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OPERATOR'S MANUAL

LOADALL (ROUGH TERRAIN VARIABLE REACH TRUCK)

533-105, 535V125, 535V140, 540-170, 540-170 MP, 540-200, 540V140, 540V140 MP, 540V180, 550-140, 550-170

EN - 9831/2100 ISSUE 12 - 06/2022

THIS MANUAL SHOULD ALWAYS STAY WITH THE MACHINE

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

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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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Notes:

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Acronyms Glossary

2WD	Two Wheel Drive
4WD	Four Wheel Drive
4WS	Four Wheel Steer
ARV	Auxiliary Relief Valve
CESAR	Construction Equipment Security and Registration
DEF	Diesel Exhaust Fluid
ECU	Electronic Control Unit
FEAD	Front End Accessory Drive
FOPS	Falling Object Protective Structure
HVAC	Heating Ventilation Air Conditioning
ISO	International Organization for Standardization
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LLMC	Longitudinal Load Moment Control
LLMI	Longitudinal Load Moment Indicator
LMI	Load Moment Indicator
LSD	Limited Slip Differential
MRV	Main Relief Valve
NOx	Nitrogen Oxide
PIN	Product Identification Number
RMS	Root Mean Square
ROPS	Roll-Over Protective Structure
RPM	Revolutions Per Minute
SCR	Selective Catalytic Reduction
SWL	Safe Working Load

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Introduction
About this Manual

Model and Serial Number

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

Model	From:	To:
533-105		
535V125		
535V140		
540-170		
540-170 MP		
540-200		
540V140		
540V140 MP		
540V180		
550-140		
550-170		

Using the Manual

The quick start 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.

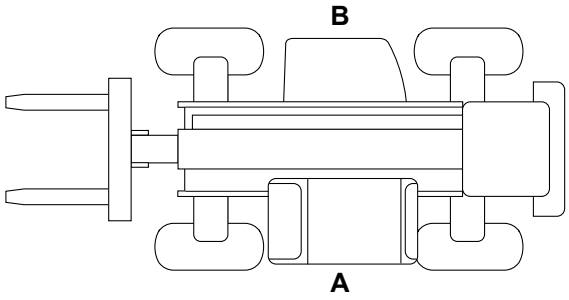
The manufacturer's policy is one of continuous improvement. The right to change the specification of the machine without notice is reserved. No responsibility will be accepted for discrepancies which may occur between specifications of the machine and the descriptions contained in this manual.

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

Left-Hand Side, Right-Hand Side

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

Figure 1.



A Left **B** Right

Cab/Canopy

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

Cross References

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

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Safety

Safety - Yours and Others

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

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

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

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

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

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

Remember:

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

Safety Warnings

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

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

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

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

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

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

Figure 2. The safety alert system symbol

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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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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.

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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.

Make sure you follow the instructions outlined in the operator's manual of the mounted or trailed machinery or trailer. Do not operate the combination tractor-machine or tractor-trailer unless all instructions have been followed.

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.

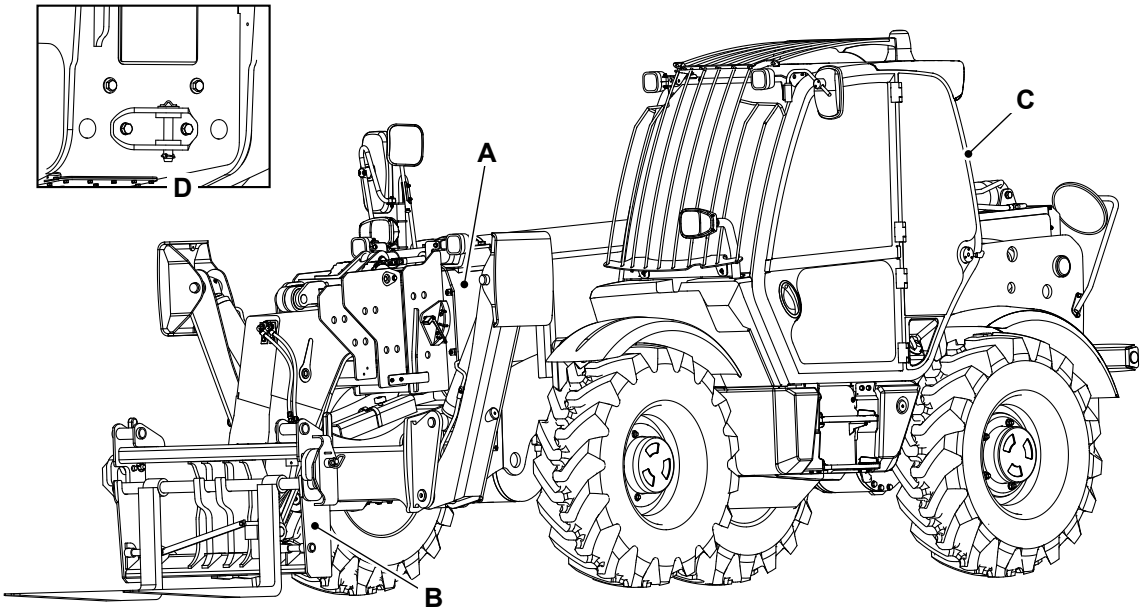
Danger Zone

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, stopping operation, isolating the controls and turning off the engine.

Main Component Locations

Figure 3.



A Lift arm/Boom
B Carriage
C ROPS (Roll-Over Protective Structure)/FOPS (Falling Object Protective Structure) cab
D Mechanical tow hitch

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Product and Component Identification

Machine

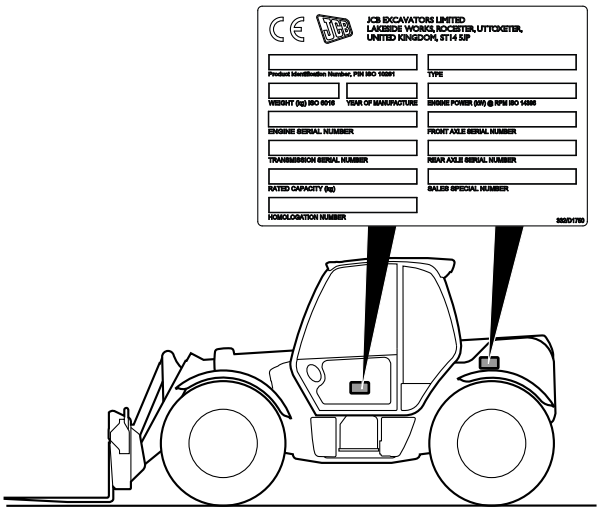
Machine Identification Plate

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

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

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

Figure 4.



Typical Product Identification Number

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

Table 1. Typical PIN

JCB	5AA	7	E	C	G	1234567

Table 2.

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

Table 3.

Digit 4 to 6	Machine Model
5AF	540-170
5AL	540-140

Digit 4 to 6	Machine Model
5AN	535-125 HiViz
5AP	535-140 HiViz
5AX	540-200
5A8	540-140 HiViz
5AG	550-140
5AM	550-170
5MA	Man basket machines
5MF	Man basket machines
5MX	Man basket machines
5M8	Man basket machines
5MN	Man basket machines
5RA	540-180 HiViz

Table 4.

Digit 7	Engine Type
JCB Dieselmax (Tier 4):	
2 (T4F)	81kW
3 (T4F)	93kW
4 (T4F)	108kW
7 (T4F)	55kW
8 (T4F)	68kW
A (T4F)	55kW
B (UN3/GB3)	68kW
C (UN3/GB3)	81kW
D (UN3/GB3)	93kW
E (UN3/GB3)	108kW

Table 5.

Digit 8	Gearbox Model
E	3 Speed (PS750)
F	3 Speed (PS760)
G	4 Speed (PS750)
H	4 Speed (PS760)
J	6 Speed (PS760)
M	4 Speed (SS700)
N	4 Speed (PS750)

Table 6.

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

Table 7.

Digit 10
Year of manufacture. G = 2016, H = 2017 etc.

Table 8.

Digit 11 to 17
Machine serial number. Each machine has a unique serial number.

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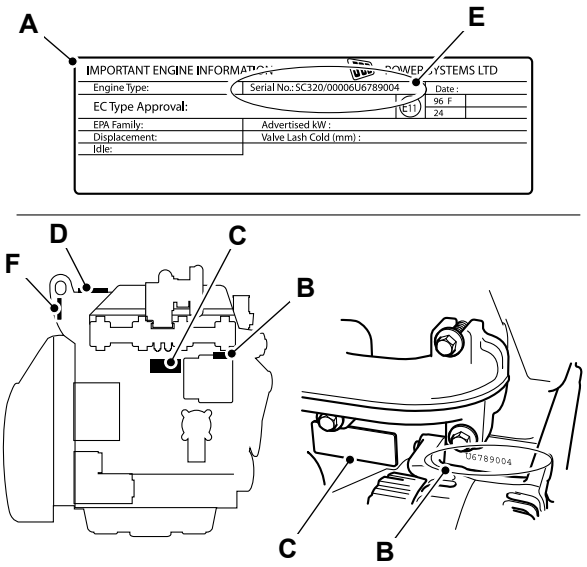
Engine

Engine data labels are located on the cylinder block and rocker cover (if fitted). The data label contains important engine information and includes the engine identification number. Injector codes are on a label on the rocker cover.

Figure 5.



A Engine data label
B Stamp - cylinder block
C Engine data label - cylinder block
D Engine data label - rocker cover
E Engine identification number
F Injector codes label - rocker cover

The data label includes the engine identification number.

Table 9. Example of the engine identification number

	SJ	**320/40001**	**U**	**00001**	**04**
Digit	1-2	3-10	11	12-16	17-18

Table 10.

Digit 1-2	**Engine Type**
SJ	4.4L turbocharged and aftercooled electronic common rail fuel injection (Tier 4F) > 55kW
DJ	4.8L turbocharged and aftercooled electronic common rail fuel injection (Tier 4F)
SL	4.4L turbocharged and aftercooled electronic common rail fuel injection (Tier 4F) 55kW
FL	3L turbocharged and aftercooled electronic common rail fuel injection (Tier 4F)
SM	4.4L turbocharged and aftercooled electronic common rail fuel injection (T3 High Sulphur UN3/GB3) > 55kW
DM	4.8L turbocharged and aftercooled electronic common rail fuel injection (T3 High Sulphur UN3/GB3) > 55kW

Table 11. Explanation of the engine identification number

Digit	**Explanation**
3-10	Engine part number
11	Country of manufacture. U = United Kingdom
12-16	Engine serial number
17-18	Year of manufacture

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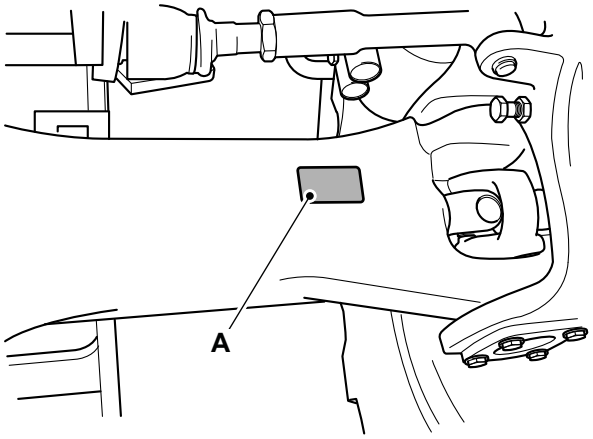
The country of manufacturer, engine serial number and year of manufacture of the engine are also stamped on the cylinder block. Refer to Figure 5.

Axle(s)

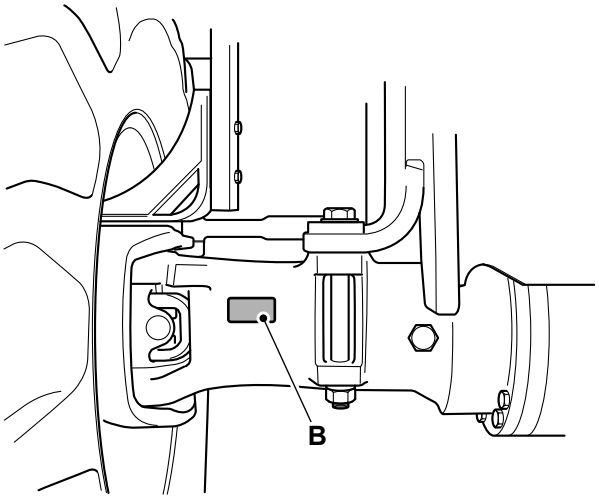
The axles have a serial number stamped on a data plate as shown.

Figure 6. Front axle



A Data plate - front axle

Figure 7. Rear axle



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. If the ROPS/FOPS 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 certification.

WARNING Machines with a ROPS/FOPS are equipped with a seat belt. The ROPS/FOPS 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.

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.

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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:

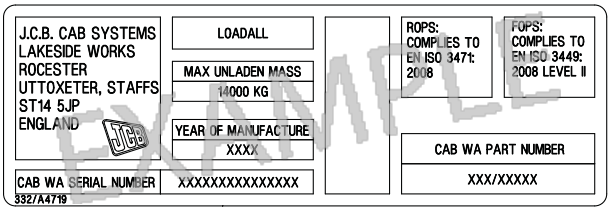
- Level I Impact Protection - impact strength for protection from small falling objects (e.g. bricks, small concrete blocks, hand tools) encountered in operations such as highway maintenance, landscaping and other construction site services.
- Level II Impact Protection - impact strength for protection 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.



Data plate - ROPS/FOPS standards

Safety Labels

General

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

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

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

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

Safety Label Identification

Figure 9.

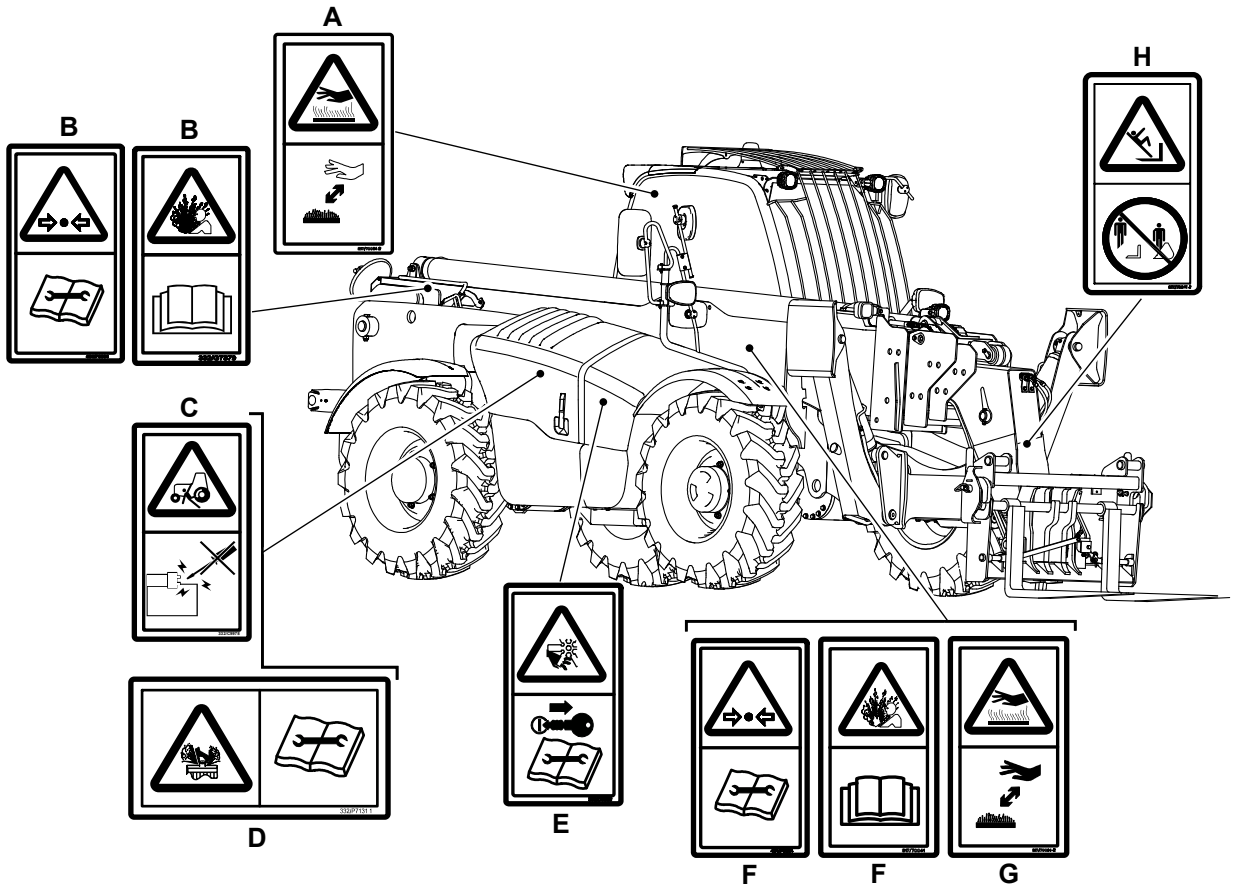


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Figure 10.

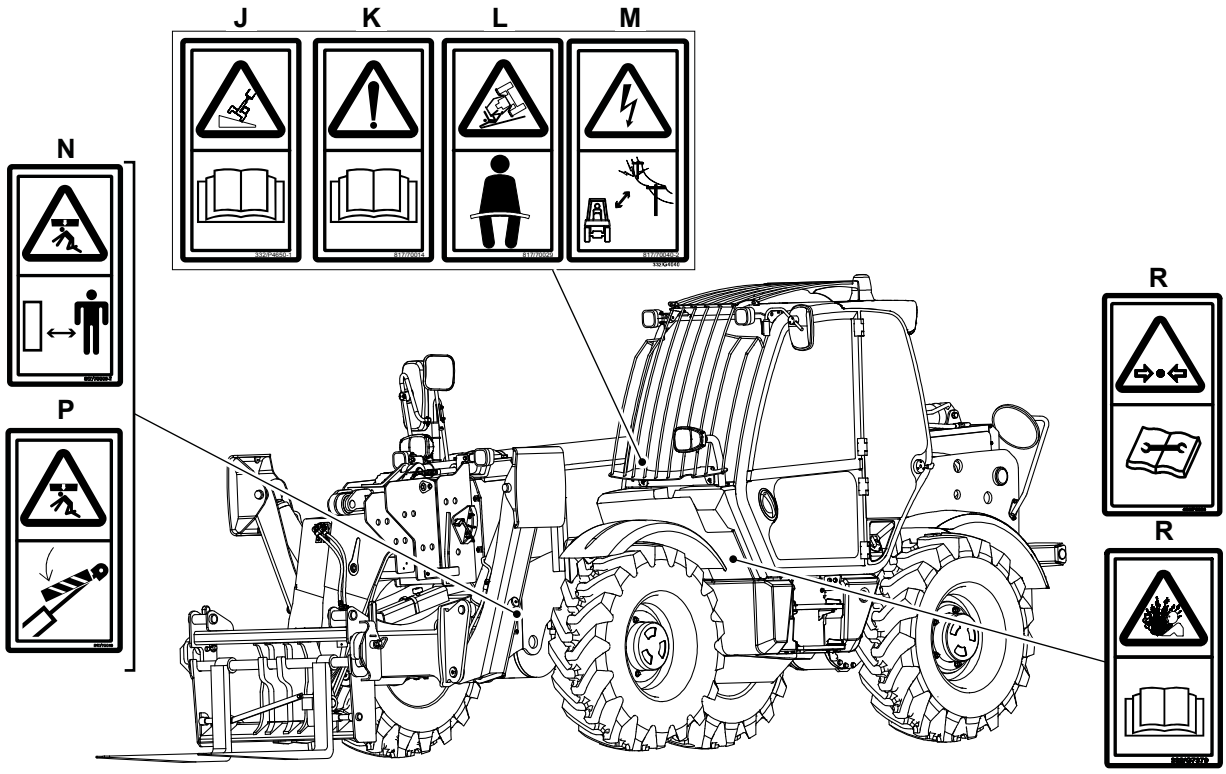

Table 12. Safety Labels

Item	Part No.	Description	Qty.
A	817/70004	Warning. Burns to fingers and hands. Stay a safe distance away.	1
B	332/G7379	Pressure hazard. Read Operator's Manual.	1 (1)
B	401/P0004	Pressure hazard. Read Service Manual.	1
C	332/C9978	Run over hazard. Start the engine from the operator's seat only. Do not short across the terminals.	1
D	332/P7131	Pressure hazard. Read the Service Manual.	1
E	333/D0526	Severing of hands or fingers. Keep clear of/do not reach into the moving parts. Stop the engine and remove the starter key before you start maintenance work. Refer to Maintenance Section in the Operator's Manual.	1
F	332/F5855	Warning. Pressure hazard. Read the Operator's Manual.	1 (1)
F	401/P1171	Stored energy/Pressure hazard. Read Service Manual.	1
G	817/70004	Warning. Burns to fingers and hands. Stay a safe distance away.	1
H	817/70011	Fall from raised attachment. Do not stand or ride on the bucket or forks.	1
J	332/P4650	Stability hazard. Read the Operator's Manual.	1
K	817/70014	Warning. Read the Operator's Manual before you operate the machine.	1
L	817/70029	Warning. Crush hazard. Wear seat belt.	1
M	817/70040	Electrical hazard. Stay a safe distance away from power lines.	1
N	817/70008	Crushing of whole body. Keep a safe distance from machine.	1
P	817/70010	Crushing of whole body. Insert the boom support device before you complete any service or maintenance work underneath the boom.	1
R	332/G7379	Pressure hazard. Read Operator's Manual.	1 (1)
R	401/P0004	Pressure hazard. Read Service Manual.	1

(1) Superseded

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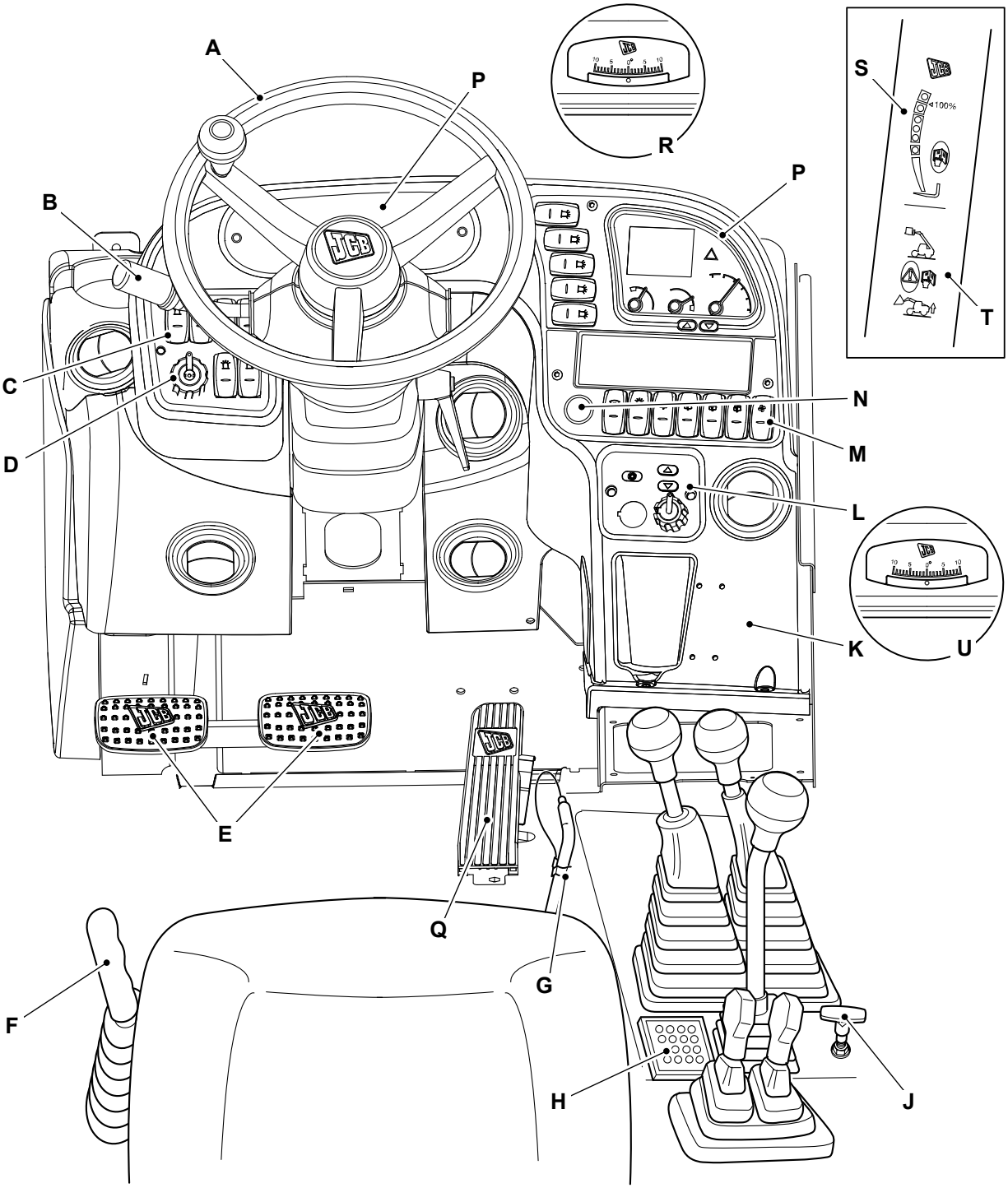
Operator Station

Component Locations

Figure 11.



A Steering wheel
Refer to: Steering Wheel (Page 68).
B Transmission Lever and Gear Selection
Refer to: Steering Wheel (Page 68).
C Console switches
Refer to: Introduction (Page 1).
D Steer mode selector
Refer to: Steer Mode Control (Page 72).
E Service brake pedal
Refer to: Service Brake Pedal (Page 68).
F Park brake lever
Refer to: Park Brake (Page 69).
G Control locks
H Immobiliser
J Hydraulic tow hitch
K Load charts
L HVAC (Heating Ventilation Air Conditioning)
M Console switches

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Refer to: Heating, Ventilating and Air-Conditioning (HVAC) (Page 145).

N Ignition switch
Refer to: Ignition Switch (Page 19).

Q Accelerator Pedal

S LLMI (Longitudinal Load Moment Indicator)

U Longitudinal Inclinometer

Refer to: Console Switches (Page 21).

P Instrument panel
Refer to: Instrument Panel (Page 73).

R Lateral Inclinometer

T Load control system

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Interior Switches

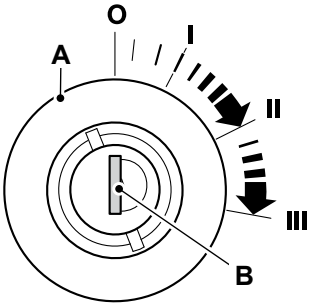
Ignition Switch

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.

Figure 12.



A Ignition switch **B** Ignition key

Table 13. Switch Positions

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

Multi-Purpose Switch

Direction Indicators

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

Windscreen Wiper

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

Single Speed (Standard)

0 = Off

I = On

Two Speed (Optional)

J = Intermittent Wipe

0 = Off

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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.

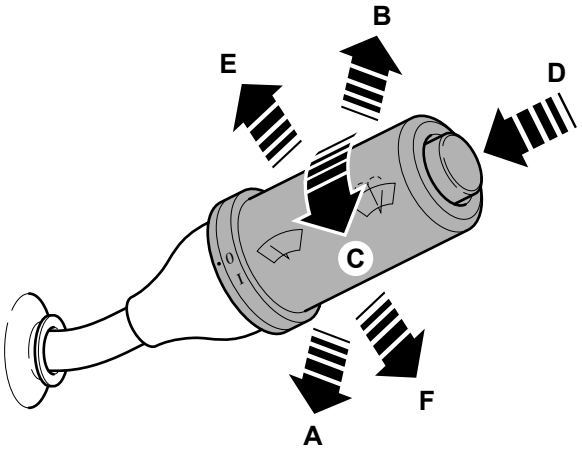
Headlights Flash

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

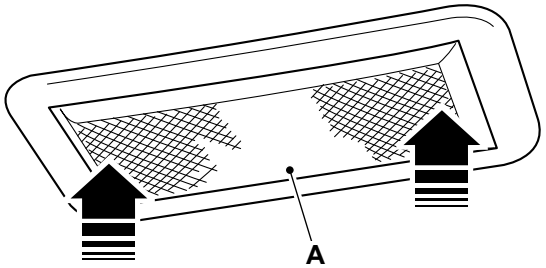
Cab Interior Light

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

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Console Switches

General

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

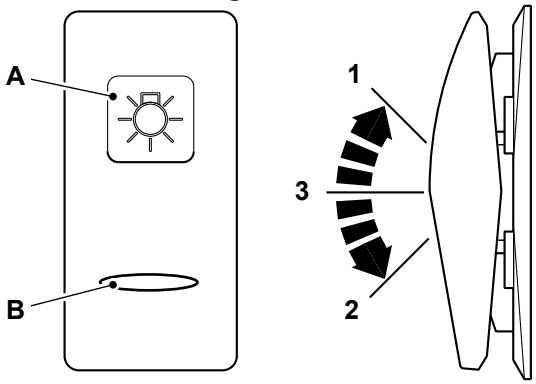
Each switch has a graphic symbol to show the function of the switch. Before you operate a switch, make sure that you understand its function.

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.

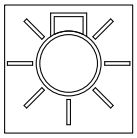
The light bar illuminates to show that the switch function is active.

Figure 15.



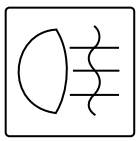
A Graphic symbol **B** Light bar

Road Lights



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

Rear Fog Lights



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

Hazard Warning Lights

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

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Work Lights

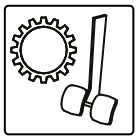
(If fitted) Three position rocker switch. The switch functions operate when the ignition switch is in the on position. The work lights work independently of the main circuit lights.
Position : 1 = Off
Position : 3 = Front work lights on
Position : 2 = Front/rear/hitch work lights on.

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

Transmission Mode

Two position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: Manual
Position **2**: Auto (Push then release)

Transmission Disconnect



Three position rocker switch. The switch functions operate when the ignition switch is in the on position. If the ignition is cycled then the system returns to off (no transmission disconnect) even if the switch is left in position 3. Position 2 must be selected every key cycle to engage transmission disconnect.
Position **1**: Off.
Position **3**: Prime
Position **2**: Transmission disconnect (push then release)

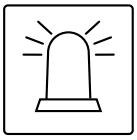
Information

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

Tilt Lock

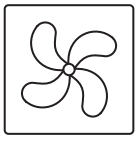
Two position rocker switch with backlight. The switch functions operate when the ignition switch is in the on position.
Position **1**: Off (Backlight off)
Position **2**: Tilt lock on (Backlight on)

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 = 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)

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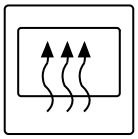
Window Heater



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

Inner Boom Extend/Retract

Two position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: Inner boom extend/retract disabled
Position **2**: Inner boom extend/retract enabled

Controls Isolation

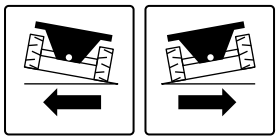
Two position rocker switch with backlight. The switch functions operate when the ignition switch is in the on position. Before you operate the switch, make sure you release the control lever locks.
Position **1**: Off
Position **2**: On

Stabiliser Isolation

Applied to machines with stabilisers only. 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**: Stabiliser isolation on (Backlight on)

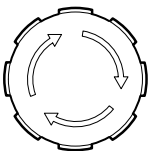
Refer to: Control Lock (Page 65).

Chassis Levelling



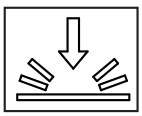
Three position rocker switch. The switch functions operate when the engine is running.
Position **1**: Sway left - Push and hold the switch.
Position **3**: Off.
Position **2**: Sway right - Push and hold the switch.

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 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)

Refer to: Discharge (Page 285).

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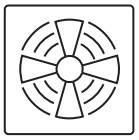
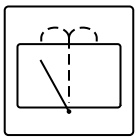
Reverse Fan



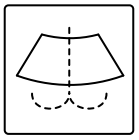
Three position rocker switch. The switch functions operate when the engine is running. An ECU controls the fan speed and direction. The cooling fan rotation can be reversed to help clear debris from the grilles. Always position the machine in a relatively clean area before reversing the fan to make sure 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

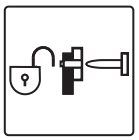


Three position rocker switch. The switch functions operate when the ignition switch is in the on position.
Position **1**: Wiper off
Position **3**: Wiper on
Position **2**: Washer on (push and hold)

Auxiliary Hydraulic Circuit

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

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 through from beginning to end.

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

When you understand the operating controls, gauges and switches, practice using them. Drive the machine in an open space, clear of people. Get to know the 'feel' of the machine and its driving controls.

Do not rush the job of learning, make sure you fully understand everything in the Operation section. Take your time and work efficiently and safely.

Remember:

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

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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 it's 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.

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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.

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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.

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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

⚠ **DANGER** Factors affecting machine stability include size and type of load, angle of elevation, the distance the boom is extended, ground condition and wind speed and direction.

It is the responsibility of the operator to assess the wind conditions and size of load before operating the machine.

It is the responsibility of the operator to assess the terrain, surface roughness, firmness of ground (remember that when wet, the ground will not support the same loads as when dry) before operating the machine.

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.

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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?

General

An area selected as a loading/unloading area should be large enough to accommodate all the wheels of the machine and stabilisers (if fitted). It should not be necessary for the machine to make tight turns with an elevated load.

The area should be of consolidated firm ground, capable of accepting the weight of the machine and its load without significant deformation. Ideally, it should be substantially level in both planes, that is no gradient of more than 2.5% (1 in 40) in either plane.

However, your machine may safely be used for loading/ unloading operations in areas which are not substantially level provided that its design capabilities are not exceeded and that the operator is satisfied that no part of the operation is outside the scope of his/her training and experience.

The capabilities of your machine are extended if stabilisers or sway control are fitted.

Traffic routes should be of consolidated firm ground with no gradient more severe than the following:

- Maximum up slope: 15% (1 in 7)
- Maximum down slope: 15% (1 in 7)
- Maximum lateral slope: 15% (1 in 7)

These figures apply only to the machine in it's normal travelling mode, that is with boom retracted and with the upper surface of the heels of the fork arms not more than 500mm (19.7 in) above mean ground level, and travelling no faster than walking pace. Particularly in the case of a lateral slope, some form of restraint on the load may be necessary.

Observe the maximum wading depth of this machine. Water can enter the engine and axles, and the cooling fan can be damaged if the machine is operated in deeper water.

Loading/Unloading Area

- Is it level? Any slope of more than 2.5% (1 in 40) must be carefully considered.
- Is more than one direction of approach to the load possible? Approaching across the slope must be avoided, if possible.
- Is the ground solid? Will it support the weight of the machine when loaded?
- How rough is the ground? Are there any sharp projections which could cause damage, particularly to the tyres?
- Are there any obstacles or hazards in the area, for example, debris, excavations, manhole covers, power lines?
- Is the space sufficient for safe manoeuvring?

- Are any other machines or persons likely to be in or to enter the area while operations are in progress?

The Route to be Travelled

- How solid is the ground, will it provide sufficient traction and braking?
- 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.

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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.

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Entering and Leaving the Operator Station

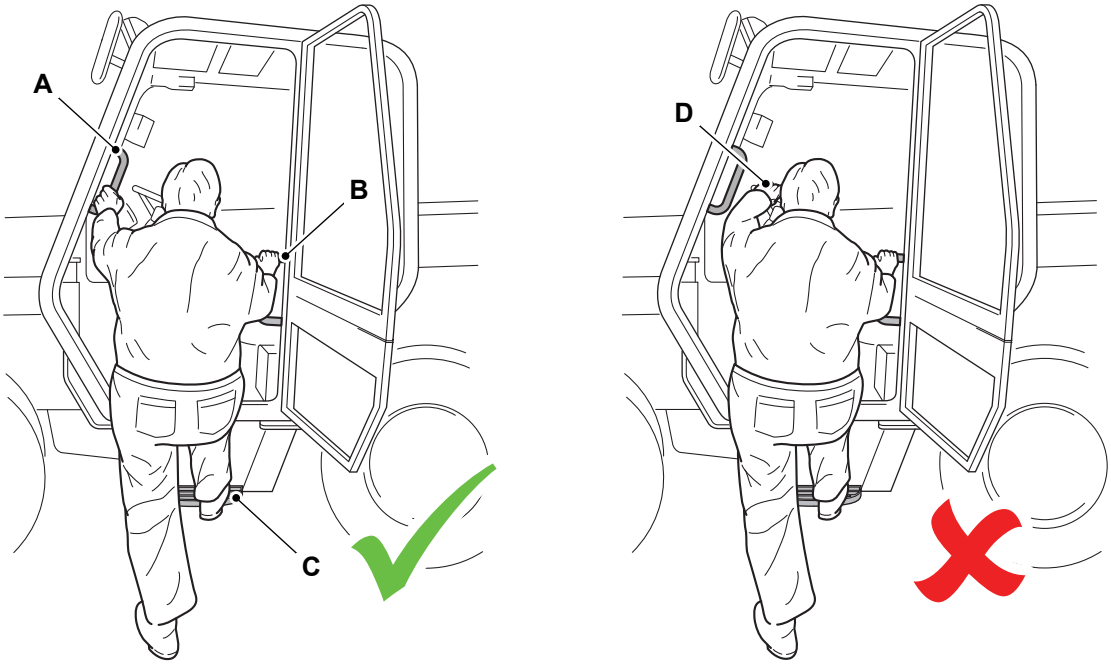
General

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

Make sure the machine is stopped and correctly parked before entering or leaving the cab.
Refer to: General (Page 56).

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

Figure 16.



A Left handrail
B Right handrail
C Step
D Steering wheel

Emergency Exit

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

The rear window can be used as an emergency exit. Make sure the emergency exit is not obstructed.

1. Remove pins and open the window fully.

    1.1. Pins should be removed in the event of an emergency. Do not remove the pins to increase the rear window opening.

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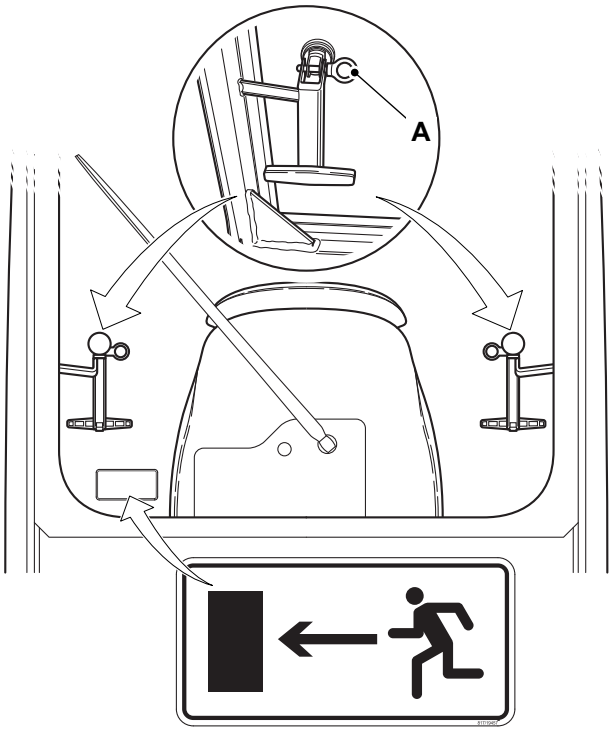
Figure 17.



A Pins

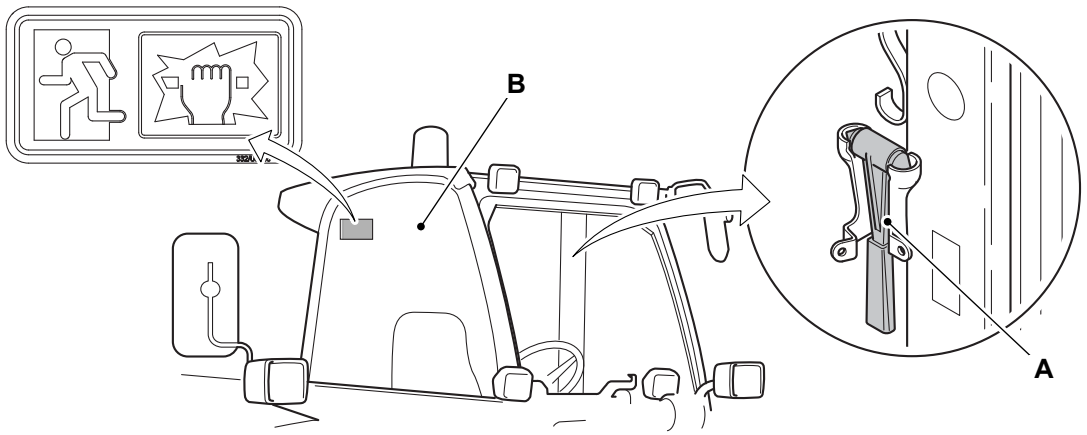
Glazing Breaker (if installed)

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

Remove the glazing breaker and strike the side screen near the corner, this will shatter the screen which can then be knocked out.

The right hand side cab glass is installed for the operator protection. If this is damaged, do not use the machine until it has been replaced.

Figure 18.



A Glazing breaker **B** Side screen

Doors

Operator Door

⚠ **Notice:** Do not drive the machine with the door unlatched.

Door

To open the door from the outside: Refer to Figure 19.

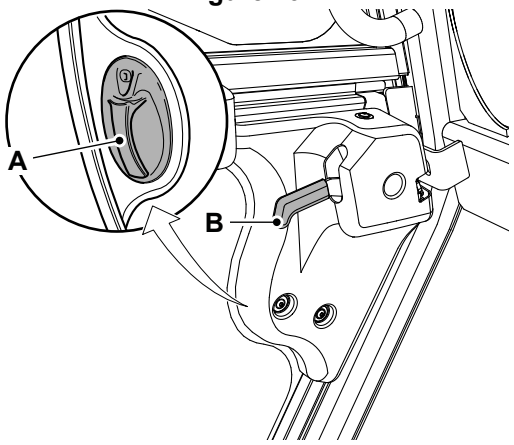
1. Unlock the door with the ignition key.
2. Pull the handle to release the latch.

To close the door:

Close the door from the inside by pulling the closing bar firmly; it will latch itself. Refer to Figure 19.

To open the door from the inside, pull lever to release the latch. Refer to Figure 19.

Figure 19.



A Handle

B Lever

Upper Door Section

To open the upper door section: Refer to Figure 20.

1. With the cab door closed, push the lever to release the upper door section.
2. Swing the door fully open until it latches.
3. To set the door slightly open, operate the lever. Rotate the door ajar pivot and locate in the latch position.

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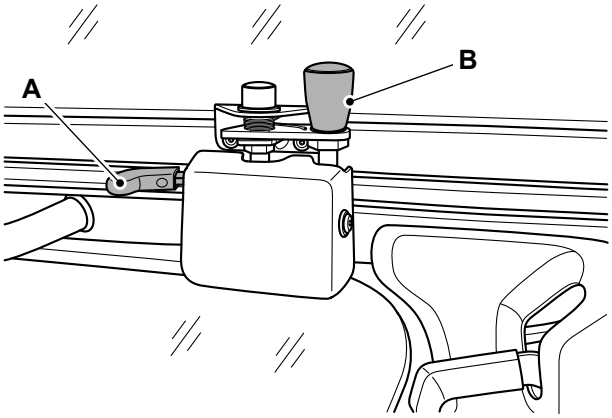
Figure 20.

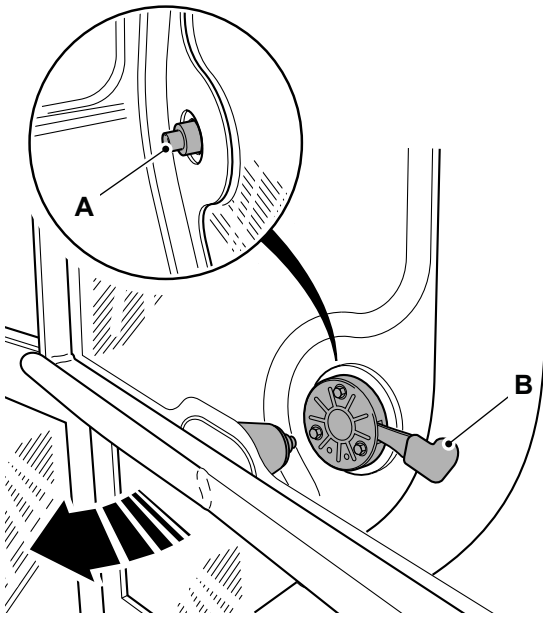


A Lever **B** Door ajar pivot

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 until it latches into position.

Figure 21.



A Button **B** Door catch

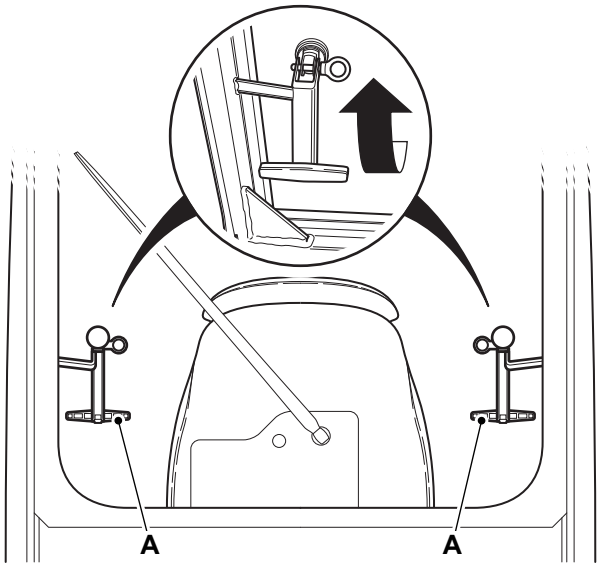
Windows

Rear Window

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

To close the window, swing the catches in the opposite direction until it locks in position.

Figure 22.



A Catches

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Battery Isolator

General

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

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

To allow the engine ECU (Electronic Control Unit) to shutdown correctly, you must wait 85s before you isolate the battery. The 85s period starts when you turn the ignition off. If a radio is fitted, you may loose any settings.

Additionally on machines using DEF (Diesel Exhaust Fluid) there is a 85s delay after isolating the machine electrics. A ticking noise will be heard from the purge pump during this time.

The hazards lights can be switched on before isolating the battery and once they extinguish this confirms that the ECU has fully shut down.

Disconnect the Machine Electrics:

1. Turn the ignition key to the off position.
2. Switch on the hazard lights.
3. Wait for the engine ECU to shutdown correctly. When the hazard lights go off this indicates the machine ECU is fully shutdown.

   Duration: 85s
4. Get access to the battery isolator.

   Refer to: Service Points (Page 211).
5. 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.

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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 155).
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 32).

   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 249).

   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 40).
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.

Basic Seat

The basic seat has vibration isolation performance as follows: ISO 7096 EM classes EM3, EM4, EM5, EM6, EM7, EM8, EM9 ISO 5007 classes AG 1, AG2, AG3 DIRECTIVE 78/764/EEC classes I, II, III

Seat Adjustments

Fore/Aft

Lift the fore/aft lever and slide the seat into the required position. Release the lever. Make sure the seat is locked in position.

Backrest

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

Height

Pull the lever upwards and raise or lower the front of the seat and the seat cushion into required position. Release the lever.

Weight

The weight indicator shows the adjustment required for the seat to match the operator weight.

Pump the lever up or down as required until the weight indicator is set to the correct position.

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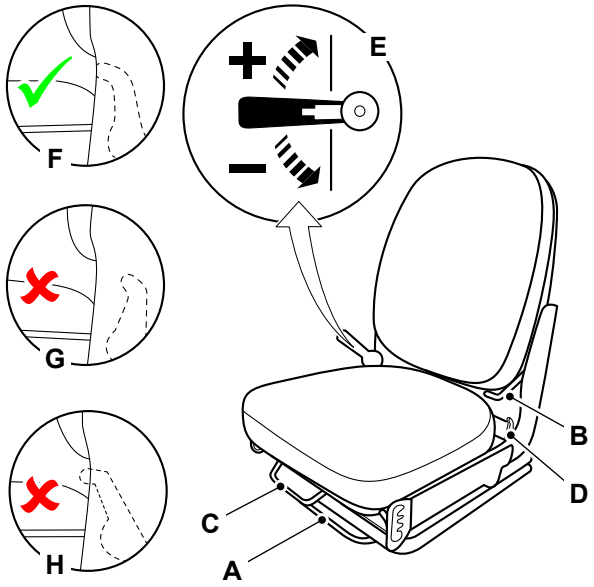
Figure 23.



A Fore/aft adjustment lever
B Backrest lever
C Height adjustment lever
D Weight indicator
E Lever
F Weight set correctly
G Weight set too low
H Weight set too high

Suspension Seat

The suspension seat has vibration isolation performance as follows: ISO 7096 EM classes EM3, EM5, EM6, EM7 ISO 5007 classes AG 1, AG2, AG3 DIRECTIVE 78/764/EEC classes I, II, III

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.

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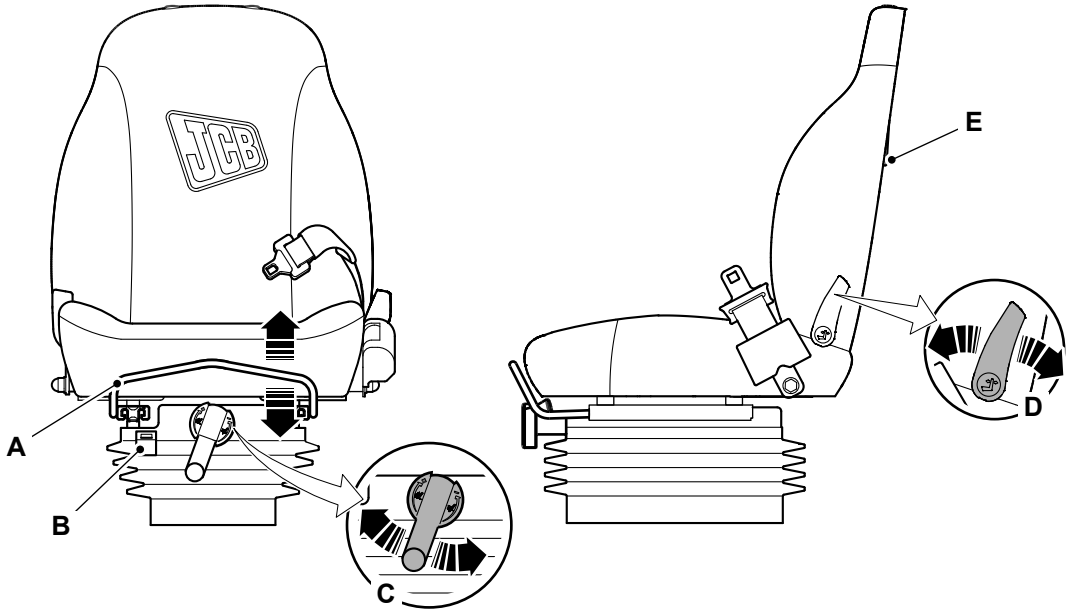
Figure 24.



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

Suspension Seat (KAB 100 Series - Air)

Horizontal Adjustment

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

Height

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

Backrest

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

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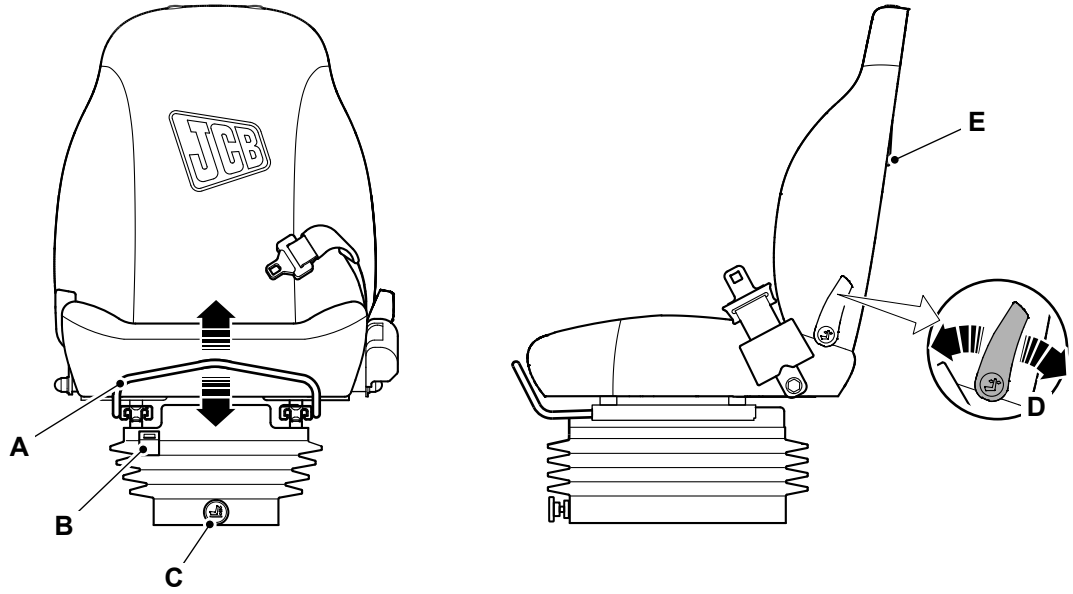
Figure 25.



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

Suspension Seat (KAB 800 Series - Air)

Horizontal Adjustment

Lift the lever upwards and slide the seat into the required position. Push the lever down to lock the seat in its position.

Height

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

One Touch Raiser (If fitted)

Press the one touch raiser button to automatically adjust the seat to the mid ride position.

Lumbar

Turn the lumbar adjuster to increase or decrease the lumbar support.

Backrest

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

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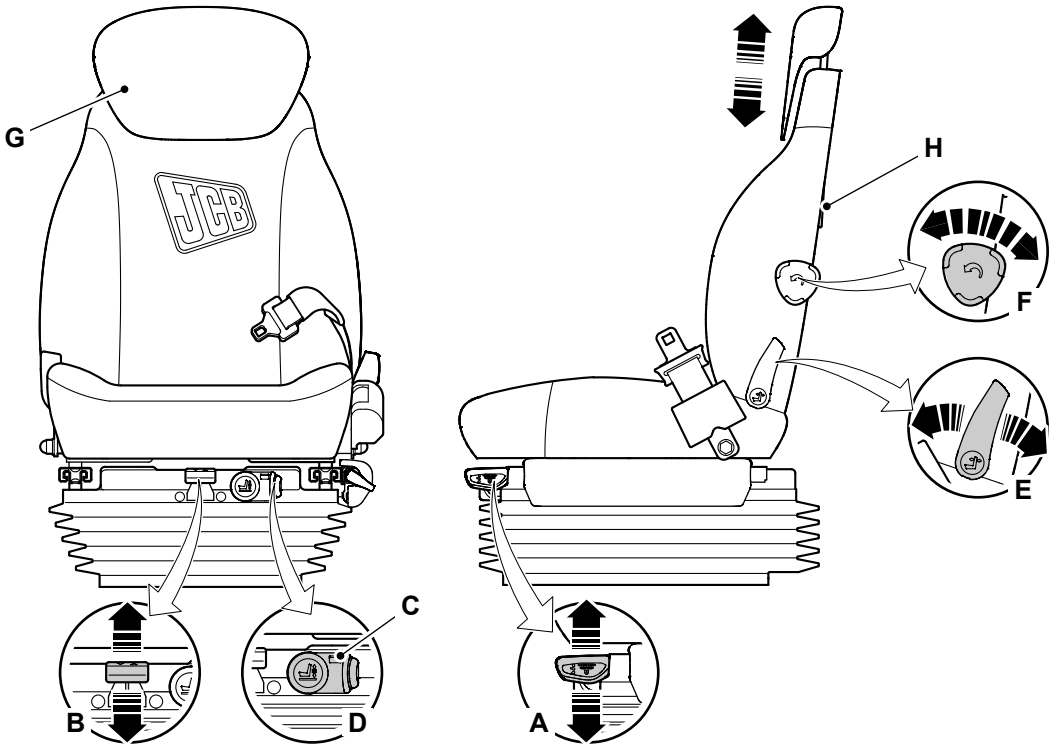
Figure 26.



A Horizontal adjustment lever
B Height adjustment lever
C Ride height indicator
D One touch raiser
E Backrest lever
F Lumbar adjuster
G Backrest extension
H Document cover

Heated Seat Controls

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

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

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

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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 replace it with a new one if it is damaged, if the fabric is worn, or if the machine has been in an accident.

Inertia Reel Seat Belt

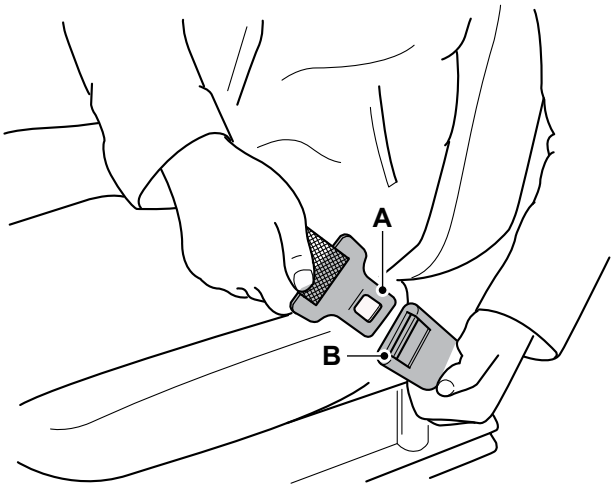
Fasten the Seat Belt

⚠ **WARNING** If you do not wear your seat belt you could be thrown about inside the machine, or thrown out of the machine and crushed. You must wear a seat belt when using the machine. Fasten the seat belt before starting the 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 27.



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 28.

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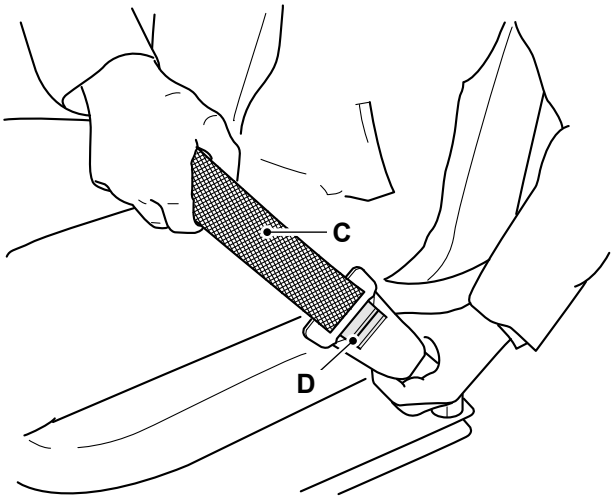
Figure 28.



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.

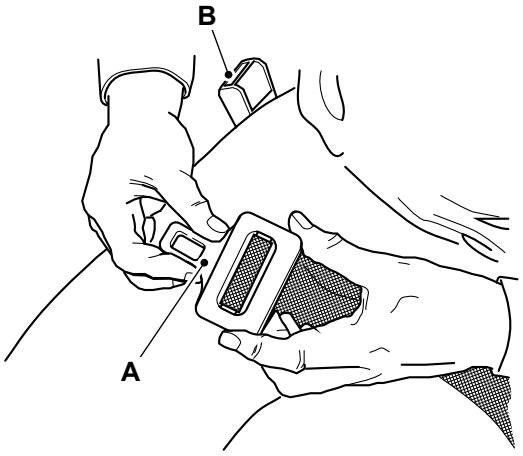
Static Seat Belt

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 29.



A Tongue **B** Latch

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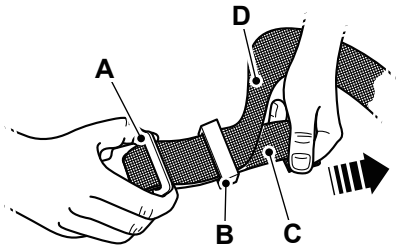
Adjust

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 30.



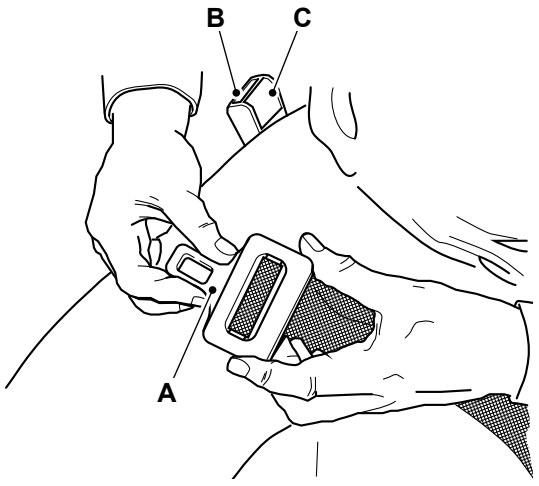
A Tongue
B Toggle
C Strap (pull here to lengthen)
D Strap (pull here to shorten)

Release the Seat Belt

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

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

Figure 31.



A Tongue
B Latch
C Button

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Mirrors

General

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

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

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

Visibility diagrams according to FprEN 15830:2011 are provided.
Refer to: Static Dimensions (Page 295).

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

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

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

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

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

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

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Starting the Engine

General

For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine ..... Page 49

For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB T4F 3.0 55kw Electronic Turbocharged Aftercooled Engine ..... Page 51

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine)

⚠ **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.

The engine control system automatically controls the response of the engine during its warm up phase; depending on the engine temperature, ambient air temperature, and throttle pedal position.

Under certain conditions condensate (steam) can be seen emitting from the exhaust tail pipe. This is normal and should not be considered a fault.

Engines with SCR (Selective Catalytic Reduction) after-treatment: If the engine and has been run low on DEF (Diesel Exhaust Fluid) and the engine has entered a de-rate state due to low DEF you must fill the machine with DEF and cycle the ignition twice to remove the fault.

1. Make sure that the machine is ready to start.
   Refer to: Before Starting the Engine (Page 39).
2. Disarm the immobiliser (if fitted).
   Refer to: Immobiliser (Page 52).
3. Put the forward/reverse lever in neutral.
   Refer to: Operating Levers/Pedals (Page 104).
   3.1. The engine will not start unless the forward/reverse lever is in neutral.
4. Make sure the battery isolator key is installed and switched on.
   Refer to: General (Page 38).
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: -12°C to 0°C

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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 73).

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 prior to starting the engine to assist the priming of the engine lubrication system.

Duration: 3s

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

Duration: 11s

7. Start the engine at cold climate engine start: -12°C to -20°C

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 73).

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 prior to starting the engine to assist the priming of the engine lubrication system.

Duration: 4s

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

Duration: 21s

8. Start the engine at cold climate engine start: below -20°C

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 -12°C to -20°C

8.3. Do not use the block heater in ambient temperatures of above 0°C

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 73).

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 at idle during which time the throttle control is overridden to assist priming of the lubrication system.

Duration: 33s

9. Release the ignition key when the engine starts.

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

10. 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 73).

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

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

11. 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.

12. 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.

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

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

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).

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB T4F 3.0 55kw Electronic Turbocharged Aftercooled Engine)

⚠ **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.

The engine control system automatically controls the response of the engine during its crank, start and warm up phase; depending on the engine temperature, ambient air temperature, and throttle pedal response.

Under certain conditions condensate (steam) can be seen emitting from the exhaust tail pipe. This is normal and should not be considered a fault.

1. Make sure that the machine is ready to start.
Refer to: Before Starting the Engine (Page 39).

2. Disarm the immobiliser (if fitted).
Refer to: Immobiliser (Page 52).

3. Put the forward/reverse lever in neutral.
Refer to: Operating Levers/Pedals (Page 104).

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

4. Make sure the battery isolator key is installed and switched on.
Refer to: Battery Isolator (Page 38).

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: -12°C to -20°C

6.1. Turn the ignition key to the on position (position I), the glow plug icon shows on the dash.
Refer to: Instruments (Page 73).

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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.

7. Start the engine at cold climate engine start: below -20°C

   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 and block heaters must be installed in to the engine block coolant jacket.

   7.2. There is no detriment if the block heater is used in ambient temperatures of -12°C to -20°C

   7.3. Do not use the block heater in ambient temperatures of above 0°C

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

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

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

8. Release the ignition key when the engine starts.

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

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

   Refer to: Instruments (Page 73).

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

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

10. 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.

11. 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.

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

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

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.

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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.

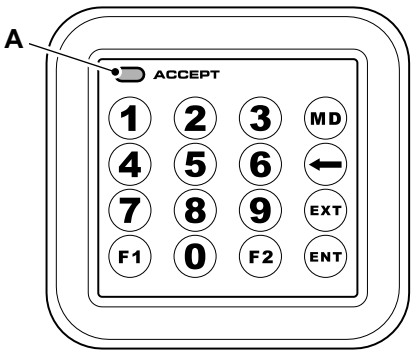
The PIN code will have to be entered every time that the ignition is switched off for longer than two minutes.

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.

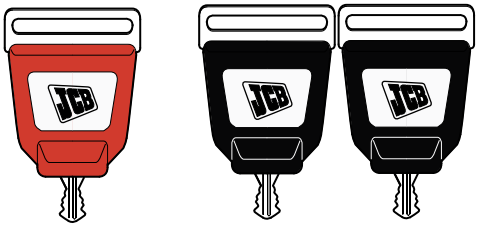
Unique Key Immobiliser System

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.

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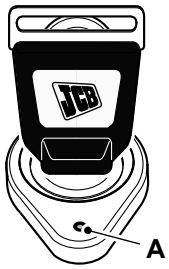
Figure 34.



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.

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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 press 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 by pulling up the lever.
4. Set the transmission to neutral. Make sure the lever is in its detent position. 506-36 machines only: 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 65).
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

   7.1. Engines with SCR (Selective Catalytic Reduction) after-treatment: A ticking noise will be heard from the purge pump for a short time after stopping the engine.
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 diesel fuel and DEF (Diesel Exhaust Fluid) (if applicable) filler caps are 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 291).

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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

⚠ **WARNING** In low visibility or at night, we recommend removing the forks before travelling on public roads. Transport the forks on a suitable vehicle.

1. Before you travel on public roads, remove the front windscreen guard if installed.
2. Use the chassis levelling (sway) switch (if installed) to set the machine body square to the axles.
   Refer to: Chassis Levelling Controls (Page 108).
3. Make sure that both the stabiliser legs (if installed) are fully raised and isolated.
4. Fully retract the boom.
5. Lower the boom fully then raise it until carrier is above the ground.
   Length/Dimension/Distance: 300mm
6. Tilt the carriage back, to keep the heel of the forks above the ground.
   Length/Dimension/Distance: 300mm

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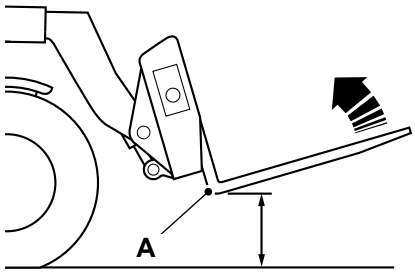
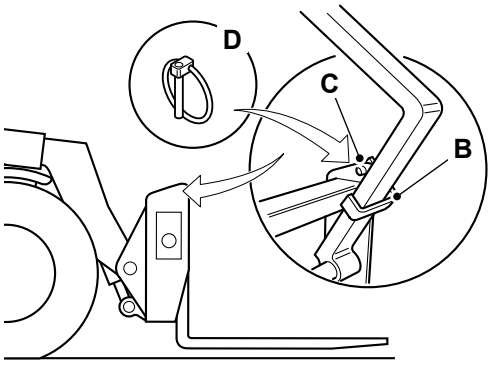
Figure 35.



A Fork

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

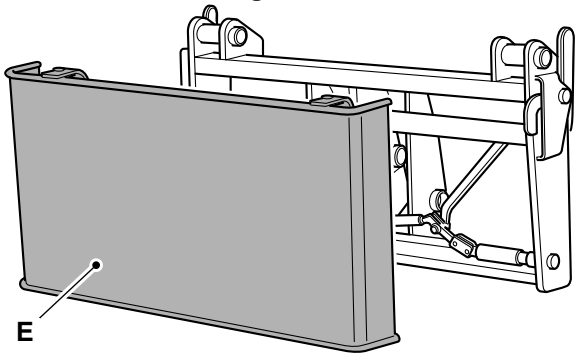
Figure 36.



B Retention brackets
C Retaining pin
D Locking pin

8. In certain countries, legislation requires forks to be removed and safety guard installed. Contact the local authorities.

Figure 37.



E Safety guard

9. If the pivoting lights are installed, move them to the horizontal position.

   9.1. Move the rear light cluster to the horizontal position. The cluster is spring loaded by its rubber mounting bush. To swing it up or down, whichever is applicable to your machine, pull the cluster slightly rearward to disengage, then swing it to the new position as shown. Refer to Figure 38.

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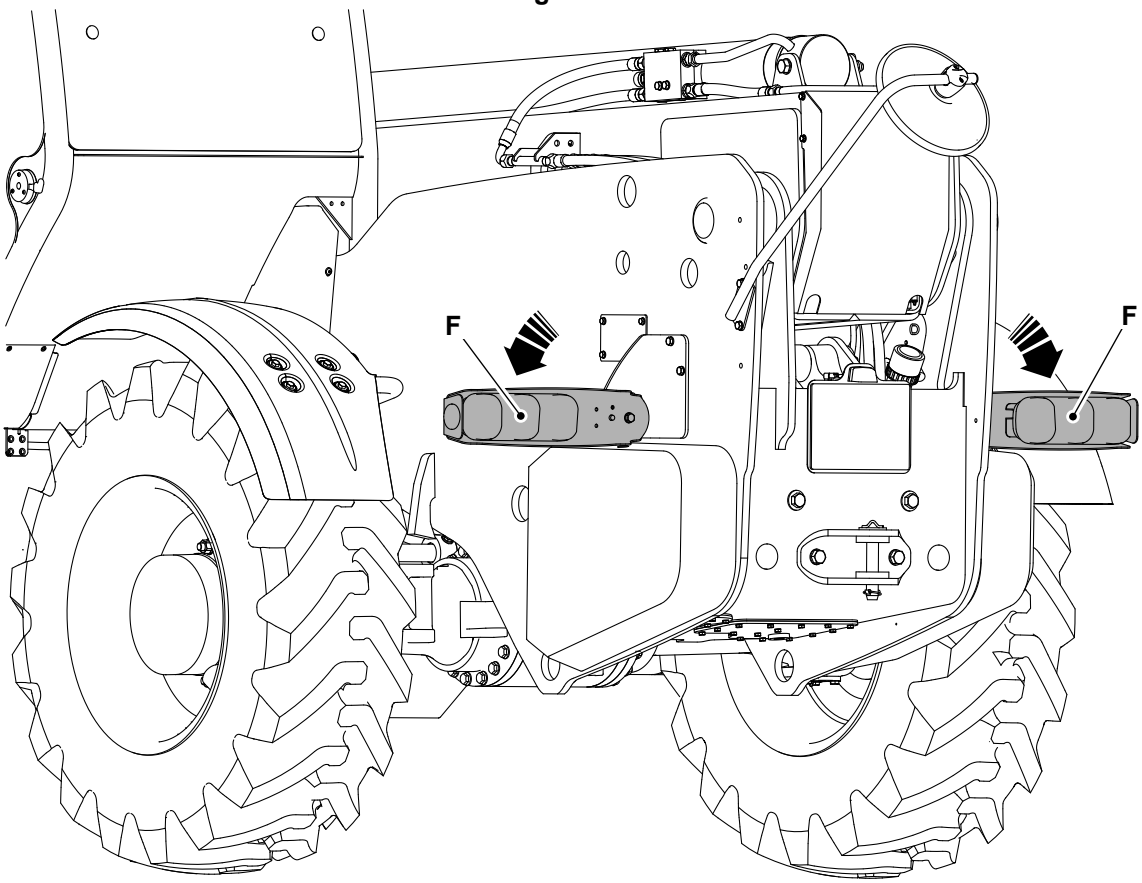
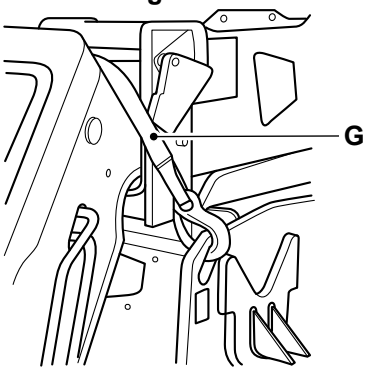
Figure 38.



F Cluster

10. Put the boom in travel position and install the restraining strap over the boom and attach to the lifting lugs on the chassis side plates (territory dependant).

Figure 39.



G Restraining strap

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

Refer to: Attachments (Page 159).

11.1. Install the tooth guard if you travel the machine with bucket.

11.2. In certain countries, legislation requires safety marker plate to be installed before travelling on public roads.

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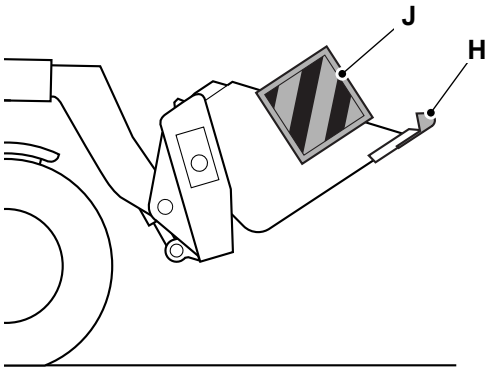
Figure 40.



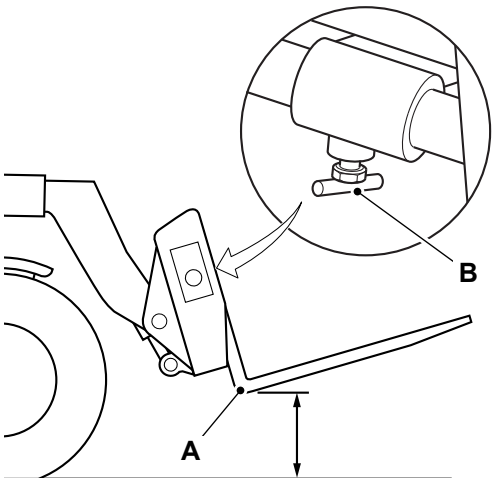
H Tooth guard **J** Marker plate

12. Do not travel on public roads with the machine loaded.
13. Lock the controls (as required).
14. Align the road wheels.
15. Select 2-wheel steer, do not use crab steer or 4-wheel steer on public roads.
16. Select 2-wheel drive.
17. Check that all road lights are working correctly.
18. The traffic regulations may require you to have a rotating beacon operating on some public roads.
    Refer to: Beacon (Page 63).

Preparing for Worksite Travel

1. Use the chassis levelling (sway) switch, (if installed) to set the body of the machine square to the axles.
   Refer to: Chassis Levelling Controls (Page 108).
2. Make sure that both the stabiliser legs (if installed) are fully raised and isolated.
   Refer to: Stabiliser Controls (Page 109).
3. Fully retract the boom.
4. Lower the boom fully then raise it until the carrier is above the ground.
   Length/Dimension/Distance: 300mm
5. Tilt the carriage back, to keep the heel of the forks above the ground.
   Length/Dimension/Distance: 300mm

Figure 41.



A Fork **B** Clamping screws

6. When attachments are fitted, position the boom in the 'low carry' position so that the right hand mirror is not hidden from the operator's view.
7. Tighten the clamping screws to prevent side movement of the forks (if installed).
8. Move the rear light cluster to the vertical position. The cluster is spring loaded by its rubber mounting bush. To swing it up or down, whichever is applicable to your machine, pull the cluster slightly rearward to disengage, then swing it to the new position as shown.

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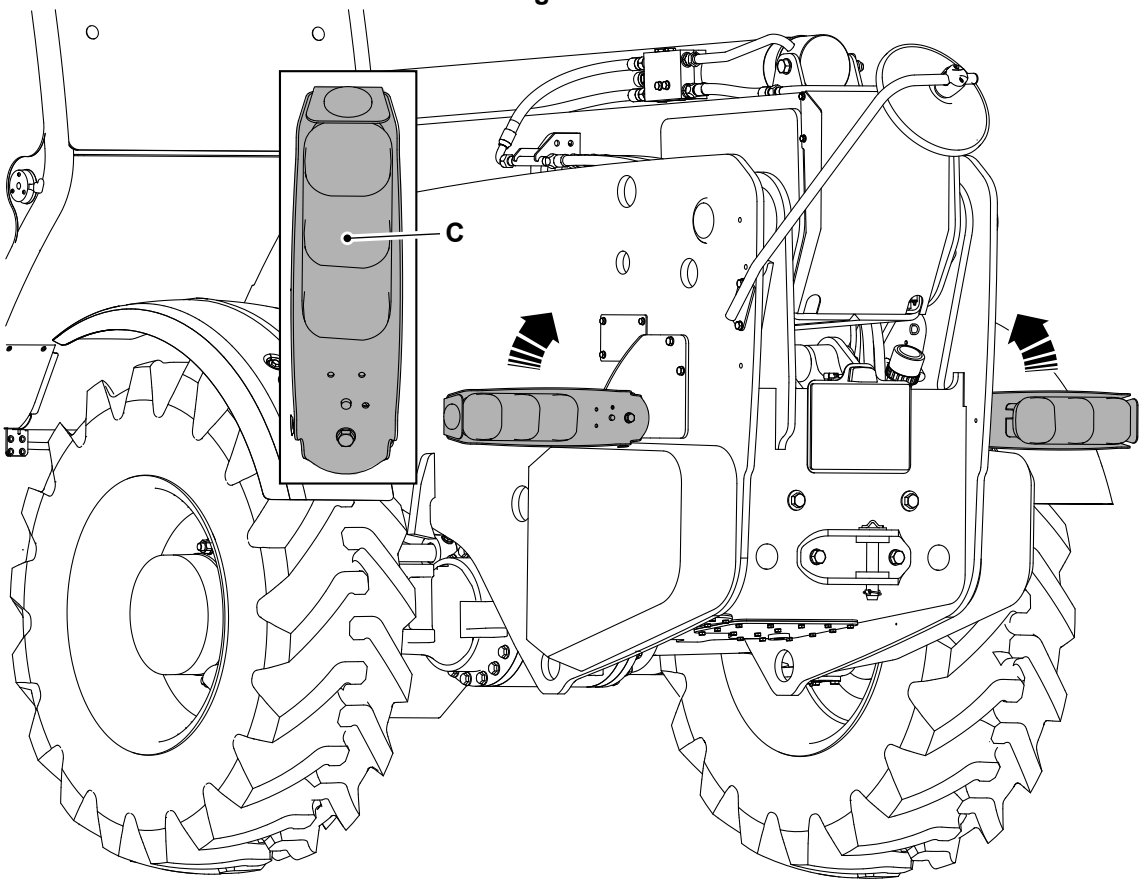
Figure 42.



C Cluster

9. Select the steer mode required.
10. If any optional attachments are installed, make them safe.
    Refer to: Attachments (Page 159).

Beacon

For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F] ..... Page 63
For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F] ..... Page 64

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F])

In certain territories you will break the law if you do not install a 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 21).

Knock-back Beacon

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 43.

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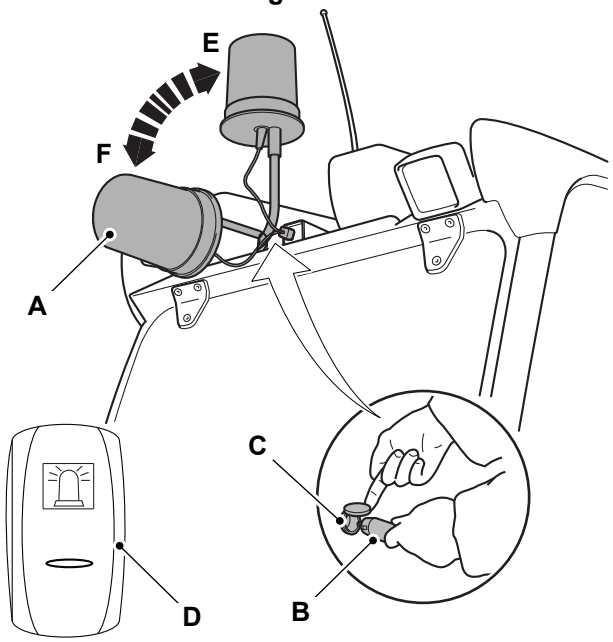
Figure 43.



A Beacon
B Plug
C Socket
D Switch
E Raised position
F Lowered position

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F])

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 is 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.

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Safety Equipment

Control Lock

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

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

Control levers and switches could change on machines. The machine might be installed with any of the following control layouts:

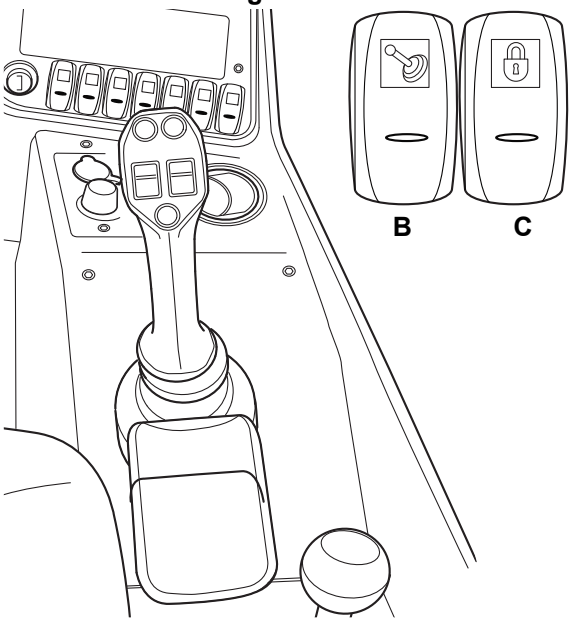
Single Lever Control Lock

Move the joystick isolation switch to the on position to isolate the joystick functions.

Move the tilt lock switch (if installed) to the on position to isolate the tilt function.

Operate the related controls to make sure that the functions are locked.

Figure 44.



B Isolation switch **C** Tilt lock Switch

Dual Lever Control (Loading and Placing Patterns)

All Levers Lock

Lock all the control levers before you travel on public roads.

To lock the controls, make sure the levers are in the neutral position, then press down pin as far as it will go.

Before you start the engine make sure the controls are locked.

Raise the pin to release the lock.

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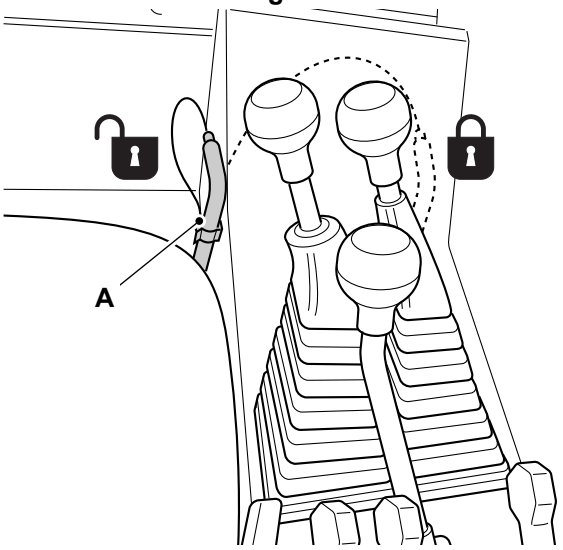
Figure 45.



A Pin

Tilt Lever Lock

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

To lock the controls, make sure the lever tilt lever is in the neutral position, then press down pin as far as it will go.

Before you start the engine make sure the controls are locked.

Raise the pin to release the lock.

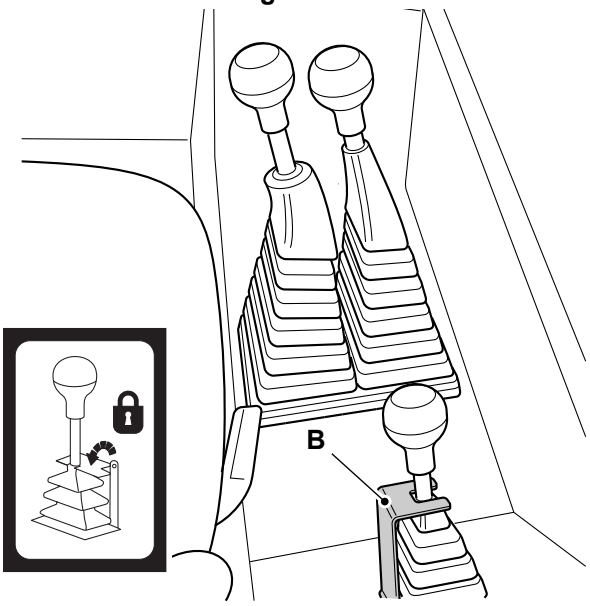
Auxiliary Lever Lock

To lock the controls, make sure the auxiliary lever is in the neutral position and move the mechanical lock to the lock position.

Before you start the engine make sure that the lever is locked.

