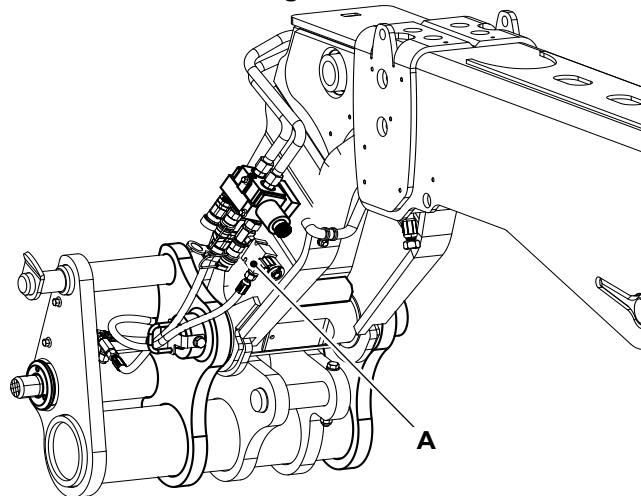


Hydraulic Pin Locking

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.

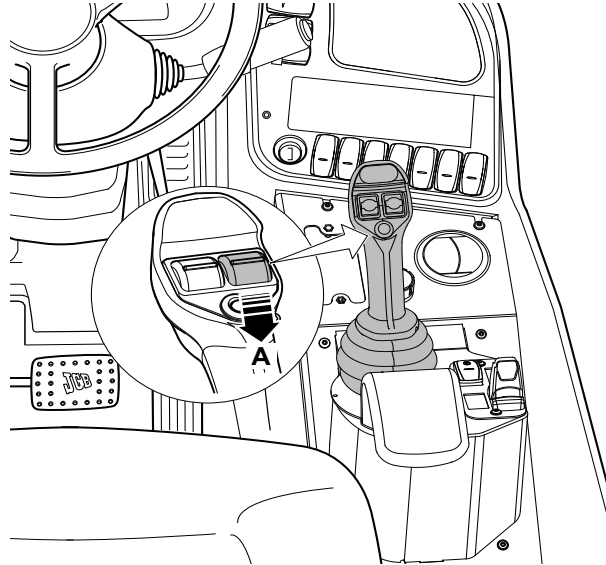
Figure 155.



A Hose(s) couplings



Figure 156.

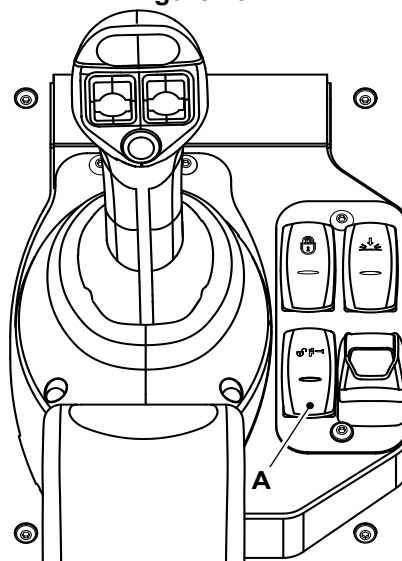


A Backward - engage locking pins

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.
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

Figure 157.



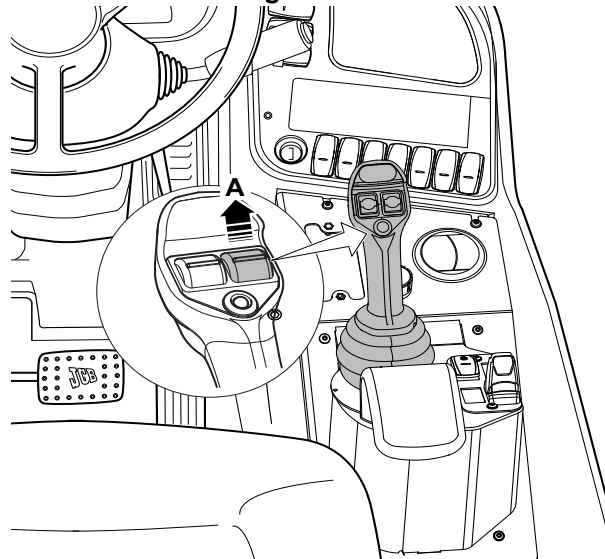
A Unlock switch

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

Skid Steer

Mechanical Pin Locking

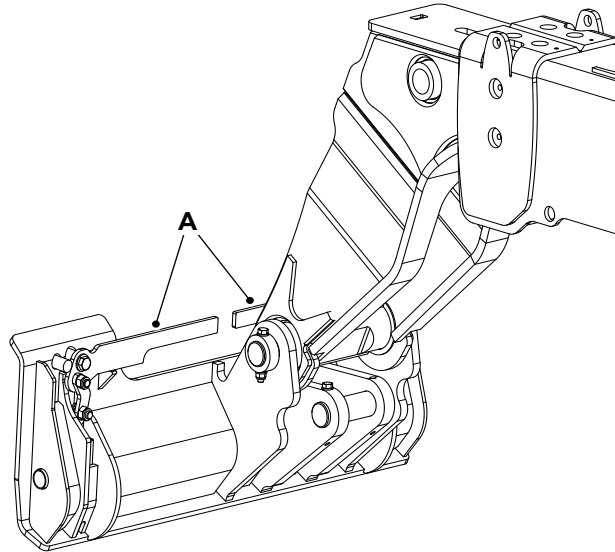
Installing Attachments

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.



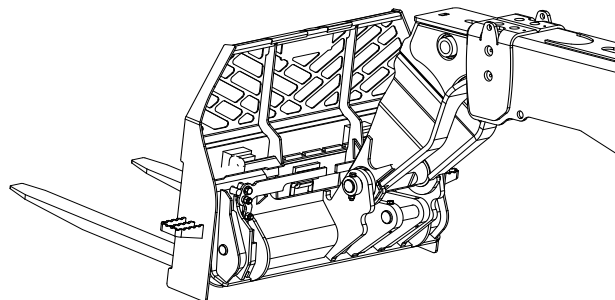
- 5.4. At the carrier, move the handles to push the locking pins into the locking holes in the carrier and attachment.
- 5.5. If a second person is to do this job keep your hands and feet away from the controls until he is clear of the machine.
6. If the attachment is hydraulically operated, connect the hoses.

Figure 159.



A Locking handles

Figure 160.



Removing Attachments

1. Lower the attachment to the ground.
2. If the attachment is hydraulically operated, connect the hoses.
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.



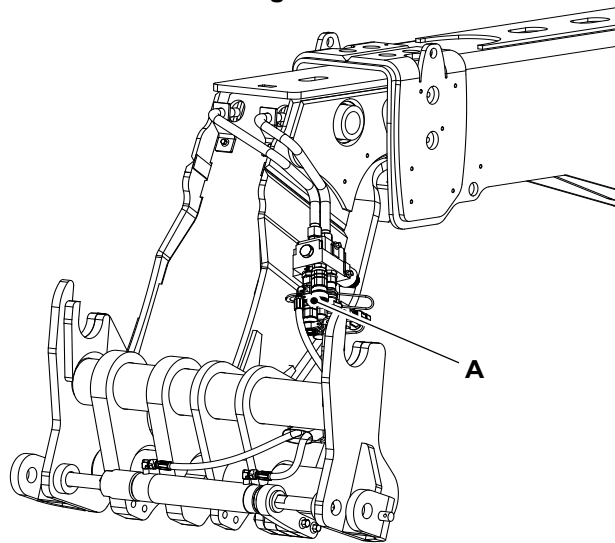
- 6.4. Then lower the boom slowly to withdraw the carrier from the attachment hook plates.
- 6.5. Carefully reverse the machine away from the attachment or retract the boom.

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.

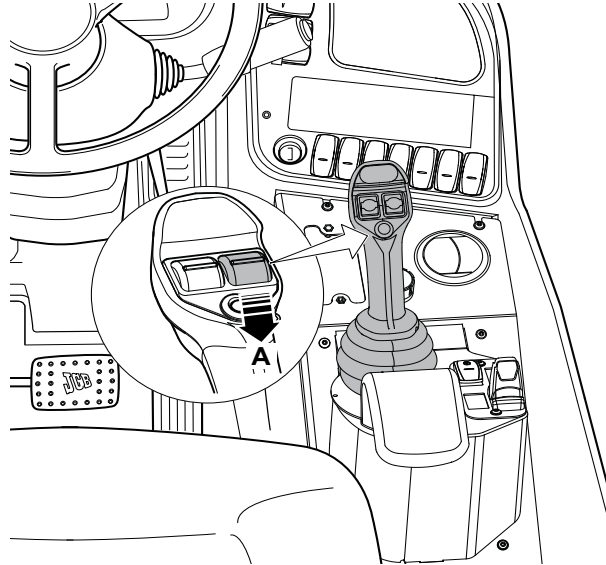
Figure 161.



A Hose(s) couplings



Figure 162.

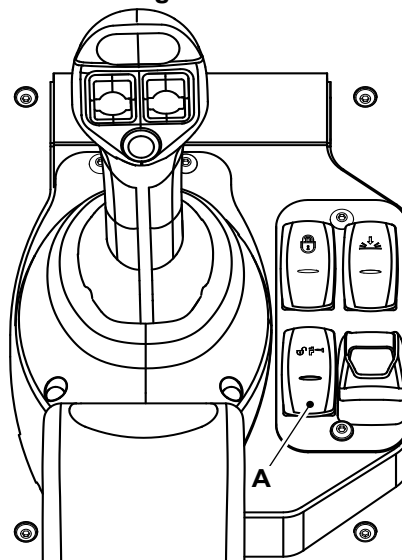


A Backward - engage locking pins

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.
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

Figure 163.



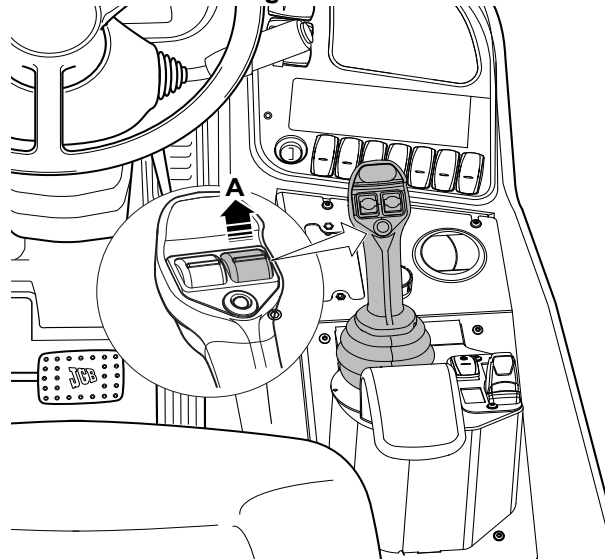
A Unlock switch

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 164.



A Forward - disengage locking pins

Manitou

Mechanical Pin Locking

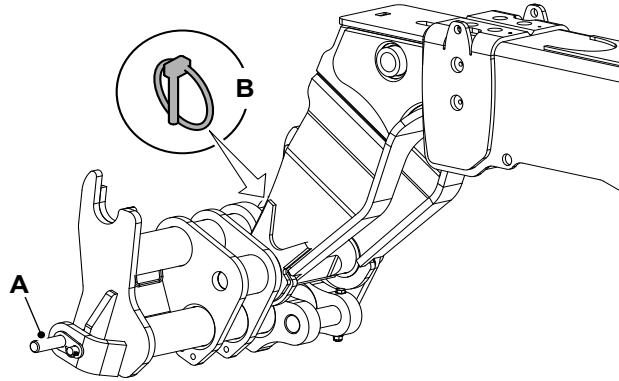
Installing Attachments

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.

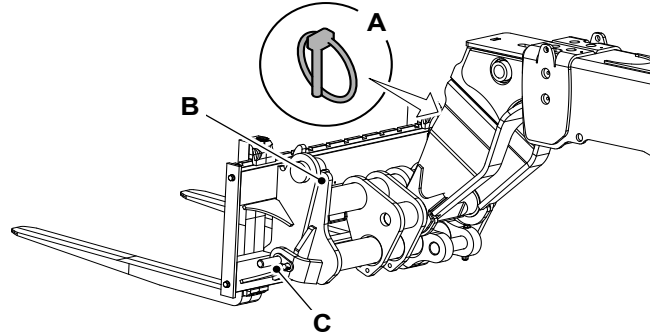
Figure 165.



A Lock pin

B Lynch pin

Figure 166.



A Lynch pin

C Lock pin

B Hook plates



Removing Attachments

1. Lower the attachment to the ground.
2. If the attachment is hydraulically operated, connect the hoses.
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.

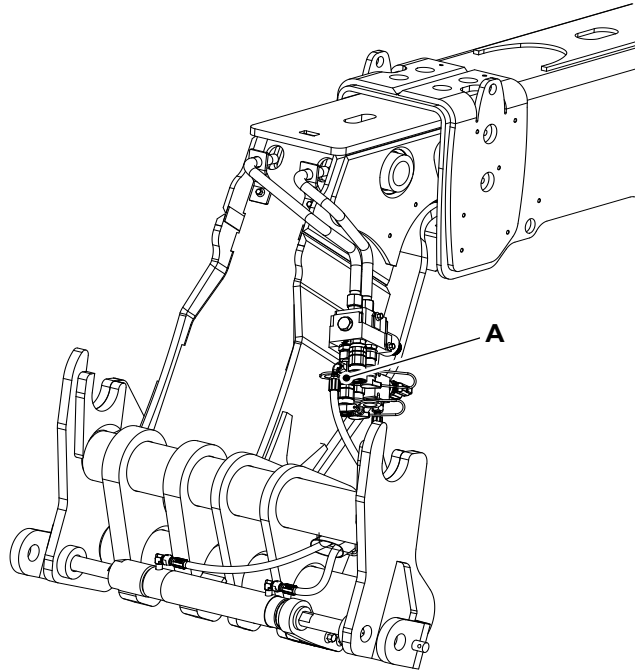
Hydraulic Pin Locking

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.

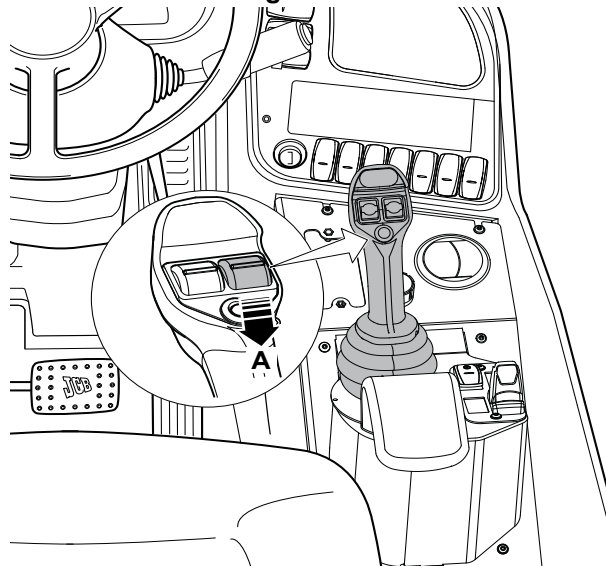


Figure 167.



A Hose(s) couplings

Figure 168.



A Backward - engage locking pins

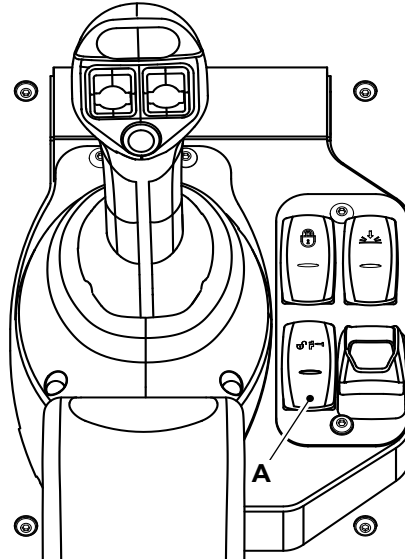
Removing Attachments

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.
5. Turn on the hitch/auxiliary switch.



6. Hold the pin unlock switch.

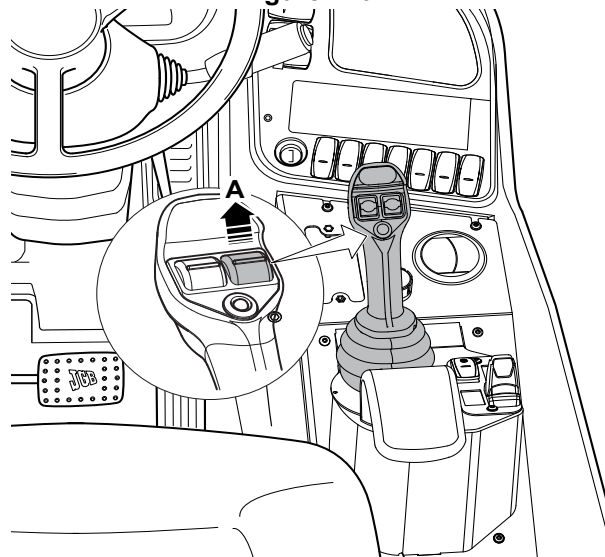
Figure 169.



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 170.



A Forward - disengage locking pins



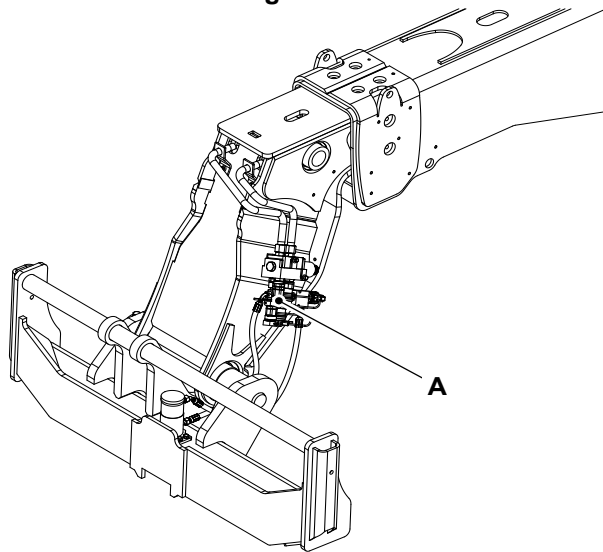
Merlo

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.

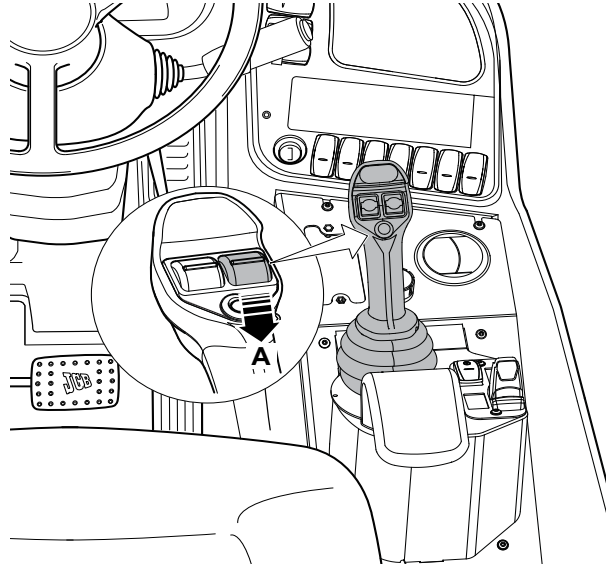
Figure 171.



A Hose(s) couplings



Figure 172.

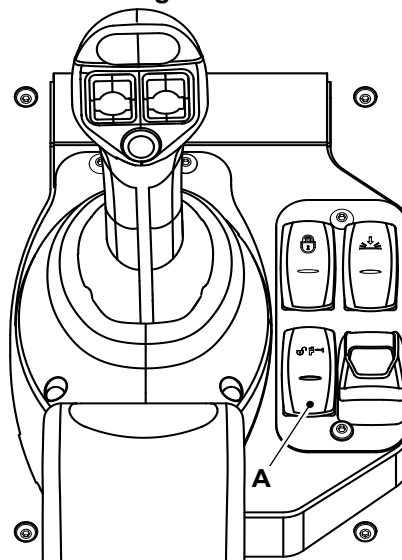


A Backward - engage locking pins

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.
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

Figure 173.



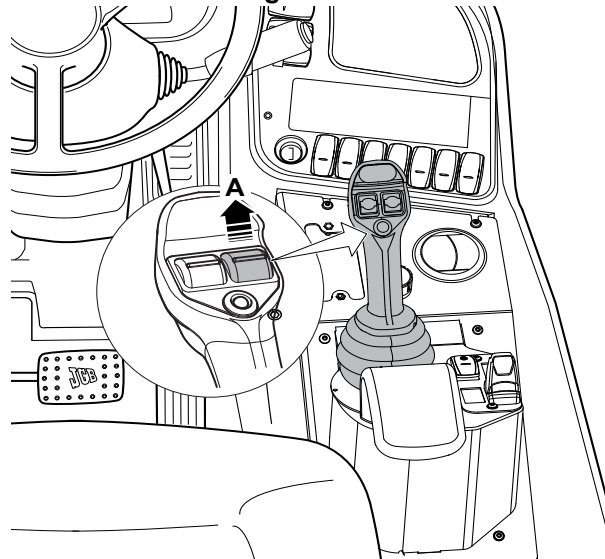
A Unlock switch

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 174.



A Forward - disengage locking pins

Pin and Cone

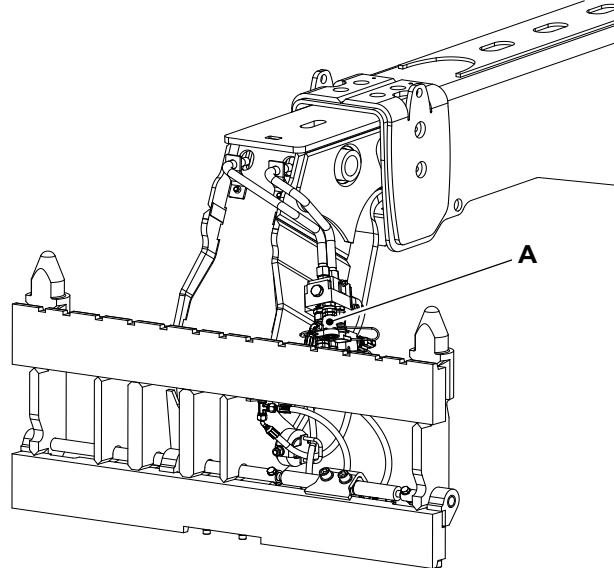
Hydraulic Pin Locking

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.

