JCB

OPERATOR'S MANUAL

DUMPER
1T-2 High Tip

EN - 9831/9450 ISSUE 8 - 01/2023

THIS MANUAL SHOULD ALWAYS STAY WITH THE MACHINE

OPERATOR'S MANUAL

DUMPER
1T-2 High Tip

EN - 9831/9450 - ISSUE 8 - 01/2023

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

www.jcb.com

Foreword

The Operator's Manual

⚠

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

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

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

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

Notes:

Contents **Page No.**

Acronyms Glossary

CESAR	Construction Equipment Security and Registration
DIS	Drive Inhibit System
ESOS	Engine Shut-Off Solenoid
ETRTO	European Tyre and Rim Technical Organisation
FOPS	Falling Object Protective Structure
HP	High Pressure
ISO	International Organization for Standardization
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LP	Low Pressure
MP	Medium Pressure
PIN	Product Identification Number
PPE	Personal Protective Equipment
RMS	Root Mean Square
ROPS	Roll-Over Protective Structure
RPM	Revolutions Per Minute
SAE	Society of Automotive Engineers

Introduction
About this Manual

Model and Serial Number

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

Table 1.

Model	**VIN Prefix.** **Refer to: OM - 1T [STV] (9831/9450) Machine.**
1T-2 High Tip [T2]	JCB1THT5

Using the Manual

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

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

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

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

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

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

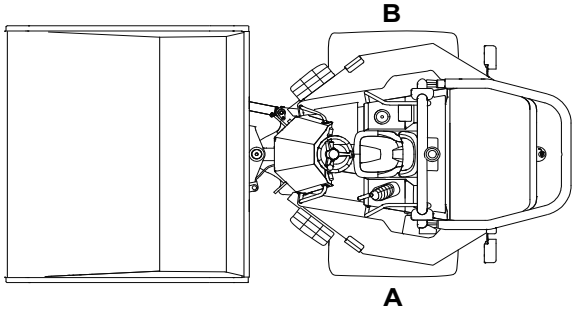
The manufacturer's policy is one of continuous improvement. The right to change the specification of the machine without notice is reserved. No responsibility will be accepted for discrepancies which may occur between specifications of the machine and the descriptions contained in this manual.

All 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

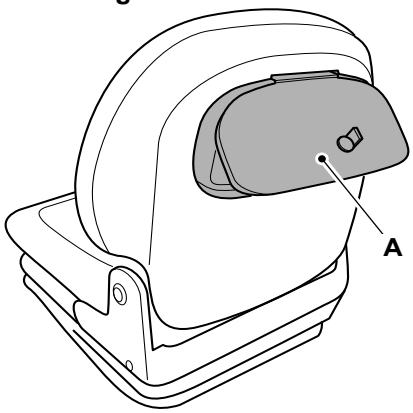
Cross References

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).

Location of Manual

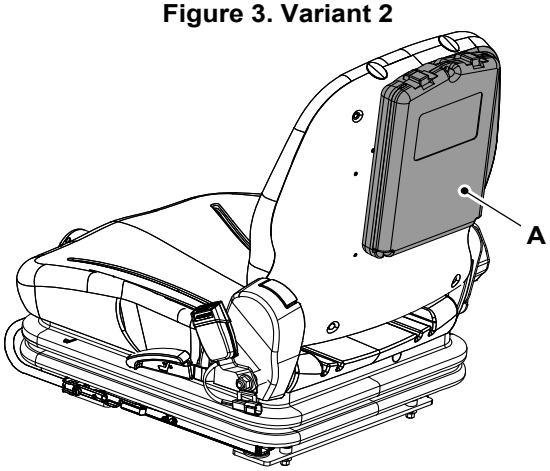
The operator's manual is located in a holder in the back of the seat and is secured using a lock. The manual must be returned to its holder after use. Refer to Figure 2. Refer to Figure 3.

Figure 2. Variant 1



A Operator manual location

Figure 3. Variant 2



A Operator manual location

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 4. The safety alert system symbol

General Safety

Training

To operate the machine safely you must know the machine and have the skill to use it. You must abide by all relevant laws, health and safety regulations that apply to the country you are operating in. The operator's manual instructs you on the machine, its controls and its safe operation; it is not a training manual. Ensure that you receive the correct training before operating any machinery. Failing to do so will result in incorrect operation of the machine and you will be putting yourself and others at risk. In some markets, and for work on certain jobsites, you may be required to have been trained and assessed in accordance with an operator competence scheme. Make sure that you and your machine comply with relevant local laws and jobsite requirements – it is your responsibility.