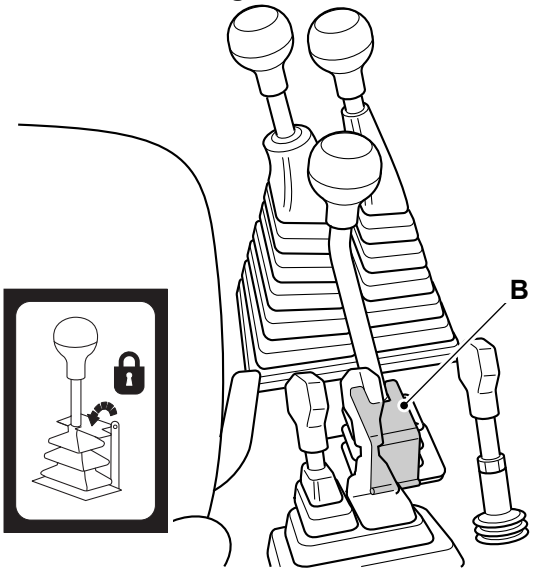
Move the lock away from the lever to release.

Figure 46.



B Mechanical lock

Figure 47.



B Mechanical lock

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Drive Controls

Steering Wheel

Turn the steering wheel in the direction you want to go.
Refer to: Component Locations (Page 17).

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.

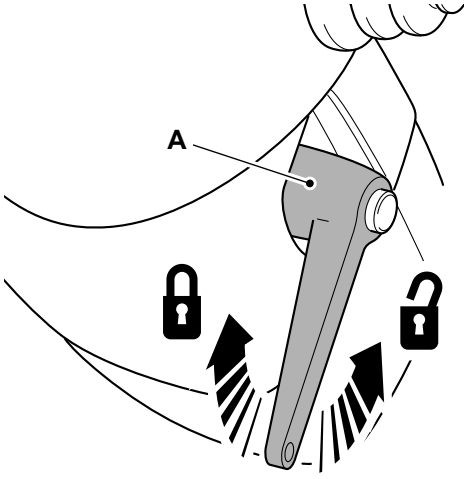
The steering column angle can be adjusted to suit the operator and to allow easier access for entering and leaving the cab.

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 48.



A Lever

Accelerator Pedal

Push this pedal down to increase engine speed. Let the pedal up to reduce engine speed. With your foot off the pedal the engine will idle.

Service Brake Pedal

Push down on the brake pedals to slow or stop the machine. Use the brakes to prevent overspeeding down a slope.

The brake pedal is in two parts so that you can use either foot to operate the brakes. Note that the two parts are linked together, depressing either side applies all brakes and they do not operate independently.

The stop lights should come on when the brakes are applied. Do not drive the machine unless both stop lights work correctly.

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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.

Use this lever to engage the park brake before leaving the machine.

The park brake lever is located on the floor of the cab, to the left of the operator seat.

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

Pull the lever up to apply the park brake.

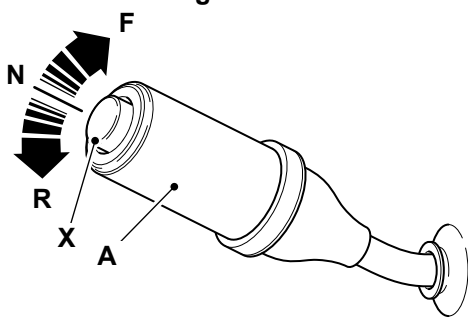
If the park brake is engaged when forward/reverse is selected, the park brake engaged indicator will come on.

Squeeze the release lever and lower the lever to release the park brake.
Refer to: Component Locations (Page 17).

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 49.



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).

Stop the machine before moving the lever. To select forward (F), reverse (R) or neutral (N), 'lift' and move the lever to the required position. All four gears are available in forward and reverse. When reverse is selected an alarm will sound. The engine will only start if the lever is at neutral.

The lever has detent positions in forward, reverse and neutral. Pull the lever towards you to move the lever from the detent position.

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

Drive Selection

To select the drive:

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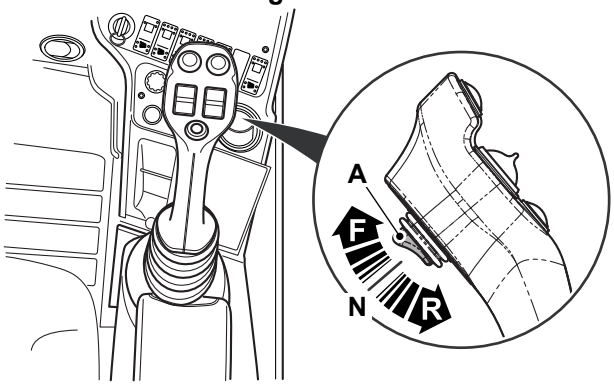
1. Stop the machine.
2. Apply the service brake.
3. Let the engine speed drop to idle.
4. Select the required direction.
5. Release the service brake and accelerate.

Drive Selection Switch (Option)

Figure 50.



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.

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.

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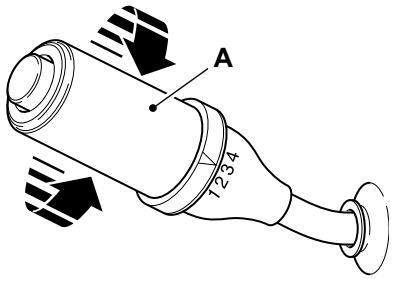
Gear Lever

For: 4 Speed Powershift Transmission (Barrel Select) ..... Page 71
For: 3/4 Speed Powershift Transmission ..... Page 71

(For: 4 Speed Powershift Transmission (Barrel Select))

⚠ **CAUTION** Gear or direction changes on this machine will only occur at a predetermined speed, this may result in gear/direction change delays. To prevent unexpected gear changes only select gears or direction as they are required.

Figure 51.



A Switch barrel

When the machine is stationary, before you select a gear, make sure the drive lever is set to the neutral position and engine is at idle speed.

To select a gear on the move, rotate the switch barrel so that the arrow marked on it aligns with the required gear.

You do not need to press the transmission dump switch.

The machine can be moved in any gear depending on the ground conditions.

(For: 3/4 Speed Powershift Transmission)

⚠ **CAUTION** Gear or direction changes on this machine will only occur at a predetermined speed, this may result in gear/direction change delays. To prevent unexpected gear changes only select gears or direction as they are required.

The transmission is controlled by an ECU (Electronic Control Unit), and information is displayed on the instrument panel.

When the machine is stationary and the drive lever is set to the neutral position, the previously selected gear will be shown on the main screen display.

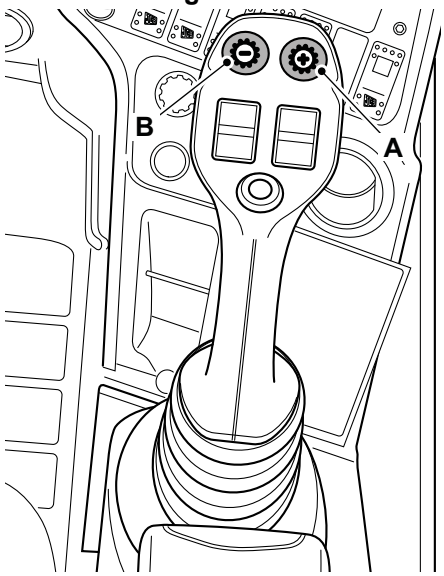
On the selection of forward or reverse the transmission will return to the previously selected gear. Even after an ignition switch cycle the ECU will remember the previously selected gear.

To select a gear on the move, press the right button on the top of the control lever to up shift the gear and press the left button to downshift the gear. One gear change will be completed for each press of the button. Pre-selection of a gear is possible when in neutral.

The machine is installed with a transmission disconnect sensor on the brake pedal, this option can be switched on and off.

The machine can be moved in any gear depending on the ground conditions.

Figure 52.



A Gear up shift button

B Gear downshift button

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 99).

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).

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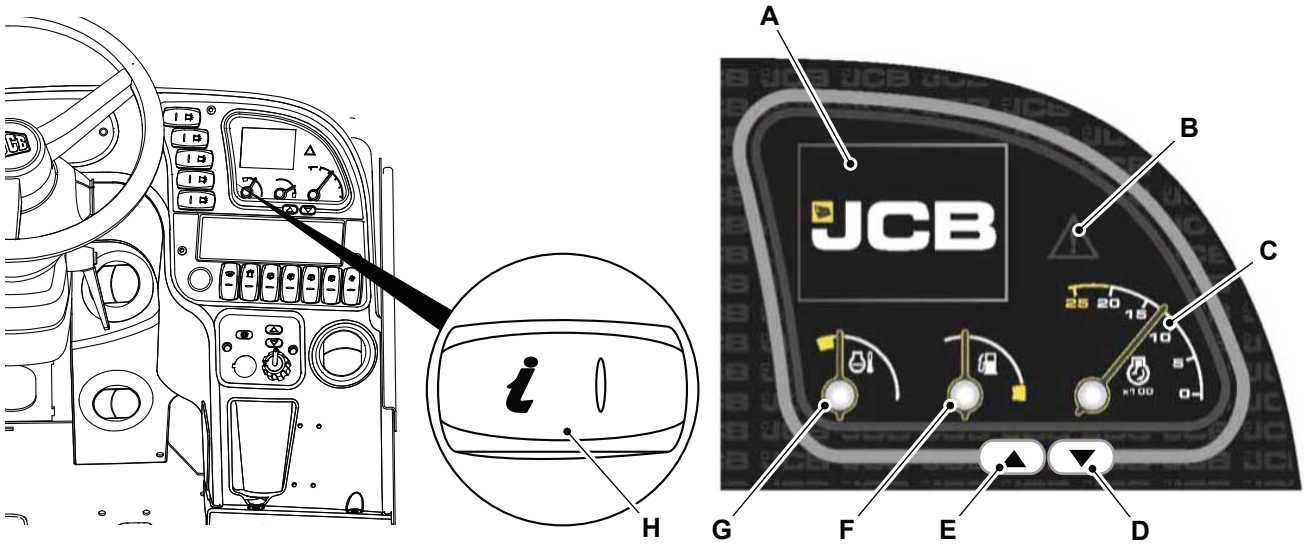
Instruments

Instrument Panel

Figure 53.



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

Instrument Panel (continued)

The instrument panel, warning indicator and warning lights are located in the dash panel at the front of the cab in the line of sight from the operator's seat.

It provides the interface with the machines electronic system.

You can navigate to different screen shown on the LCD display screen using the up and down navigation buttons and information switch.

Refer to: Instrument Panel (Page 73).

Display Screen

The LCD screen displays information such as current machine status, machine setup, service information and fault logs.
Refer to: Instrument Panel (Page 73).

Warning Indicator

The warning indicator will light up amber whenever there is a Warning Error. A buzzer shall sound for 1s when there is a service fault. This fault can be cancelled via the Fault Log Screen.
Refer to: Instrument Panel (Page 73).

The warning indicator will light up red whenever there is a critical Error. 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: Instrument Panel (Page 73).

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Navigation button (Down)

Used to navigate through the various options on the LCD Screen.
Refer to: Instrument Panel (Page 73).

Navigation button (Up)

Used to navigate through the various options on the LCD Screen.
Refer to: Instrument Panel (Page 73).

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: Instrument Panel (Page 73).

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: Instrument Panel (Page 73).

Information Switch

The information switch is used to perform different actions:
Refer to: Instrument Panel (Page 73).

- 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 54.

Default Operating Screen

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

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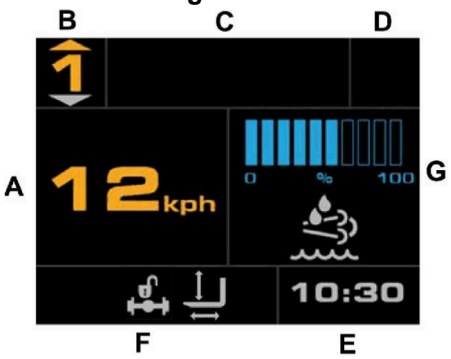
Figure 55.



A Travel speed
B Transmission FNR and gear information
C Transmission status and SCR (Selective Catalytic Reduction) status tray
D Steer mode tray
E Clock/machine hours
F Machine status tray (stabilisers, joystick configuration)
G DEF (Diesel Exhaust Fluid) level (machines with SCR after treatment system only)

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

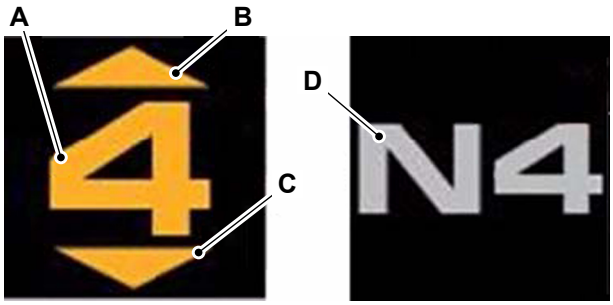
Transmission FNR and gear information - Displays the selected gear and direction of the machine. The current selected gear will be displayed in solid yellow. When a gear change request is acknowledged by the transmission, but has not yet been carried out, the requested gear will be displayed in flashing yellow until the shift takes place. Requested shifts can be cancelled by shifting in the opposite direction.

Travel Speed

Normally displays the speed of the machine.

Transmission FNR and Gear Information

Figure 56.



A Active gear information
B Forward arrow icon
C Reverse arrow icon
D Neutral

Displays the gear and direction of the machine.

The current selected gear will be displayed in solid yellow.

When a gear change request is acknowledged by the transmission, but has not yet been carried out, the requested gear will be displayed in flashing yellow until the shift takes place. Requested shifts can be cancelled by shifting in the opposite direction. Both multiple changes and downshift protection can delay shifts.

The forward arrow will be shown if a forward gear is selected.

The reverse arrow will be shown if a reverse gear is selected.

If neutral is selected the icon N and the previously selected forward gear will be shown.

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Transmission Status Symbols

Displays the current transmission status. There are more icons than space in the Transmission Icons Tray, you will always have a notification when a status changes, however only the most important status icons will be displayed.

Table 14.

	Park brake active
	Foot brake dump active
	Torque converter lock up engaged
	2WD active
	Driver not in seat
	Transmission auto mode active

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 15.

	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 16.

	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. There are more icons than space in the Machine Status Tray. You will always have a notification when a status changes, however only the most important status icons will be displayed.

Table 17.

	Constant auxiliary mode active
	Secondary auxiliary active
	Auto fan reverse active
	Tilt lock active
	Full lock active or Hydraulic function isolation active

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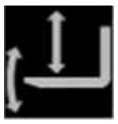
	Left stabilizer deployed
	Right stabilizer deployed
	Joystick configuration - placing pattern
	Joystick configuration - loader pattern

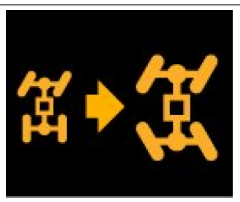
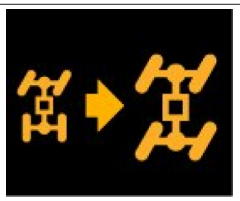
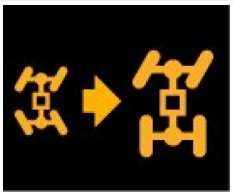
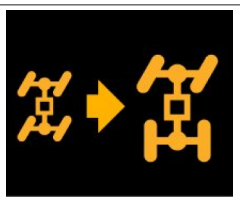
Notification Screens

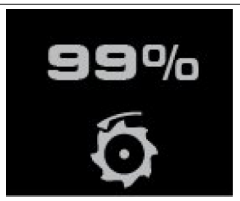
The notification screen displays temporary operator messages such as operator requested mode changes, user input screens, etc.

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. A buzzer may sound to notify the operator that a request has been acknowledged.

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

Icon	Event	Buzzer
	Audible/Visual. Cab heater fan speed setting. Number of yellow bars corresponds to current fan speed setting.	No
	Audible/Visual. Constant auxiliary operational position.	No
	Audible/Visual. Constant auxiliary stored position.	No
	Audible/Visual. Constant auxiliary cancelled.	No
	Audible/Visual. 2nd auxiliary active.	No
	Audible/Visual. 2nd auxiliary cancelled.	No
	Audible/Visual. Hydraulic lock active.	No
	Audible/Visual. Hydraulic lock cancelled.	No

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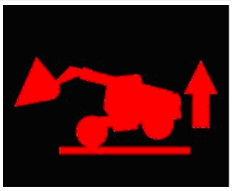
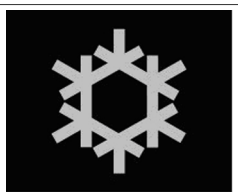
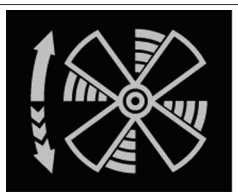
Icon	Event	Buzzer
	Audible/Visual. Tilt lock active.	No
	Audible/Visual. Tilt lock cancelled.	No
	Audible/Visual. Transmission disconnect active.	No
	Audible/Visual. Transmission disconnect cancelled.	No
	Audible/Visual. LLMC (Longitudinal Load Moment Control) override active.	Yes
	Audible/Visual. Air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

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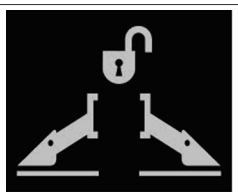
Icon	Event	Buzzer
	Audible/Visual. Auto reverse fan cancelled.	No
	Audible/Visual. Grid heater/glow plugs active.	No
	Audible/Visual. 2WD active.	No
	Audible/Visual. 2WD cancelled.	No
	Audible/Visual. Stabilizer isolation active.	No
	Audible/Visual. Stabilizer isolation cancelled.	No
	Audible/Visual. Immobiliser active.	No
	Audible/Visual. Operator has left the seat, with transmission engaged and park brake disengaged (if applicable).	Yes

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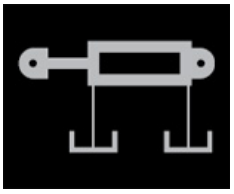
Icon	Event	Buzzer
	Audible/Visual. Service/Aux venting activated	Yes
	Audible/Visual. Transmission auto mode active.	No
	Audible/Visual. Transmission auto mode cancelled.	No

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.

Machine status screen

Figure 58.

Service information screen

Figure 59.

Machine setup screen

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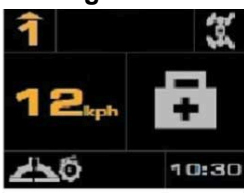
Figure 60.



Fault log screen

Press the information switch for longer than 2s to enter the displayed screen.

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

Machine Status

To see the machine status information:

Go to the machine status screen.

Press the information switch for more than 2s to see the machine status.

Figure 61.

A Battery voltage
B Coolant temperature
C Not used
D Engine RPM (Revolutions Per Minute)

Figure 62.

E Not used
F Engine air intake temperature

Press the navigation arrows to switch between the screens.

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

Figure 63.

Exit screen

Press the information switch again for more than 2s 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 64.

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

Figure 65.

E Time to next service
F Right hand cluster hardware version number
G Right hand cluster software version number
H Tyre diameter

Figure 66.

J Axle ratio

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

Figure 67.

K Machine options screen 1

Figure 68.

L Machine options screen 2

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

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Figure 69.

Exit screen

Press the information switch again for more than 2s 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.

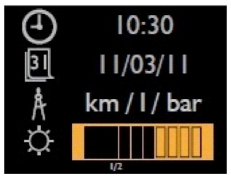
Press the information switch for less than 2s to display the main screen.

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

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

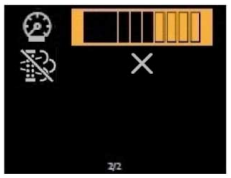
Press the navigation arrows to switch between the available options on the screen.

Figure 70.



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

Figure 71.



E Gauge backlight brightness
F Automatic refresh inhibit (machines with SCR after treatment system)

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

Figure 72.

Exit screen

Press the information switch again for more than 2s to return to the default operating screen (home screen).

Time Setup

To setup/adjust the time:

1. Go to the machine setup screen.

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2. Press the navigation arrows to select the clock.

Figure 73.

3. Press the information switch for more than 2 seconds.
4. Press the navigation arrows to select the time format.

Figure 74.

5. Press the information switch for 2 seconds to adjust the clock.
6. Press the information switch for 2 seconds to switch between the hours and minutes. Use the arrows to adjust the values.

Figure 75.

7. Press the information switch for more than 2 seconds to confirm the setup.

Date Setup

To setup the date:

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

Figure 76.

3. Press the information switch for more than 2 seconds.
4. Press the navigation arrows to select the date format.

Figure 77.

5. Press the information switch for 2 seconds to adjust the date.
6. Press the information switch for 2 seconds to switch between the day, month and year values. Use the arrows to adjust the values.

Figure 78.

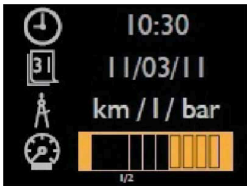
7. Press the information switch for more than 2 seconds to confirm the setup.

Brightness

To adjust the brightness of gauge backlight or display screen:

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

Figure 79.



3. Press the information switch for more than 2 seconds.

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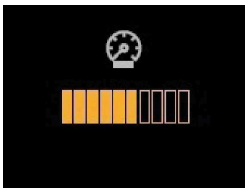
4. Press the navigation arrows to increase or decrease the brightness.

Figure 80.



5. Press the information switch for more than 2 seconds to confirm the setup.

Automatic Refresh Inhibit (machines with SCR after treatment system)

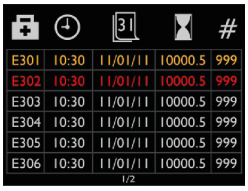
Use this menu item enable/disable the automatic refresh.

1. Go to the machine setup screen.
2. Press the navigation arrows to select the inhibit feature.
3. Auto refresh inhibit active (tick mark), auto refresh inhibit not active (X mark).
4. Press the information switch for more than 2 seconds to confirm the setup.

Fault Log

The fault log screen provides 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 81.



If a service fault or critical acknowledgeable 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 or red. The buzzer sounds momentarily when a fault is active. The code will remain until it is acknowledged by pressing the information button.

Figure 82.

When a critical non-acknowledgeable 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.

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Figure 83.

Figure 84.

Figure 85.

Warning/Fault Icons

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		Stabilizer		Transmission pressure
	Exhaust treatment		Joystick		
	Telematics		Immobiliser		Brake
	Adblue level		Engine		Engine oil pressure
	Coolant temperature				Steer
			Hydraulics		Exhaust treatment refresh
	Transmission temperature		CAN		Foot brake press

	Fuel level		Indicator lamp		Reverse alarm
	Water in fuel				Ground speed
	Sway		Air filter		Battery
	Coolant level		Engine oil level		
	HVAC		Brake light		

Warning Lights

⚠ **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.

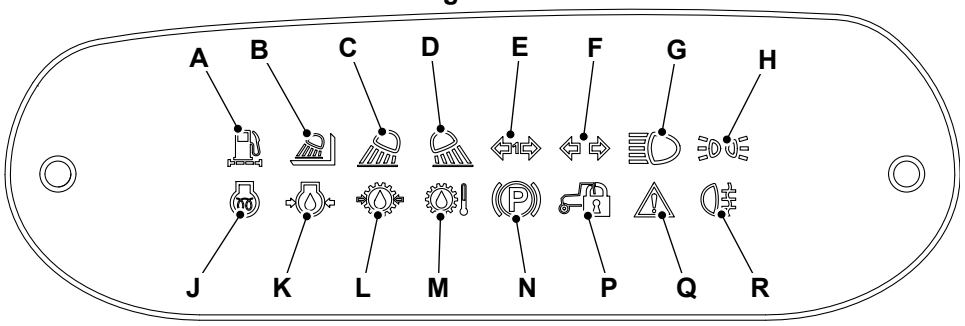
The warning lights are grouped together on a panel located on the dash board.

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

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

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

Figure 86.



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

B Boom work light - Visual (Amber Light). Illuminates when the boom work lights are switched on.

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

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

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

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

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

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

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

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

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

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

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N Park brake engaged - Visual (Red light). Illuminates when the park brake is engaged.
Q Master warning - Not used. Information displayed on instrument panel.
P Not used.
R Fog lights - Visual only (Amber light). Illuminates when the fog lights are switched on.

SCR Exhaust After Treatment

Notification Symbols

Table 20.

	Low DEF, derate warning - flashing/solid - amber icon.
	Low DEF derate warning - flashing/solid - red icon.

DEF Level

The LCD (Liquid Crystal Display) permanently displays the DEF level bargraph. Each bar represents approximately 10% of tank volume.

Figure 87.

As the DEF level depletes to low, warning icons and notification symbols and warning icons are displayed. The intensity of the warnings symbols and indicator changes as follows as the DEF level depletes further:

- Amber warning icon. Operator warning, fill up this shift.

Figure 88.

- Flashing amber notification symbol. Operator warning, fill up now.

Figure 89.

- Red warning icon. 0% DEF, fill up now. Initial derate starts.

Figure 90.

- Solid amber icon. Derate condition, fill up now.

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Figure 91.

- Flashing red notification symbol. Second stage derate condition, fill up now.

Figure 92.

- Solid red notification symbol. Forced idle, machine unusable, fill up now.

Figure 93.

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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. Sit in the machine 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 fitted).

4. Check the boom is in the travel position.

5. Push the brake pedal(s).

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.

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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

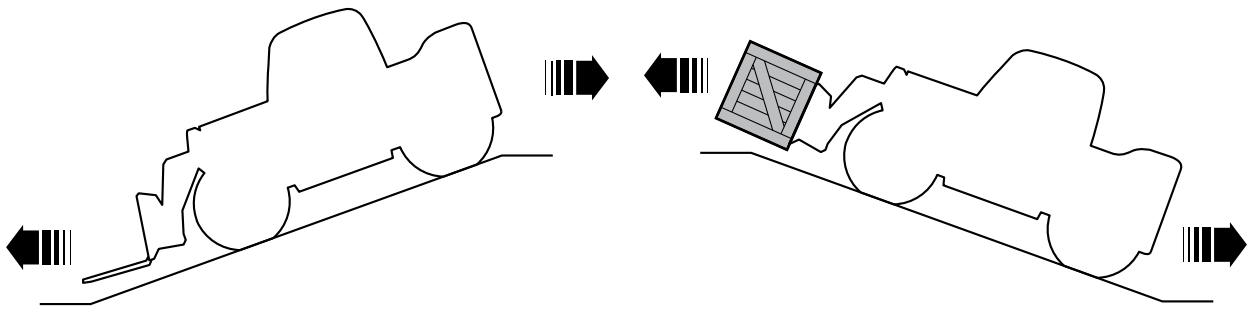
⚠ **WARNING** Operating the machine on hillsides can be dangerous if proper precautions are not taken. Ground conditions can be changed by rain, snow, ice etc. Check the site carefully. Going uphill, reverse when unloaded or travel forwards when loaded. Going downhill, travel forwards when unloaded or 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.

Refer to Load chart section for definition of fixed loads.
Refer to: Load Charts (Page 115).

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 94.



Suspended Loads

Refer to Load chart section for definition of suspended loads.
Refer to: Load Charts (Page 115).

A suspended load as 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%).

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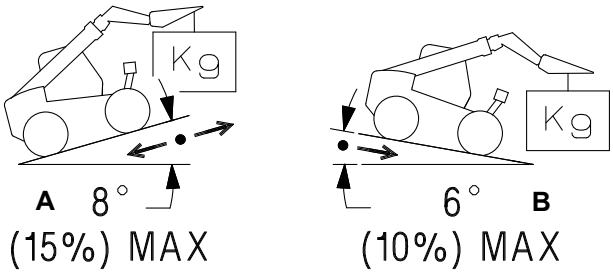
- As stated in the moving with suspended loads section ensure that the load is not carried higher than 300mm from the ground and the boom is not elevated above 45°.

Figure 95.



A 8° (15%) maximum.

B 6° (10%) maximum.

Driving Across Slopes

Fixed Loads

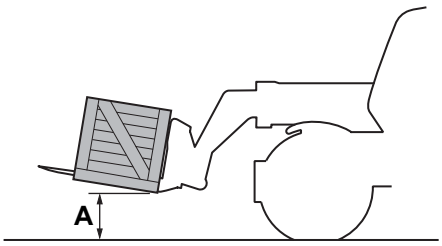
To get the maximum stability, operate the machine on solid, level ground. The stability of the machine is decreased when it is driven across a slope.

When you drive across a slope with a fixed load, fully retract the boom and 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 500mm (19.7in) above the ground.

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

Figure 96.



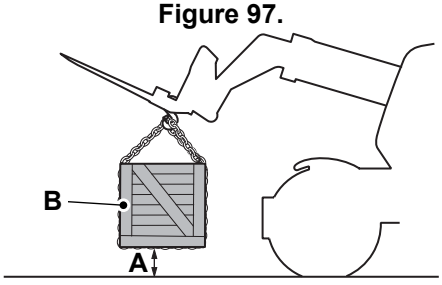
A Lowest point of the load

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 97.



A Lowest point of the load

B Load suspended below forks

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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 for a fixed load and 300mm above the ground for a suspended load with the machine on a slope.

Longitudinal Stability

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

Read and understand the section that describes the operation of the LLMI before you do a lifting operation with the machine.
Refer to: Longitudinal Load Moment Indicator (LLMI) (Page 126).

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

The longitudinal inclinometer fitted to the right hand window in the cab can also be used to check the machine is longitudinally level.
Refer to: Inclinometers (Page 121).

Lateral Stability

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

The lateral inclinometer fitted to the front windscreen of the cab can be used to check if the machine is laterally level.
Refer to: Inclinometers (Page 121).

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.

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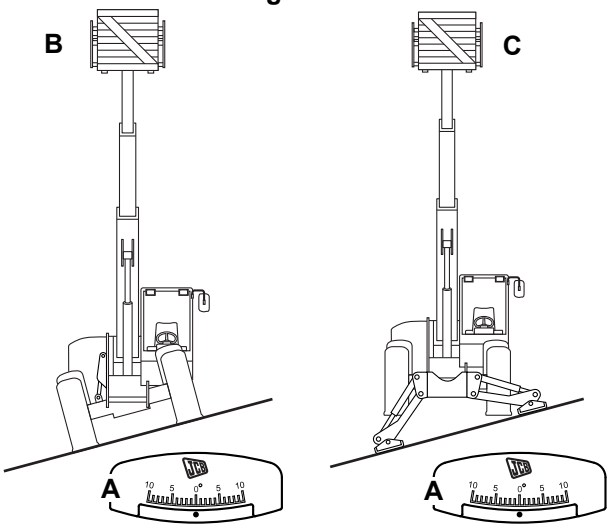
Figure 98.

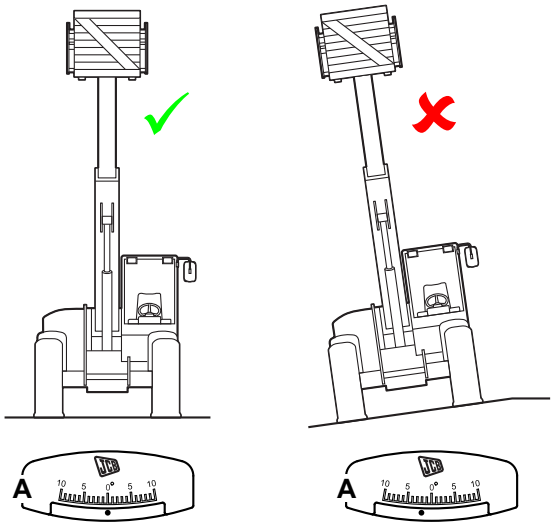


A Lateral Inclinometer
B Chassis level
C Stabilisers level

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

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

Figure 99.



A Lateral Inclinometer

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Driving the Machine

Steer Modes

Wheel Alignment

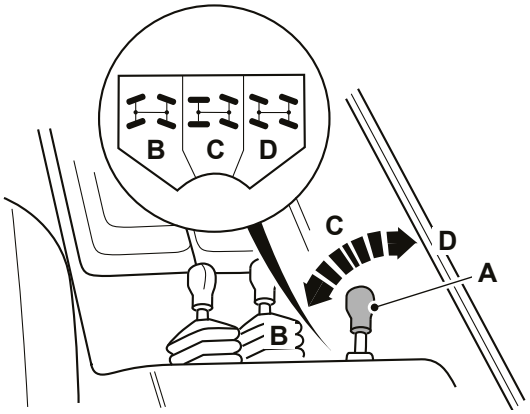
Manual Steer Mode

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 lever to select 4-wheel steer.
3. Turn the steering wheel until the rear wheels are in the straight ahead position.
4. Use the lever to select 2-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 100.



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

Indicated Manual (if fitted)

To change the steer mode:

1. Stop the machine. Set the gear lever to neutral position.
2. Turn the steering wheel until the icon in the steer mode frame indicates all the wheels are in the straight ahead position.
3. Use the decal to identify the current steer mode.
4. Use the lever to select the required steer mode.

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.

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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.

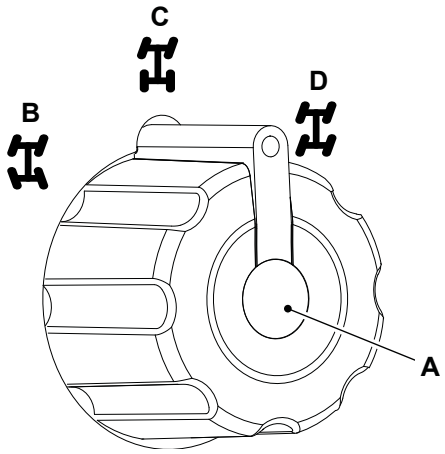
3.1. When the rear wheels are straight ahead position the machine will go to 2-wheel steer. The symbol stops flashing and change to indicate when 2-wheel steer is active.

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 101.



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

Steer Mode Override

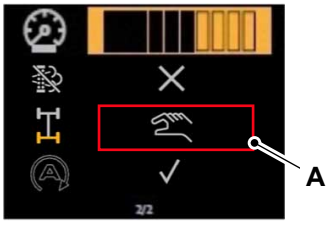
In the event of being unable to change steering modes, follow the steer mode override function.

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.

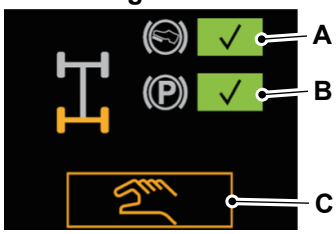
Figure 102.



A Steer mode override

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

Figure 103.



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.

Limited Slip Differential (LSD)

This is an option which can be specified on some machines to improve the traction in difficult conditions. This is achieved by transferring a high proportion of the available driving torque from the spinning wheel to the gripping wheel. The LSD (Limited Slip Differential) operates automatically and should not be confused with differential locks.

Wheel slip is an indication that the limited slip limit has been reached. On high traction surfaces (concrete etc.) noise and judder may be experienced when the LSD is operating, particularly on full steering lock. The level of noise depends on the weight of the machine, the ground conditions and steering angles. Noise in the LSD is not an indication of axle damage.

Towing Other Equipment

Introduction

⚠ **WARNING** Do not exceed the permitted limits on trailer gross weight or hitch load. The machine may become unstable.

WARNING Before reversing, make sure the area behind the machine is clear of other persons. If this is not observed, injury or death can result.

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 can be equipped with an optional trailer pickup hitch.

Make sure that before you tow with the machine, you and your machine obey with all the pertinent laws and regulations.

Make sure that the trailer draw bar is suitable for your machine and has sufficient clearance to let the machine to turn without fouling.

Make sure the machine tyre pressures are correct and that the loaded trailer does not exceed the maximum gross trailer weight.

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Refer to: Static Dimensions (Page 295).

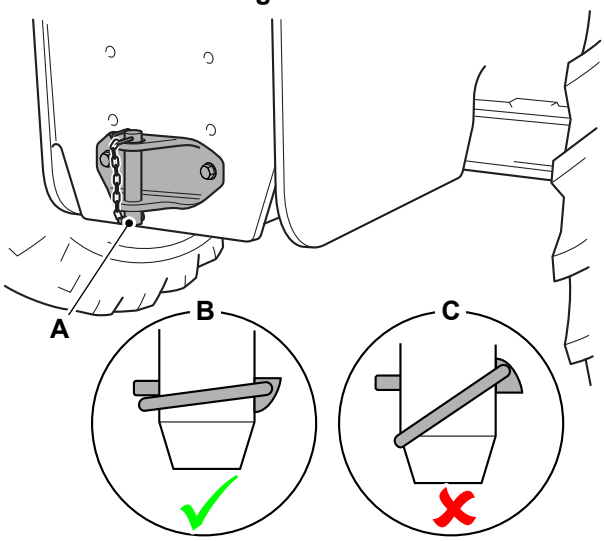
Connecting the Trailer

Mechanical Tow Hitch

To operate the pickup hitch, use the procedure as follows:

1. Engage the park brake.
2. Adjust the mirror(s) to obtain a good view of the tow hitch area.
3. If your machine is installed with a switch operated 2/4 wheel drive selector, you can tow in 2 wheel drive if required.
4. Engage the trailer.
   - 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. It is essential that the tow bar is parallel with the machine when the pickup hitch is raised and locked.
   - 4.3. 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.
   - 4.4. The helper should not approach the trailer or machine until the machine has been stopped, with the park brake engaged and the engine switched off.
   - 4.5. When the trailer has been engaged, with pin secured in position, the machine operator must not start the engine until the helper is clear of the machine and trailer.

Figure 104.



A Pin

Preparing the Trailer for Towing

Mechanical Tow Hitch

1. Connect the trailer lights into socket.
2. Make sure that all the trailer lights and the direction indicator lights are working correctly and are visible by other road users.

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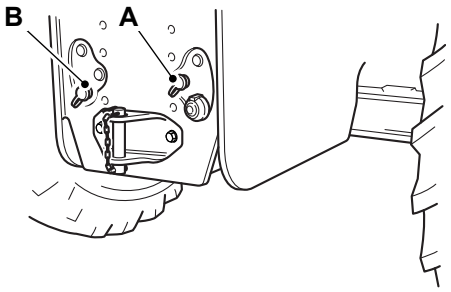
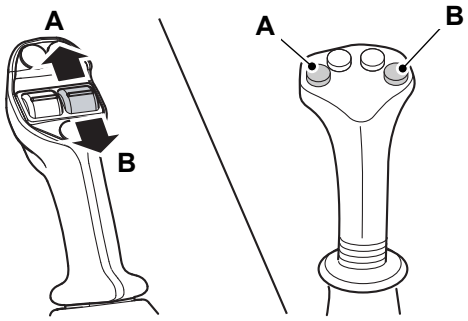
Figure 105.



A Socket **B** Coupling

3. Connect auxiliary hose to the coupling.
4. To select the rear auxiliary circuit, set switch to position I. The switch light should be extinguished.
   4.1. Make sure the hitch/auxiliary switch lamp is working that is set switch to position II.
5. For the auxiliary operation (i.e, trailer tipping) operate the switch to depend on the attachment installed and the function required.

Figure 106.



A Switch **B** Switch

6. To prevent contamination of the machine hydraulics, when using a tipping trailer leave the trailer flat before disconnecting the hydraulic service to exhaust the trailer ram of oil.
7. Select the 2 wheel steer if you tow the machine on public roads. Make sure the indicator shows that 2 wheel steer has engaged.
   Refer to: Preparing for Road Travel (Page 57).
8. It is recommended to also select 2WD (Two Wheel Drive)
   Refer to: Drive Controls (Page 68).

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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

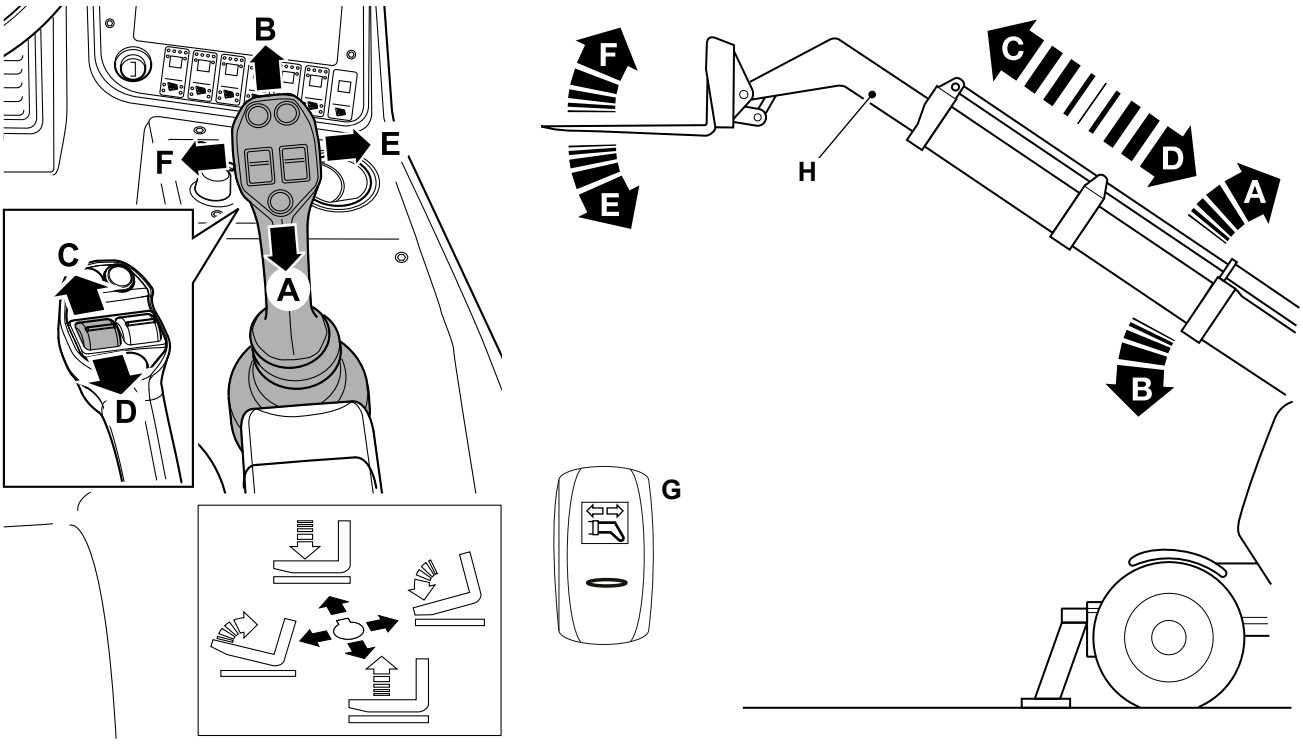
⚠ **WARNING** Control lever/switch action may vary on machines, instructional labels near the levers/switches show by symbols, which levers/switches cause what actions. Before operating control levers/switches check the instructional label to make sure you select the desired action.

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

Basic Controls

Single Lever Control

Figure 107.



A Boom raise
B Boom lower
C Boom/inner boom extend
D Boom/inner boom retract
E Carriage tilt forward
F Carriage tilt back
G Inner boom extend/retract switch
H Inner boom

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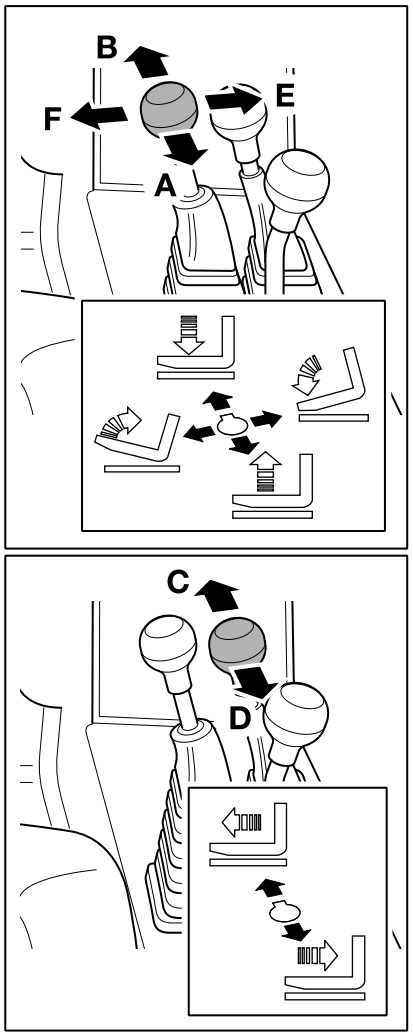
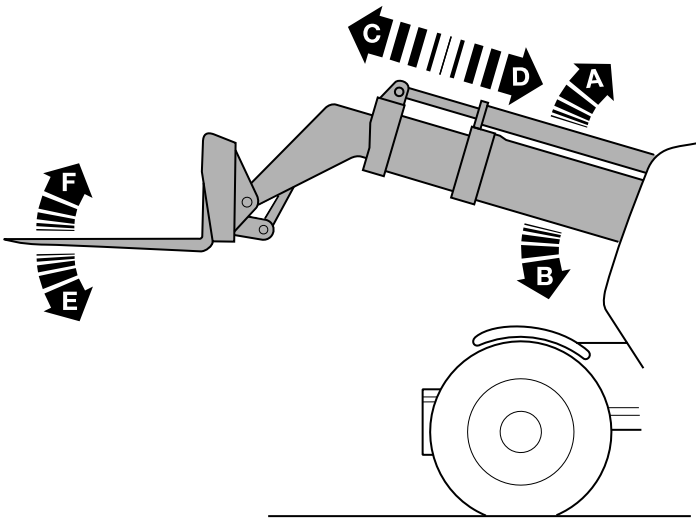
Dual Lever Control

Loading Pattern

Figure 108.





A Boom raise
B Boom lower
C Boom extend
D Boom retract
E Carriage tilt forward
F Carriage tilt back

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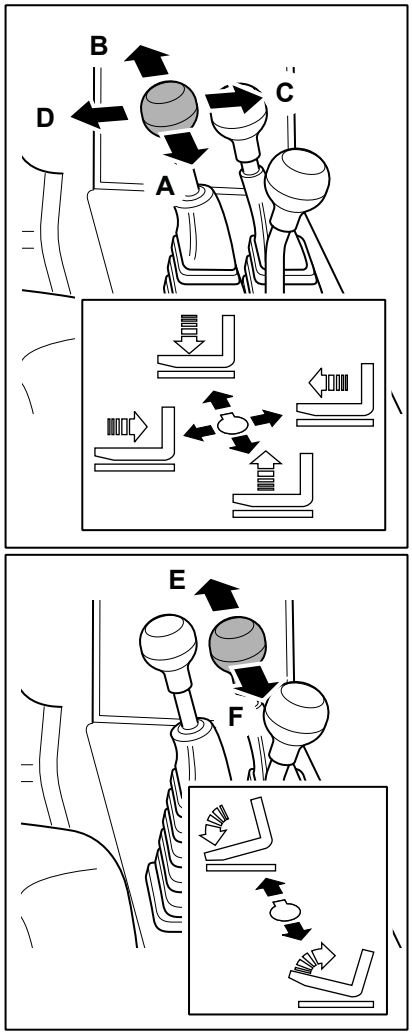
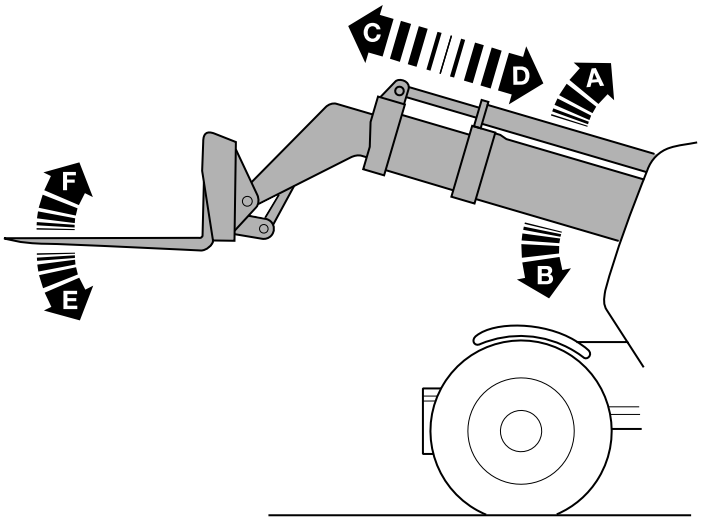
Placing Pattern

Figure 109.





A Boom raise
B Boom lower
C Boom extend
D Boom retract
E Carriage tilt forward
F Carriage tilt back

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 10 min warm up time with the engine at half throttle. Operate the arm and bucket services to warm the hydraulic oil.

Single Lever Control

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

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

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

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

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.

Refer to: Basic Controls (Page 104).

To operate the inner boom:

1. Lower the stabilisers to the ground.
2. Press inner boom extend/retract switch to select the inner boom extend/retract function.
3. The extend/retract functions of the lever change from the main boom section to the inner boom section.
4. To change back to main boom extend/retract, fully retract the inner boom and then press switch off position.

Refer to: Basic Controls (Page 104).

Dual Lever Control

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

The levers are spring-loaded to their 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.

It is important that 3-stage booms can go out of phase if the hydraulic rams are not fully retracted regularly. Fully retract the boom at least once every day.

Loading Pattern

The main lever movements and their effects are described below.

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

Refer to: Basic Controls (Page 104).

Placing Pattern

The main lever movements and their effects are described below.

1. To raise the boom pull the lever back.
2. To lower the boom, push the lever forward.
3. To extend the boom, push the lever to the right.

4. To retract the boom, pull the lever to the left.
5. To tilt the carriage forward, push the lever forward.
6. To tilt the carriage back, push the lever back.

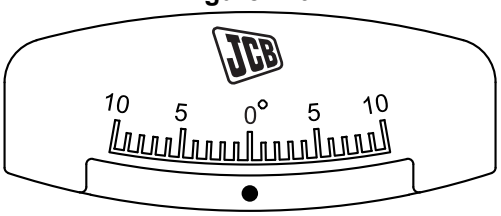
Refer to: Basic Controls (Page 104).

Chassis Levelling Controls

The chassis levelling (sway) control switch allows the machine to be levelled from side to side. The chassis levelling ram will stay in any position until you move it with the switch.

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

Figure 110.



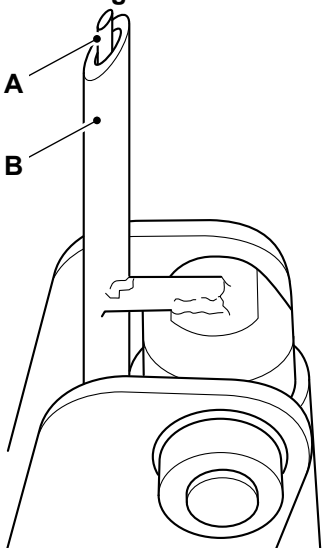
Inclinometer

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

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

Use the indicator rod to check that the machine is level, when the indicator rod is level with the top end of tube the machine is square to the axles.

Figure 111.



A Indicator rod **B** Tube

When the indicator rod is above the tube, the machine is swayed right. When the rod is down inside the tube, the machine is swayed to the left.

While you operate the chassis levelling system the cooling fan speed may be reduced, this is not a fault.

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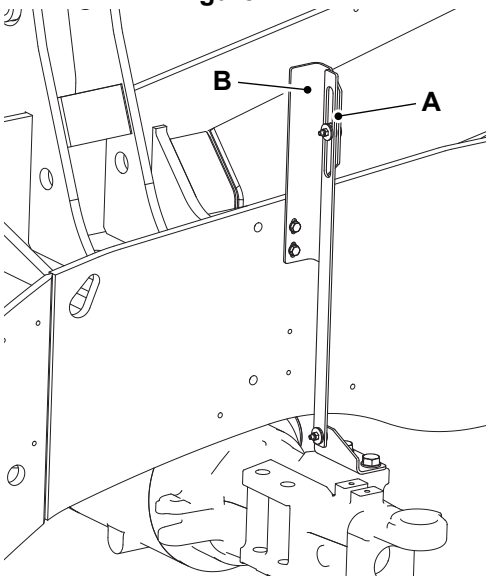
Your machine may be fitted with an alternate indicator, located in front of the cab. The machine is square to the axles when the plate is level with the top of the pressing. When the plate is above the pressing, the machine is swayed to the left. When the plate is down below the pressing, the machine is swayed to the right.

Figure 112.



A Plate **B** Pressing

Stabiliser Controls

⚠ **WARNING** Do not allow debris to accumulate in the cavity between the ram and the stabiliser leg. Remove and clean away all debris that may have built-up.

The use of stabilisers increases the stability of the machine when lifting.

The inclinometer installed in the cab will indicate the lateral position of the machine.

Before you operate the boom use the inclinometer to check that the machine is level. The machine is level when the inclinometer shows 0°.

If the machine is not in a level position adjust the stabiliser legs until the machine is level and the inclinometer shows 0°.

Make sure the stabiliser legs are in the down position and the weight of the machine is supported.

Do not extend the boom more than necessary.

Before you operate the machine make sure to isolate the stabiliser control levers.

Stabiliser Indicator Lights

The machines can be installed with optional stabiliser indicator lights which appear on the main display screen. Refer to: Instruments (Page 73).

The lights will illuminate when both stabiliser legs are in the down position and the weight of the machine is supported.

If the lights are installed, make sure both indicator lights illuminate when the stabiliser legs are in the down position. If the lights do not illuminate do not use the machine until the fault is investigated and corrected. Please contact your JCB dealer for any service requirements.

The lights will flash if the stabiliser leg is in the down position but the machine weight is not fully supported. Either lower the load on the boom or reposition the machine on firm ground.

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Lower and Raise Stabilisers

The stabilisers can be lowered or raised using the stabiliser control levers.

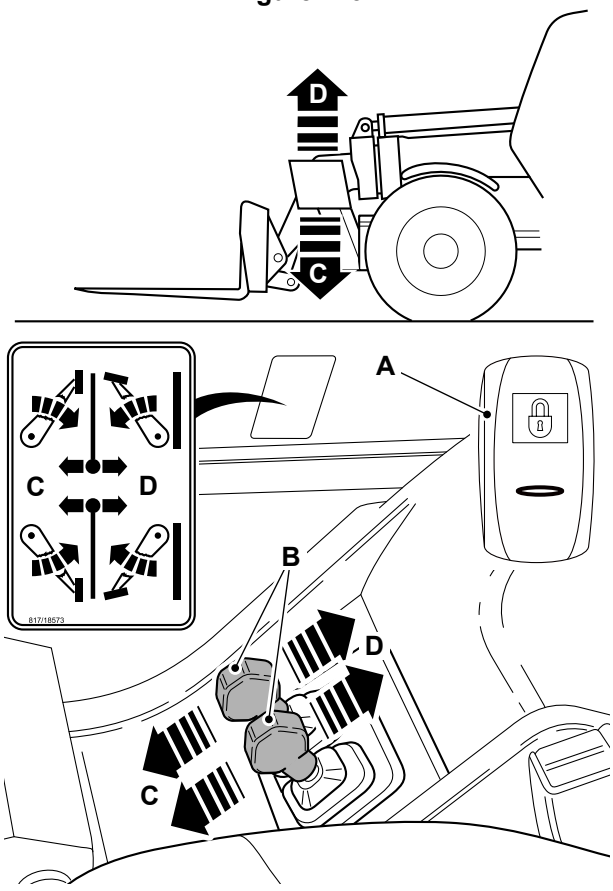
Before you travel on the public highway, fully raise both stabiliser legs and isolate the control levers using the stabiliser isolation switch.

When working with the stabilisers lowered, make sure you isolate the control levers before operating the boom controls.

To lower or raise the stabilisers:

1. Park the machine on firm ground.
2. Turn off the stabiliser isolation switch.
   Refer to: Console Switches (Page 21).
3. Push the control levers forward to lower the stabiliser legs.
4. Pull the control levers back to raise the stabiliser legs.
5. Before you operate the boom, make sure the machine is level and stabiliser controls are isolated.

Figure 113.



A Stabiliser isolation switch
Refer to: Console Switches (Page 21).
B Stabiliser control levers
C Stabiliser legs - lower
D Stabiliser legs - raise

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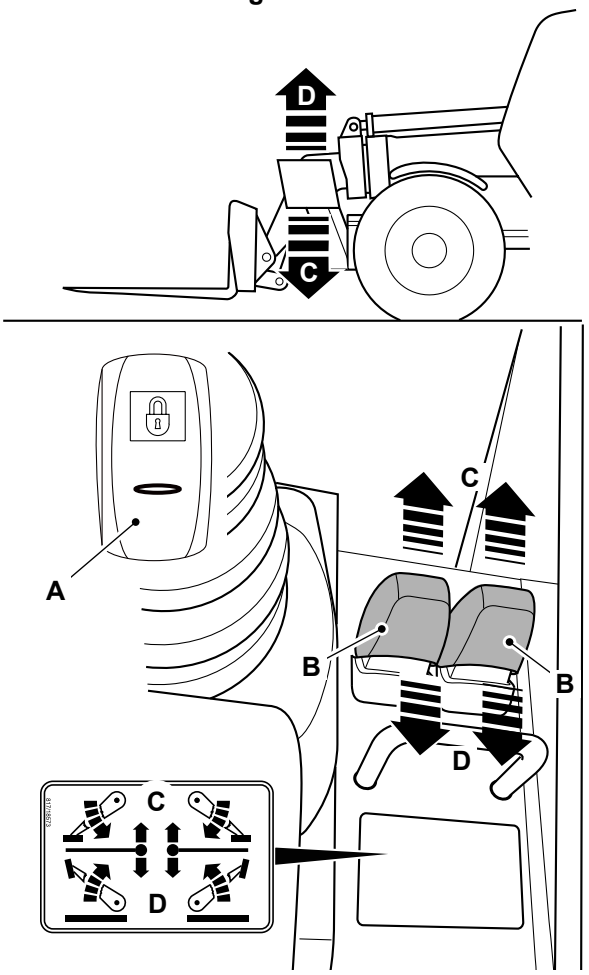
Figure 114.



A Stabiliser isolation switch
Refer to: Console Switches (Page 21).
B Stabiliser control levers
C Stabiliser legs - lower
D Stabiliser legs - raise

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) might be available as an option. An optional trailer pickup hitch may also available.

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

To enable the operator to identify which auxiliary mode is selected, the dash will display a series of icons.

Before operating the controls identify which auxiliary mode is selected.

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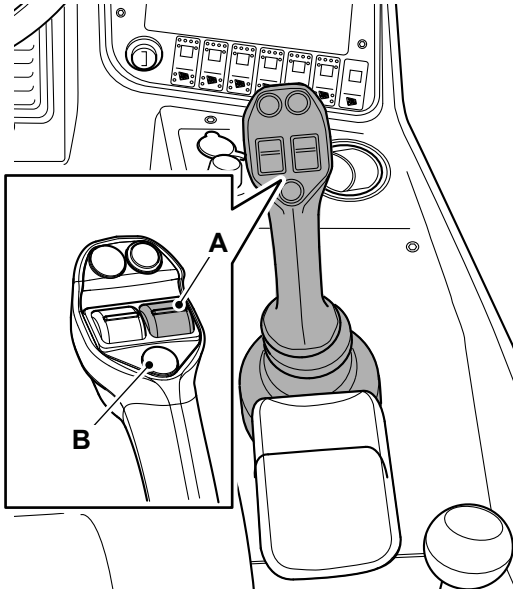
Single Lever Control

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 115.



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 21).
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 (if installed)

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 21).
2. To activate the constant flow mode:
   - 2.1. Set the hydraulic mode switch to position 2.
     Refer to: Console Switches (Page 21).
   - 2.2. Press the button on the control lever, a symbol will be displayed on the screen.
     Refer to: Instruments (Page 73).
   - 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.

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3. The constant flow mode symbol on the screen will indicate the active and inactive mode.
   Refer to: Instruments (Page 73).
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.

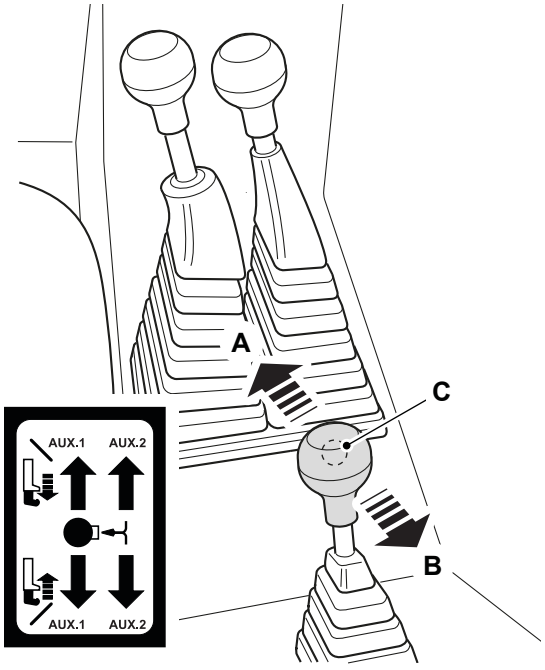
Auxiliary II (AUX II) (if installed)

1. Turn on the hitch/auxiliary selector switch, if installed.
   Refer to: Console Switches (Page 21).
2. Set the hydraulic mode switch to position 1.
   Refer to: Console Switches (Page 21).
3. To enter the AUX II mode, press the button.
4. Roll the thumb switch forwards or backwards depending on the attachment installed and function required.
5. To exit the AUX II, press the button. The symbol on the main display screen will extinguish.

Dual Lever Control

The machines with dual lever control is installed with one auxiliary circuit (AUX I). A second auxiliary circuit (AUX 2) is available as an option on some machines. An optional trailer pickup hitch is also available. In all cases there is only one auxiliary switch, selection of AUX II and the trailer is made by means of switches.

Figure 116.



A Forward
B Backward
C Button - AUX II

Auxiliary I (AUX I)

1. Turn on the hitch/auxiliary selector switch.

2. Move the control lever forward or backward depending on the attachment installed and the function required.

Auxiliary II (AUX II)

1. Turn on the hitch/auxiliary selector switch.
2. Press and hold the button to active the AUX II.
3. Move the control lever forward or backward depending on the attachment installed and the function required.

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Lifting and Loading

General

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

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

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

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

If your machine is not installed with a lifting point (for example a hook or shackle) and load charts then it must not be used for object handling.

Lifting (Object Handling) Regulations

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

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

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

Safe Working Loads

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

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

Fit for Purpose Tests for Lifting Equipment

All lifting equipment (for example forks, lifting hooks and shackles) needs regular inspections and testing by a competent person to make sure they are fit for purpose. These may be needed every six months or at least annually in some countries to meet and comply with legislation and for insurance purposes. 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 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.

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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.

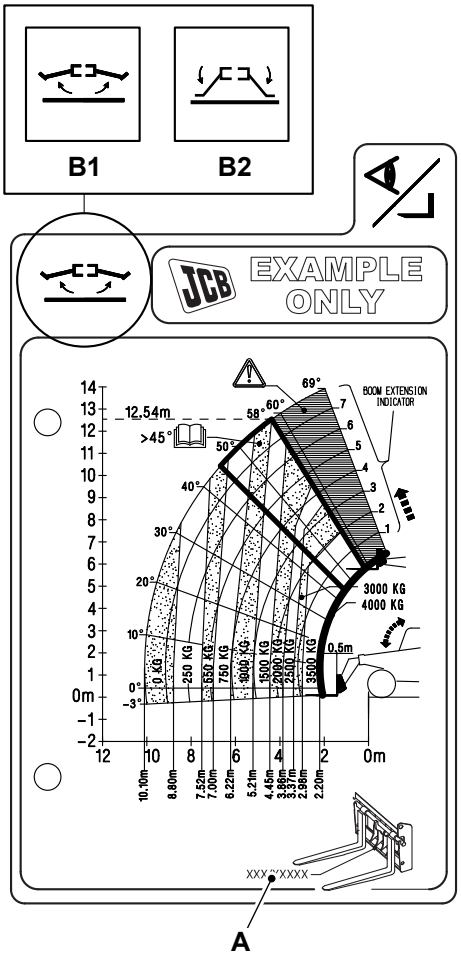
Load Charts for Fixed Loads

A fixed load is defined as any object that is lifted in such a way that it is fully supported by the lifting attachment and cannot swing freely (e.g. palletised load or a shovel load.)

As a result load charts for fixed loads are related to forks, side-shift carriages fitted with forks and fork positioner attachments.

Load charts for these attachments 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.

Figure 117.



A Attachment part number
B1 Stabiliser up
B2 Stabiliser down

Machines are shipped from the factory with the boom angle interlock set to 45°. Some applications may require the boom to be raised beyond the 45°without the stabilisers being deployed. Contact your dealer for assistance.

Load Charts for Suspended Loads

A suspended load is defined as any object that is lifted in such a way that it can swing freely, whilst it is being hoisted lowered and horizontally moved.(e.g. a load attached to a hook or shackle.)

As a result load charts for suspended loads are related to fork mounted hook, extension jib or carriage mounted shackle attachments.

Load charts for these attachments show how far you can raise and extend a load without exceeding the safe working load. A separate load chart for each attachment shows details of the general operation limitations when the machine is in a traveling and static condition.

As per the fixed load charts alternative charts are used to illustrate limitations when the stabilisers or chassis levelling (sway) are used.

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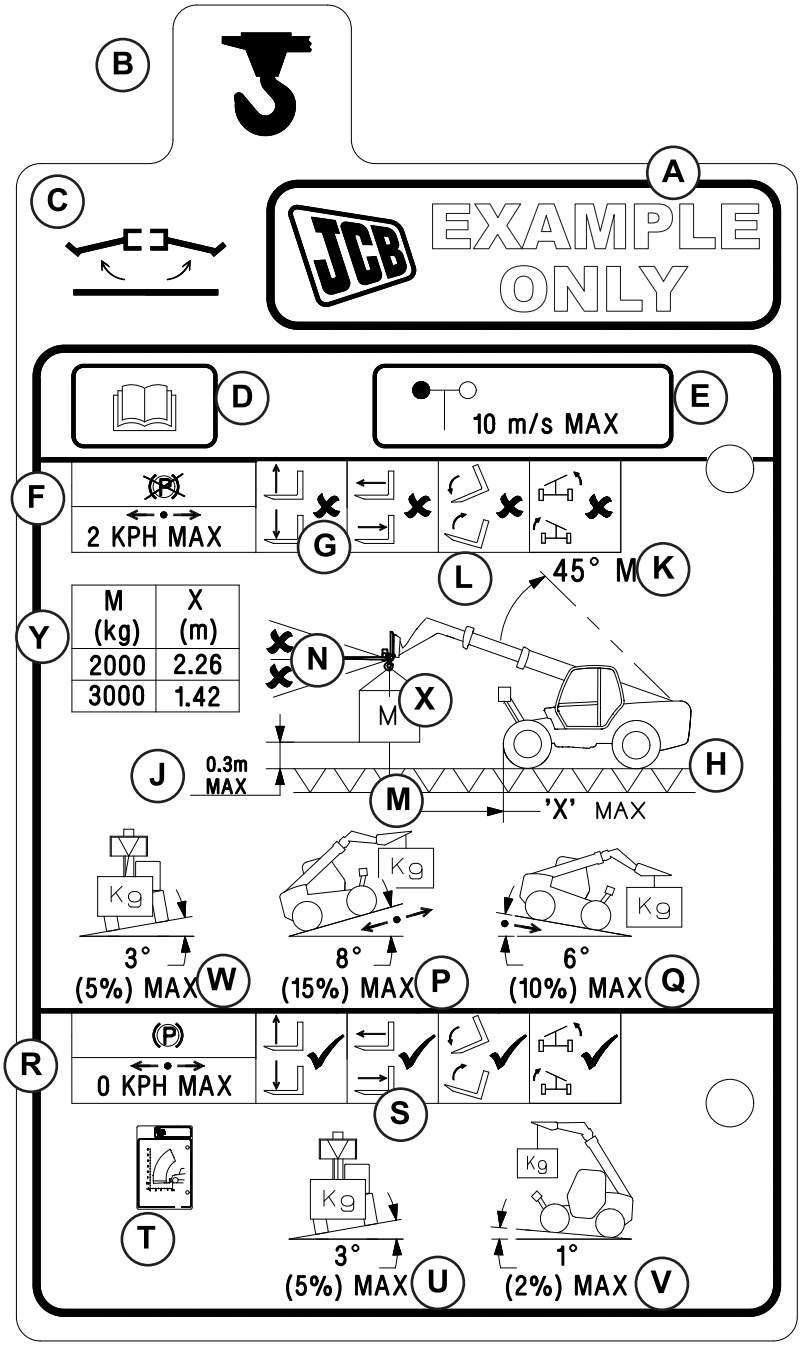
Figure 118. Example



A Machine designation
B Attachment
C Stabilisers condition
D Read operator's manual
E Maximum in service wind speed
F Parkbrake released, maximum travel speed
G Boom controls- Do not operate when travelling
H Operate on hard standing
J Keep the load within 0.3m from the ground
K Keep the boom below 45°
L Do not extend the boom
M Keep the load at the minimum reach
N Keep the attachment horizontal or crowded back
P Do not travel on slopes exceeding the specified angle with the load up the slope.
Q Do not travel on slopes exceeding the specified angle with the load down the slope.
R Parkbrake applied, zero travel speed.
S Boom controls, can be operated when stationary.
T Max load as specified by the loadchart for the attachment.
U Do not place a load on side slope exceeding the angle specified.
V Do not place a load on longitudinal slope exceeding the angle specified.

W Do not travel on sides slope exceeding the angle specified
Y Load/reach table
X Maximum load specified in the load chart for the attachment.

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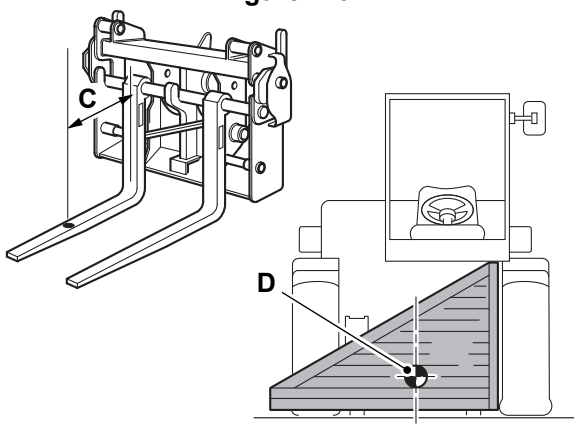
Using the Load Charts

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 119.

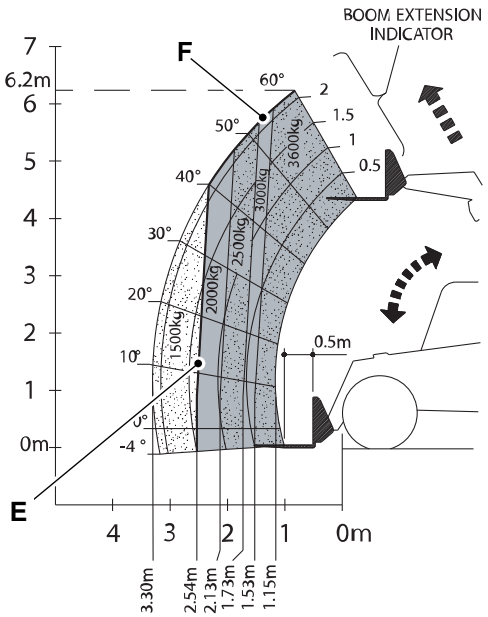


C Length =500mm (19.7in)

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 120.



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.

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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

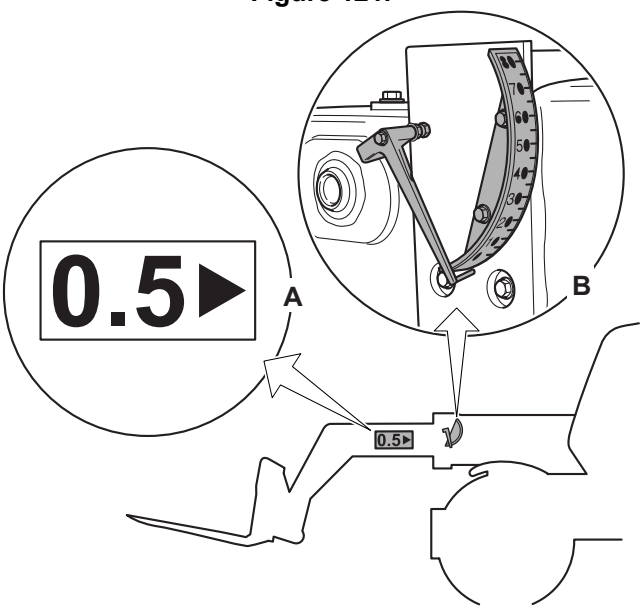
The SWL (Safe Working Load) at different boom positions shown on the load charts in the cab. Refer to the charts in the cab before lifting or placing a load.
Refer to: Load Charts (Page 115).

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 115). .

Figure 121.



A Label **B** Indicator

Inclinometers

The lateral position (side to side) of the machine is indicated by the lateral inclinometer installed on the front windscreen in the cab.

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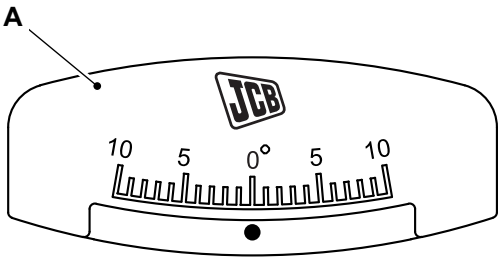
The longitudinal position (front to back) of the machine is indicated by the longitudinal inclinometer installed on the right hand side of the cab.

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

Reposition the machine if a level position cannot be achieved.

Refer to: Slopes (Page 95).

Figure 122.



A Inclinometer

Interlocks

For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 122
For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F] ..... Page 124

(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

Introduction

Your machine has a system of interlocks to prevent the operation of the machine beyond default limits unless the boom and/or the stabiliser legs are moved to the correct position.

Chassis Levelling (Sway) Operation

You cannot operate the chassis levelling (sway) function if the boom angle is more than 10° above the horizontal. If sway is selected with the boom angle over 10° the following symbol will appear on the right hand cluster:

Figure 123.

Boom and Stabiliser Operation

Boom Raise

You cannot enter zone A3 unless the stabilisers are deployed. If the stabilisers are not deployed and you try to enter zone A3 the following symbol will appear on the right hand cluster:

Figure 124.

Boom Extend

You cannot enter zone A4 unless the stabilisers are deployed. If the stabilisers are not deployed and you try to enter zone A4 the following symbol will appear on the right hand cluster:

Figure 125.

Lower/Raise Stabilisers

To lower or raise the stabilisers the boom needs to be positioned in zone A1. If these conditions are not met the following symbol will appear on the right hand cluster:

Figure 126.

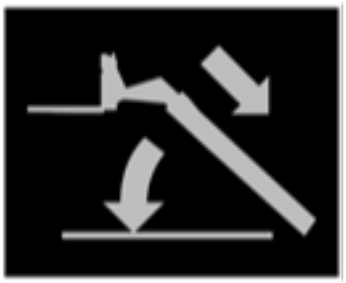


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Figure 127.

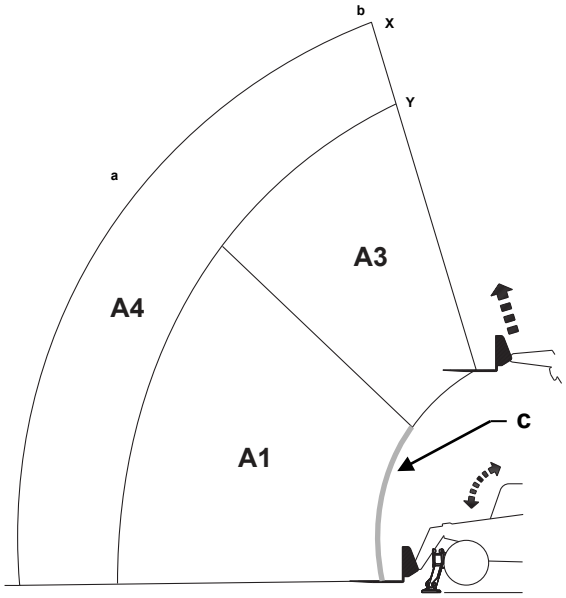

Table 21.

	540-170	540-200	540-180
a	45°	45°	45°
b	73°	73°	73.6°
x	7.09m	7.2m	7.95m
y	10.64m	13.5m	11.44m

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F])

Introduction

Your machine has a system of interlocks to prevent the operation of the machine beyond default limits unless the boom and/or the stabiliser legs are moved to the correct position.

Chassis Levelling (Sway) Operation

You cannot operate the chassis levelling (sway) function if the boom angle is more than 10° above the horizontal. If sway is selected with the boom angle over 10° the following symbol will appear on the right hand cluster:

Figure 128.

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Boom and Stabiliser Operation

Boom Raise

You cannot enter zone A2 unless the stabilisers are deployed. If the stabilisers are not deployed and you try to enter zone A2 the following symbol will appear on the right hand cluster:

Figure 129.

Lower/Raise Stabilisers

To lower or raise the stabilisers the boom needs to be positioned in zone A1. If these conditions are not met the following symbol will appear on the right hand cluster:

Figure 130.

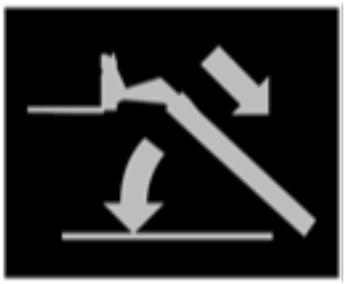
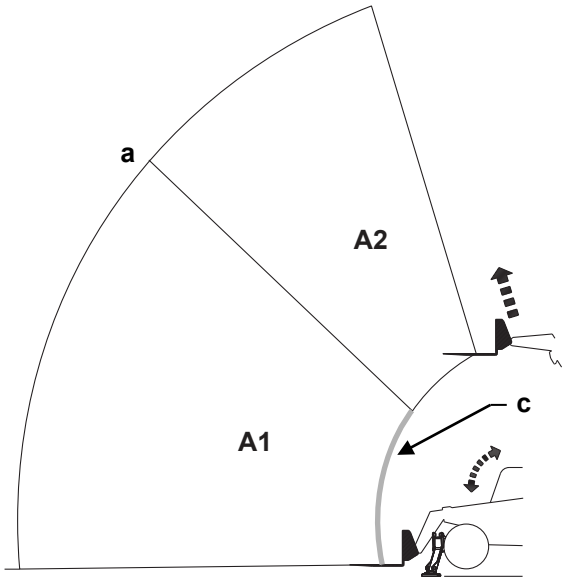


Figure 131.



A1 Boom zone

A2 Boom zone

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a 45° **c** Boom fully retracted

Longitudinal Load Moment Indicator (LLMI)

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

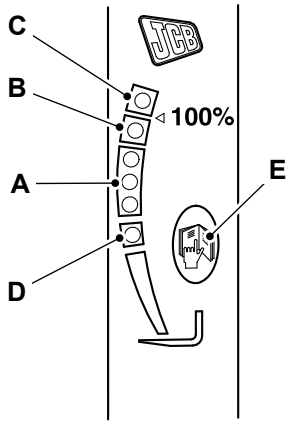
The LLMI (Longitudinal Load Moment Indicator) warns the operator when the machine is nearing its maximum forward longitudinal load moment (when the load moment could cause the machine to tip forward).

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

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

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

Figure 132.



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

Checking LLMI Limits Against Load Chart Limits

As mentioned above the the LLMI control system fitted to the machines prevents longitudinal overturn. The system responds to a reduction in rear axle load.

There are a number of elements which determine the actual capacity of a telescopic handler. These can include stability limits, structural limits and hydraulic limitations.

The loadcharts in JCB Loadall machines show the lowest of all limits.

Therefore where a limit is shown on a load chart which is not a longitudinal stability limit, the LLMI control system may allow the machine to exceed the load chart limit whilst staying within the stability limitations of the machine.

A table comparing the maximum distance from the front of the tyres to the load centre derived from the LLMI and the loadchart for a range of loads is within the flipchart pack supplied with the machine.

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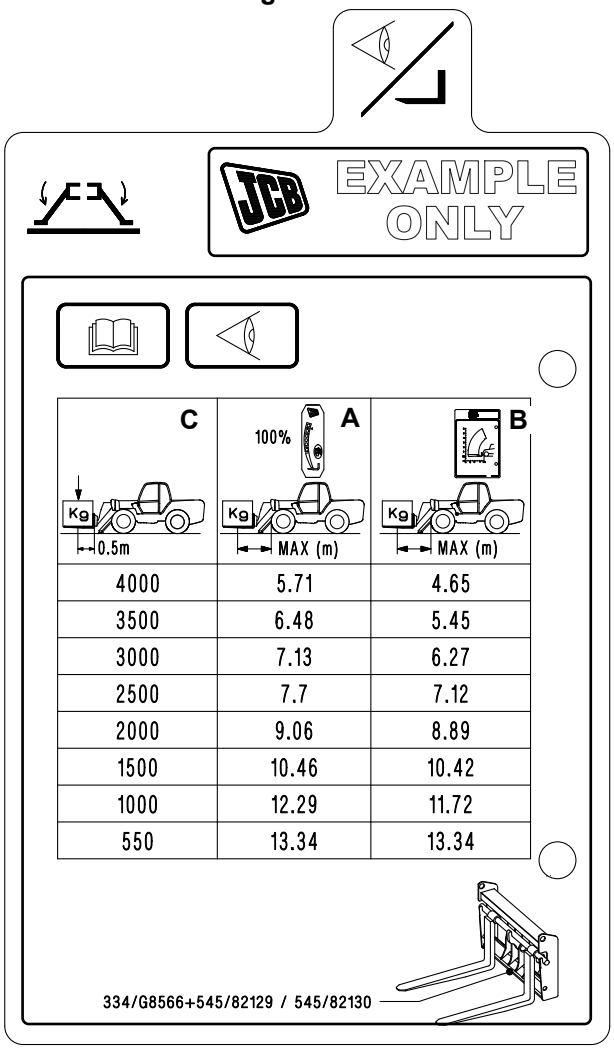
This table can be used for third party inspections.

Figure 133.



C	A	B
4000	5.71	4.65
3500	6.48	5.45
3000	7.13	6.27
2500	7.7	7.12
2000	9.06	8.89
1500	10.46	10.42
1000	12.29	11.72
550	13.34	13.34

A Maximum distance from the front of the tyres to the load centre derived from the LLMI
B Maximum distance from the front of the tyres to the load centre derived from the flip chart
C Load on forks at 0.5m load centres

Operation

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

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

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

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

A sensor measures the load exerted on the rear axle and sends a signal to the indicator unit. The indicator unit converts the signal into a display in the form of three green LED, one amber LED and one red LED. The LED will illuminate progressively as the load increases. Refer to Figure 132.

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.

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

The display brightness and audible warning levels can be adjusted.

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

Testing

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

Test the LLMI unit daily:

1. Park the machine on solid, level ground with the engine running.
2. Apply the park brake and place the forward/reverse lever in the neutral position.
3. The green LED at the bottom of the display illuminates to show that the indicator is receiving power. Refer to Figure 132.
4. Press the display button and release.
5. All LED on the indicator flash and the audible alarm sounds if the unit is functioning correctly.
6. Do not use the machine if the fault does not clear. Stop and park the machine as soon as safety permits. Switch off the engine. Contact your JCB distributor.

Setting the Volume and Brightness

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

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

1. Park the machine on solid, level ground with the engine running.
2. Apply the park brake and place the forward/reverse lever in the neutral position.
3. The green light at the bottom of the display will illuminate to show that the indicator is receiving power. Refer to Figure 132.
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 132.

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.

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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 134. Calibration faults

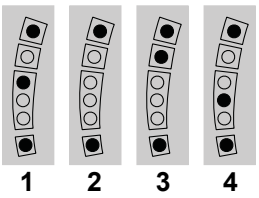


Figure 135. LLMI Unit faults

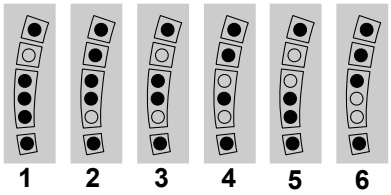
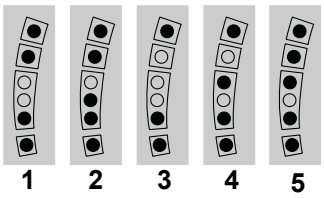


Figure 136. LLMI External faults



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.

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Figure 137.

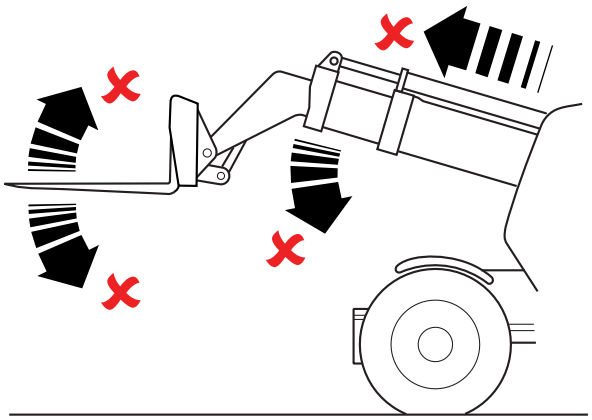
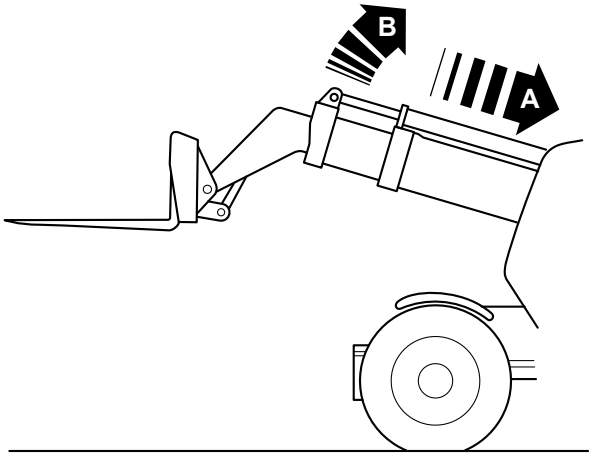


Figure 138.