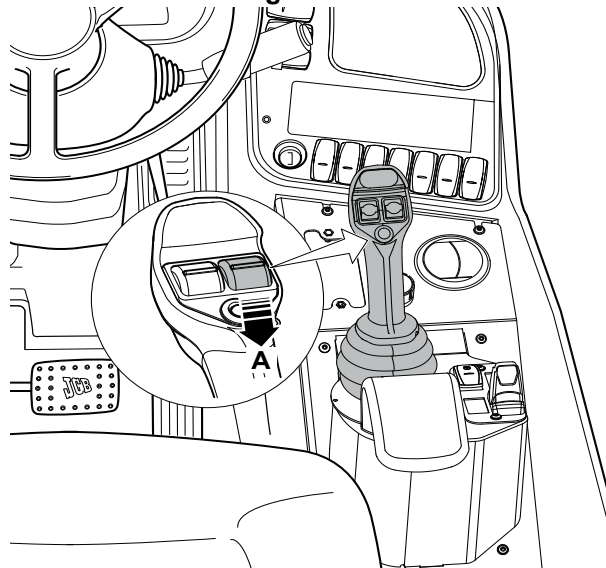


Figure 175.



A Hose(s) couplings

Figure 176.



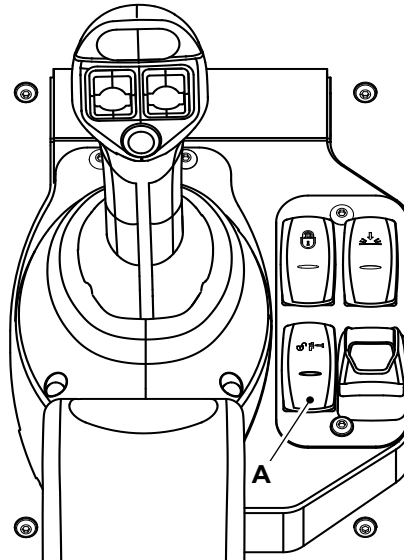
A Backward - engage locking pins

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.
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.



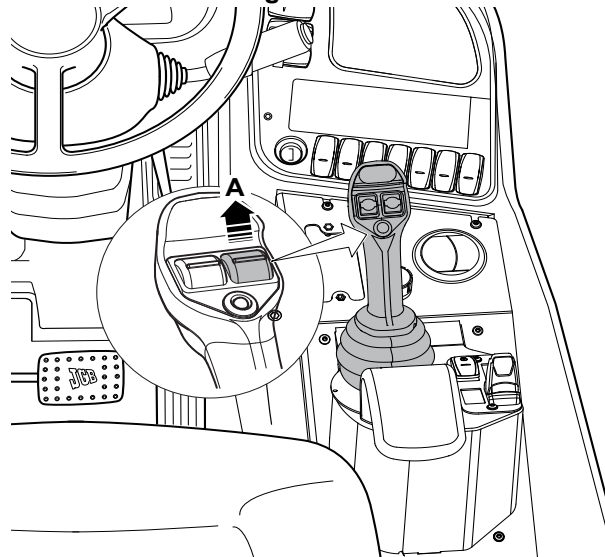
Figure 177.



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 178.



A Forward - disengage locking pins

Eurohitch

Hydraulic Pin Locking

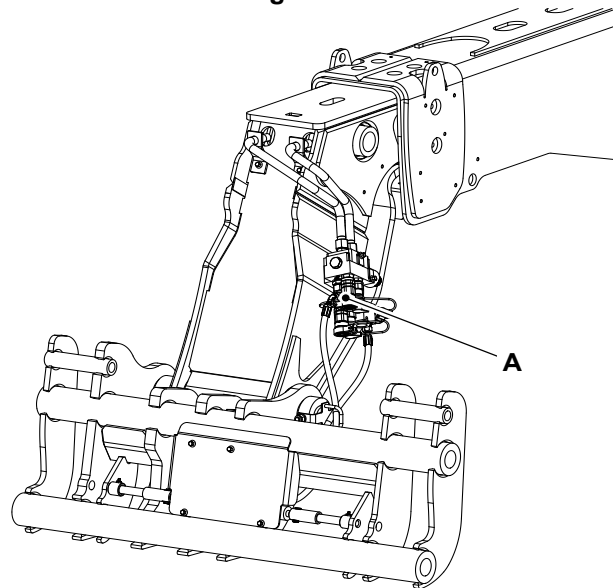
Installing Attachments

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.

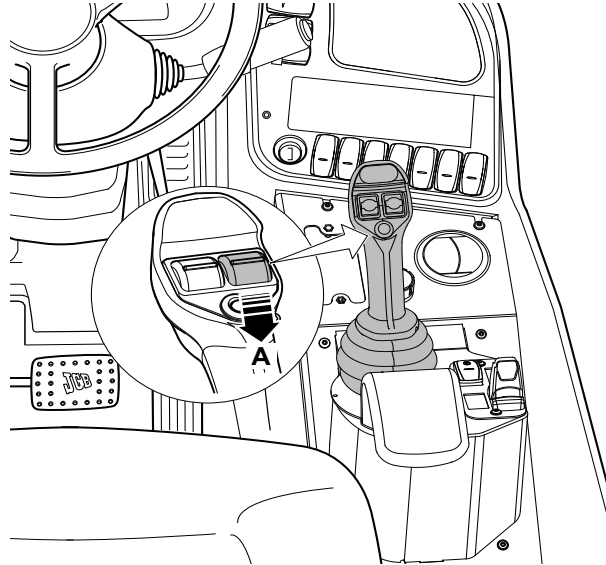
Figure 179.



A Hose(s) couplings



Figure 180.

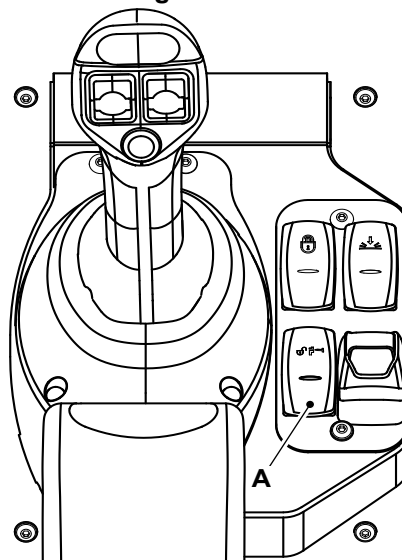


A Backward - engage locking pins

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.
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

Figure 181.



A Unlock switch

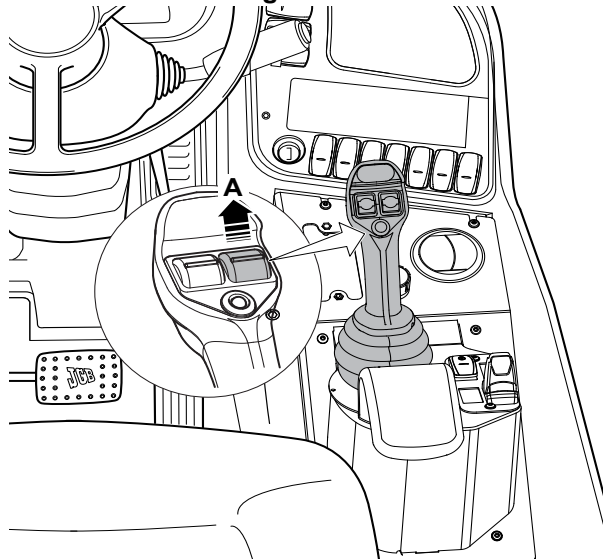
7. Move the thumb switch forwards to disengage the locking pins.



Attachments
Tool Carrier

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 182.



A Forward - disengage locking pins



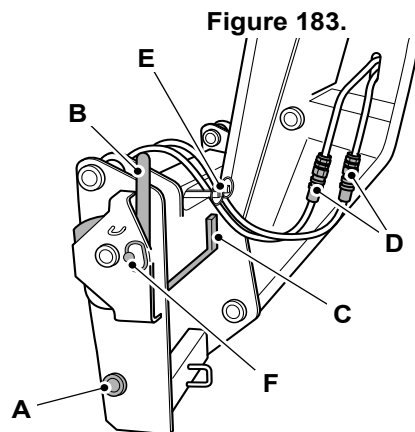
Quick-fit Carriage

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 they keep clear of the machine and attachment until signalled by you to proceed.

Mechanical Pin Locking



- | | |
|--|---|
| <p>A Lower carrier lock pins
 C Lower carrier locking lever
 E Locking pins - hydraulic hoses</p> | <p>B Upper hook plate locking levers
 D Hoses
 F Upper hook plate locking pins</p> |
|--|---|

Installing Attachments

1. Make the machine safe.
[Refer to: Stopping and Parking \(Page 57\).](#)
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 183.
 - 4.1. Make sure that the lower carrier lock pins are withdrawn. Make sure the upper hook plate locking levers are secured in the open position.
 - 4.2. Depending on the attachment, use the control levers to align the carrier hooks plates with the attachment or the attachment hook plates with the carrier.
 - 4.3. Apply the park brake.
 - 4.4. Set the transmission to neutral.
 - 4.5. Depending on the attachment, use the control levers to engage the carrier hooks plates with the attachment or the attachment hook plates with the carrier.
 - 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 machine.
7. Remove the ignition key.



8. At the carrier, operate the lower carrier locking lever to engage the lower carrier lock pins. When using the carrier lock plates rotate the hook plate locking levers into their closed positions and secure them with the upper locking pins. Refer to Figure 183.
9. Make sure all 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 183.
[Refer to: Connecting/Disconnecting Hydraulic Hoses \(Page 144\).](#)
11. Secure the hydraulic hose(s) to the carrier with the locking pins. Refer to Figure 183.

Removing Attachments

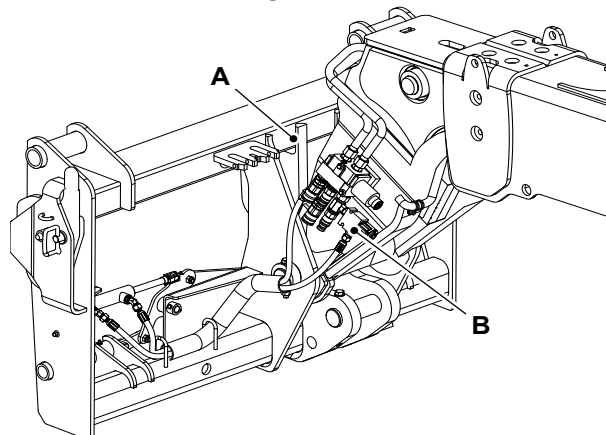
1. Make the machine safe.
[Refer to: Stopping and Parking \(Page 57\).](#)
2. Lower the attachment to the ground.
3. If the attachment is hydraulically operated, disconnect the hoses. Refer to Figure 183.
[Refer to: Connecting/Disconnecting Hydraulic Hoses \(Page 144\).](#)
4. Remove the locking pins to release the attachment hydraulic hoses from the carrier. Refer to Figure 183.
5. Move the lower carrier locking lever to the unlock position to disengage the locking pins. When using the carrier lock plates rotate the hook plate locking levers into their open position and secure them with the upper locking pins. Refer to Figure 183.
6. Start the machine.
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.
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 184.



A Hook plates

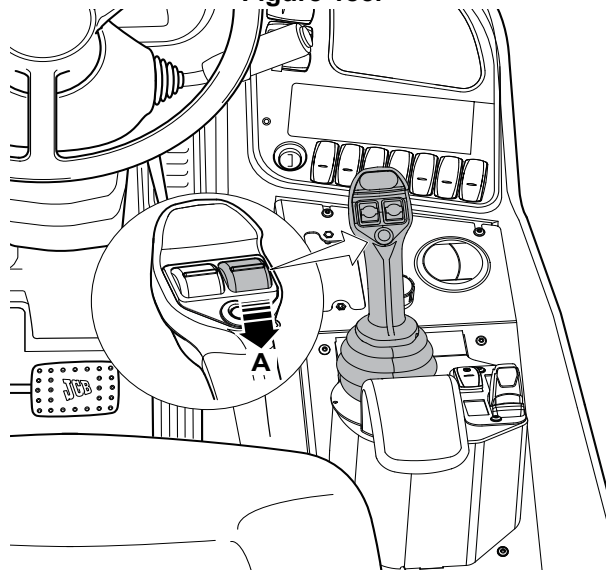
B Hose(s) couplings



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.

Figure 185.



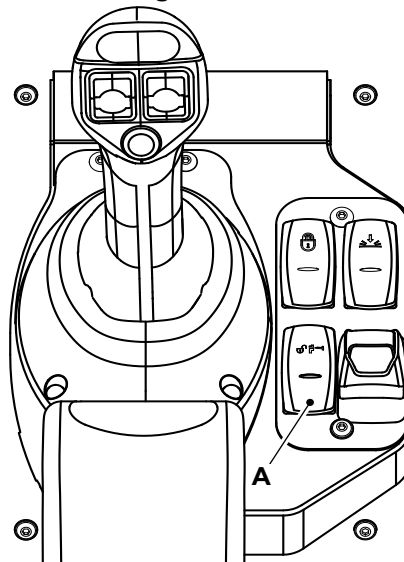
A Backward - engage locking pins



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.
5. Turn on the hitch/auxiliary switch.
6. Hold the pin unlock switch.

Figure 186.



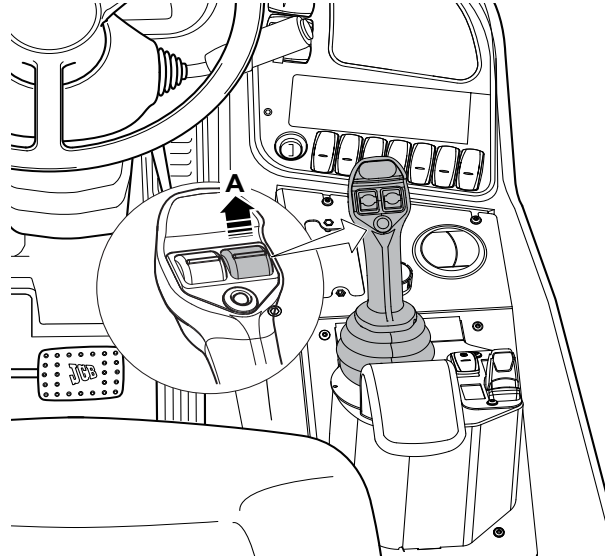
A Unlock switch

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.



Attachments
Quick-fit Carriage

Figure 187.



A Forward - disengage locking pins

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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 installed 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.

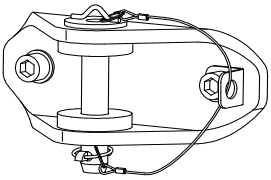

Refer to: [Wheels and Tyres \(Page 281\)](#).

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 22.

Mechanical hitch	MC0		-	-
Hydraulic pick-up hitch	MC1		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

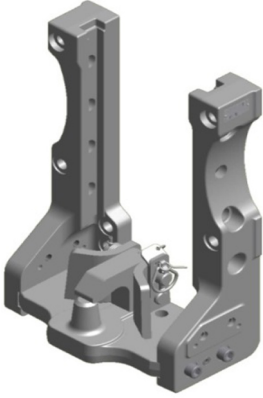
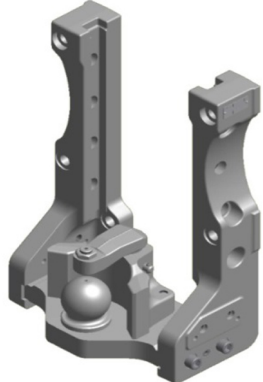
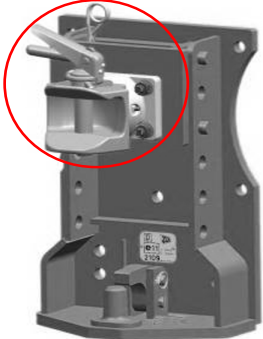


Attachments
Tow Hitches

Rockinger fixed clevis hitch - automatic	MC2		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	400/N3969
Rockinger fixed clevis hitch - manual	MC3		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	400/N4856
Rockinger automatic hitch ø 38mm	MC4 ⁽⁷⁾		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	400/N4884
Rockinger automatic hitch ø 30.6mm	MC5 ⁽⁷⁾		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	400/N4893
Rockinger manual hitch	MC6 ⁽⁷⁾		Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42	400/N4916



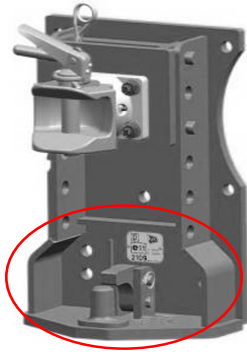

Attachments
Tow Hitches

<p>Rockinger ladder hitch - piton</p>	<p>MC7</p>		<p>Ring (ISO 5692-1:2004) Internal Ø 50, OuterØ110, Section Ø 30</p>	<p>400/N4932</p>
<p>Rockinger ladder hitch - ball</p>	<p>MC8</p>		<p>Socket (ISO 24347) Internal Ø 80, Outer Ø125</p>	<p>400/N4967</p>
<p>Ladder hitch with Rockinger fixed clevis hitch</p>	<p>MC9</p>		<p>Ring (ISO 5692-2:2002) Internal Ø 40, Outer Ø100, Section Ø 42</p>	<p>334/C6937</p>

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Attachments
Tow Hitches

Ladder hitch - piton	MC10		Ring (ISO 5692-1:2004) Internal Ø 50, OuterØ110, Section Ø 30	334/C6932
Rockinger ladder hitch (only)	MC11 ⁽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

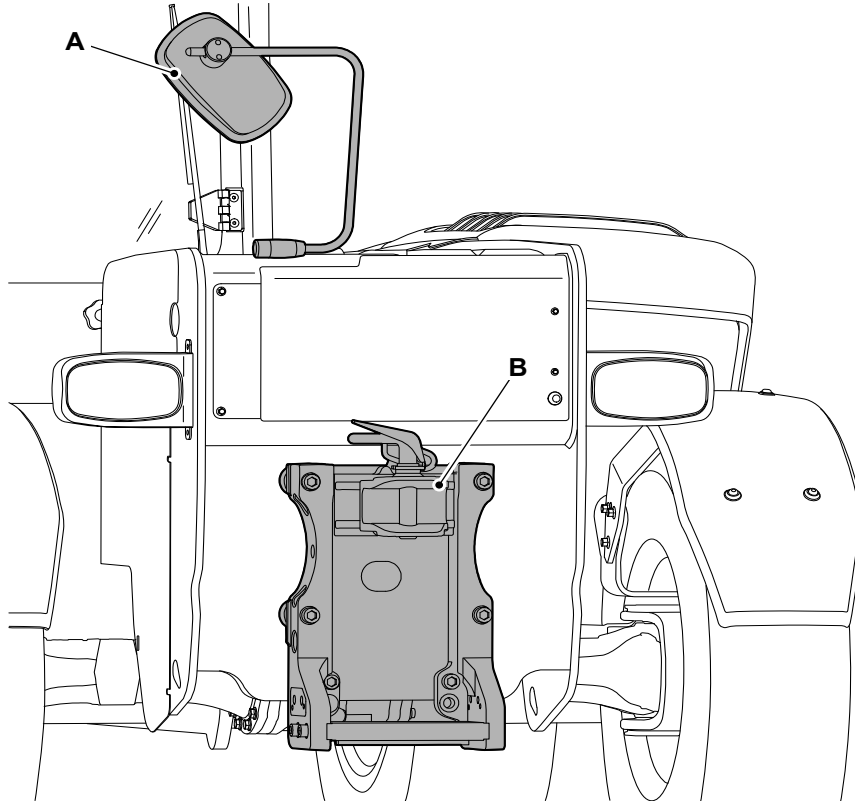
▲ WARNING Ensure that no person is between the machine and trailer when the machine is reversing up to the trailer.

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 188.



A Mirror

B Rocking hitch

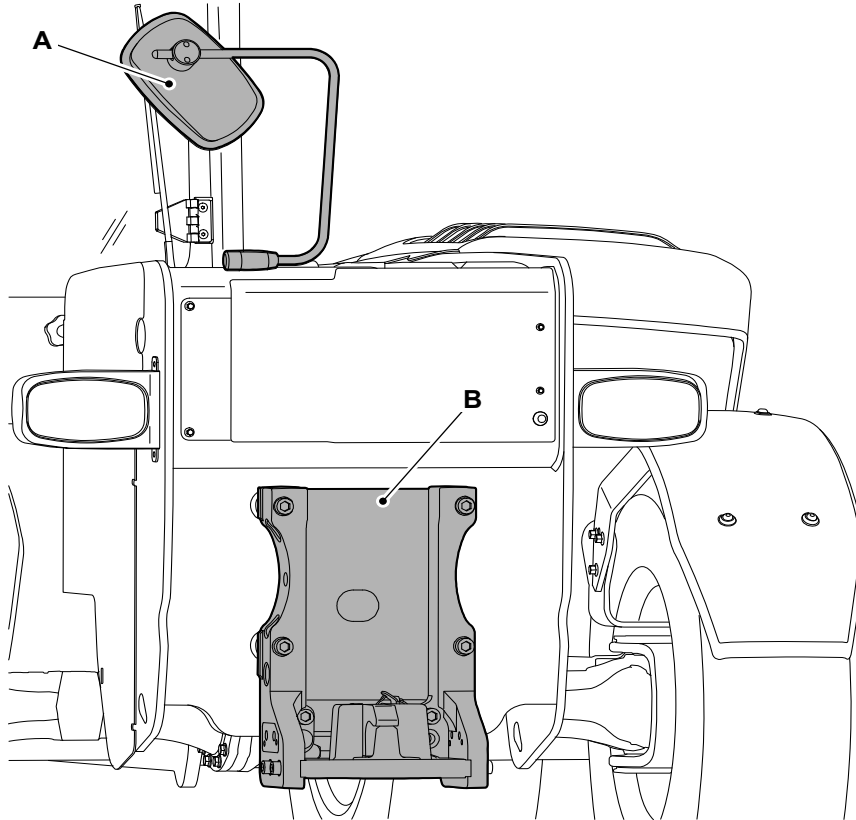
4. Support the hitch and remove the locating pins.
5. The hitch can be moved up or down until the holes for the locating pins align with the holes in the hitch.
6. Install the locating pin and retaining pins.
7. Remove the trailer securing pin.
8. Engage the Trailer:
 - 8.1. Make sure that the trailer 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 machine switched off.
 - 8.4. When the trailer has been engaged, with pin secured in position, the machine operator must not start the machine 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 189.