Clothing

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

Care and Alertness

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

Alcohol and Drugs

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

Feeling Unwell

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

Mobile Phones

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

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

Lifting Equipment

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

Raised Equipment

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

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

Raised Machine

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

Lightning

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

Machine Modifications

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

Clothing and Personal Protective Equipment (PPE)

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

Notes:

About the Product
Introduction

General

Before you start using the machine, you must know how the machine operates. Use this part of the manual to identify each control lever, switch, gauge, button and pedal. Do not guess, if there is anything you do not understand, ask your JCB dealer.

Name and Address of the Manufacturer

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

Product Compliance

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

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

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

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

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

Description

General

The machine is a self-propelled, seated operator, wheeled machine, with an open body, which transports and dumps or spreads material.

The machine has a load carrying skip located over the front axle, ahead of the driver. The machine discharges its load to the front of the machine. The skip is raised and lowered by two double acting hydraulic cylinders mounted between the front chassis and the underside of the skip controlled by a joystick operated control valve.

The machine is a load carrier and the skip can be used for a multitude of building/contracting site functions, but essentially it is used for carrying free flowing materials from excavations or demolitions and general site building activities. Loading is performed by other machines or equipment.

Intended Use

The machine is intended to be used in normal conditions and in the environmental conditions as described in this manual.

When used normally the machine transports and discharges various free flowing materials from its integral skip.

The machine is not intended for use in mining and quarrying applications (other than for light yard clearing operations), in demolition activities, forestry, any use underground, or in any kind of explosive atmosphere.

If the machine is to be used in applications where there is a high silica concentration, risk due to materials containing asbestos or similar hazards, additional protective measures such as the use of PPE (Personal Protective Equipment) may be required.

The machine should not be operated by any person who does not have an appropriate level of qualification, training or experience of use of this type of machine.

Prior to use of the machine, its suitability (size, performance, specification etc.) should be considered with regards to the intended application and any relevant hazards that may exist. Contact your JCB dealer for support in determining the appropriate JCB machine, attachment and any optional equipment that is suitable for the application and environment.

Danger Zone

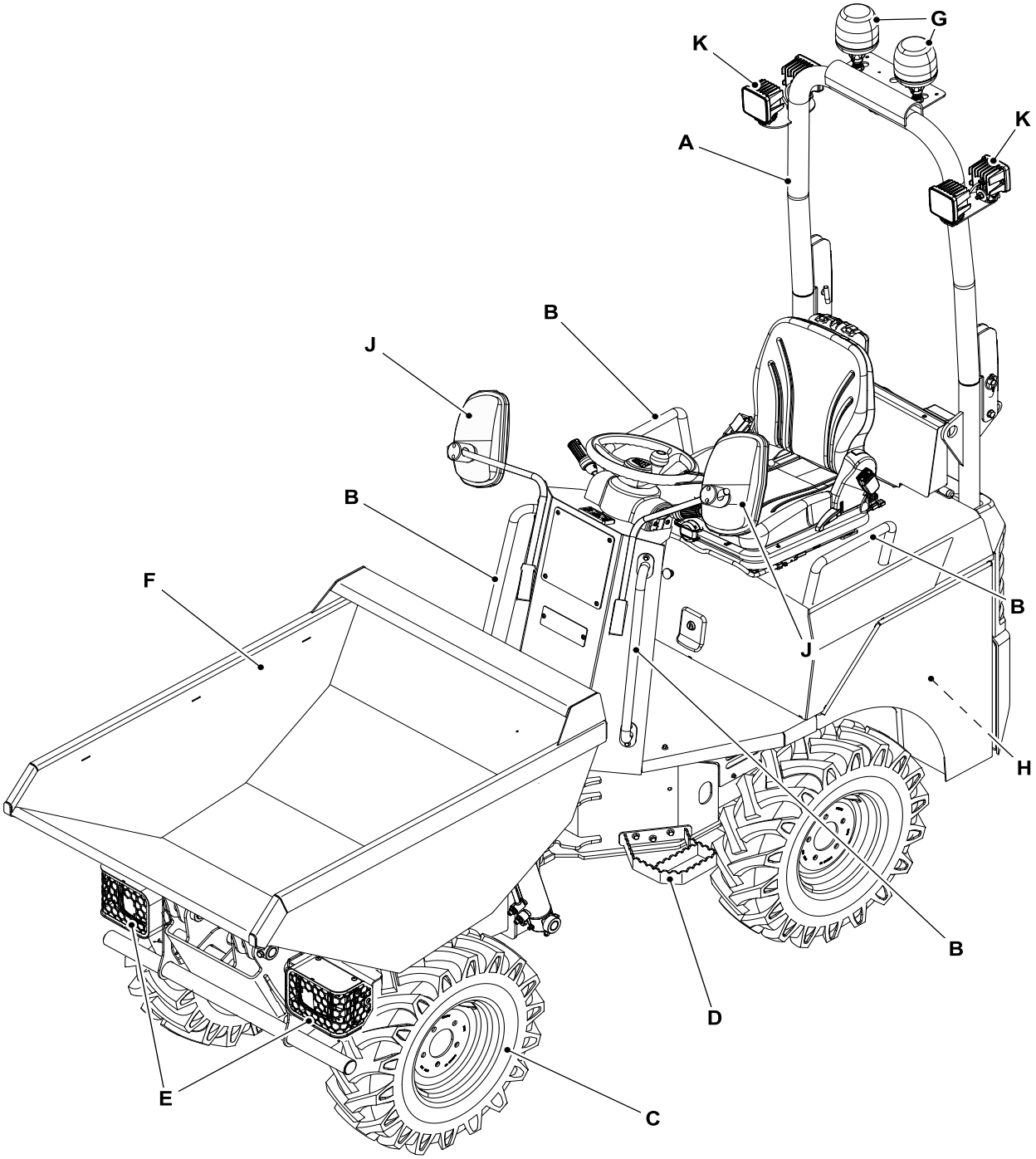
The danger zone is any zone within and/or around the machinery in which a person is subject to a risk to their health or safety. The danger zone includes the area in immediate proximity to any hazardous moving parts, areas into which working equipment and attachments can be moved to quickly, the machine 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.
Refer to: Technical Data (Page 141).