A Boom retract

B Boom raise

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

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

Neither will the system protect against instability due to the stabiliser legs being lifted nor misuse of the chassis levelling (sway) function (if either of these options are fitted).
Refer to: Chassis Levelling Controls (Page 108).

The system is designed to help you to work more safely - It is not a substitute for skill and common sense.

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 115).

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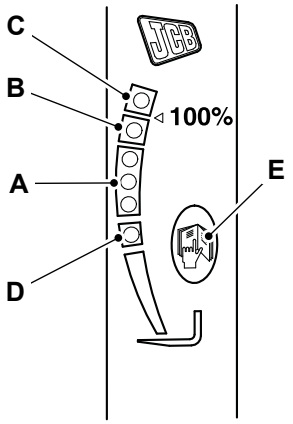
Operation

Figure 139.



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

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 amber LED will come on and then start flashing. The extend, lower, dump and crowd services will slow/stop when the amber light is on. The extend, lower, dump and crowd services stop when the amber light is flashing.This is dependant on oil temperature and macine tolerances. Both senarios are safe. Lift and retract services will continue to operate at normal speed. If you continue to move the load outside of the stability limit of the machine the red LED will be illuminated, and the boom arm hydraulic services will stop, except for lift and retract, these services should be used to bring the load back in to a more stable condition. 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.

Table 22.

LED State	Buzzer	Lower, extend, crowd, dump, AUX, stabilisers	Lift, retract
Green	-	Moving	Moving
Green 2	-	Moving	Moving
Green 3	-	Moving	Moving
Green 4	-	Moving	Moving
Amber	-	Slow/Stop	Moving
Amber flashing	-	Stop	Moving
Red Flashing	Sounding intermittent	Stop	Moving

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.

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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 change button.
2. An audible alarm will sound when all the LED flash the override function is enabled for a maximum of

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

   Duration: 5s

Figure 140.

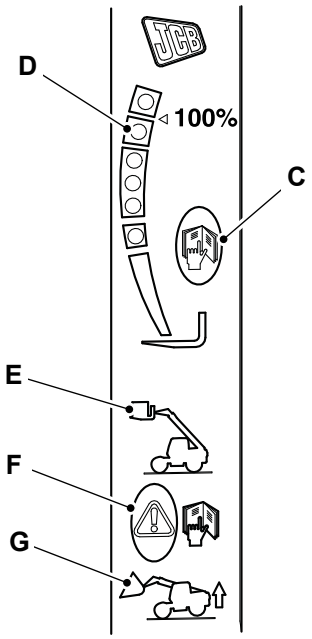

Table 23.

Callout	Colour	Description
C	Display button	
D	Amber LED	
E	Load control mode symbol	Lit when load control mode selected, flashes when red LED is lit (in load control mode).
F	Mode change button	
G	Ground work mode symbol	Lit when ground work mode selected.

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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.

When operating in cold ambient temperatures, the machine can fail the Daily Functional Check if the hydraulic oil is insufficiently warm. If this is the case, repeat the warm up procedure prior to repeating the Daily Functional Check.

Do not use the machine if the result for one or more of the test procedures is not correct. Stop and park the machine as soon as safety permits. Switch OFF the engine. Contact your JCB distributor.

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 140.
4. Complete the test procedure in the sequence as shown. Refer to Table 24.

Table 24.

S.No.	Operation	Result
1	Partly raise and extend the boom	Symbol E = On, Symbol G = Off
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 display button. When the LED flash on the LLMI, operate the boom lower	The boom should not lower
5	Press and release display button. When the LED flash on the LLMI, operate the boom extend	The boom should not extend
6	Press and release display button. When the LED flash on the LLMI, operate the boom raise	The boom should raise
7	Press and release display 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. This will increase 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 palleted loads first. Do not handle awkward loads until you can handle palleted loads safely and confidently.

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

Look in the direction of travel and keep a clear view of the way ahead. Seek assistance if forward vision is obscured by a bulky load. Particular care is required when driving off level ground.
Refer to: Slopes (Page 95).

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

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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.

Fixed Loads

⚠ **WARNING** Working with fixed loads can be dangerous; you or others can be killed or seriously injured if you do not follow the guidance within this section.

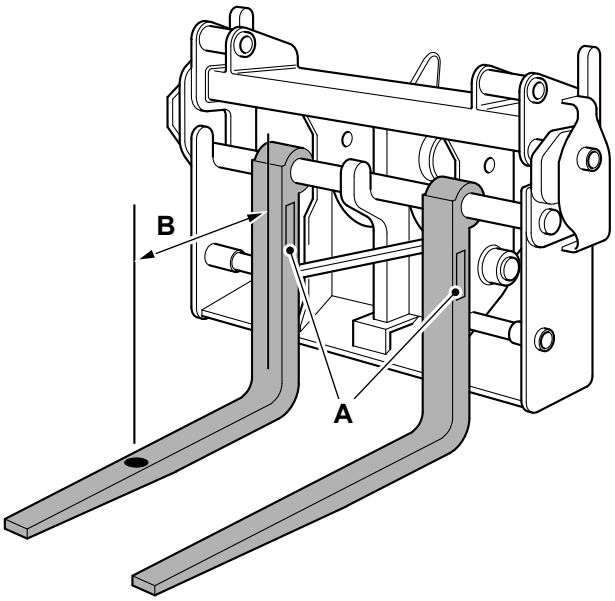
Refer to Load chart section for definition of fixed loads.
Refer to: Load Charts (Page 115).

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 141.



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 337).

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.

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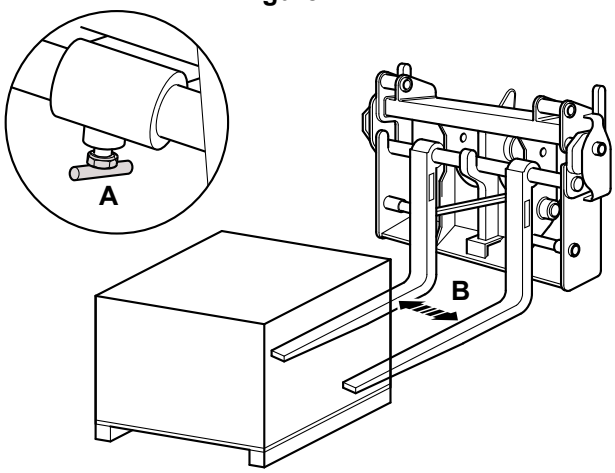
Repositioning the Forks

⚠ **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 142.



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 106).
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.

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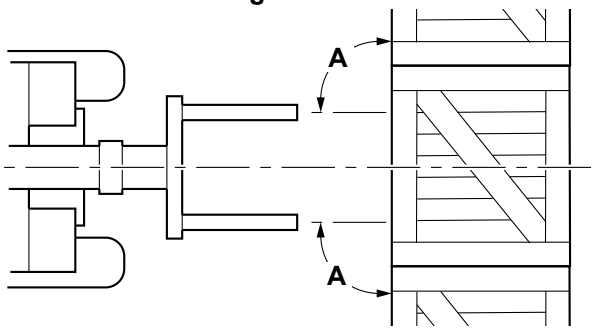
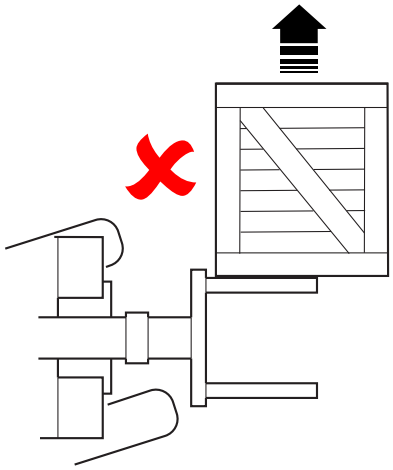
Figure 143.



A Angle = 90°

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

Figure 144.

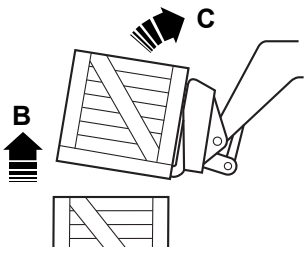


7. If the load is on a high platform you may have to raise the boom to allow you to get the machine close enough to the load.
8. Extend the boom or drive the machine, to insert the forks under the load.
9. Stop the machine, when the carriage touches the load.
10. Check the boom extension/angle(s) are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

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

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

Figure 145.



B Load raise **C** Carriage tilt

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

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13. Carefully drive the machine to the unloading point.

Unloading

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

1. Approach the unload straight-on, with all wheels straight.
2. Stop the machine and leave enough room to manoeuvre the boom.
3. Make sure the loading should not exceed the limits.
   Refer to: Load Charts (Page 115).
4. Engage the park brake and put the transmission in neutral.
5. Move the load above its required position.
6. Lower the load into position. Make sure the load is level.
7. Carefully withdraw the forks. Depending on the height of the load, you may have to raise or lower the boom as the forks come out.
8. When the forks are clear of the load, fully retract the boom.
9. Lower the boom into the travel position.

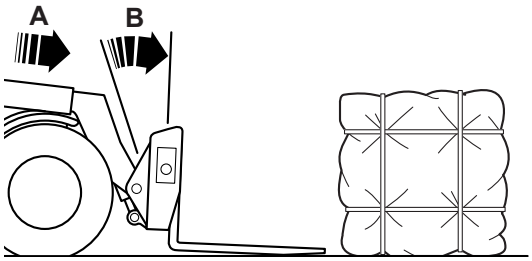
Working with Bales

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

Lifting Bales

1. Lower the boom and tilt the carriage forward.
   Refer to: Boom Controls (Page 106).

Figure 146.



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.

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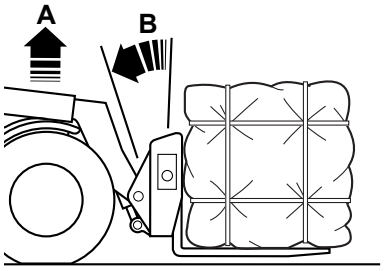
Figure 147.

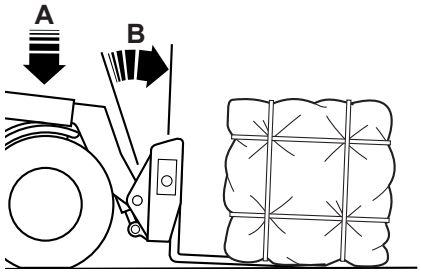


A Boom raise **B** Carriage retract

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.

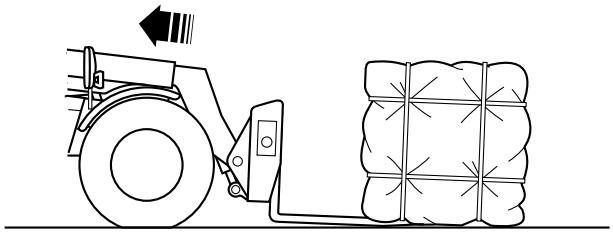
Figure 148.



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 149.



Working with Irregular Loads

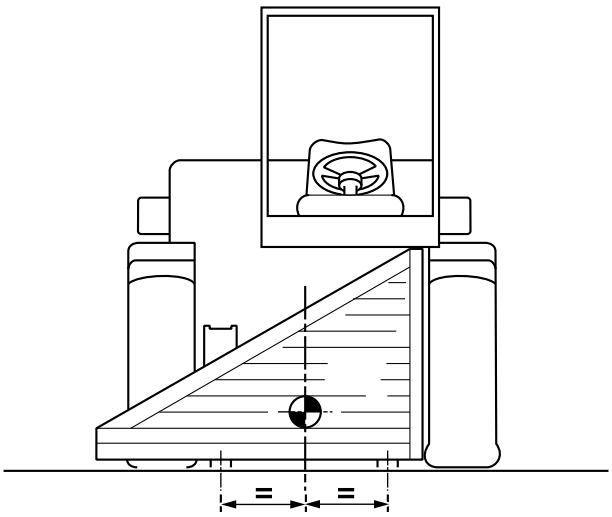
Be careful when you operate the boom and carriage with an uneven load.

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

3.2. If it is not palleted, it may be necessary to secure the load to the forks using suitable chains.

4. Stop the engine before allowing anyone to approach the forks.

Figure 150.

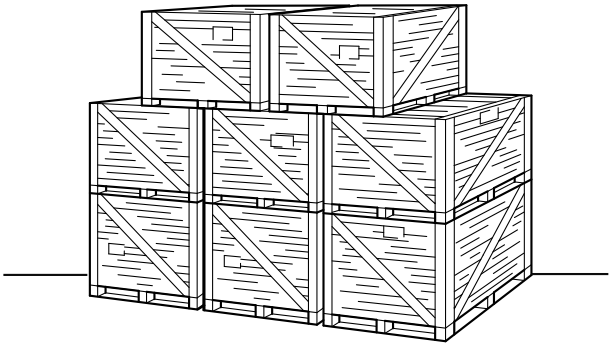


Stacking Loads

Box Pallets

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

Figure 151.



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.

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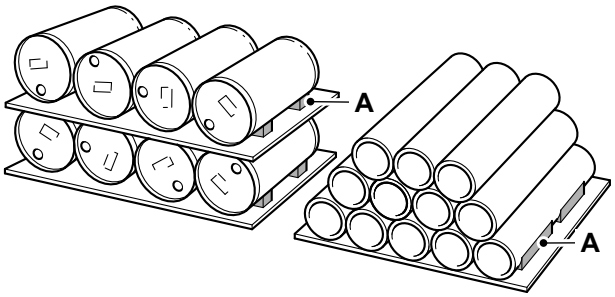
Figure 152.



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.

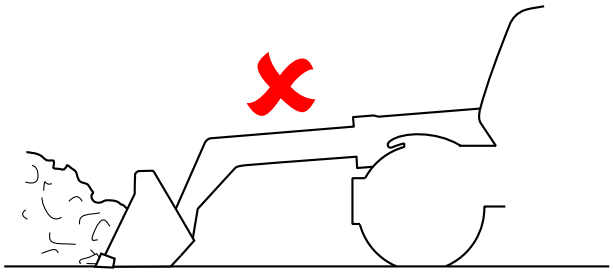
Your machine can be used with a wide variety of attachments, for example shovels.
Refer to: Attachments (Page 159).

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 153.



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.

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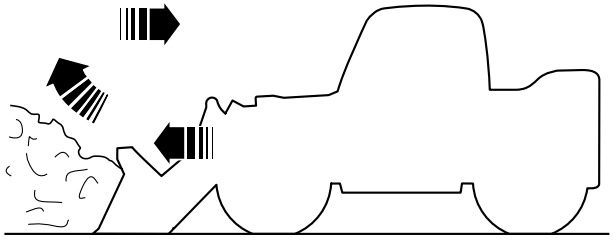
Figure 154.



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.

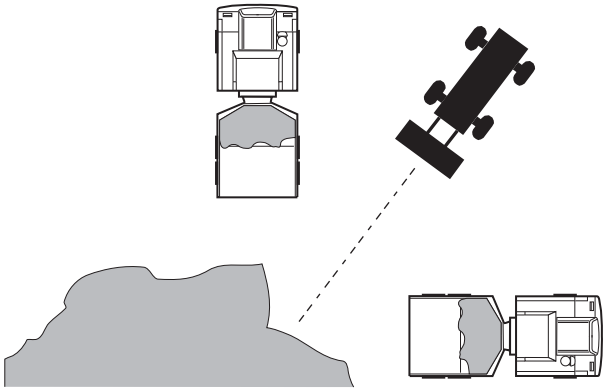
Keep the wind on your back. This keeps dust away from you and your machine.

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 155.



Suspended Loads

⚠ **WARNING** Working with suspended loads can be dangerous; you or others can be killed or seriously injured if you do not follow the guidance within this section.

Refer to load chart section for definition of suspended loads.
Refer to: Load Charts (Page 115).

Environment

Haul roads and loading areas should be consolidated (consolidated ground is firm ground capable of accepting the mass of the loaded machine without significant deformation). Beware of overhead obstructions and power

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lines. Do not lift loads when wind speeds are high enough to cause the load to swing. Before moving, ensure a visibility assessment has been carried out, to ensure both operator & banksman are fully aware of blind spots caused by the load or rigging.

Rigging of the Load

Any suspended load must be rigged by a competent person, using correctly sized equipment with valid inspection certification. The lifting equipment mass must be added to the mass of the load, to establish the total load to be lifted by the machine and attachment. This total load should then be identified on the appropriate load chart, and the limit of operation should be obeyed at all times.

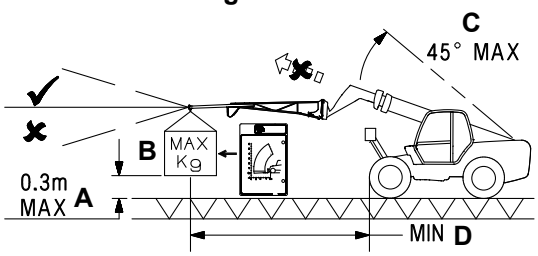
Lifting a Suspended Load

When lifting a suspended load, take up slack slowly to ensure there is no snatching of the load. Delicate use of the controls must be used to minimise any load swing. The lift should be directly over the centre of gravity of the load to minimise side loads on the machine and attachment. Ensure all bystanders, riggers and banksman are clear of the raised load and machine at all times.

Moving with a Suspended Load

When moving with a suspended load, care should be given to ensure all machine movements are smooth and slow. Travel speed should be kept to below walking pace 2km/h (1.2mph) to prevent the load from swinging. Grades, sudden starts / stops and turns can cause the load to swing. The boom should be retracted as far as practical ensuring the load does not contact the chassis. Boom controls should be isolated whilst the machine is moving. Sway control must not be used to compensate for the load swing. The load should be carried no higher than 300mm from the ground, and rigged to ensure the boom is not elevated above the angle stated on the suspended load traveling chart. The load should be externally stabilised with the use of guy lines. Ensure all bystanders, riggers and banksman are clear of the raised load and machine at all times. Refer to the important safety considerations for traveling on slopes with suspended loads.
Refer to: Slopes (Page 95).

Figure 156.



A 0.3m

B Maximum load specified in the load chart for the attachment

C 45° maximum

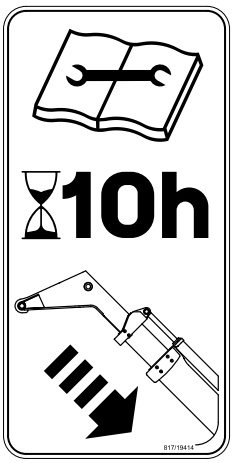
D Minimum distance

Adjusting the Boom

Re-phasing of 3-Stage Booms

3-stage booms can go out of phase if the hydraulic rams are not fully retracted regularly. You must fully retract the boom at least once every 10h of operation.

Figure 157.



To re-phase the boom sections:

- Hold the control in the retract position with the engine at high speed until the boom sections are fully retracted.

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Heating, Ventilating and Air-Conditioning (HVAC)

General

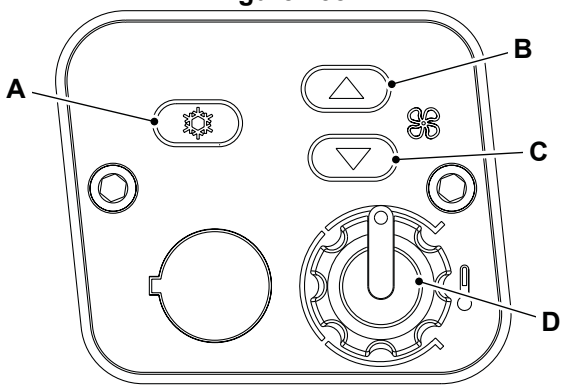
The operator must set the controls to obtain the best working environment in the operator station.

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 158.



A Air conditioning on/off switch
B Fan speed increase button
C Fan speed decrease button
D Temperature control switch

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.

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

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

Before starting the engine make sure the air conditioning is switched off. Press the air conditioning switch to turn on/off the air conditioning system.

Heat Control

Turn the temperature control switch clockwise to increase the temperature.

Turn the temperature control switch counterclockwise to decrease the temperature.

Fan Speed Control

Press the up arrow button to increase the fan speed.

Press the down arrow button to decrease the fan speed. This functions only when the ignition key is in position I.

The current fan speed will be displayed on the LCD screen.

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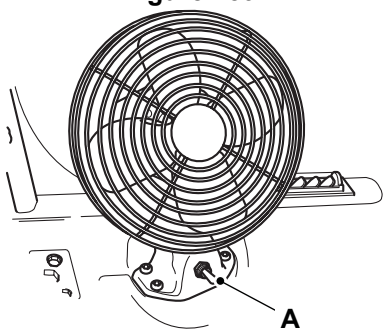
Face Level Fan

Figure 159.



A Switch - fan on/off

The face level fan is installed on the left side dash.

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

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Fire Extinguisher

General

Location

The fire extinguisher is stowed in a bracket behind the 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.

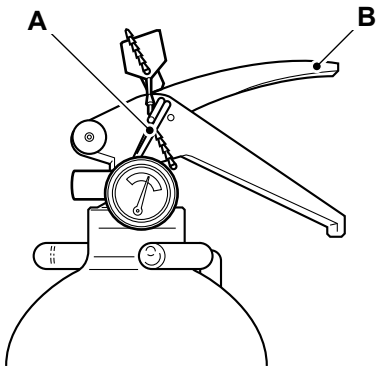
Make sure that you understand how to use the fire extinguisher. If necessary, refer to the instructions found on the fire extinguisher.

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 160.



A Safety pin **B** Trigger

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Moving a Disabled Machine

Jump-Starting the Engine

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

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

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

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

Switch off all circuits which are not controlled by the ignition key.

Do not connect the booster (slave) supply directly across the starter motor.

Use only sound jump leads with securely attached connectors. Connect one jump lead at a time.

The machine has a negative earth electrical system. Check which battery terminal is positive (+) before making any connections. Keep metal watch straps and jewellery away from the jump lead connectors and the battery terminals - an accidental short could cause serious burns and damage equipment. Make sure you know the voltage of the machine. The booster (slave) supply must not be higher than that of the machine. Using a higher voltage supply will damage your machine's electrical system. If you do not know the voltage of your booster (slave) supply, then contact your JCB dealer for advice. Do not attempt to jump-start the engine until you are sure of the voltage of the booster (slave) supply. The negative (-) terminal on the battery is connected to frame earth.

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 230).
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** Do not use the hitch to recover the machine or exceed the capability of the hitch. This could damage or weaken the hitch or pin which can result in the trailer becoming detached from the machine.

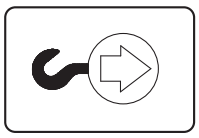
The recovery hitch is only suitable for occasional off highway towing with a maximum gross trailer weight of 1,000kg It is not approved as a permanent towing hitch. Make sure you will be obeying all pertinent laws and regulations before towing.

Preparing the Machine for Recovery

⚠ **Notice:** Towing a machine too far or too fast can damage the transmission. Do not tow the machine further than 1.6 km (1 mi). Use a trailer for greater distances. When towing do not travel faster than 10 km/h (6 mph). Use a rigid draw-bar. 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(s) must have enough pulling and braking power to move and stop the machine.

1. Make the machine safe.
2. Set the transmission to the neutral position. Dual Tech Variable Transmission: The engine must be switched off to enable mechanical neutral.
3. Prepare the machine for travel.
   3.1. 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.
4. 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.

Figure 161.



5. The machine is now ready for towing. Make sure you understand what the towing driver will be doing. Obey his instructions and all relevant regulations.
6. If the engine cannot be started, the effort required to steer the machine is greatly increased.

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Lifting the Product

General

⚠ **DANGER** Do not stand underneath the raised load during the lifting/lowering procedure. Stand clear and to one side until the load has been safely lowered. Make sure that the area is clear of other people before lowering the load. If you do not follow these precautions you or others could be killed or seriously injured.

CAUTION 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.

Safe Lifting Procedure

Provided a hoist of adequate capacity is available, it is permissible to lift a machine directly onto a suitable transporting vehicle.

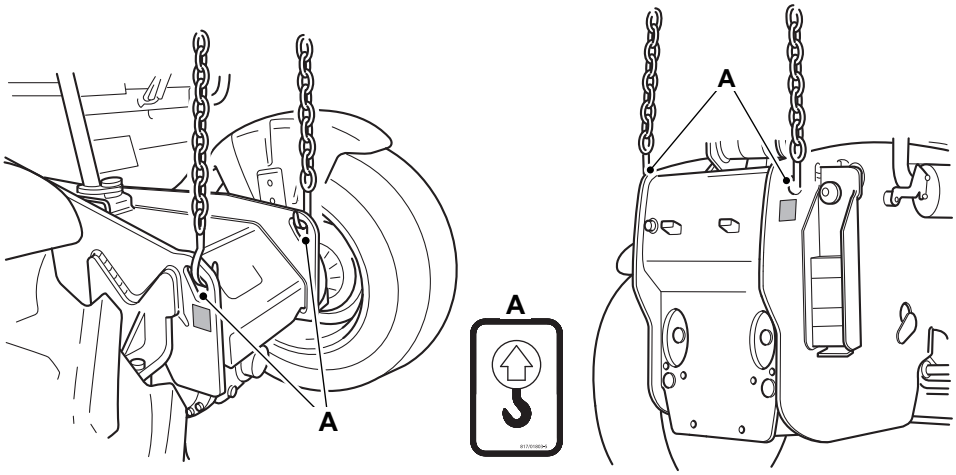
For machine weight and dimensions.
Refer to: Static Dimensions (Page 295).

Make sure that the cab door is closed before lifting the machine.
Refer to: Doors (Page 35).

1. Remove all attachments.
2. Make the machine safe with the boom lowered.
   Refer to: Maintenance Position - Boom Lowered (Page 203).
3. Remove all loose equipment from machine exterior.
4. Check the unladen weight of the machine.
   Refer to: Static Dimensions (Page 295).
5. Attach lifting equipment to lifting points.
   5.1. The correct lift-point positions are identified on the machine by a label.
6. A suitable lifting beam should be used to align the chains vertically at the chassis lifting points with the drop chains of sufficient length to ensure the lifting beam is clear of the cab.
7. Check that the lifting eye is positioned directly above the machine centre of gravity.
   Refer to: Lifting Points (Page 151).

Lifting Points

Figure 162.



A Lifting point (x4)

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Transporting the Product

General

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

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

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

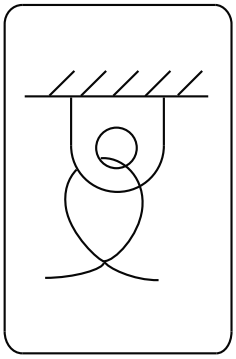
Make sure that the transport trailer is suitable for the dimensions and weight of your machine.
Refer to: Static Dimensions (Page 295).

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 onto the Transporting Vehicle

1. Attachments other than forks should be removed from the machine and secured separately.
2. Stop the transport vehicle on solid, level ground.
3. Put blocks at the front and rear of the wheels on the transport trailer.
4. Move the machine onto the transport vehicle.
   - 4.1. Make sure the ramps are in their correct positions, then secure them.
   - 4.2. Set the boom.
   - 4.3. Slowly and carefully drive the machine onto the transport trailer.
   - 4.4. Make the machine safe with the boom lowered.
     Refer to: Maintenance Position - Boom Lowered (Page 203).
   - 4.5. Put blocks at the front and rear of all four tyres.
   - 4.6. Check that the overall height of the load is within regulations. Adjust if necessary.
   - 4.7. Secure the cab.
5. Anchor the machine to the trailer with chains.
   Refer to: Tie Down Points (Page 153).
6. The correct tie down positions are identified on the machine by their labels. Refer to Figure 163.

Figure 163.



7. Measure the maximum height of the machine from the ground. Make sure that the transporter driver knows the maximum height before he drives away.

Appropriate chain tensioning devices must be used to prevent chain overload.

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Check tie down equipment before use and discard any distorted, damaged or excessively worn items. The tie down chain angles must be within the limits.
Refer to: Tie Down Points (Page 153).

Tie Down Points

Figure 164.

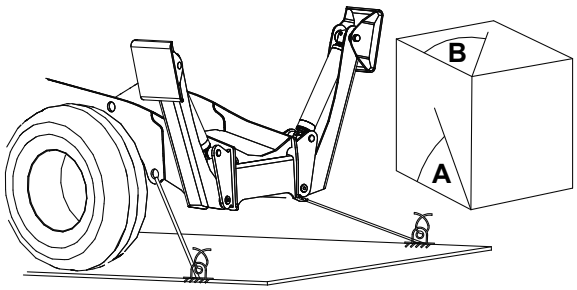

Figure 165.

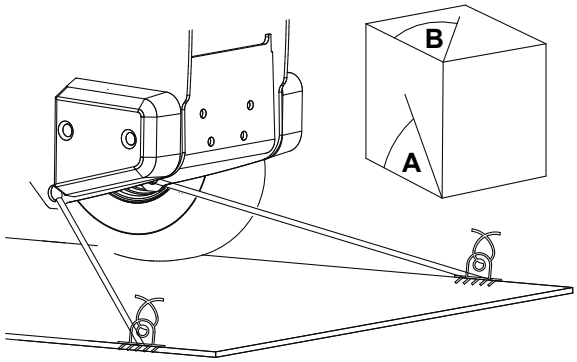

Table 25. Tie down chain angles

Model	A angle °		B angle °		Minimum chain grade	Minimum chain grade (kN)
	Min	Max	Min	Max		
533-105 front	25	34	27	43	10mm grade 'T' 8 BS 818-2 (63KN lashing capacity)	56kN
533-105 rear	18	24	29	41	10mm grade 'T' 8 BS 818-2 (63KN lashing capacity)	53kN
535-125 front	27	32	24	29	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	77kN
535-125 rear	15	20	28	39	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	70kN
535-140 front	27	32	24	29	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	77kN
535-140 rear	15	20	28	39	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	70kN
540-V140 front	27	32	24	29	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	77kN
540-V140 rear	15	20	28	39	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	70kN
540-140 front	27	42	28	39	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	86kN

Model	A angle °		B angle °		Minimum chain grade	Minimum chain grade (kN)
	Min	Max	Min	Max		
540-140 rear	20	26	26	48	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	81kN
550-140 front	27	42	28	39	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	86kN
550-140 rear	20	26	26	48	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	81kN
540-170 front	27	42	28	39	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	86kN
540-170 rear	20	26	26	48	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	81kN
540-v180 front	23	33	32	42	10mm grade 'T' 8 BS 818-2 (63KN lashing capacity)	62.9kN
540-v180 rear	17	27	31	34	10mm grade 'T' 8 BS 818-2 (63KN lashing capacity)	62.9kN
550-170 front	27	42	28	39	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	86kN
550-170 rear	20	26	26	48	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	81kN
540-200 front	27	42	28	39	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	86kN
540-200 rear	20	26	26	48	10mm grade 'T' 8 BS 818-2 (100KN lashing capacity)	81kN

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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 358).
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 and DEF (Diesel Exhaust Fluid) tank (if applicable) at the end of each work period, this will help to prevent condensation forming on the tank walls. Do not brim the tank in low temperatures, use the DEF level gauge on the instrument panel (ignition on).
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 49).

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. For every degree below 0 degrees Celsius the engine should be left at low idle for one minute.
4. With the engine at approximately 1500 rpm:
   4.1. Raise and lower the lift arm five times.
   4.2. Extend and retract the lift arm five times.
   4.3. Dump and crowd the carriage five times.

Operating in High Temperatures

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 air vents. Make sure that the air vents to and from the engine compartment are not blocked.
6. Check the engine pre-cleaner regularly (if installed).
7. Check the battery electrolyte level.

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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 264).

You must bleed the fuel system after changing the fuel filter(s).

Filling the Tank

⚠ **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: No warranty liability whatsoever will be accepted for failure of the emissions control system where the failure is attributed to contamination of the diesel exhaust fluid (DEF).

Notice: No warranty liability whatsoever will be accepted for failure of the emissions control system where the failure is attributed to contamination of the diesel fuel.

Notice: No warranty liability whatsoever will be accepted for failure of the emissions control system where the failure is attributed to the quality and grade of the diesel exhaust fluid (DEF) used.

Refer to: Fluids, Lubricants and Capacities (Page 358). If you use the incorrect type of fuel or fuel which is contaminated, then damage to the fuel injection system can occur.

Fill the fuel tank and DEF (Diesel Exhaust Fluid) tank (if applicable) at the end of each work period, this will help to prevent condensation forming on the tank walls.

Always replenish the DEF tank at the same as you refill the diesel tank. It is recommended that the DEF tank is not continually run down to the minimum, as this may drag contamination into the system and reduces the likleyhood of an engine de-rate due to DEF level.

DEF has a totally separate tank of its own. You can recognise your DEF tank by its blue cap or an AdBlue ® label.

Filling the Diesel Tank

⚠ **Notice:** Make sure that you use the fuel filler and not the DEF filler. Even small amounts of fuel in the DEF tank may damage the system. If there is any possibility that the DEF system has been contaminated with fuel, the engine must not be started before cleaning the system. Contact your JCB dealer.

1. Make the machine safe.

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Refer to: Maintenance Positions (Page 203).

2. If the machine has a protective flap, you must move the flap to get access to the filler cap. Lift the corner of the protective flap then attach to the hook.
3. Remove all unwanted material around the diesel fuel cap.
4. Remove the diesel fuel tank cap. Refer to Figure 166.
5. Add the fuel through the filler neck as necessary.
6. Install the diesel fuel tank cap.
7. Lock the diesel fuel tank cap to prevent theft and tampering.
8. Lower the protective flap.

Filling the Diesel Exhaust Fluid Tank

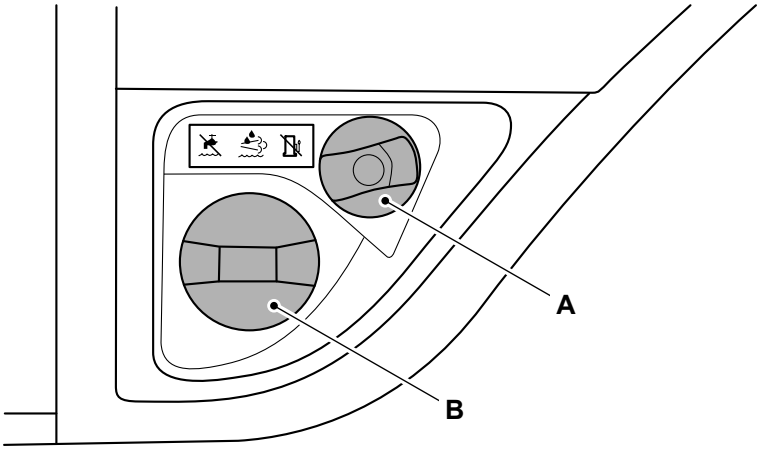
⚠ **Notice:** Make sure that you use the DEF filler and not the fuel filler. Even small amounts of DEF in the fuel tank may damage the system. If there is any possibility that the fuel system has been contaminated with DEF, the engine must not be started before cleaning the system. Contact your JCB dealer.

Machines with SCR (Selective Catalytic Reduction) after-treatment: If the engine and has been run low on DEF and the engine has entered a de-rate state due to low DEF you must fill the machine with DEF and cycle the ignition twice to remove the fault.

With the ignition on and the engine off it is possible to monitor the DEF level on the instrument panel as you fill the tank.

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 203).
2. Remove all unwanted material around the DEF cap.
3. Remove the DEF cap.
4. Add the DEF through the filler neck as necessary.
5. Install the DEF cap.
6. Lock the DEF cap to prevent theft and tampering.

Figure 166.



A DEF tank cap (blue) (machines with SCR after treatment)

B Diesel fuel tank cap (green - USA only, black - all other territories)

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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.

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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.

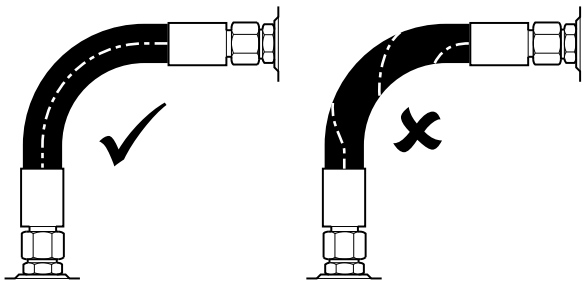
Connecting/Disconnecting Hydraulic Hoses

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 203).
2. Vent the hydraulic system.
   Refer to: Discharge (Page 285).
3. Check the hoses and adaptors for damage.
   Refer to: Check (Condition) (Page 285).
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.

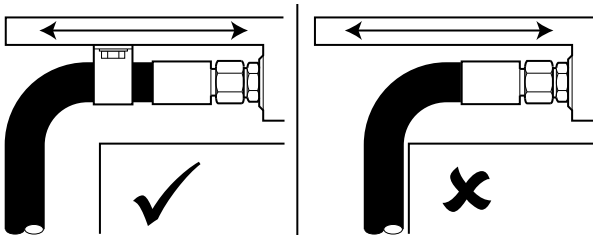
Figure 167.



   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.

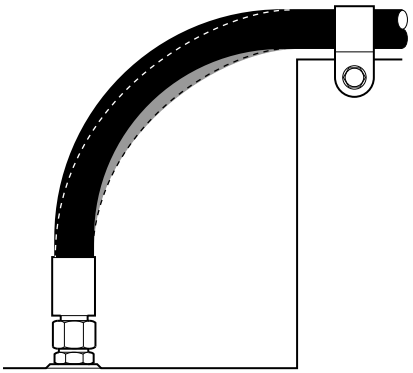
4.4. Use the hose clamps (where possible) to support long hose runs and keep the hoses away from moving parts, etc.

Figure 168.



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

Figure 169.



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 203).
2. Vent the hydraulic system.
   Refer to: Discharge (Page 285).
3. Disconnect the hoses.
4. Check the hoses and adaptors for damage.
   Refer to: Checking For Damage (Page 185).
5. If necessary, install the blanking caps.
6. Check for leaks:
   6.1. Start the engine.
   6.2. Operate the related controls to increase the pressure in the hydraulic system.
   6.3. Stop the engine then remove the ignition key.

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6.4. Check for indications of leakage at the hose connections. Correct, as necessary.

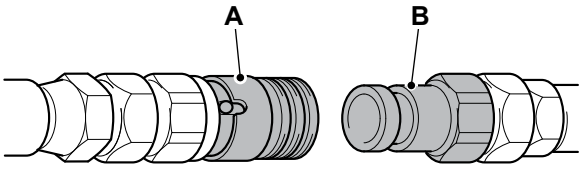
Quick Release Couplings

⚠ **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 170.



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.

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- 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 21).

   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

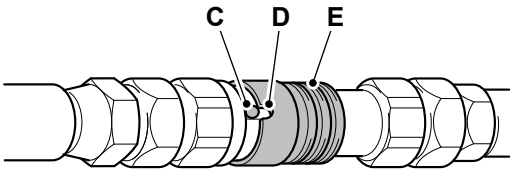
   1.2. Some attachments may require the hydraulic venting switch to be pressed for longer.

   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 171.



C Ball
D Slot
E Sleeve

Disconnecting Quick Release Couplings

1. Remove any residual hydraulic pressure trapped in the service line hose.

   Refer to: Console Switches (Page 21).

   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.

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Quick-fit Carriage

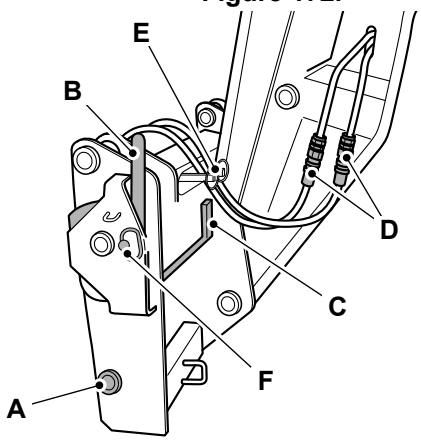
General

⚠ **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

Figure 172.



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

Installing Attachments

1. Make the machine safe.
   Refer to: Stopping and Parking (Page 56).
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 172.
   - 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 engine.
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 172.
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 172.

    Refer to: Connecting/Disconnecting Hydraulic Hoses (Page 160).
11. Secure the hydraulic hose(s) to the carrier with the locking pins. Refer to Figure 172.

Removing Attachments

1. Make the machine safe.

    Refer to: Stopping and Parking (Page 56).
2. Lower the attachment to the ground.
3. If the attachment is hydraulically operated, disconnect the hoses. Refer to Figure 172.

    Refer to: Connecting/Disconnecting Hydraulic Hoses (Page 160).
4. Remove the locking pins to release the attachment hydraulic hoses from the carrier. Refer to Figure 172.
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 172.
6. Start the engine.
7. Tilt the carrier forward to withdraw the lower end of the carrier from the attachment. Then lower the boom slowly to withdraw the carrier from the attachment.
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 with upper hooks plates to be installed or removed without leaving the cab.

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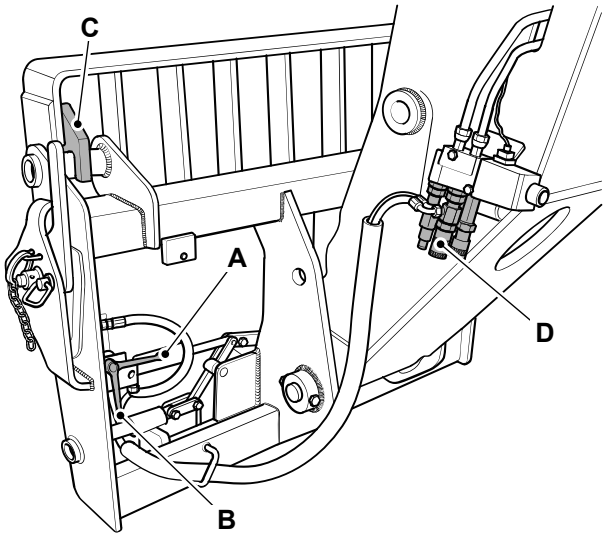
Figure 173.



A Lever - Hydraulic pin locking isolation valve (horizontal position)
B Lever - Hydraulic pin locking isolation valve (vertical position)
C Attachment hook plates
D Hose(s) couplings

Installing Attachments

1. Make the machine safe.
   Refer to: Stopping and Parking (Page 56).
2. Set the transmission to neutral.
3. Lower the boom to the ground.
4. Position the attachment on solid, level ground. Make sure the attachment will not roll over.
5. Remove the existing attachment.
6. If installed, move the lever of the hydraulic pin locking isolation valve to the horizontal position. Refer to Figure 173.
7. Engage the attachment. Refer to Figure 173.
   7.1. Make sure that the carrier lock pin is withdrawn.
   7.2. Use the control levers to align the carrier with the attachment and just below the attachment hook plates.
   7.3. Apply the park brake.
   7.4. Set the transmission to neutral.
   7.5. Use the boom controls to engage the support bar on the carrier into the hook plates on the attachment.
   7.6. Make sure that both hook plates are engaged equally.
   7.7. Lift and tilt the carrier back, to align the locking holes in the carrier with those in the attachment.
   7.8. Operate the auxiliary control to engage the locking pins. Visually check they are engaged.
8. Lower the attachment to the ground.
9. Stop the engine.
10. Remove the ignition key.
11. If installed, move the lever of the hydraulic pin locking isolation valve to the vertical position, in this position the locking pins are isolated and the auxiliary circuit is active. Refer to Figure 173.

12. If the attachment is hydraulically operated, connect the hose(s) to the couplings. Refer to Figure 173.
    Refer to: Connecting/Disconnecting Hydraulic Hoses (Page 160).

Removing Attachments

1. Make the machine safe.
   Refer to: Stopping and Parking (Page 56).
2. Lower the attachment to the ground.
3. If the attachment is hydraulically operated, disconnect the hose(s) from the couplings. Refer to Figure 173.
   Refer to: Connecting/Disconnecting Hydraulic Hoses (Page 160).
4. If installed, move the lever of the hydraulic pin locking isolation valve to the horizontal position. Refer to Figure 173.
5. If installed, press and hold the locking pin isolator switch. Operate the auxiliary control.
6. Tilt the carrier forward slowly to withdraw the lower end of the carrier from the attachment.
7. Lower the boom slowly to withdraw the carrier from the attachment hook plates. Refer to Figure 173.
8. Carefully reverse the machine away from the attachment (or retract the boom).
9. Lower the boom to the ground.
10. Stop the engine.
11. Remove the ignition key.
12. If installed, move the lever of the hydraulic pin locking isolation valve to the vertical position, in this position the locking pins are isolated and the auxiliary circuit is active. Refer to Figure 173.

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Side-Shift Carriage

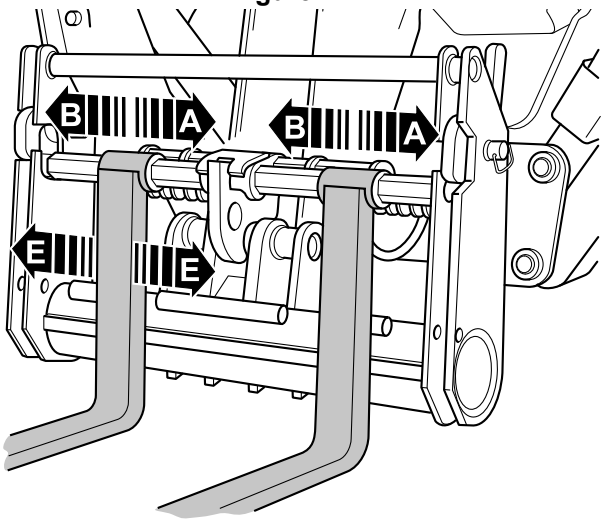
General

The side-shift carriage allows you to accurately position both forks simultaneously with 100mm of sideways movement with a load on the forks. The forks are controlled by the auxiliary control in the cab.

Operate the auxiliary controls as required to move the forks.

- Side-shift left
- Side-shift right

Figure 174.



A Side-shift left
B Side-shift right
E Fork spacing

Fork Spacing

⚠ **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.

Fork spacing may be adjusted to suit the load either hydraulically, using the auxiliary control, or manually.

Hydraulic Fork Spacing

1. Raise the boom.
2. Tilt the carriage forward until the left hand fork fingers disengage from the cylinder, leaving the right hand fork fingers engaged.
3. Use the auxiliary control to side-shift the right hand fork only, in order to position the forks.
4. Tilt the carriage back and make sure the left hand fork re-engages with the cylinder.

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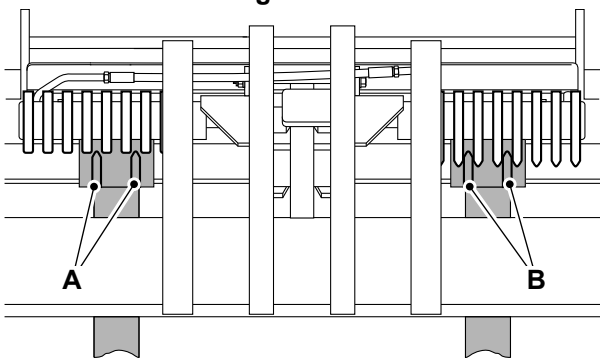
Figure 175.



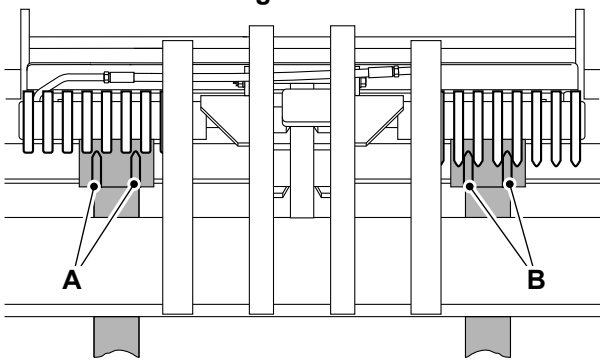
A Fork fingers - left hand **B** Fork fingers - right hand

Manual Fork Spacing

⚠ **WARNING** Forks are heavy. Take care when spacing forks or folding back the forks.

1. Raise the boom.
2. Tilt the carriage forward until both the left and right forks disengage from the cylinder.
3. Manually position the forks as required.
4. Tilt the carriage back and make sure both forks re-engage with the cylinder.

Figure 176.



A Fork fingers - left hand **B** Fork fingers - right hand

Installing the Side-shift Carriage

⚠ **WARNING** Keep other people clear of the area while you engage the attachment. If a second person is to be involved in this procedure, make sure that they keep clear of the machine and attachment until signalled by you to proceed. The machine loading limits at different boom positions are shown on the load charts in the cab.

1. Make sure the attachment is on firm level ground.
2. Make sure the attachment will not roll over.
3. Remove the existing attachment, leave the Q-fit carriage lock pin disengaged.
4. Remove the carriage locking pins.
5. Use the controls to align the carriage with the attachment and just below the attachment hook plates.

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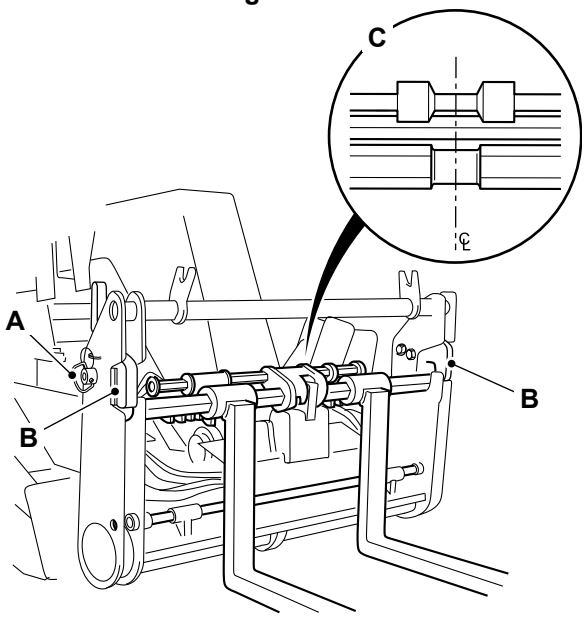
Figure 177.



A Carriage locking pins
B Hook plates
C Side-shift - central position

6. Apply the park brake, set the transmission to neutral.
7. Align the sections of the side-shift attachment centrally.
8. Remove the protective cover for clarity.
9. Use the boom controls to engage the support bar on the attachment into the hook plates on the carriage.
10. Make sure both hook plates are engaged equally.
11. Make sure that the transmission is set to neutral, and that the park brake is engaged.
12. Stop the engine.
13. Remove the ignition key.
14. Engage the locking pins.
15. Make sure the pins are fully engaged, and secure with locking rings at both sides of the carriage.
16. Connect the hoses.
    Refer to: Connecting/Disconnecting Hydraulic Hoses (Page 160).

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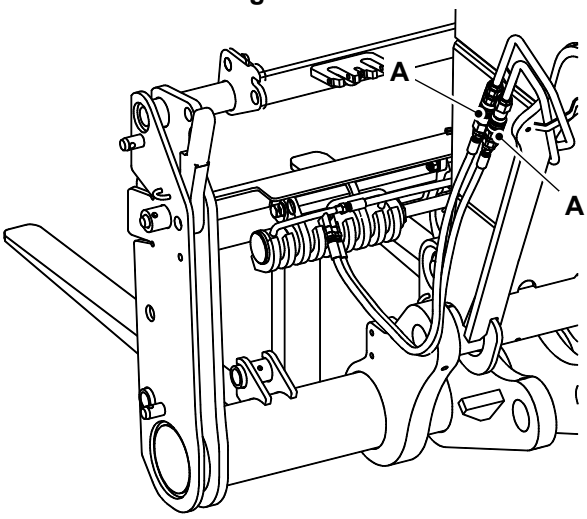
Figure 178.



A Hoses

Removing the Side-shift Carriage

⚠ **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.

1. Lower the attachment to the ground.
2. Apply the park brake.
3. Set the transmission to neutral.
4. Stop the engine.
5. Disconnect the hoses.
   Refer to: Connecting/Disconnecting Hydraulic Hoses (Page 160).
6. Remove the lock rings and remove the locking pins at both sides of the carriage.
7. Start the engine.
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.

Maintenance

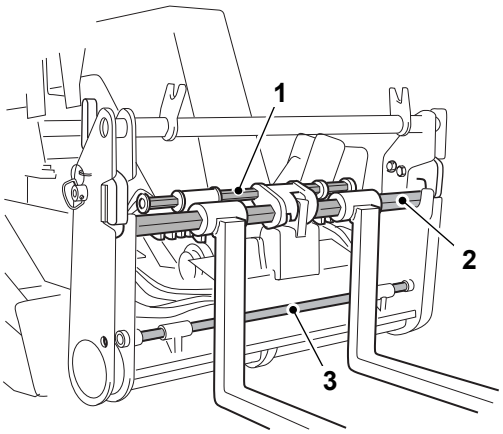
Daily

Clean with the rest of the machine.

Every 50 Hours

Lubricate the sideshift carriage in three places. Refer to Figure 179.

Figure 179.



Protective cover removed for clarity.

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Fork Positioner

General

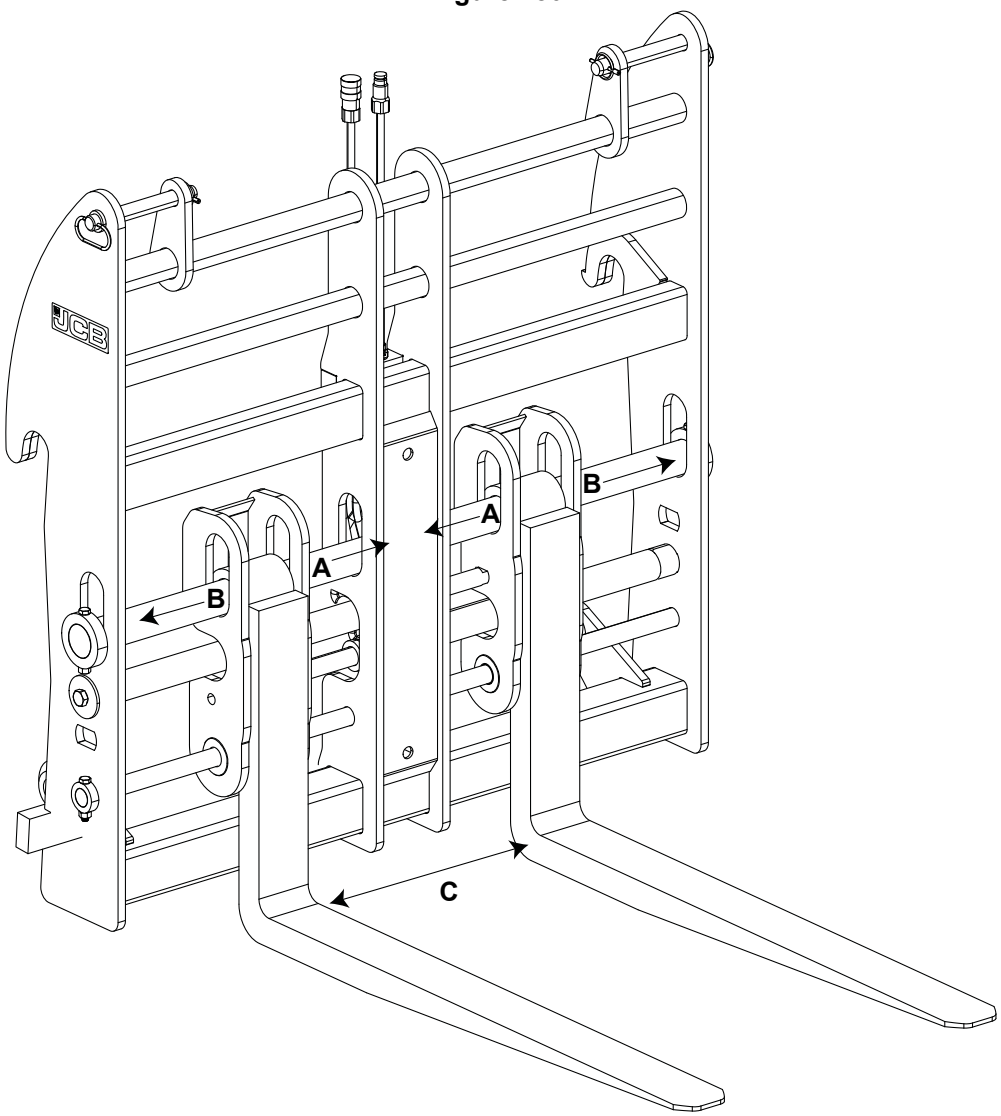
The fork positioner allows the operator to accurately position both the forks simultaneously with 410mm of sideways movement on each fork when under load. The forks are controlled by the auxiliary control in the cab.

Operate the auxiliary controls as required to move the forks.

Set the forks in the correct position before you enter the intended load.

- Side-shift left
- Side-shift right

Figure 180.



A Movement direction A
B Movement direction B
C Fork spacing

Fork Spacing

Fork spacing may be adjusted to suit the load hydraulically using the auxiliary control.

Raise the boom until forks are off the ground then use the auxiliary control to position the forks at the correct spacing for the load.

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Installing the Fork Positioner

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 Q-fit carrier lock pin disengaged.
4. Remove the carrier lock pins.
5. Engage the attachment.
   5.1. Use the control levers to align the carrier with the attachment and just below the attachment hook plates.
   5.2. Apply the park brake.
   5.3. Set the transmission to neutral.
   5.4. Align the sections of the fork positioner attachment centrally.
   5.5. Use the boom controls to engage the support bar on the attachment into the hook plates on the carrier.
   5.6. Make sure that both hook plates are engaged equally.
   5.7. Lift and tilt the carrier back, to align the lock holes in the carrier with those in the attachment.
6. Insert the lock pin.
   6.1. Make sure that the transmission is set to neutral and that the park brake is ON.
   6.2. Stop the engine.
   6.3. Remove the ignition key.
   6.4. At the carrier, insert the lock pin into the lock holes in the carrier and attachment.
   6.5. Make sure that the pins are fully engaged, and secure with the lock rings at both sides of the carrier.
   6.6. If the attachment is hydraulically operated, connect the hoses.
   Refer to: Connecting/Disconnecting Hydraulic Hoses (Page 160).

Removing the Fork Positioner

1. Lower the attachment to the ground.
2. Make sure the transmission is set to neutral and the park brake is applied.
3. Stop the engine.
4. Remove the ignition key.
5. If the attachment is hydraulically operated, disconnect the hoses.
   Refer to: Connecting/Disconnecting Hydraulic Hoses (Page 160).
6. Remove the lock rings and remove the lock pins at both sides of the carrier.
7. Start the engine.
8. Tilt the carrier forward slowly to withdraw the lower end of the carrier from the attachment.
9. Then lower the boom slowly to withdraw the carrier from the attachment hook plates.
10. Carefully reverse the machine away from the attachment or retract the boom.

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Jibs

General

Safety

⚠ **WARNING** Never exceed the capacity of the Loadall. Also make sure that the load rating for slings, chains, or straps used with the hook are equal to or exceed the rating of both the Loadall and the hook, if not; always limit the load to the lowest rated part of the lifting system.

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.

Before use inspect the swivel hook and or shackle at the end of the jib to make sure that they are in good condition and the anchor pin fits correctly.

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 no faster than 2km/h (1.2mph) 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 and do not perform any loading when the wind speed exceeds 10m/s.

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 134).

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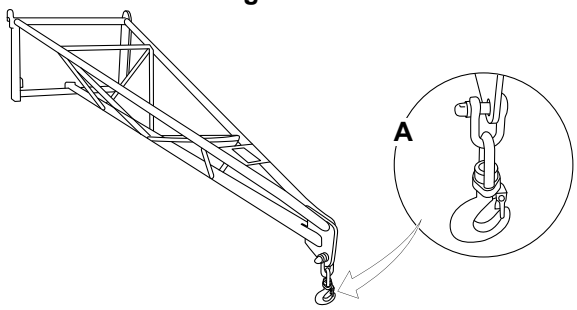
Figure 181.

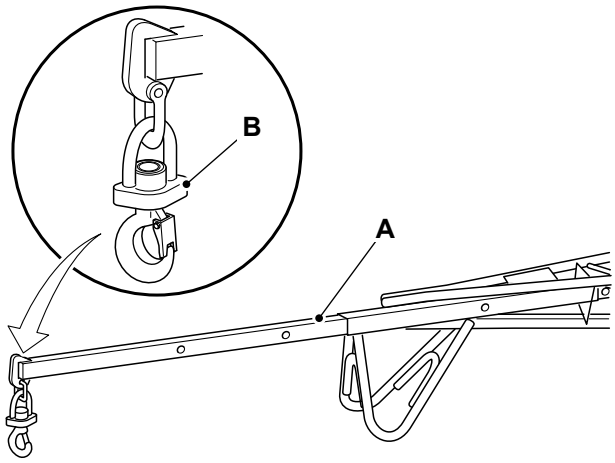


Extension jib

Roof Truss Jib

This a Q-fit attachment. It gives your machine greater reach and height. This attachment is supplied with test certificates for its fabrication, its hook and its shackle. The safe working load is stamped on a plate mounted on the attachment.

Figure 182.



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:

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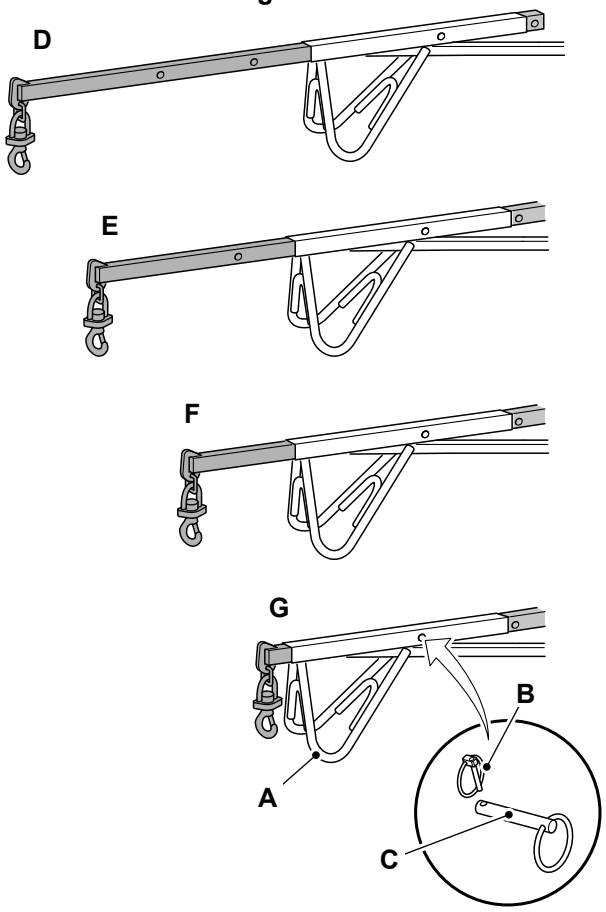
Figure 183.



A Skid
B Lynch pin
C Pin
D Jib- fully extended
E Jib- extended position 1
F Jib- extended position 2
G Jib- fully retracted

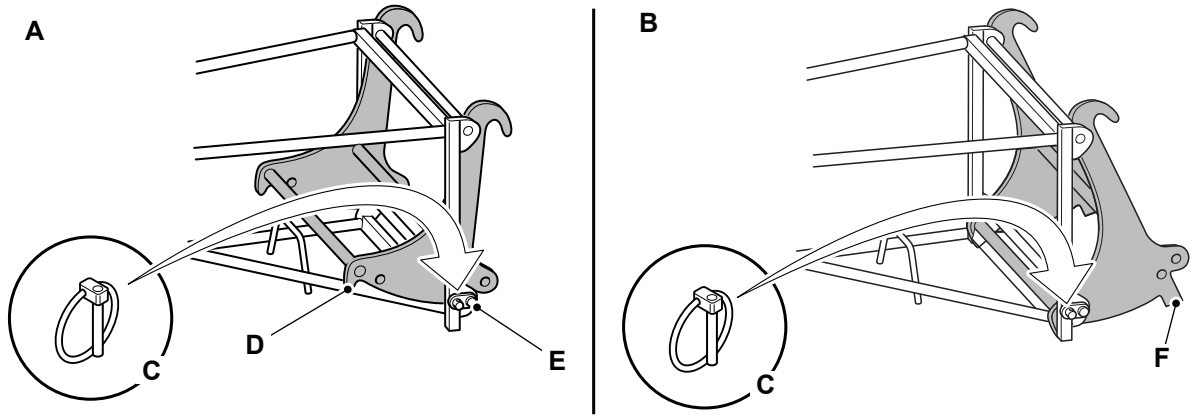
1. Remove the load and lower the jib to the ground.
2. Make sure the skid is supporting the weight of the jib.
3. Remove the lynch pin, then pin.
4. Move the jib extension to the required position; fully extended or fully retracted.
5. Insert the pin and secure with lynch pin.

Changing the Jib Angle

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

- Placing position
- Travel position

Figure 184.



A Placing position
B Travel position
C Lynch pin
D Stops
E Bar
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.

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Shackle

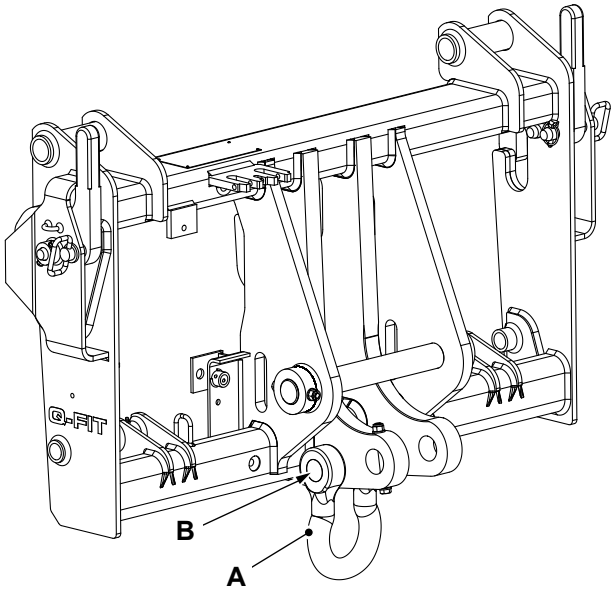
General

⚠ **WARNING** Do not exceed the safe working load limit stated on the shackle.

Carriage mounted shackle

The carriage mounted shackle allows the machine to safely carry slung loads.

Figure 185.



A Shackle **B** Screw Pin

Installing

1. Adjust the boom so that it is horizontal with the ground.
2. Apply the park brake ans stop the engine.
3. Unscrew the screw pin from the shackle and locate the shackle mounting hole in the rear support of the carriage.
4. Tighten the screw pin securely back into the shackle ensuring that it passes through the shackle mounting hole.

Removing

1. Lower the boom so that it is horizontal with the ground.
2. Apply the park brake and stop the engine.
3. Unscrew the screw pin and remove the shackle from the carriage.
4. Store the shackle carefully to prevent damage and corrosion.

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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.

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Hooks

Fork-Mounted Hook

⚠ **WARNING** The attachment is heavy. Take care when lifting and handling it. Use suitable lifting equipment. Make sure the lifting equipment is in good condition. Make sure the lifting equipment complies with all pertinent regulations. Wear gloves and safety shoes.

WARNING Never exceed the capacity of the Loadall. Also make sure that the load rating for slings, chains, or straps used with the hook are equal to or exceed the rating of both the Loadall and the hook, if not; always limit the load to the lowest rated part of the lifting system.

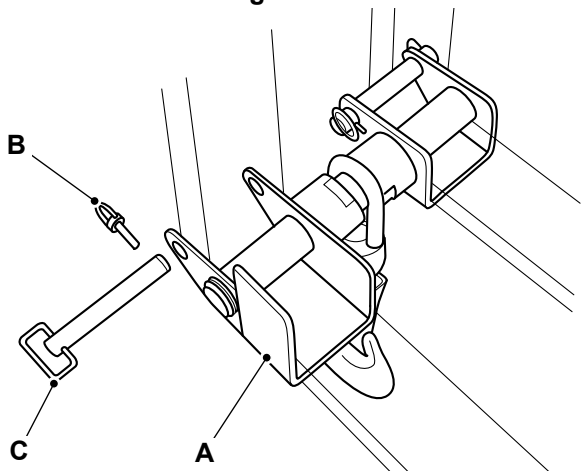
The fork mounted hook allows the machine to carry slung loads with safety. It incorporates a swivel hook with a spring-loaded safety catch. This attachment is supplied with test certificates for its fabrication and its hook. Its safe working load is stamped on a plate mounted on the attachment.

Safety

Obey all the safety instructions given in the main part of this book, plus the ones given in this section. Use this attachment only if it carries updated test certificates.

Before use inspect the swivel hook to make sure that it is in good condition and the anchor pin fits correctly.

Figure 186.



A Mounting sockets
B Lynch pin
C Locking bar

Installing

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

Removing

1. Lower the attachment so that it just clears the ground.

2. Apply the park brake and stop the engine.
3. Remove the attachment.
    3.1. Remove the lynch pin and locking bar.
    3.2. Carefully slide the attachment off the forks.
    3.3. Install the locking bar and secure with lynch pin.
    3.4. Store the attachment carefully to prevent damage and corrosion.

Maintenance

Daily

1. Clean with the rest of the machine.
2. Check for damage. Make sure that the hook safety catch is in good working order.

As Required or At least Annually

All lifting equipment including this attachment may need regular inspection and testing by a competent person to make sure they are fit for purpose.

This may be needed every six months or at least annually in many countries to meet and comply with local legislation and for insurance purposes.

Contact your JCB dealer for further advice.

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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 196).

Detergents

Do not use a full strength detergent. Always dilute the detergents as per the manufacturer's recommendations, or damage to the paint finish can occur.

Always obey the local regulations regarding the disposal of debris created from cleaning the machine.

Pressure Washing and Steam Cleaning

⚠ **CAUTION** When using a steam cleaner, wear safety glasses or a face shield as well as protective clothing. Steam can cause personal injury.

Notice: The 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 (2,000.0psi).
- Keep water temperature below 80°C (176°F).

- 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 203).

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.

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Checking For Damage

General

Refer to the individual condition checks throughout the Maintenance section.
Refer to: Maintenance Schedules (Page 196).

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Storage

General

If the machine will not be used for an extended period (greater than two months), 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.

It is recommended the engine is operated and reaches operating temperature at least every three months.

Storage Area

The machine can be stored in a temperature range of: -40°C (-40°F) to 30°C (86°F).

If the machine uses DEF (Diesel Exhaust Fluid) and is to be stored with DEF (or other fluids present), check the relevant fluid storage requirements as they may affect the applicable storage temperature range.
Refer to: During Storage (Page 187).

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. Treat exposed parts with anti-rust agent. Apply grease to unpainted surfaces.
4. Apply grease to the moving parts.
5. Examine the machine for worn or damaged parts. Replace if necessary.
6. Fill the diesel fuel and DEF tanks to prevent a build up of condensation in the tank.
7. Examine the coolant condition. Replace if necessary.
8. Examine all fluid levels. Top up if necessary.
9. Inflate the tyres to the correct pressure (if applicable).

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.

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During Storage

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

1. Remove the grease or petroleum jelly from the ram piston rods.
2. Examine all fluid levels. If necessary, add more fuel and DEF (Diesel Exhaust Fluid).
3. Install a charged battery.
4. Start the engine.
5. Operate the hydraulic controls. Make sure that the hydraulic functions operate correctly.
6. Prepare the machine for storage.

Effects of Storage on the DEF System (if applicable)

If the engine has been shutdown correctly and there are no faults with the DEFsystem, the DEF system and engine can remain in a deactivated state under the following conditions:

Table 26.

Storage Period	Storage Actions
Up to 9 months	Fill DEF tank to maximum level with fresh DEF. Do not disconnect any electrical or hydraulic connections. Make sure the ambient temperature is between the values shown. -40°C (-40°F) to 30°C (86°F).
Longer than 9 months	Carry out recommissioning process

Take out of Storage

1. Examine the coolant condition. Replace if necessary.
2. Examine all fluid levels. If necessary, add more fluid.
3. Clean the machine to remove all unwanted material and corrosive products. Dry the machine to remove solvents and moisture.
4. Remove the grease or petroleum jelly from the ram piston rods.
5. Install a charged battery.
6. Start the engine.
7. Operate the hydraulic controls. Make sure that the hydraulic functions operate correctly.

DEF Recommissioning Process (if applicable)

1. Drain the DEF (Diesel Exhaust Fluid) tank.
2. Refill DEF tank with fresh fluid.
3. If a DEF system failure is detected, contact your JCB dealer for advice.

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.

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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.

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Service/Maintenance Agreements

To help plan and spread the costs of maintaining your machine, we strongly recommend you take advantage of the many service and maintenance agreements your dealer can offer. These can be tailor made to meet your operating conditions, work schedule etc.

Please consult your JCB dealer for details.

Initial Service and Inspection

To further protect your machine's performance it is essential your JCB distributor carries out an initial service and inspection when the machine is one month old or when it has completed 100h of operation (whichever occurs first). You should notify your distributor in advance to allow the necessary arrangements to be made.

Obtaining Spare Parts

If you use non-genuine JCB parts or consumables, then you can compromise the health and safety of the operator and cause machine failure.

A parts book for your machine is available from your JCB dealer. The parts book will help you identify parts and order them from your JCB dealer.

Your dealer will need to know the exact model, build and serial number of your machine.
Refer to: 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.

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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 Triochloroethane or paint thinners near 'O' rings and seals.

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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®, FluorelTM and Technoflon®. Fluoroelastomeric materials subjected to high temperatures can produce highly corrosive hydrofluoric acid. This acid can severely burn. New fluoroelastomeric components at ambient temperature require no special safety precautions. Used fluoroelastomeric components whose temperatures have not exceeded 300 °C (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 fluoroelastiometric materials.

Hydraulic Hoses

Never re-use hydraulic hose end crimps or use reusable hose end crimps.

Personal Protective Equipment

Use the appropriate personal protective equipment before performing maintenance on the machine, otherwise you could be injured.

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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.

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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 187.

A Keep away from children
B Shield eyes
C No smoking, no naked flames, no sparks
D Explosive gas
E Battery acid
F Note operating instructions

First Aid - Oil

Eyes

In the case of eye contact, flush with water for 15min. If irritation persists, get medical attention.

Swallowing

If oil is swallowed do not induce vomiting. Get medical advice.

Skin

In the case of excessive skin contact, wash with soap and water.

Spillage

Absorb with sand or a locally approved brand of absorbent granules. Scrape up and remove to a chemical disposal area.

Fires

⚠ **WARNING** Do not use water to put out an oil fire. This will only spread it because oil floats on water.

Extinguish oil and lubricant fires with carbon dioxide, dry chemical or foam.

First Aid - Electrolyte

Eyes

In the case of eye contact, flush with water for 15min. always get medical attention.

Swallowing

Do not induce vomiting. Drink large quantities of water or milk. Then drink milk of magnesia, beaten egg or vegetable oil. Get medical help.

Skin

Flush with water, remove affected clothing. Cover burns with a sterile dressing then get medical help.

First Aid - DEF (if applicable)

Do not drink or inhale DEF (Diesel Exhaust Fluid). If large quantities of DEF have been swallowed a doctor should be called immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

Avoid prolonged or repeated skin contact. After contact with skin wash thoroughly with plenty of soap and water. If irritation develops seek medical advice.

Avoid contact with eyes, skin and clothing. Wear chemical resistant gloves, overalls and safety goggles complying with an approved standard. If in contact with eyes, rinse immediately with plenty of clean water. If irritation occurs seek medical attention. Always wash hands and arms thoroughly after handling before eating, drinking, smoking or using the lavatory.

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Maintenance Schedules

General

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

Before doing any maintenance make sure the machine is safe, it must be correctly parked on 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 27.

○	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 28.

Interval (h)	Calendar Equivalent
10	Daily
50	Weekly
500	Six months
1000	Yearly
2000	Two Years
5000	Five Years

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Operator Maintenance Tasks

Table 29.

Component	Task	10	50
ENGINE			
Oil level	Check	O	O
Coolant Quality and Level	Check	O	O
Coolant, Oil or Fuel Leaks	Check (leaks)	O	O
Water Separator	Check for contamination and drain		O
TRANSMISSION, AXLES AND STEERING			
Transmission Oil Level	Check	O	O
Axle(s) Oil Level	Check		O
Wheel Nut Security	Check	O	O
Tire Pressures/Condition	Check	O	O
Wheel Alignment	Check	O	O
Axle Pivots and Linkages[2]	Grease		O
Steering - Operation/Phasing	Check	O	O
Transmission Operation	Check	O	O
HYDRAULICS			
Oil Level	Check (level)		O
Operation of All Services	Check	O	O
Boom Extension/Phasing (3 stage boom)[1]	Check	O	O
BRAKES			
Brake System Fluid Level	Check (condition)	O	O
Foot Brake - Operation	Check	O	O
Park Brake	Check and adjust	O	O
ELECTRICS			
All Electrical Equipment Operation, (warning lights, beacon, alarms, horn, wipers etc.)	Check	O	O
Longitudinal Load Moment Indicator	Check	O	O
LLMC (Longitudinal Load Moment Control)/LC4 System (if fitted)	Check	O	O
Stabiliser Indicators (if fitted)	Check	O	O
BODYWORK AND CAB			
All Ram Pivot Pins	Grease		O
All Other Pivot Pins	Grease		O
Fire Extinguisher (if fitted)	Check	O	O
Wing Mirrors Condition and Security	Check	O	O
ROPS (Roll-Over Protective Structure)/FOPS (Falling Object Protective Structure) Structure	Check	O	O
Windshield Washer Fluid Level	Check	O	O
Seat/Seat Belts	Check	O	O

Component	Task	10	50
Forks[1]	Fit and Check security	O	O
Generally for damage, leaks and wear	Check	O	O
BOOM CHAIN SERVICING			
Boom Chains	Oil		O
Boom Chains - Tension	Check/Adjust		O
Boom Roller - Wear	Check		O
ATTACHMENTS			
Carriage Lock Pins	Grease		O
REGISTRATION/CERTIFICATION			
SWL Stickers (UK) and Flip Chart	Renew as required	O	O

(1) Jobs which should only be done by a specialist.
(2) The axles and drive shafts are factory greased with a high performance grease, if during service a standard grease is used, then the interval must be reduced to every 50h, contact your JCB Distributor for advice.

Service Engineer Maintenance Tasks

Table 30.

Component	Task	100 [1]	500	1,000	1,500	2,000
ENGINE						
Oil level	Check	□	□	□	□	□
Oil and Filter (UN3/GB3, SJ and SL engine)[2, 4]	Replace		□	□	□	□
Oil and Filter (FL engine)[3, 5]	Replace			□		□
Coolant Quality and Level	Check	□	□	□	□	□
Cooling System	Drain and Refill					□
Coolant, Oil or Fuel Leaks	Check (leaks)	O	□	□	□	□
Air Cleaner Dust Valve [6]	Clean		□	□	□	□
Air Cleaner Outer Element [6]	Replace			□		□
DEF (Diesel Exhaust Fluid) Filter (SJ engine)[13]	Replace			□		□
Air Cleaner Inner Element	Replace					□
Pre-Cleaner (if fitted)	Check	□	□	□	□	□
Water Separator	Check for contamination and drain	□	□	□	□	□
Water Separator Fuel Filter (SJ and SL engine, excludes UN3/GB3 engines)[14]	Replace		□	□	□	□
Water Separator Fuel Filter (FL engine, excludes UN3/GB3 engines)[14]	Replace			□		□
Fuel Filter 30 micron, Fuel Filter 5 micron, Lubricity Filter (UN3/GB3 engines)[14]	Replace		□	□	□	□
Engine Fuel Filter	Replace			□		□
Front End Accessory Drive (FEAD) Belt Condition[6]	Check		□	□	□	□

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Component	Task	100 (1)	500	1,000	1,500	2,000
Front End Accessory Drive (FEAD) Belt(12, 15)	Replace					
Powertrain Mounting Bolts for Tightness	Check	☐	☐	☐	☐	☐
All Hoses - Condition	Check	☐	☐	☐	☐	☐
Radiator(6)	Clean, Check (condition)		☐	☐	☐	☐
Crankcase Ventilation Filter	Replace				☐	
Valve Clearances(7)	Check and adjust					☐
Oil Filler and Dipstick Seals	Replace					☐
Injectors(7, 12)	Replace					
Injector(s) Leak Off Rail(7, 12)	Replace					
High Pressure Fuel Lines(7, 12)	Replace					
Idle speed(7)	Check	☐	☐	☐	☐	☐
Torque converter stall speed(7)	Check	☐	☐	☐	☐	☐
Max. no load speed(7)	Check	☐	☐	☐	☐	☐
Exhaust system security(7)	Check	☐	☐	☐	☐	☐
Air inlet system security	Check	☐	☐	☐	☐	☐
TRANSMISSION, AXLES AND STEERING						
Transmission Mount Security	Check	☐	☐	☐	☐	☐
Transmission Oil Level	Check	☐	☐	☐	☐	☐
Transmission Oil(8)	Replace			☐		☐
Transmission Oil Filter Canister	Replace	☐	☐	☐	☐	☐
Gearbox Breather	Check (condition/cleanliness)					☐
Axle Mount Security	Check	☐	☐	☐	☐	☐
Axle(s) Oil Level	Check	☐	☐	☐	☐	☐
Axle(s) Differential Oil	Replace		☐	☐	☐	☐
Hub Oil Level(9)	Check	☐	☐	☐	☐	☐
Hub Oil (Without Oil Immersed Brakes(9)	Replace			☐		☐
Hub Oil (With Oil Immersed Brakes(9)	Replace		☐	☐	☐	☐
Axle Breather(s)	Check	☐	☐	☐	☐	☐
Steering Stops (if fitted)	Security	☐	☐	☐	☐	☐
Wheel Nut Security	Check	☐	☐	☐	☐	☐
Tire Pressures/Condition	Check	☐	☐	☐	☐	☐
Wheel Alignment	Check	☐	☐	☐	☐	☐
Transmission Strainer	Clean			☐		☐
Drive Shafts and Universal Joints(10)	Security and grease	☐	☐	☐	☐	☐
Axle Pivots and Linkages(10)	Grease	☐	☐	☐	☐	☐
Steering - Operation/Phasing	Check	☐	☐	☐	☐	☐

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Component	Task	100 (1)	500	1,000	1,500	2,000
2WD (Two Wheel Drive)/4WD (Four Wheel Drive) selection (if fitted)	Check	☐	☐	☐	☐	☐
Transmission Operation	Check	☐	☐	☐	☐	☐
Forward/Reverse/Gear - Selection/ Operation	Check	☐	☐	☐	☐	☐
Torque Converter Main Line Pressure(7)	Check	☐	☐	☐	☐	☐
Neutral Start Operation	Check	☐	☐	☐	☐	☐
Transmission Disconnect brake pedal operation(7)	Check	☐	☐	☐	☐	☐
Clutch Disconnect/Dump Button	Check	☐	☐	☐	☐	☐
HYDRAULICS						
Oil Level	Check (level)	☐	☐	☐	☐	☐
Oil	Sample			☐		☐
Oil	Replace					☐
Servo Pilot Filter	Clean	☐				
Servo Pilot Filter	Replace		☐	☐	☐	☐
Oil Filter (Hydraulic Oil Tank, Top Mounting)	Replace	☐	☐	☐	☐	☐
Oil Filter (Canister Type)	Replace	☐	☐	☐	☐	☐
Suction Strainer	Clean					☐
MRV (Main Relief Valve) pressure at max RPM (Revolutions Per Minute)(7)	Check and adjust	☐	☐	☐	☐	☐
Operation of All Services	Check	☐	☐	☐	☐	☐
Hose Burst Protection Valves (if fitted)	Check	☐	☐	☐	☐	☐
ARV (Auxiliary Relief Valve) Pressure at idle(7)	Check and adjust	☐	☐	☐	☐	☐
Steer CircuitMRV Pressure(7)	Check and adjust	☐	☐	☐	☐	☐
Fan Motor Speed (If fitted)(7)	Check	☐	☐	☐	☐	☐
Attachment Operation/Remote Servo (if fitted)	Check	☐	☐	☐	☐	☐
Piston Rods Chrome	Check	☐	☐	☐	☐	☐
Boom Extension/Phasing (3 stage boom)(7)	Check	☐	☐	☐	☐	☐
Parallel Lift/Lower	Check	☐	☐	☐	☐	☐
Stabiliser Leg Cut-out (if fitted)(7)	Check	☐	☐	☐	☐	☐
Chassis Levelling (Sway) Cut-out (if fitted)	Check	☐	☐	☐	☐	☐
BRAKES						
Brake System Fluid Level	Check (condition)	☐	☐	☐	☐	☐
Brake System Fluid	Replace					☐
Foot Brake - Operation	Check	☐	☐	☐	☐	☐
Park Brake	Check and adjust	☐	☐	☐	☐	☐
ELECTRICS						

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Component	Task	100 (1)	500	1,000	1,500	2,000
Battery Electrolyte Level (if applicable)	Check		☐	☐	☐	☐
Battery Terminals for Condition and Tightness	Check	☐	☐	☐	☐	☐
Alternator - Output(7)	Check	☐	☐	☐	☐	☐
All Electrical Equipment Operation, (warning lights, beacon, alarms, horn, wipers etc.)	Check	☐	☐	☐	☐	☐
Longitudinal Load Moment Indicator	Check	☐	☐	☐	☐	☐
LLMC (Longitudinal Load Moment Control)/LC4 System (if fitted)	Check	☐	☐	☐	☐	☐
Stabiliser Indicators (if fitted)	Check	☐	☐	☐	☐	☐
BODYWORK AND CAB						
All Ram Pivot Pins	Grease	☐	☐	☐	☐	☐
All Other Pivot Pins	Grease	☐	☐	☐	☐	☐
Fire Extinguisher (if fitted)	Check	☐	☐	☐	☐	☐
Wing Mirrors Condition and Security	Check	☐	☐	☐	☐	☐
ROPS/FOPS Structure	Check	☐	☐	☐	☐	☐
Doors and Hinges	Lubricate	☐	☐	☐	☐	☐
Control Lever Linkages	Lubricate	☐	☐	☐	☐	☐
Windshield Washer Fluid Level	Check	☐	☐	☐	☐	☐
Cab Heater Fresh Air Filter	Replace		☐	☐	☐	☐
Cab Heater Re-circulation Filter	Replace		☐	☐	☐	☐
Boom Wear Pad Runways	Waxoyl		☐	☐	☐	☐
Inner Boom Hoses	Grease		☐	☐	☐	☐
Boom Wear Pad Clearance(11)	Check/Adjust		☐	☐	☐	☐
Boom Wear Pad Condition and Security (Replace if required)(11)	Check/Adjust	☐	☐	☐	☐	☐
Inclinometer (if fitted)(7)	Check	☐	☐	☐	☐	☐
Glazing for Correct Fit/Leaks	Check	☐	☐	☐	☐	☐
Seat/Seat Belts	Check	☐	☐	☐	☐	☐
Air Conditioning (if fitted)	Check	☐	☐	☐	☐	☐
Forks(7)	Fit and Check security	☐	☐	☐	☐	☐
Generally for damage, leaks and wear	Check	☐	☐	☐	☐	☐
BOOM CHAIN SERVICING						
Boom Chains	Oil	☐	☐	☐	☐	☐
Boom Chains - Tension	Check/Adjust	☐	☐	☐	☐	☐
Boom Chains - Wear and Defects(7, 11)	Check			☐	☐	☐
Boom Roller - Wear	Check	☐	☐	☐	☐	☐
Boom Roller Pivot Pin (with Grease Point)	Grease		☐	☐	☐	☐
ATTACHMENTS						

Component	Task	100 (1)	500	1,000	1,500	2,000
Carriage Lock Pins	Grease	☐	☐	☐	☐	☐
REGISTRATION/CERTIFICATION						
SWL Stickers (UK) and Flip Chart	Renew as required	☐	☐	☐	☐	☐
LIFTING EQUIPMENT						
Fit for Purpose Test(16)	Check	☐	☐	☐	☐	☐

(1) First 100h service only, to be completed by your JCB Distributor.
(2) If operating under arduous conditions, do an engine oil flush (use the normal recommended engine oil) every 250h. Change the engine oil and filter every 250h.
(3) If operating under arduous conditions, do an engine oil flush (use the normal recommended engine oil) every 500h. Change the engine oil and filter every 500h.
(4) When the engine is operated with 20% biodiesel change the engine oil and filter every 250h. Refer to Fuel System for more information.
(5) When the engine is operated with 20% biodiesel change the engine oil and filter every 500h. Refer to Fuel System for more information.
(6) More frequently if operating in dusty working environments.
(7) Jobs which should only be done by a specialist.
(8) After a major transmission repair, the new oil should be run to operating temperature and changed again to remove any contamination which entered during the repair. Change the oil and filter after a further 100h if the oil was heavily contaminated because of, or from the failure (e.g. water contamination).
(9) After a hub repair, the new oil should be run to operating temperature and changed again to remove any contamination which entered during the repair. Change the oil after a further 100h to remove any bedding-in wear. This is particularly important if new brake plates have been fitted.
(10) The axles and drive shafts are factory greased with a high performance grease, if during service a standard grease is used, then the interval must be reduced to every 50h, contact your JCB Distributor for advice.
(11) If operating under arduous conditions, complete this operation every 250h.
(12) 8,000h
(13) If operating under arduous conditions, change the DEF filter more frequently.
(14) If the engine is difficult to start or the engine has poor performance, fit new filters.
(15) If the operating environment is very warm i.e above 40°C (103.9°F) ambient temperature then the FEAD (Front End Accessory Drive) may need changing every 4,000h.
(16) This may be required every six months or at least annually in some countries to meet and comply with legislation and for insurance purposes.