A Mirror

B Piton hitch

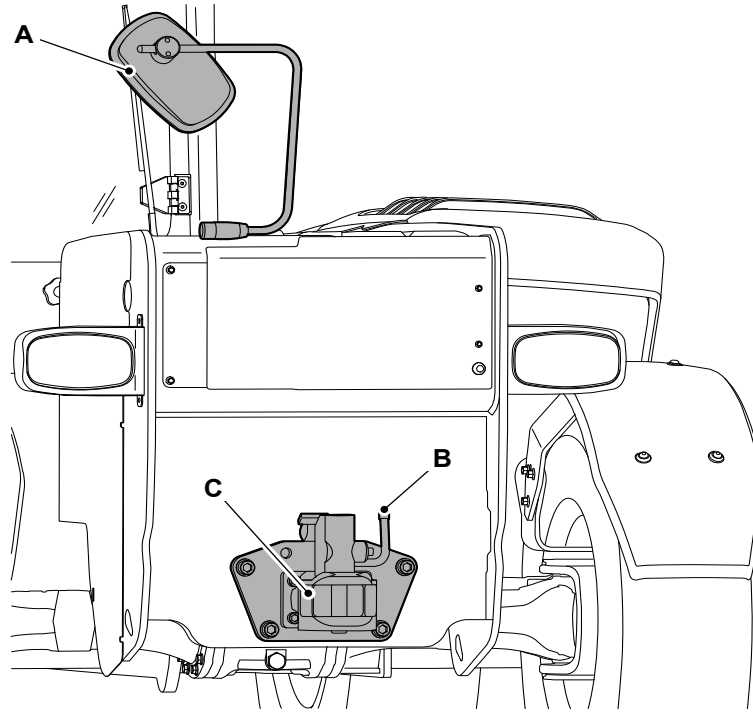
4. Remove the securing arm pin.
5. Lift up the securing arm.
6. Engage the trailer onto the hitch:
 - 6.1. Make sure that the trailer and its draw bars are correctly positioned for engagement before the machine begins to approach it.
 - 6.2. If a helper is available to manoeuvre the trailer he should 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 machine 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 machine 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 190.



A Mirror
C Funnel

B Locking lever

4. Engage the trailer in the funnel:

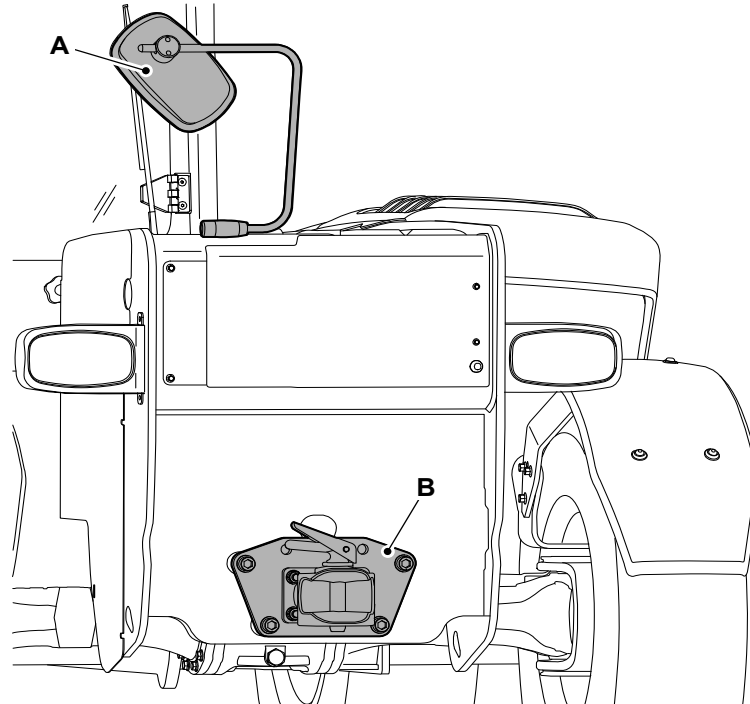
- 4.1. Make sure that the trailer and its draw bars are correctly positioned for engagement before the machine begins to approach it.
- 4.2. If a helper is available to manoeuvre the trailer he should stand well clear of the machine until the tow hitch is correctly aligned with the trailer towing eye.
- 4.3. The helper should not approach the trailer or machine until the machine has been stopped, with the park brake engaged and the machine 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 191.



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 machine switched off.
- 4.4. When the trailer has been engaged, the lever will automatically return to the locked position.

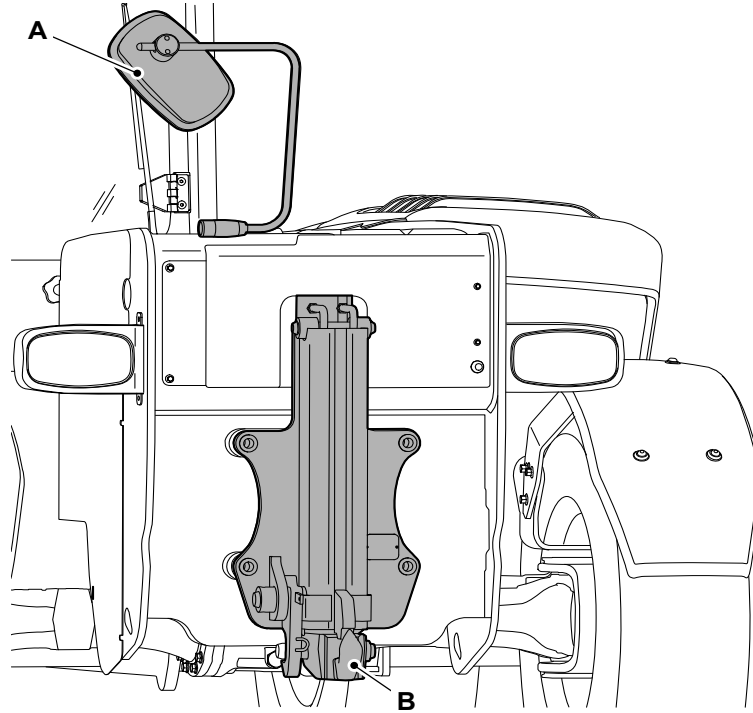
Hydraulic Tow Hitch

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 192.

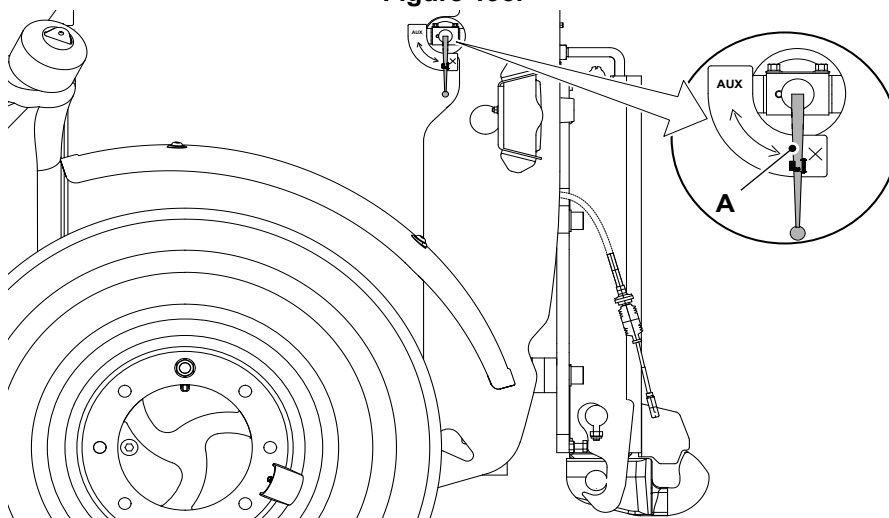


A Mirror

B Locking lever

3. Make sure the auxiliary/hitch switchover lever is in the position shown.

Figure 193.

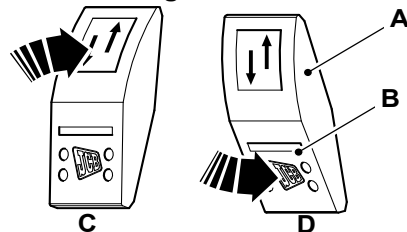


A Auxiliary/hitch switchover lever

4. To select the rear auxiliary circuit, set switch to position I. The switch light should be extinguished.



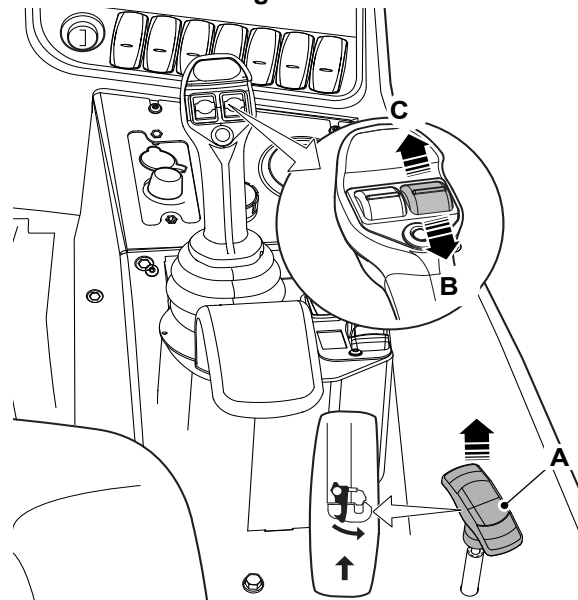
Figure 194.



- A Set switch
- C Position I
- B Switch light
- D Position II

5. Operate the switch to raise the hitch, this will remove the load on locking lever.

Figure 195.



- A Lever
- C Raise the hitch position
- B Lower 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 machine 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 machine until the helper is clear of the machine and trailer.

Mechanical Tow Hitch

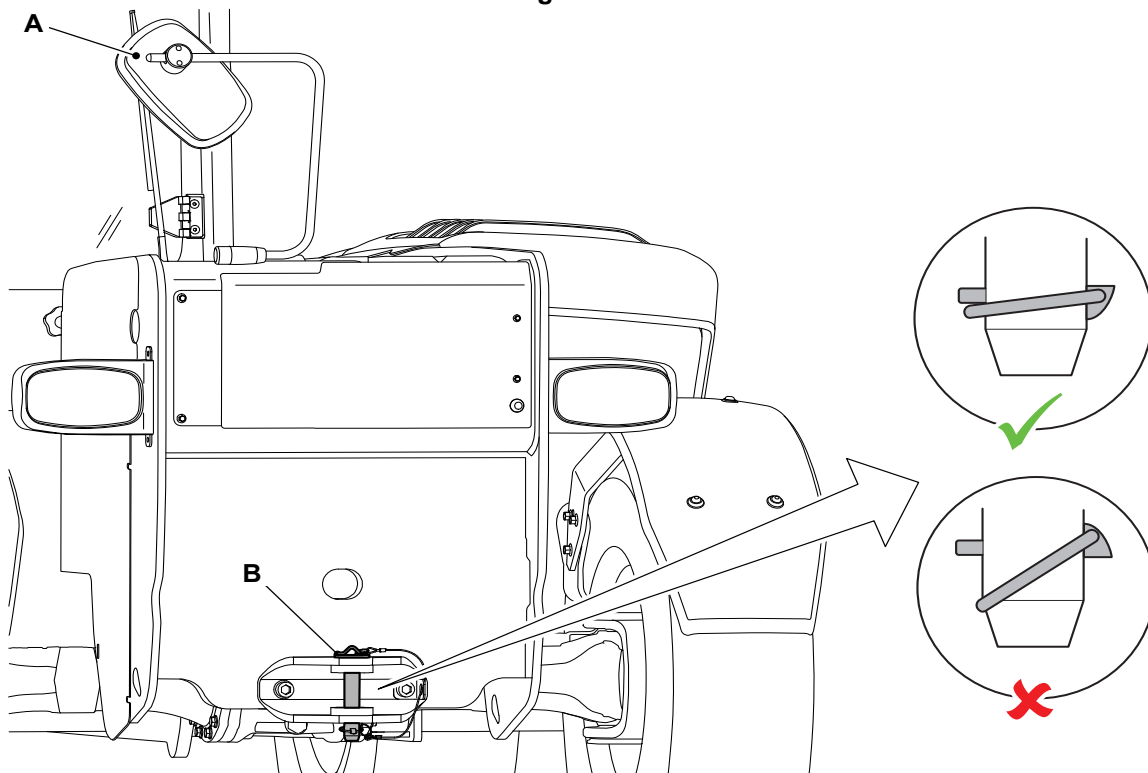
Connecting the Trailer

▲ 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 196.



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 machine switched off.
- 3.4. When the trailer has been engaged, with pin secured in position, the machine operator must not start the machine until the helper is clear of the machine and trailer.



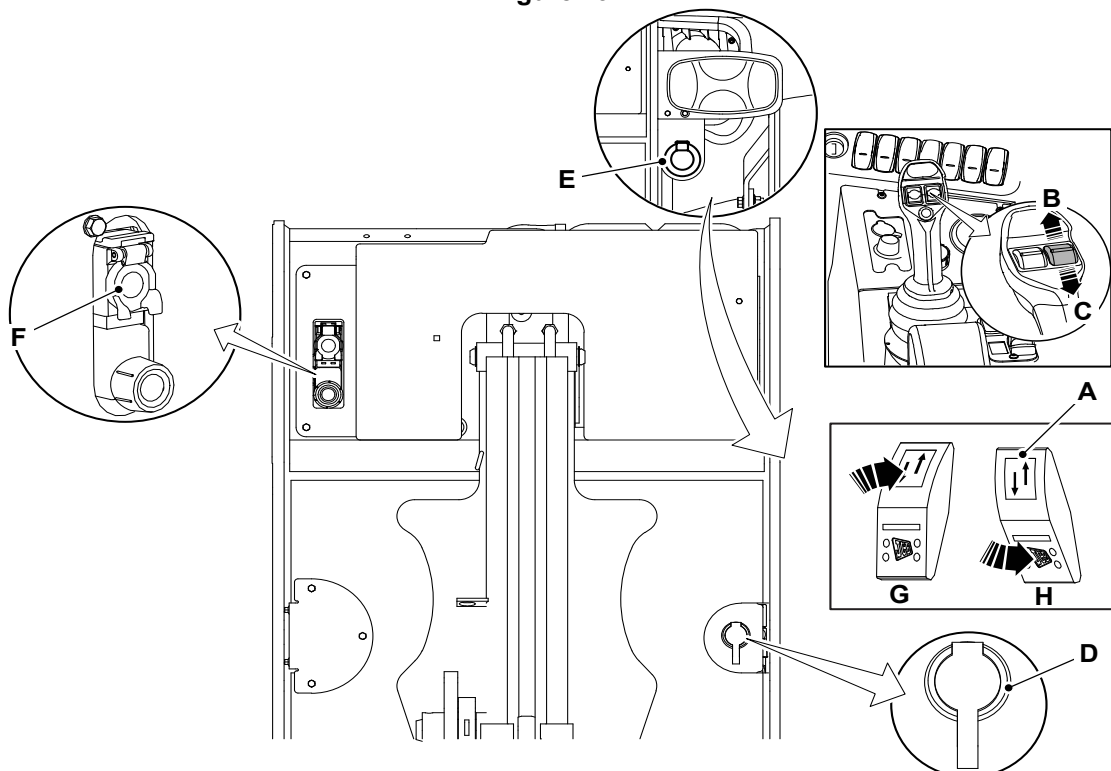
Prepare the Trailer for Towing

▲ 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 197.



- | | |
|---------------------------------------|--------------------------------------|
| 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.



Attachments
Tow Hitches

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.

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Jibs

General

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.

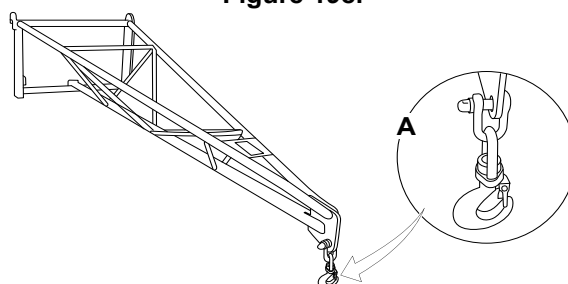
Extension Jib

▲ 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: [Working with the Boom \(Page 118\)](#).

Figure 198.



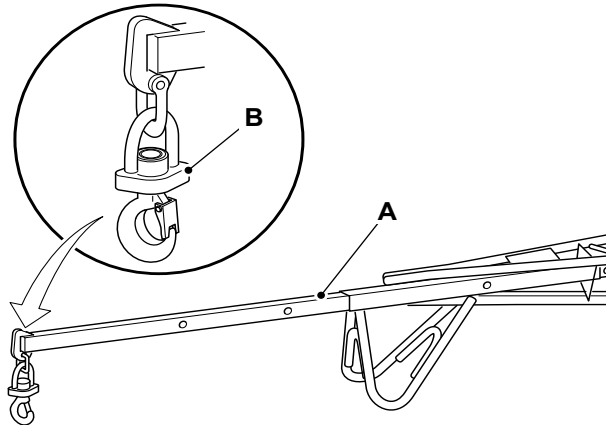
Extension jib



Roof Truss Jib

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.

Figure 199.



A Roof truss jib

B Hook

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 relevant regulations. Wear gloves and safety shoes.

The installation will be easier if the attachment is rested on wooden blocks.

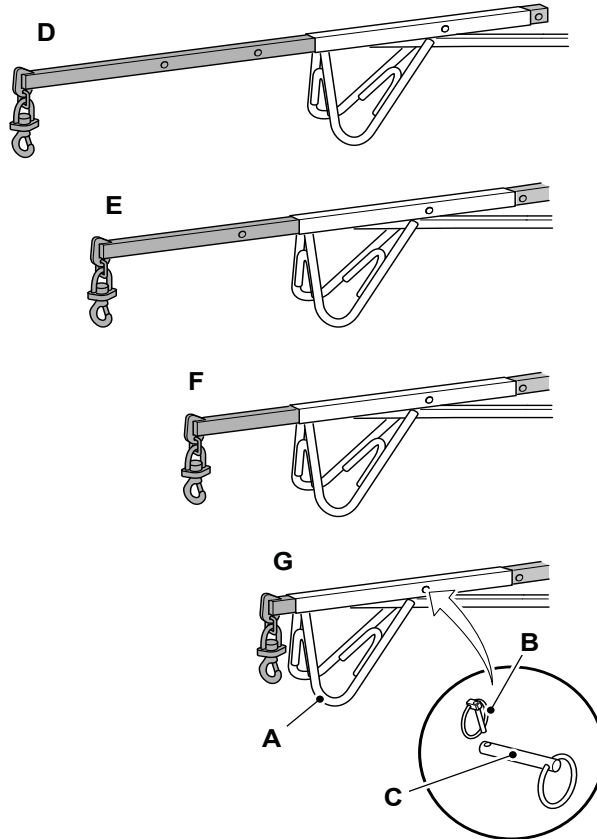
Store the attachment carefully to prevent damage and corrosion.

Extending the Jib

The jib may be extended to one of four positions:



Figure 200.



- | | |
|---|--|
| <p>A Skid
C Pin
E Jib- extended position 1
G Jib- fully retracted</p> | <p>B Lynch pin
D Jib- fully extended
F Jib- extended position 2</p> |
|---|--|

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.

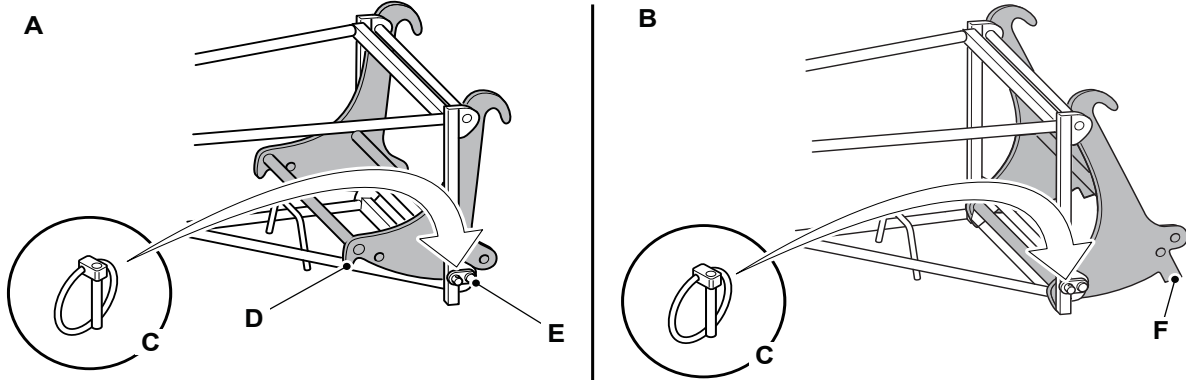
Changing the Jib Angle

The angle of the jib may be set in one of two positions.

- Placing position
- Travel position



Figure 201.



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.



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.

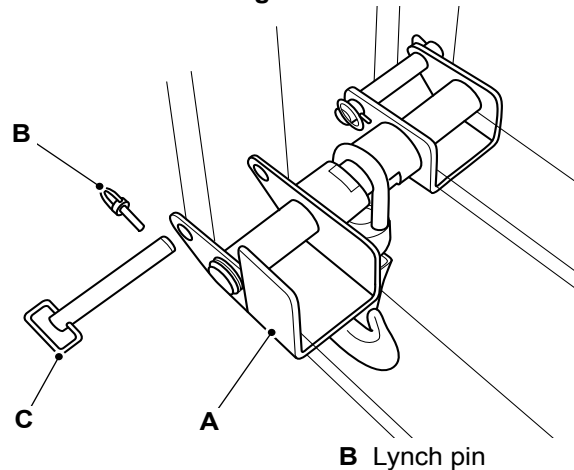
JCB supply integrated work platforms solely for use in Europe which comply with the requirements of European Directive 2006/42/EC. Contact your dealer for further details. Health and safety legislation also varies from territory to territory. Customers should check the latest health and safety legislation for the territory in which the work platform is to be used prior to operation.



Hooks

Fork-Mounted Hook

Figure 202.



A Mounting sockets
C Locking bar

B Lynch pin

Remove

1. Make the machine safe.
2. Lower the attachment so that it just clears the ground.
3. Apply the park brake and stop the machine.
4. Remove the attachment.
 - 4.1. Remove the lynch pin and locking bar.
 - 4.2. Carefully slide the attachment off the forks.
 - 4.3. Install the locking bar and secure with lynch pin.
 - 4.4. Store the attachment carefully to prevent damage and corrosion.

Install

1. Space the forks, equally on either side of the machine centreline, so that the mounting sockets can be slid onto them.
2. Tighten the fork clamping screws to prevent movement.
3. Install the attachment.
 - 3.1. Remove the lynch pin and locking bar.
 - 3.2. Slide attachment over the forks so that the rear of the attachment butts against the heels of the forks.
 - 3.3. Install the locking bar and secure with lynch pin.
 - 3.4. Make sure that both mounting brackets are installed securely.



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.

WARNING Airborne particles of light combustible material such as straw, grass, wood shavings, etc. must not be allowed to accumulate within the engine compartment or in the propshaft guards (when installed). Examine these areas frequently and clean at the beginning of each work shift or more often if required. Before opening the engine cover, make sure that the top is clear of debris.

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 operator station. The use of water or steam could damage the machine electrics 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 Schedules \(Page 206\).](#)

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 batteries and other electrical 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.

Use a low pressure washer and brush to remove dried mud or dirt.

Use a steam cleaner to remove soft dirt and oil.

When cleaning around decals:

- Ensure the water pressure is kept below 138bar (2,001.5psi).
- Keep water temperature below 80°C (176°F).



Preservation and Storage
Cleaning

- Use a spray nozzle with a 40° wide angle spray pattern.
- Keep the nozzle at least 300mm (11.81 in) away from and perpendicular (at 90° degrees) to the decal.

The machine must always be greased (if appropriate) after pressure washing or steam cleaning.