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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.

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.

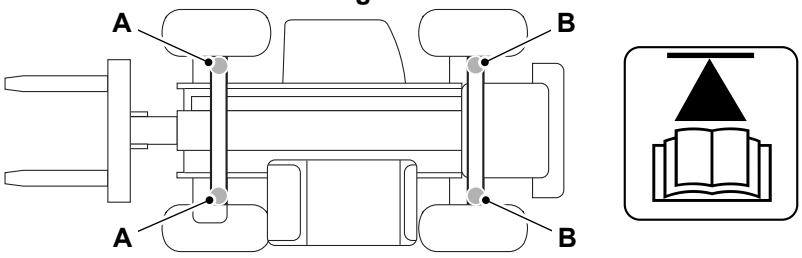
Make the machine safe before you start a maintenance procedure. You can complete most of the maintenance procedures with the boom lowered. Unless a maintenance procedure instructs you differently, you must lower the boom.

When lifting a machine make sure the jack is positioned on the correct point. The jacks are on the front and rear axle casings on the machine.

Before you jack the rear axle make sure the axle has wedges added between the axle and the chassis oscillation stop to stop the axle from oscillating.

Make sure the jack is placed on a firm and level surface and that the jack is of a suitable capacity for the load. Only jack one point at a time.

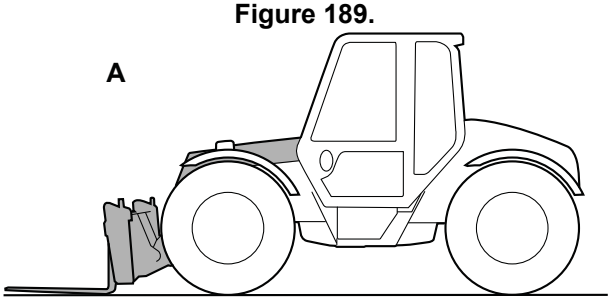
Figure 188.



A Jack point

Maintenance Position - Boom Lowered

Figure 189.



A Boom lowered

1. Park the machine on level, solid ground.
   Refer to: Stopping and Parking (Page 56).
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

For: 533-105 [T4F 3L], 533-105 [T4F] ..... Page 204
For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F] ..... Page 206
For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 209

(For: 533-105 [T4F 3L], 533-105 [T4F])

⚠ **WARNING** You could be killed or injured if the lift arm drops while you are working under it. Install the lift arm maintenance strut as instructed before doing any maintenance work with the lift arm raised. Keep people away from the machine while you install or remove the lift arm maintenance strut.

WARNING Make sure that you use the correct JCB maintenance strut for the machine. Make sure that the safety strut is only used with the correct JCB retaining bolt or securing device. Never substitute this bolt or securing device, always use the correct JCB part.

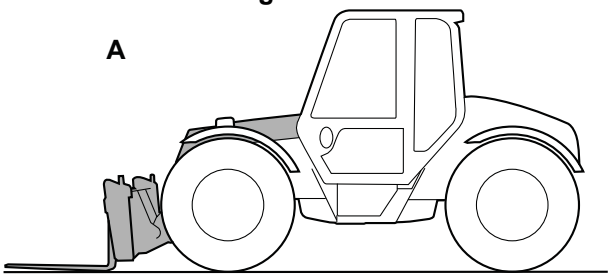
Make sure that the strut and bolt/securing device is installed correctly. Never use a strut intended for another machine. If in doubt, consult your JCB dealer.

WARNING Do not drive the machine with the maintenance strut installed.

CAUTION You will have to climb onto the machine to install or remove the strut. Take care, especially if the machine is wet. Remove mud and oil before climbing onto the machine. Do not use the exhaust as a handhold. It can burn you.

Lift Arm Lowered

Figure 190.



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.

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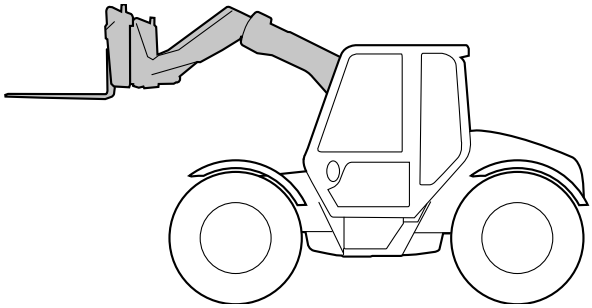
Lift Arm Raised

If you raise the lift arm to get access for maintenance, you must install the maintenance strut on the lift arm. Before you install the maintenance strut remove any load on the forks and empty shovels or attachments.

Figure 191.

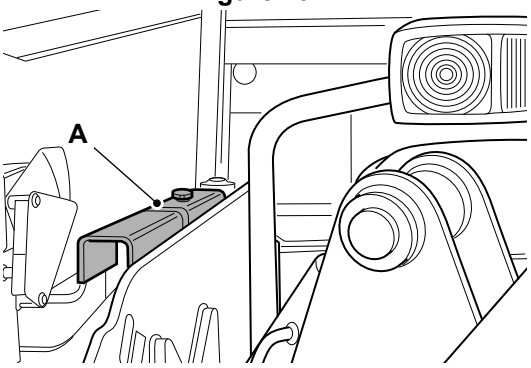


Lift arm raised

Installing the Maintenance Strut

1. Make the machine safe.
2. Retract the lift arm.
3. Raise the lift arm.
4. Stop the engine and remove the ignition key.
5. Remove the maintenance strut from its stowage position.

Figure 192.



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.

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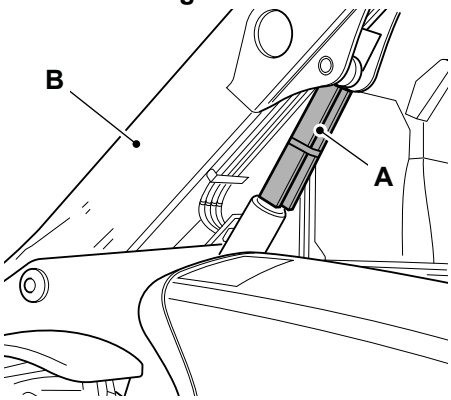
Figure 193.



A Maintenance strut **B** Lift arm

8. To prevent any chance of the lift arm creeping down and trapping your fingers, the lift arm should be lowered onto the strut. Lower the arm carefully, to prevent possible damage to the strut. Stop as soon as the weight of the lift arm is on the strut.
9. Isolate 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 lift arm 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 lift arm to the ground.

(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F])

⚠ **WARNING** You could be killed or injured if the lift arm drops while you are working under it. Install the lift arm maintenance strut as instructed before doing any maintenance work with the lift arm raised. Keep people away from the machine while you install or remove the lift arm maintenance strut.

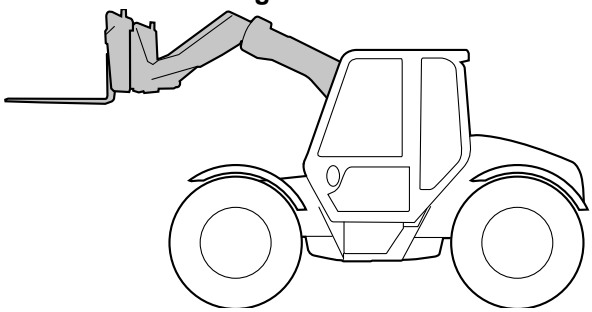
WARNING Make sure that you use the correct JCB maintenance strut for the machine. Make sure that the safety strut is only used with the correct JCB retaining bolt or securing device. Never substitute this bolt or securing device, always use the correct JCB part.

Make sure that the strut and bolt/securing device is installed correctly. Never use a strut intended for another machine. If in doubt, consult your JCB dealer.

CAUTION You will have to climb onto the machine to install or remove the strut. Take care, especially if the machine is wet. Remove mud and oil before climbing onto the machine. Do not use the exhaust as a handhold. It can burn you.

If you raise the lift arm to get access for maintenance, you must install the maintenance strut on the lift arm. Before you install the maintenance strut remove any load on the forks and empty shovels or attachments.

Figure 194.

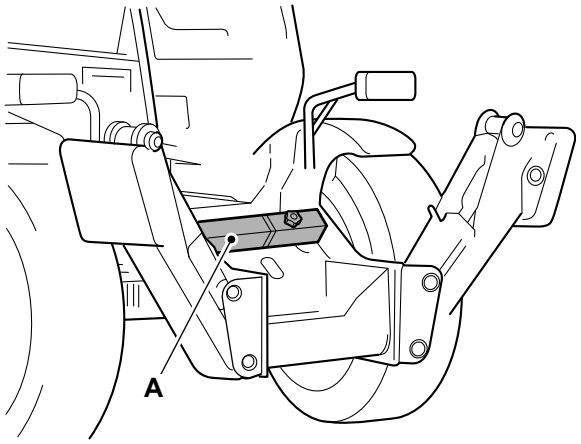


Lift arm raised

Install the Maintenance Strut

1. Make the machine safe.
2. Retract the lift arm.
3. Raise the lift arm.
4. Stop the engine and remove the ignition key.
5. Remove the maintenance strut from its stowage position.

Figure 195. 510-44, 510-55, 540-140, 550-140, 540-170, 550-170



A Maintenance strut

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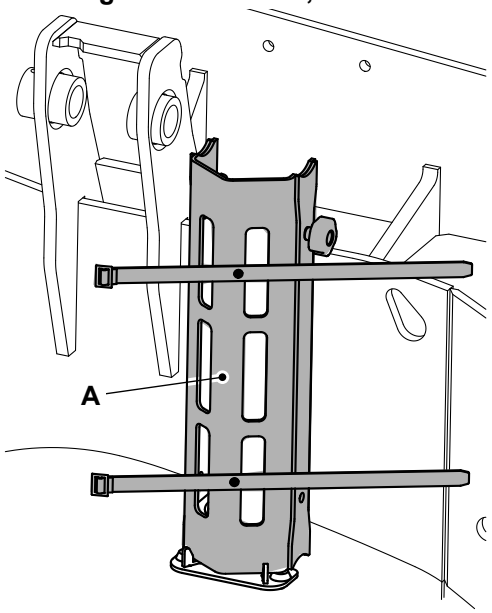
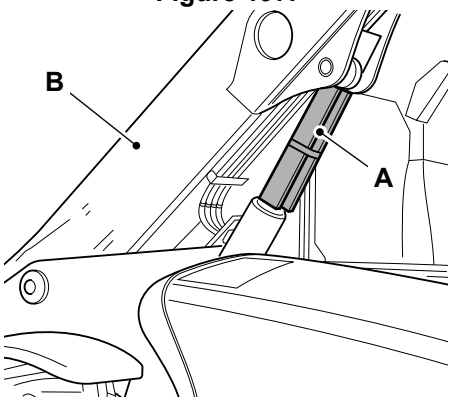
Figure 196. 508-66, 540-200



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 197.



A Maintenance strut **B** Lift arm

8. To prevent any chance of the lift arm creeping down and trapping your fingers, the lift arm should be lowered onto the strut. Lower the arm carefully, to prevent possible damage to the strut. Stop as soon as the weight of the lift arm 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 lift arm 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 lift arm to the ground.

(For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

⚠ **WARNING** You could be killed or injured if the lift arm drops while you are working under it. Install the lift arm maintenance strut as instructed before doing any maintenance work with the lift arm raised. Keep people away from the machine while you install or remove the lift arm maintenance strut.

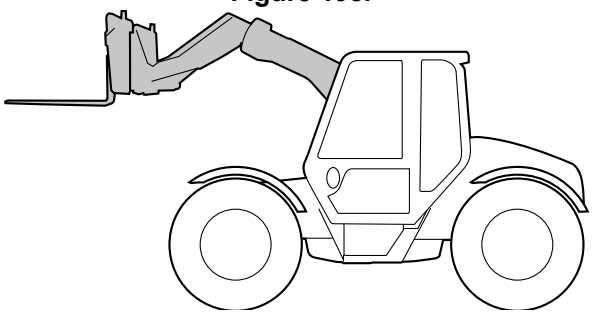
WARNING Make sure that you use the correct JCB maintenance strut for the machine. Make sure that the safety strut is only used with the correct JCB retaining bolt or securing device. Never substitute this bolt or securing device, always use the correct JCB part.

Make sure that the strut and bolt/securing device is installed correctly. Never use a strut intended for another machine. If in doubt, consult your JCB dealer.

CAUTION You will have to climb onto the machine to install or remove the strut. Take care, especially if the machine is wet. Remove mud and oil before climbing onto the machine. Do not use the exhaust as a handhold. It can burn you.

If you raise the lift arm to get access for maintenance, you must install the maintenance strut on the lift arm. Before you install the maintenance strut remove any load on the forks and empty shovels or attachments.

Figure 198.



lift arm raised

Installing the Maintenance Strut

1. Make the machine safe. Refer to (PIL 01-03).
2. Retract the lift arm.
3. Raise the lift arm.
4. Stop the engine and remove the ignition key.
5. Remove the maintenance strut from its stowage position.

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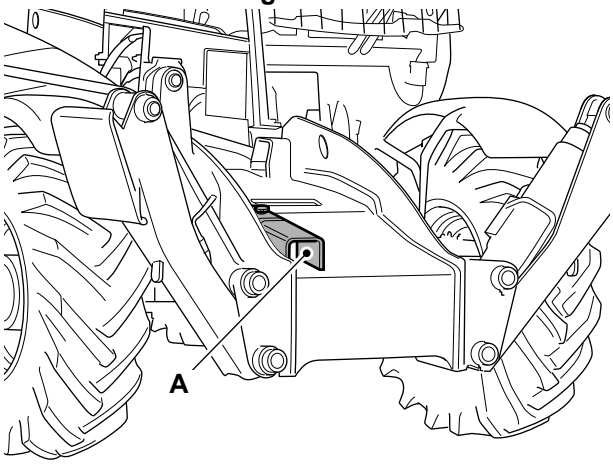
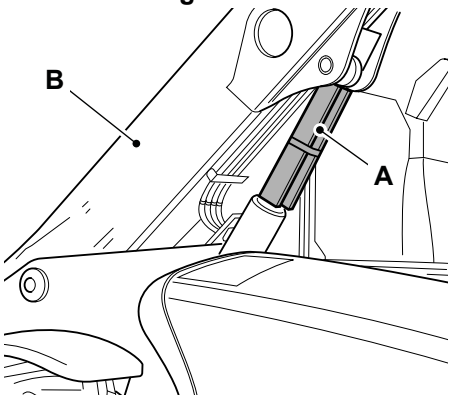
Figure 199.



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 200.



A Maintenance strut **B** lift arm

8. To prevent any chance of the lift arm creeping down and trapping your fingers, the lift arm should be lowered onto the strut. Lower the arm carefully, to prevent possible damage to the strut. Stop as soon as the weight of the lift arm 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 lift arm 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 lift arm to the ground.

Service Points

General

For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine ..... Page 211

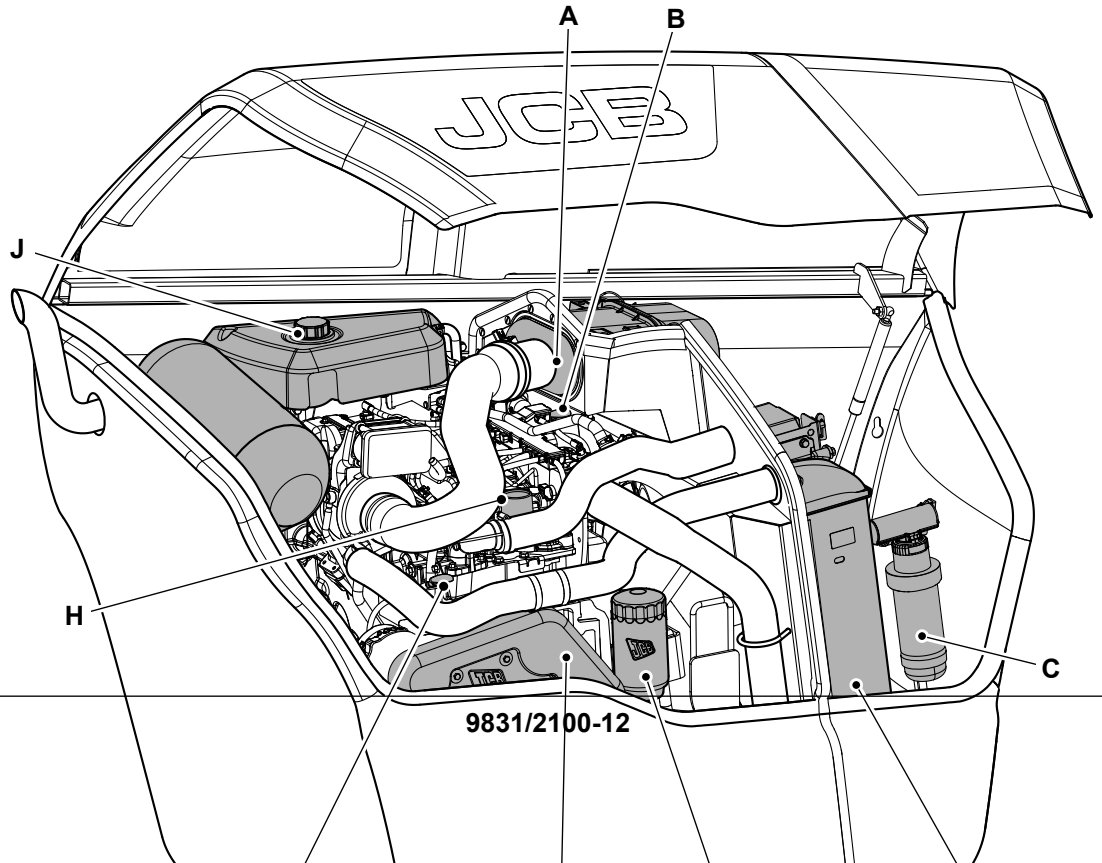
For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB T4F 3.0 55kw Electronic Turbocharged Aftercooled Engine ..... Page 218

For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine ..... Page 224

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine)

Engine Compartment

Figure 201.



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C Water separator
D Radiator
E Engine oil filter
F Drive belt guard
G Engine oil dipstick
H Engine oil filler cap
J Coolant expansion tank

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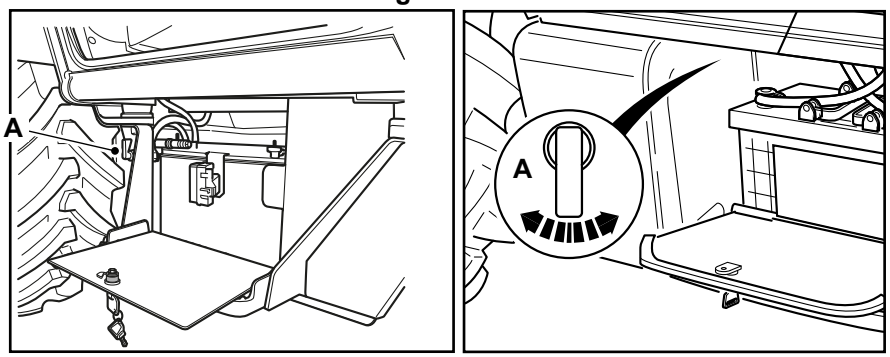
Battery Isolator

Figure 202.



A Battery isolator

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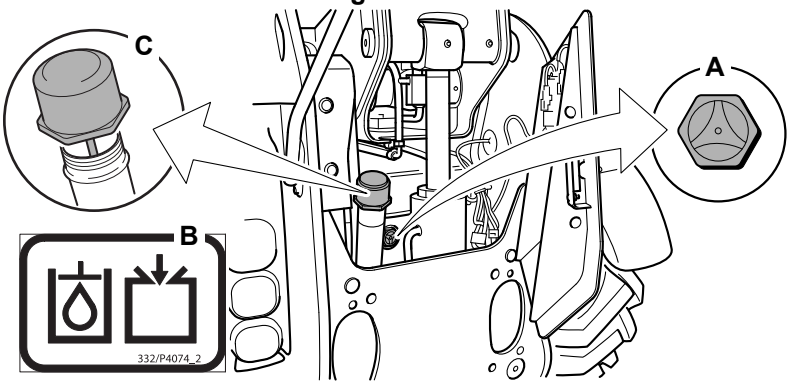
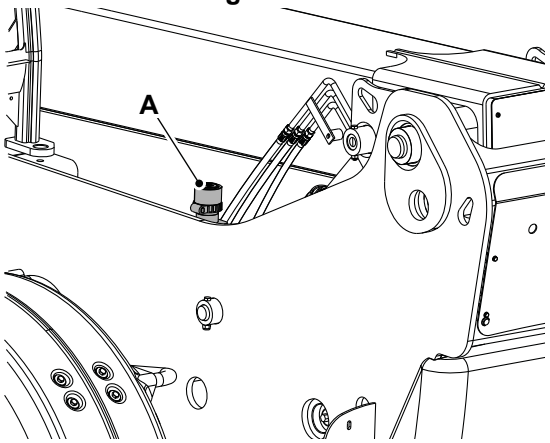
Hydraulic Oil Level Indicator and Filler

Figure 203.



A Hydraulic oil level indicator
B Label - hydraulic oil filling point
C Hydraulic tank filler cap

Figure 204.

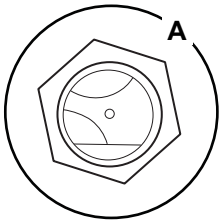


A Secondary hydraulic tank filler cap - If applicable

Machines with External Sight Gauge

On some machines the sight gauge is mounted externally.

Figure 205.



A Hydraulic oil level indicator

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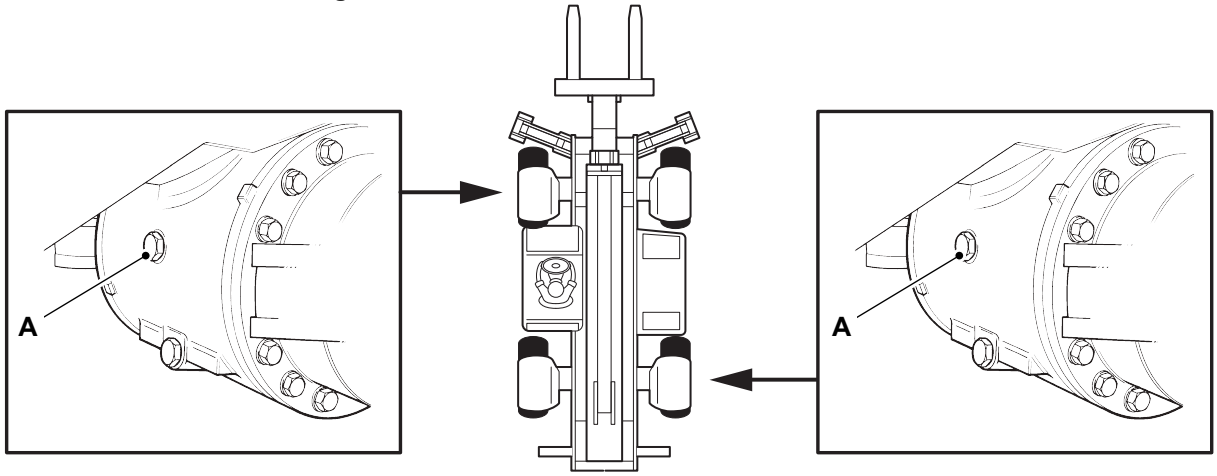
Axles

Arrangement

Figure 206. Machines with Powered Track Rods



A Axle fill/level plug

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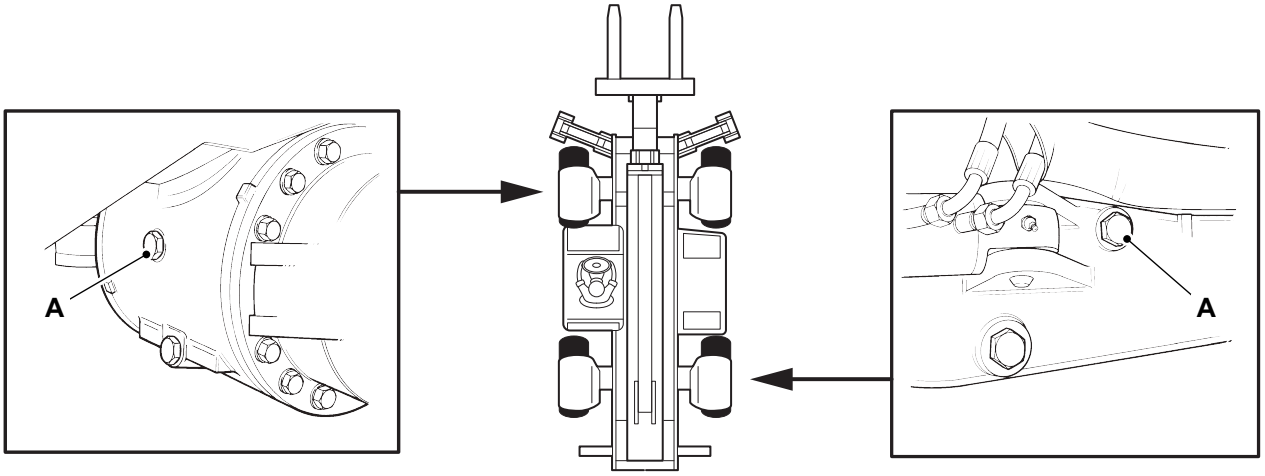
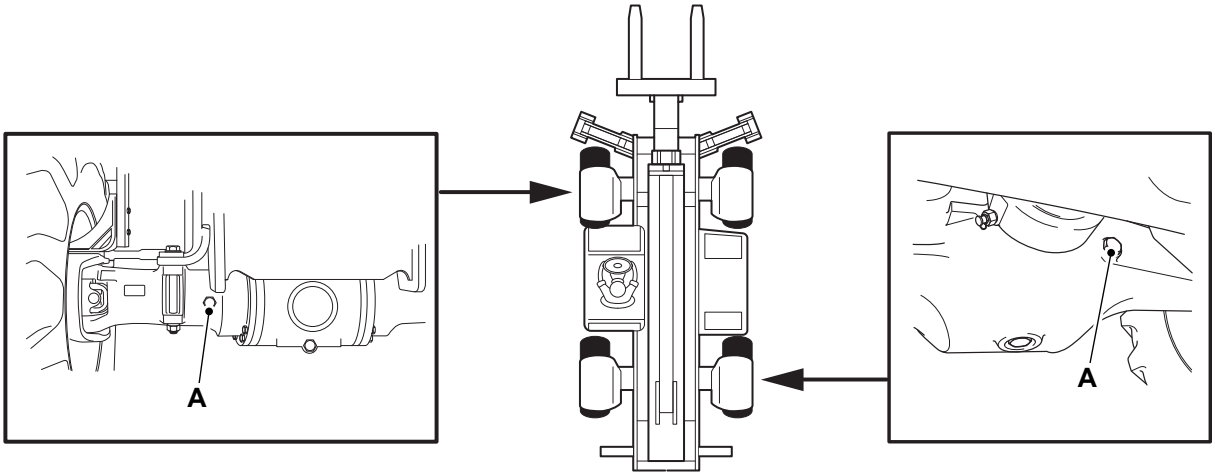
Alternate arrangement

Figure 207. Machines with Powered Track Rods



A Axle fill/level plug

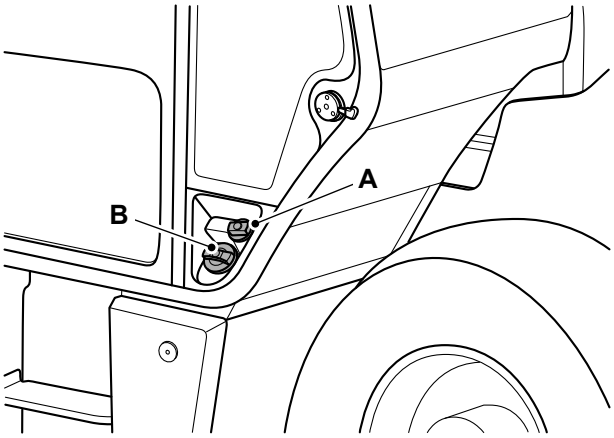
Figure 208. Machines with Double Acting Cylinders



A Axle fill/level plug

Filling the Tank

Figure 209.

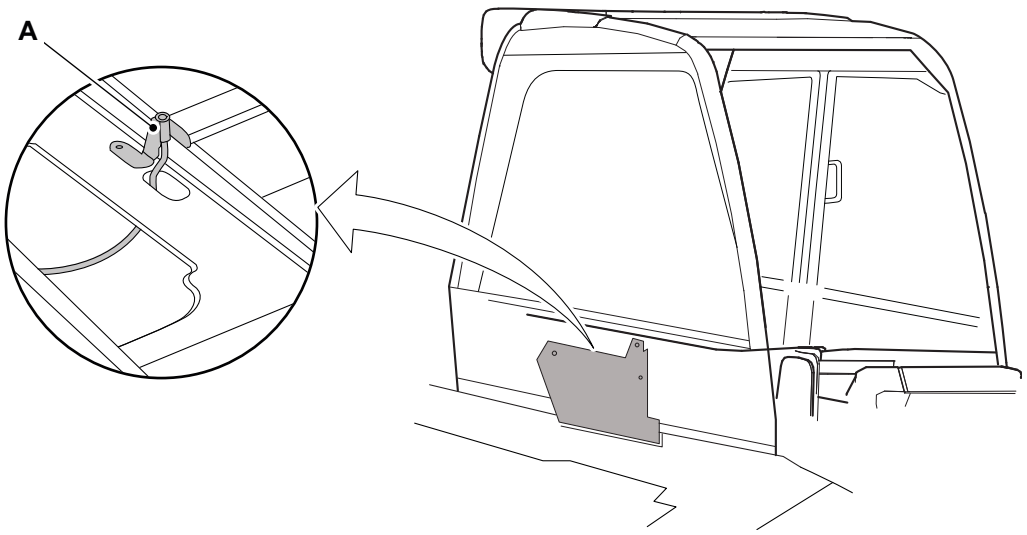


A Diesel exhaust fluid tank cap (blue)

B Diesel fuel tank cap (green - USA only, black - all other territories)

Gearbox Breather

Figure 210.



A Gearbox breather

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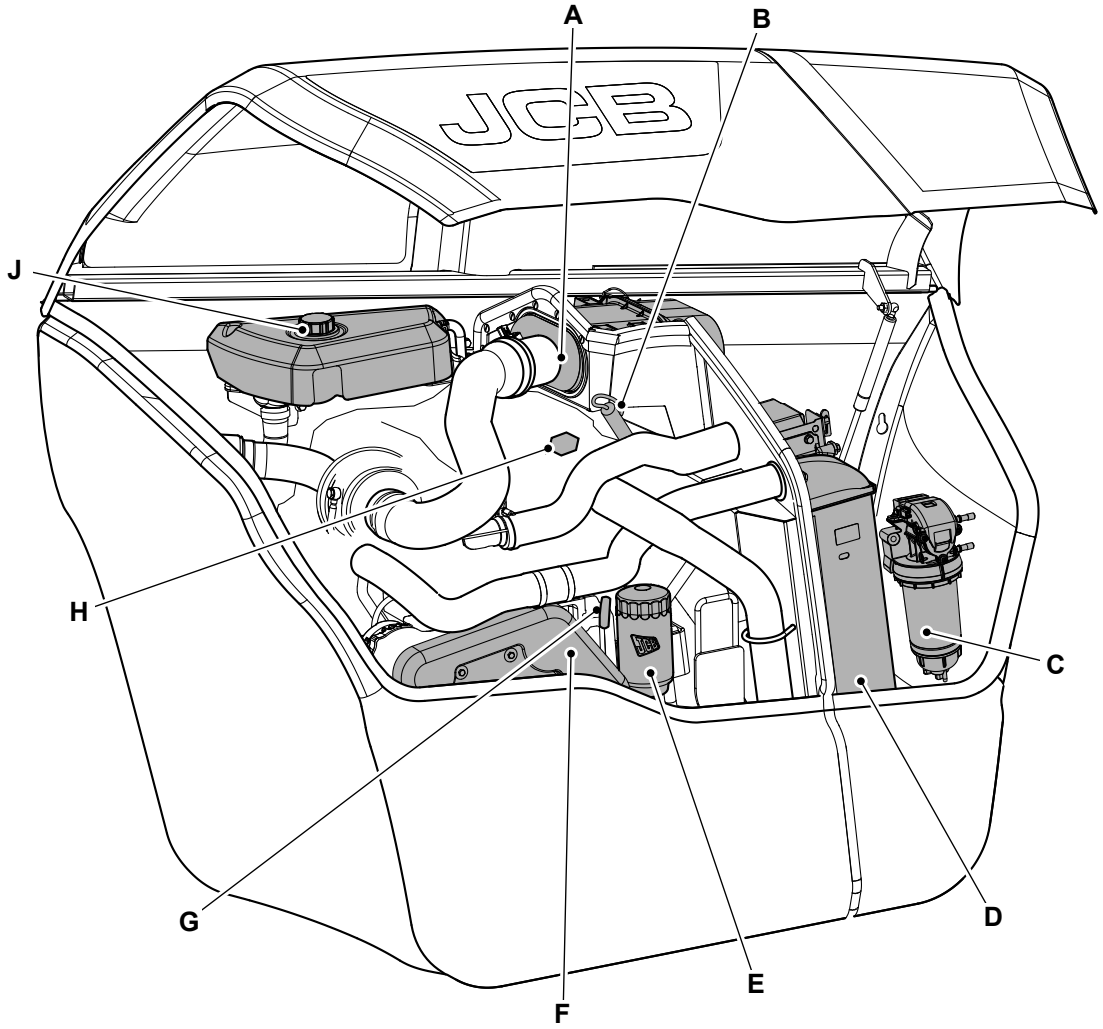
Engine Compartment

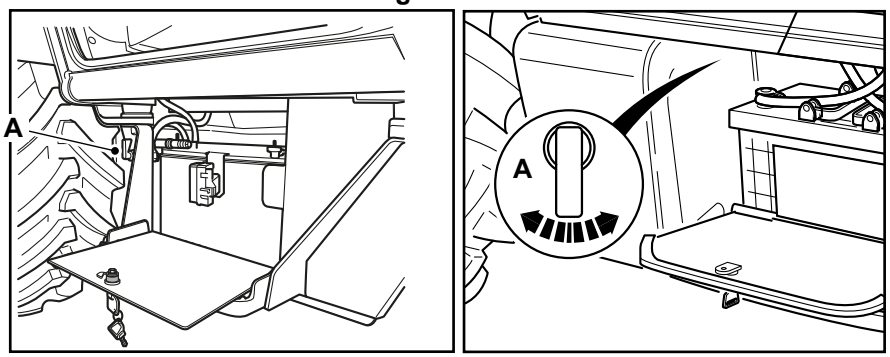
Figure 211.



A Air filter
B Transmission oil dipstick
C Water separator
D Radiator
E Engine oil filter
F Drive belt guard
G Engine oil dipstick
H Engine oil filler cap
J Coolant expansion tank

Battery Isolator

Figure 212.



A Battery isolator

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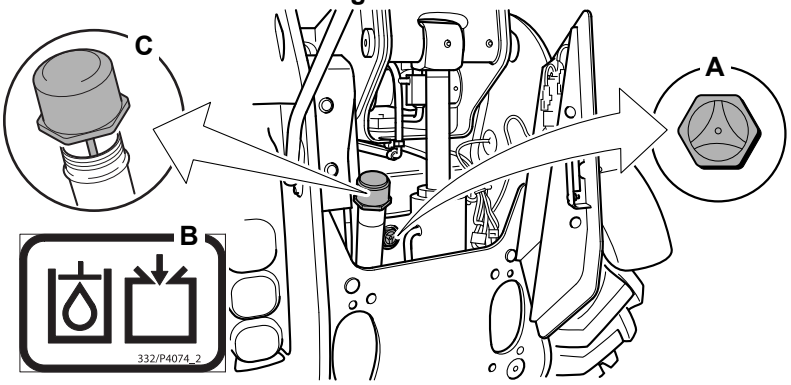
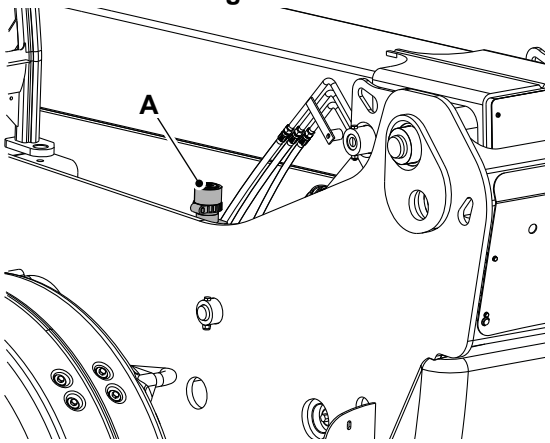
Hydraulic Oil Level Indicator and Filler

Figure 213.



A Hydraulic oil level indicator
B Label - hydraulic oil filling point
C Hydraulic tank filler cap

Figure 214.

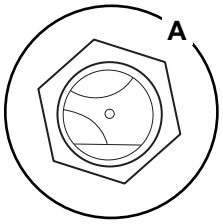


A Secondary hydraulic tank filler cap - If applicable

Machines with External Sight Gauge

On some machines the sight gauge is mounted externally.

Figure 215.

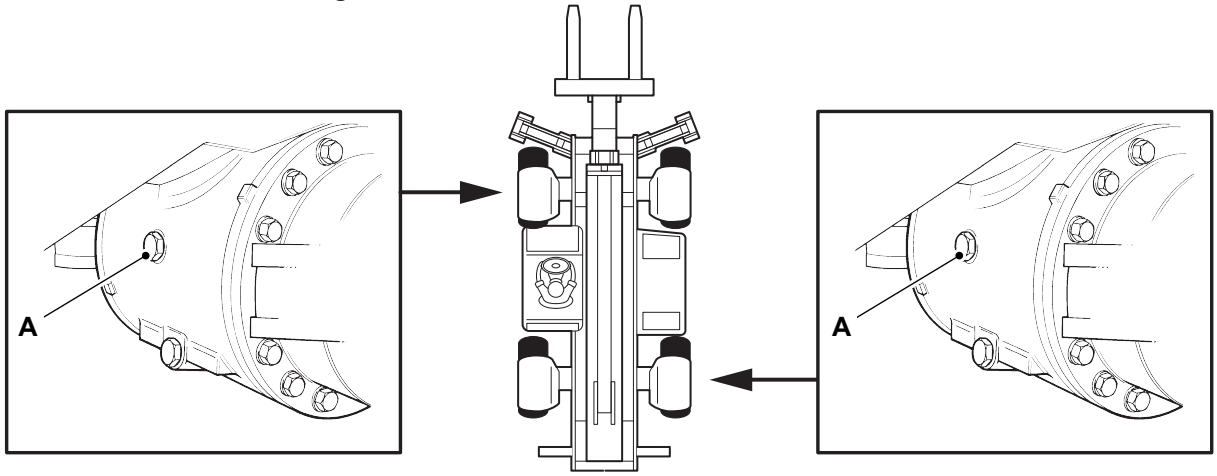


A Hydraulic oil level indicator

Axles

Arrangement

Figure 216. Machines with Powered Track Rods



A Axle fill/level plug

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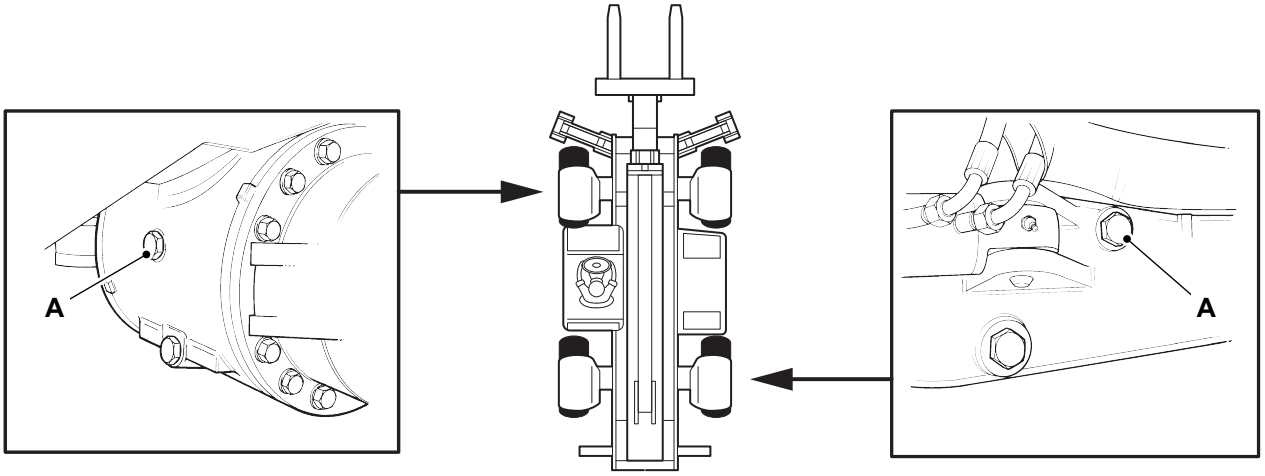
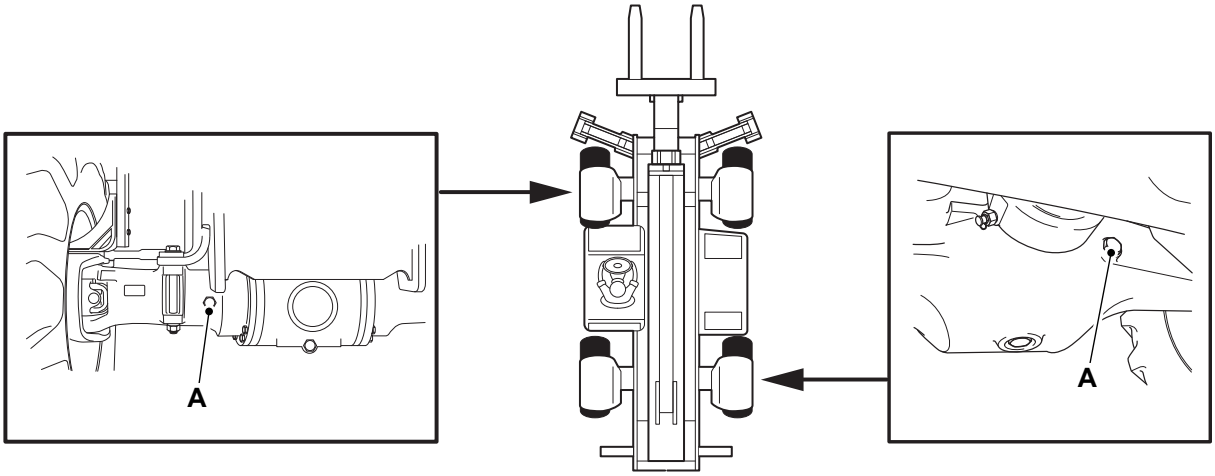
Alternate arrangement

Figure 217. Machines with Powered Track Rods



A Axle fill/level plug

Figure 218. Machines with Double Acting Cylinders



A Axle fill/level plug

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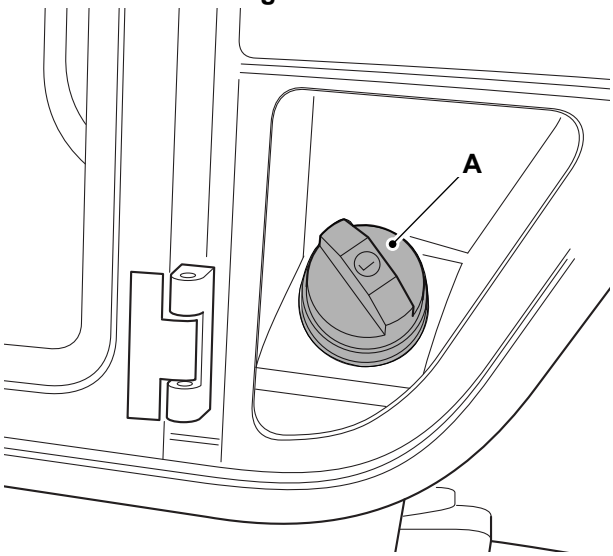
Filling the Tank

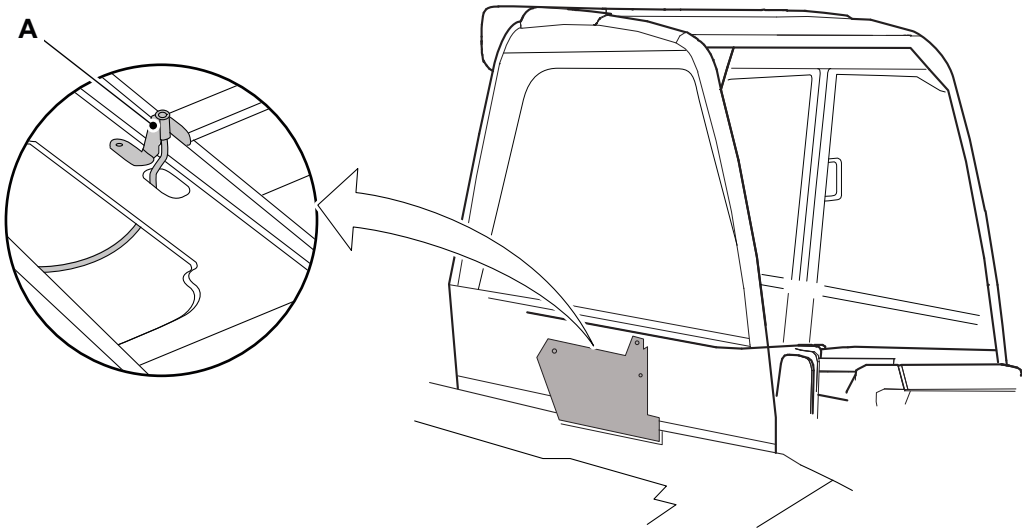
Figure 219.



A Fuel cap

Gearbox Breather

Figure 220.



A Gearbox breather

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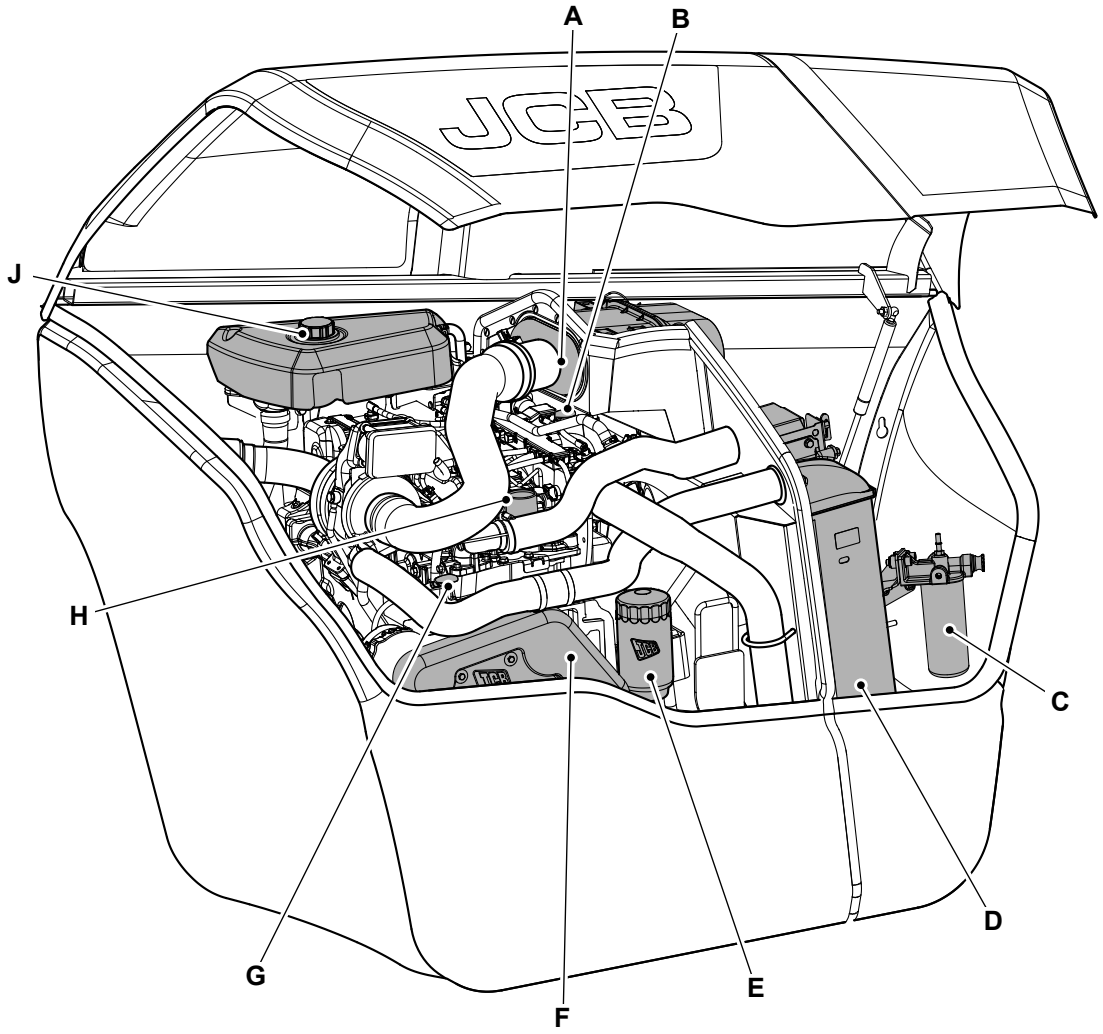
(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine)

Engine Compartment

Figure 221.



A Air filter
B Transmission oil dipstick
C Lubricity filter
D Radiator
E Engine oil filter
F Drive belt guard
G Engine oil dipstick
H Engine oil filler cap
J Coolant expansion tank

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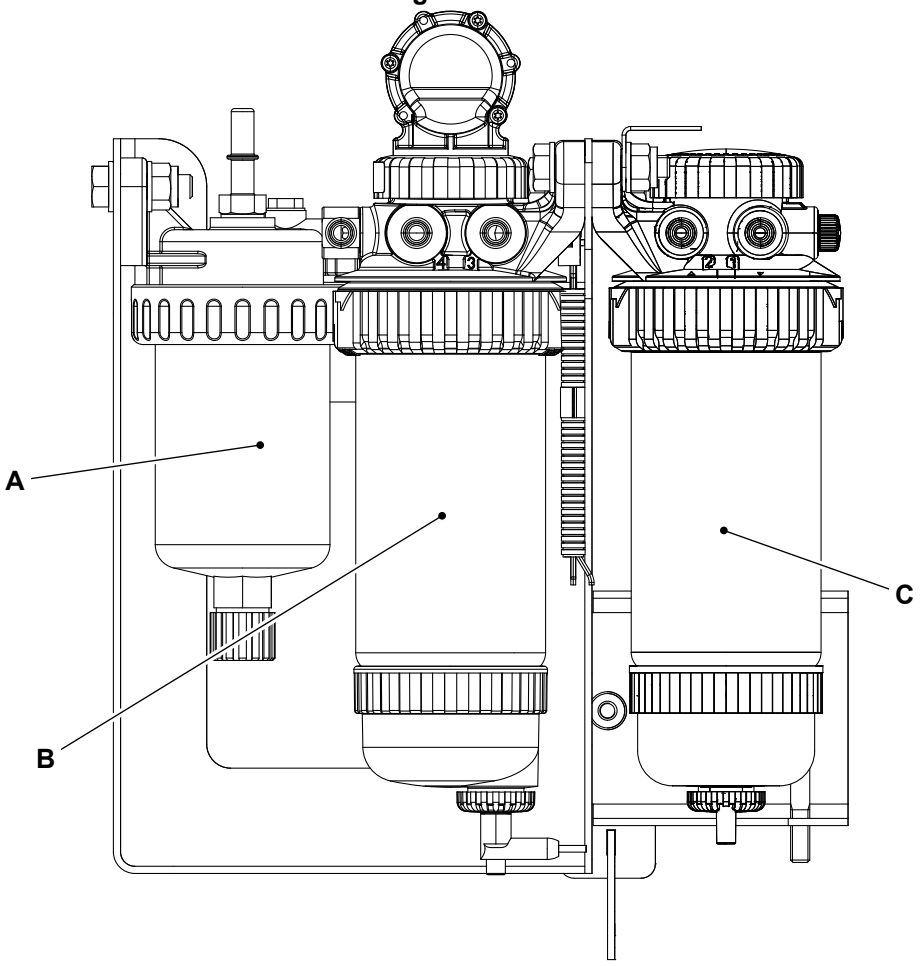
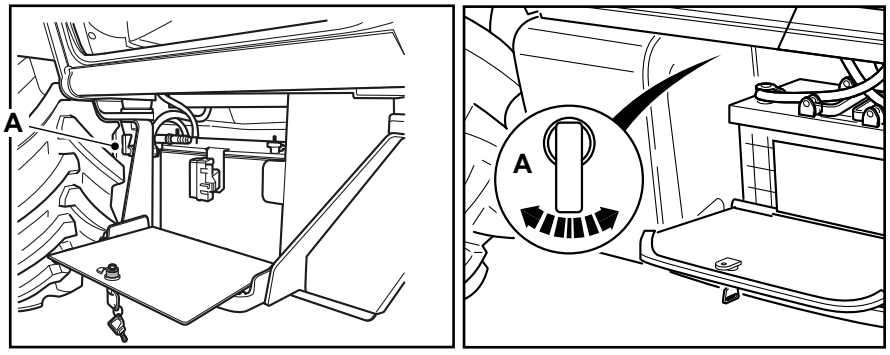
Figure 222.



A Main Water separator
B 30 micron Fuel filter (with separator bowl)
C 5 micron Fuel filter (with separator bowl)

Battery Isolator

Figure 223.



A Battery isolator

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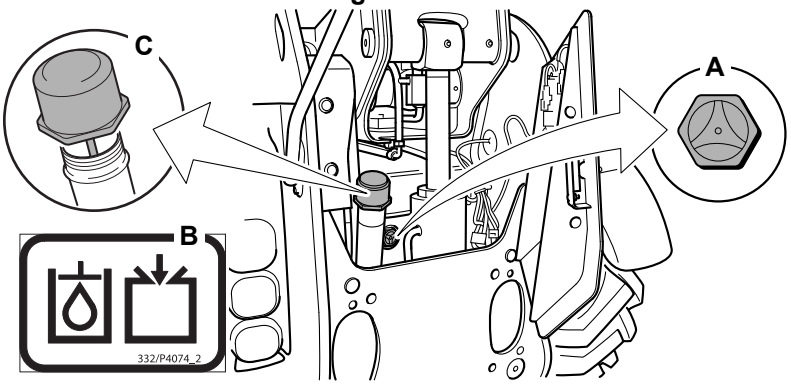
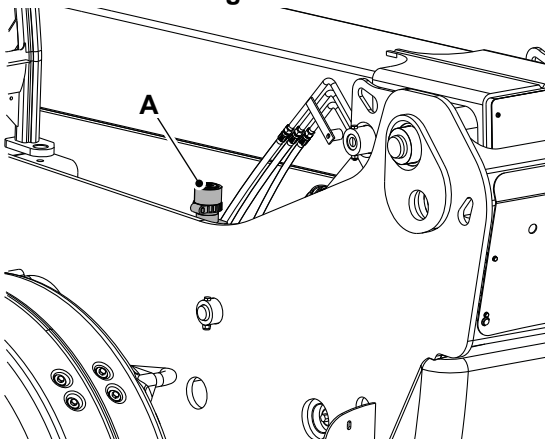
Hydraulic Oil Level Indicator

Figure 224.



A Hydraulic oil level indicator
B Label - hydraulic oil filling point
C Hydraulic tank filler cap

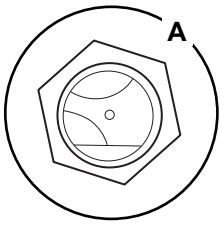
Figure 225.



A Secondary hydraulic tank filler cap

Machines without External Sight Gauge

Figure 226.

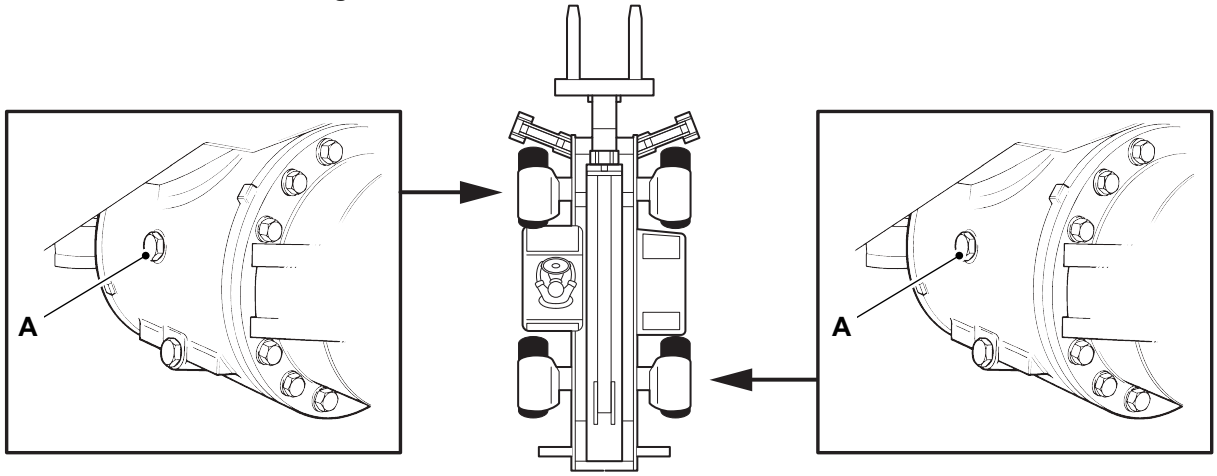


A Hydraulic oil level indicator

Axles

Arrangement

Figure 227. Machines with Powered Track Rods



A Axle fill/level plug

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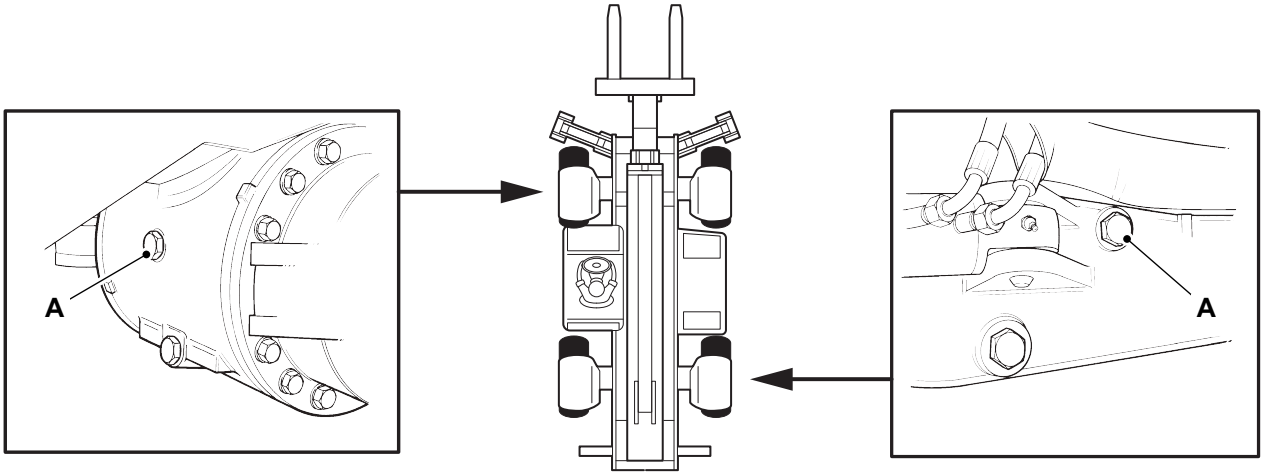
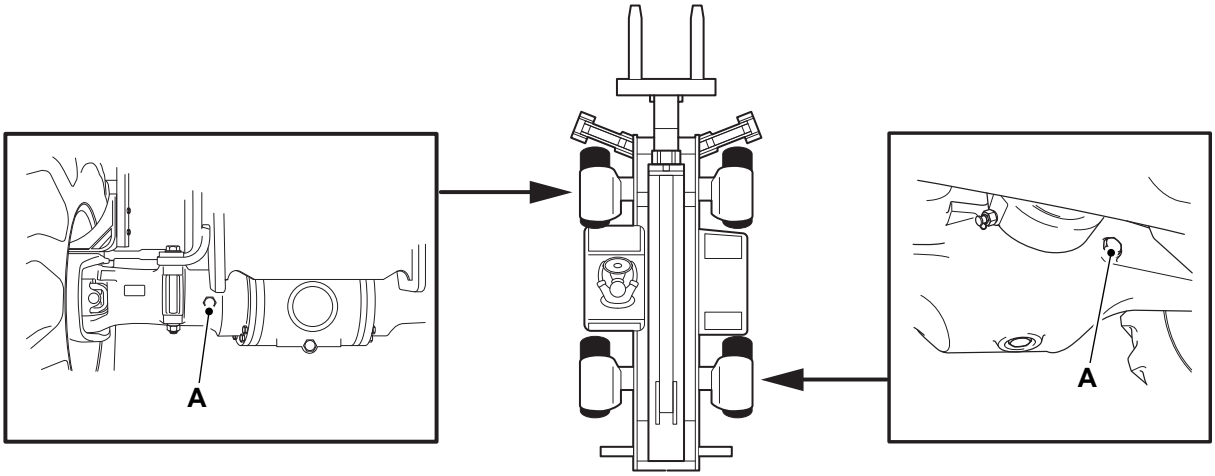
Alternate arrangment

Figure 228. Machines with Powered Track Rods



A Axle fill/level plug

Figure 229. Machines with Double Acting Cylinders



A Axle fill/level plug

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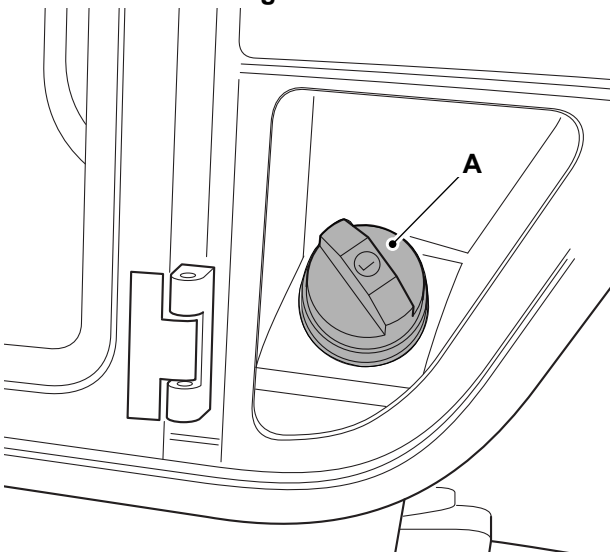
Filling the Tank

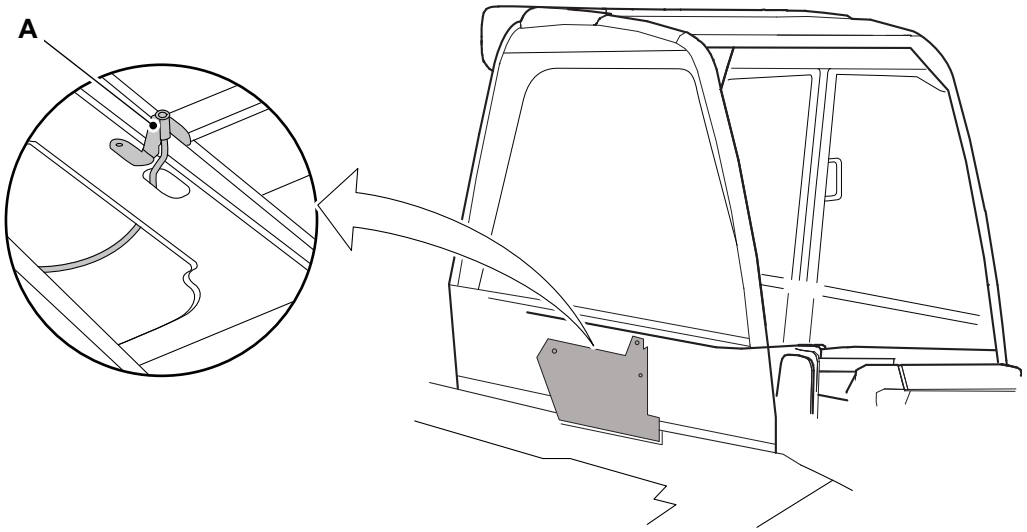
Figure 230.



A Fuel cap

Gearbox Breather

Figure 231.



A Gearbox breather

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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.

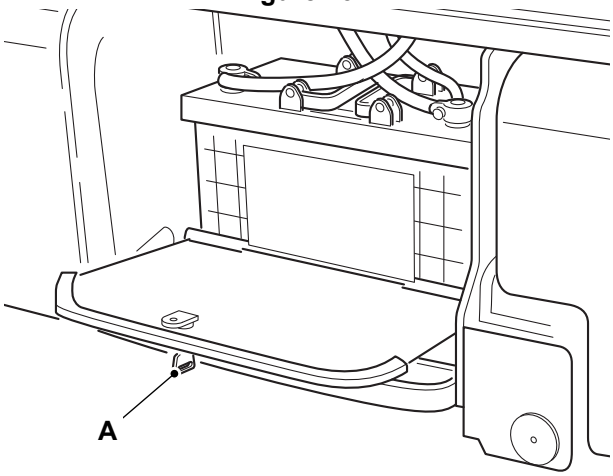
Battery Cover

Single Step Installation

Open

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 203).
2. Use the key to unlock the battery compartment cover.
3. Open the battery compartment cover.

Figure 232.



A Battery compartment cover

Close

1. Close the battery compartment cover.
2. Make sure the battery compartment cover is closed correctly.
3. Use the key to lock the battery compartment cover.

Twin Step Installation

Open

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 203).
2. Remove the bolts (and washers).
3. Lift the battery compartment cover to a small distance and allow the cover to pivot forward.

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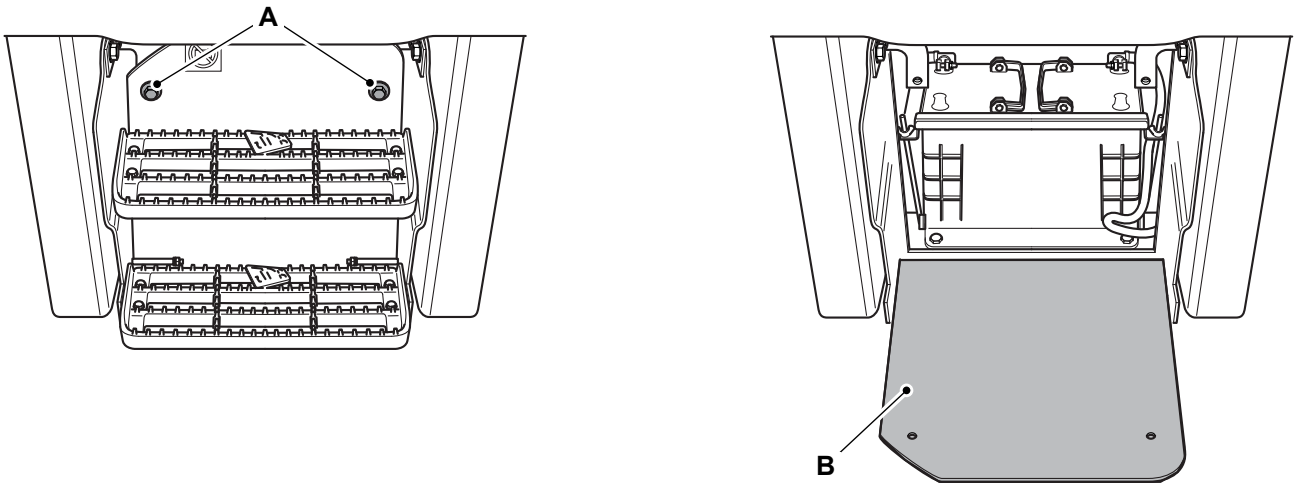
Figure 233.



A Bolts

B Battery compartment cover

Close

1. Position the battery compartment cover.
2. Install the bolts.
3. Tighten the bolts to the correct torque value.

Engine Compartment Cover

Open

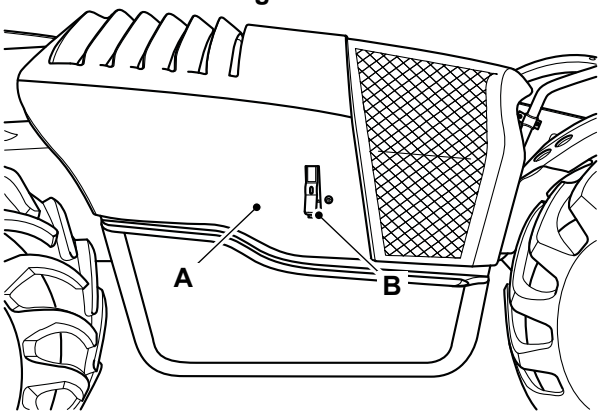
⚠ **WARNING** The engine has exposed rotating parts. Switch off the engine before working in the engine compartment. Do not use the machine with the engine cover open.

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 234.



A Engine cover

B Latch

Close

1. Push the cover down.
2. Make sure that the cover is correctly latched.
3. Make sure to lock the engine cover.

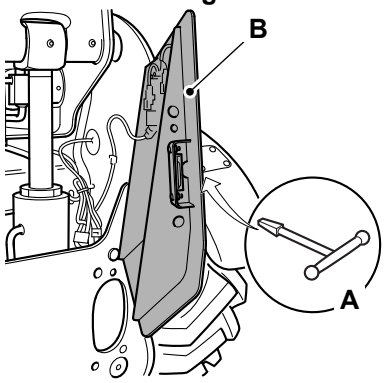
Rear Cover

Open the rear cover for access to the filler cap and sight glass.

Open

1. Make the machine safe. Refer to (PIL 01-03).
2. Use the key to unlock the rear cover.
3. Open the rear cover.

Figure 235.



A Key **B** Rear cover

Close

1. Position the rear cover.
2. Use the key to lock the rear cover.

Undershield

Removal

⚠ **WARNING** You will be working close into the machine for these jobs. Lower the attachments. Remove ignition key and isolate service disconnector. 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 three undershields in turn and remove the bolts.
3. Lower the undershields to the ground.

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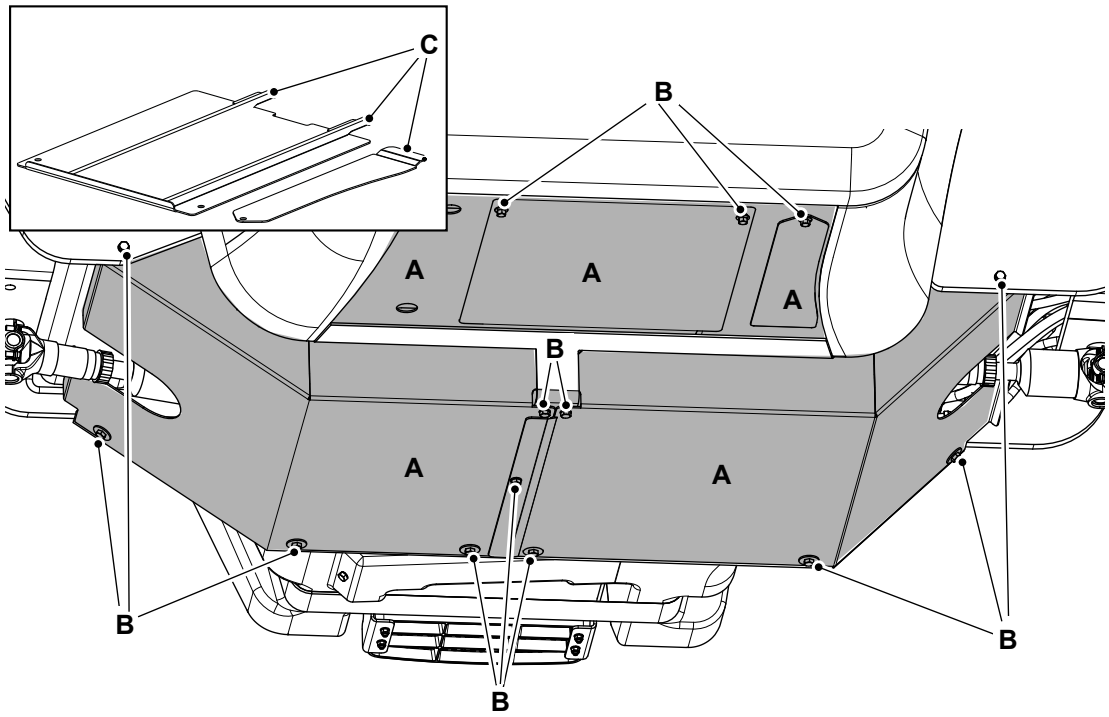
Figure 236.



A Undershields
B Bolts
C Lips

Install

1. Install the undershields.
2. Before you install the bolts, make sure the lips on the two smaller undershields are located above the frame.

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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 disconnector. This will prevent the engine being started.

Make the machine safe before you start a greasing procedure.

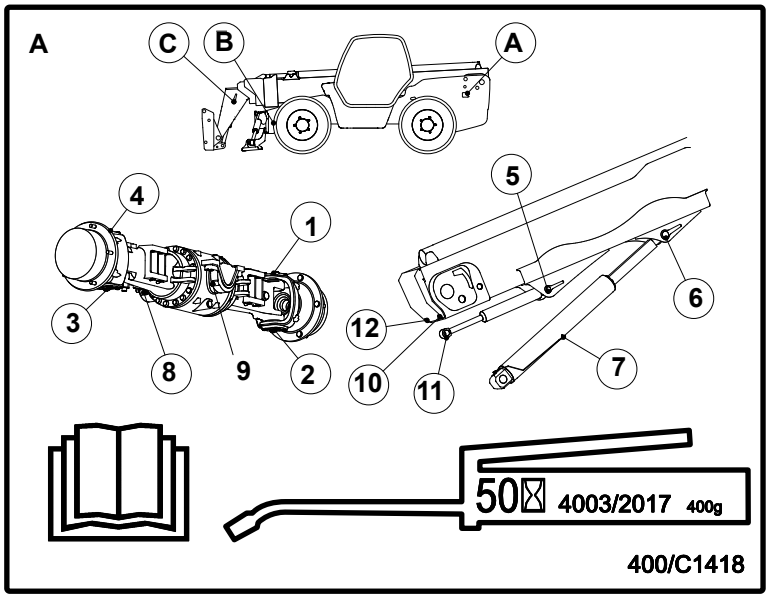
You can complete most of the greasing procedures with the boom lowered. If you raise the boom to get access for greasing, you must install the maintenance strut on the boom.

Remote Greasing

(For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

(option)

Figure 237.



A1 Right hand axle hub top
A2 Right hand axle hub bottom
A3 Left hand axle hub bottom
A4 Left hand axle hub top
A5 Disp. ram dump end
A6 Lift ram eye end

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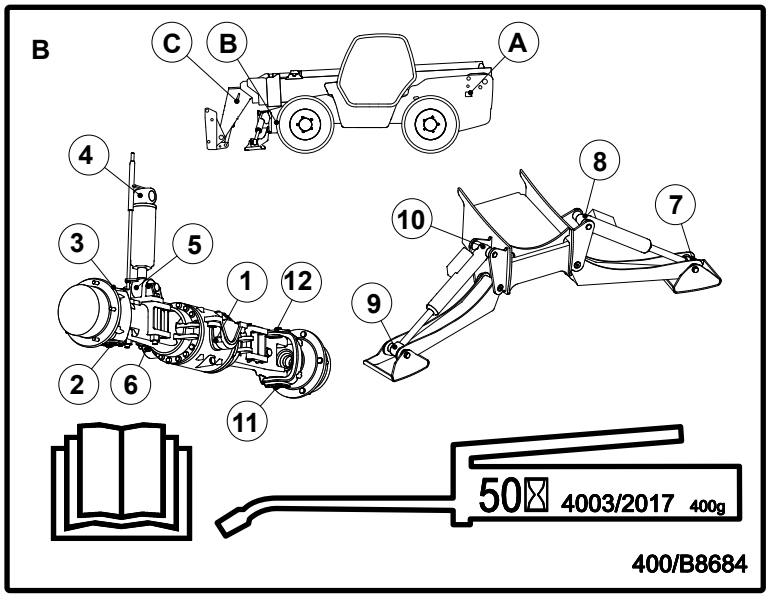
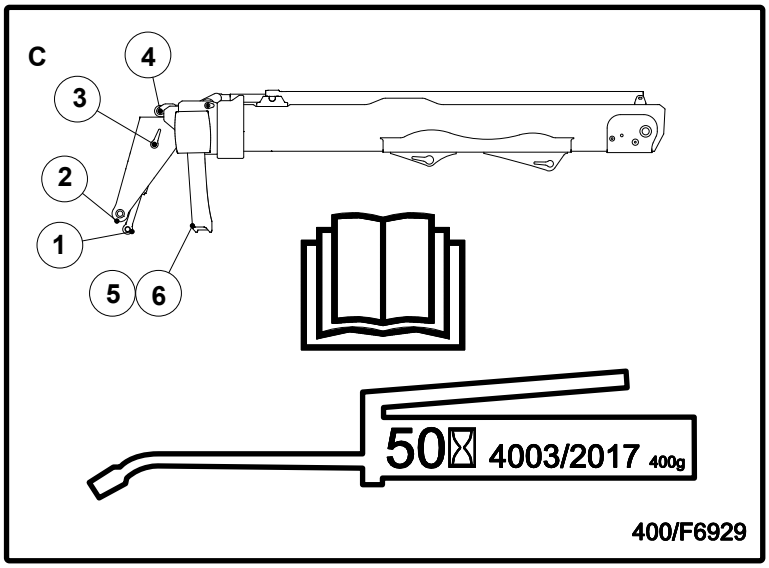
A7 Lift ram dump end
A8 Rear axle front trunion
A9 Rear axle rear trunion
A10 Right hand boom pivot
A11 Disp. ram eye end
A12 Left hand boom pivot

Figure 238.



B1 Front axle front trunion
B2 Right hand axle hub bottom
B3 Right hand axle hub top
B4 Sway ram dump end
B5 Sway ram eye end
B6 Front axle rear trunion
B7 Left hand stab ram eye end
B8 Left hand stab ram dump end
B9 Right hand stab ram eye end
B10 Right hand stab ram dump end
B11 Left hand axle hub bottom
B12 Left hand axle hub top

Figure 239.



B1 Tilt ram eye end
B2 Jib pivot
B3 Tilt ram dump end
B4 Extension roller
B5 Left hand stab leg pivot
B6 Right and stab leg pivot

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.

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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.

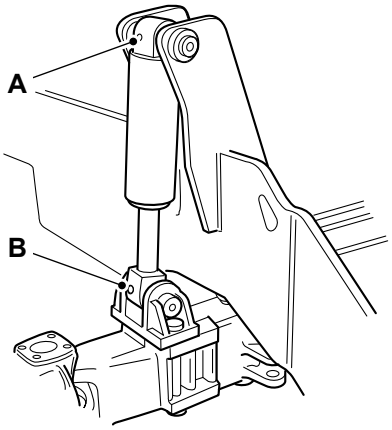
Pivot Pins

Lubricate

Make the machine safe.
Refer to: Maintenance Positions (Page 203).

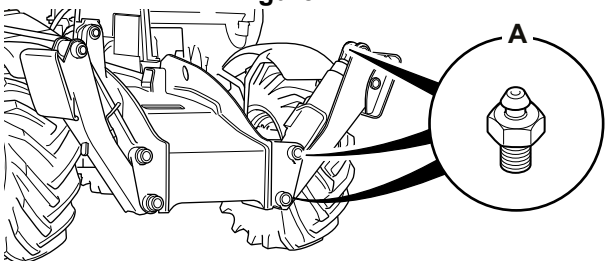
Apply grease to all the pivot points and linkages.

Figure 240.



A Upper grease point **B** Lower grease point

Figure 241.



A Grease points - stabiliser legs (if installed)

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Boom

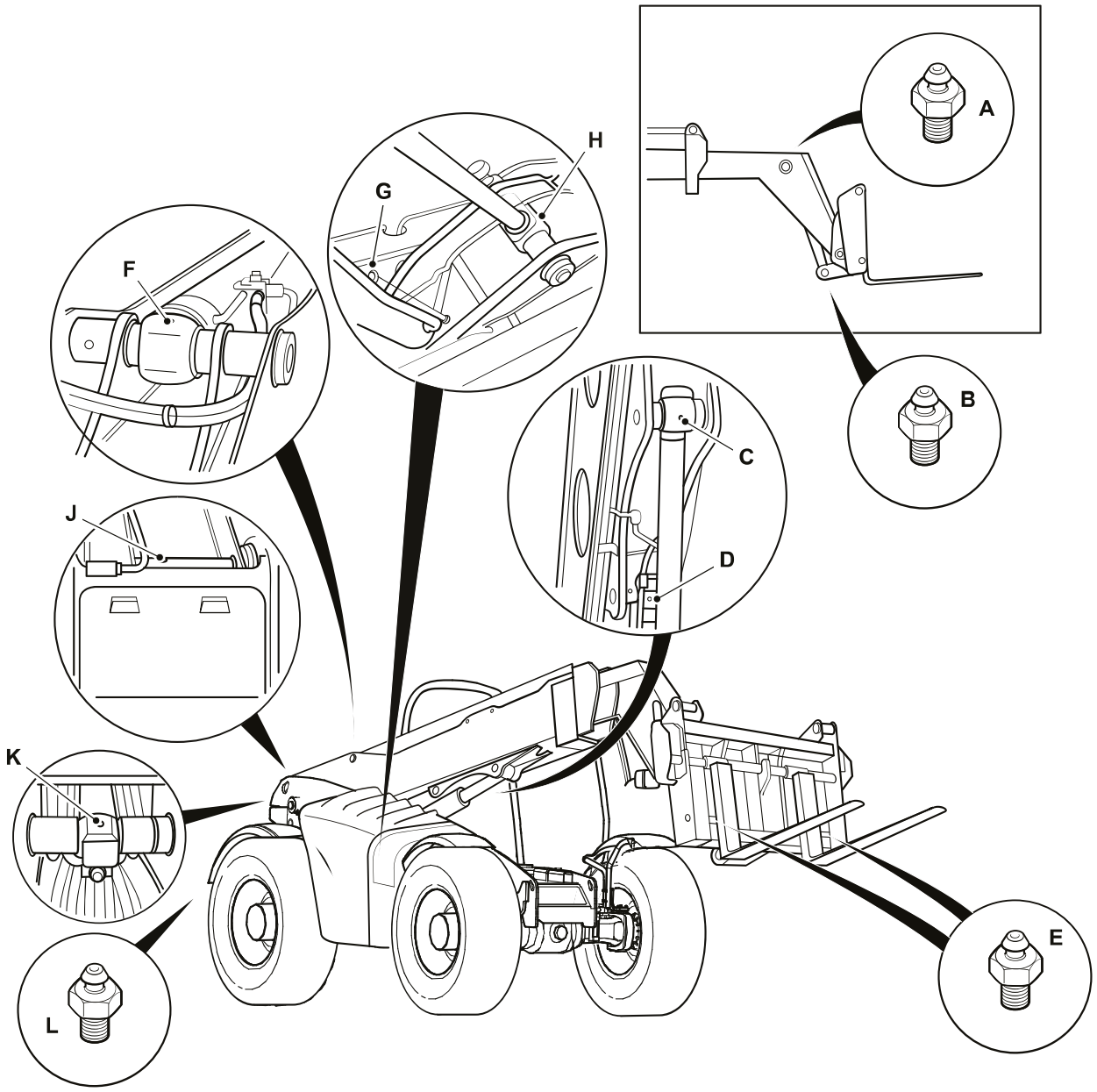
General

Lubricate

For: 533-105 [T4F 3L], 533-105 [T4F] ..... Page 240
For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F] ..... Page 241
For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F] ..... Page 242
For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F] ..... Page 242
For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 244

(For: 533-105 [T4F 3L], 533-105 [T4F])

Figure 242.

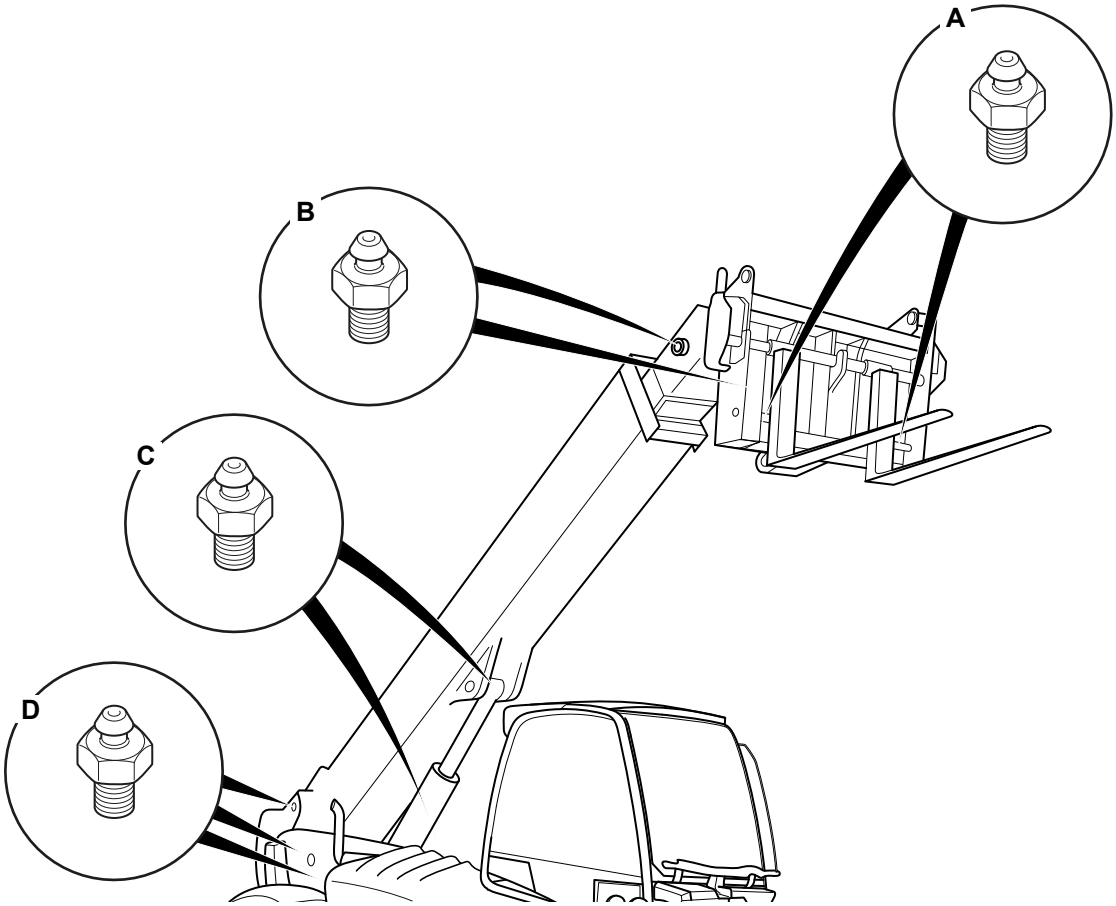


Make the machine safe.
Refer to: Maintenance Positions (Page 203).

Apply grease to all the points and linkages.

(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F])

Figure 243.



Make the machine safe.
Refer to: Maintenance Positions (Page 203).

Apply grease to all the points and linkages.

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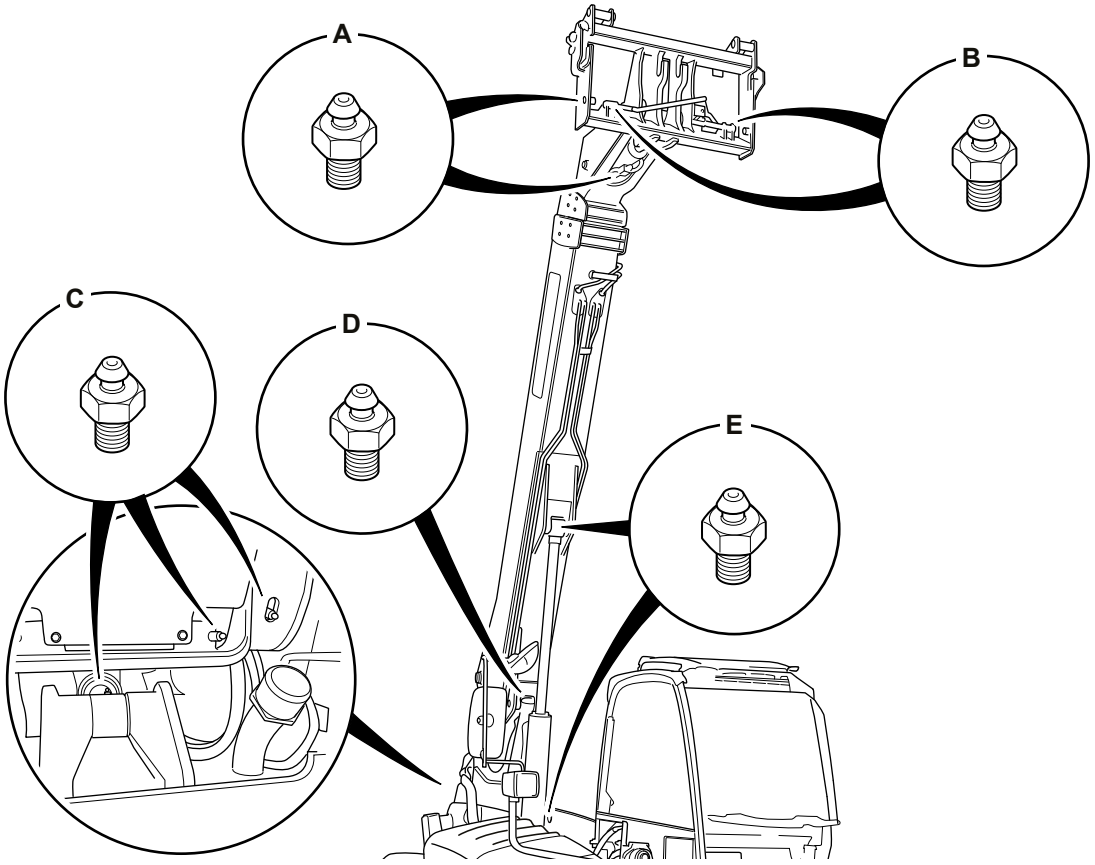
(For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F])

Figure 244.



Make the machine safe.
Refer to: Maintenance Positions (Page 203).

Apply grease to all the points and linkages.

(For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F])

⚠ **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.

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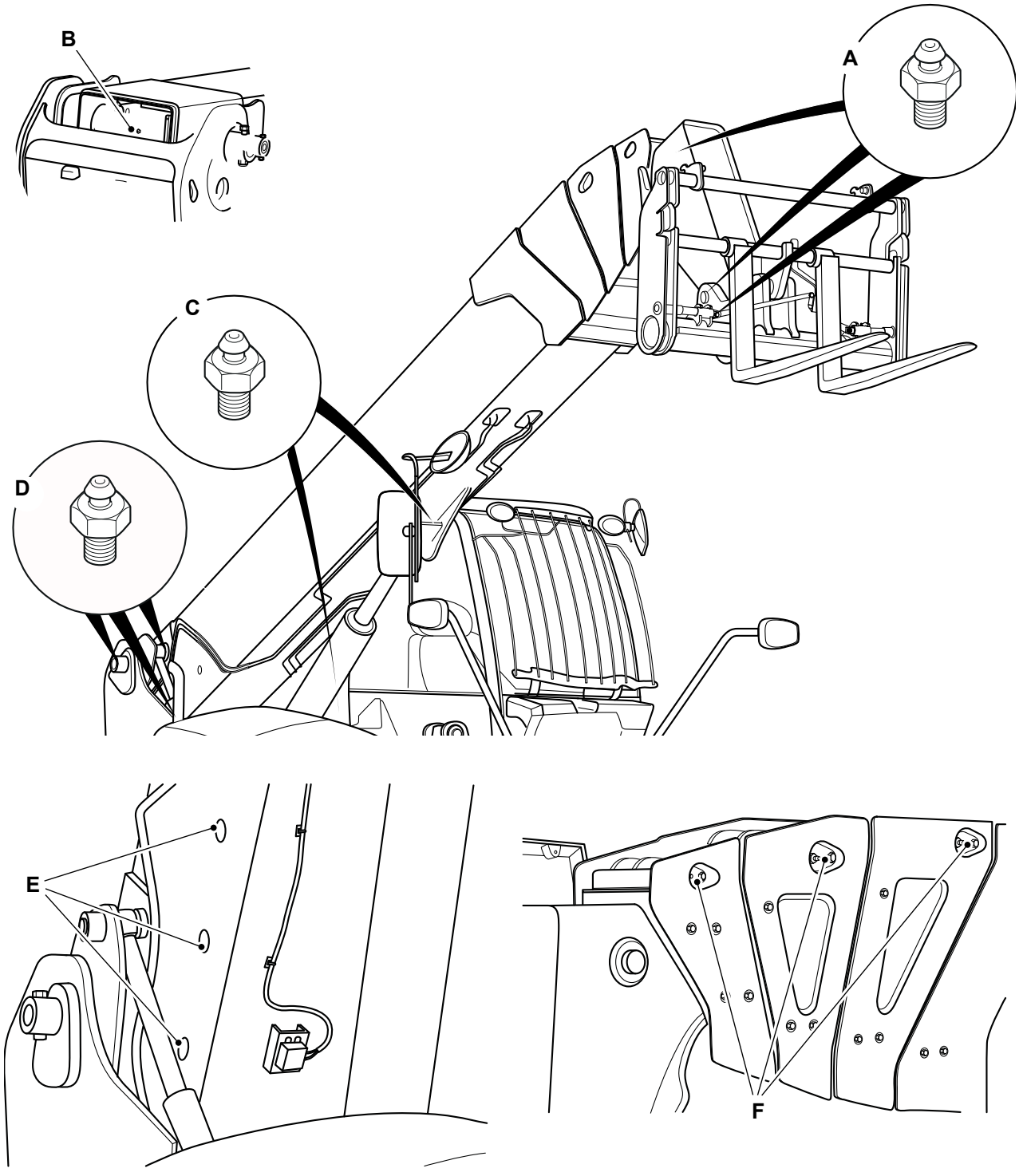
Figure 245.

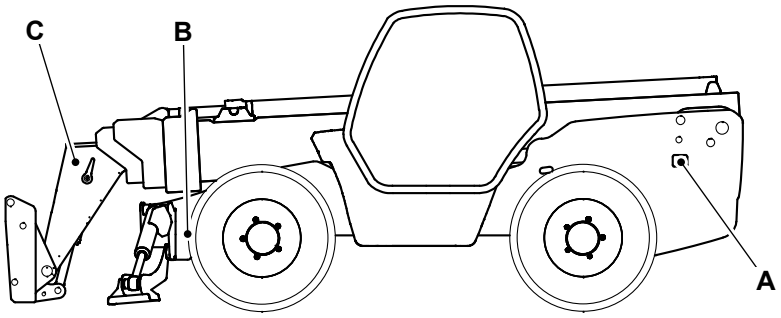


1. Make the machine safe.
2. Apply grease to all the points and linkages where applicable.

(For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

Option

Figure 246.



Make the machine safe.
Refer to: Maintenance Positions (Page 203).

Apply grease to all the points and linkages.

Boom Chains

Lubricate

(For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F])

The boom drive chains should be sprayed with JCB Chain Lubricant at the periods stated in the Service Schedules

Spray the chain with an even coating, avoid over oiling.

1. Extend boom.
2. With the boom extended spray the drive chains and retract chains with JCB chain lubricant.
3. Retract boom.

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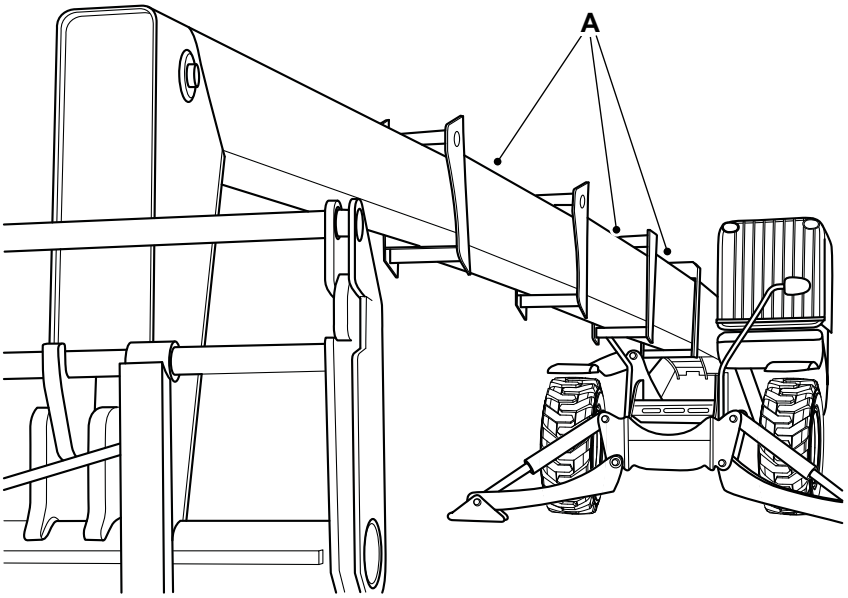
Figure 247.



A Drive Chains

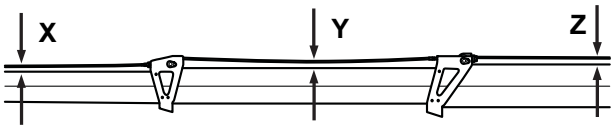
Check (Condition)

(For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

Boom Chains

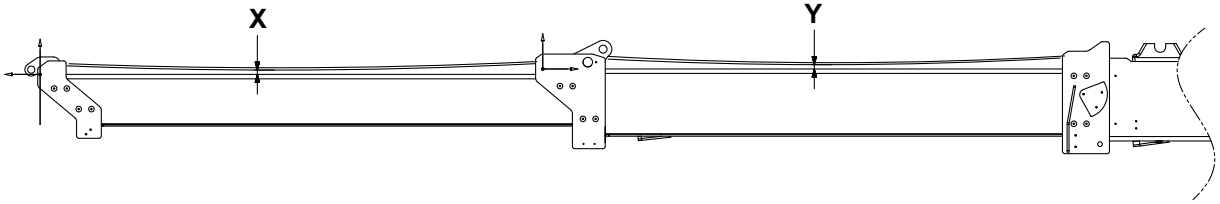
1. Position the machine on firm level ground
2. Fully extend the boom and then retract by approximately 1m. Measure the gap between the underside of the extend chain and the top of the intermediate boom at the mid-point of each span. If tightening is required extend the boom approximately 0.5m before tightening the lower adjustment screws.

Figure 248. 3 Chains



X 65mm **Y** 90mm
Z 80mm

Figure 249. 2 Chains



X 55mm **Y** 75mm

3. The boom should then be retracted before repeating steps . Visual indication of chain stretch and tension: Chain tension can be observed by watching the amount of slack in the upper chains during the retract cycle. Additional features to the front and rear cab side of the boom also give indication to the tension or stretch condition of the chains.

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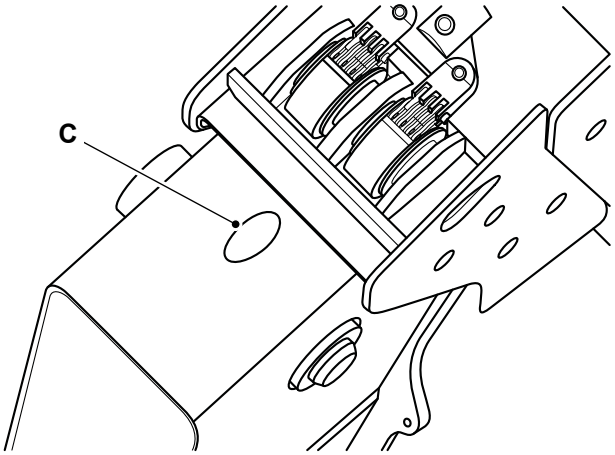
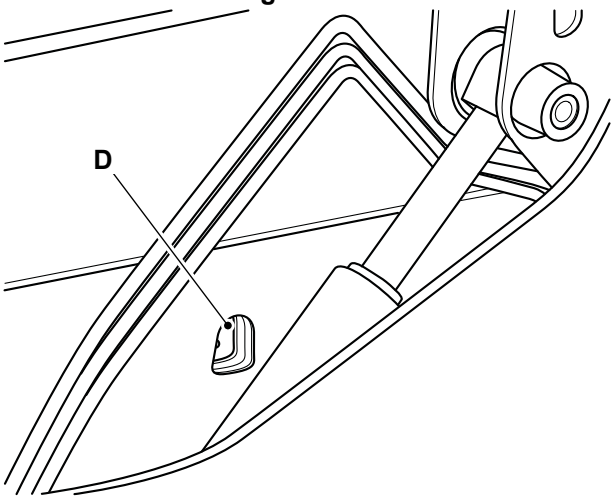
Figure 250.



C Front of the boom

Figure 251.



D Rear cab side of the boom

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Figure 252.

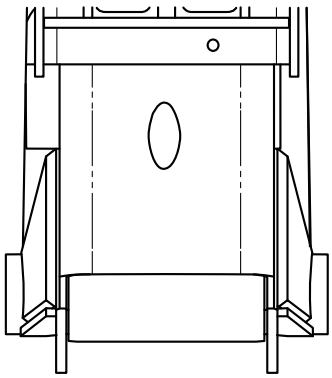

Figure 253.

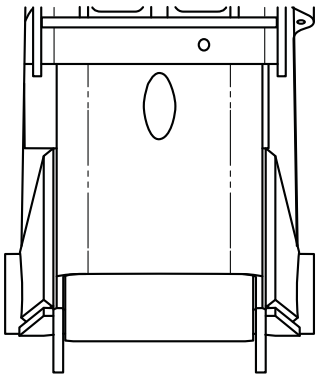

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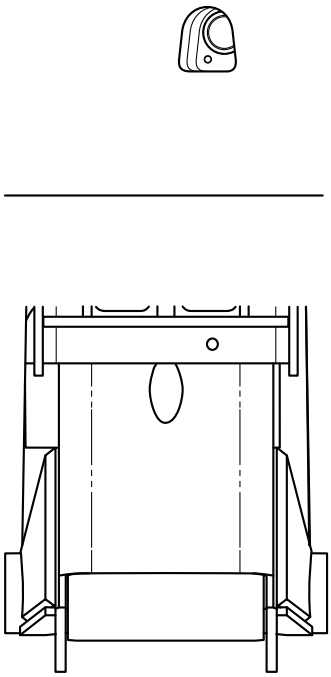
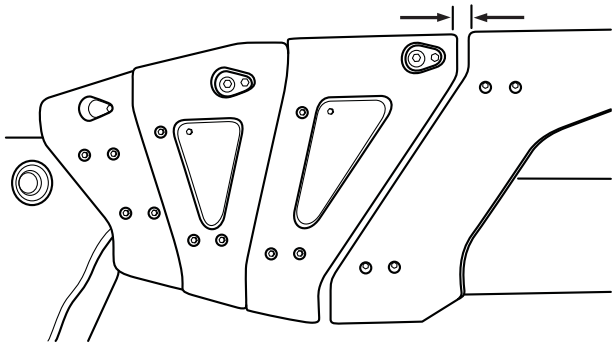
Figure 254.



Damage may occur to the boom structure or internals if boom is allowed to achieve this condition

Figure 255.



A gap between the outer and 1st intermediate, even though the remaining booms are together. This means that the upper chains have stretched and need to be tightened

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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. If the ROPS/FOPS 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 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 Maintenance, Maintenance positions.
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.

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 replace it with a new one if it is damaged, if the fabric is worn, or if the machine has been in an accident.

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

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

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Engine

General

Clean

⚠ **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.

Notice: The engine or certain components could be damaged by high pressure washing systems; special precautions must be taken if the engine is to be washed using a high pressure system. Ensure that the engine air intake, alternator, starter motor and any other electrical components are shielded and not directly cleaned by the high pressure cleaning system.

Notice: Clean the engine before you start engine maintenance. Obey the correct procedures. Contamination of the fuel system will cause damage and possible failure of the engine.

Stop the engine and allow it to cool for at least one hour. Do not attempt to clean any part of the engine while it is running.

Do not aim the water jet directly at oil seals or electrical and electronic components such as the ECU (Electronic Control Unit), alternator or fuel injectors.

Before carrying out any service procedures that require components to be removed, the engine must be properly cleaned.

Cleaning must be carried out 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 surrounding machine must be cleaned.

1. Remove the undershield.
   Refer to: Access Apertures (Page 230).
2. Make sure that the electrical system is isolated.
3. Make sure that all electrical connectors are correctly coupled. If connectors are open fit the correct caps or seal with water proof tape.
4. Cover the alternator with a plastic bag to prevent water ingress.
5. Seal the engine air intake, exhaust and breather system.
6. Make sure that the oil filler caps and dipstick are correctly installed.
7. Use a low pressure water jet and brush to soak off caked mud or dirt.
8. Apply an approved cleaning and degreasing agent with a brush. Obey the manufacturers instructions.
9. Use a pressure washer to remove the soft dirt and oil. Do not place the jet nozzle closer to any part of the engine than the distance specified. 600mm (1 ft 11 in)
10. When the pressure washing is complete move the machine away from the wash area, or alternatively, clean away the material washed from the machine.
11. Before working on specific areas of the engine use a compressed air jet to dry off any moisture. When the area is dry use a soft clean brush to remove any sand or grit particles that remain.
12. When removing components be aware of any dirt or debris that may be exposed. Cover any open ports and clean away the deposits before proceeding.

Check (Condition)

Start the engine and check for:

- Excessive smoke

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- 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 203).
2. Get access to the engine compartment (if applicable).
   Refer to: Access Apertures (Page 230).
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 203).
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 230).
4. Remove and clean the dipstick.
   Refer to: Service Points (Page 211).
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 211).
   8.2. Add the recommended oil slowly through the filler point
   Refer to: Fluids, Lubricants and Capacities (Page 358).
   8.3. Replace the dipstick.
   8.4. Remove the dipstick.

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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

For: JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine ..... Page 253
For: JCB T4F 3.0 55kw Electronic Turbocharged Aftercooled Engine ..... Page 255
For: JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine ..... Page 257

(For: JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine)

⚠ **CAUTION** Oil will gush from the hole when the drain plug is removed. Keep to one side when you remove the plug.

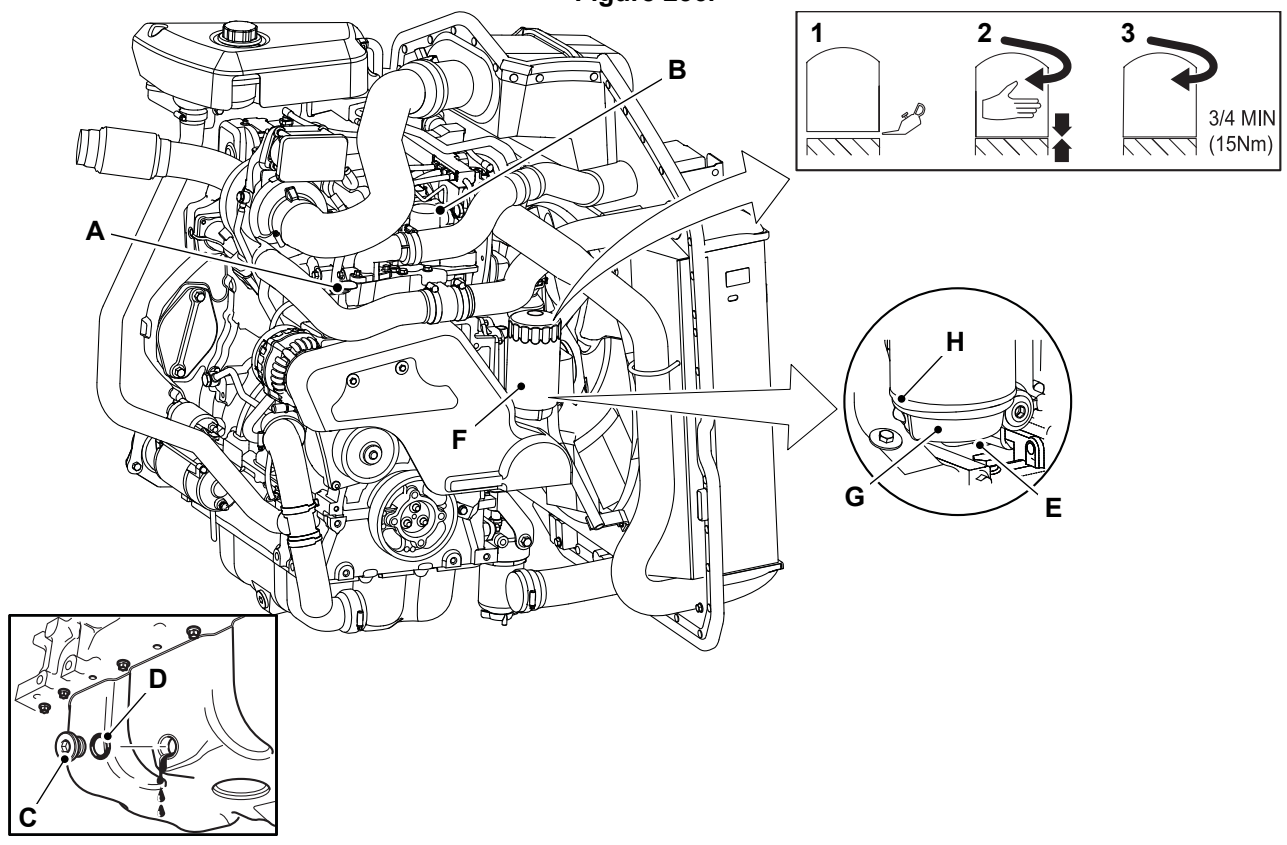
CAUTION It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.

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

Your machine may be installed with a oil evacuation/fill system. A quick release connection is used for purging, evacuating, and refilling the engine oil. Refer to Oil Evacuation/Fill System in this section.

Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil.

Figure 256.



A Dipstick
B Filler point
C Drain plug
D O-ring

E Drain plug
F Filter canister
G Filter head
H Seal

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 203).
2. Get access to the engine compartment.
   Refer to: Access Apertures (Page 230).
3. Place a suitable container below the sump drain plug.
4. Remove the sump drain plug and O-ring. Drain the oil in to a suitable container.
5. Clean the sump drain plug. Install the sump drain plug with a new O-ring. Tighten the sump drain plug to the correct torque value.
   Torque: 40–60N·m
6. Loosen and remove the filter housing drain plug. Drain the oil.
7. Install the filter housing drain plug. Tighten the filter housing drain plug to the correct torque value.
   Torque: 40–60N·m
8. Remove the filter canister.
   8.1. Use a chain wrench if necessary.
9. Clean the seal face of the filter head.
10. Fit a seal on the new filter canister with clean engine oil.
11. Install and tighten the new filter canister with your hand.
12. Add the correct specification and quantity of oil through one of the filler points to the maximum mark on the dipstick.
    12.1. Clean the spilt oil.
13. Fit the filler cap and make sure to secure the filler cap.
14. Operate the engine at idle speed until the oil pressure low warning light has extinguished and the new filter primed before the engine speed is increased above idle speed.
15. Check for leaks.
16. Check the oil level when the oil has cooled.
    16.1. Fill with clean engine oil, if necessary.

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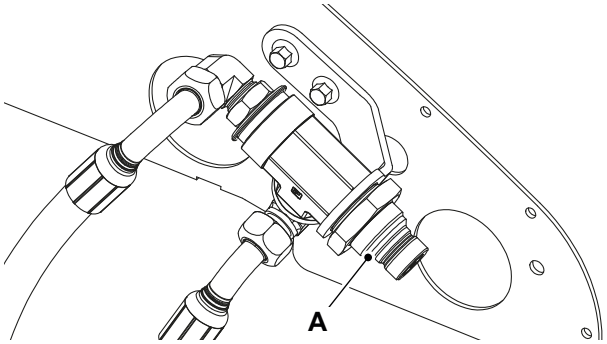
Oil Evacuation/Fill System

Figure 257.



A Oil evacuation/fill quick release connection

Oil Purge

- The engine should be run at idle for a minimum of 5 minutes prior to commencing an oil purge/evacuation to ensure the oil is warm.
- Connect a compressed air line to the quick release connection. Maximum compressed air pressure must not exceed 9bar (130psi) on the compressor tank feed gauge. This gauge must be within calibration.
- Compressed air must not be applied to the oil evacuation/fill system for a period greater than 10 seconds. A period of 10 seconds must elapse before any subsequent application of compressed air. Subsequent applications of compressed air must not exceed the previously prescribed pressure and time limit. This process must be repeated until all of the oil has been purged form the lubrication system and resides in the oil pan.
- The compressed air system used must be fitted with a condensate filtration system to prevent the ingress of moisture into the engine.

Oil Evacuation

- Disconnect the compressed air line and connect the oil evacuation line to the quick release connection.
- Evacuate the engine oil from the sump.
- Once all the oil has been removed from the engine, remove the oil filter and replace with a new one.

Oil Fill

- Disconnect the oil evacuation line and connect the oil fill line.
- Fill the engine with the correct specification and volume of engine oil. Maximum oil fill pressure must not exceed 6bar (87psi)

Oil Level

- Disconnect the oil fill line.
- Ensure the fill, evacuation or compressed air line is not fitted to the quick connection. Then complete the normal oil level check process utilising the engine oil dipstick.

(For: JCB T4F 3.0 55kw Electronic Turbocharged Aftercooled Engine)

⚠ **CAUTION** Oil will gush from the hole when the drain plug is removed. Keep to one side when you remove the plug.

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.

Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil.

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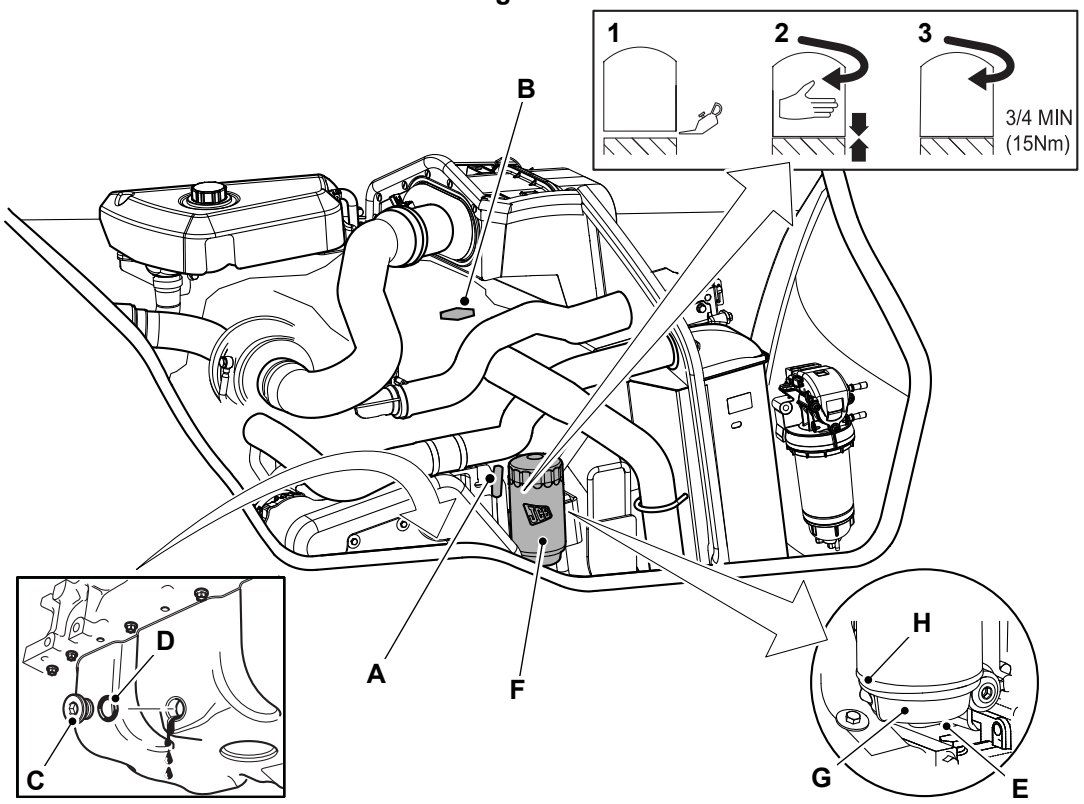
Figure 258.



A Dipstick
B Filler point
C Drain plug
D O-ring
E Drain plug
F Filter canister
G Filter head
H Seal

1. Make the machine safe.
2. Get access to the engine compartment.
3. Place a suitable container below the sump drain plug.
4. Remove the sump drain plug and O-ring. Drain the oil in to a suitable container.
5. Clean the sump drain plug. Install the sump drain plug with a new O-ring. Tighten the sump drain plug to the correct torque value.

   Torque: 45–55N·m
6. Loosen and remove the filter housing drain plug. Drain the oil.
7. Install the filter housing drain plug. Tighten the filter housing drain plug to the correct torque value.

   Torque: 24–28N·m
8. Remove the filter canister.

   8.1. Use a chain wrench if necessary.
9. Clean the seal face of the filter head.
10. Fit a seal on the new filter canister with clean engine oil.
11. Install and tighten the new filter canister with your hand.
12. Tighten the new filter canister to the correct torque value.

    Torque: 17–21N·m

13. Add the correct specification and quantity of oil through one of the filler points to the maximum mark on the dipstick.

    13.1. Clean the spilt oil.

14. Fit the filler cap and make sure to secure the filler cap.

15. Operate the engine at idle speed until the oil pressure low warning light has extinguished and the new filter primed before the engine speed is increased above idle speed.

16. Check for leaks.

17. Check the oil level when the oil has cooled.

    17.1. Fill with clean engine oil, if necessary.

(For: JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine)

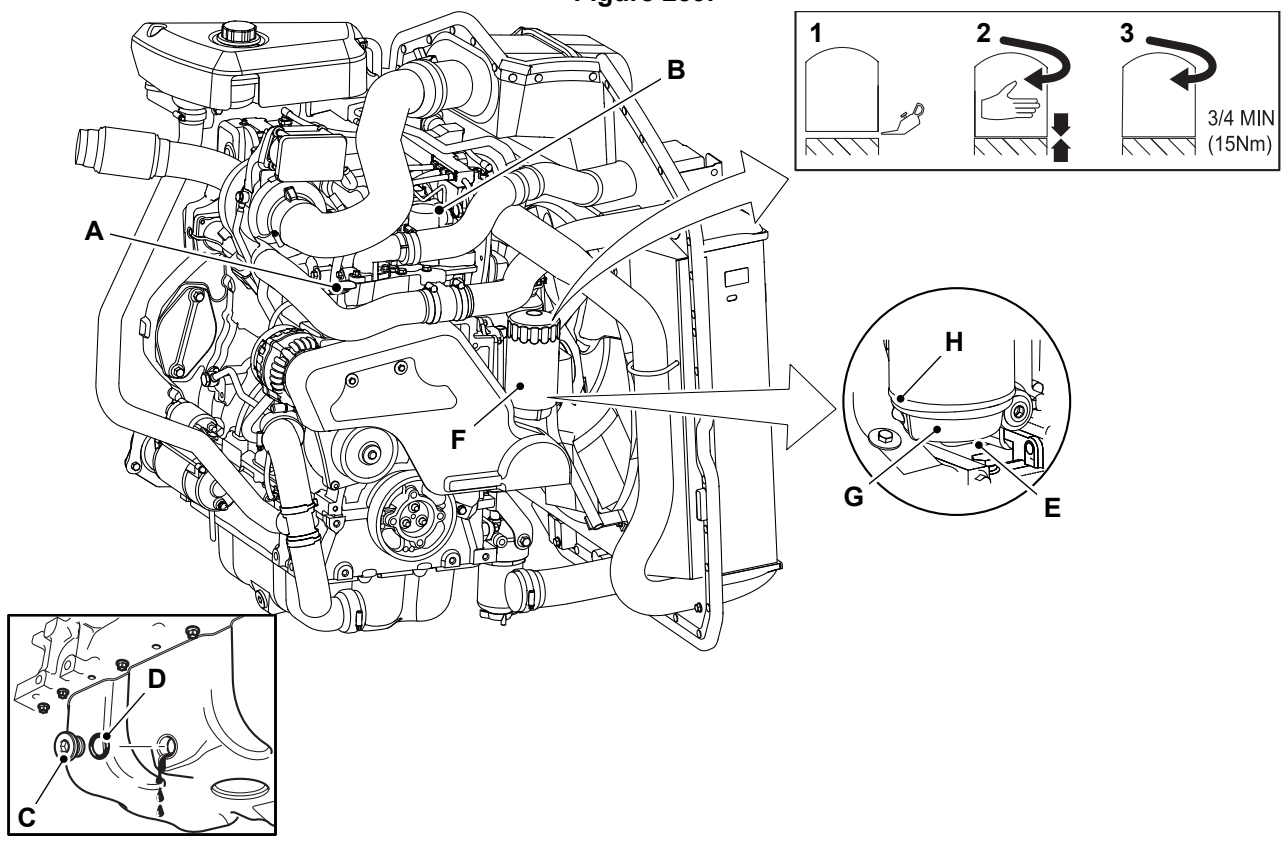
⚠ **CAUTION** Oil will gush from the hole when the drain plug is removed. Keep to one side when you remove the plug.

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.

Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil.

Figure 259.



A Dipstick
B Filler point
C Drain plug
D O-ring
E Drain plug
F Filter canister
G Filter head
H Seal

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1. Make the machine safe.
   Refer to: Maintenance Positions (Page 203).
2. Get access to the engine compartment.
   Refer to: Access Apertures (Page 230).
3. Place a suitable container below the sump drain plug.
4. Remove the sump drain plug and O-ring. Drain the oil in to a suitable container.
5. Clean the sump drain plug. Install the sump drain plug with a new O-ring. Tighten the sump drain plug to the correct torque value.
   Torque: 40–60N·m
6. Loosen and remove the filter housing drain plug. Drain the oil.
7. Install the filter housing drain plug. Tighten the filter housing drain plug to the correct torque value.
   Torque: 40–60N·m
8. Remove the filter canister.
   8.1. Use a chain wrench if necessary.
9. Clean the seal face of the filter head.
10. Fit a seal on the new filter canister with clean engine oil.
11. Install and tighten the new filter canister with your hand.
12. Add the correct specification and quantity of oil through one of the filler points to the maximum mark on the dipstick.
    12.1. Clean the spilt oil.
13. Fit the filler cap and make sure to secure the filler cap.
14. Operate the engine at idle speed until the oil pressure low warning light has extinguished and the new filter primed before the engine speed is increased above idle speed.
15. Check for leaks.
16. Check the oil level when the oil has cooled.
    16.1. Fill with clean engine oil, if necessary.

Front End Accessory Drive (FEAD) Belt

Check (Condition)

⚠ **WARNING** Do not try to turn the engine by pulling the fan or fan belt. This could cause injury or premature component failure.

CAUTION Make sure the engine cannot be started. Disconnect the battery before doing this job, otherwise you could be injured.

The FEAD (Front End Accessory Drive) belt drives the alternator, water pump and the air conditioning compressor (if fitted).

The belt is automatically kept in tension so will not need to be adjusted.

At the recommended service interval, visually inspect the belt for damage:

1. Make the machine safe.

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Refer to: Maintenance Positions (Page 203).

2. Open the engine cover.
   Refer to: Engine Compartment Cover (Page 231).
3. Remove the FEAD belt cover.
4. Inspect the belt for cracks, fraying or missing pieces. If necessary contact your JCB dealer for service requirements.
5. When maintenance is complete, make sure that the guard is installed. Do not operate the machine unless the guard is installed correctly.
   Refer to: Service Points (Page 211).

Emissions Control System

General

Stationary Refresh

Before starting the SCR (Selective Catalytic Reduction) stationary refresh procedure the following conditions must be met:

- Clean under the bonnet to ensure there is no flammable material on hot surfaces (eg turbo, exhaust manifold).
- The diesel and AdBlue / DEF (Diesel Exhaust Fluid) tanks should be full.
- Stop the machine on flat level ground where the machine will not be a hazard or danger.
- 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.
- Activate the park brake.
- Set the transmission to neutral. Make sure the lever is in its detent position.
- Retract and lower the boom, rest the forks flat on the ground.
- Hand throttle (if fitted) should be set to minimum.

Activation

- Neutral must be selected.
- Park brake must be applied.
- The engine coolant must be 70°C (157.9°F) or higher.
- If necessary warm the engine by running at high revs and activating the auxiliary hydraulics (where fitted ensure any powered attachments are disconnected) or boom retract and fork crowd functions.
- When a stationary refresh is available the display will show an icon.

Figure 260.

- Press the info button (less than 2s) to access the following screen.

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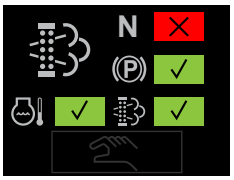
Figure 261.

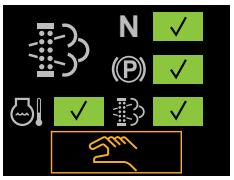
- Press the info button (more than 3s) again to access the following screen.

Figure 262.



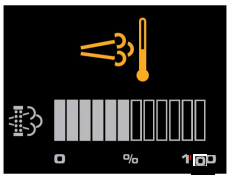
- Once all requirements are met the screen will look like the following.

Figure 263.



- The engine coolant must be at 70°C (157.9°F) at this point.
- Press the info button (more than 3s) to activate stationary refresh.
- A progress indicator is displayed.

Figure 264.



- If the refresh is interrupted or unsuccessful the display will show a red icon.

Figure 265.

What to Expect and Do While a Stationary Refresh is Running

- During refresh the following screen will be displayed.

Figure 266.

- The engine revs will increase from idle to 1500RPM (Revolutions Per Minute). After3min the revs will increase to 2000RPM and remain at this speed for approximately 30min. After this time the revs will drop to 1200RPM for2min to cool the exhaust system.
- Do not operate the throttle, park brake or transmission control - it will stop the process immediately.
- Do not operate the hydraulic functions.
- The process can be interrupted at any time but will then have to be repeated to clear the fault.
- It is advised that the operator should stay with the machine during the procedure.
- In the unlikely event that the exhaust temperature reaches 465°C (868.3°F) this icon will be displayed.

Figure 267.

Completion

- After a successful refresh the display will return to its default setting.

Figure 268.

- The machine can now return to normal operation.
- If the refresh has not been successful then the following icon will remain on the display. Repeat the process to clear the icon.

Figure 269.

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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.
   Refer to: Service Points (Page 211).
2. Unclip and remove the prefilter element.
3. Remove the main element. Take care not to tap or knock the element.
4. If the safety element is to be changed, lift up pulls and remove the safety element.
5. Clean the prefilter element housing and main element housing. Make sure that the air holes on the prefilter housing are clear.
6. Make sure that the aspirator hose is securely installed and is in good condition.
7. Put the new safety element and main element into the housing. Push them firmly in so that they seated correctly.
8. Install the prefilter element. Make sure that the aspirator hose mates with the spigot.

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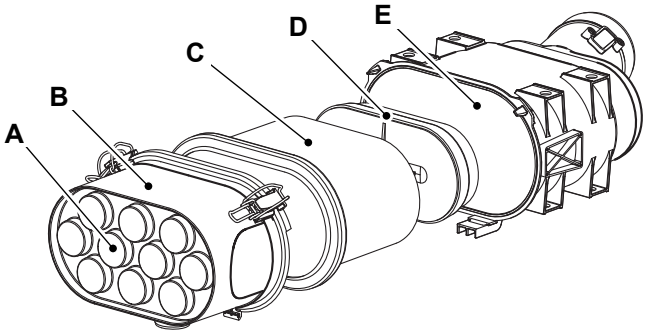
Figure 270.



A Air holes
B Prefilter element
C Main element
D Safety element
E Main housing

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.

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Fuel System

General

Bleed

For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine ..... Page 264

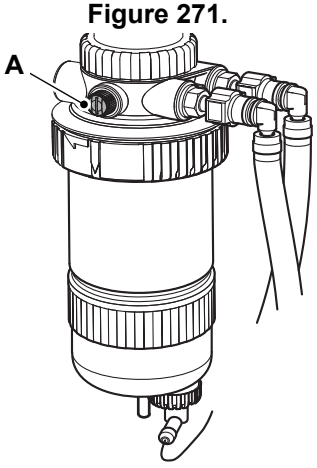
For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB T4F 3.0 55kw Electronic Turbocharged Aftercooled Engine ..... Page 265

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine)

⚠ **WARNING** Do not open the high pressure fuel system with the engine running. Engine operation causes high fuel pressure. High pressure fuel spray can cause serious injury or death.

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 203).
2. Open the engine cover.
   Refer to: Access Apertures (Page 230).
3. Loosen the bleed screw. Refer to Figure 271.

Figure 271.



A Bleed screw

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4. Turn the ignition key to the on position (this will start the electric fuel pump).
5. When all of the air has been released, tighten the bleed screw .
6. Close the engine cover.
7. Turn the ignition key to the off position.

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB T4F 3.0 55kw Electronic Turbocharged Aftercooled Engine)

⚠ **WARNING** Do not open the high pressure fuel system with the engine running. Engine operation causes high fuel pressure. High pressure fuel spray can cause serious injury or death.

The engine installation features an electrically operated fuel lift pump.

The system is designed to bleed automatically when the lift pump is operated.

Make sure that as much air is removed from the fuel system as possible before starting the engine.

Bleed the system as follows:

1. Make the machine safe.
2. Turn the ignition key to position I (this will start the fuel lift pump).
3. Do not start the engine.
4. Allow the fuel lift pump to run for a short period of time.
   Duration: 30s
5. Turn the ignition key to the off position to stop the fuel lift pump. Wait for a short period of time and then turn the starter switch to start the pump.
   Duration: 10s
6. Start the engine and make sure it runs smoothly.
7. If the engine fails to start or does not run smoothly contact your JCB dealer.

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.

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Refer to: Maintenance Positions (Page 203).

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 203).
2. Get access to the fuel filler cap.
   Refer to: Service Points (Page 211).
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

(For: JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine)

⚠ **Notice:** Do not allow dirt to enter the fuel system. Before disconnecting any part of the fuel system, thoroughly clean around the connection. When a component has been disconnected, for example a fuel pipe, always install protective caps and plugs to prevent dirt ingress. Failure to follow these instructions will lead to dirt entering the fuel system. Dirt in the fuel system will seriously damage the fuel injection equipment and could be expensive to repair.

Notice: Running the engine with air in the system could damage the fuel injection pump. After maintenance, the system must be bled to remove any air.

1. Make the machine safe. Refer to Maintenance, Maintenance Positions.
2. Get access to the filter. Refer to Maintenance, Access Apertures
3. Drain and remove the separator bowl. Refer to Maintenance, Fuel System, Water separator.
4. Replace the fuel filter.
5. Install the separator bowl.
6. Bleed the fuel system. Refer to Maintenance, Fuel System, General, Bleed.

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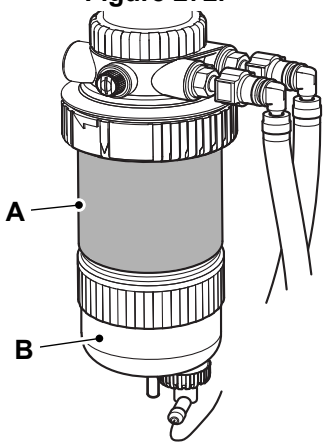
Figure 272.



A Filter **B** Bowl

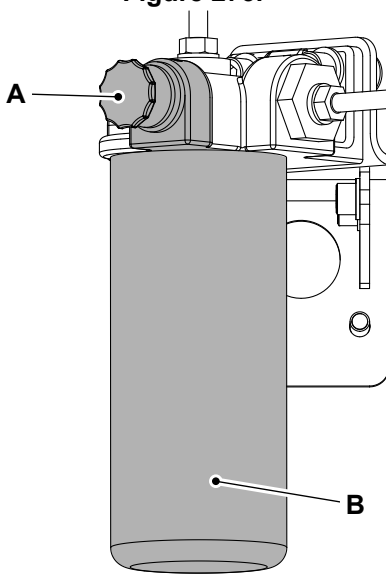
Lubricity Filter

Replace

(For: JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine)

1. Make the machine safe.
2. Get access to the filter.
3. Unscrew the filter to remove it.
4. Replace the lubricity filter.
5. Use the pump to prime the filter.

Figure 273.



A Pump **B** Lubricity filter

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Water Separator

Clean

For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine ..... Page 268

For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB T4F 3.0 55kw Electronic Turbocharged Aftercooled Engine ..... Page 269

For: JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine ..... Page 270

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 up to 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine)

Draining the Water Separator

1. Make the machine safe.
2. Get access to the filter.
3. If there is water but no sediment, open the tap to drain the water. If there is any sediment in the bowl replace the fuel filter element. Do not disconnect the electrical connector (if installed).
4. Tighten the drain tap when all the water is drained.

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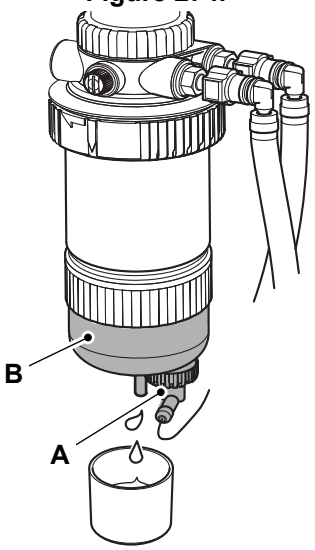
Figure 274.



A Tap **B** Bowl

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB T4F 3.0 55kw Electronic Turbocharged Aftercooled Engine)

1. Make the machine safe.
2. Get access to the filter.
3. If there is water but no sediment, open the tap to drain the water. If there is any sediment in the bowl replace the fuel filter element. Do not disconnect the electrical connector (if installed).
4. Tighten the drain tap when all the water is drained.

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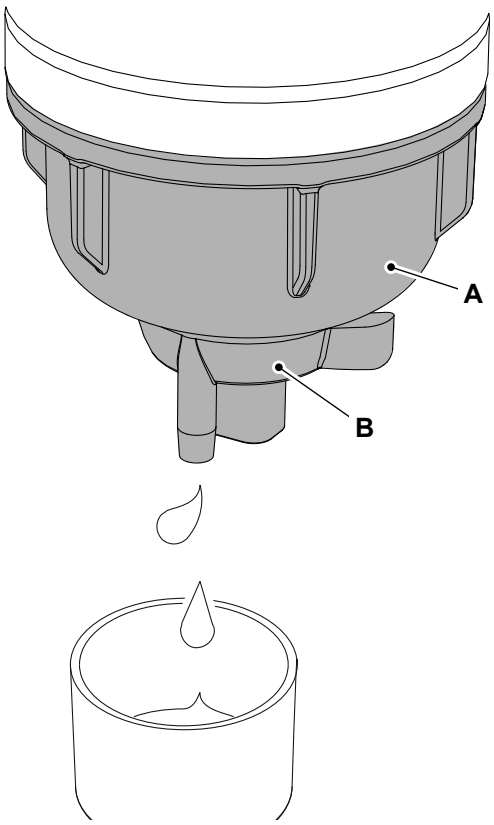
Figure 275.

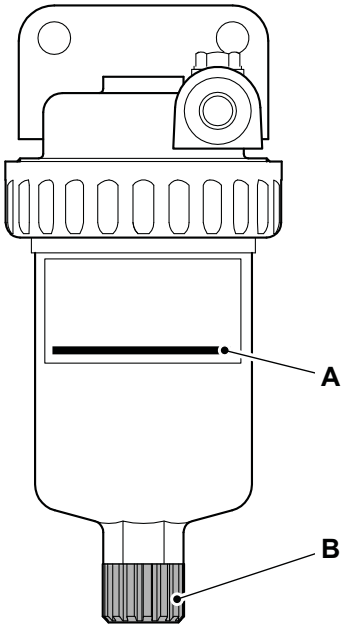


A Water separator **B** Drain tap

(For: JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine)

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 203).
2. Get access to the separator.
   Refer to: Service Points (Page 211).
3. Check the water separator float position. If the float has reached the red line, open the drain tap and drain the water.
4. Tighten the drain tap when all the water is drained.

Figure 276.



A Maximum level - red line

B Drain tap

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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 203).
2. Get access to the cooling pack.
   Refer to: Access Apertures (Page 230).
3. Check the cooling system for leaks.
4. If necessary, contact your JCB dealer.

Coolant

Check (Condition)

Refer to: Coolant (Page 369).

Check (Level)

⚠ **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.

1. Make the machine safe.
2. Let the engine cool.
3. Get access to the coolant expansion tank.
   Refer to: Service Points (Page 211).
4. Check the coolant level in the expansion tank.
   4.1. Carefully loosen the cap on the expansion tank and let the pressure release from the system.
   Refer to: Service Points (Page 211).
   4.2. Remove the cap from the expansion tank.
   4.3. Add the recommended coolant up to the maximum mark.
   Refer to: Fluids, Lubricants and Capacities (Page 358).
   4.4. Replace the cap.
5. Start the engine and run the engine up to operating temperature.
6. Stop the engine.
7. Remove the ignition key.
8. Check for leaks.

Cooling Pack

Clean

1. Make the machine safe. Do not stop the engine at this time.
   Refer to: Maintenance Positions (Page 203).

2. Position the machine in a relatively clean area before reversing the fan to make sure that other debris is not drawn in.
3. Turn on the reverse fan switch.
   Refer to: Console Switches (Page 21).
4. Stop the engine.
5. Let the engine cool.
6. Get access to the radiator.
   Refer to: Access Apertures (Page 230).
7. If necessary, use a soft bristle brush or compressed air to remove all debris from the radiator.

Check (Condition)

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 203).
2. Let the engine cool.
3. Get access to the cooling pack.
   Refer to: Access Apertures (Page 230).
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.

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Brakes

General

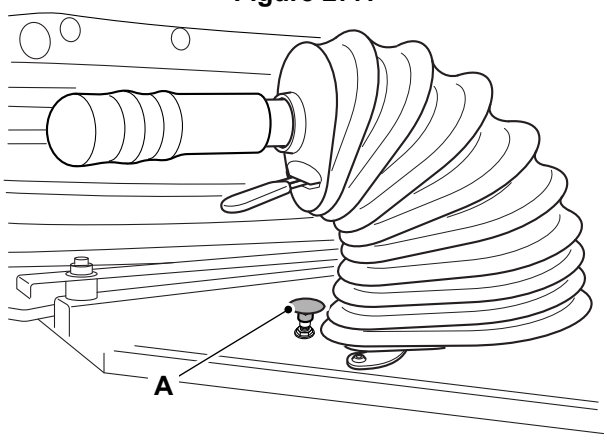
Check (Level)

⚠ **WARNING** Faulty brakes can kill. If you have to top up the brake oil reservoir frequently, get the brake system checked by your JCB Dealer. Do not use the machine until the fault has been rectified.

Notice: Using incorrect fluid could damage the system. See Fluids, Capacities and Lubricants for the correct fluid. The fluid can harm your skin. Wear rubber gloves. Cover cuts or grazes.

The brake fluid tank is in the panel in front of the cab. Pull the release knob to open the panel.

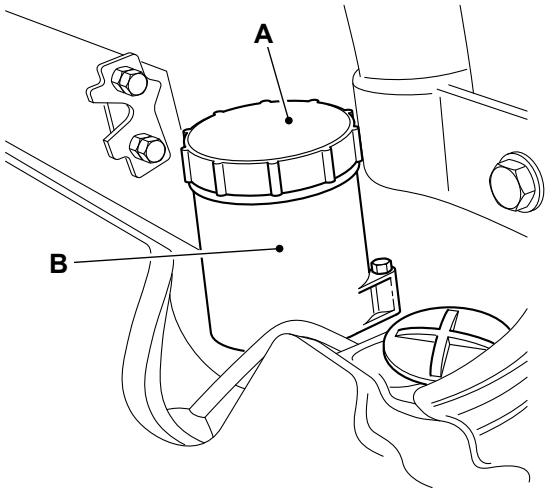
Figure 277.



A Knob

1. Make the machine safe.
2. Check the brake fluid level. The correct fluid level is marked on the tank.
3. If necessary, add more fluid:

Figure 278.



A Tank cap **B** Tank

3.1. Remove the tank cap.
3.2. Add the recommended fluid slowly.
3.3. Replace the tank cap.
3.4. Clean any spilt fluid.

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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.

Adjust

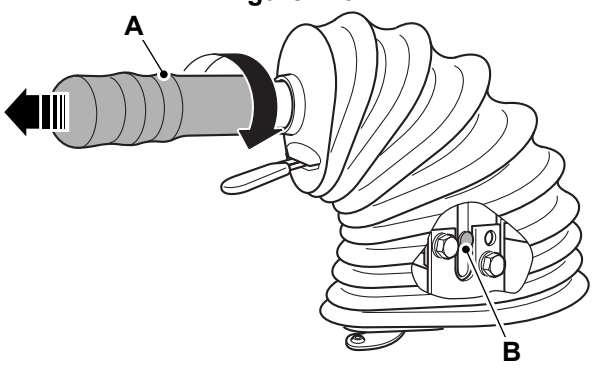
⚠ **Notice:** Over adjustment or failure to disengage the park brake properly will cause excessive wear of the park brake mechanism.

1. Disengage the park brake (lever horizontal). Failure to disengage the park brake fully will result in excessive wear of the park brake mechanism.
2. Pull and turn handle grip clockwise, half a turn.
3. Test the park brake.

Refer to: Check (Operation) (Page 275).

If the brake fails the test repeat the above steps. If there is no more adjustment and the pin is at the end of its travel get the brake checked by your JCB dealer.

Figure 279.



A Handle grip

B Pin

Service Brake

Check (Operation)

1. Before you start the machine, check the brake system hydraulic hoses for any signs of damage or leaks.
2. Start the engine.
3. Wait for the brake accumulator amber warning symbol to extinguish from the main display screen.
4. If the brake accumulator red warning symbol illuminates do not use the machine. Contact your JCB dealer for any service requirements.

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Gearbox

Oil

Check (Level)

1. Make the machine safe with the boom lowered.
2. Start the engine and operate at low idle for few minutes. This allows the oil to fill the filter, pump, torque converter, oil cooler and hoses.

   Duration: 4min
3. Stop the engine.
4. Remove the ignition key.
5. Open the engine compartment cover.
6. Before you complete a check of the oil level, you must wait for the time specified.

   Duration: 60s
7. Check the gearbox oil level on the dipstick. The oil level must be between the end of the dipstick and maximum mark on the dipstick.
8. If necessary add oil through the dipstick tube.

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Axles

General

Lubricate

For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 278

For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F] ..... Page 278

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

Make the machine safe. Refer to Maintenance, Maintenance positions.

Apply grease to all the points and linkages shown.

Figure 280.

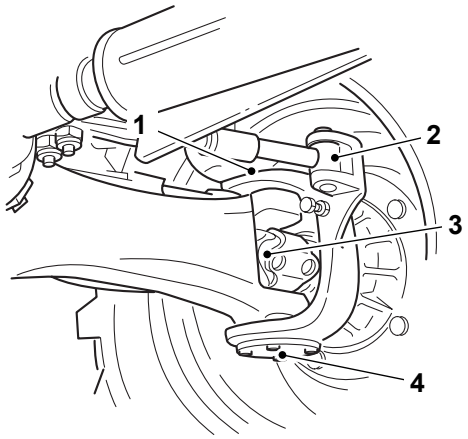
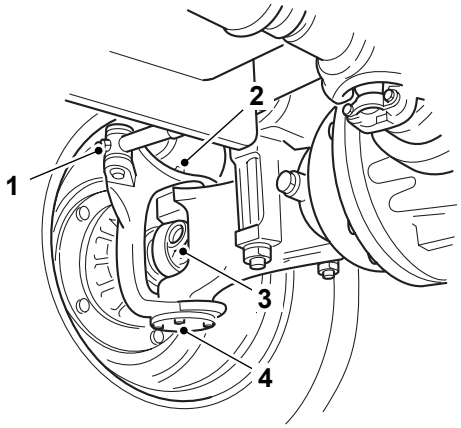


Figure 281.



(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F])

Make the machine safe.

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Refer to: Maintenance Positions (Page 203).

Apply grease to all the points and linkages shown.

Figure 282.

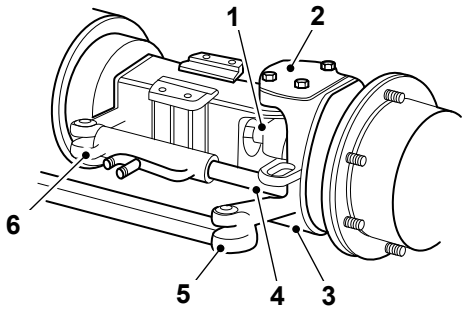
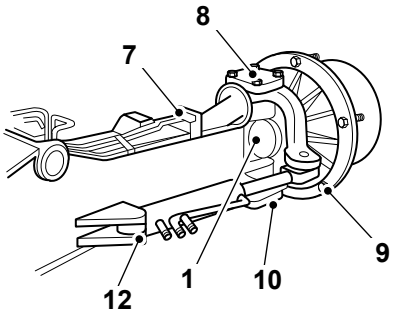


Figure 283.



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.

Notice: It is not recommended that the machine be driven with the axle partially filled with oil.

1. Make the machine safe.
2. Get access to the axle fill/level plug.
   Refer to: Service Points (Page 211).
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 358).
7. Clean the fill/level plug.
8. Install the plug with its sealing washer.
9. Tighten the plug to the correct torque value.
   Refer to: Torque Values (Page 371).

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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.

Where a wheel has been replaced, ensure that the offset of the central nave plate of the wheel rim is as specified for the tyre by JCB. If in doubt request additional information from your JCB Dealer.

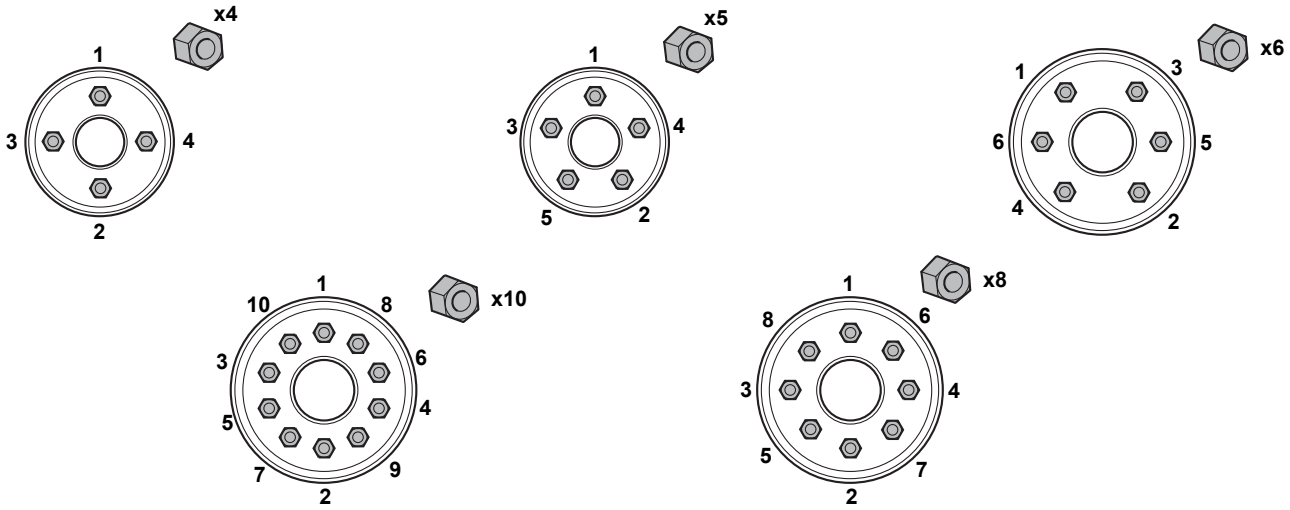
Remove

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 203).
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 284.



7. Lower the machine to the ground.
8. Torque tighten the nuts in the sequence shown.
   Refer to: Torque Values (Page 371).

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 371).

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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.

Where a replacement tyre is necessary, seek advice from your JCB Dealer. Always use a trained tyre technician to replace the tyre onto the rim. Tyres are critical to the machines stability and performance. Always select replacement tyres from approved options for your machine as listed.

Checking the Tyre Condition

Always drive with consideration for the condition of the tyres. Low tyre pressures will affect the stability of the machine. Check the tyres daily when cold for the correct tyre pressure and signs of damage. For example:

- Signs of distortion (bulges)
- Cuts or wear
- Embedded objects (nails, etc.)

Install the valve caps firmly to prevent dirt from entering the valve. Inspect for leaks when you check the tyre pressures.

Inspect the tyre valve for leaks, when you check the tyre pressures.

Tyre Inflation

Always maintain your tyre pressure to the recommended cold inflation pressure settings. Using your machine with under-inflated tyres means:

- Decreasing the machines stability
- Higher tyre temperatures
- Excessive strain of the tyre fabric
- More bulging of the sidewalls
- Shortens the tyres life.

Using the machine with over-inflated tyres is dangerous:

- It causes excessive tensile loads in the fabric: this makes a tyre more susceptible to cuts and punctures.

Do not cut or weld on the rim of an inflated tyre.

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 adjusting the tyre pressure always replace and secure the valve cap.

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.

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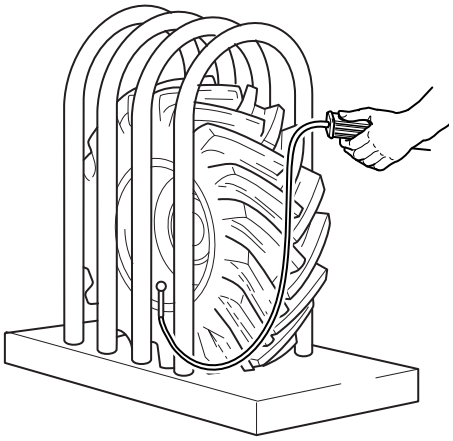
1. Prepare the wheel. Before you add air to the tyre, make sure it is correctly fitted on the machine or installed in a tyre inflation cage. Refer to Figure 285.

Figure 285.



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.
   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.

Make a note that the warning marking or text on the tyre sidewall only applies to the initial tyre fitting and bead seating and not the operating inflation pressure.

Figure 286.

Puncture repairs

Emergency external repairs, ‘sticky string’, must only be used to move a disabled machine to a suitable location for a definitive repair in line with the tyre manufacturer’s guidelines. Operating the machine with external repairs can result in secondary irreparable tyre damage such as ply separation and bulges.

Propshafts

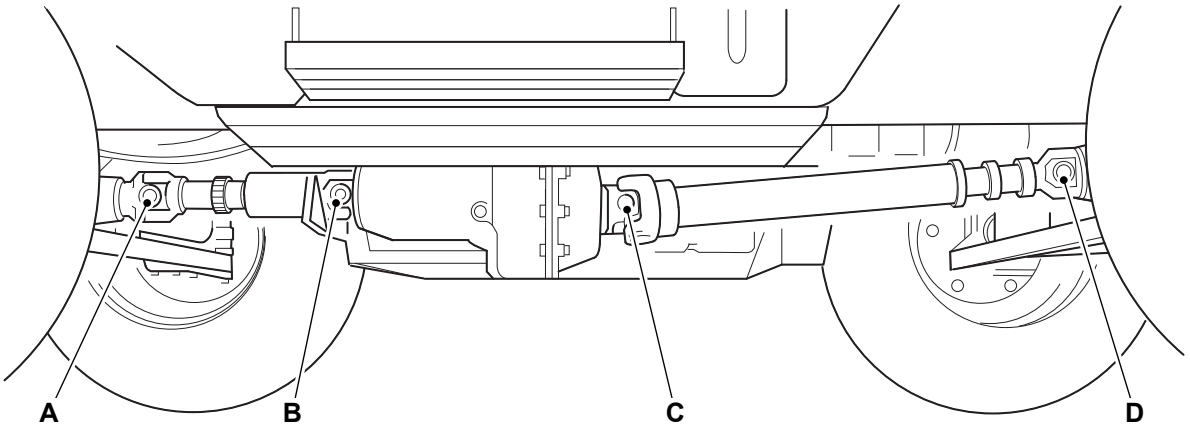
General

Lubricate

Make the machine safe.

Apply grease to all the points and linkages shown. Refer to Figure 287.

Figure 287.



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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.

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.

   Refer to: Maintenance Positions (Page 203).

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 servo operated hydraulic services, turn the ignition key to the on position. Operate the controls of the service(s) to be disconnected.

   2.3. 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.

   Refer to: Console Switches (Page 21).

   2.4. 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.

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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)

⚠ **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.

Notice: Using incorrect fluid could damage the system. See Fluids, Capacities and Lubricants for the correct fluid. The fluid can harm your skin. Wear rubber gloves. Cover cuts or grazes.

External Sight Gauge

1. Make the machine safe with the boom lowered.
   Refer to: Maintenance Positions (Page 203).
2. Get access to the hydraulic oil level indicator and hydraulic oil filler cap.
   Refer to: Service Points (Page 211).
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. Vent the hydraulic system.
   Refer to: Discharge (Page 285).
   4.2. Remove the hydraulic oil filler cap.
   4.3. Add hydraulic oil.
   Refer to: Fluids, Lubricants and Capacities (Page 358).

4.4. Install the filler cap.

Dipstick

1. Make the machine safe with the boom lowered.
   Refer to: Maintenance Positions (Page 203).
2. Get access to the hydraulic oil filler cap.
   Refer to: Service Points (Page 211).
3. Check the hydraulic oil level on the dipstick. The hydraulic oil level must be between the two marks on the dipstick.
4. Top up oil level if necessary:
   4.1. Vent the hydraulic system.
   Refer to: Discharge (Page 285).
   4.2. Remove the hydraulic oil filler cap.
   4.3. Add hydraulic oil.
   Refer to: Fluids, Lubricants and Capacities (Page 358).
   4.4. 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.

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.

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Electrical System

Fuses and Relays

⚠ **Notice:** Always replace fuses with ones of correct ampere rating to avoid electrical system damage.

The electrical circuits are protected by fuses. The fuses are located in a fuse box, to the left side of the console. They are in four banks. Each fuse position in each bank is numbered to aid identification. If a fuse ruptures, find out why and rectify the fault before fitting a new one.
Refer to: Fuses (Page 373).

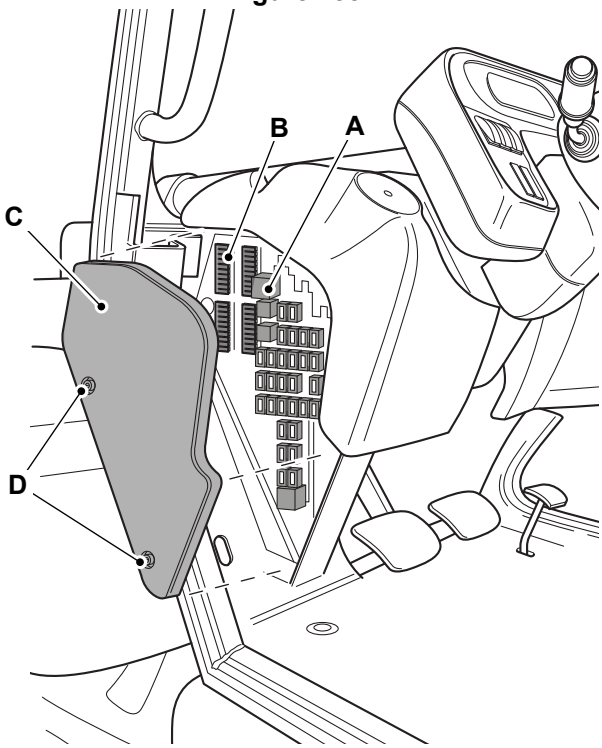
The relays and fuses are located in a fuse box, to the left side of the console.

The relays are separated into banks. Each relay position in each bank is numbered to aid identification.
Refer to: Relays (Page 377).

Additional fuse links are fitted at the battery positive terminal and within the engine compartment.
Refer to: Fuses (Page 373).

1. Make the machine safe with the boom lowered.
   Refer to: Maintenance Position - Boom Lowered (Page 203).
2. Open the cab door.
3. Hold the cover and remove the screws.
4. Remove the cover.

Figure 288.



A Relays
B Fuses
C Cover
D Screws (x2)

Primary Fuses

To further protect the machine wiring harnesses and electrical circuits, a fuse link box is fitted as shown. Remember to check the main circuit fuses as well as the primary fuses shown on this page.

Your machine may not be equipped with all the fuses shown.

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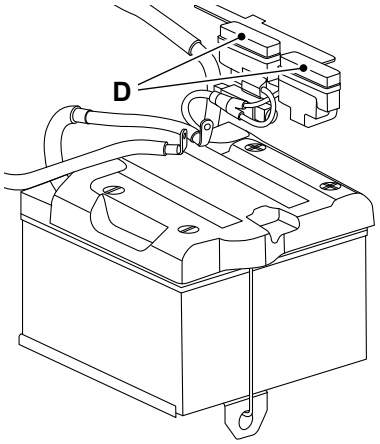
Figure 289.



D Primary fuses

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.

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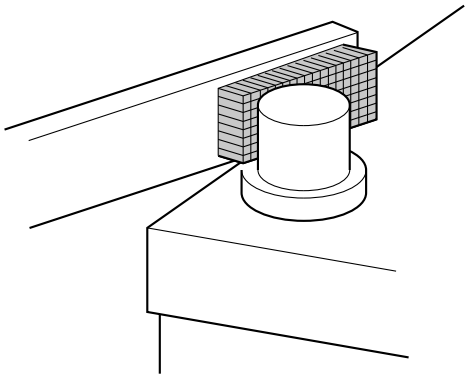
Refer to: Maintenance Positions (Page 203).

2. Get access to the battery.

   Refer to: Access Apertures (Page 230).

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 290.

Figure 290.



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 203).

2. Get access to the batteries.

   Refer to: Disconnect (Page 290).

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.

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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 203).
2. Get access to the batteries.
   Refer to: Access Apertures (Page 230).
3. If the machine has a battery isolator, switch off the battery isolator and remove the key.
   Refer to: Battery Isolator (Page 38).
4. Disconnect the battery leads. Disconnect the earth (-) terminal first.

Battery Isolator

Check (Operation)

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

1. Isolate the machine electrics.
2. Make sure that the machine electrics are isolated.

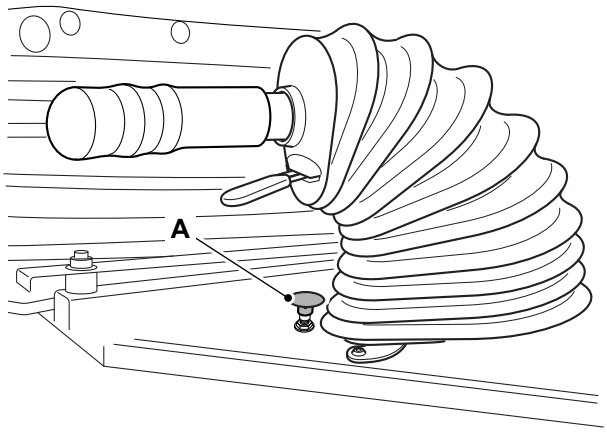
A defective isolator must be repaired before the machine is used. For more information, contact your JCB dealer.

Window Washer

Check (Level)

1. Make the machine safe.
   Refer to: Stopping and Parking (Page 56).
2. Pull the release knob to open the panel in front of the cab. Refer to Figure 291.

Figure 291.



A Knob

3. Locate the washer bottle in the panel in front of the cab.
4. Remove the washer bottle filler cap. Refer to Figure 292.

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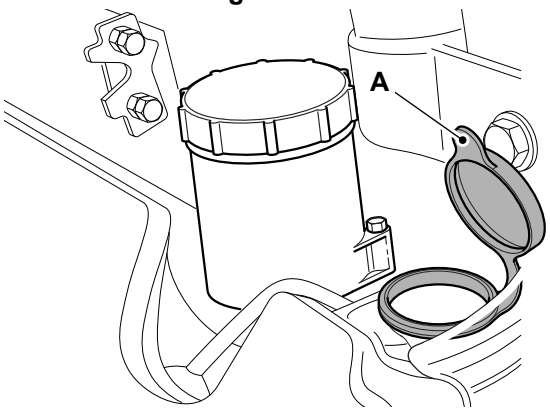
Figure 292.



A Filler cap

5. Check the water level. If necessary, fill in the washer bottle with clean water. Add de-icing fluid to prevent it freezing.

   Refer to: Fluids, Lubricants and Capacities (Page 358).

6. Replace the washer bottle filler cap

Do not use engine coolant antifreeze.

Do not use the window washer when there is no liquid in the washer bottle as it will cause damage to the motor.

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Miscellaneous

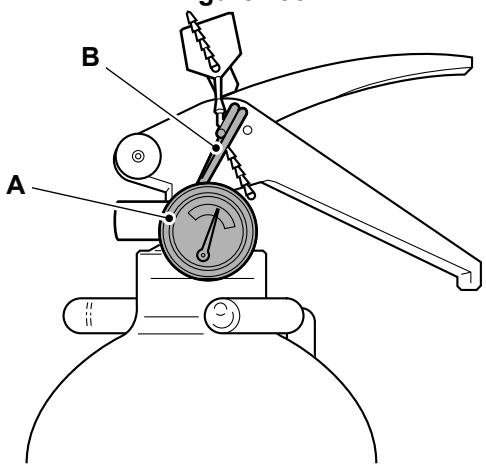
Fire Extinguisher

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 293.



A Gauge **B** Safety Pin

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Notes:

Technical Data
Static Dimensions

Dimensions

For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3] ..... Page 296
For: 550-140 [T4F], 550-140 [UN3/GB3] ..... Page 298
For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 550-170 [T4F] ..... Page 300
For: 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F] ..... Page 302
For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F] ..... Page 304
For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 306
For: 533-105 [T4F 3L], 533-105 [T4F] ..... Page 308

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(For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3])

Figure 294.

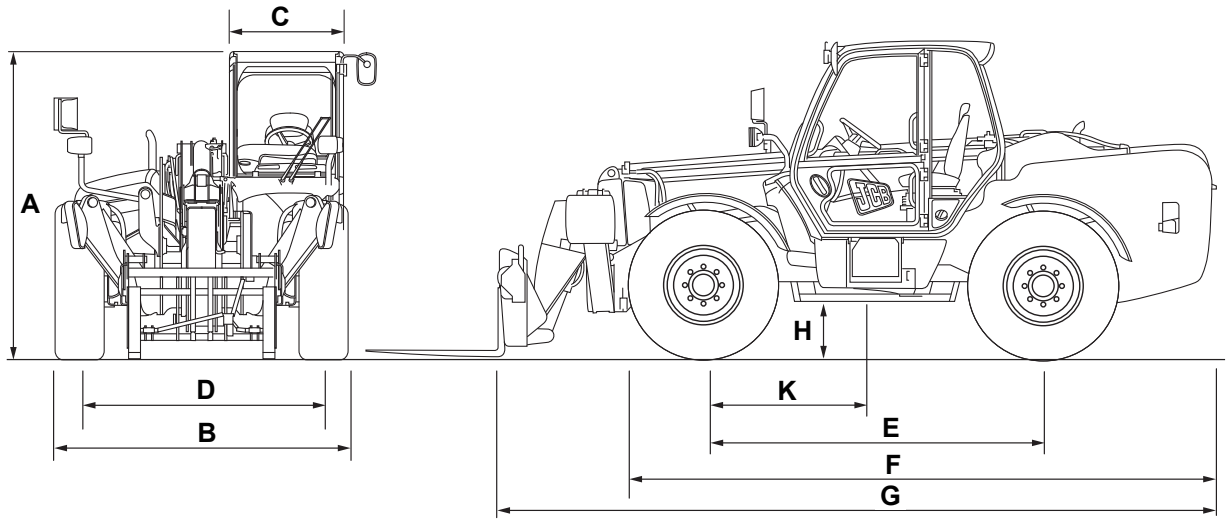

Table 31.

Item	Description	Dimension[1]
A	Overall height	2,600mm
B	Overall width (over tyres)	2,320mm
C	Inside width of cab (between windows)	940mm
D	Front track	1,900mm
E	Wheelbase	2,750mm
F	Overall length to front tyres	4,750mm
G	Overall length to front of carriage	5,790mm
H	Ground clearance	320mm
K	Centre of gravity (unladen)	1,340mm

(1) Dimensions relative to MICHELIN 400/80-24 . POWER CL 162A8 [-32 OFFSET]

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Figure 295.