Preparation

1. Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
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 Schedules \(Page 206\).](#)

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Storage

General

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

Storage Area

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

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

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

Prepare the Machine for Storage

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

Put into Storage

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

During Storage

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

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

**Preservation and Storage**
Storage

3. Examine all fluid levels. If necessary, add more fuel.
4. Install a charged battery.
5. Start the engine.
6. Operate the hydraulic controls. Make sure that the hydraulic functions operate correctly.
7. Prepare the machine for storage.

Take out of Storage

1. Examine the coolant condition. Replace if necessary.
2. Examine all fluid levels. If necessary replace the fluid or 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 and maintenance, as specified in this manual, are done 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.

After completing any routine servicing, maintenance or repairs you must complete the functional checks according to the maintenance schedule.

This section of the manual gives full details of the service requirements necessary to maintain your JCB machine at peak efficiency.

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. JCB dealer service engineers have been trained by JCB to do such specialist tasks, and 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 to safely service the machine to the latest requirements, which makes them best placed to maintain and service your machine.

A service record sheet or book is provided at the back of this publication 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 dealer's 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.

It is machine owner's responsibility to ensure that the maintenance is carried out properly in accordance with the requirement of this manual.



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, they could cause compatibility issues, malfunctions or failures. The health and safety of the operator and bystanders could be compromised.

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: 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.

Air Tanks

The air tank contains air at high pressure. Prior to any work being carried out the Air Trailer Brake System, the system pressure must be discharged by a JCB dealer, as the sudden release of the air may cause serious injury or death.

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.

You must stop the machine operation, isolate the controls and turn off the engine when persons are required to interact with the machine.

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 Trichloroethane 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 0.6 m.

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 serious injury or death.

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, 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®, Fluorel™ 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 (572 °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 (572 °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 fluoroelastomeric 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 or death.

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 suitable closed receptacle and must be disposed of in accordance with local environmental waste regulations.

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

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



Handling

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

New Oil

There are no special precautions needed for the handling or use of new oil, beside the normal care and hygiene practices.

Used Oil

Used engine crankcase lubricants contain harmful contaminants.

Here are precautions to protect your health when handling used engine oil:

- Avoid prolonged, excessive or repeated skin contact with used oil
- Apply a barrier cream to the skin before handling used oil. Note the following when removing engine oil from skin:
 - Wash your skin thoroughly with soap and water
 - 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 203.



- A Keep away from children
C No smoking, no naked flames, no sparks
E Battery acid

- B Shield eyes
D Explosive gas
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.

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.



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 firm, level ground.

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

WARNING All scheduled and routine maintenance/daily tasks should be conducted with the machine cool. Checking or servicing a hot machine could lead to injury.

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

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

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

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

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

How to Use the Maintenance Schedules

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

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

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

Table 23.

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

Maintenance Intervals

Table 24.

Interval (h)	Calendar Equivalent
10	Daily
50	Weekly
100	Monthly
500	Yearly
2000	Two Years



Pre-start Cold Checks, Service Points and Fluid Levels

Table 25.

Component	Task	10	50	100 (1)	500	1,000	2,000
Attachments							
Condition	Check/clean	○	○	□	□	□	□
Attachment - Fit and Security	Check	○	○	□	□	□	□
Carriage lock pins	Lubricate		○	□	□	□	□
Tow Hitch Mount Security	Check			□	□	□	□
Tow Hitch Wear	Check				□	□	□
Body and Framework							
Window washer fluid level	Check (level)	○	○	□	□	□	□
Wing mirrors condition and security	Check (condition)	○	○	□	□	□	□
Seat, seat belt	Check (condition)	○	○	□	□	□	□
All pivot pins	Lubricate		○	□	□	□	□
Extension ram pivot pin ⁽⁹⁾	Grease					□	□
Control lever linkages	Lubricate		○	□	□	□	□
Bonnet hinges	Lubricate			□	□	□	□
Wear pad condition and security (re- place if required)	Check/Adjust		○	□	□	□	□
Wear pad runways	Waxoyl			□	□	□	□
Wear pad clearance	Check/Adjust			□	□	□	□
Boom hoses	Lubricate				□	□	□
General machine condition/security	Check		○	□	□	□	□
Cab heater fresh air filter ⁽⁴⁾	Change				□	□	□
Cab re-circulation filter ⁽⁴⁾	Change				□	□	□
ROPS (Roll-Over Protective Struc- ture)/FOPS (Falling Object Protective Structure) Structure	Check (condition)	○	○	□	□	□	□
Fire extinguisher (if installed)	Check (condition)	○	○	□	□	□	□
Engine compartment ⁽⁴⁾	Check/clean debris		○	□	□	□	□
Brakes							
Brake system fluid level	Check (level)	○	○	□	□	□	□
Brake Shoes	Check (condition)			□	□	□	□
Brake system fluid ⁽⁶⁾	Replace						□
Electrics							
Longitudinal Load Moment Control	Calibrate			□	□	□	□
Battery charge and condition	Check			□	□	□	□
Battery terminals - condition and tight- ness	Check			□	□	□	□
Wiring - Chaffing and Routing	Check			□	□	□	□
Engine							
Oil	Check (Leaks)	○	○	□	□	□	□



Maintenance
Maintenance Schedules

Component	Task	10	50	100 (1)	500	1,000	2,000
Oil	Check (level)	○	○	□	□	□	□
Oil and Filter ^(3, 10)	Replace				□	□	□
All hoses	Check (condition)	○	○	□	□	□	□
Air conditioning compressor Belt - condition and tension	Check		○	□	□	□	□
FEAD (Front End Accessory Drive) Belt condition/tension	Check (condition)		○	□	□	□	□
FEAD Belt ⁽¹¹⁾	Replace						
Engine mounting bolts - security	Check (condition)			□	□	□	□
Air Filter							
Air intake hose - condition/security	Check (condition)	○	○	□	□	□	□
Air filter (dust valve) ⁽⁴⁾	Clean			□	□	□	□
Air filter (outer) ⁽⁴⁾	Replace				□	□	□
Air filter (inner) ⁽⁴⁾	Replace						□
Fuel system							
Filter/water separator	Replace				□	□	□
Fuel lines hoses integrity	Check (condition)			□	□	□	□
Fuel filter/water separator	Clean (drain)		○	□	□	□	□
Engine fuel filter ⁽⁵⁾	Replace					□	□
Fuel system	Check (leaks)	○	○	□	□	□	□
Cooling System							
Coolant	Check (leaks)	○	○	□	□	□	□
Coolant	Check (level)	○	○	□	□	□	□
Coolant	Replace						□
Coolant hoses	Check (condition)			□	□	□	□
Cooling pack ⁽⁴⁾	Clean		○	□	□	□	□
Hydraulics							
Oil	Check (level)	○	○	□	□	□	□
Hydraulic oil filter	Replace				□	□	□
Oil ⁽⁶⁾	Sample					□	
Oil	Replace						□
Rams, Hoses and Pipework - Damage and Leaks	Check		○	□	□	□	□
Pilot (servo) filter and seal	Replace				□	□	□
Suction strainer	Replace						□
Transmission							
Axle oil (include hubs when applicable) ⁽⁶⁾	Check (level)		○	□	□	□	□
Axle oil (include hubs when applicable) ⁽²⁾	Replace				□	□	□
Drive shafts	Security/Grease				□	□	□
Steer axle movement/shimming ⁽⁶⁾	Check			□	□	□	□



Maintenance
Maintenance Schedules

Component	Task	10	50	100 (1)	500	1,000	2,000
Axle pivot and steering joints	Grease			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cylinders - Chrome condition	Check (condition)				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wheels and Tyres							
Tyre pressures	Check (condition)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wheel nuts security	Check (condition)		<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wheel alignment	Check (condition)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- (1) First 100h service only, to be completed by your JCB Dealer.
- (2) Replace at first 500h service, then every subsequent 1,000h service.
- (3) If operating under arduous conditions, change every 250h
- (4) More frequently in dusty environments
- (5) If the engine is difficult to start or the engine has poor performance, fit new filters.
- (6) Jobs which should be done by a specialist.
- (8) Inspect magnetic plug for debris, if necessary change oil.
- (9) Only grease extension ram every 1,000h hours.
- (10) The oil service interval will be affected if there is a high sulphur content in the fuel. Refer to Fuel System for more information.
- (11) Replace every 5,000h. If heavy application every 2,000h

Functional Tests and Final Inspection

Table 26.

Component	Task	10	50	100 (1)	500	1,000	1,500	2,000
Body and Framework								
General	Check (condition)		<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seat/seat belts	Check (condition)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inclinometer (if installed) ⁽²⁾	Check (condition)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air conditioning (if installed)	Check (condition)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Glazing	Check (leaks)			<input type="checkbox"/>				
Forks	Check (condition)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Engine								
Idle and maximum speed	Check (operation)				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General	Check (condition)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydraulics								
Services	Check (operation)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hose burst protection valves (if installed)				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MRV (Main Relief Valve) pressure ⁽²⁾	Check (operation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ARV (Auxiliary Relief Valve) pressure ⁽²⁾	Check (operation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attachment operation/re-mote servo (if installed)	Check (operation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parallel lift/lower	Check (operation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Steer circuit MRV pressure ⁽²⁾	Check (operation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Maintenance
Maintenance Schedules

Component	Task	10	50	100 (1)	500	1,000	1,500	2,000
Fan motor speed (if installed) ⁽²⁾	Check (operation)				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Piston rod chrome	Check (operation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brakes								
Foot brake	Check (operation)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Park brake	Check (operation)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transmission								
Steering	Check (operation)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transmission	Check (operation)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forward/reverse gear	Check (operation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High/low speed	Check (operation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Neutral start	Check (operation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Varispeed control knob	Check (operation)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrics								
Alternator - output ⁽²⁾	Check (condition)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All electrical equipment	Check (operation)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LMI (Load Moment Indicator) ⁽²⁾	Check (condition)	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(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

▲ 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 firm, level ground.

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

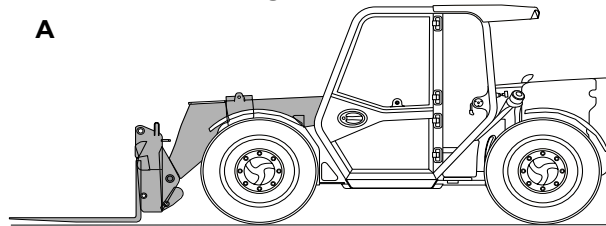
WARNING Make the machine safe before getting beneath it. Make sure that any attachments on the machine are correctly attached. Engage the park brake, remove the ignition key, isolate the battery.

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 204.



A Boom lowered

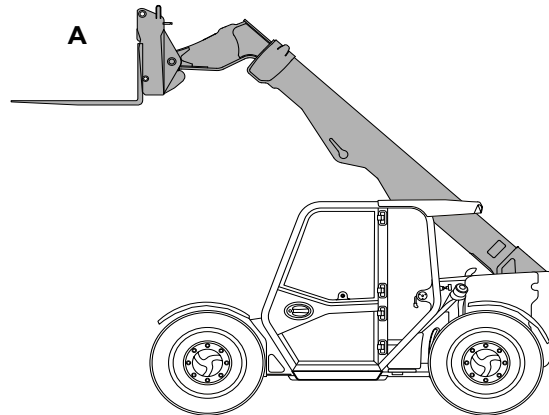
1. Park the machine on level, solid ground.
2. Lower the boom.
3. Put the attachment flat on the ground.
4. Stop the engine and remove the starter key.
5. Disconnect the battery to prevent accidental operation of the engine.
6. Make sure there are no loose articles in the enclosure.
7. If necessary, 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 205.

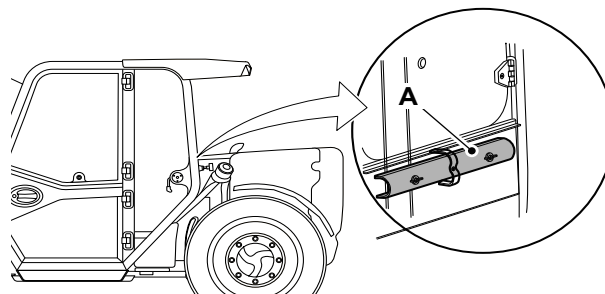


A Boom raised

Installing the Maintenance Strut

1. Park the machine on level, solid ground.
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 206.

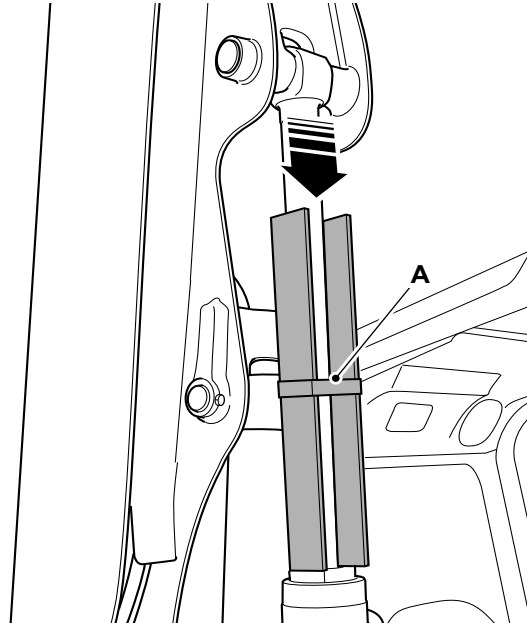


A Maintenance strut

6. Install the maintenance strut.
7. Place the strut around the lift ram piston rod. Secure it in position with the strap.



Figure 207.



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.
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.

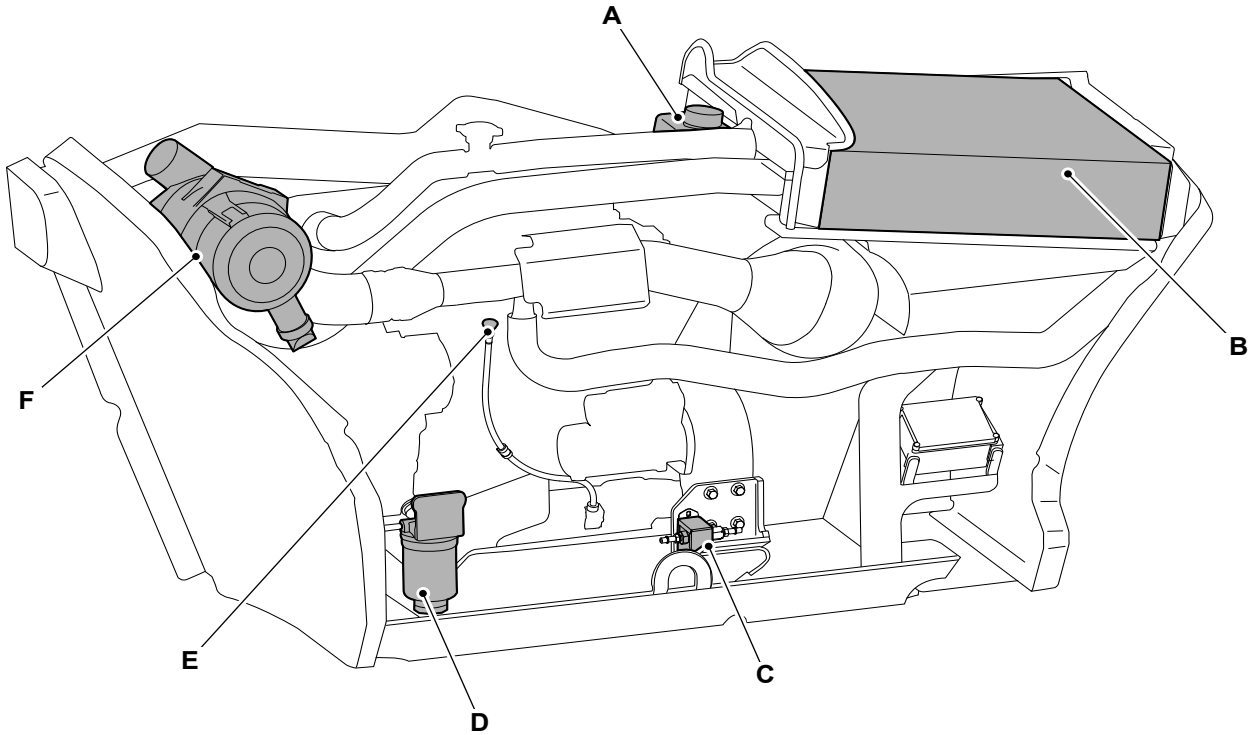


Service Points

General

Engine Compartment

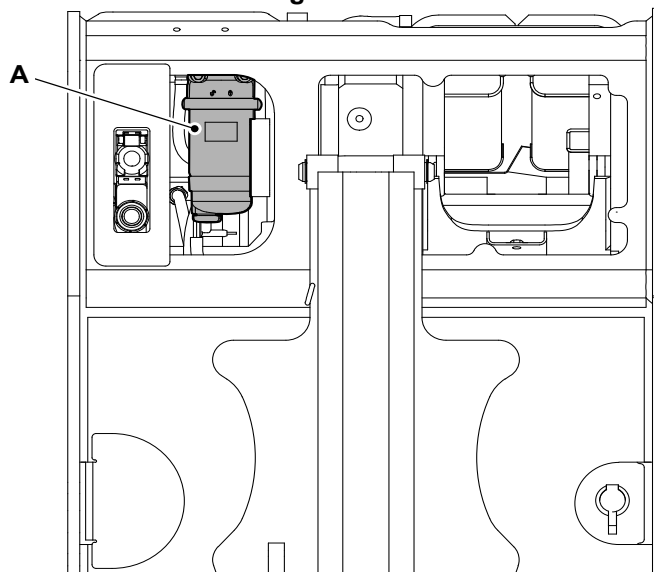
Figure 208.



- A Coolant expansion tank
- C Fuel pump
- E Engine oil dipstick

- B Radiator
- D Engine fuel filter
- F Air filter

Figure 209.



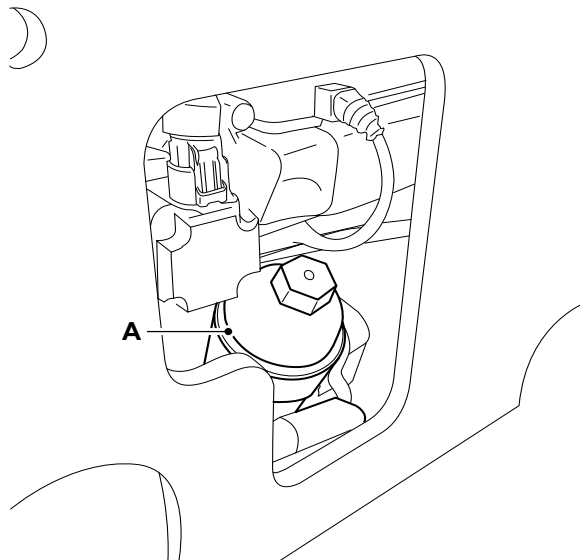
- A Fuel filter



Engine Oil Filter

Lift the boom to access the oil filter.

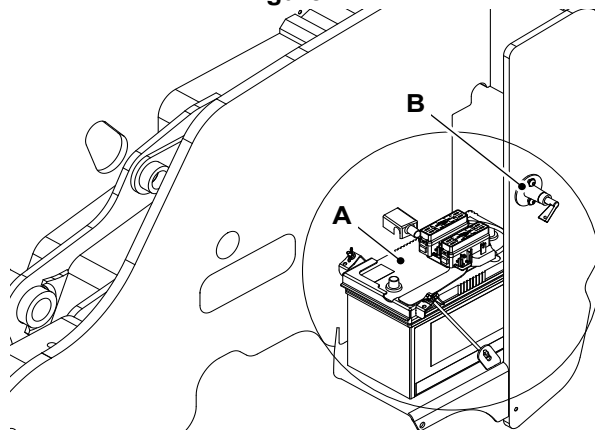
Figure 210.



A Engine Oil filter

Battery Compartment

Figure 211.



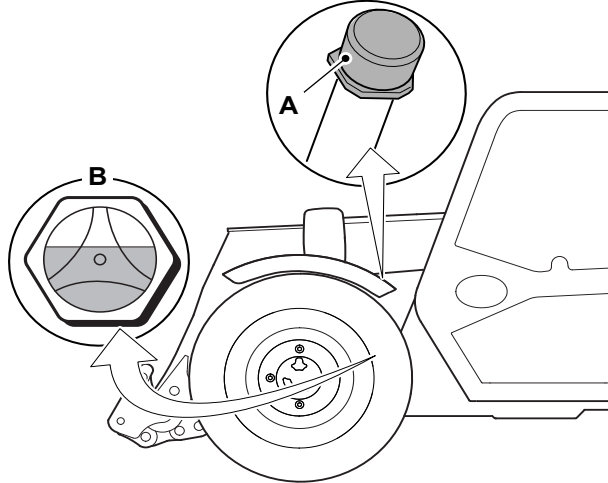
A Battery

B Battery isolator



Hydraulic Oil Level Indicator

Figure 212.

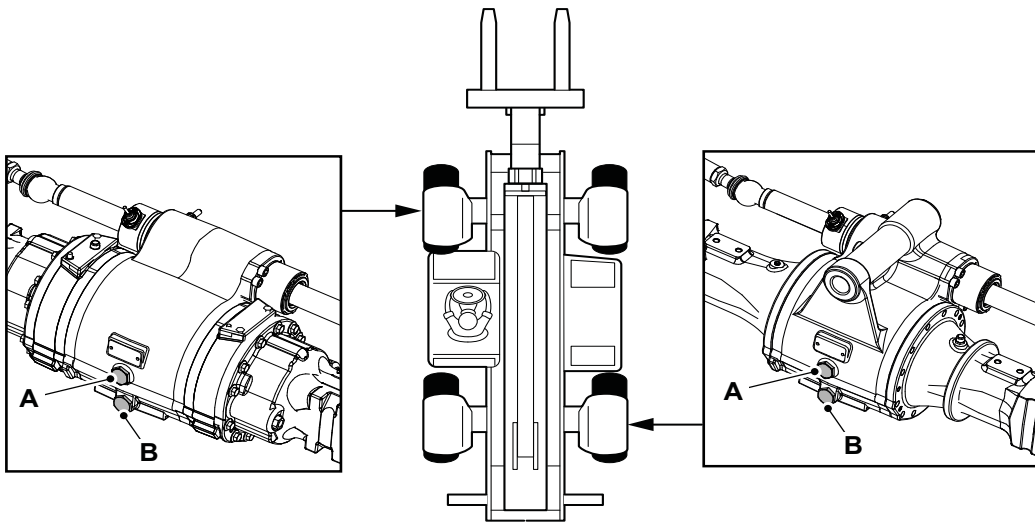


A Hydraulic tank filler cap

B Hydraulic oil level indicator

Axles

Figure 213.