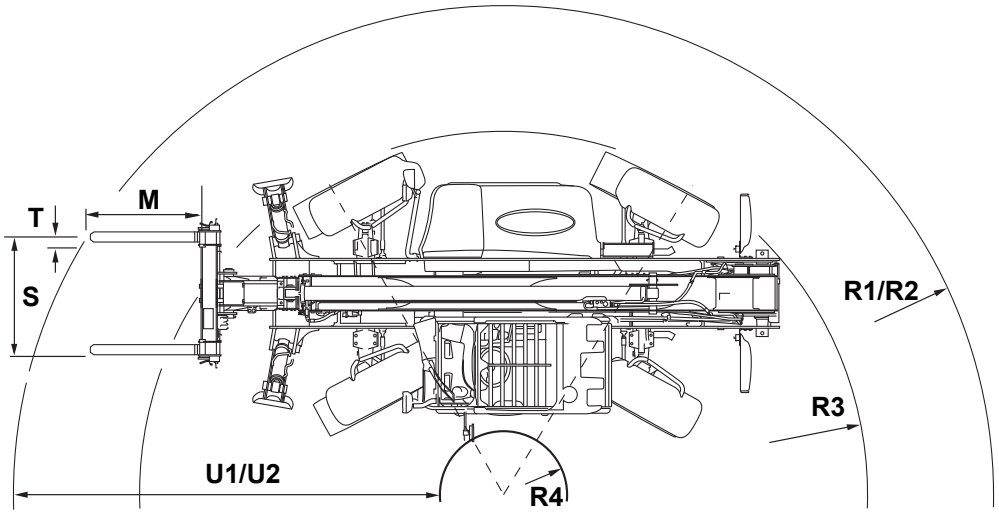

Table 32.

Item	Description	Dimension[1]
M1	Fork length	1,060mm
M2	Fork length	1,200mm
R1	Turn radius over forks at spacing S	5,020mm
R2	Turn radius over forks at spacing S	5,140mm
R3	Outside turn radius over tyres	3,800mm
R4	Inside turn radius to cab	1,080mm
R5	Turn radius over stabilisers	3,620mm
S	Fork spread (max spacing in carriage)	1,230mm
T	Fork width	100mm
U1		3,940mm
U2		4,060mm
V1		6,840mm
V2		8,040mm

(1) Dimensions relative to MICHELIN 400/80-24 . POWER CL 162A8 [15 OFFSET]

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(For: 550-140 [T4F], 550-140 [UN3/GB3])

Figure 296.

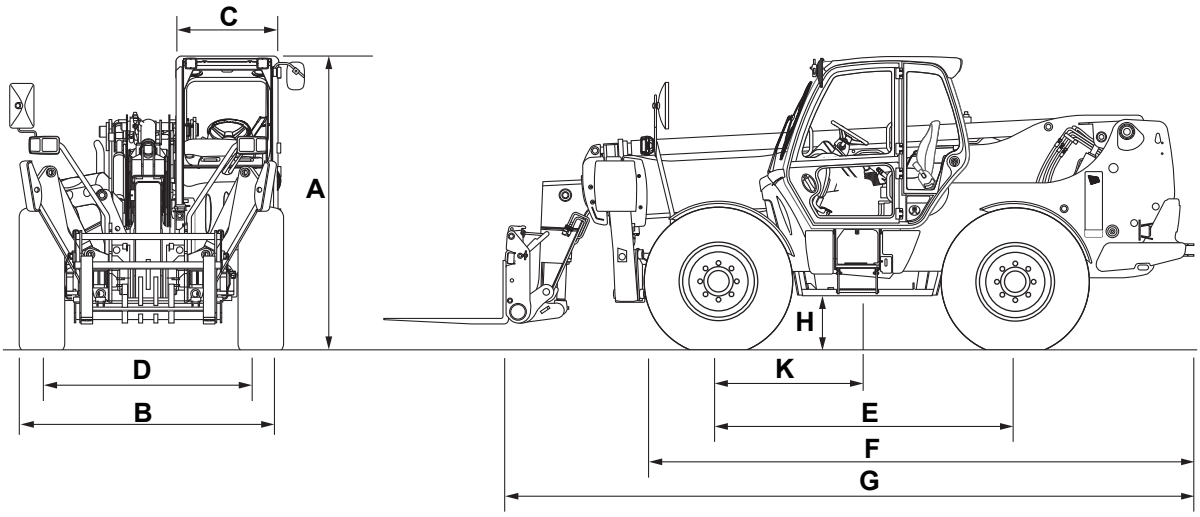

Table 33.

Item	Description	Dimension[1]
A	Overall height	2,590mm
B	Overall width (over tyres)	2,350mm
C	Inside width of cab (between windows)	940mm
D	Front track	1,900mm
E	Wheelbase	2,900mm
F	Overall length to front tyres	5,180mm
G	Overall length to front of carriage	6,250mm
H	Ground clearance	400mm
K	Centre of gravity (unladen)	1,536mm

(1) Dimensions relative to 15.5/25 tyres.

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Figure 297.

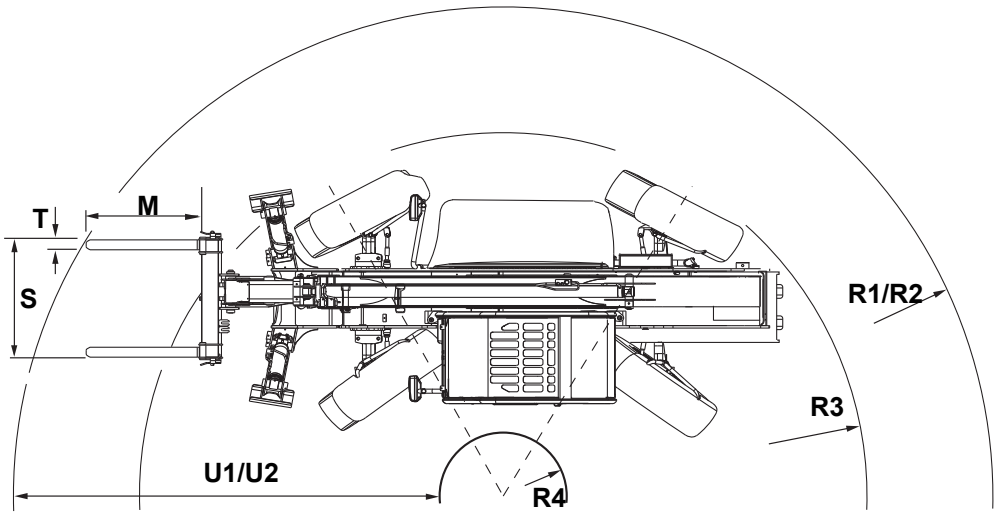

Table 34.

Item	Description	Dimension[1]
M		1,067mm
		1,200mm
R1	1,067mm forks	5,430mm
R2	1,200mm forks	5,530mm
R3		4,100mm
R4		1,340mm
S		1,226mm
T		103mm
U1	1,067mm forks	4,100mm
U2	1,200mm forks	4,190mm

(1) Dimensions relative to 15.5/25 tyres.

(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 550-170 [T4F])

Figure 298.

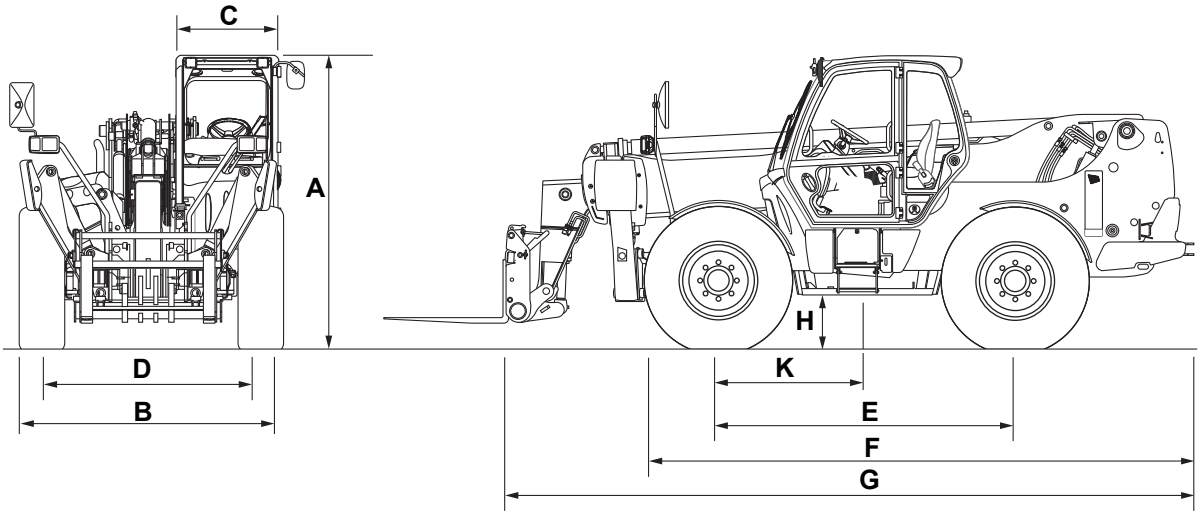

Table 35.

Item	Description	Dimension[1]
A	Overall height	2,740mm
B	Overall width (over tyres)	2,430mm
C	Inside width of cab (between windows)	940mm
D	Front track	1,970mm
E	Wheelbase	2,750mm
F	Overall length to front tyres	4,910mm
G	Overall length to front of carriage	6,170mm
H	Ground clearance	430mm
K	Centre of gravity (unladen)	1,500mm

(1) Dimensions relative to MICHELIN 440/80-24 . POWER CL 168A8 [2 OFFSET]

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Figure 299.

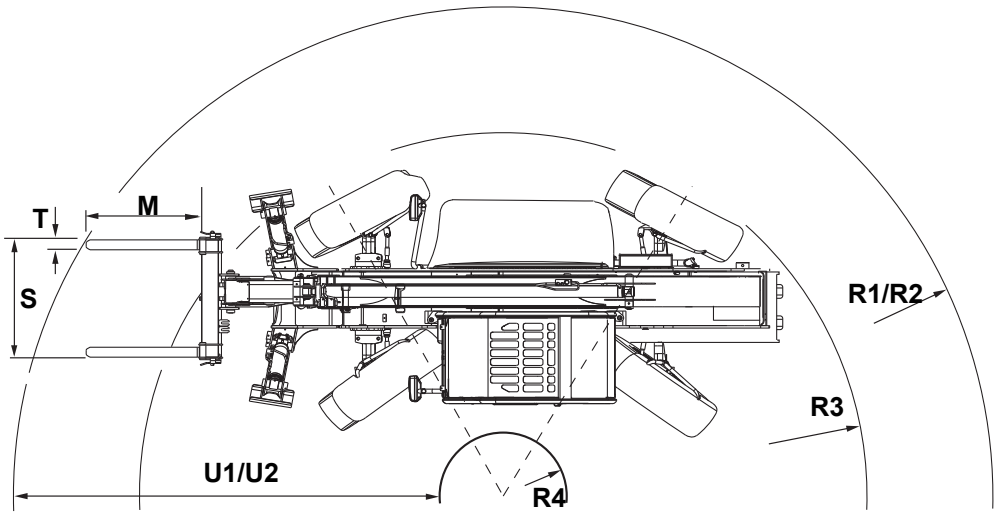

Table 36.

Item	Description	Dimension[1]
M1	Fork length	1,060mm
M2	Fork length	1,200mm
R1	Turn radius over forks at spacing S	5,440mm
R2	Turn radius over forks at spacing S	5,560mm
R3	Outside turn radius over tyres	4,230mm
R4	Inside turn radius to cab	1,460mm
R5	Turn radius over stabilisers	4,090mm
S	Fork spread (max spacing in car-rriage)	1,100mm
T	Fork width	100mm
U1		3,990mm
U2		4,100mm
V1		7,540mm
V2		8,740mm

(1) Dimensions relative to MICHELIN 440/80-24 . POWER CL 168A8 [2 OFFSET]

(For: 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F])

Figure 300.

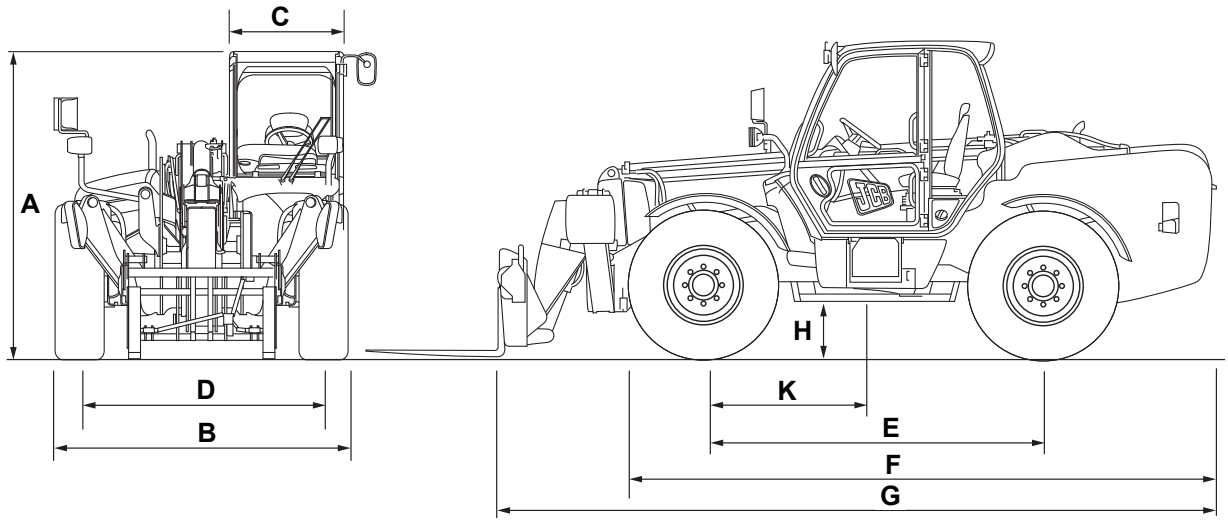

Table 37.

Item	Description	Dimension[1]
A	Overall height	2,600mm
B	Overall width (over tyres)	2,320mm
C	Inside width of cab (between windows)	940mm
D	Front track	1,900mm
E	Wheelbase	2,750mm
F	Overall length to front tyres	4,750mm
G	Overall length to front of carriage	6,230mm
H	Ground clearance	320mm
K	Centre of gravity (unladen)	1,400mm

(1) Dimensions relative to MICHELIN 400/80-24 . POWER CL 162A8 [-32 OFFSET]

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Figure 301.

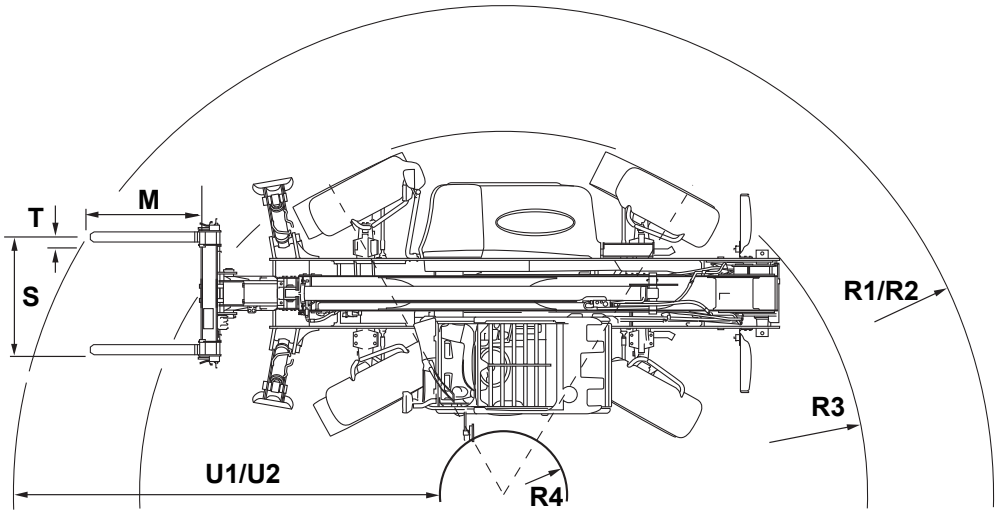

Table 38.

Item	Description	Dimension[1]
M1	Fork length	1,060mm
M2	Fork length	1,200mm
R1	Turn radius over forks at spacing S	5,400mm
R2	Turn radius over forks at spacing S	5,520mm
R3	Outside turn radius over tyres	3,800mm
R4	Inside turn radius to cab	1,100mm
R5	Turn radius over stabilisers	3,620mm
S	Fork spread (max spacing in carriage)	1,230mm
T	Fork width	100mm
U1		4,300mm
U2		4,420mm
V1		7,290mm
V2		8,490mm

(1) Dimensions relative to MICHELIN 400/80-24 . POWER CL 162A8 [-32 OFFSET]

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(For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F])

Figure 302.

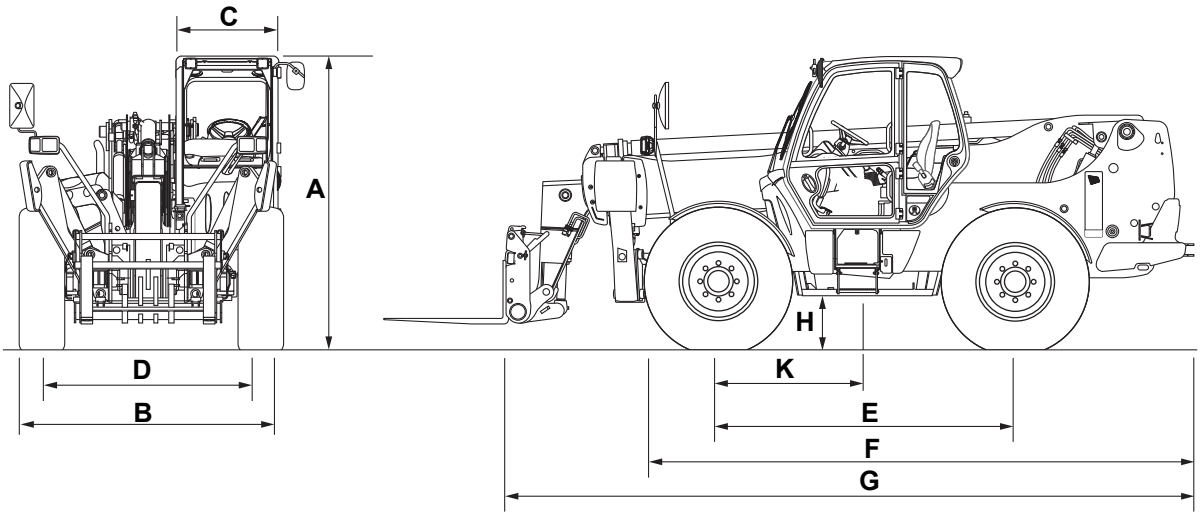

Table 39.

Item	Description	Dimension[1]
A	Overall height	2,740mm
B	Overall width (over tyres)	2,430mm
C	Inside width of cab (between windows)	940mm
D	Front track	1,970mm
E	Wheelbase	2,750mm
F	Overall length to front tyres	4,910mm
G	Overall length to front of carriage	6,690mm
H	Ground clearance	430mm
K	Centre of gravity (unladen)	1,430mm

(1) Dimensions are based on a machine with MICHELIN 440/80-24. POWER CL 168A8 [2 OFFSET]

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Figure 303.

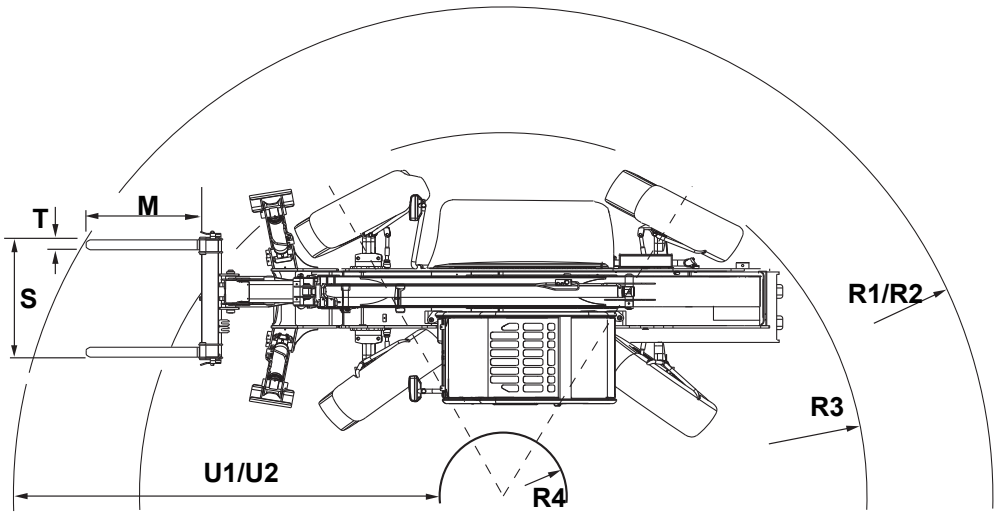

Table 40.

Item	Description	Dimension[1]
M1	Fork length	1,060mm
M2	Fork length	1,200mm
R1	Turn radius over forks at spacing S	5,870mm
R2	Turn radius over forks at spacing S	5,990mm
R3	Outside turn radius over tyres	4,230mm
R4	Inside turn radius to cab	1,460mm
R5	Turn radius over stabilisers	4,210mm
S	Fork spread (max spacing in car-rriage)	1,100mm
T	Fork width	100mm
U1		4,410mm
U2		4,530mm
V1		9,110mm
V2		9,260mm

(1) Dimensions relative to MICHELIN 440/80-24. POWER CL 168A8 [2 OFFSET]

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(For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

Figure 304.

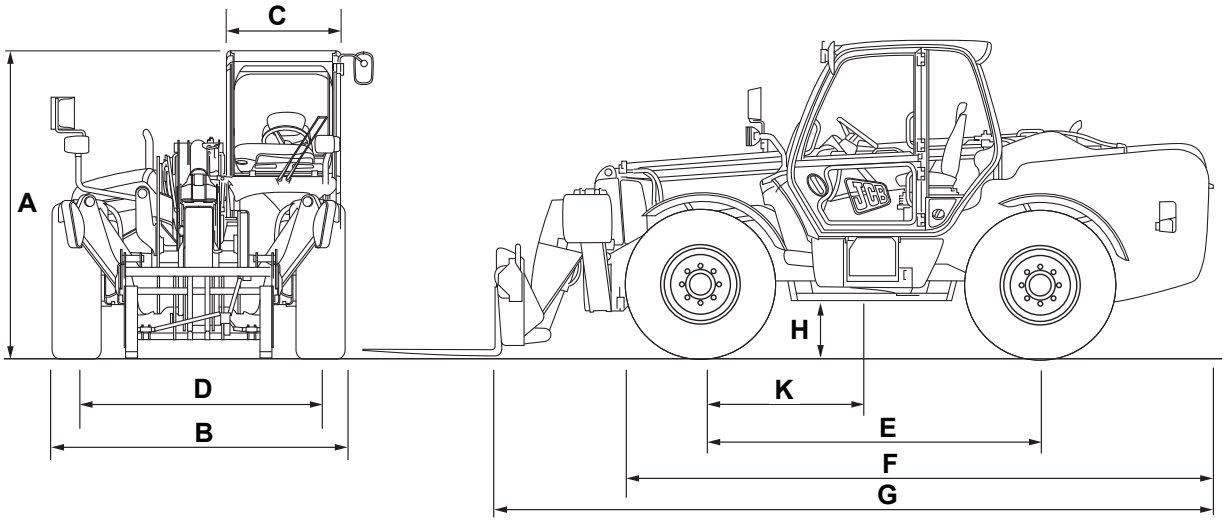

Table 41.

Item	Description	Dimension[1]
A	Overall height	2,700mm
B	Overall width (over tyres)	2,320mm
C	Inside width of cab (between windows)	940mm
D	Front track	1,900mm
E	Wheelbase	2,750mm
F	Overall length to front tyres	4,720mm
G	Overall length to front of carriage	6,260mm
H	Ground clearance	320mm
K	Centre of gravity (unladen)	1,550mm

(1) Dimensions relative to MICHELIN 400/80-24 . POWER CL 162A8 [-32 OFFSET]

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Figure 305.

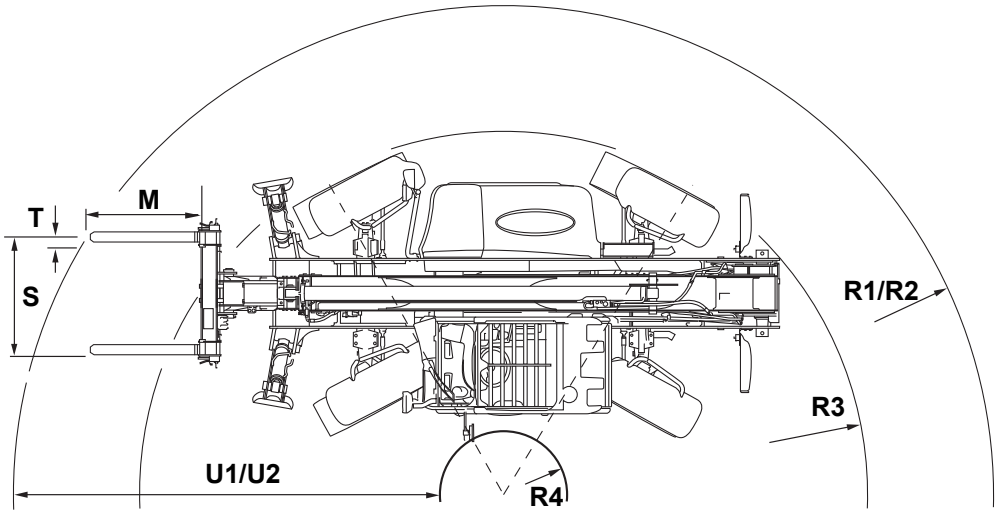

Table 42.

Item	Description	Dimension[1]
M1	Fork length	1,060mm
M2	Fork length	1,200mm
R1	Turn radius over forks at spacing S	5,380mm
R2	Turn radius over forks at spacing S	5,500mm
R3	Outside turn radius over tyres	3,800mm
R4	Inside turn radius to cab	1,060mm
R5	Turn radius over stabilisers	3,700mm
S	Fork spread (max spacing in carriage)	1,100mm
T	Fork width	100mm
U1		4,320mm
U2		4,440mm
V1		7,310mm
V2		8,510mm

(1) Dimensions relative to MICHELIN 400/80-24 . POWER CL 162A8 [-32 OFFSET]

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(For: 533-105 [T4F 3L], 533-105 [T4F])

Figure 306.

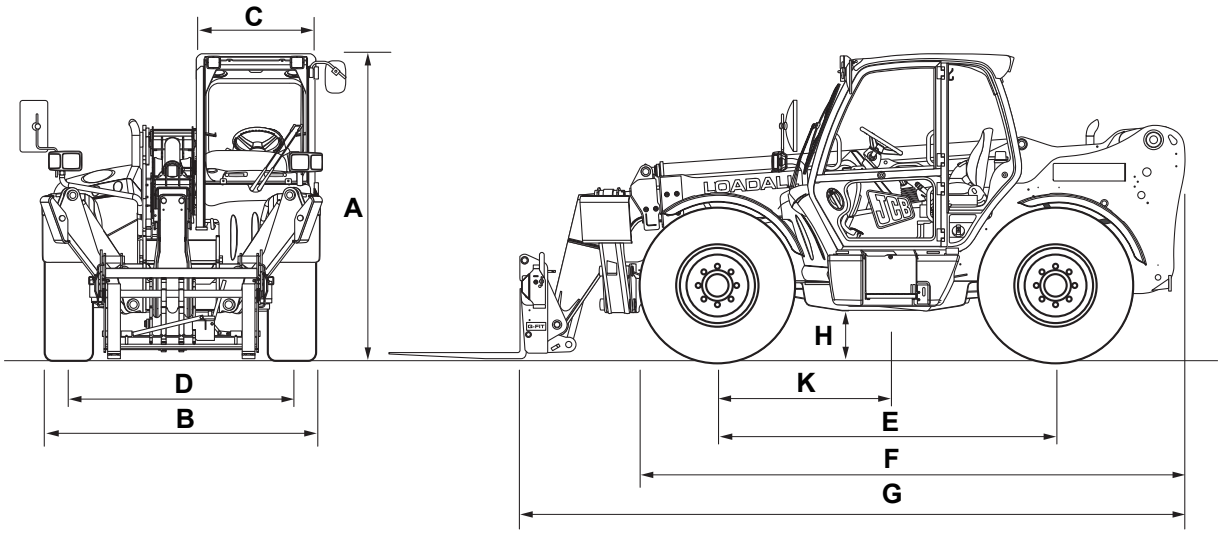

Table 43.

Item	Description	Dimension[1]
A	Overall height	2,500mm
B	Overall width (over tyres)	2,280mm
C	Inside width of cab (between windows)	940mm
D	Front track	1,870mm
E	Wheelbase	2,750mm
F	Overall length to front tyres	4,410mm
G	Overall length to front of carriage	5,470mm
H	Ground clearance	370mm
K	Centre of gravity (unladen)	1,300mm

(1) Dimensions relative to MICHELIN 400/80-24 . POWER CL 162A8 [15 OFFSET]

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Figure 307.

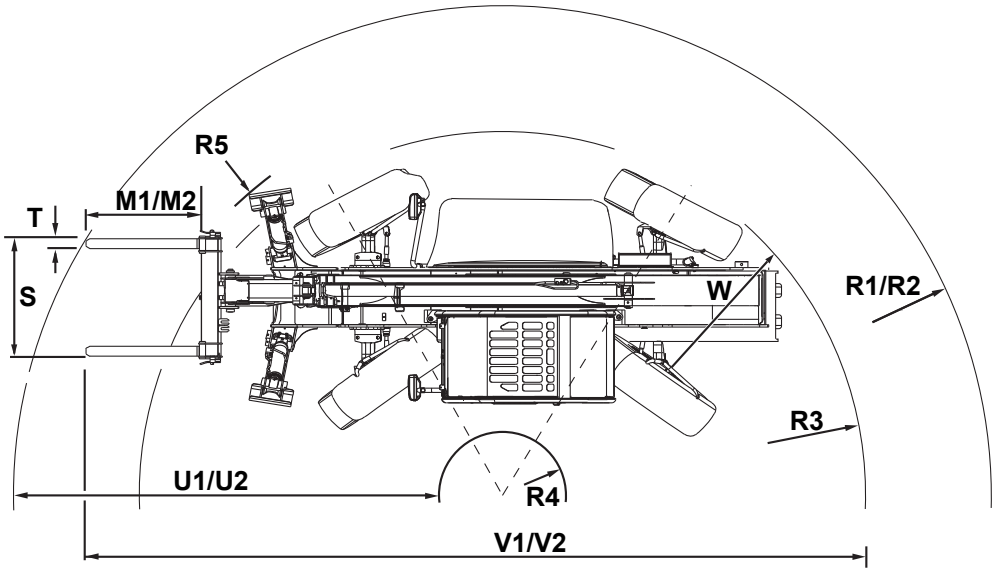

Table 44.

Item	Description	Dimension[1]
M1	Fork length	1,060mm
M2	Fork length	1,200mm
R1	Turn radius over forks at spacing S	5,000mm
R2	Turn radius over forks at spacing S	5,120mm
R3	Outside turn radius over tyres	3,720mm
R4	Inside turn radius to cab	1,100mm
R5	Turn radius over stabilisers	3,950mm
S	Fork spread (max spacing in car-rriage)	1,220mm
T	Fork width	100mm
U1		3,900mm
U2		4,020mm
V1		6,780mm
V2		7,980mm

(1) Dimensions relative to MICHELIN 400/80-24 . POWER CL 162A8 [15 OFFSET]

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Weights

For: 550-140 [T4F], 550-140 [UN3/GB3] ..... Page 310
For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 550-170 [T4F] ..... Page 310
For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3] ..... Page 310
For: 535V140 [T4F] ..... Page 310
For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F] ..... Page 311
For: 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F] ..... Page 311
For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 311
For: 533-105 [T4F 3L], 533-105 [T4F] ..... Page 311

(For: 550-140 [T4F], 550-140 [UN3/GB3])

The figures stated above are measured with the boom horizontal and in the retracted position with the forks horizontal and no operator.

Table 45.

Wheel Load		Total	Lift Capacity	Axle Load at Maximum Lift Capacity		Total
Front	Rear			Front	Rear	
4,757kg	6,022kg	10,779kg	4,000kg	12,029kg	2,750kg	14,779kg

(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 550-170 [T4F])

The figures stated above are measured with the boom horizontal and in the retracted position with the forks horizontal and no operator.

Table 46.

Wheel Load		Total	Lift Capacity	Axle Load at Maximum Lift Capacity		Total
Front	Rear			Front	Rear	
5,377kg	6,924kg	12,301kg	4,000kg	13,073kg	3,228kg	16,301kg

(For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3])

The figures stated above are measured with the boom horizontal and in the retracted position with the forks horizontal and no operator.

Table 47.

Wheel Load		Total	Lift Capacity	Axle Load at Maximum Lift Capacity		Total
Front	Rear			Front	Rear	
4,976kg	5,082kg	10,058kg	3,500kg	11,328kg	2,230kg	13,558kg

(For: 535V140 [T4F])

The figures stated above are measured with the boom horizontal and in the retracted position with the forks horizontal and no operator.

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Table 48.

Wheel Load		Total	Lift Capacity	Axle Load at Maximum Lift Capacity		Total
Front	Rear			Front	Rear	
4,943kg	6,145kg	11,088kg	3,500kg	11,868kg	2,720kg	14,588kg

(For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F])

The figures are based on the machine operating mass defined by ISO 6016:2008, describes the operating mass.

The base machine mass with equipment and empty attachment in the most usual configuration (machine with forks, with the boom in the load carrying position, boom fully retracted, fork heel 300mm above the ground), including a 75kg operator, a full fuel tank and all operating fluids (hydraulic oil, transmission oil, engine oil, engine coolant, Adblue/DEF etc.) at the level specified by the manufacturer.

Table 49.

Wheel Load		Total	Lift Capacity	Axle Load at Maximum Lift Capacity		Total
Front	Rear			Front	Rear	
6,216kg	7,036kg	13,252kg	4,000kg	14,480kg	2,667kg	17,147kg

(For: 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F])

The figures stated above are measured with the boom horizontal and in the retracted position with the forks horizontal and no operator.

Table 50.

Wheel Load		Total	Lift Capacity	Axle Load at Maximum Lift Capacity		Total
Front	Rear			Front	Rear	
5,325kg	6,045kg	11,370kg	4,000kg	13,140kg	2,230kg	15,370kg

(For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

The figures below are based on the machine operating mass as defined by ISO 6016:2008, describing operating mass as;

The base machine mass with equipment and empty attachment in the most usual configuration (machine with forks, with the boom in the load carrying position, boom fully retracted, fork heel 30mm above the ground), including a 75kg operator, a full fuel tank and all operating fluids (hydraulic oil, transmission oil, engine oil, engine coolant, Adblue/DEF etc.) at the level specified by the manufacturer.

Table 51.

Axle Load		Total	Lift Capacity	Axle Load at Maximum Lift Capacity		Total
Front	Rear			Front	Rear	
5,065kg	6,310kg	11,375kg	4,000kg	13,045kg	2,330kg	15,375kg

(For: 533-105 [T4F 3L], 533-105 [T4F])

The figures stated above are measured with the boom horizontal and in the retracted position with the forks horizontal and no operator.

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Table 52.

Wheel Load		Total	Lift Capacity	Axle Load at Maximum Lift Capacity		Total
Front	Rear			Front	Rear	
4,620kg	4,160kg	8,780kg	3,300kg	10,550kg	1,530kg	12,080kg

Visibility Diagrams

For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3] ..... Page 314
For: 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F] ..... Page 317
For: 550-140 [T4F], 550-140 [UN3/GB3] ..... Page 320
For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 550-170 [T4F] ..... Page 323
For: 533-105 [T4F 3L], 533-105 [T4F] ..... Page 326
For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F] ..... Page 329
For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 334

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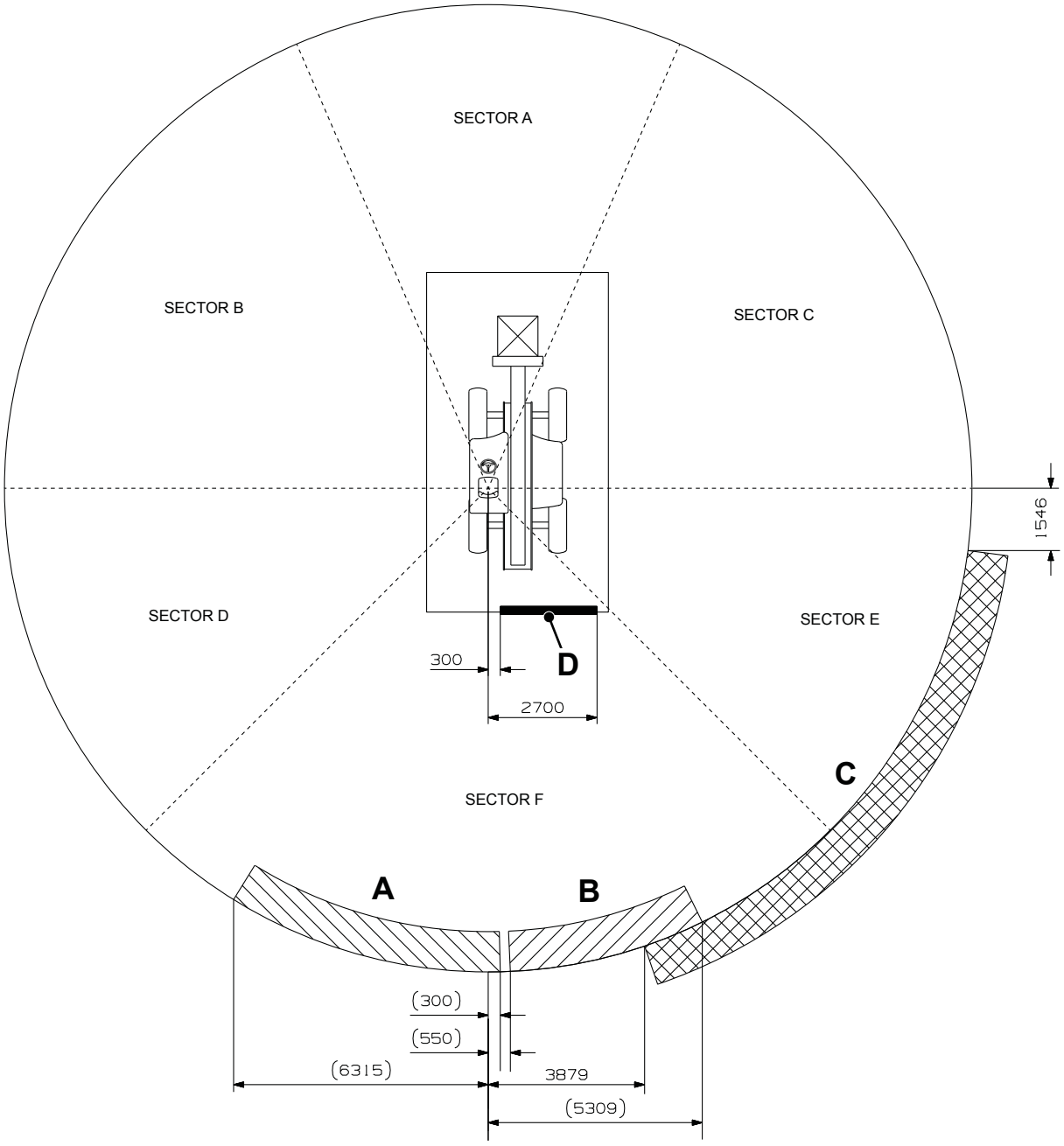
(For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3])

Figure 308. Mirror Setup



A Left hand mirror
B Right hand mirror
C Right hand wide angle
D Rear mounted wide angle

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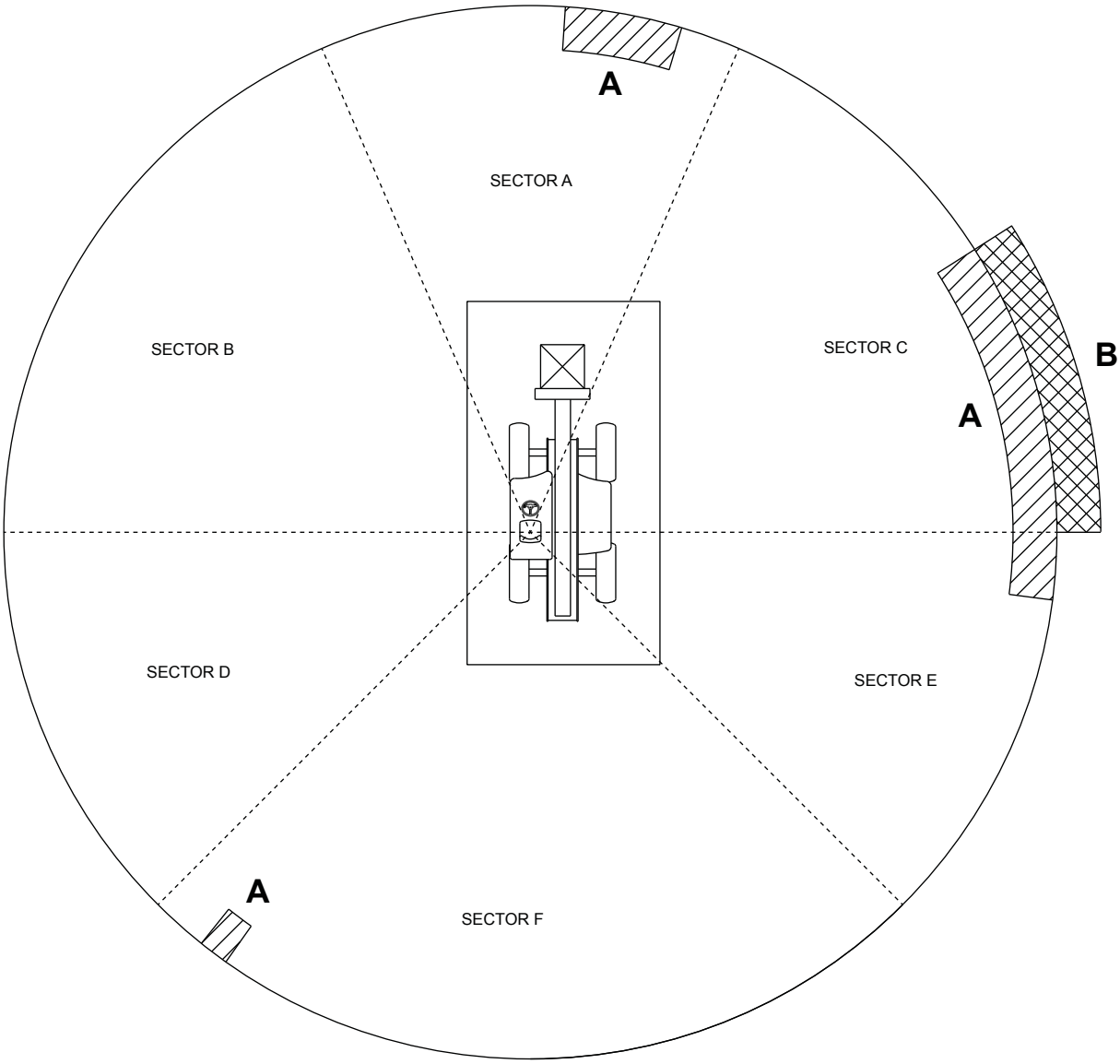
Figure 309. Visibility Masking in Suspended Load Condition



A Masking at 12m radius measured at ground level

B Masking at 12m radius measured at 0.75m above ground level

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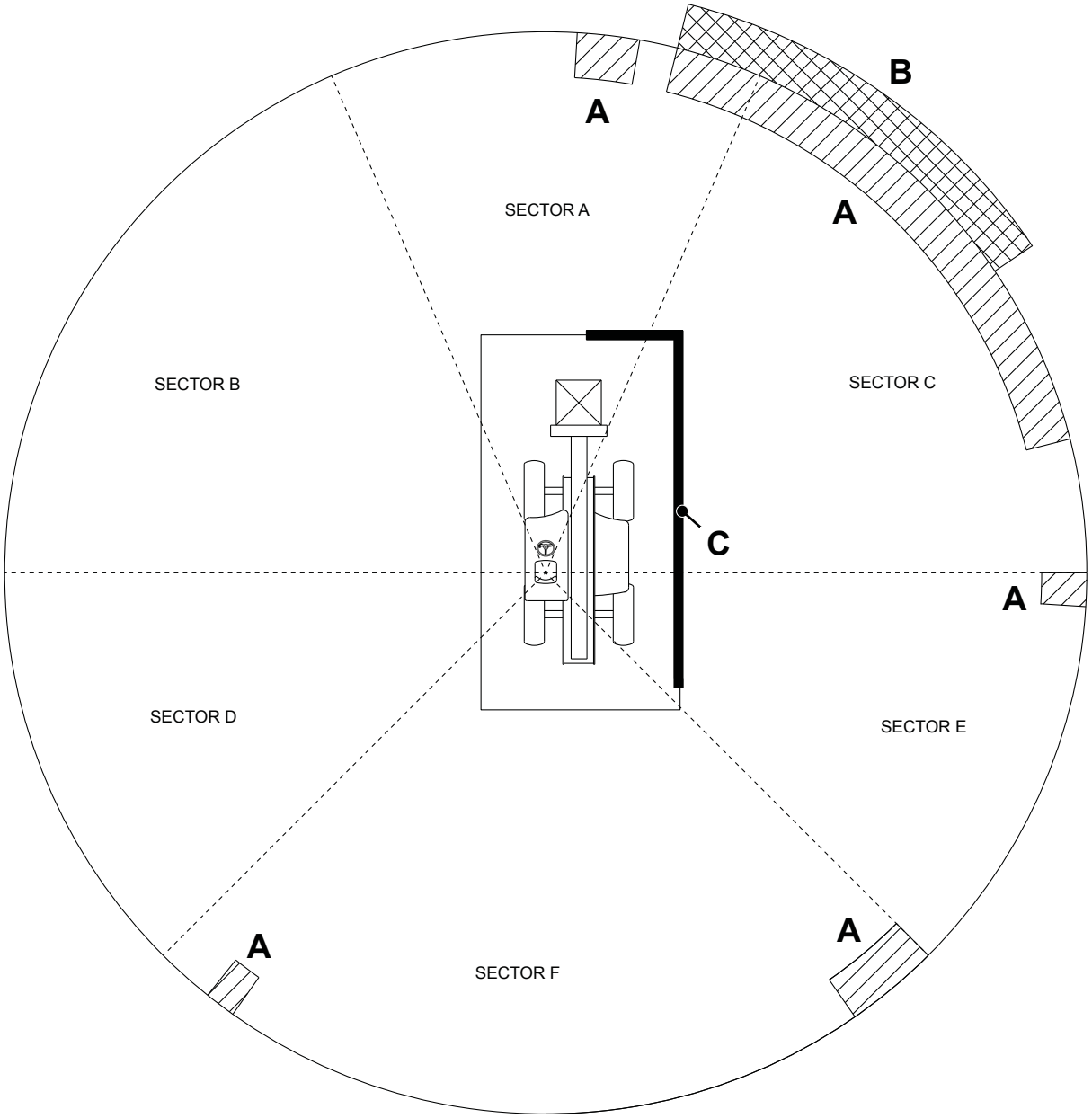
Figure 310. Visibility Masking in Lorry Trailer Loading Condition



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 measured between ground level and 1.5m above ground level

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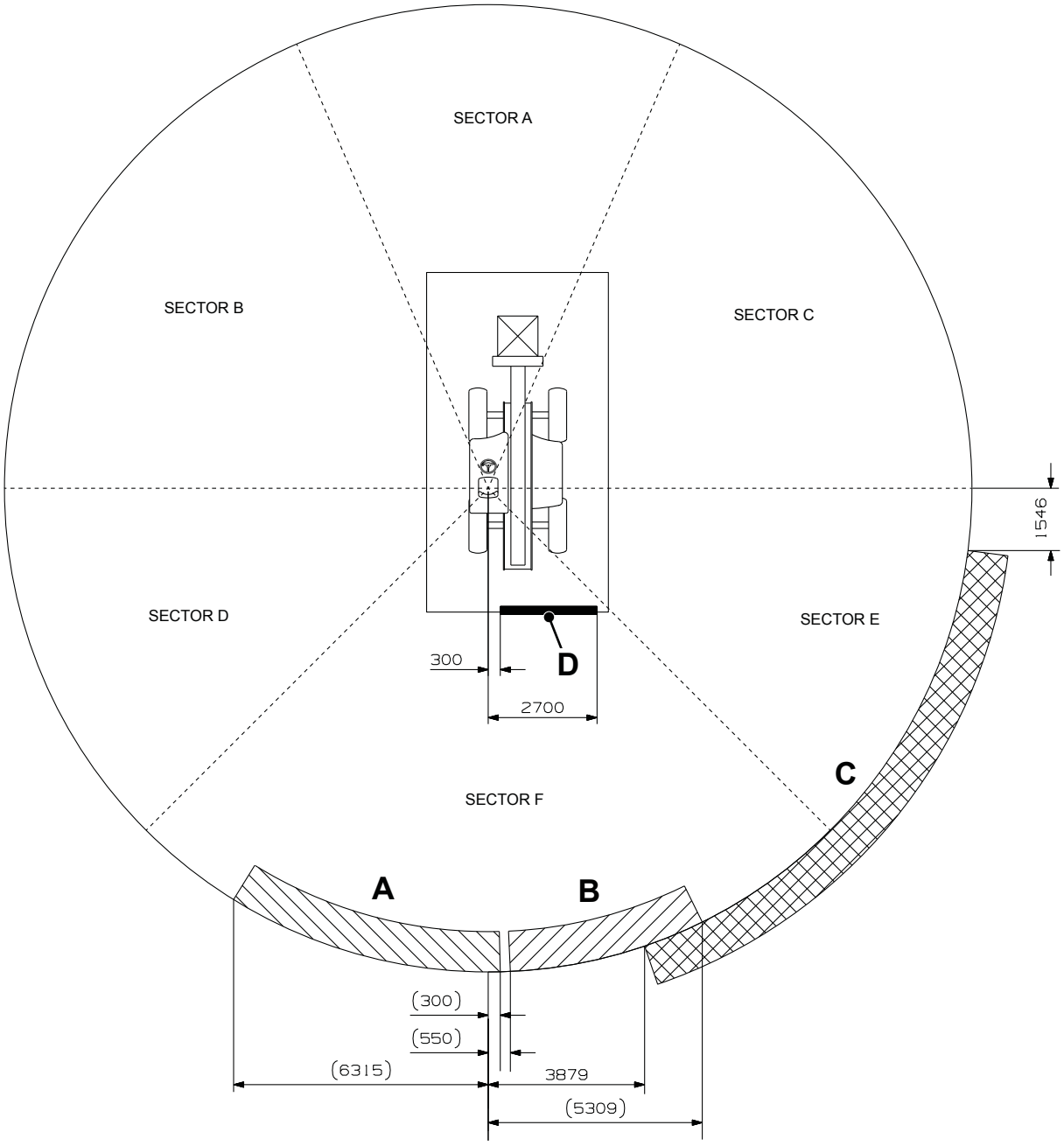
(For: 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F])

Figure 311. Mirror Setup



A Left hand mirror
B Right hand mirror
C Right hand wide angle
D Rear mounted wide angle

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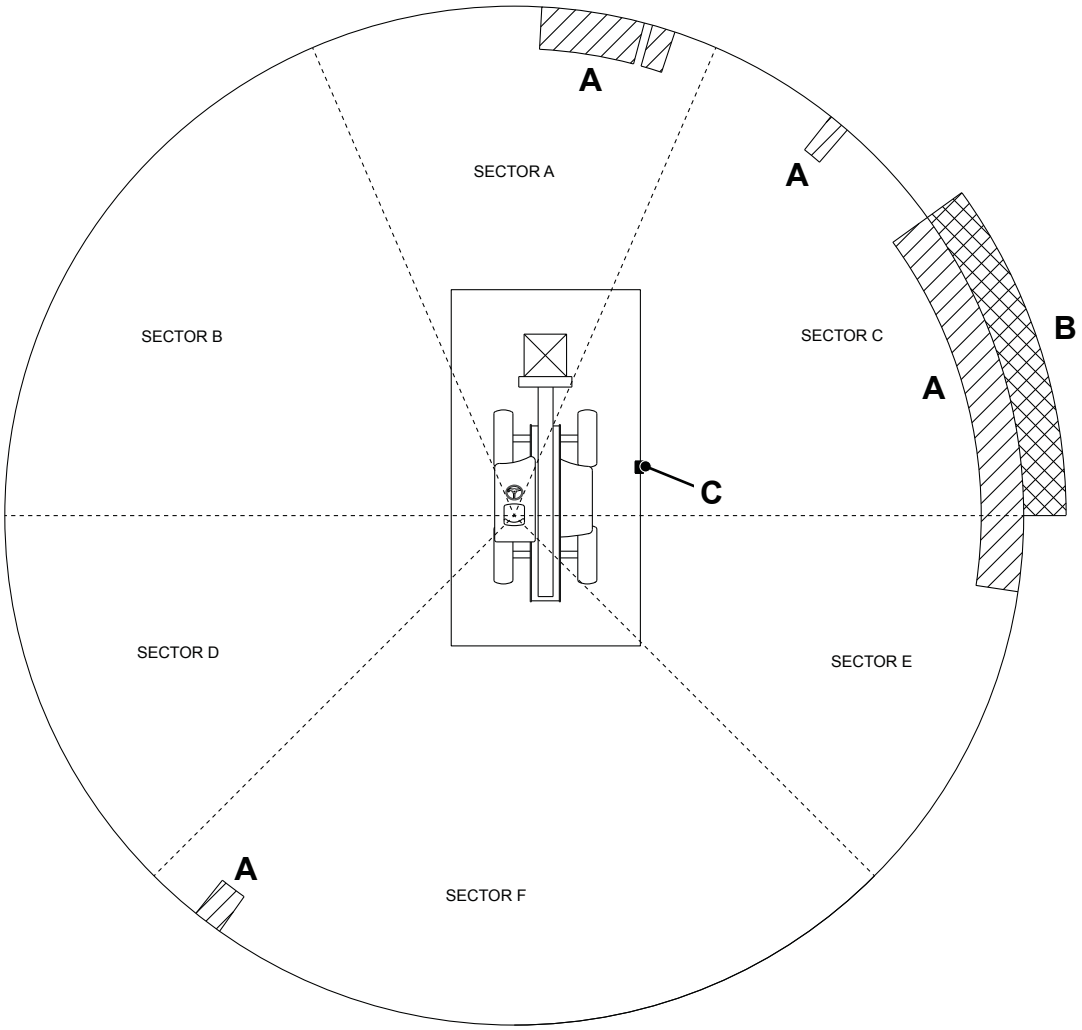
Figure 312. Visibility Masking in Suspended Load Condition



A Masking at 12m radius measured at ground level

B Masking at 12m radius measured at 0.75m above ground level

C Masking at 1m boundary measured between ground level and 1.5m above ground level

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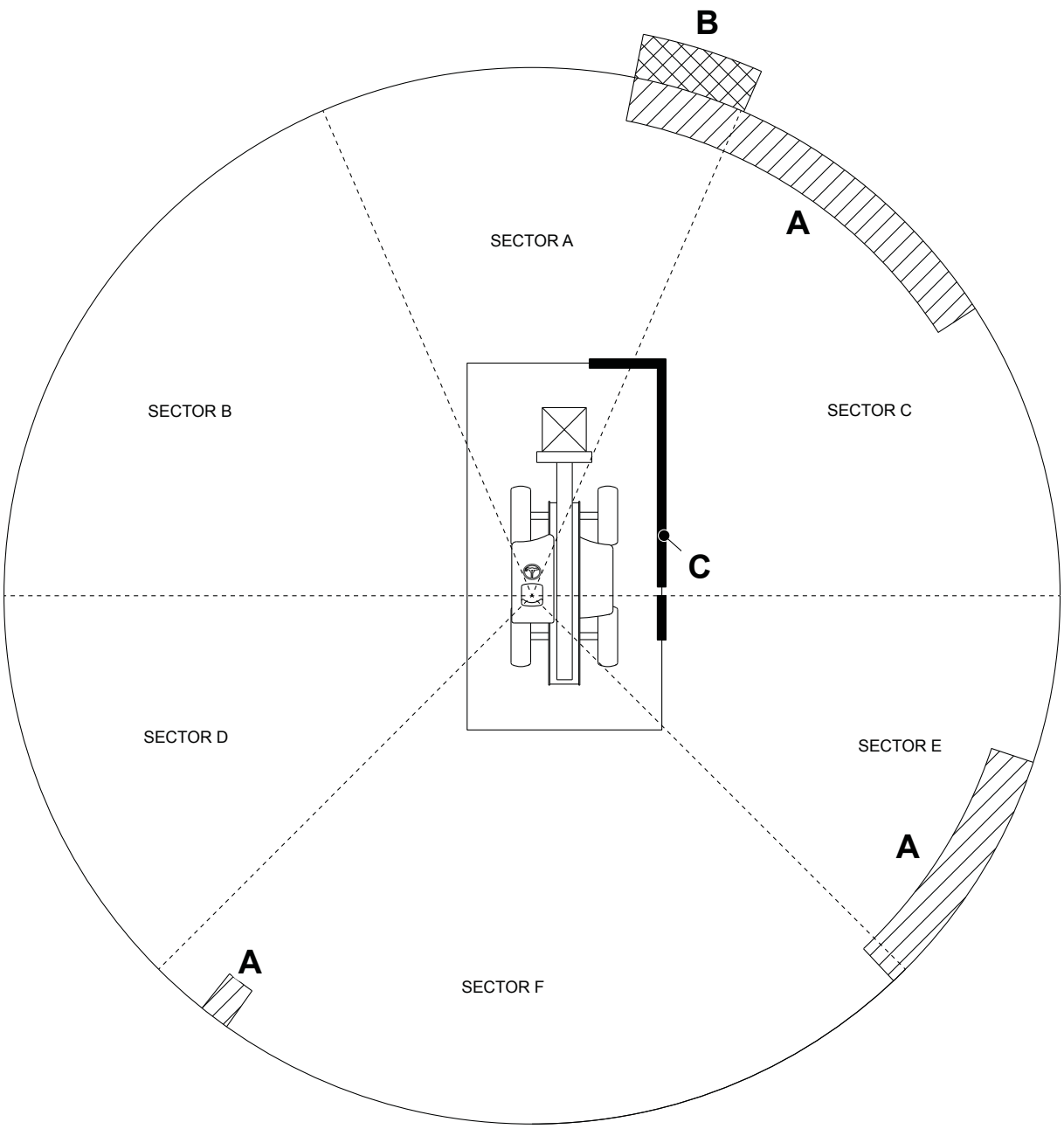
Figure 313. Visibility Masking in Lorry Trailer Loading Condition



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 measured between ground level and 1.5m above ground level

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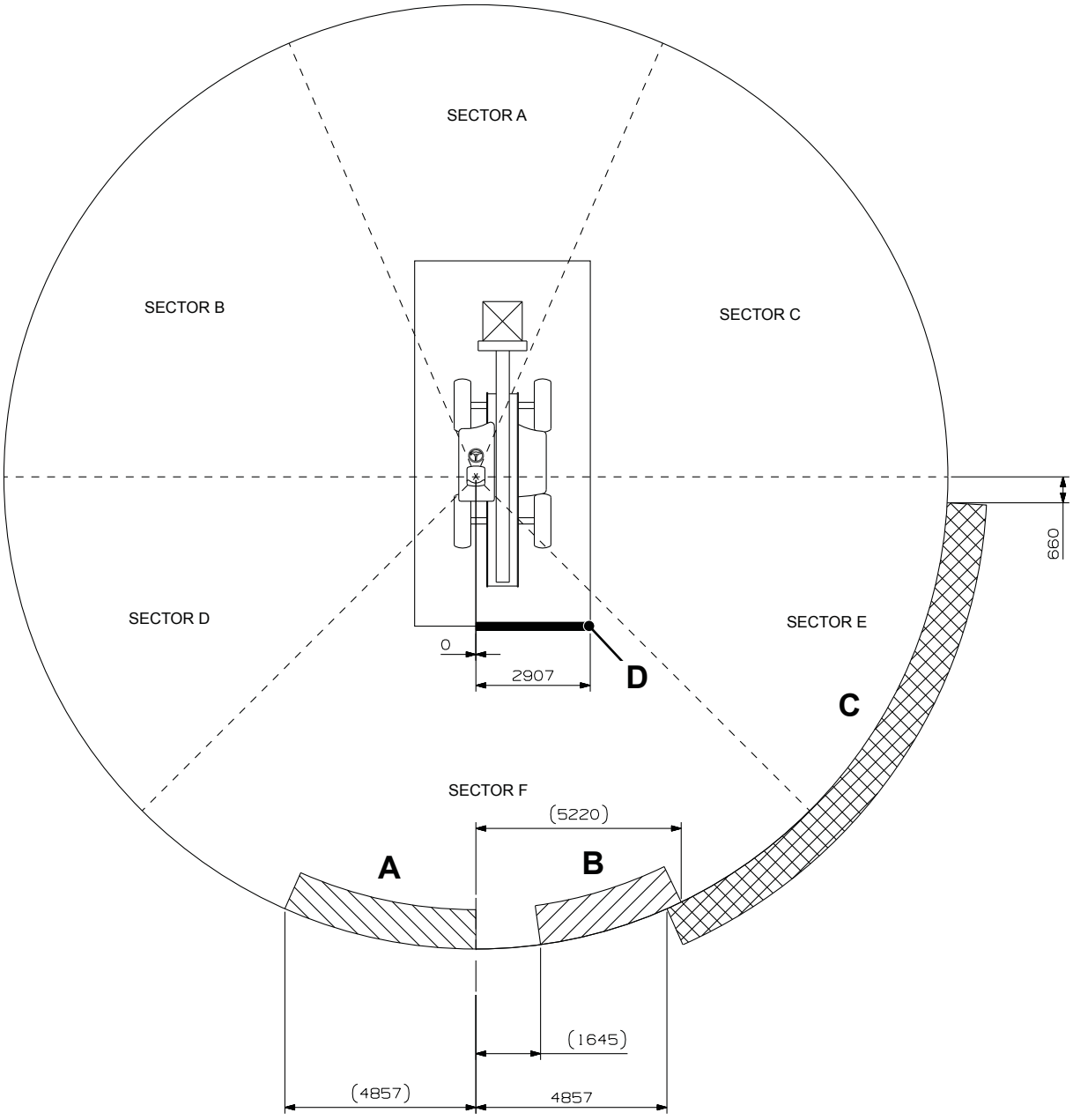
(For: 550-140 [T4F], 550-140 [UN3/GB3])

Figure 314. Mirror Setup



A Left hand mirror
B Right hand mirror
C Right hand wide angle
D Rear mounted wide angle

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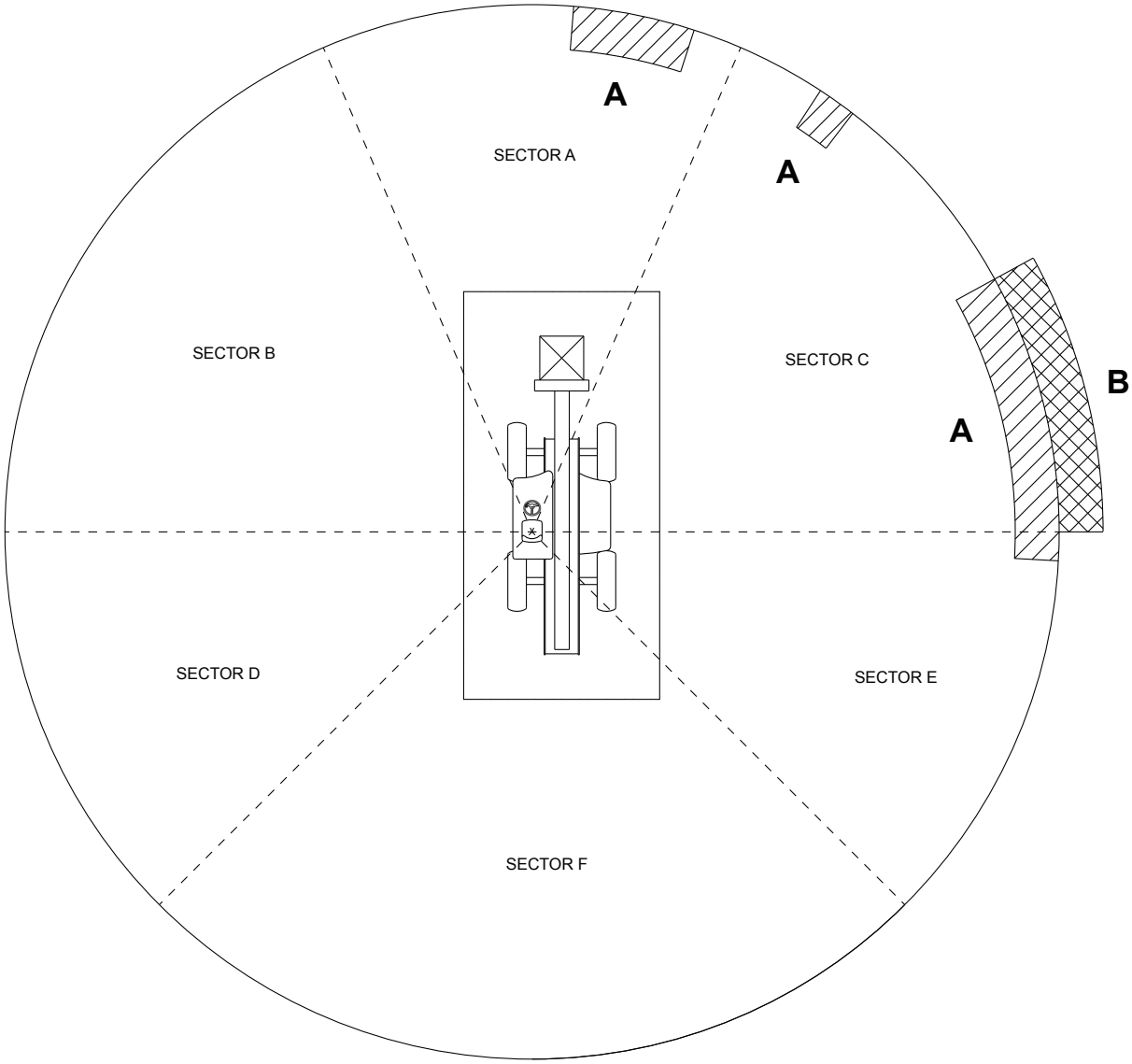
Figure 315. Visibility Masking in Suspended Load Condition



A Masking at 12m radius measured at ground level

B Masking at 12m radius measured at 0.75m above ground level

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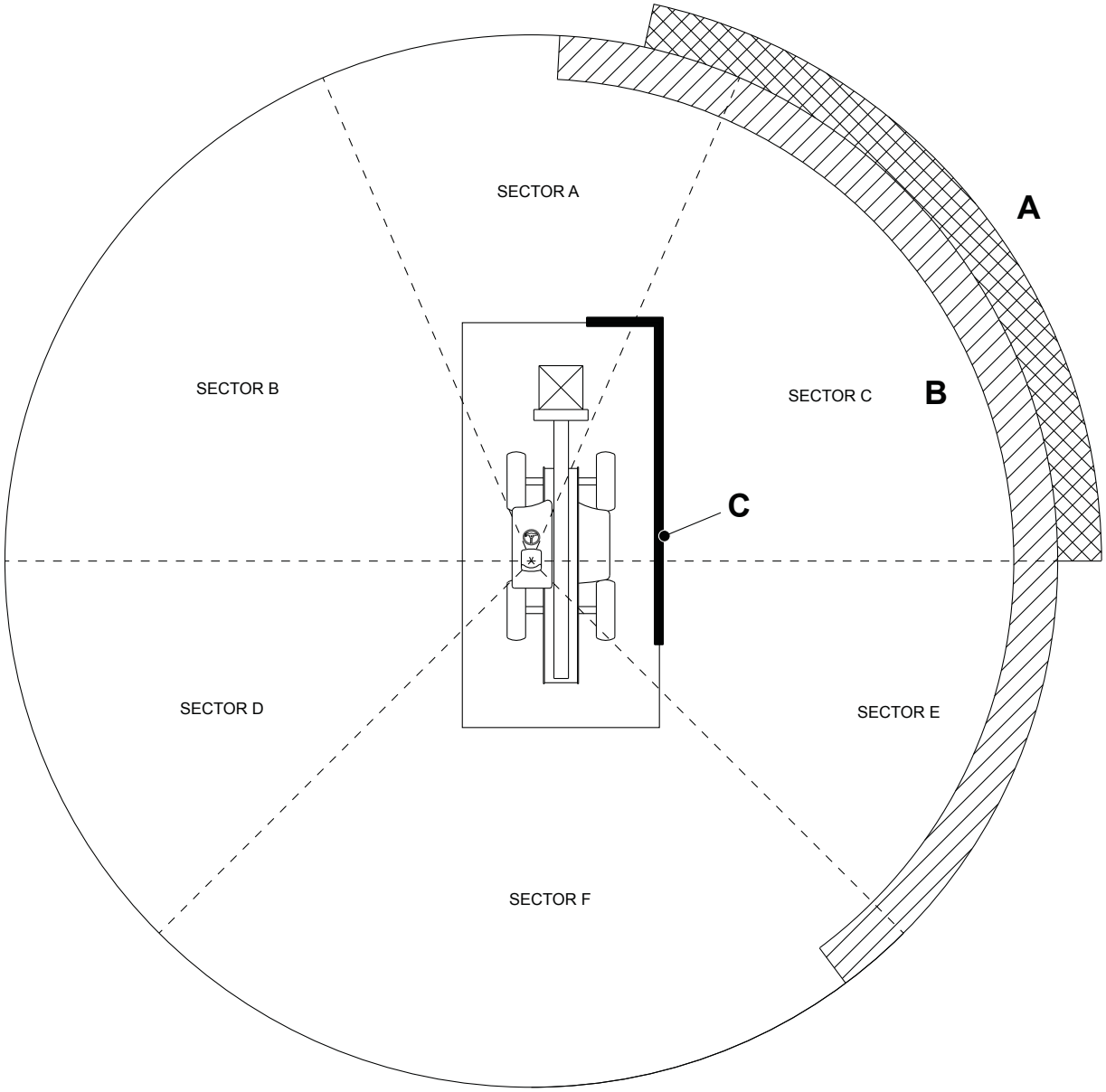
Figure 316. Visibility Masking in Lorry Trailer Loading Condition



A Masking at 12m radius measured at 0.75m ground level

B Masking at 12m radius measured at ground level

C Masking at 1m (>200mm) measured between ground level and 1.5m above ground level

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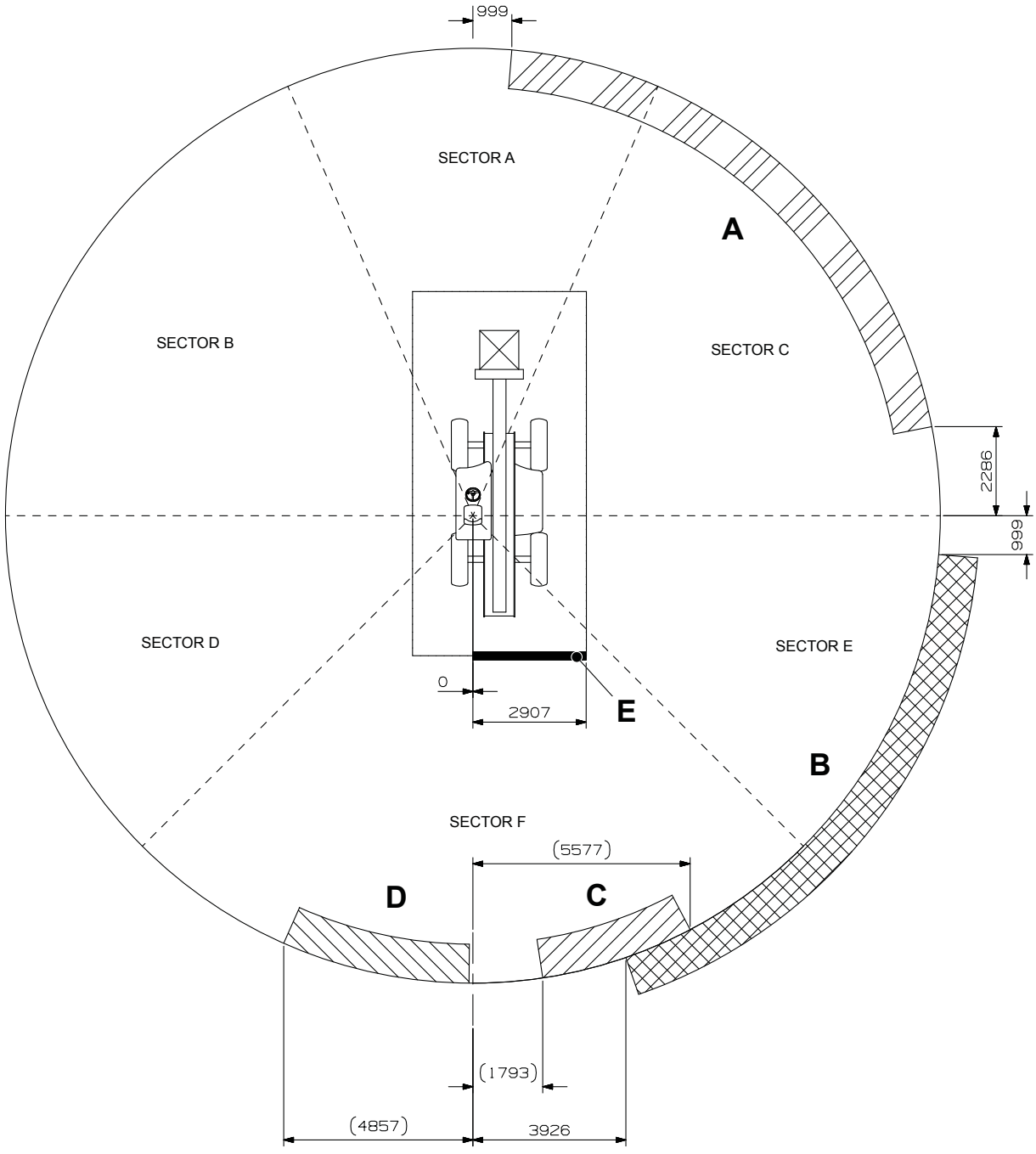
(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 550-170 [T4F])

Figure 317. Mirror Setup



A Left hand wide angle
B Right hand wide angle
C Right hand road mirror
D Left hand road mirror
E Rear mounted wide angle

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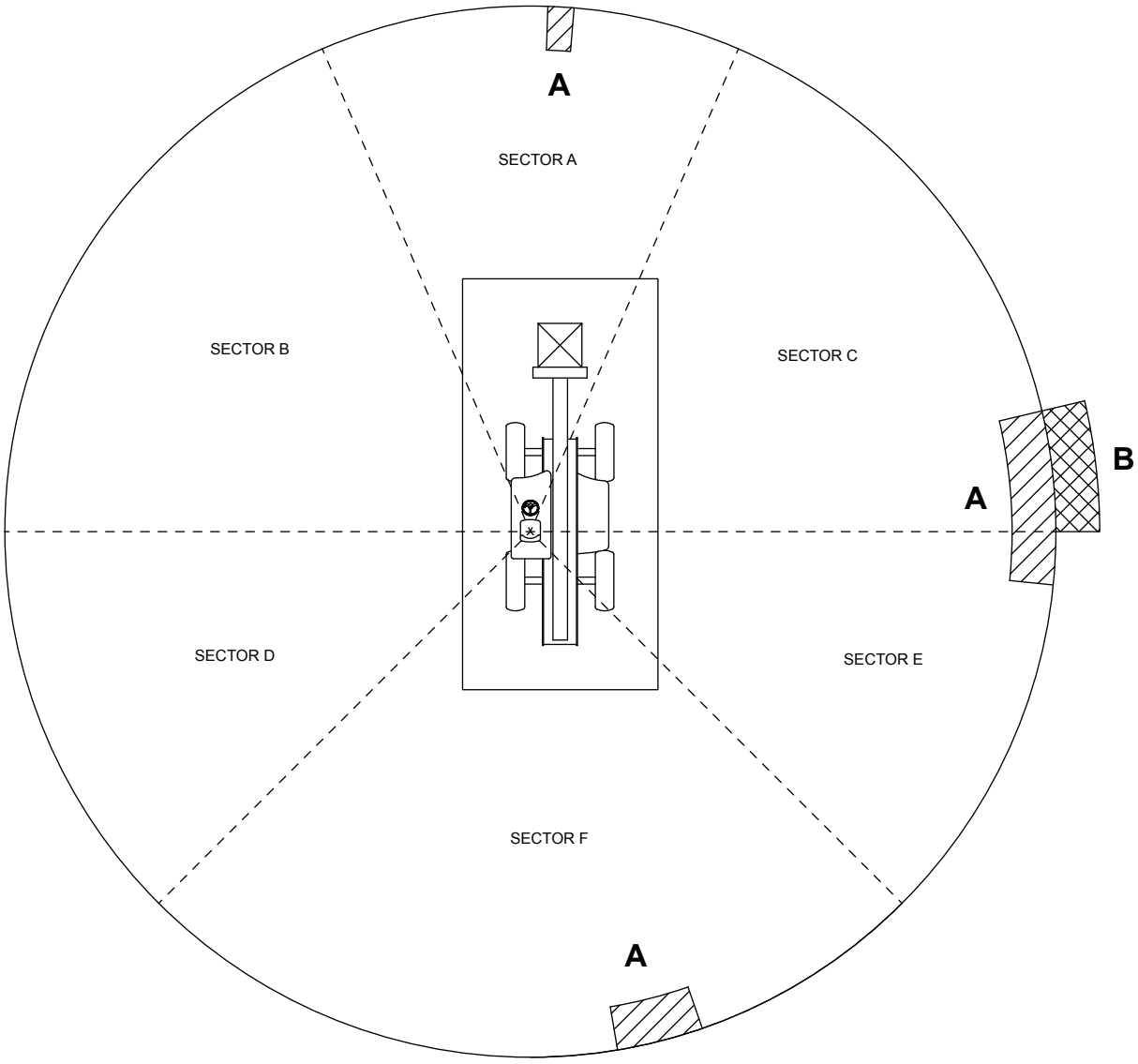
Figure 318. Visibility Masking in Suspended Load Condition



A Masking at 12m radius measured at ground level

B Masking at 12m radius measured at 0.75m above ground level

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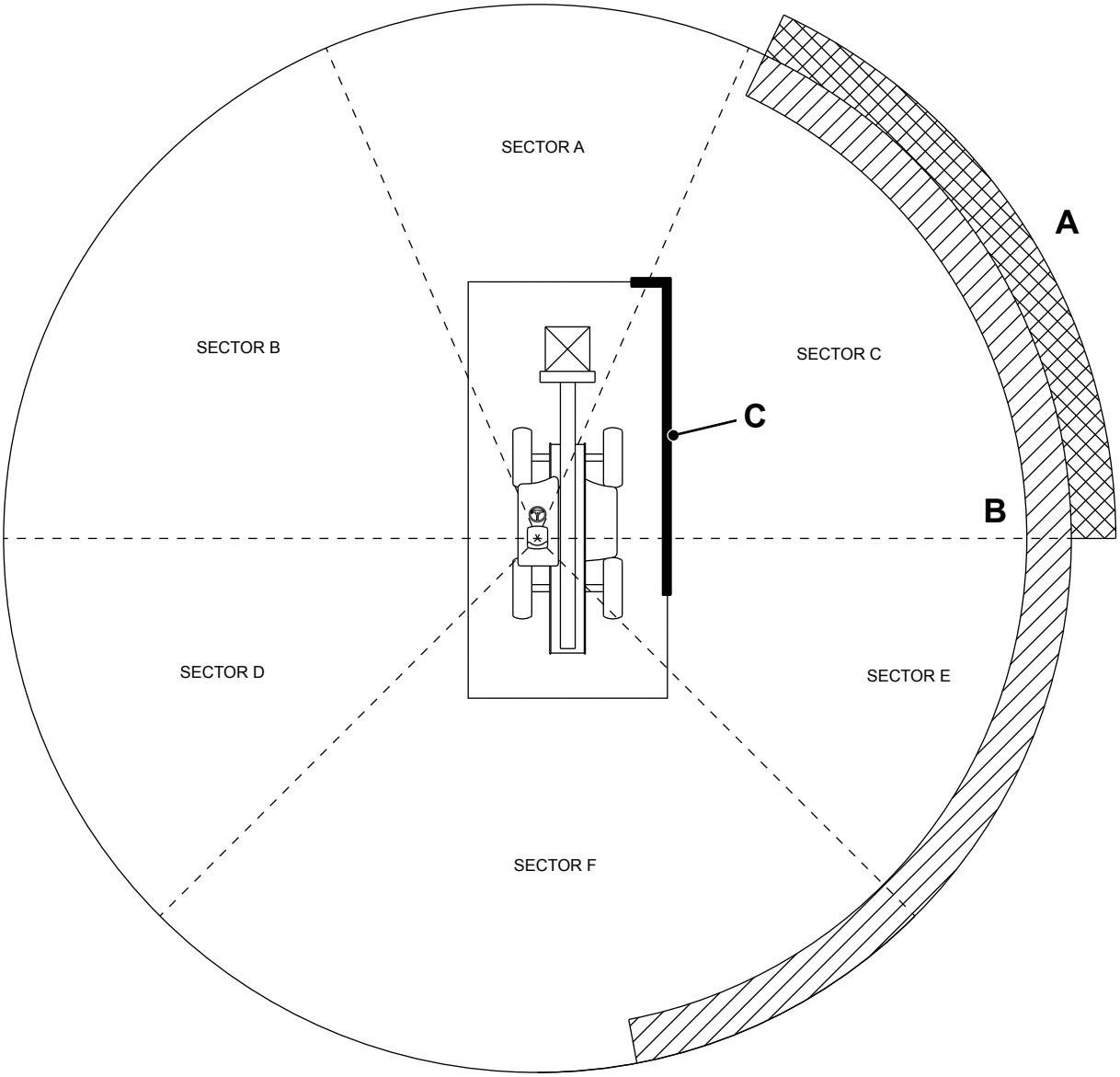
Figure 319. Visibility Masking in Lorry Trailer Loading Condition



A Masking at 12m radius measured at 0.75m above ground level

B Masking at 12m radius measured at ground level

C Masking at 1m boundary (>200mm) measured between ground level and 1.5m above ground level

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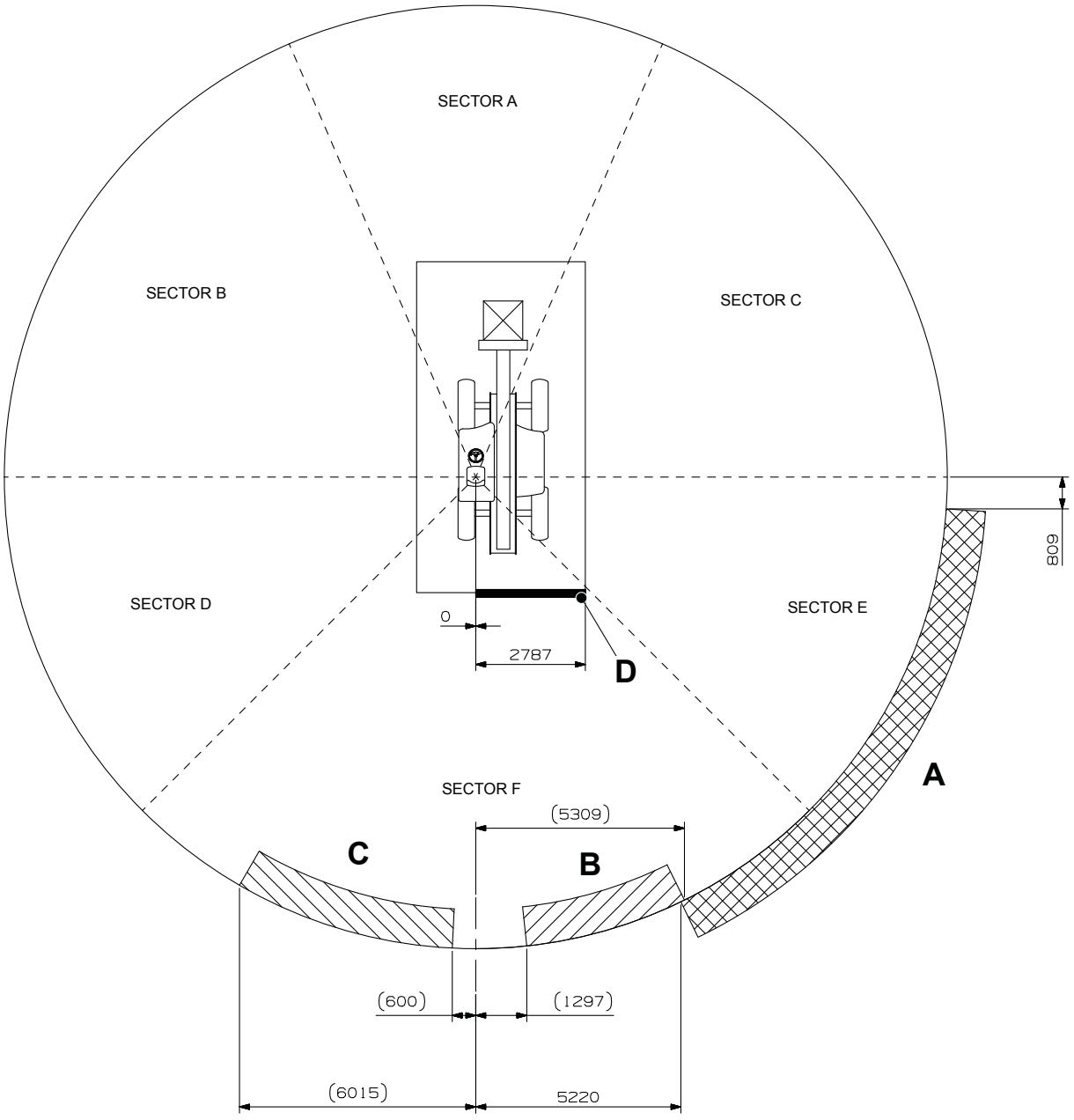
(For: 533-105 [T4F 3L], 533-105 [T4F])