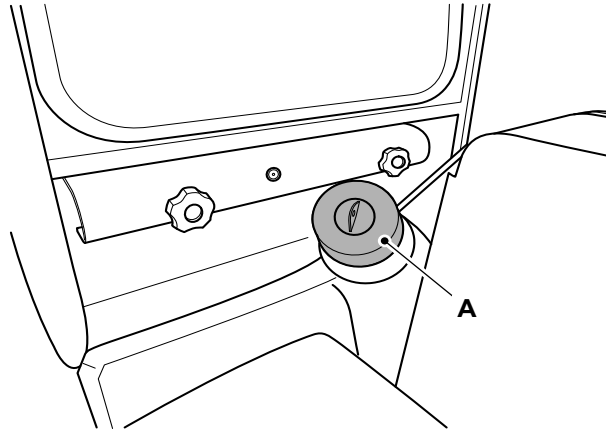
A Axle fill/level plug

B Beneath plug



Filling the Fuel Tank

Figure 214.



A Fuel cap

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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

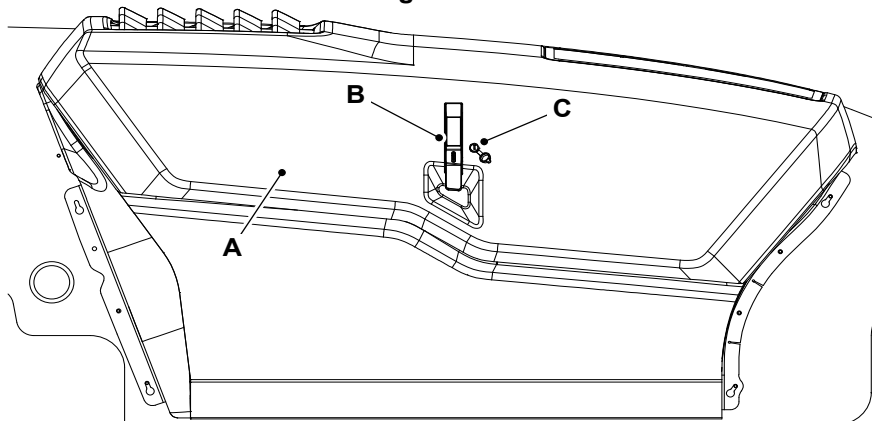
▲ WARNING The engine has exposed rotating parts. Switch off the engine before working in the engine compartment. Do not use the machine with the engine cover open.

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 215.



A Engine cover
C Lock

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

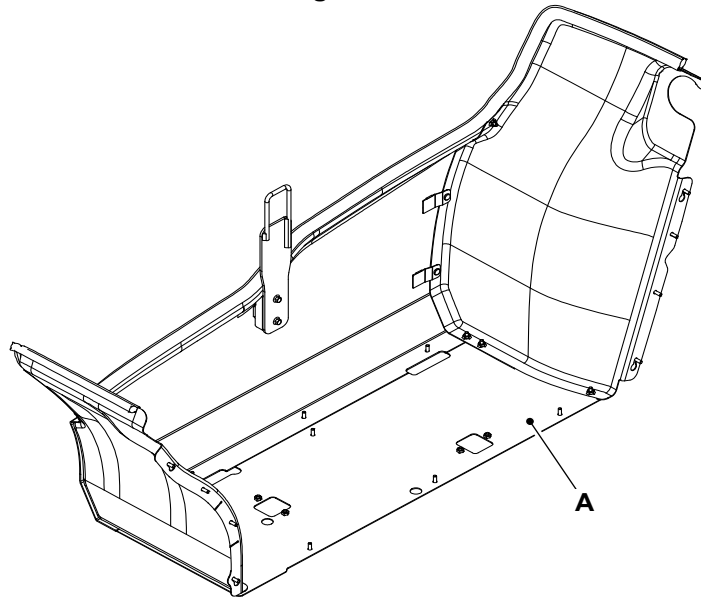
▲ WARNING You will be working close into the machine for these jobs. Lower the attachments. Remove ignition key and isolate service disconnecter. This will prevent the engine being started.

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 216.



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

All tools must be kept in the toolbox (if installed) when not in use.

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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.

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 isolate service disconnect. 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

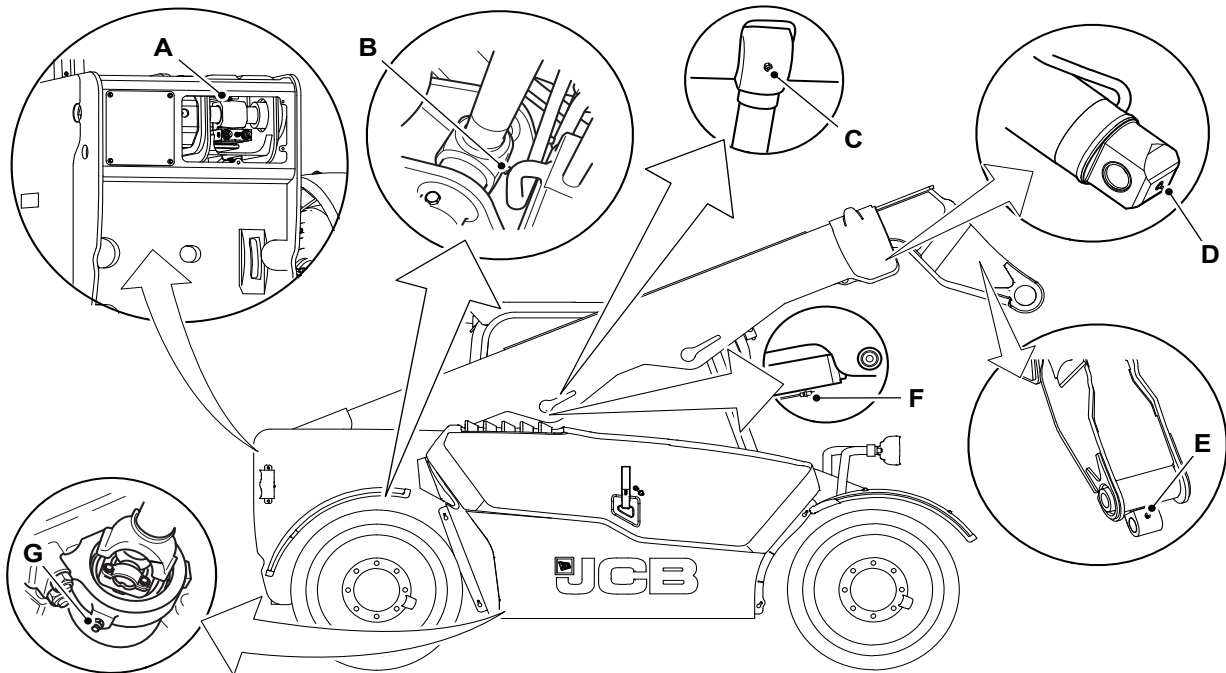
Lubricate

Make the machine safe.

Refer to: [Maintenance Positions \(Page 211\)](#).

Apply grease to all the points and linkages.

Figure 217.





Operator Station

General

Clean

- ▲ **Notice:** Never use water or steam to clean inside the operator station. The use of water or steam could damage the machine electrics and render the machine inoperable. Remove dirt using a brush or damp cloth.

Remove debris and loose articles from inside the operator station.

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 Positions \(Page 211\).](#)
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: Torque Values \(Page 275\).](#)

Seat

Check (Condition)

1. Check that the seat adjustments operate correctly.
2. Check the seat is undamaged.
3. Check the seat mounting bolts are undamaged, correctly installed and tight.
4. Make sure the seat is clear from unwanted materials and hazards at all times.

Seat Belt

Check (Condition)

- ▲ **WARNING** When a seat belt is checked for condition if it is damaged, if the fabric is worn, or if the machine has been in an accident, replace it with a complete seat belt assembly.

WARNING The seat belt life can be reduced by many factors such as severe working conditions, high usage, humidity, dust, chemicals and atmospheric conditions. Where the seat belt is exposed to any of these conditions it should be inspected more frequently than that specified in the maintenance schedules.

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.

1. Make sure the seat belt can be adjusted.
2. Examine the seat belt for signs of fraying and stretching.

**Maintenance**
Operator Station

3. Check that the stitching is not loose or damaged.
4. Check that the belt mounting bolts are undamaged, correctly installed and tight.
5. 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.

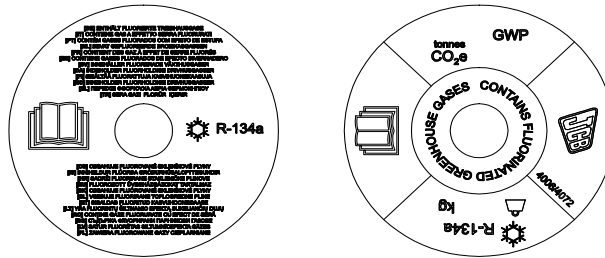


Heating, Ventilating and Air-Conditioning (HVAC)

General

When the air-conditioning cooling performance becomes reduced the system may need recharging by a specialist. A label on the refrigerant recharge connection specifies details of the system.

Figure 218.



The air conditioning system contains fluorinated greenhouse gas R134a of quantity described in this manual. Refer to: [Fluids, Lubricants and Capacities \(Page 269\)](#).

R134a Refrigerant

Refrigerants are the basic ingredient of all air conditioning systems and are used to transfer the heat energy around the system. Refrigerant type R134a is used in the air conditioning system. It's full chemical name is:

1, 1, 1, 2-Tetraflouroethane (CH₂FCF₂)

R134a is a HFC (Hydrofluorocarbon) and is non-toxic, non-flammable and non-explosive at normal atmospheric temperature and pressure. It can be flammable under certain pressure and air mixtures.

Due to environmental concerns, the use of ozone depleting chlorofluorocarbons (CFCs) in the air conditioning systems is being gradually phased out. The R12 refrigerant used in some systems contains CFCs. Air conditioning systems using R134a refrigerant are not compatible with systems using R12 refrigerant. No attempt should be made to charge R134a systems with R12 refrigerant.

Good installation practice is required to avoid the release of refrigerant into the atmosphere. Refrigerant R134a contains no chlorine and has an Ozone Depleting Potential (ODP) of zero, and a Global Warming Potential (GWP) of 1,430.

The air-conditioning system on the 3CX is charged with 1.3kg of R134a refrigerant.

PAG Type Refrigerant Oil

The system requires a PAG (Polyalkylene Glycol) type refrigerant oil to lubricate the compressor. The oil mixes with the refrigerant and is carried around the system.

It is important that the recommended grade of refrigerant oil is used. Mineral oil is not suitable for R134a refrigerant systems. Do not mix oil types.

The compressor is supplied with an oil charge, but additional oil will be required when the receiver drier is replaced. The oil is added to the compressor through the oil filling plug before the evacuation procedure is started.

Only use fresh, unused oil. Oil that has been exposed to the air will have absorbed water.



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.
[Refer to: Maintenance Positions \(Page 211\).](#)
2. Get access to the engine compartment (if applicable).
[Refer to: Access Apertures \(Page 218\).](#)
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 maximum level of engine oil in the sump. If the maximum is exceeded, the excess must be drained to the correct level. An excess of engine oil could cause the engine speed to increase rapidly without control.

1. Make the product safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
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: Access Apertures \(Page 218\).](#)
4. Remove and clean the dipstick.
[Refer to: Service Points \(Page 214\).](#)
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: [Service Points \(Page 214\)](#).

- 8.2. Add the recommended oil slowly through the filler point

Refer to: [Fluids, Lubricants and Capacities \(Page 269\)](#).

- 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 maximum level of engine oil in the sump. If the maximum is exceeded, the excess must be drained to the correct level. An excess of engine oil could cause the engine speed to increase rapidly without control.

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.

CAUTION The oil filter canister will contain some oil which could spill out when you remove the canister.

1. Make the machine safe with the boom in the raised position.
Refer to: [Maintenance Positions \(Page 211\)](#).
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 access panel under the boom to gain access to the oil filter.
Refer to: [Service Points \(Page 214\)](#).
7. Remove the cap from the oil filter housing (if applicable).
8. Remove and discard the oil filter cartridge.
9. Fit a new filter with new gaskets.
10. Fit and tighten the cover on the oil filter housing (if applicable). Tighten the cover to the correct torque value.
11. Fit and secure the access panel under the boom.
12. Add the correct specification and quantity of oil.
13. Check the oil level.
14. Install the oil filler cap.
15. Close and secure the engine cover.
16. 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.



17. Check for leaks.
18. Check the oil level when the oil has cooled.
 - 18.1. Fill with clean engine oil, if necessary.

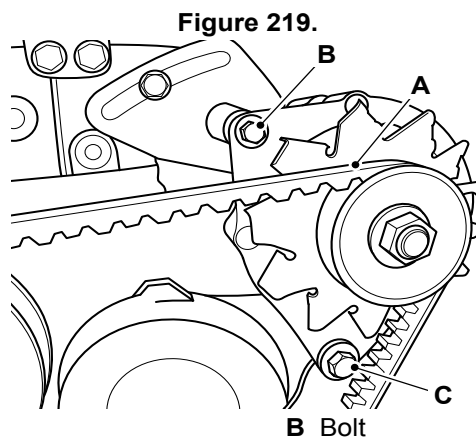
Front End Accessory Drive (FEAD) Belt

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.
2. Get access to the drive belt.
[Refer to: Access Apertures \(Page 218\).](#)
3. The belt should have the required length of slack at the longest part of the belt.
Length: 7mm



- A Fan belt
- C Bolt

B Bolt

Adjusting the Fan Belt

1. Loosen the bolts which secure the alternator. Refer to Figure 219.
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 install 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.

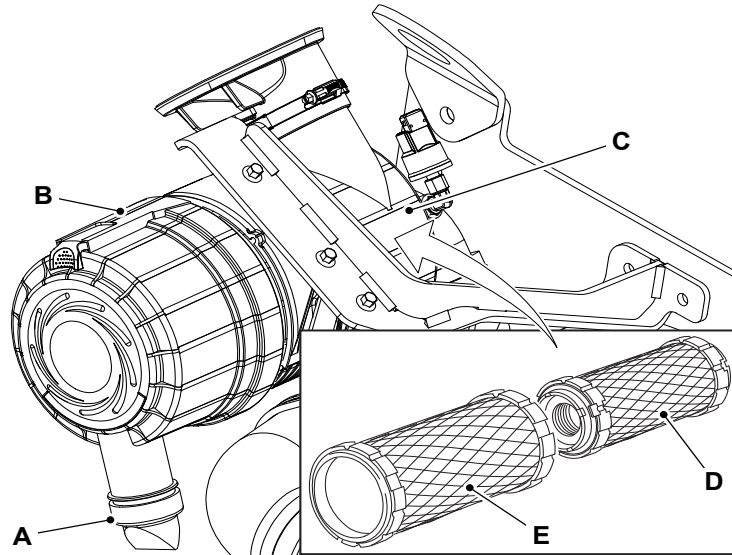
Do not attempt to clean or wash the elements - they must only be renewed.

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 cover assembly.
3. Remove the main element. Take care not to tap or knock the element.
4. If the inner element is to be changed, remove the safety element.
5. Clean the main element housing.
6. Make sure that the aspirator hose is securely installed and is in good condition.
7. Put the new inner element and main element into the housing. Push them firmly in so that they seated correctly.



Figure 220.



- A Vacuum valve
- C Body
- E Inner element assembly

- B Cover assembly
- D Main element assembly

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

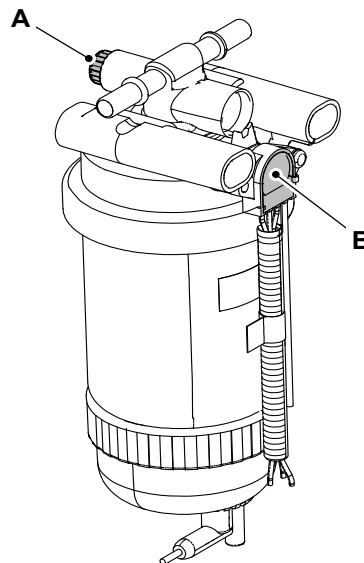
Bleed

▲ Notice: 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 221.



A Bleed screw

B Sensor

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

Drain

Draining Fuel Tank Impurities

1. Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
2. Remove the cover plate from below the fuel tank.
3. Put a suitable container below the self sealing drain plug.
4. Remove the outer threaded cover from the self sealing drain plug.
5. Connect the self sealing drain kit threaded union with attached pipe. Drain the water and deposits until there is clean diesel.
6. Remove the self seal drain kit.
7. Clean and install the outer threaded cover. Do not over tighten the cover.
8. Install the cover plate.

Clean the Filler Cap

1. Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
2. Get access to the fuel filler cap.
[Refer to: Service Points \(Page 214\).](#)
3. Clean the exterior of the cap with a clean cloth.
4. Remove the fuel filler cap.
5. Clean the interior of the fuel filler cap with a clean cloth.
6. Install the fuel filler cap.

Fuel Filter

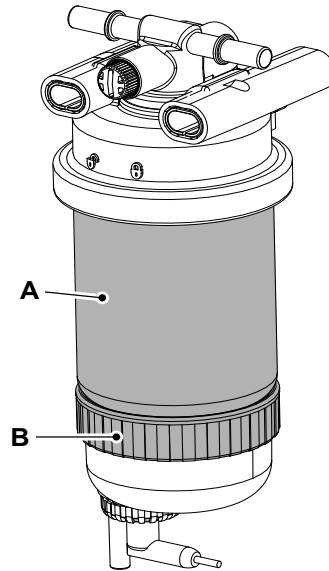
Replace

1. Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
2. Get access to the engine compartment.
[Refer to: Access Apertures \(Page 218\).](#)
3. Drain and remove the water separator bowl. To remove the water separator bowl release the locking ring.
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: Bleed \(Page 233\).](#)



- Close the engine cover.

Figure 222.



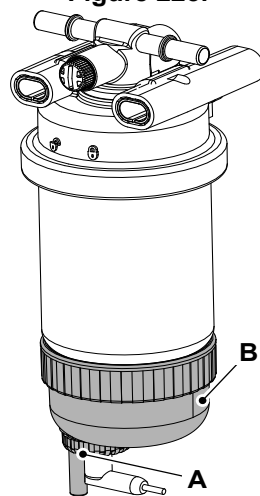
A Filter element

B Locking ring

Draining the Water Separator

- Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
- Get access to the engine compartment
- 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.
- Close the engine cover.

Figure 223.



A Tap

B Bowl

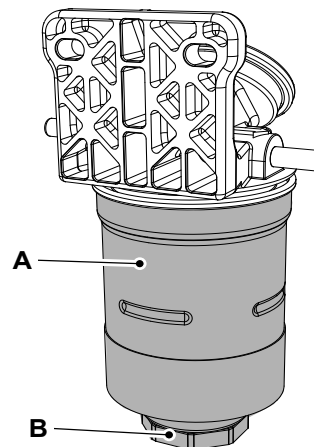


Engine Fuel Filter

Replace

1. Make the machine safe.
2. Get access to the engine compartment.
3. Remove the drain.
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 drain.
7. Bleed the fuel system.
8. Close the engine cover.

Figure 224.



A Filter element

B Drain



Cooling System

General

Check (Leaks)

Before you start the machine, inspect the system for leaks:

1. Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
2. Get access to the cooling pack.
[Refer to: Access Apertures \(Page 218\).](#)
3. Check the cooling system for leaks.
4. If necessary, contact your JCB dealer.

Coolant

Check (Condition)

▲ Notice: Check which coolant type is installed in the machine before topping up the coolant. Mixing of different coolant types is not recommended and may result in invalidation of the warranty offered by JCB. In the event of mixing or if the coolant type is to be changed, the coolant circuit should be completely drained and flushed twice with clean water before re-filling with fresh coolant.

[Refer to: Coolant \(Page 274\).](#)

Check (Level)

1. Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
2. Let the engine cool.
3. Get access to the radiator filler cap and expansion bottle.
[Refer to: Service Points \(Page 214\).](#)

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 Positions \(Page 211\).](#)
2. Let the engine cool.



3. Get access to the cooling pack.
[Refer to: Access Apertures \(Page 218\).](#)
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 Positions \(Page 211\).](#)
2. Let the engine cool.
3. Get access to the cooling pack.
[Refer to: Access Apertures \(Page 218\).](#)
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 machine.



Axles

General

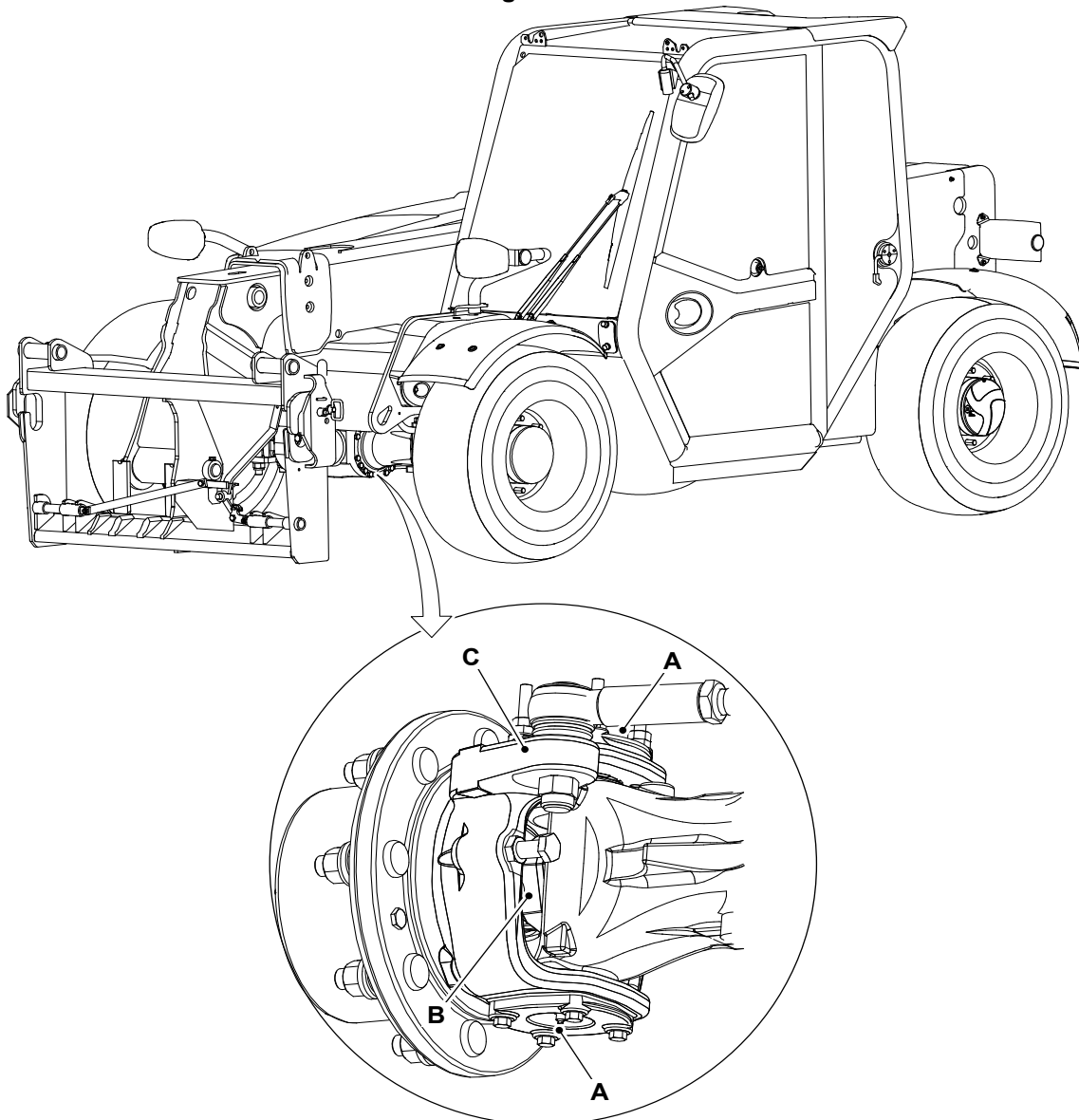
Lubricate

Make the machine safe.

Refer to: [Maintenance Positions \(Page 211\)](#).

Apply grease to all the points and linkages shown.

Figure 225.



A Axle grease point
C Track road grease point

B Steer ram grease point



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 Positions \(Page 211\).](#)
2. Get access to the axle fill/level plug.
[Refer to: Service Points \(Page 214\).](#)
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: Fluids, Lubricants and Capacities \(Page 269\).](#)
7. Clean the fill/level plug.
8. Install the plug with its sealing washer.



Hubs

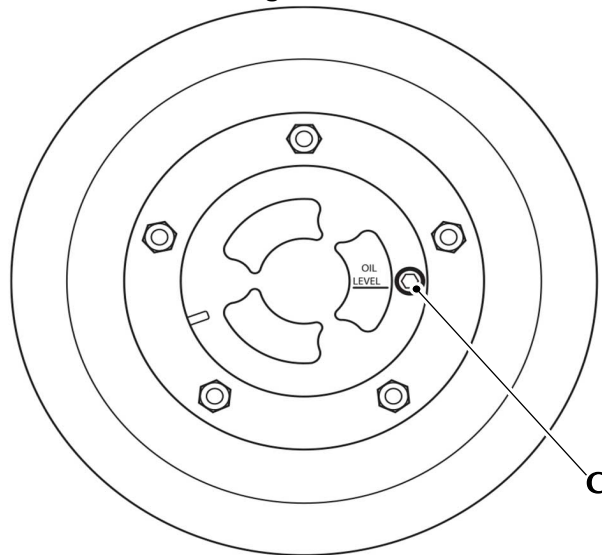
Oil

Check (Level)

Make sure that you check the hub oil level after correct intervals.
Refer to: [Pre-start Cold Checks, Service Points and Fluid Levels \(Page 207\)](#).

1. Make the machine safe.
[Refer to: Maintenance Position - Boom Lowered \(Page 211\)](#).
2. Park the machine on a level ground with the machine tyres clear of the ground.
3. Make sure that the oil level mark on the hub is horizontal.
4. Remove the fill/level plug.
5. Make sure that the oil is in level with the bottom of the fill/level hole. If necessary, top up with the correct axle oil.
6. Clean and install the fill/level plug.

Figure 226.



C Fill/level plug

Replace

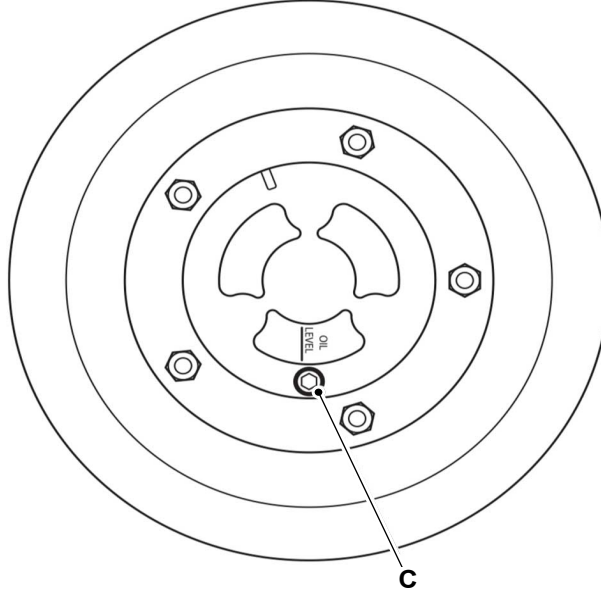
Make sure that you change the hub oil after correct intervals.
Refer to: [Pre-start Cold Checks, Service Points and Fluid Levels \(Page 207\)](#).

Drain

1. Make the machine safe.
[Refer to: Maintenance Position - Boom Lowered \(Page 211\)](#).
2. Park the machine on level ground with the machine tyres clear of the ground.
3. Turn the wheel manually to move the oil level mark on the hubs to the vertical position with the fill/level plug at the bottom.
4. Remove the fill/level plug.
5. Allow the oil to drain.



Figure 227.

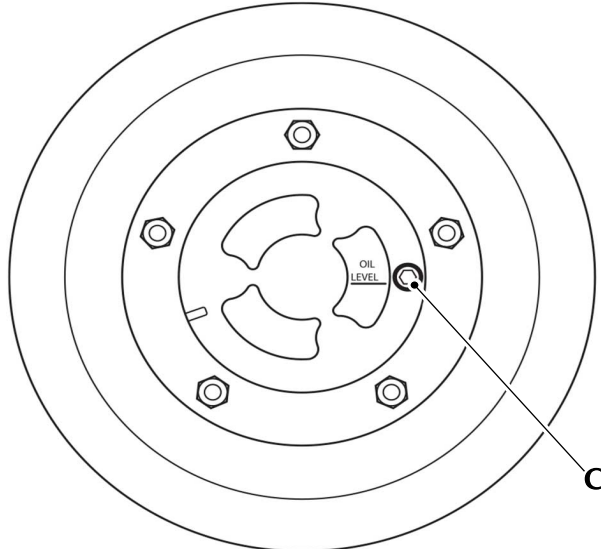


C Fill/level plug

Fill

1. Set the oil level marks to the horizontal position.

Figure 228.



C Fill/level plug

2. Fill the hubs with the correct axle oil through the fill/level hole.
3. Make sure that the oil is in level with the bottom of the fill level hole.
4. Clean and Install the fill/level plug.



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 machine being started while you are beneath it.

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 8 h, 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. Use suitable lifting equipment if necessary.

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

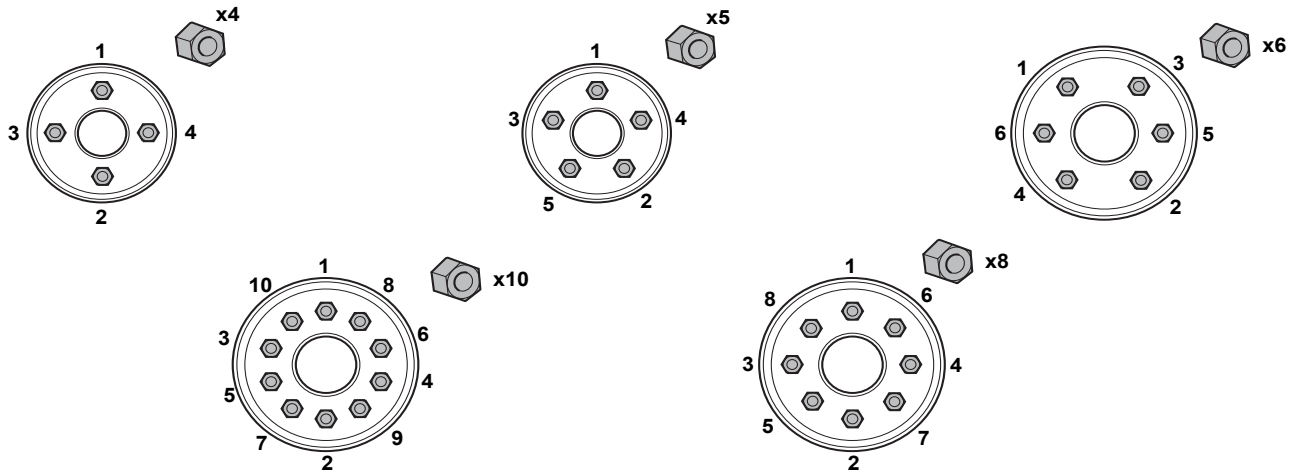
1. Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
2. Jack up the machine to gain access to whichever wheel you wish to change.
3. Remove the nuts then remove the wheel

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 229.



7. Lower the machine to the ground.
8. Torque tighten the nuts in the sequence shown.

[Refer to: Torque Values \(Page 275\).](#)

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: Torque Values \(Page 275\).](#)



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 installed 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. Use suitable lifting equipment if necessary.

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 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:

[Refer to: Wheels and Tyres \(Page 281\).](#)

- 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.

Always deflate the tyre before removing foreign obstacles from the tread.

Always check the tyre pressures with the machine in an unladen state.

After checking or amending the tyre pressure always replace and secure the valve cap.

Under special conditions (e.g. on sand) the air pressure in the tyre may be reduced after you have consulted your JCB dealer or tyre manufacturer.

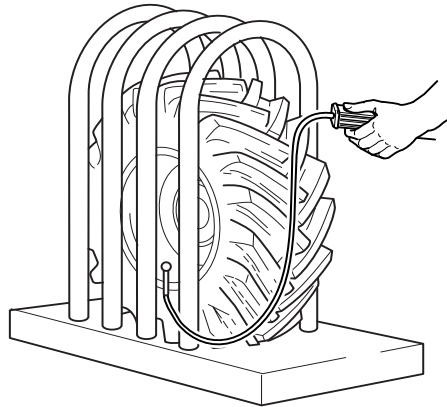
Procedure

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 230.

Figure 230.



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: [Wheels and Tyres \(Page 281\)](#).
 - 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 machine 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 or cracked 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.

Cylinders / 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.

**Maintenance**
Hydraulic System

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.
3. Stop the machine.
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)

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

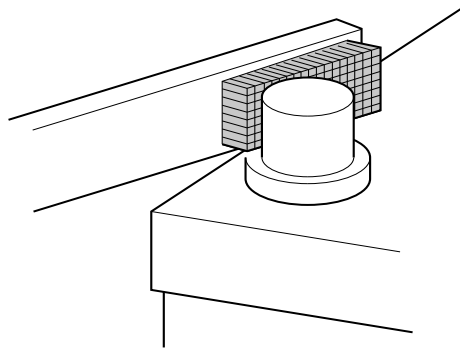
Clean

▲ 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 Positions \(Page 211\).](#)
2. Get access to the battery.
[Refer to: Access Apertures \(Page 218\).](#)
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 231.



Figure 231.



4. Apply a thin layer of petroleum jelly to the terminal posts.

Connect

▲ 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.

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.

CAUTION Understand the electrical circuit before connecting or disconnecting an electrical component. A wrong connection can cause injury and/or damage.

1. Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
2. Get access to the batteries.
[Refer to: Disconnect \(Page 252\).](#)
3. Connect the battery leads. Connect the earth (-) terminal last.
4. If the machine has a battery isolator, move the switch to the on position.

Disconnect

▲ 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.

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.

CAUTION Understand the electrical circuit before connecting or disconnecting an electrical component. A wrong connection can cause injury and/or damage.

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 Positions \(Page 211\).](#)
2. Get access to the batteries.
[Refer to: Access Apertures \(Page 218\).](#)



- If the machine has a battery isolator, switch off the battery isolator and remove the key.
[Refer to: Battery Isolator \(Page 40\).](#)

- 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.

- Isolate the machine electrics.
- 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

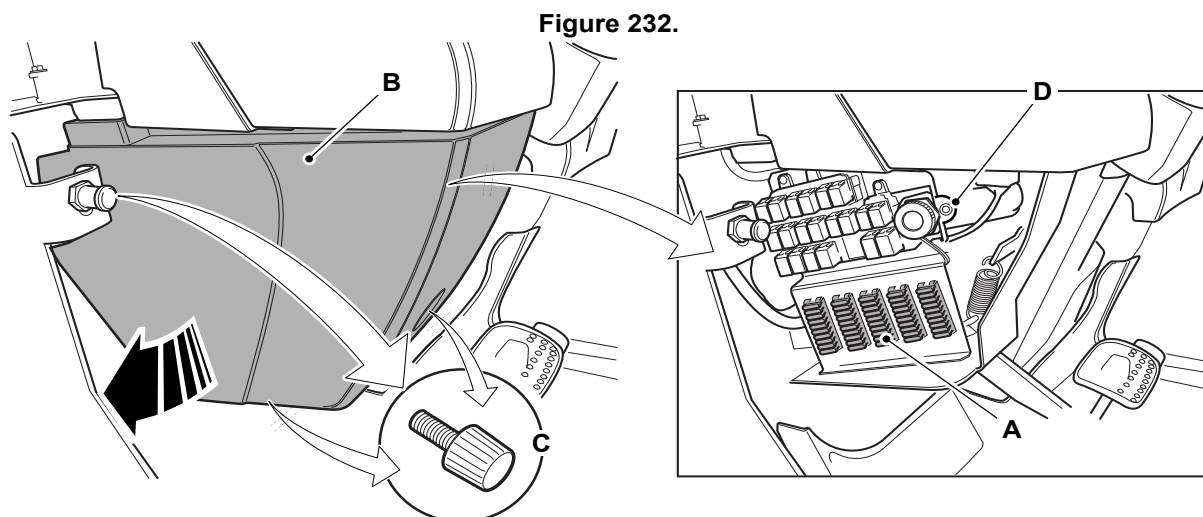
Replace

▲ 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: Fuses \(Page 276\).](#)

Secondary Fuses

The secondary fuses are situated in a fuse box inside the door. Refer to Figure 232.



A Fuses
C Screw (x3)

B Cover
D USB (Universal Serial Bus) port for serviceraster

- Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)
- Open the cab door.

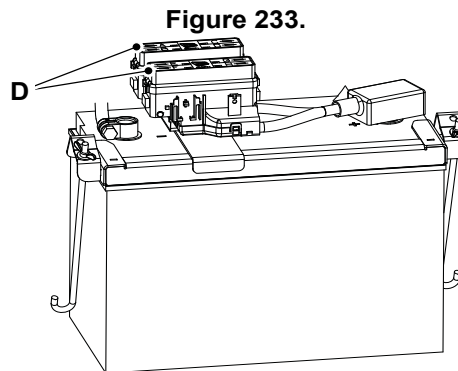


3. Hold the cover and remove the screws.
4. Remove the cover.

Primary Fuses

The primary fuse box is situated above the battery. Refer to Figure 233. 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.

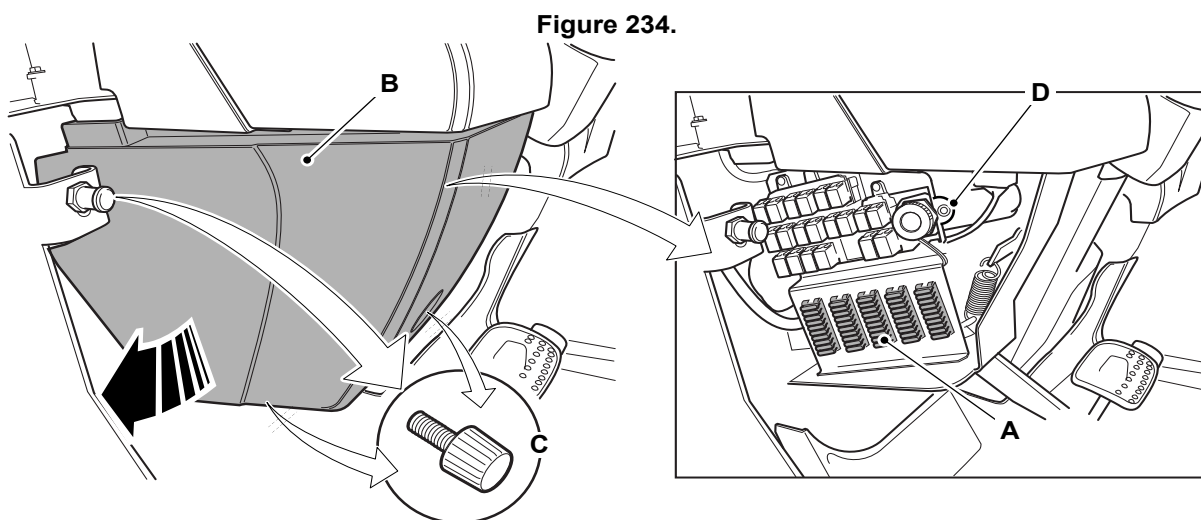


D Primary fuses

Relays

Replace

The relays are situated in a fuse box inside the door.



A Relays
C Screw (x3)

B Cover
D USB (Universal Serial Bus) port for service master

The relays are separated into banks. Each relay position in each bank is numbered.
[Refer to: Relays \(Page 278\).](#)

1. Make the machine safe.
[Refer to: Maintenance Positions \(Page 211\).](#)



Miscellaneous

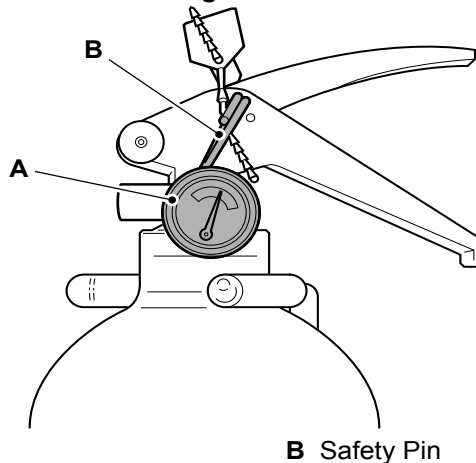
Fire Extinguisher

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 236.



A Gauge

B Safety Pin



Technical Data Static Dimensions

Dimensions

Figure 237.

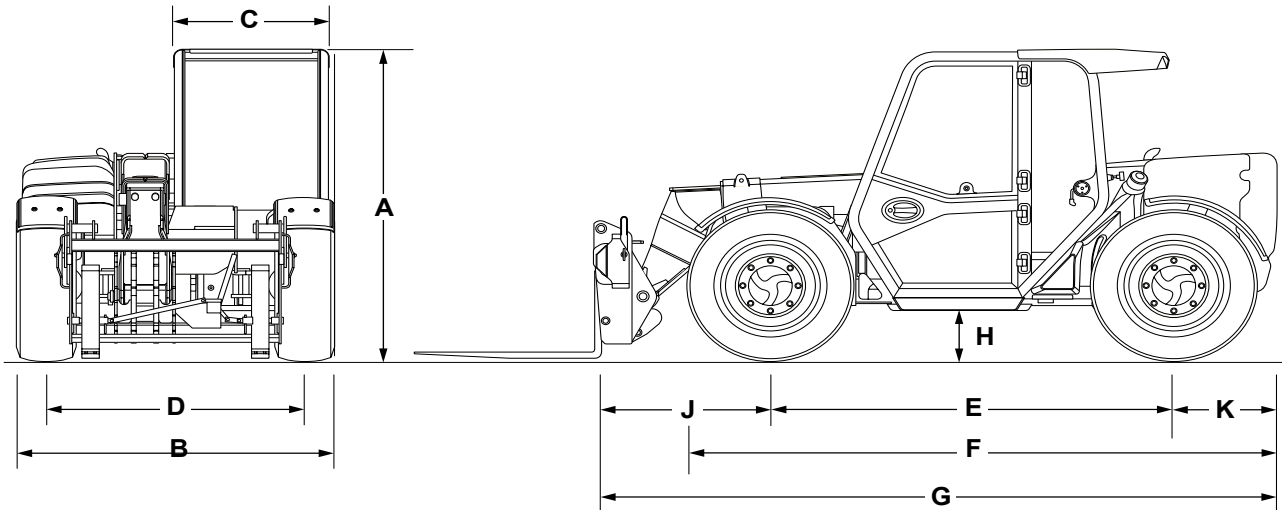


Table 27.

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°



Technical Data
Static Dimensions

Figure 238.

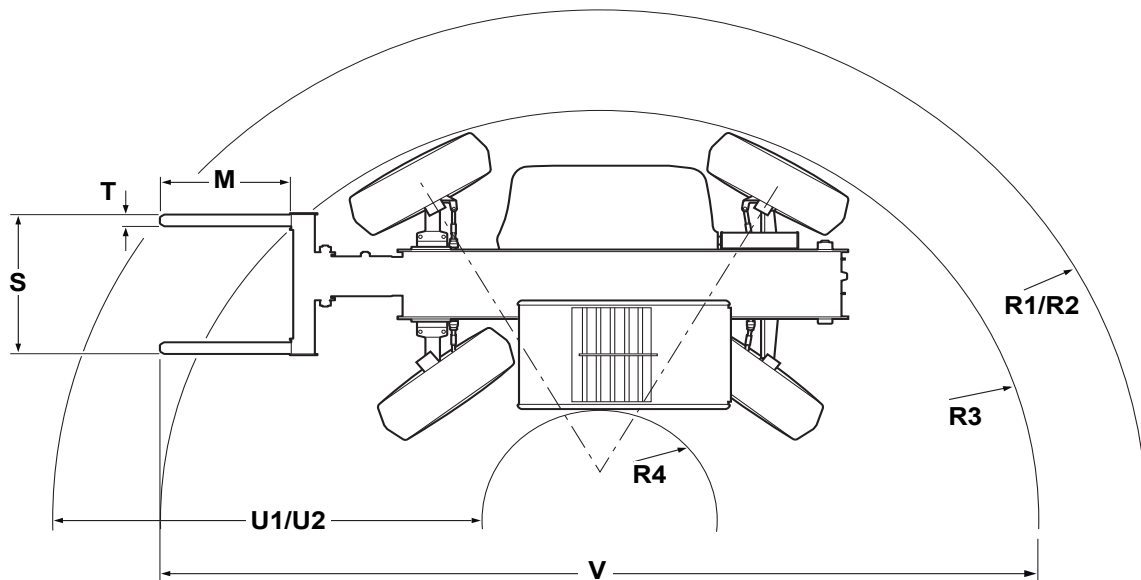


Table 28.

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 29.