Figure 320. Mirror Setup



A Left hand wide angle
B Right hand wide angle
C Right hand road mirror
D Left hand road mirror

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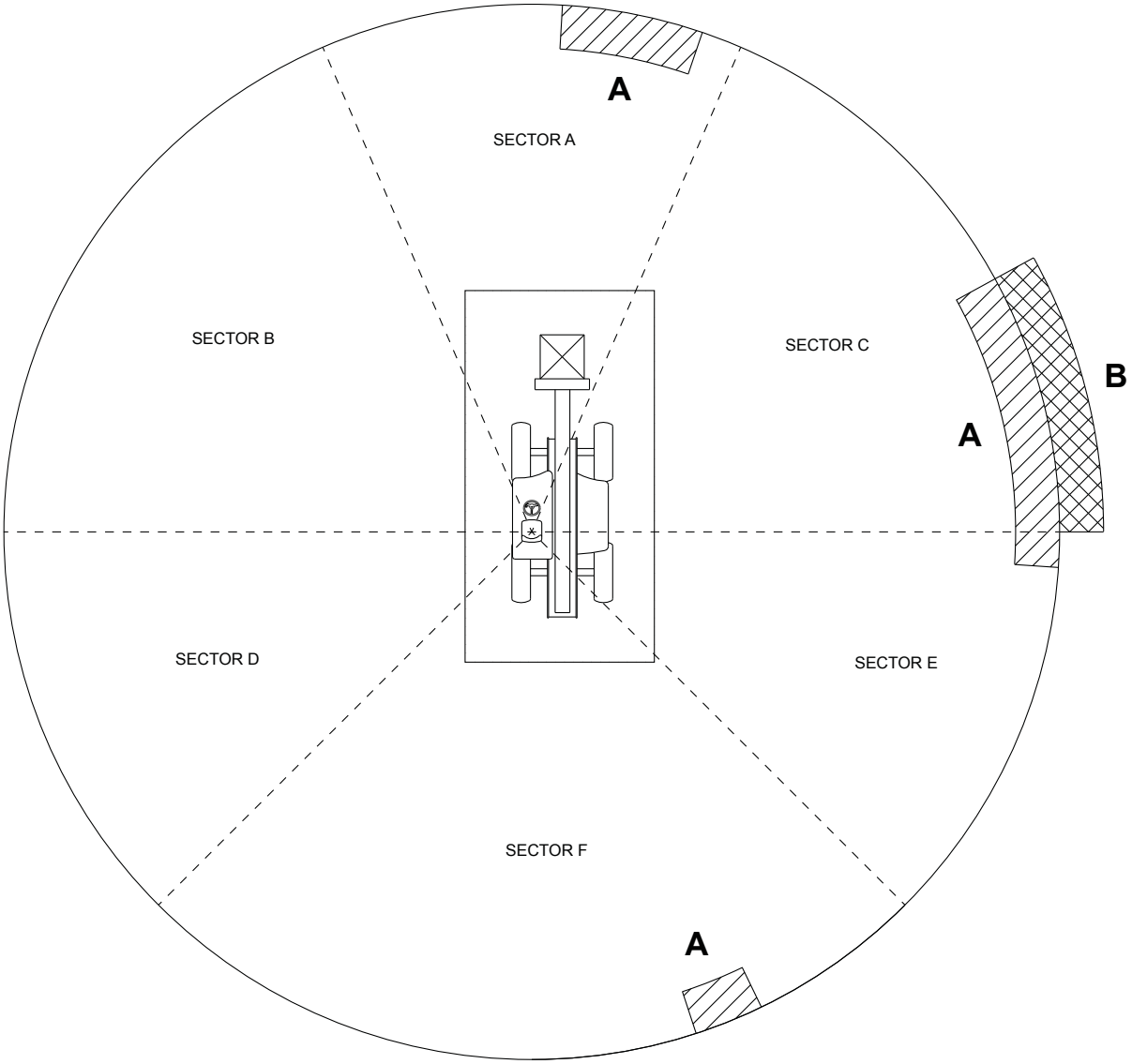
Figure 321. Visibility Masking in Suspended Load Condition



A Masking at 12m radius measured at ground level

B Masking at 12m radius measured at 0.75m above ground level

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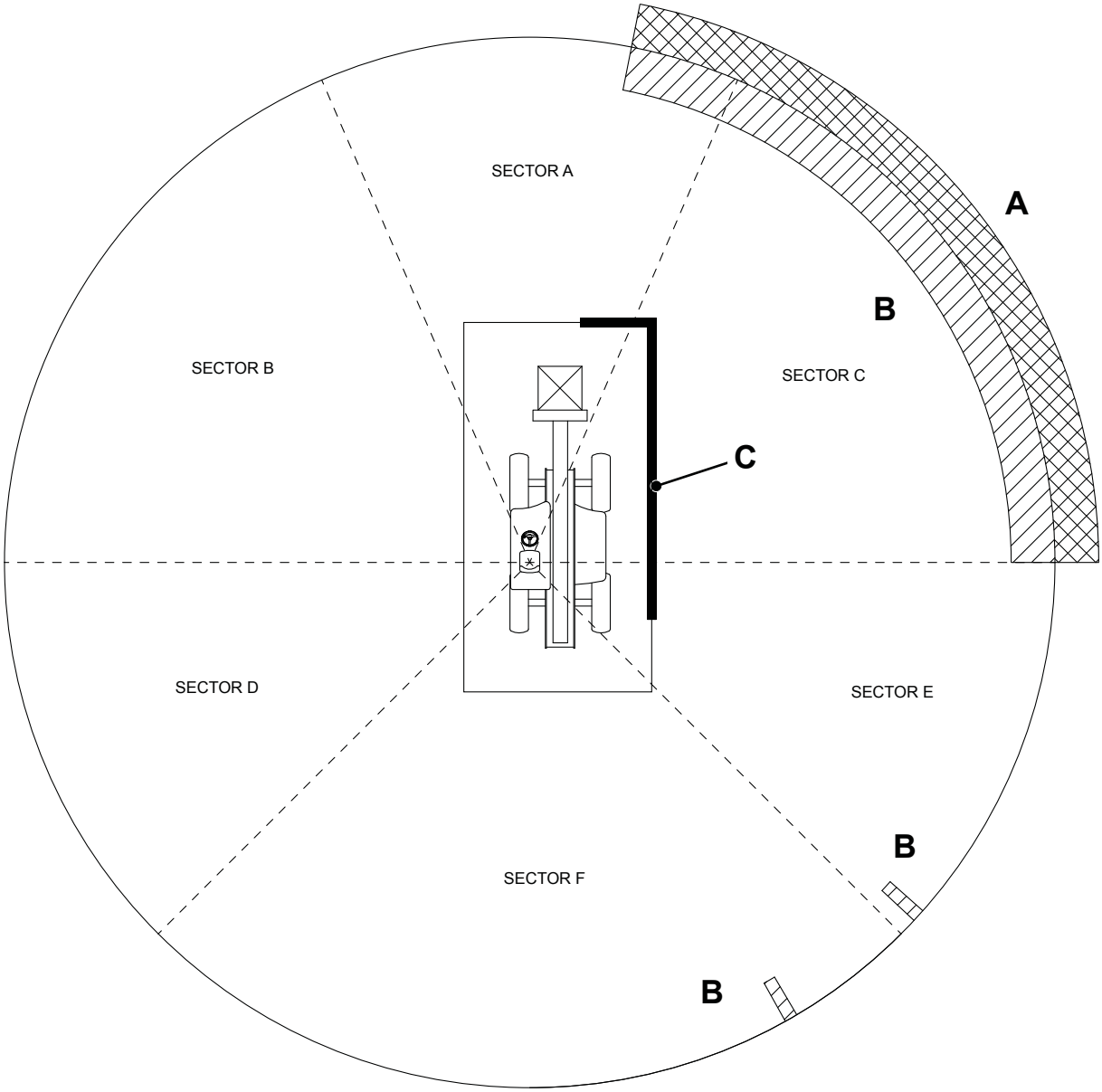
Figure 322. Visibility Masking in Lorry Trailer Loading Condition



A Masking at 12m radius measured at 0.75m above ground level

B Masking at 12m radius measured at ground level

C Masking at 1m boundary (>200mm) measured between ground level and 1.5m above ground level

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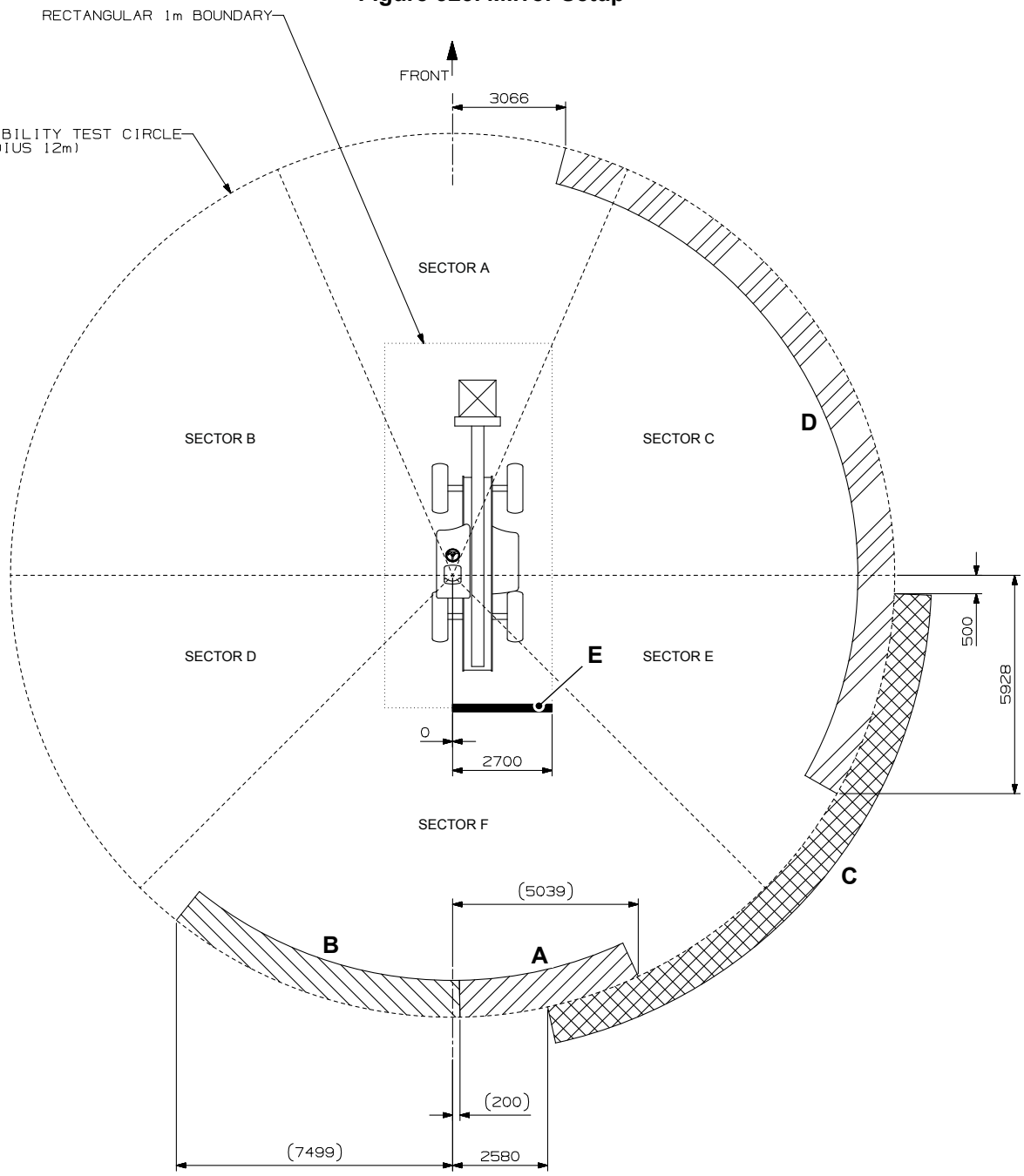
(For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F])

Figure 323. Mirror Setup



A Right hand road mirror
B Left hand road mirror
C Right hand wide angle
D Left hand wide angle
E Rear mounted wide angle

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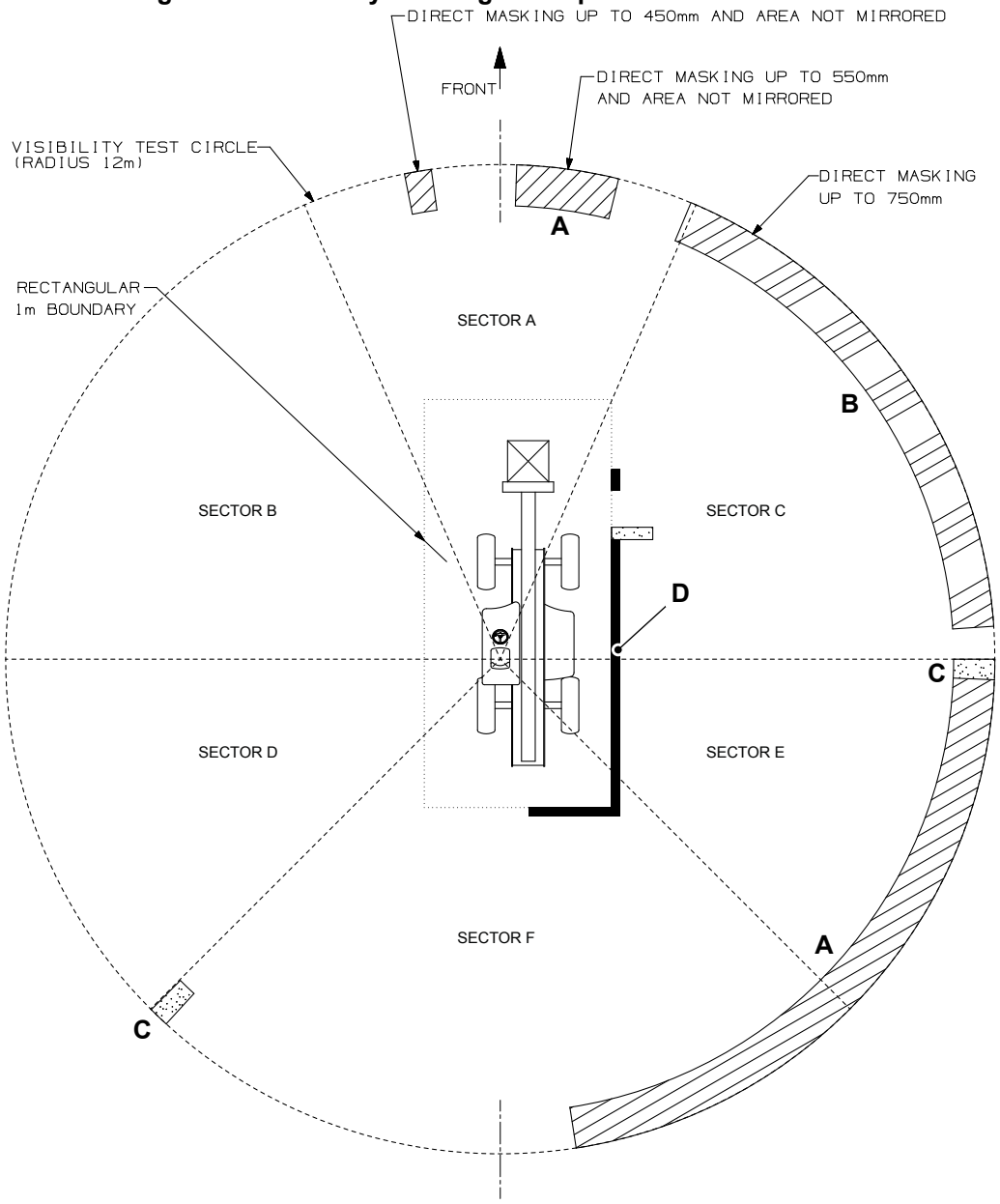
Figure 324. Visibility Masking in Suspended Load Condition



A Masking at 12m radius measured at ground level

B Masking at 12m radius measured above ground level up to 0.75m

C Overall masking

D Masking at 1m boundary (>200mm width) measured between ground level and 1.5m above ground level

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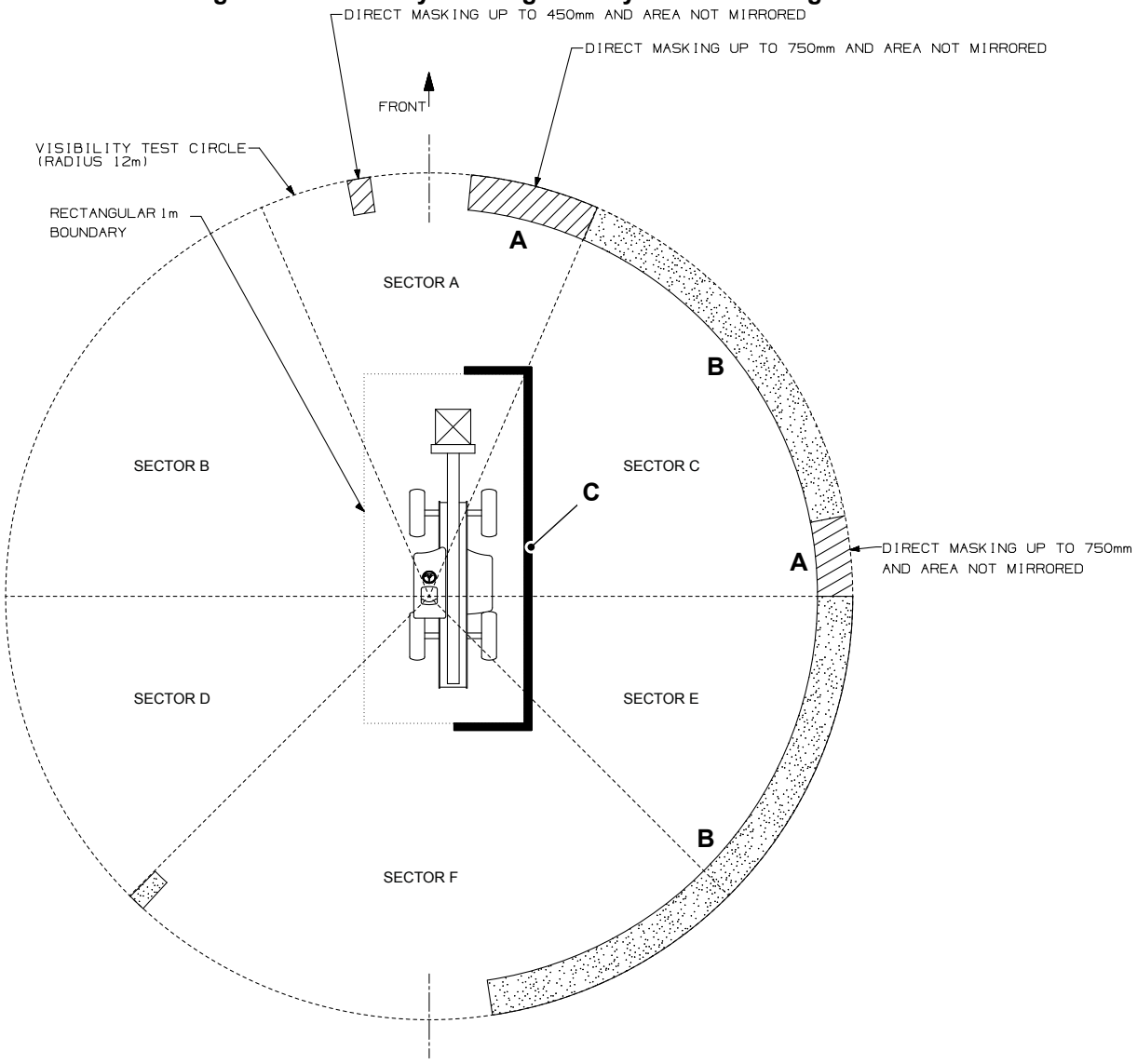
Figure 325. Visibility Masking in Lorry Trailer Loading Condition

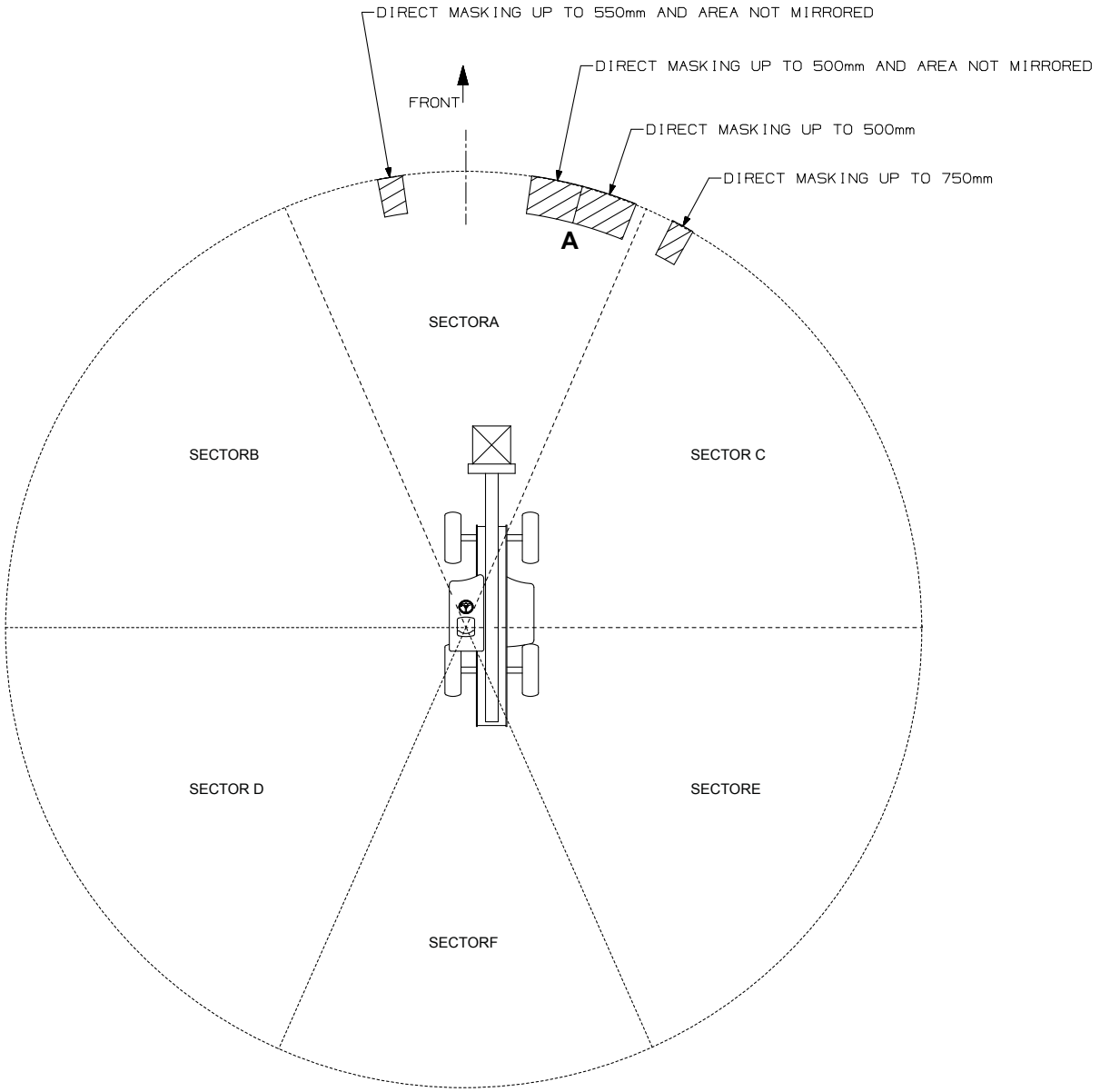


A Masking at 12m radius measured at ground level

B Overall masking

C Masking at 1m boundary (>200mm width) measured between ground level and 1.5m above ground level

Figure 326. Visibility Masking in Sectors A and C at the 12m Radius, With the Machine in Normal Travel Mode No Load Condition



A Masking at 12m radius measured at ground level

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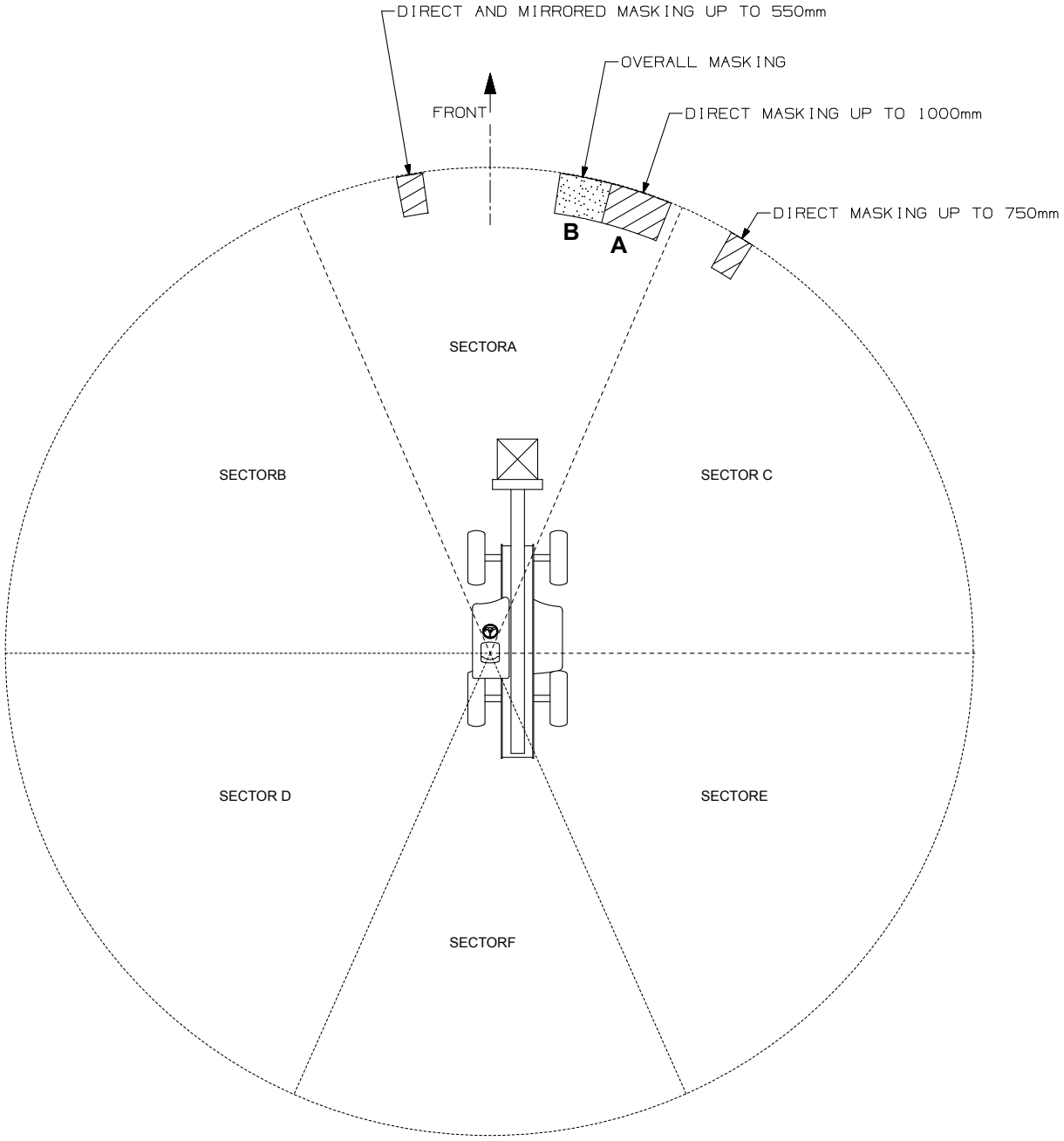
Figure 327. Visibility Masking in Sectors A and C at the 12m Radius, With the Machine in Normal Travel Mode Fork Load Condition



A Masking at 12m radius measured at ground level

B Overall masking

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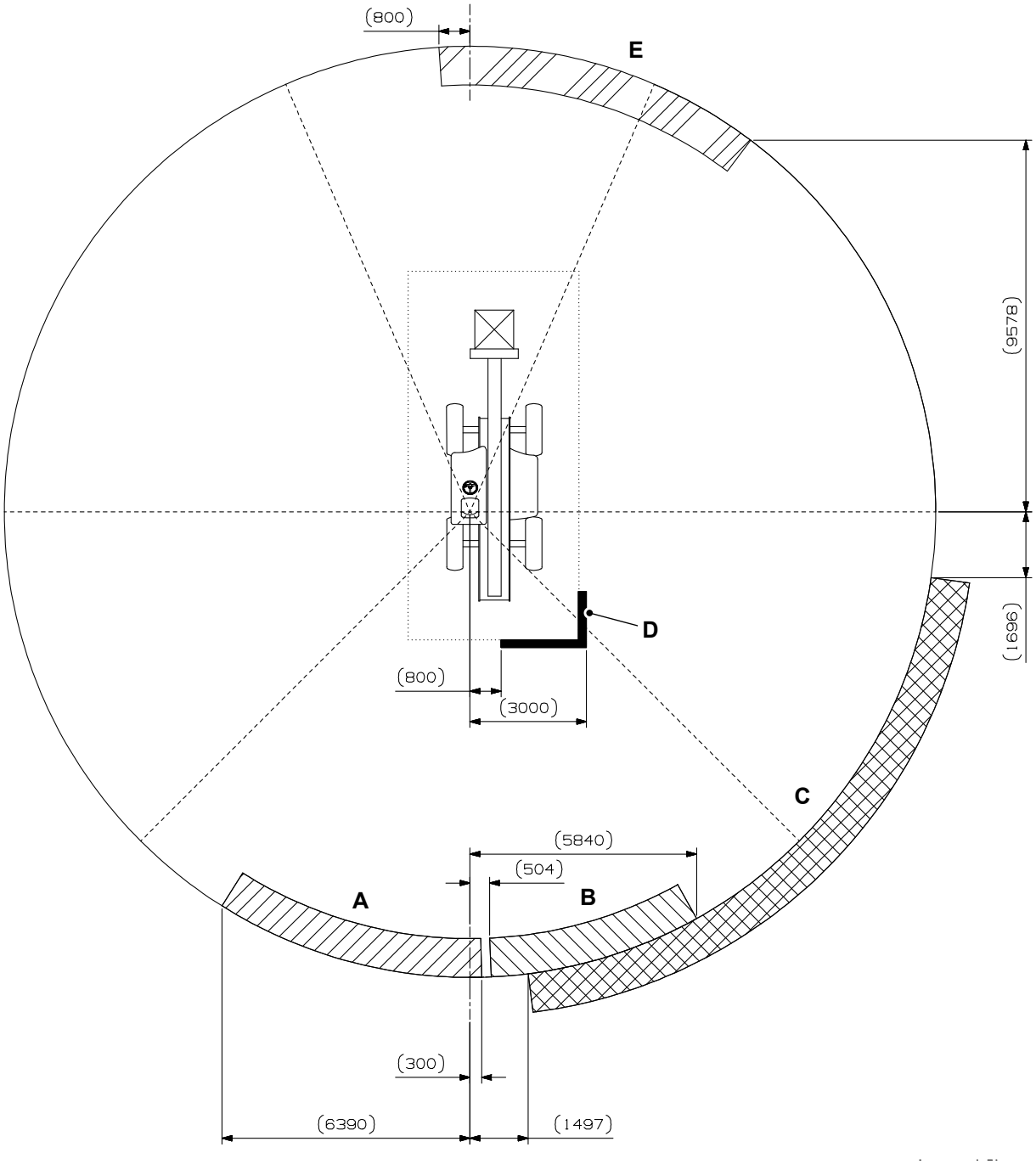
(For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

Figure 328. Mirror Setup



A Right hand road mirror
B Left hand road mirror
C Right hand wide angle
D Left hand wide angle
E Rear mounted wide angle

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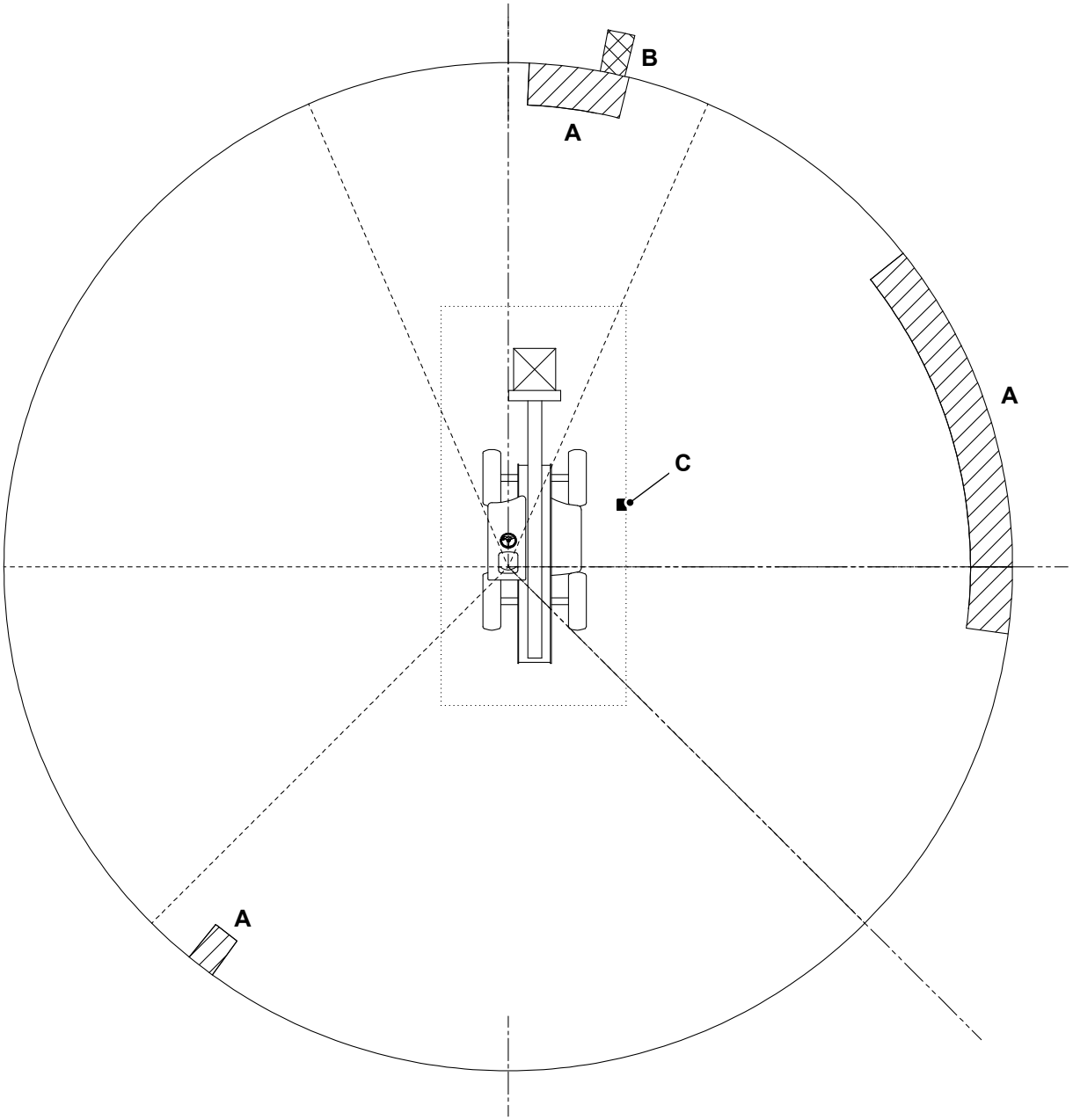
Figure 329. Visibility Masking in Suspended Load Condition



A Masking at 12m radius measured at ground level

B Masking at 12m radius measured at 0.75m above ground level

C Masking at 1m boundary (>200mm width) measured between ground level and 1.5m above ground level

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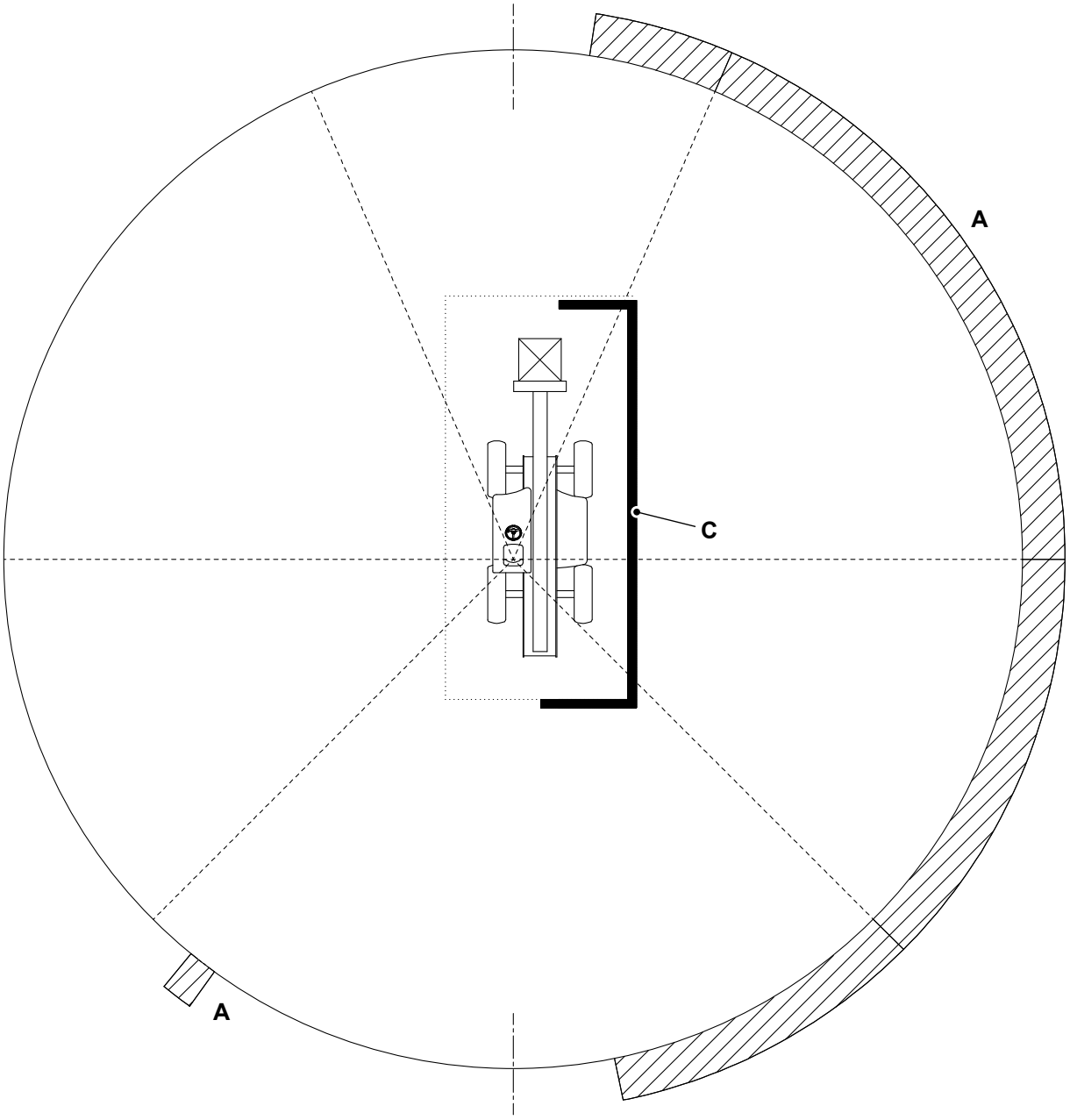
Figure 330. Visibility Masking in Lorry Trailer Loading Condition



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 (>200mm width) measured between ground level and 1.5m above ground level

Performance Dimensions

General

Maximum Wading Depth

The maximum wading depth of the machine is 400mm. Water can enter the engine and axles and the cooling fan can be damaged if the machine is operated in deeper water.

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Boom Dimensions and Performance

For: 533-105 [T4F 3L], 533-105 [T4F] ..... Page 339
For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3] ..... Page 340
For: 535V140 [T4F] ..... Page 341
For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F] ..... Page 342
For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F] ..... Page 343
For: 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F] ..... Page 344
For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 345
For: 550-170 [T4F] ..... Page 346
For: 550-140 [T4F], 550-140 [UN3/GB3] ..... Page 347

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(For: 533-105 [T4F 3L], 533-105 [T4F])

Table 53.

Description	Weight
Maximum lift capacity	3,300kg
Lift capacity to full height	3,300kg
Lift capacity at full reach	1,050kg

Table 54.

Description	Length
Maximum lift height	10,220mm
Reach at maximum lift height	1,910mm
Maximum forward reach	6,830mm
Reach with 1t load	6,830mm
Placing height	9,820mm

Ground pressures have been provided as a guide based on a typical machine using forks on hard ground with a standard size tyre. Ground pressure will vary depending on the machine configuration, attachment, tyre option, and ground condition. Spreader plates should be used to protect the ground as necessary. Reference tyre: Michelin 400/80-24 Power CL 162 A8

Table 55.

Condition	Front (kg/cm²)	Rear (kg/cm²)	Stab (kg/cm²)
Laden	12.2	5.2	3.2
Unladen	9.0	8.6	-

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(For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3])

Table 56.

Description	Weight
Maximum lift capacity	3,500kg
Lift capacity to full height	3,500kg
Lift capacity at full reach	1,150kg

Table 57.

Description	Length
Maximum lift height	12,280mm
Reach at maximum lift height	460mm
Maximum forward reach	8,060mm
Reach with 1t load	8,060mm
Placing height	11,750mm

Ground pressures have been provided as a guide based on a typical machine using forks on hard ground with a standard size tyre. Ground pressure will vary depending on the machine configuration, attachment, tyre option, and ground condition. Spreader plates should be used to protect the ground as necessary. Reference tyre: Michelin 400/80-24 Power CL 162 A8

Table 58.

Condition	Front (kg/cm²)	Rear (kg/cm²)	Stab (kg/cm²)
Laden	12.3	6.8	4.6
Unladen	9.2	9.2	-

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(For: 535V140 [T4F])

Table 59.

Description	Weight
Maximum lift capacity	4,000kg
Lift capacity to full height	3,000kg
Lift capacity at full reach	1,250kg

Table 60.

Description	Length
Maximum lift height	13,780mm
Reach at maximum lift height	930mm
Maximum forward reach	9,600mm
Reach with 1t load	9,600mm
Placing height	13,300mm

Ground pressures have been provided as a guide based on a typical machine using forks on hard ground with a standard size tyre. Ground pressure will vary depending on the machine configuration, attachment, tyre option, and ground condition. Spreader plates should be used to protect the ground as necessary. Reference tyre: Michelin 400/80-24 Power CL 162 A8

Table 61.

Condition	Front (kg/cm²)	Rear (kg/cm²)	Stab (kg/cm²)
Laden	12.5	7.3	5.0
Unladen	9.2	9.9	-

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(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F])

Table 62.

Description	Weight
Maximum lift capacity	4,000kg
Lift capacity to full height	2,500kg
Lift capacity at full reach	600kg

Table 63.

Description	Length
Maximum lift height	16,700mm
Reach at maximum lift height	2,050mm
Maximum forward reach	12,500mm
Reach with 1t load	10,500mm
Placing height	16,200mm

Ground pressures have been provided as a guide based on a typical machine using forks on hard ground with a standard size tyre. Ground pressure will vary depending on the machine configuration, attachment, tyre option, and ground condition. Spreader plates should be used to protect the ground as necessary. Reference tyre: Michelin 400/80-24 Power CL 162 A8

Table 64.

Condition	Front (kg/cm²)	Rear (kg/cm²)	Stab (kg/cm²)
Laden	12.2	5.7	4.8
Unladen	8.9	9.6	-

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(For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F])

Extended Stabiliser

Table 65.

Description	Dimension
Maximum lift capacity	4,000kg
Lift capacity to full height	1,500kg
Lift capacity at full reach	200kg
Maximum lift height	20,000mm
Reach at maximum lift height	2,820mm
Maximum forward reach	15,900mm
Reach with 1t load	10,650mm
Placing height	19,100mm

Retracted Stabiliser

Table 66.

Description	Dimension
Maximum lift capacity	4,000kg
Lift capacity to full height	500kg
Lift capacity at full reach	0kg
Maximum lift height	10,270mm
Reach at maximum lift height	6,420mm
Maximum forward reach	9,630mm
Reach with 1t load	6,250mm
Placing height	9,100mm

Ground pressures have been provided as a guide based on a typical machine using forks on hard ground with a standard size tyre. Ground pressure will vary depending on the machine configuration, attachment, tyre option, and ground condition. Spreader plates should be used to protect the ground as necessary. Reference tyre: Michelin 400/80-24 Power CL 162 A8

Table 67.

Condition	Front (kg/cm²)	Rear (kg/cm²)	Stab (kg/cm²)
Laden	12.2	6.0	3.7
Unladen	9.2	9.6	-

(For: 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F])

Table 68.

Description	Weight
Maximum lift capacity	4,000kg
Lift capacity to full height	3,000kg
Lift capacity at full reach	1,250kg

Table 69.

Description	Length
Maximum lift height	13,780mm
Reach at maximum lift height	930mm
Maximum forward reach	9,600mm
Reach with 1t load	9,600mm
Placing height	13,300mm

Ground pressures have been provided as a guide based on a typical machine using forks on hard ground with a standard size tyre. Ground pressure will vary depending on the machine configuration, attachment, tyre option, and ground condition. Spreader plates should be used to protect the ground as necessary. Reference tyre: Michelin 400/80-24 Power CL 162 A8

Table 70.

Condition	Front (kg/cm²)	Rear (kg/cm²)	Stab (kg/cm²)
Laden	12.9	6.8	5.0
Unladen	9.2	9.9	-

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(For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

Table 71.

Description	Weight
Maximum lift capacity	4,000kg
Lift capacity to full height	2,500kg
Lift capacity at full reach	550kg

Table 72.

Description	Length
Maximum lift height	17,510mm
Reach at maximum lift height	1,980mm
Maximum forward reach	13,340mm
Reach with 1t load	11,720mm
Placing height	17,000mm

Ground pressures have been provided as a guide based on a typical machine using forks on hard ground with a standard size tyre. Ground pressure will vary depending on the machine configuration, attachment, tyre option, and ground condition. Spreader plates should be used to protect the ground as necessary. Reference tyre: Michelin 400/80-24 Power CL 162 A8

Table 73.

Condition	Front (kg/cm²)	Rear (kg/cm²)	Stab (kg/cm²)
Laden	12.9	7.0	4.3
Unladen	9.2	10.0	-

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(For: 550-170 [T4F])

Table 74.

Description	Weight
Maximum lift capacity	4,000kg
Lift capacity to full height	4,000kg
Lift capacity at full reach	1,250kg

Table 75.

Description	Length
Maximum lift height	13,800mm
Reach at maximum lift height	740mm
Maximum forward reach	9,250mm
Reach with 1t load	9,250mm
Placing height	13,250mm

Ground pressures have been provided as a guide based on a typical machine using forks on hard ground with a standard size tyre. Ground pressure will vary depending on the machine configuration, attachment, tyre option, and ground condition. Spreader plates should be used to protect the ground as necessary. Reference tyre: Michelin 400/80-24 Power CL 162 A8

Table 76.

Condition	Front (kg/cm²)	Rear (kg/cm²)	Stab (kg/cm²)
Laden	11.8	7.4	4.1
Unladen	8.9	9.6	-

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(For: 550-140 [T4F], 550-140 [UN3/GB3])

Table 77.

Description	Weight
Maximum lift capacity	4,000kg
Lift capacity to full height	4,000kg
Lift capacity at full reach	1,250kg

Table 78.

Description	Length
Maximum lift height	13,800mm
Reach at maximum lift height	740mm
Maximum forward reach	9,250mm
Reach with 1t load	9,250mm
Placing height	13,250mm

Ground pressures have been provided as a guide based on a typical machine using forks on hard ground with a standard size tyre. Ground pressure will vary depending on the machine configuration, attachment, tyre option, and ground condition. Spreader plates should be used to protect the ground as necessary. Reference tyre: Michelin 400/80-24 Power CL 162 A8

Table 79.

Condition	Front (kg/cm²)	Rear (kg/cm²)	Stab (kg/cm²)
Laden	11.5	7.5	4.8
Unladen	8.6	9.4	-

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 383).
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 383).

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 383).

Make sure that the tyre pressures are correct and do not exceed the speed or loads shown against the size of tyres fitted.

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Noise Emissions

General

To assist in compliance with European Directives 2000/14/EC and 2005/88/EC, the noise data values for this type of machine have been provided on the following page(s) and may be used for the assessment of risks to exposure from noise.

The noise data values shown only apply to CE marked machines.

For information relating to this machine when used with other JCB approved attachments, please refer to the literature accompanying the attachments.

Table 80. 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

For: 533-105 [T4F 3L], 533-105 [T4F] ..... Page 349
For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 349
For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F] ..... Page 350

(For: 533-105 [T4F 3L], 533-105 [T4F])

Table 81.

Engine rating[1]	LwA
81kW	106 dB(A)
93kW	107 dB(A)
108kW	107 dB(A)

(1) Net installed power.

Table 82. Driver's Exposure to Noise Level to 1322/2014 Annex XIII Test method 2

Model	LpA (Door Closed)	LpA (Door Open)
Agri, Agri Plus, Agri Super	74.2 dB(A)	84.1 dB(A)
Agri Pro	72.8 dB(A)	84.2 dB(A)

(For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

Table 83.

Engine rating[1]	LpA	LwA
55kW	77	104
81kW	80	106

(1) Net installed power.

(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F])

Table 84.

Engine rating[1]	**LpA**	**LwA**
55kW		104
81kW	81	106
93kW		107

(1) Net installed power.

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Vibration Emissions

General

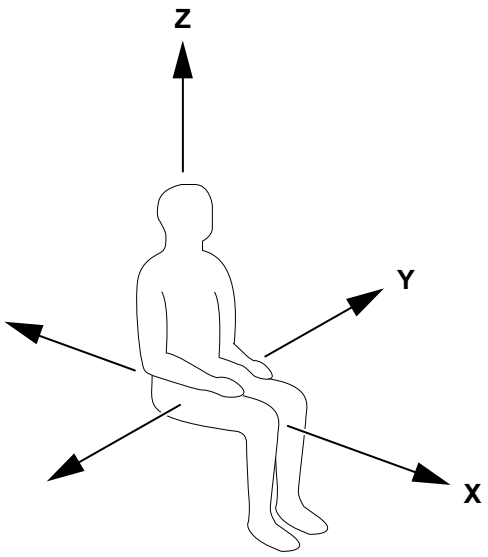
To assist in compliance with the European Directive 2002/44/EC, the duty specific vibration emission values for this machine type have been provided on the following page(s) and may be used for the assessment of risks to exposure from vibration.

Unless otherwise indicated for a specific operating condition, the vibration values are calculated with the machine equipped with the standard attachments (for example bucket, shovel, fork, etc.) for the respective operating condition.

The vibration values are calculated from measurements in three perpendicular axes (X, Y and Z). The highest weighted (RMS (Root Mean Square)) value is used to specify the vibration emission.

The axis upon which the highest weighted (RMS) value occurs is shown on the vibration chart for each of the machine operating duties, see dominant axis (X, Y or Z).

Figure 331.



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.

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Vibration Data

For: 550-140 [T4F], 550-140 [UN3/GB3] ..... Page 353
For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F] ..... Page 354
For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 550-170 [T4F] ..... Page 355
For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 356
For: 533-105 [T4F 3L], 533-105 [T4F] ..... Page 357

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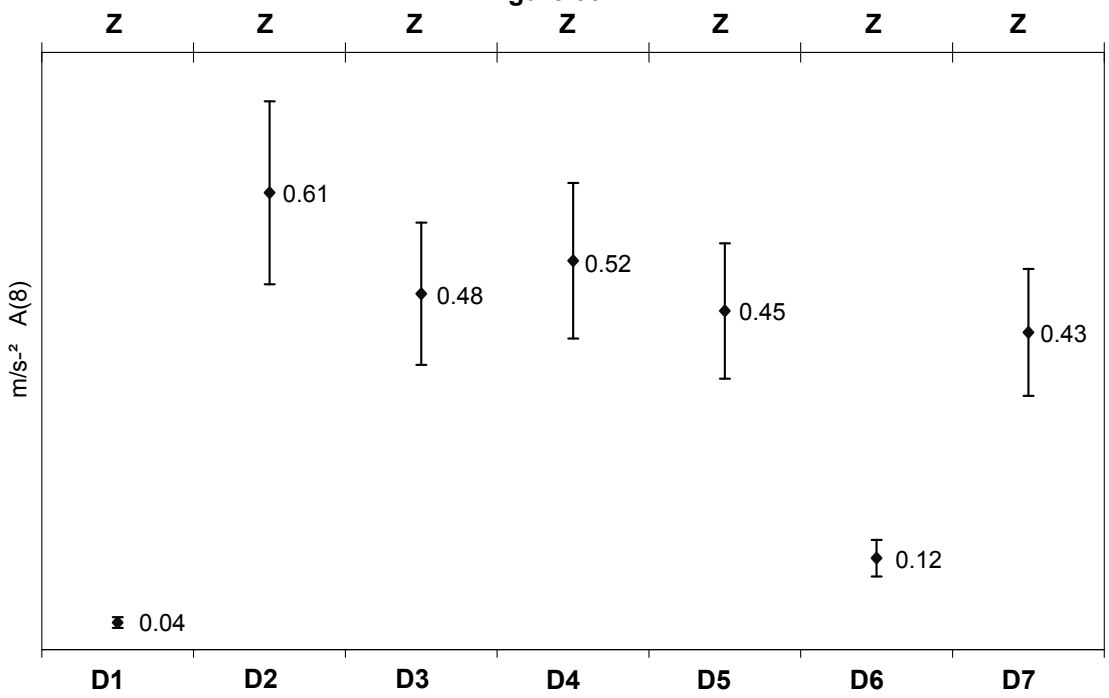
(For: 550-140 [T4F], 550-140 [UN3/GB3])

The whole-body vibration emission under representative operating conditions (according to the intended use) are shown.

Figure 332.



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

Whole-body vibration emission determined in accordance with ISO 2631-1:1997.

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).

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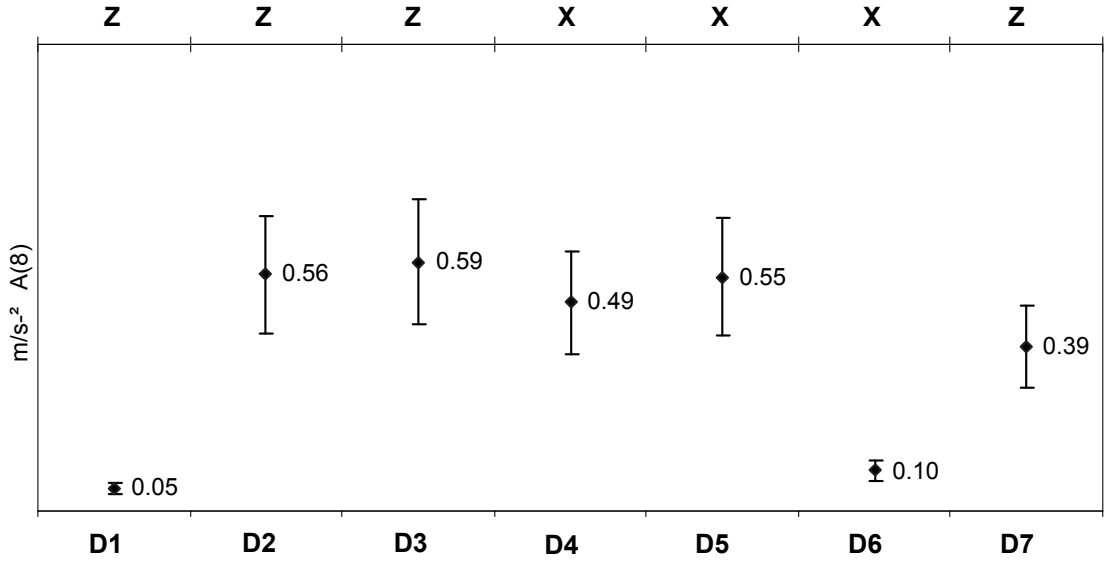
(For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F])

The whole-body vibration emission under representative operating conditions (according to the intended use) are shown.

Figure 333.



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

Whole-body vibration emission determined in accordance with ISO 2631-1:1997.

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).

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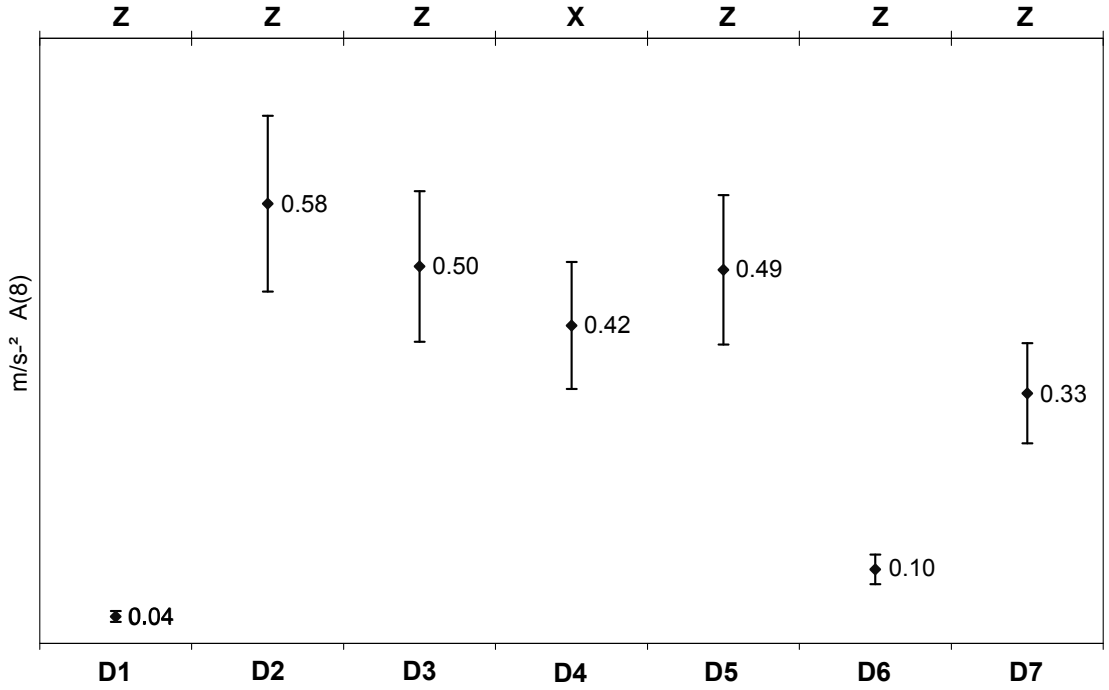
(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 550-170 [T4F])

The whole-body vibration emission under representative operating conditions (according to the intended use) are shown.

Figure 334.



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

Whole-body vibration emission determined in accordance with ISO 2631-1:1997.

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).

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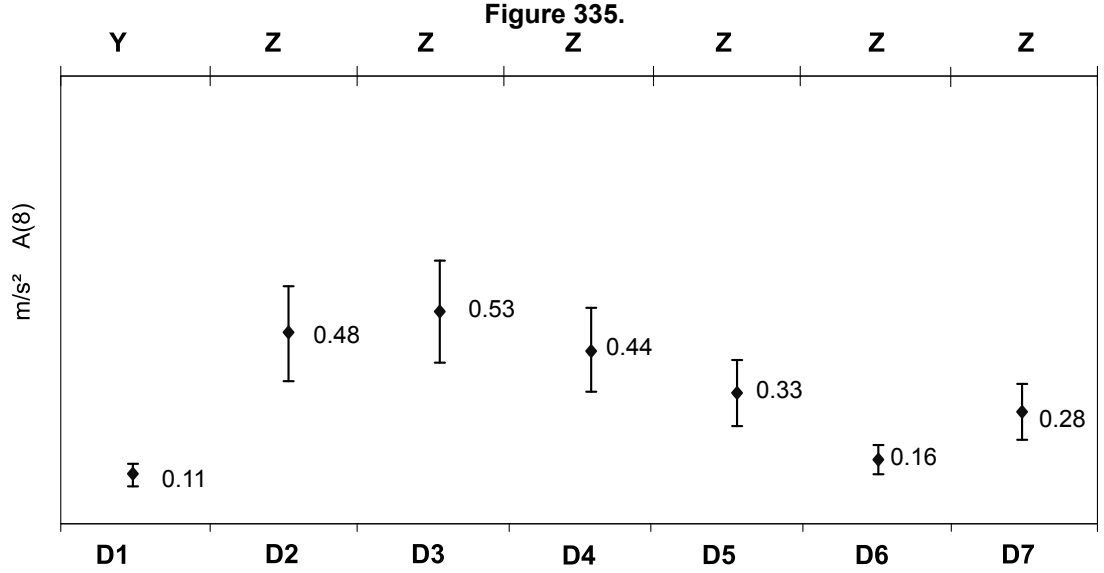
(For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

The whole-body vibration emission under representative operating conditions (according to the intended use) are shown.

Figure 335.



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

Whole-body vibration emission determined in accordance with ISO 2631-1:1997.

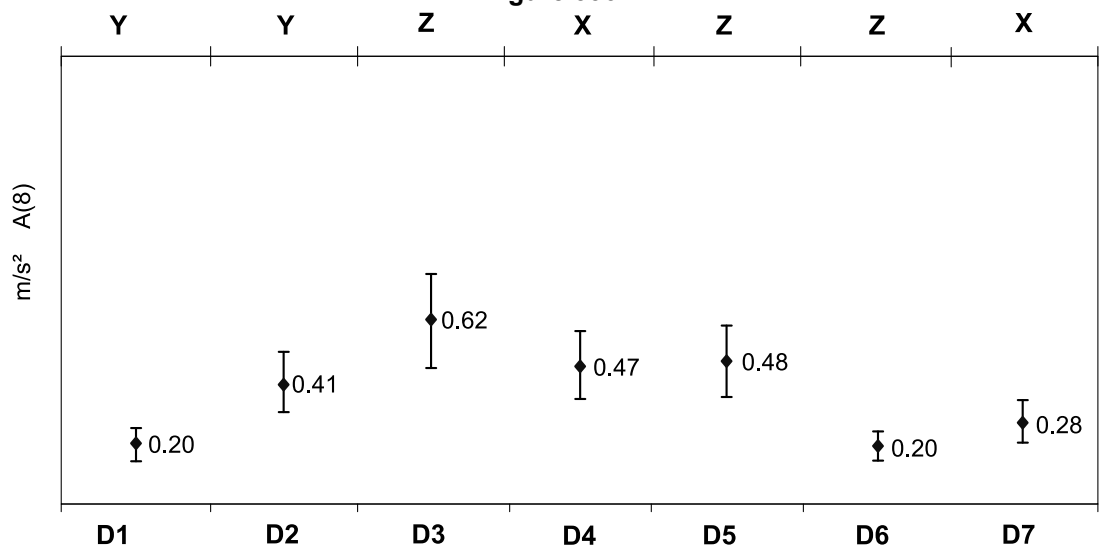
Hand-arm vibration determined in accordance with dynamic test conditions defined in ISO 5349-2: 2001 does not exceed 2.5m/s².

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

(For: 533-105 [T4F 3L], 533-105 [T4F])

The whole-body vibration emission under representative operating conditions (according to the intended use) are shown.

Figure 336.



X-Z Dominant axis
D1 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

Whole-body vibration emission determined in accordance with ISO 2631-1:1997.

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).

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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 85.

Item	Capacity	Fluid/Lubricant	JCB Part Number	Container Size[1]
Fuel Tank	146L	Diesel Oil		See Technical Data, Fluids, Lubricants and Capacities, Fuel.
DEF (Diesel Exhaust Fluid) Tank (minimum to maximum)	13L	DEF		See Technical Data, Fluids, Lubricants and Capacities, Diesel Exhaust Fluid.
Engine (Oil)[2]	Min12.5L - Max15L (Except FL engine), Min11.5L - Max14L (FL engine)	JCB Engine Oil UP 5W30 (API CJ-4) -30–30°C (-22.0–86.0°F)	4001/3105	20L
		(USA Only) JCB Engine Oil UP 5W40 (API CJ-4) -30–46°C (-22.0–114.7°F)	4001/3405	
		JCB Engine Oil UP 10W30 (API CJ-4) -15–46°C (5.0–114.7°F)	4001/3005	
		UN3/GB3 Machines only: JCB Engine Oil EP 5W40 (API CH-4/CG-4/CF-4/ CF/SJ, ACEA E2/B3/A3)--30–46°C (-22.0–114.7°F)	4001/2705	
Engine (Coolant)[3]	28L (Except FL engine), 25.5L (FL engine)	JCB Antifreeze HP/Coolant + Water	4006/1120	20L
Transmission (SS750)	• Wet fill 11.5L • Dry fill 13.5L	JCB Transmission Fluid EP 10W-30	4000/2505	20L
Transmission (PS750)	• Wet fill 17L • Dry fill 19L	JCB Transmission Fluid EP 10W, -32–40°C (-25.6–103.9°F)[4]	4000/2505	20L
		JCB Transmission Fluid SAE 30, -5–46°C (23.0–114.7°F)	4000/2605	20L
Transmission (PS760)	• Wet fill 21L • Dry fill 23L	JCB Transmission Fluid EP 10W, -32–40°C (-25.6–103.9°F)	4000/2505	20L
		JCB Transmission Fluid SAE 30, -5–46°C (23.0–114.7°F)[4]	4000/2605	20L
Front axle housing	17.7L	JCB Gear oil HP plus	4000/2205[5]	20L
Hubs	1.9L	JCB Gear oil HP plus	4000/2205[5]	20L

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Item	Capacity	Fluid/Lubricant	JCB Part Number	Container Size[1]
Rear axle housing (533-105)	10L	JCB Gear oil HP plus	4000/2205[5]	20L
Rear axle housing (540-140, 540-170, 540-200)	19L	JCB Gear oil HP plus	4000/2205[5]	20L
Rear axle housing (535-125, 535-140)	17.7L	JCB Gear oil HP plus	4000/2205[5]	20L
Hubs	2L	JCB Gear oil HP plus	4000/2205[5]	20L
Brake system[6]		JCB Hydraulic fluid HP 15[7]	4002/0503	5L
Hydraulic tank (540-140)[8]	131L	JCB Optimum Performance Hydraulic Fluid 46 or 68	4002/2005 or 4002/2705	20L
Hydraulic tank (535-v125, 535-v140, 540v-140, 540-v180)[8]	127L			
Hydraulic tank (533-105)[8]	125L			
Hydraulic tank (540-170, 540-200)[8]	180L			
Grease Points		JCB Special HP Grease (Blue)[9]	4003/2017	0.4kg
		JCB Special MPL EP Grease[9]	4003/1501	0.4kg
Wear pad runways		JCB Waxoyl	4004/0502	5L
Inner Boom hoses		JCB Special HP Grease (Blue)	4003/2017	0.4kg
Boom chain		JCB Chain Lubricant	4004/0237A	0.3L

(1) For information about the different container sizes that are available (and their part numbers), contact your JCB Dealer.
(2) Do not use ordinary engine oil.
(3) 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) Friction modified oils must not be used (eg Dexron ATF type).
(5) Must be suitable for use with oil immersed brakes and limited slip differentials (LSD).
(6) Excluding 550-80 machines.
(7) Do not use ordinary brake fluid.
(8) 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.
(9) JCB Special HP Grease is the recommended specification grease. If JCB Special MPL-EP Grease is used, all 50h greasing operations must be carried out at 10h intervals; all 500h greasing operations must be carried out at 50h intervals.

Fuel

For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F] ..... Page 360
For: JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine ..... Page 363

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F])

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 affects on the expected life of the engine performance, those that will reduce the expected life, and lastly those that are viewed as unacceptable for use (fuels shown on the same line as each other are considered equivalents).

The lists below are not exhaustive of all diesel fuel standards encountered in the marketplace. If comment is required on the suitability of fuel standards not on the list, requests with, if possible, specification details showing at least the key characteristics described above should be forwarded to JCB Service for assessment and comment.

Table 86. 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		

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Table 87. 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		

(1) See your JCB dealer for advice on service requirements.

Table 88. 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 89. 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%).

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.

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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.

Unacceptable Fuels

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.

Using B20 biodiesel can result in poisoning of the SCR (Selective Catalytic Reduction) system.

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.

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.

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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°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.

(For: JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine)

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 affects on the expected life of the engine performance, those that will reduce the expected life, and lastly those that are viewed as unacceptable for use (fuels shown on the same line as each other are considered equivalents).

The lists below are not exhaustive of all diesel fuel standards encountered in the marketplace. If comment is required on the suitability of fuel standards not on the list, requests with, if possible, specification details showing at least the key characteristics described above should be forwarded to JCB Service for assessment and comment.

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Table 90. 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 91. Group 2

Fuel	Advice	Service Requirements
Group1 fuels with HFFR WSD in the range 460 to 520	Not preferred and may be used but may lead to reduced FIE life and / or loss of performance.	
ASTM D975-91 Class 1-1DA		
B20 Biodiesels can cause serious problems for engines. JCB Ecomax Stage 3b / Tier 4i engines have been developed to run with biodiesels up to 20 mix (B20), but NOT with higher biodiesel proportion. The biodiesel content of this mix must be to ASTM D6751, DIN 51606, or ISO 14214 standards. Using a B20 blend of biodiesel requires caution and additional servicing of the engine is required.(1)		The Ecomax dealer, or JCB Power Systems Applications department, should be consulted for further guidance. Biodiesel is very problematic to store; fuel in storage has to be very carefully managed to ensure that it does not deteriorate during this period. No warranty liability will be accepted for failure of fuel injection equipment where the failure is attributed to the quality and grade of the fuel used.

(1) See your JCB dealer for advice on service requirements.

Table 92. 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 93. 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.

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- 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.

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Biodiesels will 'cloud' at higher temperatures than mineral based fuels. To explain Cloud Point - the lowest temperature at which fluid can flow and performs its functions is referred to as Pour Point. Just prior to reaching its Pour Point the diesel fluid becomes 'cloudy' due to crystallization of waxy constituents - this is know as Cloud Point. Using diesel at temperature below its cloud point can result in filter clogging. To prevent this happening preheating will be required.

Using B20 biodiesel can result in unburnt fuels accumulating in the engine oil, ultimately this can affect the engine oil efficiency and lead to engine damage (with standard diesel any unburnt fuel evaporates off the lubricating oil).

The natural properties of biodiesel make it a good medium for micro bacterial growth, these microbes can cause fuel system corrosion and early fuel filter blocking. Biodiesels must be stored to exclude water absorption and oxidation. It will be necessary to consult and seek advice from your fuel supplier, the effectiveness of conventional antibacterial additives when used in biodiesel is still being investigated in the fuel industry. A high percentage biodiesel mixture (>205%) can lead to fuel gelling and filter blocking in low temperature operation, it may also effect the power and performance of the engine.

To minimise the risk of engine damage when using a B20 mix, there are additional service requirements.

If the recommended actions are not taken there may be the following consequences:- low temperature filter clogging- injectors lacquering / sticking deterioration of seals and rubber hoses- corrosion of metal parts in the fuel system- engine performance problems. These risks will be increased if the fuel has been poorly stored, that is deteriorated through oxidation and / or water absorption.

Unacceptable Fuels

B100 - Chemically Modified Vegetable Oils (FAME/ VOME)

These fuels have been derived from a wide range of vegetable oils and animal fats, resulting in better stability, viscosity and cetane number than those produced from unmodified vegetable oils, but it is recognised that there are potential problems associated with the finished fuel characteristics. These oils are less stable than mineral oil derived fuels when stored and they will readily degrade producing fatty acids, methanol and water, none of which are desirable in the FIE. These effects are known to be accelerated when the fuel is stored in the presence of air and water together.

An extract 'common statement' from the FIE manufactures specifies that "The fuel injection equipment manufacturers can accept no liability whatsoever for failure attributable to operating their products with fuels for which the products were not designed, and no warranties or representations are made as to the possible effects of running these products with such fuels".

Unmodified Vegetable Oils

Burned in diesel engines neat or used as an extender to mineral derived fuel. When these are subjected to heat in the fuel injection system they form sticky deposits that can be found inside the fuel pump and a hard lacquer in the injectors where exposure to even higher temperatures takes place.

Sulphur Content

⚠ **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:

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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.

Diesel Exhaust Fluid (DEF)

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine)

⚠ **Notice:** No warranty liability whatsoever will be accepted for failure of the emissions control system where the failure is attributed to the quality and grade of the diesel exhaust fluid (DEF) used.

Notice: No warranty liability whatsoever will be accepted for failure of the emissions control system where the failure is attributed to contamination of the diesel exhaust fluid (DEF).

This engine has exhaust gas treatment using selective catalytic reduction technology. In SCR (Selective Catalytic Reduction) technology, a liquid called diesel exhaust fluid is injected into the exhaust gasses. DEF

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(Diesel Exhaust Fluid) is used within SCR systems on diesel engines to reduce harmful exhaust gas emissions known as NOx (Nitrogen Oxide). When the DEF is injected into the exhaust stream it turns into ammonia and water, this ammonia enters the catalyst and reacts with the NOx molecules to form nitrogen and water. Naturally occurring and harmless, they are then released into the atmosphere.

The DEF consumption depends on the duty cycle of the engine.

DEF is a highly purified, colourless liquid containing demineralized water 67.5% and Urea 32.5%. DEF is specified under ISO 22241 and is marketed under various names such as AdBlue®, ARLA 32 or AUS 32.

Make sure that genuine DEF is used. Do not dilute DEF or mix it with other substances, it may damage the catalyst.

The DEF tanks and pipes are heated if there is any danger of freezing, the freezing point of DEF at 32.5% is -11°C (12°F). The DEF storage tank on the machine will be heated from the engine cooling system automatically.

If a problem is detected within the DEF system for any problem including contamination, engine power will be reduced.

Storage

Always use polyethylene, polypropylene, stainless steel or plastic containers for storing DEF, as DEF can be corrosive to most metals (eg steel, copper , and aluminium). This applies to any funnels, jugs, pipes, pumps and other handling equipment

Avoid decanting wherever possible to prevent contamination from dirt or trace amounts of metals that can occur when metal containers are used. Even the use of apparently clean items such as jugs or funnels may introduce damaging contaminants if they have ever been used for other purposes.

Always ensure any caps on DEF storage containers are screwed tight to prevent evaporation and crystallisation.

DEF can be stored for up to 12 months in a sealed container, and must be kept between -6°C (21°F) and 25°C (77°F) in a shaded area out of direct sunlight and ultraviolet radiation.

Spillages

A small DEF spill can be diluted with water. It is best to mop up the spillage and avoid flushing it down a drain or waterway

In case of a large spill, try to prevent the spillage from entering drains or waterways. Contain the spill with sand, earth or your spill kit and dispose of it properly

The surface on which you spill DEF may become slippery. Make sure that you clean up the spill as quickly as possible to prevent slips and falls.

If a spill occurs on the machine, wash away with water as white crystals will form and these will eventually become corrosive to paintwork and, in turn, metal work

DEF should never be spilled onto electrical connectors as it will destroy terminals quickly. It can also travel easily by capillary action between the insulation and copper wires in harnesses.

Preventing Contamination of the DEF tank

In order to prevent damage to the SCR system, DEF used must be compliant to the ISO 22241-1 standard. ISO 22241-1 DEF is available from all JCB dealers

Every machine equipped with a JCB SCR system is fitted with a quality sensor in the DEF tank to help prevent problems caused by cross contamination with other fluids

DEF needs to be kept free from dirt and other particle contaminants at all times to prevent damage to the SCR system. There is a mesh strainer fitted in the JCB DEF filler.

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DEF needs to be kept free from liquid contaminants such as diesel, oil, antifreeze, screenwash and other fluids at all times. Even one drop of diesel or oil can pollute 20L of DEF.

If diesel is poured into the DEF tank this can damage the after treatment system, do not start the engine, please contact your local JCB dealer immediately so they can correctly flush the system to avoid an expensive repair.

A range of special tools and fluid analysis services are available at your local JCB dealer to check DEF quality via simple hydrocarbon test paper strips, or a more comprehensive laboratory service. Digital and optical concentration measuring devices are also available.

If any cross contamination is detected JCB will not be liable for any further diagnosis or repairs to the SCR system.

Preventing Cross Contamination of Diesel Fuel and DEF

The opening for your DEF tank is narrower than the opening for a diesel tank, so you should not be able to put diesel in the wrong tank (as the nozzle does not fit)

The DEF cap on every JCB machine is blue and clearly marked with AdBlue ®, DEF and the ISO (International Organization for Standardization) symbol in white lettering . There are warning decals next to the DEF filling point

The diesel cap is also clearly marked with lettering.

Every JCB DEF cap is lockable with a special key with a blue key fob, which can be given to a site supervisor or other person of responsibility.

There is a special magnet fitted in the DEF filler neck which will allow some DEF electric dispensing pumps to start if it has the matching ISO feature, as all forecourt dispensing systems have, thus preventing DEF being dispensed if nozzle is not in the DEF tank.

If contamination occurs do not start the engine. Please contact your local JCB dealer immediately so they can correctly flush the system to avoid an expensive repair.

Coolant

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

Check the strength of the coolant mixture at least once a year, preferably at the start of the cold period.

Replace the coolant mixture according to the intervals shown in the machine's Service Schedule.

You must dilute full strength antifreeze with clean water before use. Use clean water of no more than a moderate hardness (pH value 8.5). If this cannot be obtained, use de-ionized water. For further information advice on water hardness, contact your local water authority.

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

The protection provided by JCB High Performance Antifreeze and Inhibitor is shown below.

Table 94.

Concentration	Level of protection
50% (Standard)	Protects against damage down to -40°C (-40°F)
60% (Extreme Conditions Only)	Protects against damage down to -56°C (-69°F)

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

If you use any other brand of antifreeze:

- Make sure that the antifreeze complies with International Specification ASTM D6210.
- Always read and understand the manufacturer's instructions.
- Make sure that a corrosion inhibitor is included. Serious damage to the cooling system can occur if corrosion inhibitors are not used.
- Make sure that the antifreeze is ethylene glycol based and does not use Organic Acid Technology (OAT).
- Care should be taken to not mix coolant types. Mixing coolant will have a detrimental effect on the performance of the coolant.

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Torque Values

General

ROPS/FOPS

Table 95.

Mounting bolts torque	205N·m

Wheels

Table 96.

	Front Wheel Nut Torque	Rear Wheel Nut Torque
All machines excluding 560-80	680N·m	680N·m
560-80 only	650N·m	650N·m

Step/Battery Compartment Cover

Table 97.

Mounting bolt torque	25N·m

Axles

Table 98.

Fill/level plug torque	79N·m

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Electrical System

General

Table 99.

Item	Specification
Battery voltage/system voltage	12V

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Fuses

Secondary Fuses

Figure 337.

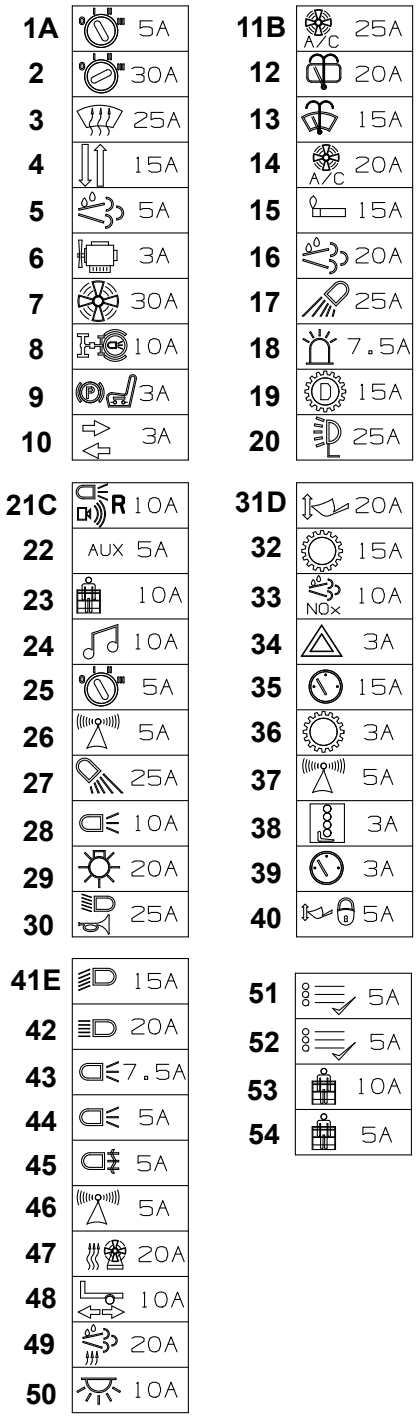

Table 100.

Fuse	Circuit(s) Protected	Rating
1A	Ignition	5A
2	Crank	30A

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Fuse	Circuit(s) Protected	Rating
3	Heated Glass	25A
4	Front/rear Auxiliary	15A
5	Heater Hose and SCR (Selective Catalytic Reduction) ECU (Electronic Control Unit)	5A
6	Engine ECU	3A
7	Heater Blower	30A
8	Brake Lights	10A
9	Seat Pressure Switch and Park Brake	3A
10	Directional Indicators	3A
11B	Roof Air Conditioning Fans	25A
12	Rear Wiper	20A
13	Front Wiper	15A
14	Air Conditioning	20A
15	12V Power Connection Auxiliary	15A
16	After Treatment	20A
17	Front Work lights	25A
18	Beacon	7.5A
19	Machine ECU	15A
20	Boom Worklights	25A
21C	Reverse Alarm	10A
22	Auxiliary Connector	5A
23	Transmission Controller	10A
24	Radio	10A
25	Ignition	5A
26	Live Link	5A
27	Rear Work Lights	25A
28	Head Lights	10A
29	Head Lights	20A
30	Horn and Main Beam	25A
31D	Hydraulic ECU	20A
32	SPARE	15A
33	NOx Sensor	10A
34	Hazard Lights	3A
35	Instruments V+	15A
36	Machine ECU	3A
37	Live Link	5A
38	LLMI (Longitudinal Load Moment Indicator)	3A
39	Instruments	3A
40	Immobiliser	5A
41E	Dipped Beam	15A
42	Main Beam	20A
43	Side Lights	7.5A
44	Side Lights	5A
45	Fog lights	5A
46	Live Link	5A
47	Seat Heater and Face Fan	20A
48	Trailer Directional Indicators	10A
49	DEF (Diesel Exhaust Fluid) Heated Hoses	20A
50	Interior Light and Radio	10A

Fuse	Circuit(s) Protected	Rating
51	Daily Checks (when fitted)	5A
52	Daily Checks (when fitted)	5A
53	Man Basket - Recovery Pump (when fitted)	10A
54	Man Basket - Radio (when fitted)	5A

Primary Fuses

Figure 338.