Model	Axle Loads		Total	Lift Capacity	Laden Axle Loads		Total
	Front	Rear			Front	Rear	
Hi-Viz	2,730kg	2,500kg	5,230kg	2,500kg	7,010kg	720kg	7,730kg
Agri	2,980kg	2,540kg	5,520kg	2,500kg	7,250kg	760kg	8,020kg
Agri Plus	3,090kg	2,750kg	5,840kg	2,500kg	7,370kg	970kg	8,340kg

Visibility Diagrams

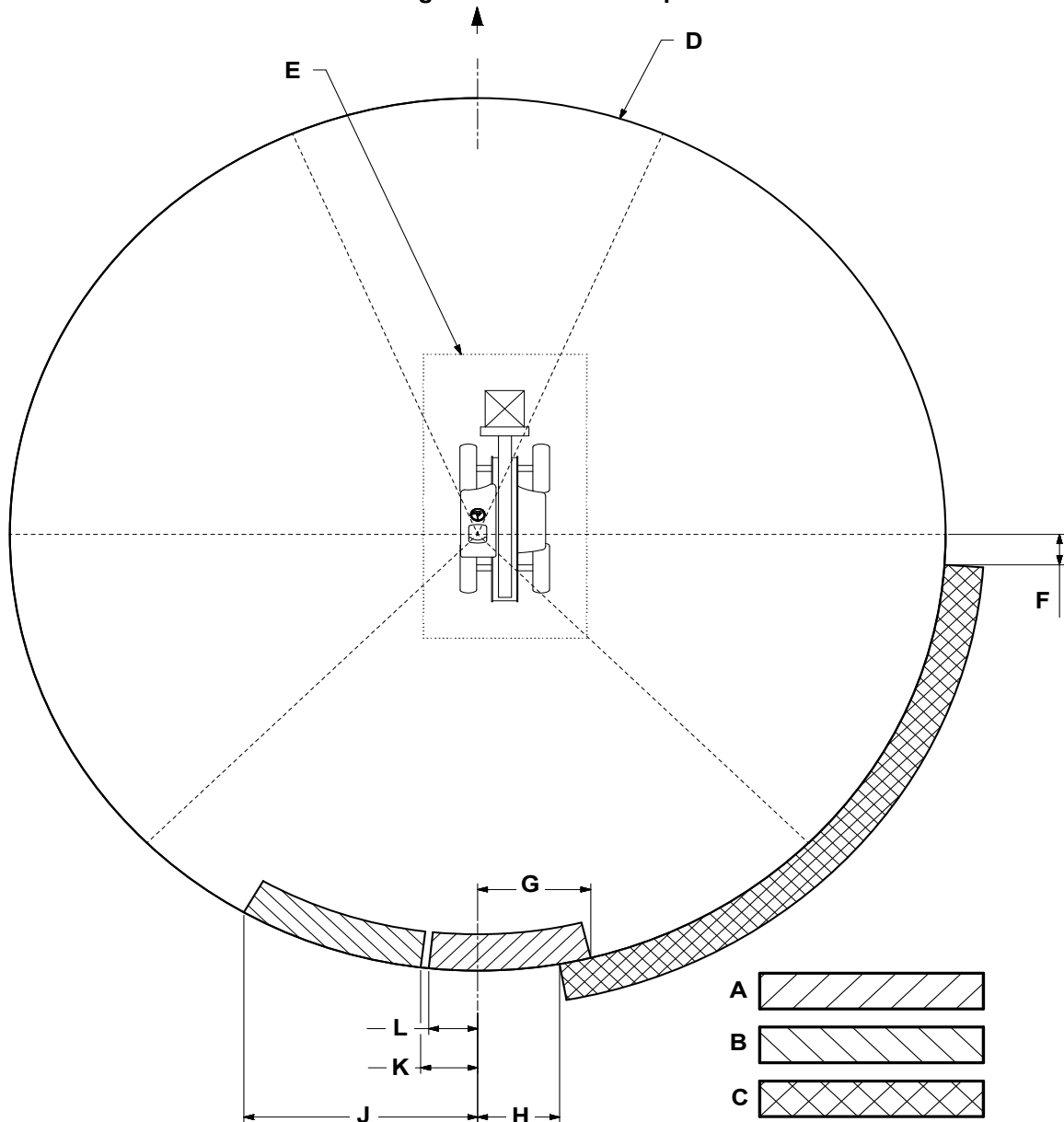
All measurements are from the filament position centre point as defined in standard EN 15830:2012.



Technical Data
Static Dimensions

The right hand and left hand road mirrors shall be adjusted to comply with directive 2003/97/EC Annex III for a vehicle class $N_2 > 7.5$ tonnes. The dimension for the road mirrors given below are for the reference only and do not replace the requirement of the directive.

Figure 239. Mirror Setup

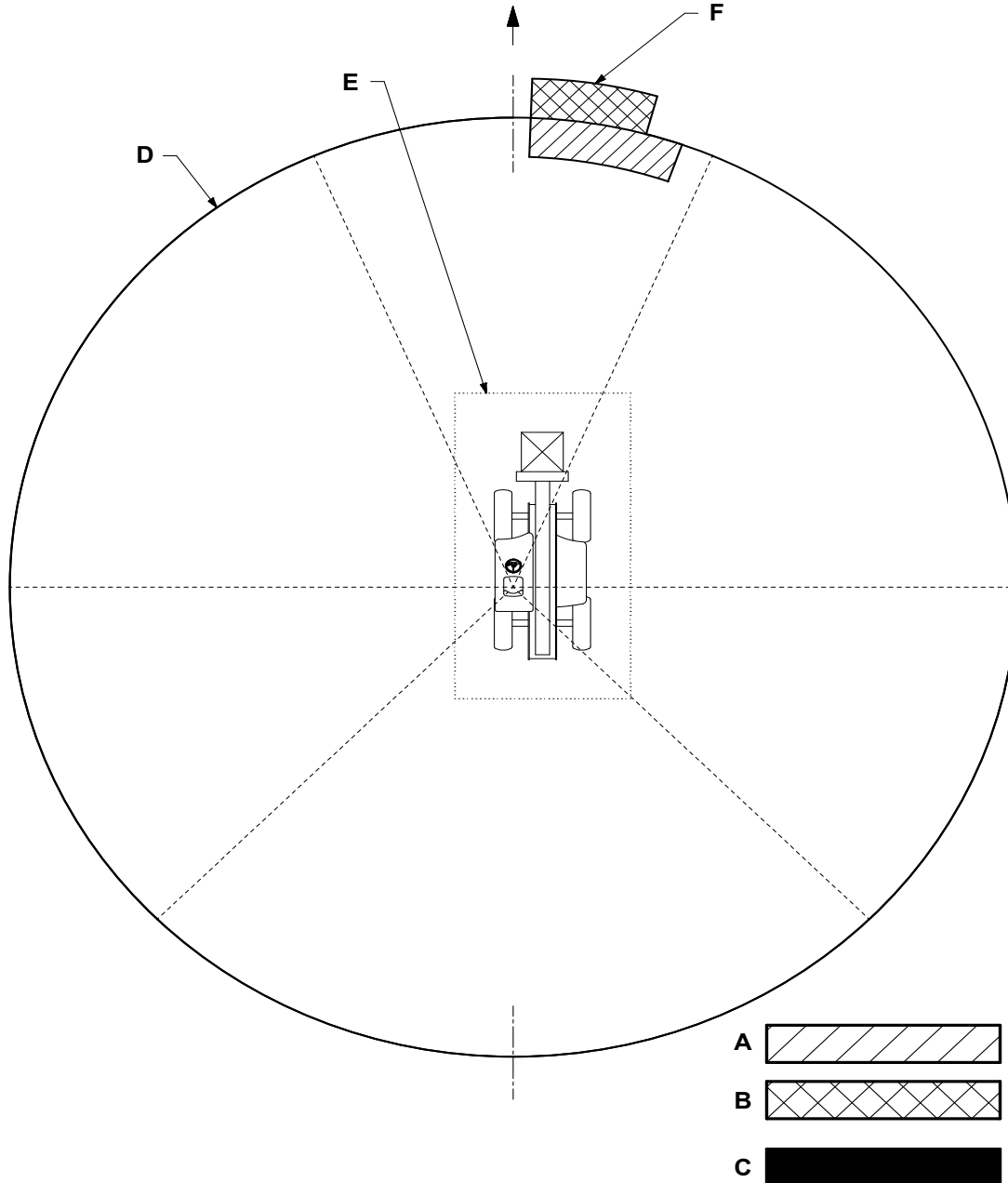


- A Right hand road mirror
- C Right hand wide angle
- E Rectangular 1m boundary
- G 2,903mm
- J 6,000mm
- L 1,254mm

- B Left hand road mirror
- D Visibility test circle (radius 12m)
- F 837mm
- H 2,104mm
- K 1,462mm



Figure 240. Visibility Masking in Suspended Load Condition

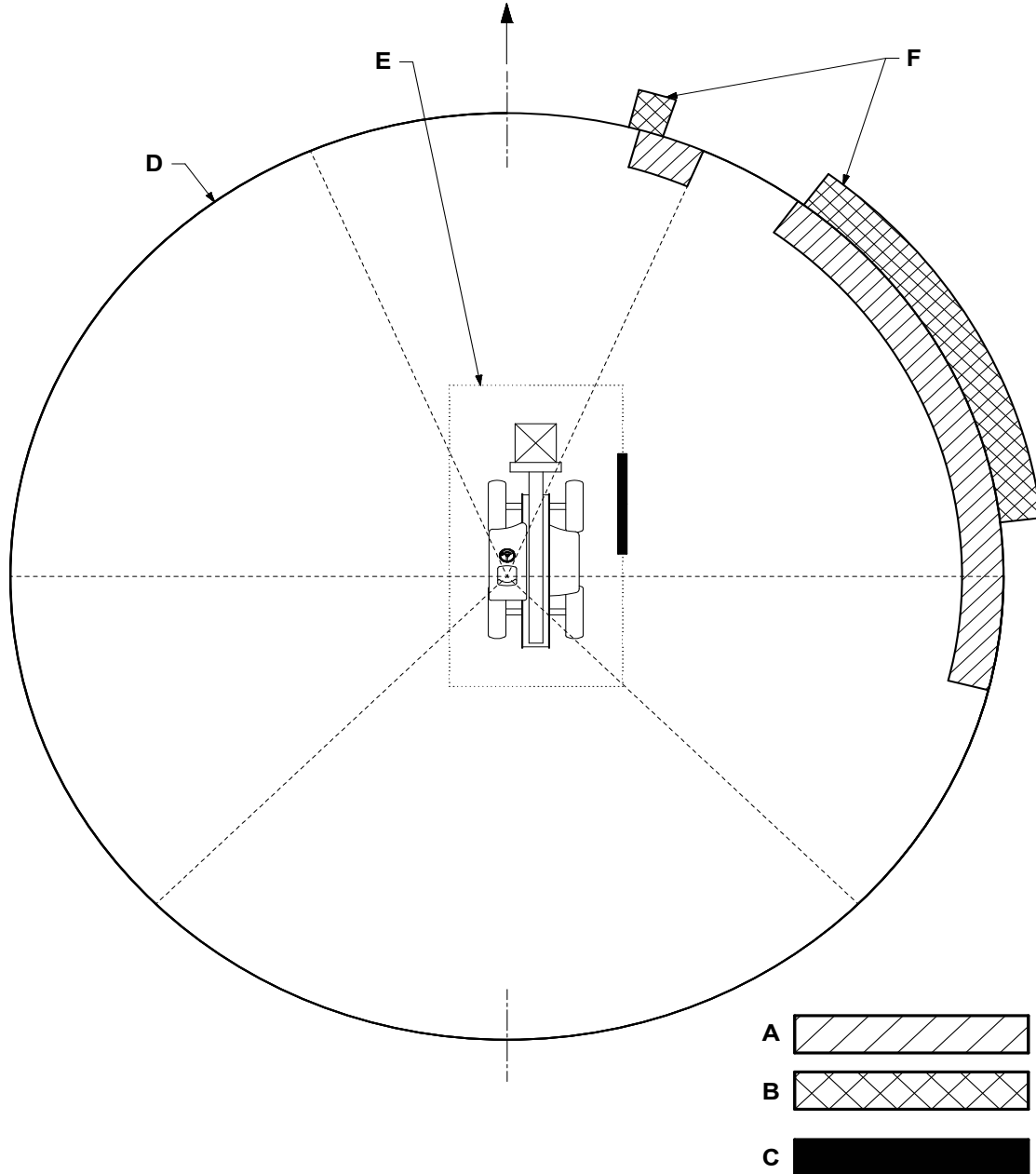


- A Masking at 12m radius measured at ground level
- C Masking at 1m boundary (> 200mm width) measured between ground level and 1.5m above ground level
- E Rectangular 1m boundary

- B Masking at 12m radius measured at 0.75m above ground level
- D Visibility test circle (radius 12m)
- F Masking disappear at 0.74m above ground level



Figure 241. 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
- E Rectangular 1m boundary

- D Visibility test circle (radius 12m)
- F Masking disappear at 0.74m 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: Towing Weights \(Page 263\).](#)
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 30.

Description	Agricultural (Agri & Agri Plus) Weight ⁽¹⁾
Maximum lift capacity	2,500kg
Lift capacity to full height	1,750kg
Lift capacity at full reach	800kg

(1) Capacities listed are for the standard fit, Q-Fit carriage, for other carriages refer to the load charts fitted to your machine

Table 31.

Description	Construction (HiViz) Weight ⁽¹⁾
Maximum lift capacity	2,500kg
Lift capacity to full height	2,000kg
Lift capacity at full reach	750kg

(1) Capacities listed are for the standard fit, Q-Fit carriage, for other carriages refer to the load charts fitted to your machine

Table 32.

Description	Construction Dimension	Agricultural Dimension
Maximum lift height	6m	6m
Reach at maximum lift height	-0.15m	-0.25m



Description	Construction Dimension	Agricultural Dimension
Maximum forward reach (to front of carriage)	3.06m	3m
Reach with 1.2t load	2.64m	2.58m

Towing Weights

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: Wheels and Tyres \(Page 281\).](#)
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.

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: Wheels and Tyres \(Page 281\).](#)

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: Wheels and Tyres \(Page 281\).](#)

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.



Technical Data
Performance Dimensions

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.

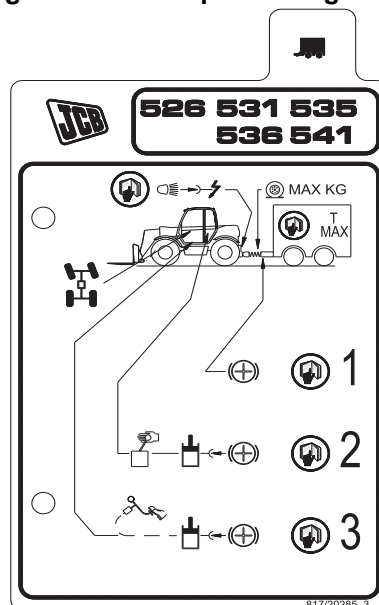
Above 3,500kg and not exceeding 6,000kg gross trailer weight, independent brakes must be fitted. Independent brakes are those that are applied by the operator.

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 242. Example Towing Chart



- 1 Over-run brakes
- 3 Close-coupled brakes

- 2 Independent brakes



Noise Emissions

General

▲ CAUTION In some operating conditions the specified noise emission levels may be different to those shown. Factors such as workplace, other machinery and duration of exposure may require additional personal protective equipment to be provided.

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 33. 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 34.

Engine rating ⁽¹⁾	LpA	LwA
55kW	76	104

(1) Net installed power.



Vibration Emissions

General

▲ **CAUTION** In some operating conditions the specified vibration emission levels may be different to those shown. Factors such as workplace, other machinery and duration of exposure may require additional personal protective equipment to be provided.

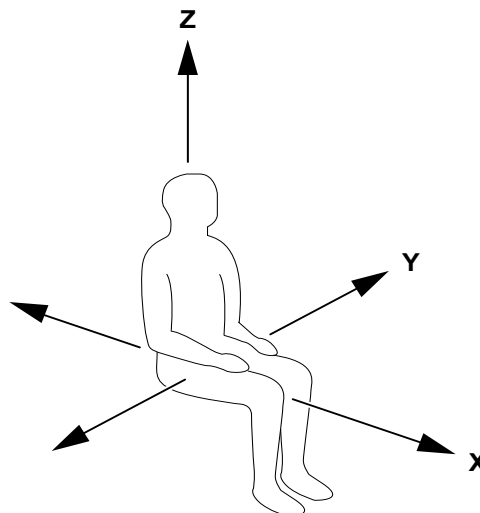
To assist in compliance with the European Directive 2002/44/EC, the duty specific vibration emission values for this machine type have been provided on the following page(s) and may be used for the assessment of risks to exposure from vibration.

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 243.



Exposure to Vibration

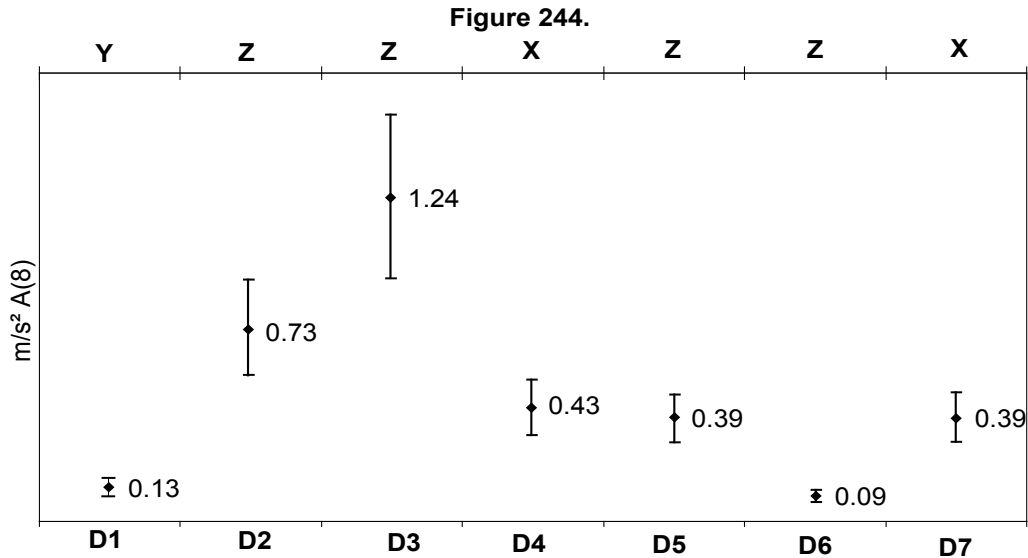
Exposure to vibration can be minimised through:

- 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

Hi-Viz



- | | |
|--|---|
| 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 0.43m/s² normalised to an 8h reference period [A(8)] and based upon a test cycle 'defined in SAE (Society of Automotive Engineers) J1166'.

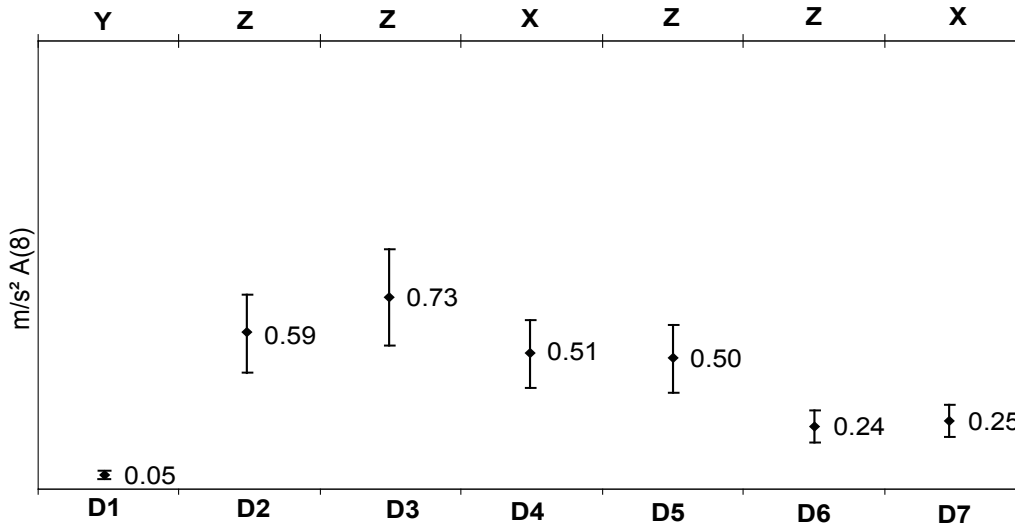
Hand-arm vibration determined in accordance with dynamic test conditions defined in ISO (International Organization for Standardization) 5349-2: 2001 does not exceed 2.5m/s².

Errors bars are due to variations in vibration emissions due to measurement uncertainty (50% in accordance with EN 12096:1997).



Agri and Agri Plus

Figure 245.



- | | |
|--|--|
| X-Z Dominant axis | D1 Machine operating duty: Low idle |
| D2 Machine operating duty: Roothing (tarmac) | D3 Machine operating duty: Roothing (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 0.51m/s² normalised to an 8h reference period [A(8)] and based upon a test cycle 'defined in SAE J1166'.

Hand-arm vibration determined in accordance with dynamic test conditions defined in ISO 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 35.

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 CJ-4, ACEA E9
		JCB Engine Oil UP 5W30 (Ultra Performance)-19°C (-2.2°F) and below	4001/3105	20L	
		JCB engine Oil UP 5W40 (ultra performance) -19°C (-2.2°F) and below	4001/3405	20L	
Engine (coolant) ⁽²⁾	11L	JCB Antifreeze HP/Coolant + water	4006/1120	20L	ASTM D6210
Front axle housing	4L	JCB Gear Oil HP Plus	4000/2205	20L	
Rear axle housing	4L				
Hubs	1L				
Brake system		JCB Hydraulic Fluid HP 15 ⁽⁴⁾	4002/0503	5L	
Hydraulic tank ⁽⁵⁾	48.7L	JCB Optimum Performance Hydraulic Fluid 46, -20°C (-4.0°F) to 46°C (114.7°F)	4002/2005	20L	
Grease points		JCB Special HP Grease ⁽⁶⁾	4003/2017	0.4kg x 24	
		JCB Special MPL EP Grease ⁽⁶⁾	4003/1501	0.4kg x 24	
Wear pad runways		JCB Waxoyl	4004/0502	5L	
Boom hoses		JCB Special Slide Lubricant	4003/1115	0.4kg	
HVAC (Heating Ventilation Air Conditioning) refrigerant ⁽⁷⁾	1.7kg	R134a			

(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.

(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.

(7) The CO₂ equivalent is 2.43t. The Global Warming Potential (GWP) for R134a is 1430.



Fuel

Acceptable and Unacceptable Fuels

▲ WARNING Do not use petrol in this machine. Do not mix petrol with the diesel fuel. In storage tanks the petrol will form flammable vapours.

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.

Notice: Sulphur can be detrimental to the emissions performance of your engine and it is in your interest to ensure Ultra Low Sulphur Diesel (ULSD) is used. Failure to adhere to local emissions regulations will result in no support and no warranty liability being accepted on any engine.

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 effects 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 36. Group 1

Fuel	Advice	Service Requirements
EN590 Diesel fuel types - Auto/C0/ C1/C2/C3/C4 Sulphur < 10ppm.	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 Sulphur < 10ppm		
ASTM D975-076 2-D, US DF1, US DF2, US DFA Sulphur < 15ppm		
JIS K2204 Grades 1, 2, 3 and Special Grade 3 Sulphur < 10ppm		

Table 37. 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 Eco-max 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 38. 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 39. 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%).

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 known 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 (>20%) 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

▲ Notice: A combination of water and Sulphur will have a corrosive chemical effect on fuel injection equipment. Use of high Sulphur fuels will poison the Selective Catalytic Reduction (SCR) catalyst (if fitted) and must not be used. Ultra Low Sulphur Diesel (ULSD) should always be used. Ultra Low Sulphur Diesel (ULSD) has a Sulphur content of less than 10 ppm (US 15ppm).

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.



JCB Power Systems - Use of HVO Fuels

Following market requests from JCB power systems customers to approve the use of HVO (hydro-treated vegetable oil) fuel as a diesel fuel alternative in JCB engines. JCB power systems have carried out extensive testing to make sure that this has no detrimental effect on the performance and reliability of the JCB engine.

JCB power systems confirm that HVO has been tested and approved for use with JCB 444 and 448, stage IIIB and stage IV engines. The testing has been conducted by JCB power systems and this approval does not constitute any recertification of any engine model by any third party notified body.

The JCB 444/448 engines can be operated on HVO or 'synthetic' fuels as long as these fuels meet EN15940 and any other local emissions legislation. Customers should note that engine performance may be lower than regular diesel due to the characteristics of HVO fuel. Customers make sure that any additional maintenance requirements, including but not limited to servicing periods, are identified to users.

Coolant

▲ CAUTION Antifreeze can be harmful. Obey the manufacturer's instructions when handling full strength or diluted antifreeze.

Notice: Check which coolant type is installed in the machine before topping up the coolant. Mixing of different coolant types is not recommended and may result in invalidation of the warranty offered by JCB. In the event of mixing or if the coolant type is to be changed, the coolant circuit should be completely drained and flushed twice with clean water before re-filling with fresh coolant.

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 coolant with clean water before use. Use clean water of no more than a moderate hardness 0 to 20°dGH, maximum Chloride content 100ppm, maximum Sulphate content 100ppm. If this cannot be obtained, use distilled or de-ionized water. For further information advice on water hardness, contact your local water authority.

The correct concentration of coolant protects the engine against frost damage in winter and provides year round protection against corrosion.

Table 40.

Concentration	Level of protection
50% (Standard)	Protects against damage down to -37°C (-35°F)
60% (Extreme Conditions Only)	Protects against damage down to -48°C (-54°F)

Do not exceed a 60% concentration, as the freezing protection provided reduces beyond this point.

- Make sure that the coolant complies with specification in this manual.
- 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.



Torque Values

General

ROPS/FOPS

Table 41.

Mounting bolts torque	205N·m
-----------------------	--------

Wheels

Table 42.

Front Wheel Nut Torque	Rear Wheel Nut Torque
500N·m	500N·m

Engine

Table 43.

	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 44.

Fill/level plug torque	35–50N·m
------------------------	----------

Propshafts

Table 45.

Constructional propshaft bolts (x4)	M10 10.9 grade	60N·m
Agricultural propshaft bolts (x8)	M10x20 8.8 grade	43N·m
Agricultural propshaft double end-studs	M10 8.8 grade (zinc coating)	47N·m



Electrical System

General

Table 46.

Item	Specification
Battery voltage/system voltage	12V

Bulbs

Table 47.

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 246.

1A	5A	11B	25A	21C	10A	31D	20A	41E	15A
2A	30A	12B	20A	22C	AUX 5A	32D	10A	42E	20A
3A	5A	13B	15A	23C	5A	33D	10A	43E	7.5A
4A	15A	14B	20A	24C	10A	34D	3A	44E	5A
5A	5A	15B	15A	25C	5A	35D	15A	45E	5A
6A	5A	16B	20A	26C	10A	36D	3A	46E	5A
7A	30A	17B	25A	27C	25A	37D	5A	47E	20A
8A	10A	18B	10A	28C	10A	38D	3A	48E	10A
9A	3A	19B	15A	29C	20A	39D	3A	49E	20A
10A	3A	20B	25A	30C	25A	40D	5A	50E	10A

Table 48.

Fuse	Circuits	Rating
		A
1A	Ignition	5
2A	Crank signal	30
3A	Engine fuse	5
4A	Auxiliary/hitch hydraulics	15
5A	Diesel exhaust fluid fuse (527-58 only)	5
6A	Engine fuse	5
7A	Bonnet fan	30



Technical Data
Electrical System

Fuse	Circuits	Rating
		A
8A	Break light	10
9A	Seat switch/parkbrake	3
10A	Turn indicator	3
11B	Air conditioning fan	25
12B	Rear and roof wash/wipe	20
13B	Front wash/wipe	15
14B	Air conditioning fan	20
15B	12V Power socket	15
16B	Diesel exhaust fluid fuse (527-58 only)	20
17B	Front worklights	25
18B	Beacon	10
19B	Heater	15
20B	Boom worklights	25
21C	Road lights and reverse alarm	10
22C	Auxiliary	5
23C	Vehicle system gateway	5
24C	Radio	10
25C	Ignition	5
26C	Livelink	10
27C	Rear worklights	25
28C	Roadlights	10
29C	Roadlights	20
30C	Horn and headlight flash	25
31D	Hydraulic ECU (Electronic Control Unit)	20
32D	ECU	10
33D	NOx (Nitrogen Oxide)	10
34D	Hazard	3
35D	Instrument panel	15
36D	ECU	3
37D	Livelink	5
38D	LLMI (Longitudinal Load Moment Indicator) (if installed)	3
39D	Clocks	3
40D	Hydraulic lock	5
41E	Dipped headlights	15
42E	Main beam lights	20
43E	Side lights	7.5
44E	Side lights	5
45E	Fog lights	5
46E	Live link	5
47E	Heated seat/air suspension seat	20
48E	Trailer electrics	10
49E	Diesel exhaust fluid (527-58 only)	20
50E	Interior lights	10



Relays

Figure 247.

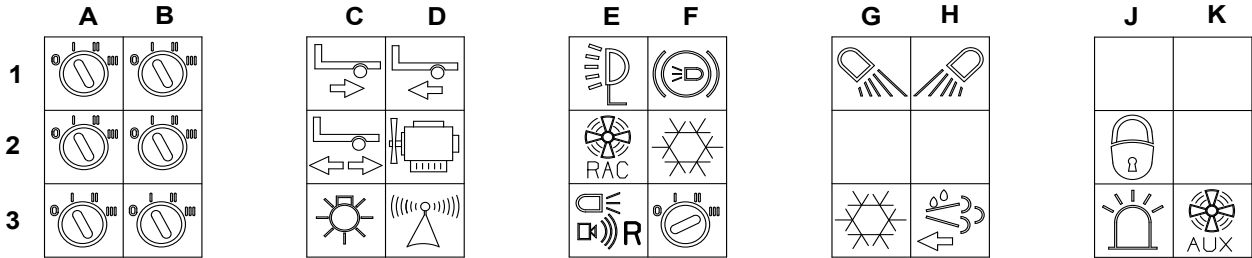


Table 49.

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	Livelink
E1	Boom work lights
E2	Roof air-conditioning
E3	Side lights/reverse buzzer alarm
F1	Brake lights
F2	Air-conditioning pump
F3	Ignition
G1	Rear worklights
G2	-
G3	Air-conditioning pump
H1	Front worklights
H2	Livelink
H3	Diesel exhaust fluid (527-58 only)
J1	-
J2	Hydraulic lock
J3	Beacon
K1	-
K2	-
K3	Auxiliary



Engine

General

Table 50.

Data	Description
Make	Kohler
Model	2504 TCR
Engine rating at 2200 RPM (Revolutions Per Minute)	55kW
Emission compliance	Stage 5
Number of cylinders	4
Cylinder arrangement	In-line
Combustion cycle	4-stroke

Exhaust After Treatment (EAT)

Introduction

For the applicable regulations this engine has been designed in compliance with, the emissions control system is essential for meeting the requirements of exhaust emission content. The emissions control system is defined as any device, system or element of design which controls or reduces engine exhaust emissions.

Your engine is equipped with a fully automated after-treatment system. It has a sophisticated system of self-monitoring and fault detection to ensure it is both reliable and compliant to applicable emissions legislation. An operator warning system informs when the system is not functioning correctly or when intervention is required. Failure to respond to this warning system and rectify any detected fault will lead to the activation of a derate. This system will limit engine performance until the detected fault is rectified and may result in the machine being unable to conduct its mission.

Tampering with or modifying the engine may void the type approval and warranty. The on-board computer will log faults tampering conditions, inspection authorities will be able to read these logs with a scan tool.

The type-approval certificate is valid only when all of the following conditions are met:

- The engine and emissions control system are operated and maintained in accordance with the instructions of this manual.
- Prompt action is taken for the rectification of incorrect operation, maintenance or repair.
- No deliberate misuse or tampering of the engine or emission control system has occurred.

A DPF (Diesel Particulate Filter) is used to remove diesel particulate matter or soot from the exhaust gas of a diesel engine, in order to reduce emissions. Excess soot deposited in the filter is cleanly burned off by raising the temperature of the exhaust through the process of a running regeneration.

An EGR (Exhaust Gas Recirculation) valve recirculates a portion of exhaust gas back into the engine to reduce nitrous oxide emissions.

If the engine is used for a prolonged period (100s of hours) in light duties and the soot level reaches a certain percentage, the engine is equipped with a mode which runs the after-treatment system at typical operating temperatures. In this way the DPF filter is regenerated while the engine is running normally. This is automatic and seamless to the operator and the machine can continue to be operated normally while this is happening. During regeneration the exhaust gases temperature is raised and the operator has the option to inhibit a regeneration if for example the machine is in a hazardous area.

Should the duty cycle continue to be very light the operator will be warned. If this occurs the operator has a choice to either operate the engine at a higher duty or complete the regeneration cycle with a manual regeneration. The engine is equipped with a setting that will automatically run the exhaust system hot enough while the machine is manual. The operator must acknowledge that the engine can run a manual regeneration by initiating the procedure. Refer to the machine operator manual manual regeneration initiation procedure.

If the operator ignores the warnings, and manual regeneration is not initiated, the DPF will clog and gradually reduce engine performance. Replacement or specialist cleaning will be required.



Technical Data
Engine

If there is excessive white smoke or excessive diesel smell from the exhaust system then if possible please perform a manual regeneration.

[Refer to: Instrument Panel \(Page 72\).](#)

[Refer to: Instrument Panel \(Page 72\).](#)

If the option of a regeneration is not available then if possible run the machine under high load (roading) for 30min to clean the after treatment system.

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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 installed 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.

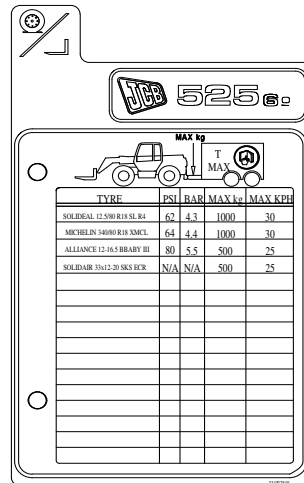
Due to size variations between tyre brands and reduction in diameter due to wear, both tyres on axle must be replaced at the same time with identical tyres.

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 248.



525-60 Hi-Viz

Table 51.

Make	Size	Designation	Rim Size and Offset	Part Number	Inflation Pressure
Camso	12.5/80-18 14PR 134 A6	SL R4	9 x 18 (13 Offset)	42/925246	4.3bar (62psi)
Galaxy	12-16.5 12PR 144 A2	BEEFY BABY III	9.75 x 16.5 (7.5 Offset)	333/H3169	5.5bar (80psi)
Camso	33x12-20 0 162 A2	SKS 792S GNM	7.5 WV - 20 (16 Offset)	400/U7252, 400/U7235	-
Camso	33x12-20 0 162 A2	SKS 792S	7.5 WV - 20 (16 Offset)	400/E2976, 400/E3011	-

Table 52. Maximum Laden Mass

Hitch Type	MC0	MC3
Brake System	Maximum Laden Mass kg⁽¹⁾	
Unbraked	750	750
Inertia braked	3,500	3,500
Hydraulic braked - Single line	-	-

(1) Local legislation may limit the maximum trailer mass.

Table 53. Maximum Laden Mass: Tractor-Trailer Combination

Hitch Type	MC0	MC3
Brake System	Maximum Laden Mass: Tractor-Trailer Combination kg⁽¹⁾	
Unbraked	5,980	5,980
Inertia braked	8,730	8,730
Hydraulic braked - Single line	-	-

(1) Local legislation may limit the maximum trailer mass.



Table 54. Permissible Vertical Hitch Load

Hitch Type	MC0	MC3
Tyre Part Number	Permissible Vertical Hitch Load kg	
42/925246	500	1,000
333/H3169	500	1,000
400/U7252, 400/U7235	500	1,000
400/E2976, 400/E3011	500	1,000

525-60 Agri

Table 55.

Make	Size	Designation	Rim Size and Offset	Part Number	Inflation Pressure
Camso	12.5/80-18 14PR 134 A6	SL R4	9 x 18 (13 Off- set)	42/925246	4.3bar (62psi)
Michelin	340/80R18 . 143 A8	XMCL	11 x 18 (-2 Off- set)	42/925376	4.4bar (64psi)

Table 56. Maximum Laden Mass

Hitch Type	MC0	MC3, MC4 or MC5	MC6, MC7 or MC8 fitted to MC9, MC10 or MC11		MC9 or MC10
			Top	Bottom	
Brake System	Maximum Laden Mass kg⁽¹⁾				
Unbraked	750	750	750	750	750
Inertia braked	3,500	3,500	3,500	3,500	3,500
Hydraulic braked - Single line	-	-	-	-	-

(1) Local legislation may limit the maximum trailer mass.

Table 57. Maximum Laden Mass: Tractor-Trailer Combination

Hitch Type	MC0	MC3, MC4 or MC5	MC6, MC7 or MC8 fitted to MC9, MC10 or MC11		MC9 or MC10
			Top	Bottom	
Brake System	Maximum Laden Mass: Tractor-Trailer Combination kg⁽¹⁾				
Unbraked	6,270	6,270	6,270	6,270	6,270
Inertia braked	9,020	9,020	9,020	9,020	9,020
Hydraulic braked - Single line	-	-	-	-	-

(1) Local legislation may limit the maximum trailer mass.

Table 58. Permissible Vertical Hitch Load

Hitch Type	MC0	MC3, MC4 or MC5	MC6, MC7 or MC8 fitted to MC9, MC10 or MC11		MC9 or MC10
			Top	Bottom	
Tyre Part Number	Permissible Vertical Hitch Load kg				
42/925246	500	1,000	1,000	1,000	1,000
42/925376	500	1,000	1,000	1,000	1,000



525-60 Agri Plus

Table 59.

Make	Size	Designation	Rim Size and Offset	Part Number	Inflation Pressure
Camso	12.5/80-18 14PR 134 A6	SL R4	9 x 18 (13 Off-set)	42/925246	4.3bar (62psi)
Michelin	340/80R18 . 143 A8	XMCL	11 x 18 (-2 Off-set)	42/925376	4.4bar (64psi)

Table 60. Maximum Laden Mass

Hitch Type	MC0	MC1 HYD PUH 40kN	MC3, MC4 or MC5	MC6, MC7 or MC8 fitted to MC9, MC10 or MC11		MC9 or MC10
				Top	Bottom	
Brake System	Maximum Laden Mass kg⁽¹⁾					
Unbraked	750	750	750	750	750	750
Inertia braked	3,500	3,500	3,500	3,500	3,500	3,500
Hydraulic braked - Single Line	5,000	5,000	5,000	5,000	5,000	5,000

(1) Local legislation may limit the maximum trailer mass.

Table 61. Maximum Laden Mass: Tractor-Trailer Combination

Hitch Type	MC0	MC1 HYD PUH 40kN	MC3, MC4 or MC5	MC6, MC7 or MC8 fitted to MC9, MC10 or MC11		MC9 or MC10
				Top	Bottom	
Brake System	Maximum Laden Mass: Tractor-Trailer Combination kg⁽¹⁾					
Unbraked	6,590	6,590	6,590	6,590	6,590	6,590
Inertia braked	9,340	9,340	9,340	9,340	9,340	9,340
Hydraulic braked - Single Line	10,840	10,840	10,840	10,840	10,840	10,840

(1) Local legislation may limit the maximum trailer mass.

Table 62. Permissible Vertical Hitch Load

Hitch Type	MC0	MC1 HYD PUH 40kN	MC3, MC4 or MC5	MC6, MC7 or MC8 fitted to MC9, MC10 or MC11		MC9 or MC10
				Top	Bottom	
Tyre Part Number	Permissible Vertical Hitch Load kg					
42/925246	500	950	950	950	950	950
42/925376	500	1,000	1,000	1,000	1,000	1,000



Declaration of Conformity

General

A completed copy of the EC/UKCA 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/UKCA Declaration of Conformity and a summary of the information that can appear is provided.

[Refer to: Data \(Page 285\).](#)

Data

Table 63.

A	Refer to: Name and Address of the Manufacturer (Page 7).
B	Lift Truck, Combustion-Engine Driven, Counterbalanced (Rough Terrain Trucks).
C	Refer to: Machine (Page 10).
D	Refer to: Machine (Page 10).
E	EN 1459-1: 2017.
F	Managing Director, JCB Vibromax GMBH, Europaallee 113a, 50226 Frenchen, Germany
G	Principal Engineer NVH, JCB Excavators Limited, Lakeside Works, Rocester, Staffordshire, United Kingdom, ST14 5JP.
H	ANNEX VI PROCEDURE 1.
J	A. V. Technology Unit 2 Easter Court Europa Boulevard Warrington Cheshire WA5 7ZB.
K	Refer to: Noise Emissions (Page 265).
L	Refer to: Noise Emissions (Page 265).
M	Rocester.
N	Managing Director.



Figure 249.

Declaration of Conformity	
NAME AND ADDRESS OF MANUFACTURER	<input style="width: 100%; height: 40px;" type="text"/> A
HEREBY DECLARES THAT THE MACHINERY / EQUIPMENT DESCRIBED BELOW COMPLIES WITH ALL UK AND EU RULES AS APPLICABLE: DESCRIPTION OF MACHINERY / EQUIPMENT TRADE NAME: MODEL NAME SERIAL NUMBER OF MACHINERY / EQUIPMENT	<input style="width: 100%; height: 20px;" type="text"/> B <input style="width: 100%; height: 20px;" type="text"/> JCB <input style="width: 100%; height: 20px;" type="text"/> C <input style="width: 100%; height: 20px;" type="text"/> D
COMPLIES WITH THE PROVISIONS OF THE MACHINERY DIRECTIVE (DIRECTIVE 2006/42/EC AS AMENDED) AND THE SUPPLY OF MACHINERY (SAFETY) REGULATIONS 2008 [AS AMENDED] THE FOLLOWING STANDARDS HAVE BEEN USED	<input style="width: 100%; height: 20px;" type="text"/> E
NAME AND ADDRESS OF PERSON ESTABLISHED IN THE EU AUTHORISED TO COMPILE THE TECHNICAL CONSTRUCTION FILE FOR UK REFER TO ADDRESS ABOVE AND SIGNATORY	<input style="width: 100%; height: 40px;" type="text"/> F
COMPLIES WITH THE PROVISIONS OF THE ELECTRO-MAGNETIC COMPATABILITY DIRECTIVE (DIRECTIVE 2014/30/EU AS AMENDED) ELECTROMAGNETIC COMPATIBILITY REGULATIONS 2016 AS AMENDED	
COMPLIES WITH THE PROVISION OF THE NOISE EMISSIONS IN THE ENVIRONMENT BY EQUIPMENT FOR USE OUTDOORS DIRECTIVE DIRECTIVE 2000/14/EC (AS AMENDED) AND THE NOISE EMISSION IN THE ENVIRONMENT BY EQUIPMENT FOR USE OUTDOORS REGULATIONS 2001[UK] (AS AMENDED). NAME AND ADDRESS OF THE PERSON WHO KEEPS THE TECHNICAL DOCUMENTATION	<input style="width: 100%; height: 40px;" type="text"/> G
CONFORMITY ASSESSMENT PROCEDURE	<input style="width: 100%; height: 20px;" type="text"/> H
NAME AND ADDRESS OF NOTIFIED BODY:	<input style="width: 100%; height: 40px;" type="text"/> J
MEASURED SOUND POWER LEVEL ON EQUIPMENT REPRESENTATIVE FOR THIS TYPE	<input style="width: 100%; height: 20px;" type="text"/> K
GUARANTEED SOUND POWER LEVEL FOR THIS EQUIPMENT	<input style="width: 100%; height: 20px;" type="text"/> L
NET INSTALLED POWER	<input style="width: 100%; height: 20px;" type="text"/> L
PLACE OF DECLARATION DATE OF DECLARATION NAME OF AUTHORISED SIGNATORY POSITION	<input style="width: 100%; height: 20px;" type="text"/> M dd/mm/yyyy XX/XX/XXX <input style="width: 100%; height: 20px;" type="text"/> N
SIGNATURE	XXXXXX

JCB Part No:

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Warranty Information

Service Record Sheet

Table 64.





	Signature and stamp		Date
	Annual Insurance (Yes)		Hours

Figure 250. Installation Checklist





			/	/		h

Figure 251. 500h










			/	/		h

Figure 252. 1000h

			/	/		h
						



Technical Data
Warranty Information

Figure 253. 1500h





 	 1 / /  h

Figure 254. 2000h






 	 1 / /  h
	

Figure 255. 2500h










 	 1 / /  h

Figure 256. 3000h

 	 1 / /  h
	



Technical Data
Warranty Information

Figure 257. 3500h





 	 1 / /  h

Figure 258. 4000h






 	 1 / /  h
	

Figure 259. 4500h










 	 1 / /  h

Figure 260. 5000h

 	 1 / /  h
	



Technical Data
Warranty Information

Figure 261. 5500h





 	 1 / /  h

Figure 262. 6000h






 	 1 / /  h
	

Figure 263. 6500h










 	 1 / /  h

Figure 264. 7000h

 	 1 / /  h
	



Technical Data
Warranty Information

Figure 265. 7500h





 	 1 / /  h

Figure 266. 8000h






 	 1 / /  h
	

Figure 267. 8500h










 	 1 / /  h

Figure 268. 9000h

 	 1 / /  h
	



Technical Data
Warranty Information

Figure 269. 9500h





 	 1 / /  h

Figure 270. 10000h






 	 1 / /  h
	

Figure 271. 10500h










 	 1 / /  h

Figure 272. 11000h

 	 1 / /  h
	



Engine Emissions

Modification to the engine will invalidate warranty and invalidate the emissions certification. The engine and its emissions components must be maintained in accordance with the maintenance schedules. Non-compliance to the maintenance schedule invalidates the emissions warranty.

JCB shall only deny claims in the warranty period due to:

- Improper maintenance
- Accidents (where JCB have no control)

If a failure is caused by the operator fitting of non-exempted or add-on components JCB shall not deny warranty for:

- Maintenance we or an authorised facility performed.
- Operator repairs to correct unsafe/emergency condition attributable to JCB (as long as attempt is made to restore normal conditions as soon as possible).
- Operator action/inaction unrelated to claim.
- Maintenance performed too frequently.
- Failure due JCB responsibility.
- Use of any fuel that is commonly available where the equipment operates unless the operator's manual state that this fuel would harm the equipment's emission control system.

The owner is responsible for the proper maintenance of the engine. Proper maintenance includes replacement and service, at the owner's expense at a service establishment or facility of the owner's choosing, of all parts, items, or devices related to emission control (but not designed for emission control).