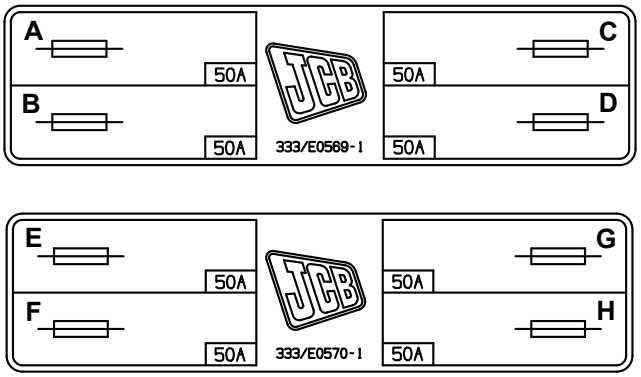

Table 101.

Fuse	Circuit(s) Protected	Rating
A	Starting circuit	50A
B	Engine/DEF ECU, Heater blower, Directional Indicators	50A
C	Wipers, A/C Fluid Levels	50A
D	Fluid Levels, Work Lights, Beacon, Radio, Interior Light	50A
E	Reverse Lights/Alarm, DEF System, DEF Heated Lines	50A
F	Road Lights, Worklights, Horn	50A
G	Machine ECU, Hazards/DIR, RH Instruments	50A
H	Engine	50A

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Engine Fuses

Figure 339.

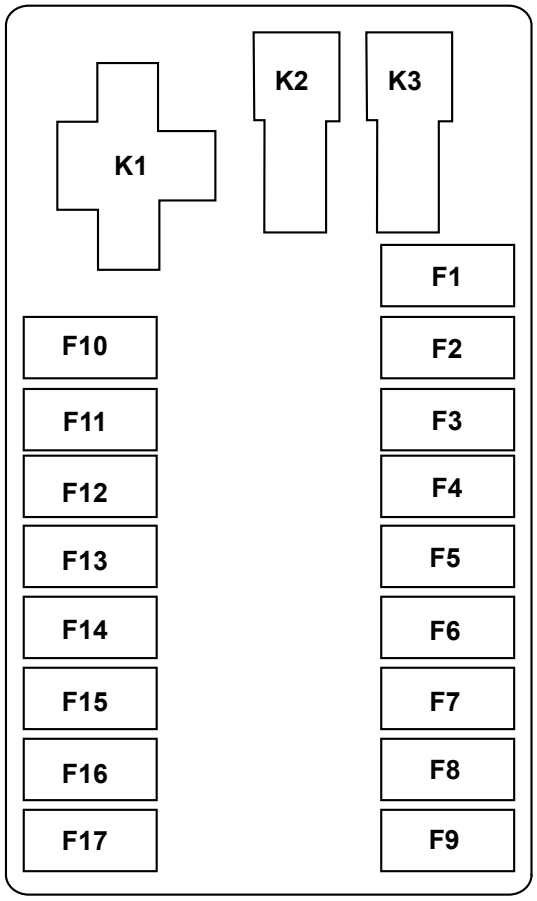

Table 102.

Fuse	Circuit(s)
F1	Power hold relay
F2	Fuel pump
F3	Starter solenoid
F4	Fuel Pump ECU- 40
F5	Spare
F6	Spare
F7	Spare
F8	ECU- 49
F9	ECU- 53
F10	HC-doser /spare
F11	Machine Isolation
F12	WF sensor
F13	Empty/spare
F14	Engine power supply
F15	Engine power supply
F16	ECU- 60
F17	ECU- 57

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Relays

Figure 340.

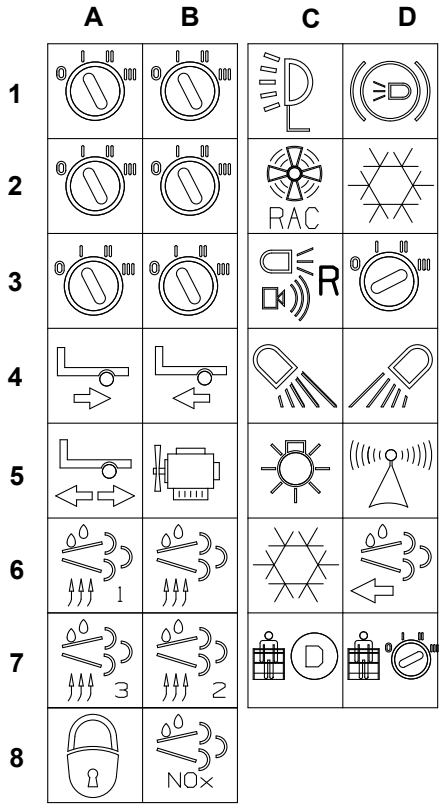

Table 103.

Relay	Circuit(s)
A1	Ignition
A2	Ignition
A3	Ignition
A4	Right Trailer Flash
A5	Trailer Indicator
A6	DEF Heated Line 1
A7	DEF Heated Line 3
A8	Immobiliser
B1	Ignition
B2	Ignition
B4	Ignition
B4	Left Trailer Flash
B5	Engine Run
B6	DEF Heated Line All
B7	DEF Heated Line 2
B8	NOx Sensor
C1	Boom Worklight
C2	Roof Air Conditioning Fans
C3	Reverse Alarm and Lamp
C4	Rear Work Lights
C5	Roadlights
C6	Air Conditioning

Relay	Circuit(s)
C7	Man Basket - Recovery Pump
D1	Brake Lights
D2	Air Conditioning
D3	Crank
D4	Front Work Lights
D5	Machine Isolation
D5	Man Basket - Remote Start

Engine Relays

Figure 341.

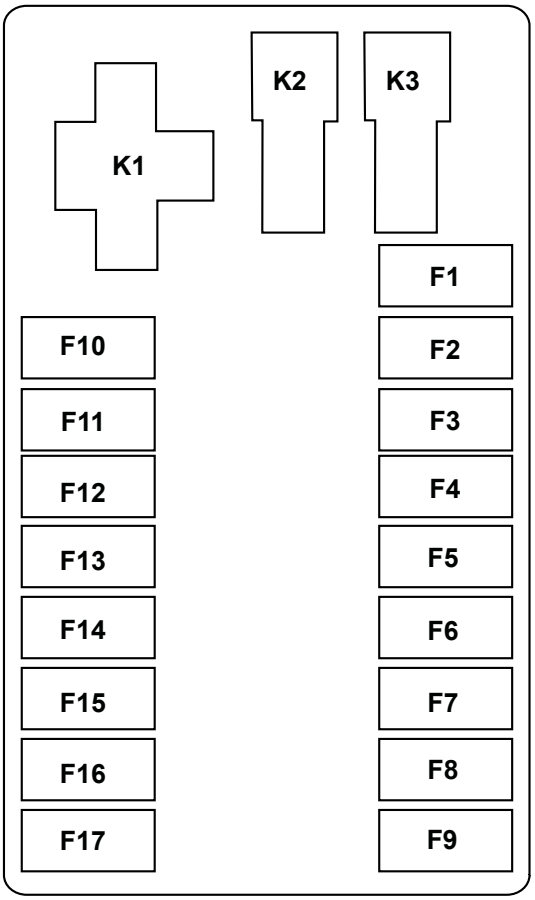

Table 104.

Relay	Circuit(s)
K1	Power hold relay
K2	Starter inhibit
K3	Fuel pump

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Engine

Exhaust After Treatment (EAT)

(For: 533-105 [T4F 3L], 533-105 [T4F], 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3], 535V140 [T4F], 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F], 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F], 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F], 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F], 550-140 [T4F], 550-140 [UN3/GB3], 550-170 [T4F], JCB (UN3/GB3) Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.4 over 55kw Electronic Dieselmax Turbocharged Aftercooled Engine, JCB T4F 4.8 Electronic Dieselmax Turbocharged Aftercooled Engine)

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.

Emissions control systems can be integrated into the base engine structure, or contained separately. To ensure the correct functioning of the engine and emissions control system all operation and maintenance must be conducted in accordance with the instructions of 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. Machine operation and maintenance must be in accordance with the instructions provided in the applicable machine operator manual. If the emissions control system is not functioning correctly and detects a fault, the operator will be informed by the operator warning system. Failure to respond to this warning and rectify the detected fault will lead to the activation of the operator inducement system. This system will limit engine performance until the detected fault is rectified and may result in the machine being unable to conduct its mission.

The issued type approval certificate is valid only when 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.

Your engine is equipped with an SCR (Selective Catalytic Reduction) after-treatment system. This is a fully automated system in which DEF (Diesel Exhaust Fluid) is fed into the exhaust to remove Nitrogen Oxides. It has a sophisticated system of self-monitoring and fault detection to ensure it is both reliable and compliant to applicable emissions legislation.

The engine must operate with DEF of the correct specification at all times. Correct use and refuelling of the DEF system is essential to ensure the correct functioning of the engine and emission control system.

In order that the machine can be compliant across all duty cycles the performance of the SCR must be maintained. If a machine is used for a prolonged period in light duties the SCR can become less efficient. Therefore the engine is equipped with a mode which runs the after-treatment system at typical operating temperatures whilst the machine is being lightly used. In this way the SCR is refreshed while the machine is running normally. This is automatic and seamless to the operator and the machine can continue to be operated normally while this is happening.

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 machine at a higher duty or complete the refresh cycle with the machine stationary. This again is a fully automatic process once initiated by the operator.

If the operator ignores the warnings and does not complete a stationary refresh then the SCR will cease to be compliant and the engine will derate in accordance with the legislative requirements until a stationary refresh has been completed.

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The system has been designed such that the majority of customers should not have to invoke a stationary refresh, however the mode exists to ensure all products remain compliant. Typically the earliest a refresh would be required is around 700-1000 hours.

Stationary Refresh

- The engine is equipped with a setting that will automatically run the exhaust system hot enough while the machine is stationary. The operator will need to park the machine in a safe position and acknowledge that the machine can run a stationary refresh by initiating the procedure. Refer to the machine operator manual stationary refresh initiation procedure.
  Refer to: Instrument Panel (Page 73).

DEF Levels

The engine or SCR will not be damaged when you run out of DEF. To protect itself the machine performance will be reduced. Refill the DEF tank to restore performance.

The engine will not shut down if you run out of DEF, however it will:

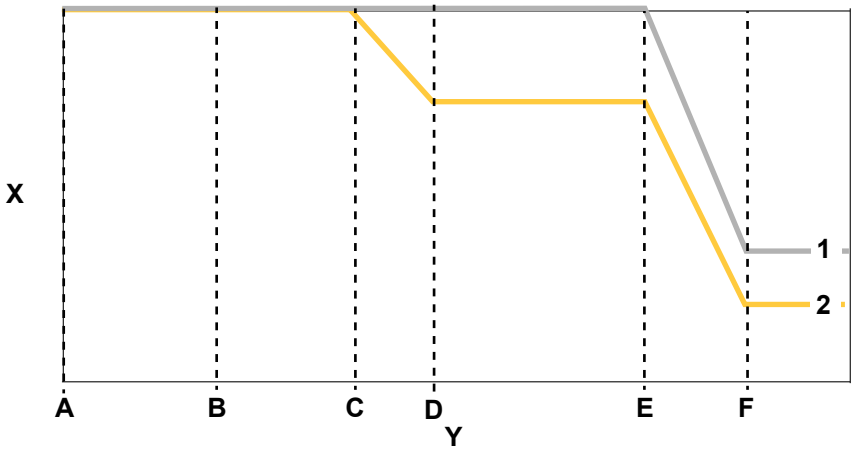
- Give the driver a warning when the remaining level falls low, which if continually ignored will progressively automatically reduce engine torque and reduce engine speed to tick over, preventing effective working activity.
- Allow only enough power for ‘limp home’ i.e to move the machine to a safe area or onto a trailer.
- Restore power when the DEF tank is refilled.

Attempting to operate the machine without DEF is a Federal Offence in the United States of America, operators may be prosecuted under the Clean Air Act.

DEF is required for type approval, operators attempting to operate the machine without DEF may be liable for civil and criminal prosecution in the European Union.

If there are no other engine or emission system faults, the information below explains when the engine power and speed de-ratings occur, according to DEF tank level.

Figure 342. DEF Level Warning Graph



A DEF level Low. Early warning to operator - Fill up this shift
B DEF level indicated critical low. Last warning to operator - Fill up now
C 0% DEF level indicated on level gauge. Machine starts to derate (reduced torque) - Fill up now
D Engine torque will remain at the levels shown for a period - Fill up now
E Engine torque begins reduce further, engine maximum speed begins to reduce - Fill up now
F Engine torque and engine maximum speed will remain at the levels shown. The engine will no longer respond when the accelerator is operated - Fill up now

1 Engine speed
2 Engine torque

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X Percentage

Y Time

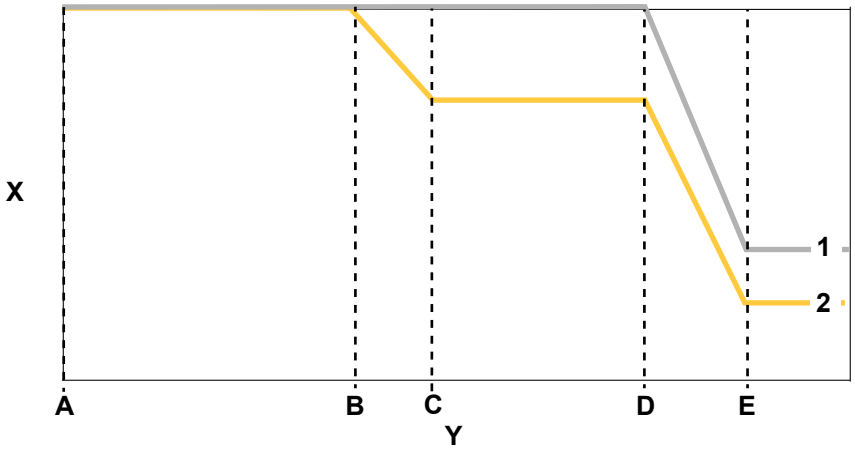
Emissions System- First Fault

The presence of emissions system related faults will result in (initially) warnings given and engine power reduction. If the warnings continue to be ignored, it will lead to the engine being only able to idle, and then only at reduced idle power.

If the engine is shut down by the operator during these steps, unless the fault is repaired, the duration of the step will resume from the point at which it was left.

If the fault is still detected again when the engine is restarted, the engine will continue at reduced power.

Figure 343. Emissions System First Fault Graph



A Fault detected

B Fault continues to be ignored, engine torque reduction begins, engine maximum speed is unaffected

C Engine torque will remain at the levels shown for a period

D Fault continues to be ignored, engine torque begins reduce further, engine maximum speed begins to reduce

E Engine torque and engine maximum speed will remain at the levels shown. The engine will no longer respond when the accelerator is operated

1 Engine speed

2 Engine torque

X Percentage

Y Time

Emissions Systems Faults - Additional Faults Within 40 Hours of The First Fault

If the emissions system detects a second fault within 40 engine hours of a previous fault occurring, the system will reduce power immediately to protect the engine, this is usually indicative of a more serious fault with the system. The system will return to normal operation when the fault(s) are repaired.

Table 105. Emissions system-Faults occurring in less than 40 hours

Parameter	Subsequent Fault Effects
Engine power output	Initial full power further reduces to limited power at idle speed only over time.
Engine RPM limit	Reducing to idle speed only over time
Driver/operator action needed	If appropriate to the application, park the machine in a safe place. Contact your JCB engines dealer immediately

DEF DO's and DON'Ts

DO's

- Before engine start up, locate and identify both separate diesel and DEF tanks, they do not share the same tank. Do not allow cross contamination between diesel and DEF.
- Act on machine warnings that DEF is running low.
- Ensure that there is sufficient DEF in the machine at all times.
- Use only high quality DEF to ISO 22241-1 from a reputable source.
- Keep all DEF, tanks, tank necks, drums and dispensing equipment clean to prevent contamination.

DON'Ts

- Don't allow contamination of your DEF by dirt or fluid as it will damage the SCR system.
- Don't mix DEF with your diesel; it is not a fuel additive.
- Don't put DEF in your diesel tank – if you do, do not start the engine, call your JCB dealer immediately.
- Don't add chemicals to your DEF to prevent freezing.
- Don't dilute DEF with water or any other fluids or the machine may stop or be permanently damaged.
- When the engine is switched off, there is a small pump in the DEF system which purges the line from the supply module to the dosing injector. Don't remove the battery isolator for 30s so this operation can be completed and the system shut down correctly. Some machines may be fitted with a power hold relay to prevent this purge from being interrupted by operating the isolator.

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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 cab 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

In this manual rims with a value greater than zero e.g '13' are considered outset (wider track).

In this manual rims with a value less than zero e.g '-13' are considered inset (narrower track).

Heavy duty tyres such as semi-solids and Michelin XMine D2 tyres are limited to a maximum travel distance of 6km (3.1/2mi) in any 1h period to prevent tyres overheating. Speeds above 6km/h (3.7mph) are permitted in short bursts provided the maximum distance travelled in 1h does not exceed 6km (3.7mi).

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.

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Tyre Sizes and Pressures

For: 535V140 [T4F] ..... Page 386
For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F] ..... Page 388
For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F] ..... Page 390
For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3] ..... Page 392
For: 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F] ..... Page 394
For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F] ..... Page 396
For: 533-105 [T4F] ..... Page 398

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(For: 535V140 [T4F])

Table 106. Tyre Specifications

Brand	Size	Designation	Load Index/ Speed Rating	Inflation Pressure bar (psi)	JCB Tyre Part Number	Max. Speed km/h (mph)
Michelin	15.5 - 25	XHA L3	146 A8	4.5 (65.2)	42/105900	30 (18.6)
Goodyear	15.5 - 25 12 PR	SGL	168 A2	4 (58.0)	42/405700	30 (18.6)
JCB Sitemaster	15.5/80 - 24 12PR	IMP I-3 TRACTION	145 A6	4 (58.0)	332/H7460	30 (18.6)
JCB Earthmover	15.5 R25	925 GPR L3	160 B	4.5 (65.2)	42/925396	30 (18.6)
Michelin	400/80 - 24	IND TL POWER CL	162 A8	4 (58.0)	332/C4655	30 (18.6)
Mitas	15.5/80 - 24 16PR	TR-01 TRACTION	159 A8	4.1 (59.4)	332/F6055	30 (18.6)
JCB Sitemaster	15.5 25 12 PR	XLW	168 A2	4 (58.0)	332/H7461	30 (18.6)
Nokian	460/65 R24	TRI 2	148 D	4.5 (65.2)	42/925398	30 (18.6)

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Hitch Options

Table 107. Maximum Trailer Mass

Hitch Type	Mechanical Hitch H0[1]	Rockinger Fixed Clevis (Auto/Manual) H2/H3
Brake System	**Maximum Trailer Mass kg[2]**	
Unbraked	750	750
Inertia braked	750	3,500

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass or prevent towing on public highways.

Table 108. Maximum Allowable Vertical Hitch Load

Hitch Type	Mechanical Hitch H0[1]	Rockinger Fixed Clevis (Auto/Manual) H2/H3
JCB Tyre Part Number	**Maximum Allowable Vertical Hitch Load kg[2]**	
42/105900 Michelin 15.5 R25 XHA	-	-
42/405700 Goodyear 15.5-25 SGL	500	1,510
332/H7460 JCB Sitemaster 15.5/80-24 I-3	-	-
42/925396 JCB Earthmover 15.5 R25 925	500	1,480
332/C4655 Michelin 400/80-24 Power CL	500	1,500
332/F6055 Mitas 15.5/80-24 TR-01	500	1,500
332/H7461 JCB Sitemaster 15.5-25 XLW	500	1,480
42/925398 Nokian 460/65 R24 TRI 2	500	1,500

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass or prevent towing on public highways.

(For: 540-170 MP [UN3/GB3], 540-170 Work Platform [T4F], 540-170 [T4F 3L], 540-170 [T4F])

Table 109. Tyre Specifications

Brand	Size	Designation	Load Index/ Speed Rating	Inflation Pressure bar (psi)	JCB Tyre Part Number	Max. Speed km/h (mph)
Michelin	15.5 R25	XHA	169 A2	4.5 (65.2)	42/105900	30 (18.6)
Galaxy	15.5 - 25 12 PR	GIRAFFE L2 TRACTION	168 A2	4 (58.0)	332/D0017	30 (18.6)
Michelin	15.5 R25	XTLA L2	169 A2	4.5 (65.2)	42/107000	30 (18.6)
JCB Sitemaster	15.5 - 25 12 PR	XLW	168 A2	4 (58.0)	332/H7461	30 (18.6)
Michelin	440/80 - 24 22PR	IND TL POWER CL	168 A8	4.5 (65.2)	332/C4139	30 (18.6)
JCB Earthmover	15.5 R25	925 GPR L3	160 B	4.5 (65.2)	42/925396	30 (18.6)
Nokian	460/65 R24	TRI 2	156 A8	4.5 (65.2)	42/925398	30 (18.6)
MITAS	15.5/80-24	TR-01 TRACTION	151 A8	4.75 (68.8)	334/E3667	30 (18.6)
JCB	440/80-24	SITEMASTER	168 A8	5 (72.5)	400/G1340	30 (18.6)

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Hitch Options

Table 110. Maximum Trailer Mass

Hitch Type	**Mechnical Hitch H0**[1]
Brake System	**Maximum Trailer Mass kg**[2]
Unbraked	750
Inertia braked	750

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass or prevent towing on public roads.

Table 111. Maximum Allowable Vertical Hitch Load

Hitch Type	**Mechanical Hitch H0**
JCB Tyre Part Number	**Maximum Allowable Vertical Hitch Load kg**
42/105900	500
332/D0017	500
42/107000	500
332/H7461	500
332/C4139	500
42/925396	500
42/925398	500
334/E3667	500
400/G1340	500

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(For: 540-200 Work Platform [T4F], 540-200 [T4F 3L], 540-200 [T4F])

Table 112. Tyre Specifications

Brand	Size	Designation	Load Index/ Speed Rating	Inflation Pressure bar (psi)	JCB Tyre Part Number	Max. Speed km/h (mph)
Michelin	440/80 - 24 22PR	IND TL POWER CL	168 A8	4.5 (65.2)	332/C4139	30 (18.6)
Goodyear	17.5 - 25 16 PR	SGL	177 A2	4.5 (65.2)	42/925256	30 (18.6)
Galaxy	17.5 - 25 16 PR	XLW	177 A2	4.5 (65.2)	335/C1604	30 (18.6)

Work platform and work platform ready machines require run flat inserts to be fitted to the rear wheels.

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Hitch Options

Table 113. Maximum Trailer Mass

Hitch Type	**Mechanical Hitch H0**[1]
Brake System	**Maximum Trailer Mass kg**[2]
Unbraked	750
Inertia braked	750

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass or prevent towing on public roads.

Table 114. Maximum Allowable Vertical Hitch Load

Hitch Type	**Mechanical Hitch H0**
JCB Tyre Part Number	**Maximum Allowable Vertical Hitch Load kg**
332/C4139 Michelin 440/80-24 Power CL	500
42/925256 Goodyear 17.5-25 SGL	500
335/C1604 Galaxy 17.5-25 XLW	500

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(For: 535V125 [T4F 3L], 535V125 [T4F], 535V125 [UN3/GB3])

Table 115. Tyre Specifications

Brand	Size	Designation	Load Index/ Speed Rating	Inflation Pressure bar (psi)	JCB Tyre Part Number	Max. Speed km/h (mph)
Michelin	15.5 R25	XHA L3	146 A8	4.5 (65.2)	42/105900	30 (18.6)
Michelin	400/80 - 24	IND TL POWER CL	162 A8	4.8 (69.6)	332/C4655	30 (18.6)
Goodyear	15.5 - 25 12 PR	SGL	168 A2	4.25 (61.6)	42/405700	30 (18.6)
JCB Sitemaster	15.5 - 25 12 PR	XLW	168 A2	5 (72.5)	332/H7461	30 (18.6)
Mitas	15.5/80 - 24	TR-01 TRACTION	159 A8	4.1 (59.4)	332/F6055	30 (18.6)
JCB Sitemaster	15.5/80 - 24 12 PR	IMP I-3 TRACTION	145 A6	5 (72.5)	332/H7460	30 (18.6)
Mitas	400/80 - 24	IND TI05	162 A8	5 (72.5)	334/F3758	30 (18.6)
Nokian	460/65 R24	TRI 2	148 D	4.5 (65.2)	42/925398	30 (18.6)

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Hitch Options

Table 116. Maximum Trailer Mass

Hitch Type	Mechanical Hitch H0[1]	Rockinger Fixed Clevis (Auto/Manual) H2/H3
Brake System	**Maximum Trailer Mass kg[2]**	
Unbraked	750	750
Inertia braked	750	3,500

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass or prevent towing on public highways.

Table 117. Maximum Allowable Vertical Hitch Load

Hitch Type	Mechanical Hitch H0[1]	Rockinger Fixed Clevis (Auto/Manual) H2/H3
JCB Tyre Part Number	**Maximum Allowable Vertical Hitch Load kg[2]**	
42/105900 Michelin 15.5 R25 XHA	500	800
332/C4655 Michelin 400/80-24 Power CL	500	2,000
42/405700 Goodyear 15.5-25 SGL	500	2,000
332/H7461 JCB Sitemaster 15.5-25 XLW	500	2,000
332/F6055 Mitas 15.5/80-24 TR-01	500	2,000
332/H7460 JCB Sitemaster 15.5/80-24 I-3	500	500
42/925398 Nokian 460/65 R24 TRI 2	500	2,000
334/F3758 Mitas 400/80-24 TI05	500	2,000

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass or prevent towing on public highways.

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(For: 540V140 Work Platform [T4F], 540V140 [T4F 3L], 540V140 [T4F])

Table 118. Tyre Specifications

Brand	Size	Designation	Load Index/ Speed Rating	Inflation Pressure bar (psi)	JCB Tyre Part Number	Max. Speed km/h (mph)
Michelin	15.5 R25	XHA L3	146 A8	4.5 (65.2)	42/105900	30 (18.6)
Goodyear	15.5 - 25 12 PR	SGL	168 A2	4.25 (61.6)	42/405700	30 (18.6)
JCB Sitemaster	15.5 25 12 PR	XLW	168 A2	5 (72.5)	332/H7461	30 (18.6)
Mitas	15.5/80 - 24	TR-01 TRACTION	159 A8	4.1 (59.4)	332/F6055	30 (18.6)
Michelin	400/80 - 24	IND TL POWER CL	162 A8	4.8 (69.6)	332/C4655	30 (18.6)
Nokian	460/65 R24	TRI 2	148 D	4.5 (65.2)	42/925398	30 (18.6)
Mitas	400/80 - 24	IND TI05	162 A8	5 (72.5)	334/F3758	30 (18.6)

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Hitch Options

Table 119. Maximum Trailer Mass

Hitch Type	**Mechanical Hitch H0**[1]	
Brake System	**Maximum Trailer Mass kg**[2]	
Unbraked	750	750
Inertia braked	750	3,500

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass or prevent towing on public highways.

Table 120. Maximum Allowable Vertical Hitch Load

Hitch Type	**Mechanical Hitch H0**[1]	**H2/H3**
JCB Tyre Part Number	**Maximum Allowable Vertical Hitch Load kg**[2]	**Maximum Allowable Vertical Hitch Load**
42/105900 Michelin 15.5 R25 XHA	500	50
42/405700 Goodyear 15.5-25 SGL	500	1,600
332/H7461 JCB Sitemaster 15.5-25 XLW	500	1,600
332/F6055 Mitas 15.5/80-24 TR-01	500	1,900
332/C4655 Michelin 400/80-24 Power CL	500	2,000
42/925398 Nokian 460/65 R24 TRI 2	500	2,000
334/F3758 Mitas 400/80-24 TI05	500	2,000

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass or prevent towing on public highways.

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(For: 540V180 Work Platform [T4F], 540V180 Work Platform [UN3/GB3], 540V180 [T4F 3L], 540V180 [T4F])

Table 121. Tyre Specifications

Brand	Size	Designation	Load Index/ Speed Rating	Inflation Pressure bar (psi)	JCB Tyre Part Number	Max. Speed km/h (mph)
Michelin	15.5 R25	XHA L3	146 A8	4.5 (65.2)	42/105900	30 (18.6)
Goodyear	15.5-25 12PR	SGL	168 A2 / 149 B	4.25 (61.6)	42/405700	30 (18.6)
JCB Sitemaster	400/80-24	TRACTION	162 A8	5 (72.5)	400/C6523	30 (18.6)
Michelin	400/80-24	IND TL POWER CL	162 A8	4.8 (69.6)	332/C4655	30 (18.6)
Mitas	400/80-24	IND TI05	162 A8	5 (72.5)	334/F3758	30 (18.6)
JCB Sitemaster	15.5-25 12PR	XLW	168 A2 / 149B	5 (72.5)	332/H7461	30 (18.6)
Michelin	460/70 R24	BIBLOAD	159 A8	4.4 (63.8)	334/D3793	30 (18.6)

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Hitch Options

Table 122. Maximum Trailer Mass

Hitch Type	Mechanical Hitch H0[1]
Brake System	**Maximum Trailer Mass kg[2]**
Unbraked	750
Inertia braked	750

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass or prevent towing on public highways.

Table 123. Maximum Allowable Vertical Hitch Load

Hitch Type	Mechanical Hitch[1]	H2/H3
JCB Tyre Part Number	**Maximum Allowable Vertical Hitch Load kg[2]**	**Maximum Allowable Vertical Hitch Load[2]**
42/105900 Michelin 15.5 R25 XHA	500	1,400
42/405700 Goodyear 15.5-25 SGL	500	1,400
332/H7461 JCB Sitemaster 15.5-25 XLW	500	1,400
332/F6055 JCB Sitemaster 400/80-24	500	1,250
332/C4655 Michelin 400/80-24 Power CL	500	1,250
334/F3758 Mitas 400/80-24 TI05	500	1,250

(1) The mechanical hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass or prevent towing on public highways.

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(For: 533-105 [T4F])

Table 124. Tyre Specifications

Brand	Size	Designation	Load Index/ Speed Rating	Inflation Pressure bar (psi)	JCB Tyre Part Number	Max. Speed km/h (mph)
Alliance	460/70R24 .	580 AGRO	159 A8	4 (58)	333/H7444	30 (18.6)
JCB Sitemaster	15.5/80 - 24 12 PR	SITEMASTER TRACTION	145 A6	4 (58)	332/H7460	30 (18.6)
Michelin	460/70R24	BIBLOAD HS	159 A8	4 (58)	334/D3793	30 (18.6)
Michelin	460/70R24	XMCL	159 A8	4 (58)	42/925369	30 (18.6)
Goodyear	15.5 - 25 12 PR	SGL	168 A2	4 (58)	42/405700	30 (18.6)
Michelin	15.5 R25	XHA	169 A2	4 (58)	42/105900	30 (18.6)
JCB Sitemaster	400/80-24	SITEMASTER	162 A8	4 (58)	400/C6523	30 (18.6)
Michelin	400/80-24	POWER CL	162 A8	4 (58)	332/C4655	30 (18.6)
MITAS	400/80-24	TI-05	162 A8	4 (58)	334/F3758	30 (18.6)

(1) This tyre is approved for fitment to European Tractor Type Approved Machines.
(2) These tyres are limited to a maximum travel distance of 6km (3.7 miles) in any one hour period. Speeds above 6kph (3.7 mph) are permitted in short bursts provided the maximum distance travelled in one hour does not exceed 6 km or 3.7 miles

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Hitch Options (JCB)

Table 125. Maximum Trailer Mass

Hitch Type	Recovery Hitch H0[1]
Brake System	**Maximum Trailer Mass kg[2]**
Unbraked	750
Inertia braked	750
Independently braked	750
Proportional assisted braking	750

(1) The recovery hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass.

Table 126. Maximum Tractor-Trailer Combination Mass

Hitch Type	Recovery Hitch H0[1]
Brake System	**Maximum Tractor-Trailer Mass kg[2]**
Unbraked	9,515
Inertia braked	9,515
Independently braked	9,515
Proportional assisted braking	9,515

(1) The recovery hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass.

Table 127. Maximum Allowable Vertical Hitch Load

Hitch Type	Recovery Hitch H0[1]
JCB Tyre Part Number	**Maximum Allowable Vertical Hitch Load kg[2]**
333/H7444	500
332/H7460	500
334/D3793	500
42/925369	500
42/405700	500
42/105900	500
400/C6523	500
332/C4655	500
334/F3758	500

(1) The recovery hitch is only suitable for occasional off-highway use.
(2) Local legislation may limit the maximum trailer mass.

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Star Industries Truss Boom

General

(For: 550-170 [T4F])

1360B Truss Boom Approval Letter - 22/6/2015

Subject: The use of a Star Industries Extendable Truss Boom Model 1360B 2015 Model on the following JCB Loadall models: 506-36, 507-42, 509-42, 510-42, 510-56, 512-56, 514-56 and 550-170.

Subject to the requirements of this letter, JCB authorizes the owner of all JCB telescopic handlers listed above to use the Star Industries Extendable Truss Boom Model 1360B (maximum reach 144 inches and weight of 570 lbs) based on the requirements hereinafter.

WARNING! *Failure to comply with all restrictions, instructions and warnings contained in this letter and in all Operator Manuals could result in death or serious injury. A suspended load has a dynamic, and therefore unpredictable, effect on machine stability, so extreme caution should always be exercised when operating with suspended loads including but not limited to 29 CFR 1926 Subpart CC.*

Owner/Employer/Operator Requirements

1. A copy of this letter and the Star Industries Extendable Boom operator's manual must accompany the operator and safety manuals at all times in the weather resistant storage compartment located on the equipment.
    1.1. Read, understand and follow the proper installation and operating instructions of the Star Industries Extendable Boom.
2. Operators must be trained and qualified how to safely operate the equipment and be familiar with the specific model of telescopic handler as follows:
    2.1. Operators must be trained and qualified how to safely operate the equipment and be familiar with the specific model of telescopic handler as follows:
    2.2. Understand all control functions, decals and warnings.
    2.3. Be aware of and understand all safety devices specific to the equipment being used.
    2.4. Be instructed regarding the specific hazards associated with using the JCB telescopic handler with a suspended load, and utilize all means, including those provided by the employer, to avoid them.
    2.5. Using the JCB telescopic handler with a suspended load, the operator must only use a telescopic handler fork carriage.
3. The employer and operator shall identify the specific hazards associated with operating the equipment with a suspended load and utilize all means to prevent surrounding personnel and traffic from being exposed to these hazards. Do not allow personnel under a suspended load.
4. The owner, employer and the operator shall comply with all applicable jobsite, local, state, provincial, or federal rules, regulations and standards related to the use of the equipment with the Star Industries Extendable Boom and a suspended load.
5. The operator must use the telescopic handler load chart for the Star Industries Extendable Boom supplied with this letter and corresponding to the specific telescopic handler model, if one is not already supplied with the telescopic handler. It is the responsibility of the employer and/or operator to place the appropriate load chart in the JCB telescopic handler in a clearly visible location for the operator in their normal operating position.

Lamination of the load chart may help minimize potential damage.

Specific Training

1. The employer shall provide any additional training to the operator, and other personnel, that is deemed necessary to safely operate the JCB telescopic handler with a suspended load, which may include but not be limited to the following:

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Setup

1. If the telescopic handler has a hydraulically powered fork carriage:
    1.1. Verify that the fork carriage is reset to 0 degrees rotation on its pivot axis.
    1.2. Turn off the telescopic handler and disable the hydraulic power to the attachment by disconnecting the hydraulic couplings to the attachment.
2. Position both forks equally from the centreline of the fork carriage such that the load center of the attachment is on centre with the fork carriage and boom.
3. Secure the attachment to the forks and fork carriage according to the manufacturer's instructions.

Rigging

1. A qualified rigger shall determine the most appropriate rigging equipment, and methods, to properly secure the load such that unintentional unhooking or displacement of the load or rigging is avoided.
2. All rigging shall be approved, and in proper working condition, by the employer prior to lifting.
3. Suspend the load in a position to help minimize potential swinging; any ropes or chains used should be as short as practicable.
4. If possible, position the load in a manner that will help minimize the exposed surface area to wind.

Signal person

1. A signal person must be provided in each of the following situations
    1.1. The point of operation, meaning the load travel or the area near or at the load placement point, is not in full view of the operator.
    1.2. The point of operation, meaning the load travel or the area near or at the load placement point, is not in full view of the operator.
    1.3. Due to site specific safety concerns, either the operator or the person handling the load determines that it is necessary.
2. The signals used (hand, voice or audible), and means of transmitting the signals to the operator (such as direct line of sight, video, radio, etc.), must be appropriate for the site conditions.
3. When using hand signals, the Standard Method must be used (see Appendix A of 1926 Subpart CC). Exception: Where use of the Standard Method for hand signals is not feasible, or where an operation or use of an attachment is not covered in the Standard Method, nonstandard hand signals may be used in accordance with paragraph (c)(2) of 1926.1419.

Lifting

1. Do not leave the controls while the load is suspended except when a competent person determines it is safe to do so.
    1.1. Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
2. Only lift the load when the telescopic handler is on firm level ground.
3. Do not operate the machine while people are under a suspended load. If people are approaching an elevated load, immediately inform them to evacuate the area.
4. All movements of the load must be accomplished at lowest possible speed.
5. Do not lift loads in windy conditions that will result in the movement of the load away from the boom's centreline.
6. Level the telescopic handler with sway before lifting the load.

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7. Deploy stabilizers, if equipped, prior to picking or placing the suspended load.
8. Do not tilt the forks forward from the tilted back position with a suspended load.
9. Use guide ropes or tag lines by qualified personnel to help control the load and prevent it from swinging.
10. Do not attempt to use the telescopic handler frame levelling to compensate for a swinging load.
11. Never drag the load.
12. Do not try to move fixed or obstructed loads.
13. Only lift a load vertically; do not pull a load horizontally as it could cause excessive swinging of the load.
14. Always operate within the load capacities of the load chart.

Visibility

1. When visibility is or could be obstructed, the operator shall use alternative/additional means to safely transport the load.
    1.1. Use of additional personnel to direct the operator in his movements as well as the surrounding ground traffic.

Travel

1. A competent person shall supervise the operation, and determine if it is necessary to reduce rated capacity, and make a determination regarding load position, boom location, ground support, travel route, overhead obstructions, and speed of movement necessary to ensure safety.
2. Speed shall be limited by any conditions that could cause any unexpected movement of the load, or jeopardize the safe transport of the load.
3. The telescopic handler boom shall be retracted and lowered as much as possible.
4. The load shall be transported as low to the ground as practical.
5. Only travel on solid surfaces.
6. Start, travel, turn and stop slowly to prevent the load from becoming unstable or swinging.
7. Do not exceed walking speed.
8. Do not use any controls to re#position the load when traveling. Come to a gradual and complete stop before attempting to re#position the load.

Use Requirements/Considerations

1. This approval only applies for the primary intended purpose and use of the telescopic handler, as defined by ANSI/ITSDF B56.6.
2. Rigging shall comply with applicable ASME rigging standards (ex: B31.9, B30.26)
3. The combined load center shall be located approximately on the center line of the telescopic handler boom.
4. Rated lift capacities, of the telescopic handler, are with the machine on a firm level surface with undamaged, properly configured tires.
5. The additional weight of the rigging, the load, and the position of the combined load center, shall be taken into consideration and be deducted from the load chart capacity allowance prior to lifting.
6. The maximum load capacities referenced on the telescopic handler load charts shall not be exceeded.

In consideration for JCB's authorization herein, the equipment owner hereby agrees to indemnify and hold harmless JCB and its affiliated companies against any and all liability, claims, suits, losses, costs and legal fees arising out of or resulting from the modification to the JCB equipment; the failure to comply with the criteria

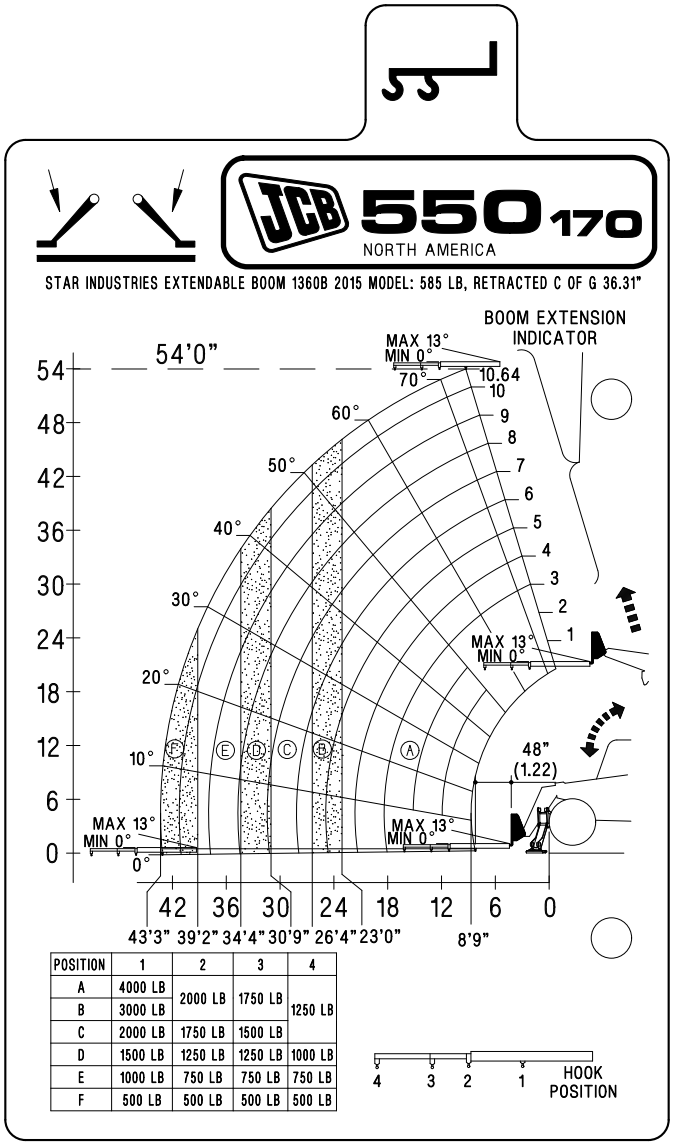
set forth in this letter related to the modification; the design, manufacture and installation of the modification; the safety rules and operating instructions in the Operator's Manual; the design and placement of any safety decals; the operation of the equipment by the owner, user and/or operator; and any negligent act or omission related to the equipment, its use or its modification.

BY PROCEEDING WITH THE MODIFICATION AUTHORIZED HEREIN, YOU AGREE TO THE CONTENTS OF THIS LETTER AND ITS CONDITIONS. IF YOU DO NOT AGREE, DO NOT PROCEED WITH THE PROPOSED MODIFICATION.

Load Charts

(For: 550-170 [T4F])

Figure 344.



POSITION	1	2	3	4
A	4000 LB	2000 LB	1750 LB	1250 LB
B	3000 LB			
C	2000 LB	1750 LB	1500 LB	
D	1500 LB	1250 LB	1250 LB	1000 LB
E	1000 LB	750 LB	750 LB	750 LB
F	500 LB	500 LB	500 LB	500 LB

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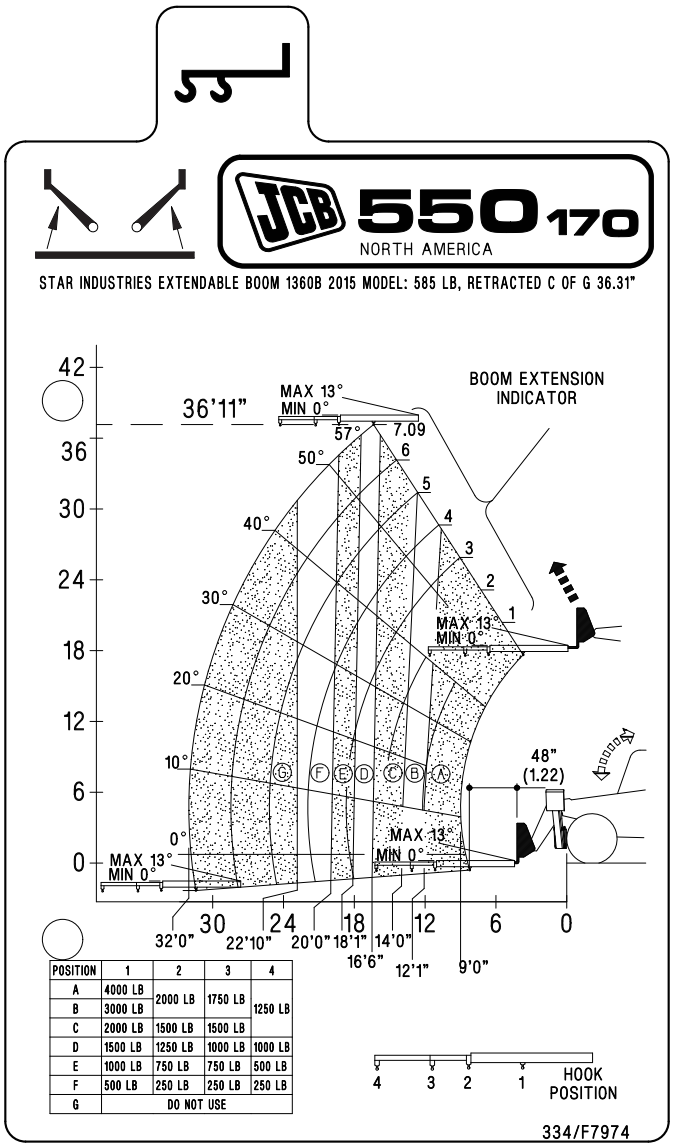
Figure 345.



POSITION	1	2	3	4
A	4000 LB	2000 LB	1750 LB	1250 LB
B	3000 LB			
C	2000 LB	1500 LB	1500 LB	
D	1500 LB	1250 LB	1000 LB	1000 LB
E	1000 LB	750 LB	750 LB	500 LB
F	500 LB	250 LB	250 LB	250 LB
G	DO NOT USE			

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Declaration of Conformity

General

A completed copy of the EC Declaration of Conformity is supplied with all machines manufactured according to EC type examination and/or self-certification requirements.

A sample copy of the EC Declaration of Conformity and a summary of the information that can appear is provided.
Refer to: Data (Page 405).

Data

Table 128.

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 349).
L	Refer to: Noise Emissions (Page 349).
M	Rocester.
N	Managing Director.

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Figure 346.

Declaration of Conformity

NAME AND ADDRESS OF MANUFACTURER — A

HEREBY DECLARES THAT THE MACHINERY / EQUIPMENT DESCRIBED
BELOW COMPLIES WITH ALL UK AND EU RULES AS APPLICABLE:
DESCRIPTION OF MACHINERY / EQUIPMENT — B
TRADE NAME: JCB

MODEL NAME — C

SERIAL NUMBER OF MACHINERY / EQUIPMENT — D

COMPLIES WITH THE PROVISIONS OF THE MACHINERY DIRECTIVE (DIRECTIVE 2006/42/EC AS AMENDED)
AND THE SUPPLY OF MACHINERY (SAFETY) REGULATIONS 2008 [AS AMENDED]
THE FOLLOWING STANDARDS HAVE BEEN USED — 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 — 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 — G

CONFORMITY ASSESSMENT PROCEDURE — H

NAME AND ADDRESS OF NOTIFIED BODY: — J

MEASURED SOUND POWER LEVEL ON EQUIPMENT
REPRESENATATIVE FOR THIS TYPE

GUARANTEED SOUND POWER LEVEL FOR THIS EQUIPMENT — K

NET INSTALLED POWER — L

PLACE OF DECLARATION — M
DATE OF DECLARATION dd/mm/yyyy XX/XX/XXX
NAME OF AUTHORISED SIGNATORY
POSITION

N

SIGNATURE XXXXXX

JCB Part No:

Warranty Information

Service Record Sheet

Table 129.

	Signature and stamp		Date
	Annual Insurance (Yes)		Hours

Figure 347. Installation Checklist

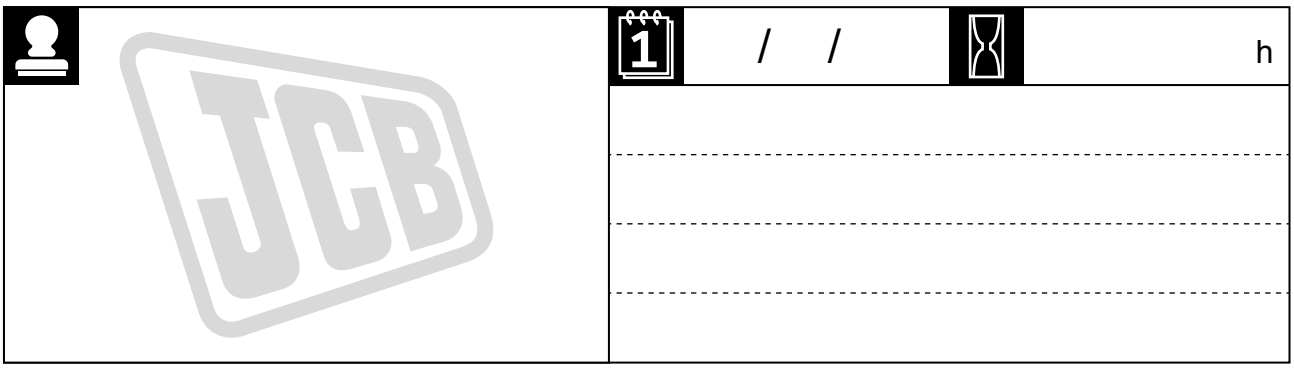

Figure 348. 1st 100h/1 Month

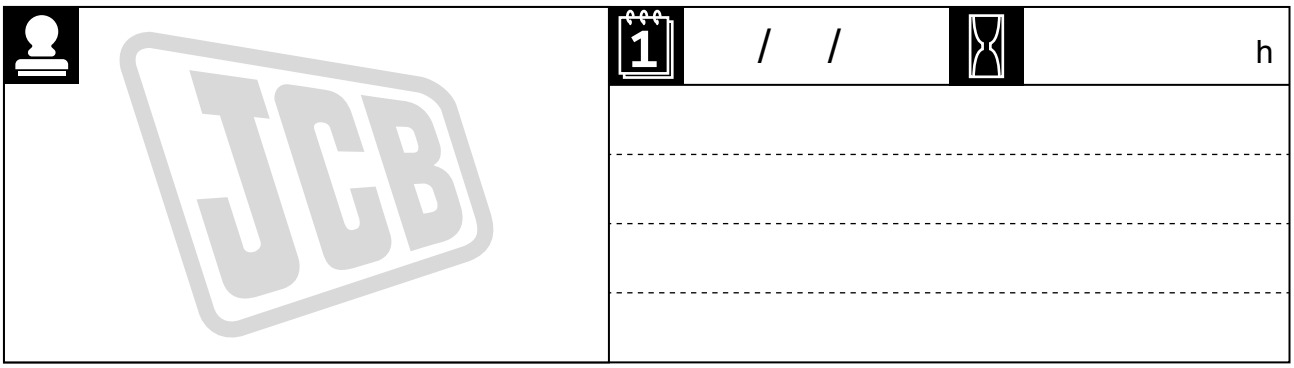

Figure 349. 500h/6 Month

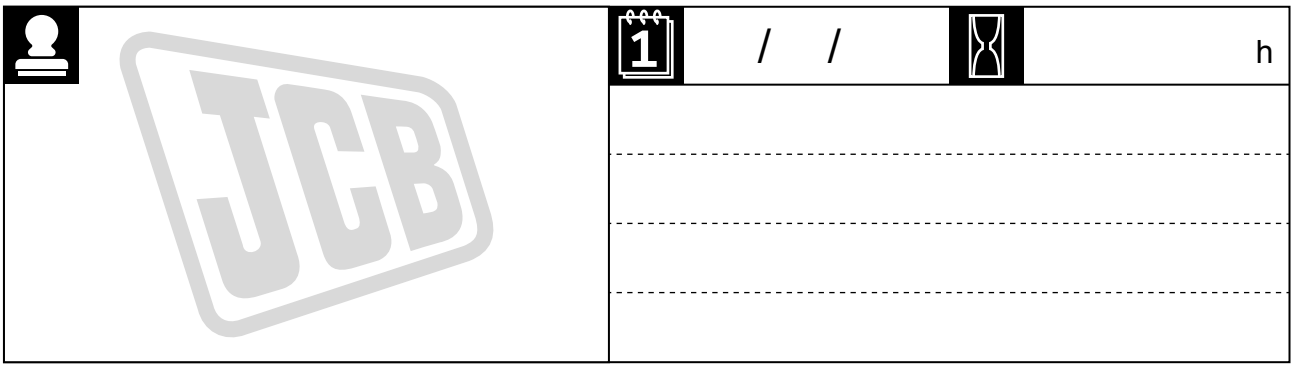

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Figure 350. 1000h/12 Month

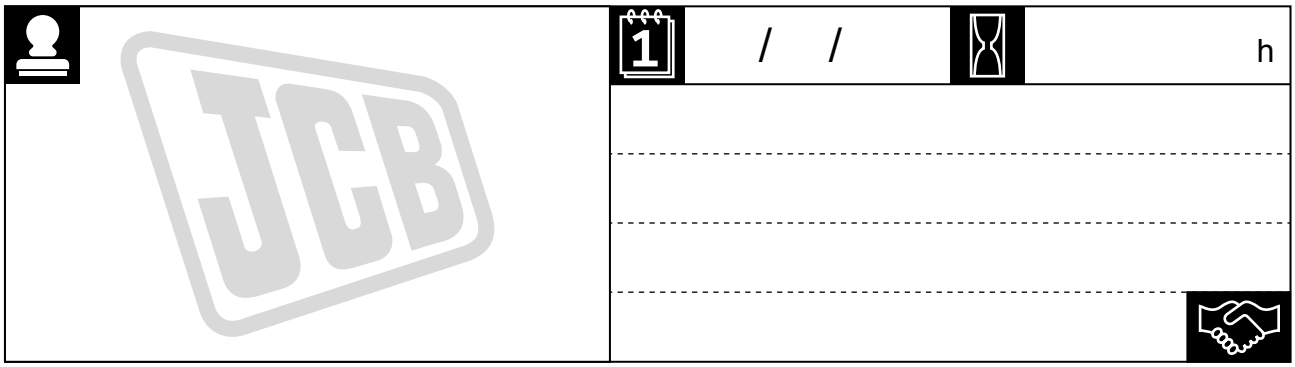

Figure 351. 1500h/18 Month

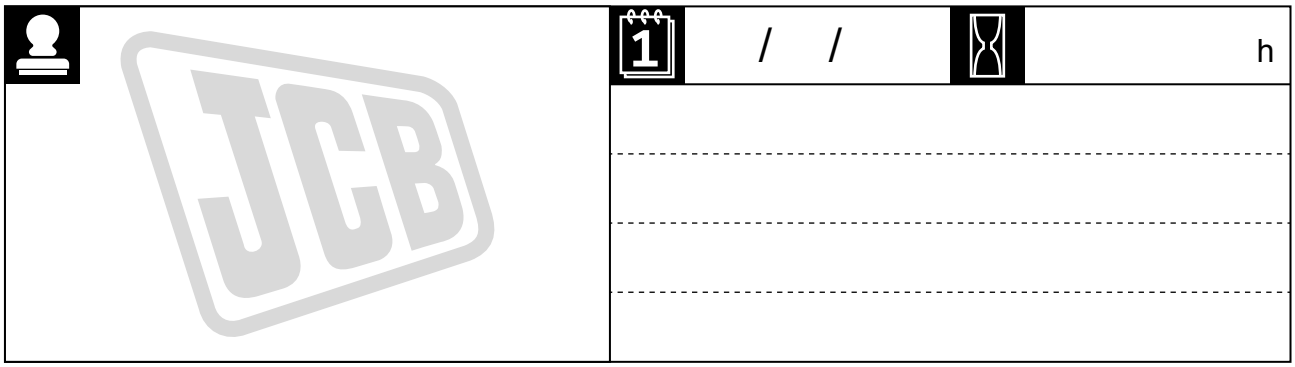

Figure 352. 2000h/24 Month

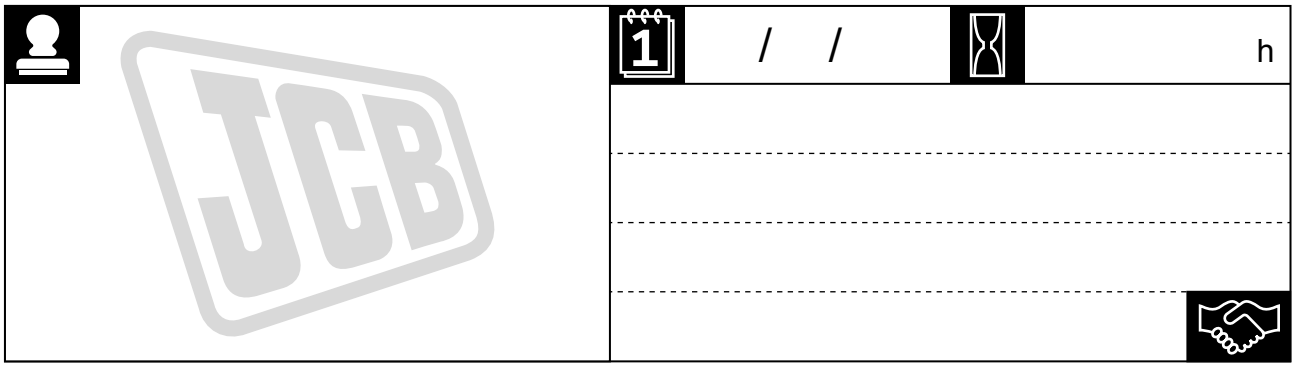

Figure 353. 2500h/30 Month

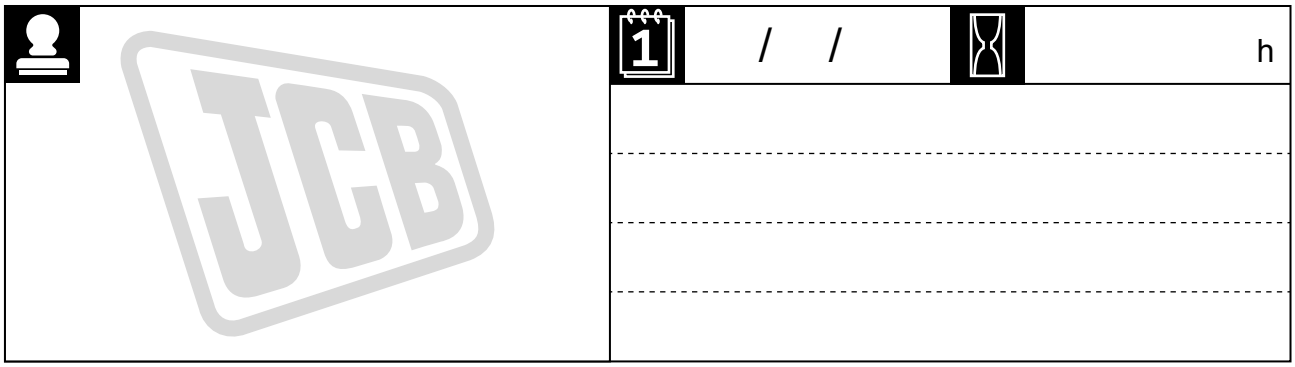

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Figure 354. 3000h/36 Month

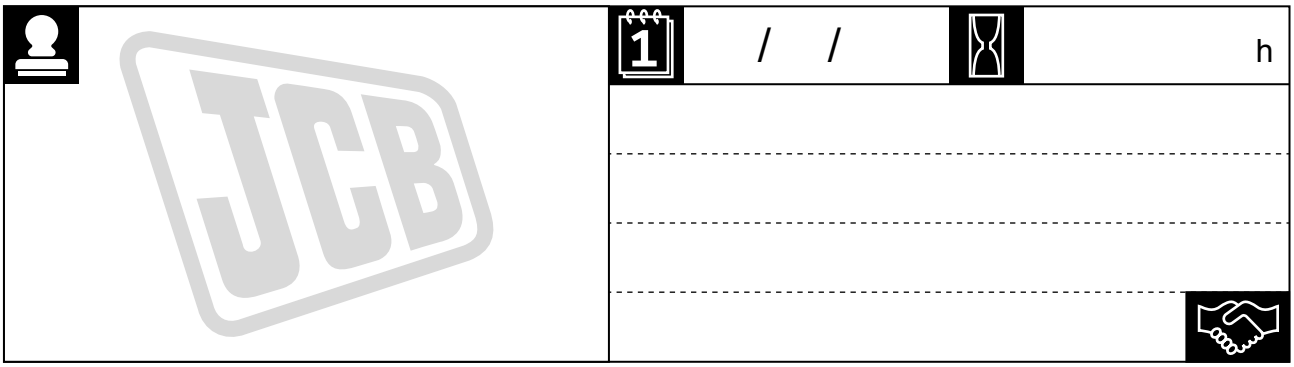

Figure 355. 3500h/42 Month

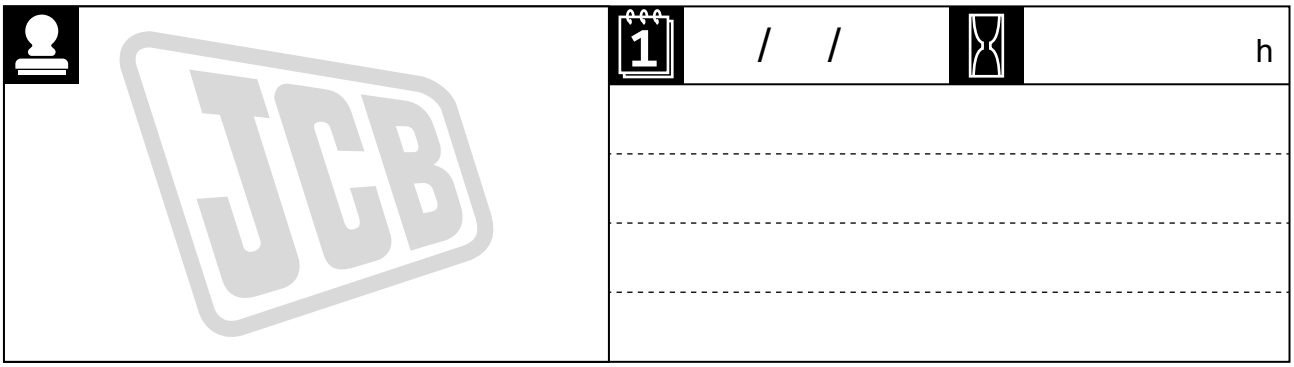

Figure 356. 4000h/48 Month

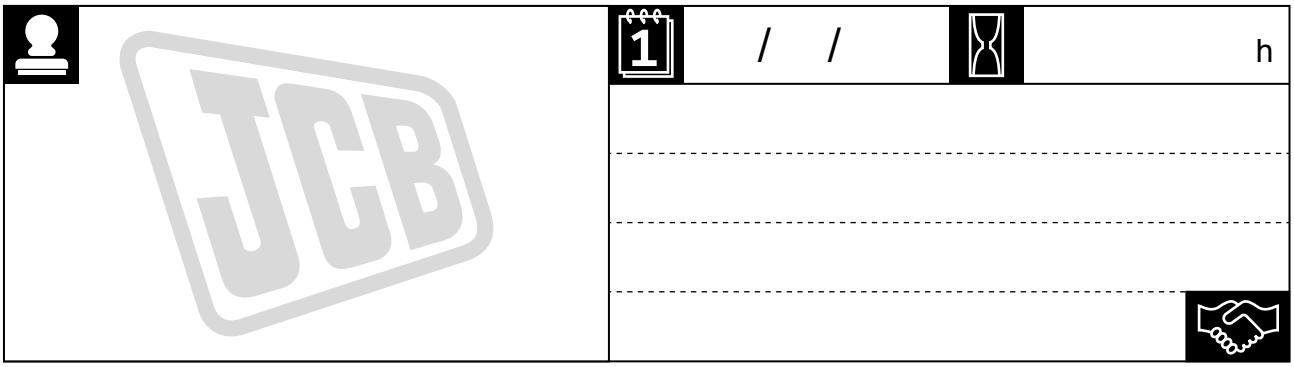

Figure 357. 4500h/54 Month

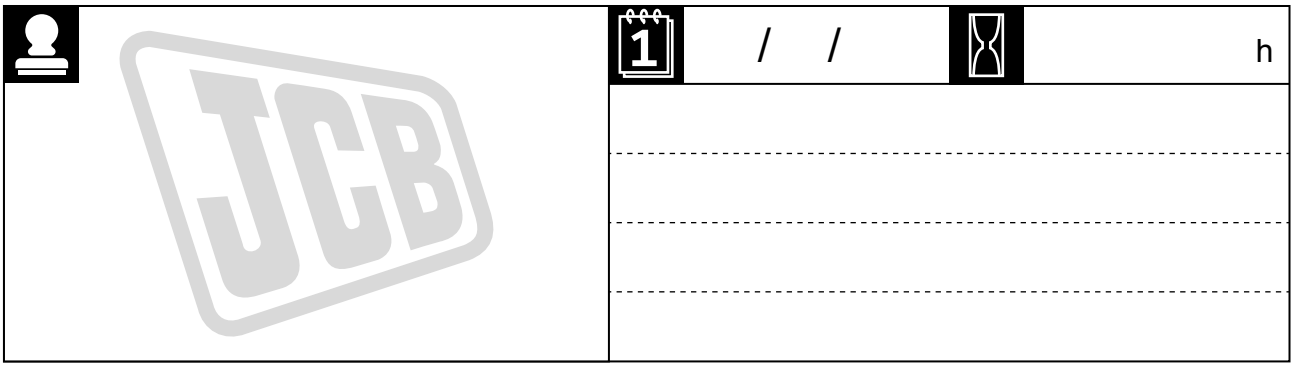

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Figure 358. 5000h/60Month

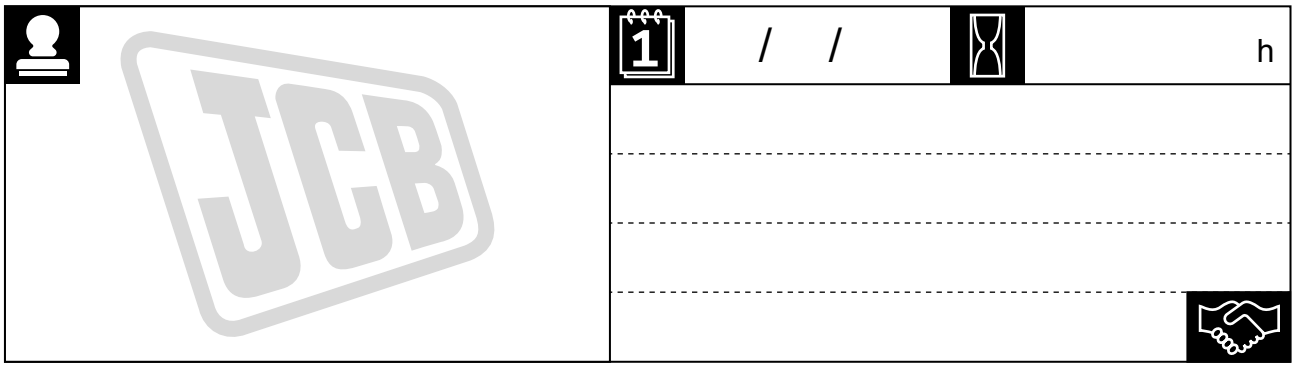

Figure 359. 5500h/66 Month

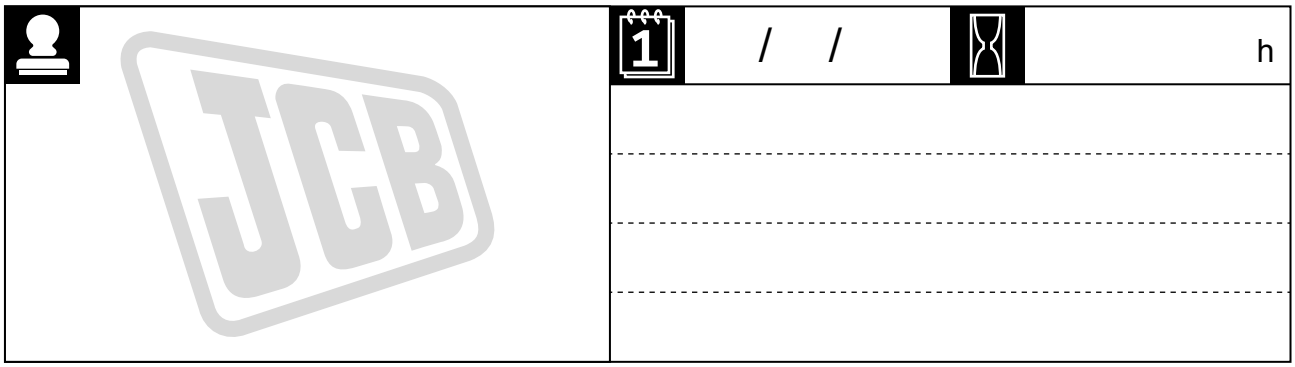

Figure 360. 6000h/72 Month

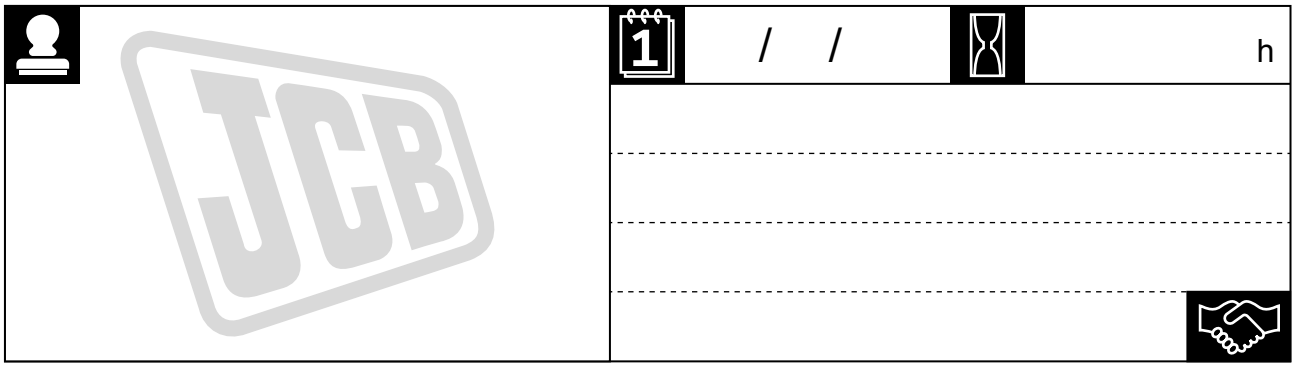

Figure 361. 6500h/78 Month

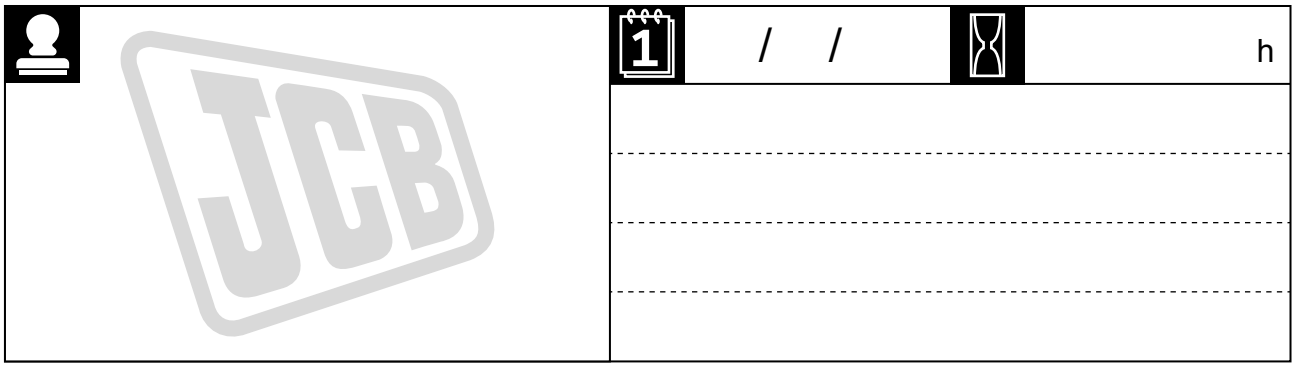

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Figure 362. 7000h/84 Month

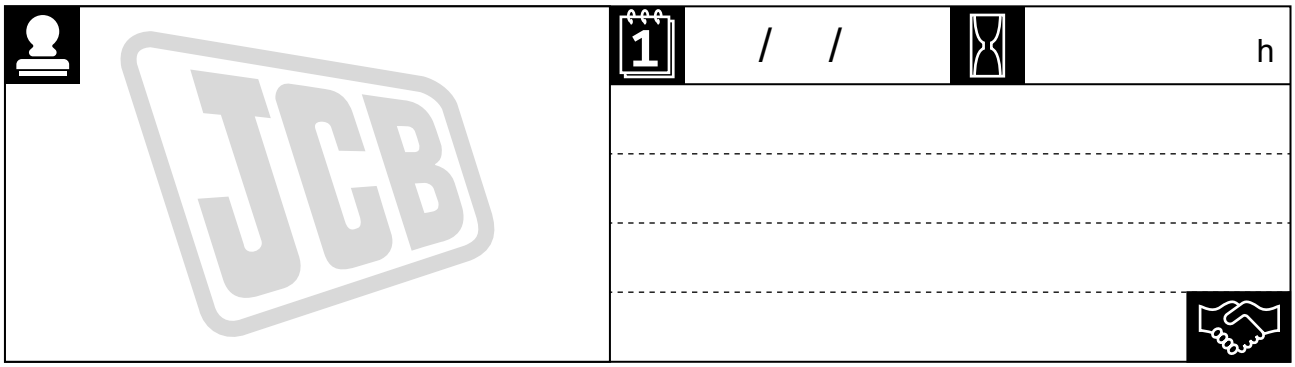

Figure 363. 7500h/90 Month

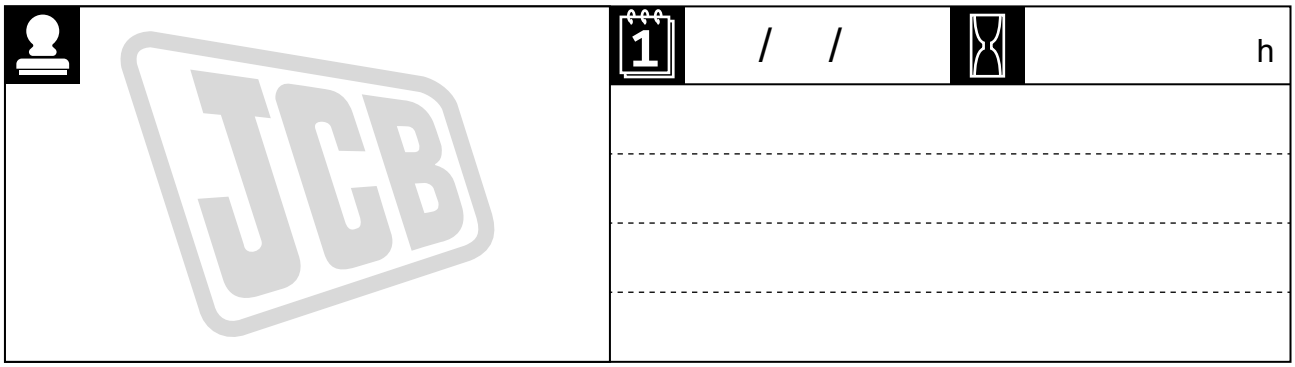

Figure 364. 8000h/96 Month

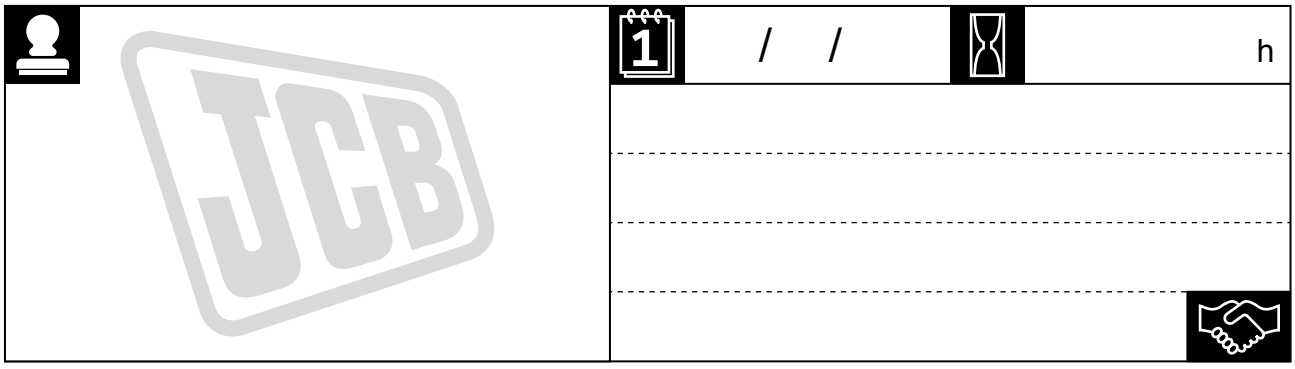

Figure 365. 8500h/102 Month

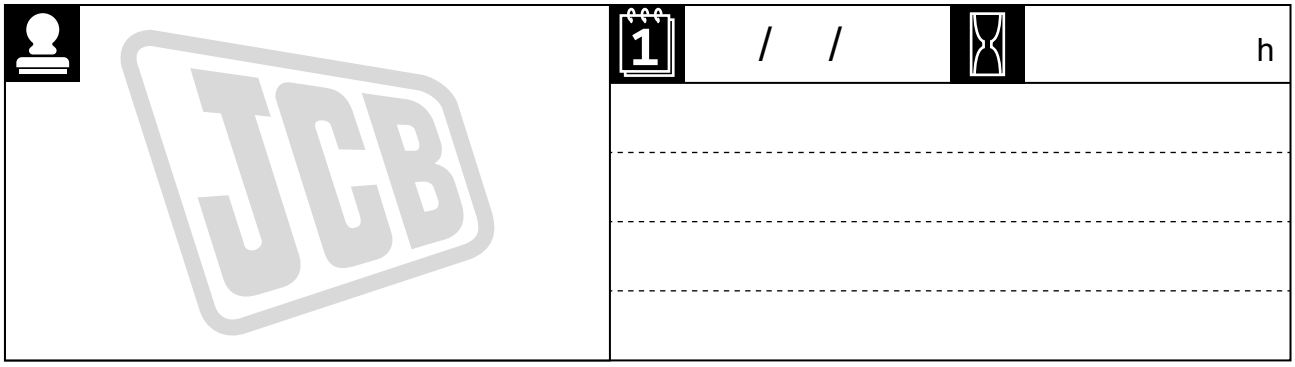

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Figure 366. 9000h/108 Month

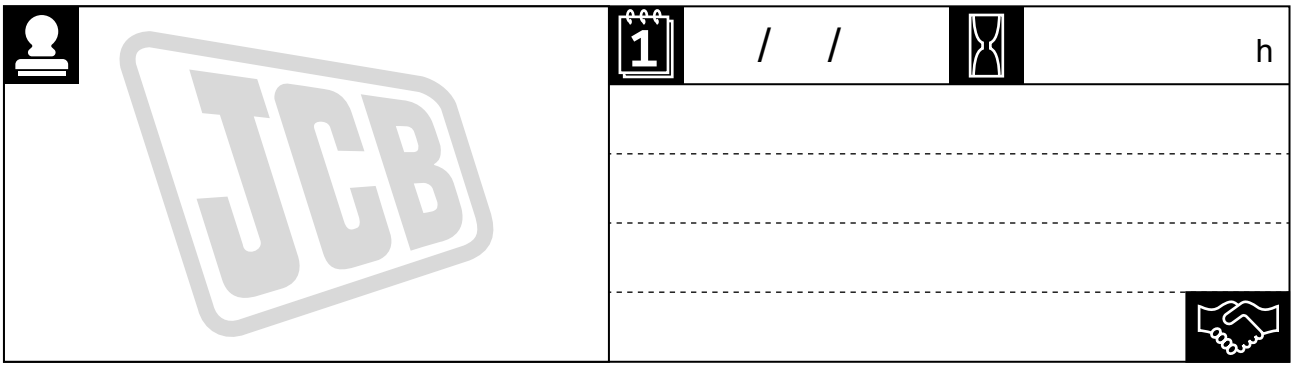


Figure 367. 9500h/114 Month

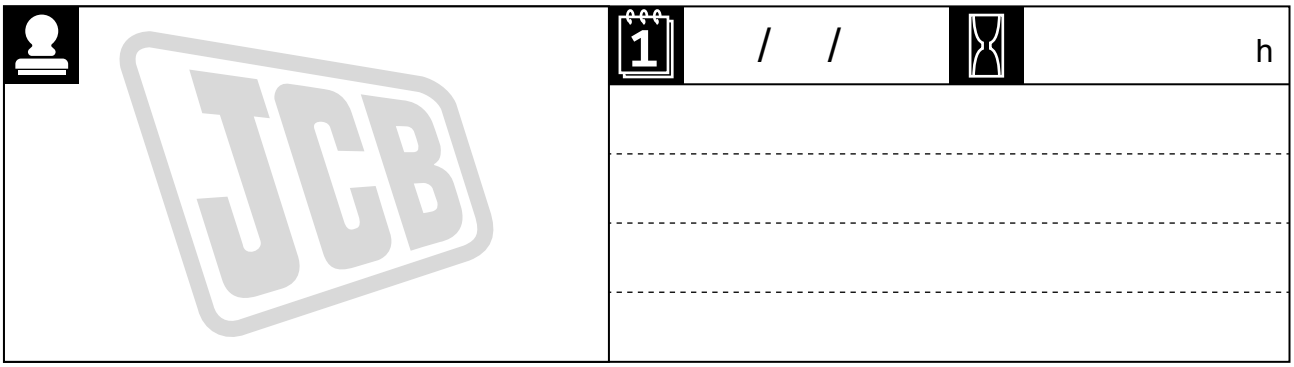


Figure 368. 10000h/120 Month

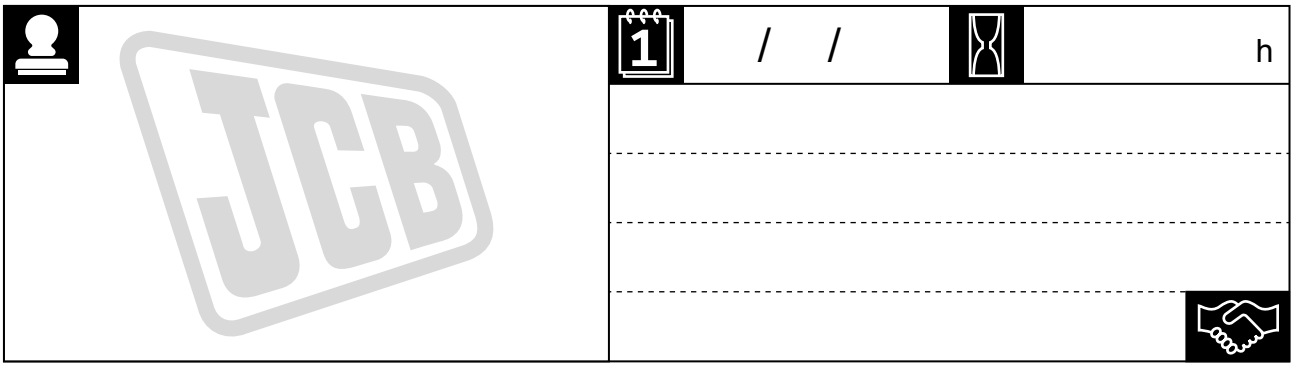
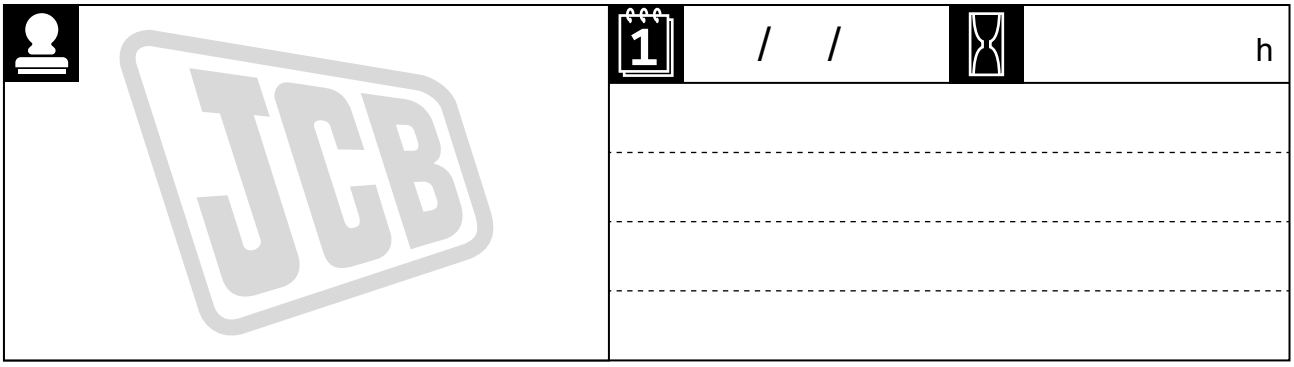


Figure 369. 10500h/126 Month



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