Before you do a maintenance task, make the product safe.
Refer to: Maintenance Positions (Page 97).

Main Component Locations

Figure 5. Machine Components



A ROPS (Roll-Over Protective Structure)
B Hand rails
C Tyres/Wheels
D Steps
E Head lights
F Skip
G Beacon
H Engine
J Mirrors
K Worklights

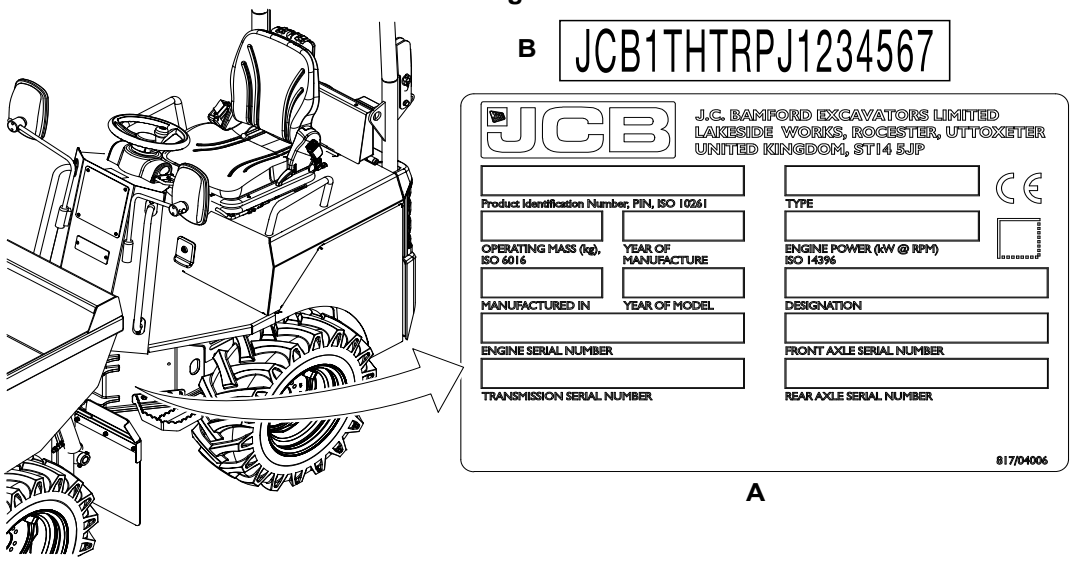
Product and Component Identification

Machine

Your machine has an identification plate. The PIN (Product Identification Number), weight, engine power, year of manufacture and serial number of the machine are shown on the identification plate.

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.

Figure 6.



A Identification plate

B Chassis PIN stamping

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

The machine PIN is also stamped on the chassis above the identification plate.

Table 2. Typical PIN

JCB	1THT5	A	B	1234567

Table 3. Explanation of the PIN

Digit	Description
1 to 3	World manufacturer identification. For example, JCB = UK Build.
4 to 8	Machine type and model
9	Randomly Generated Check Letter. The check letter is used to verify the authenticity of a machine's PIN.
10	Year of manufacturer K=2019, L=2020 etc
11 to 17	Machine serial number

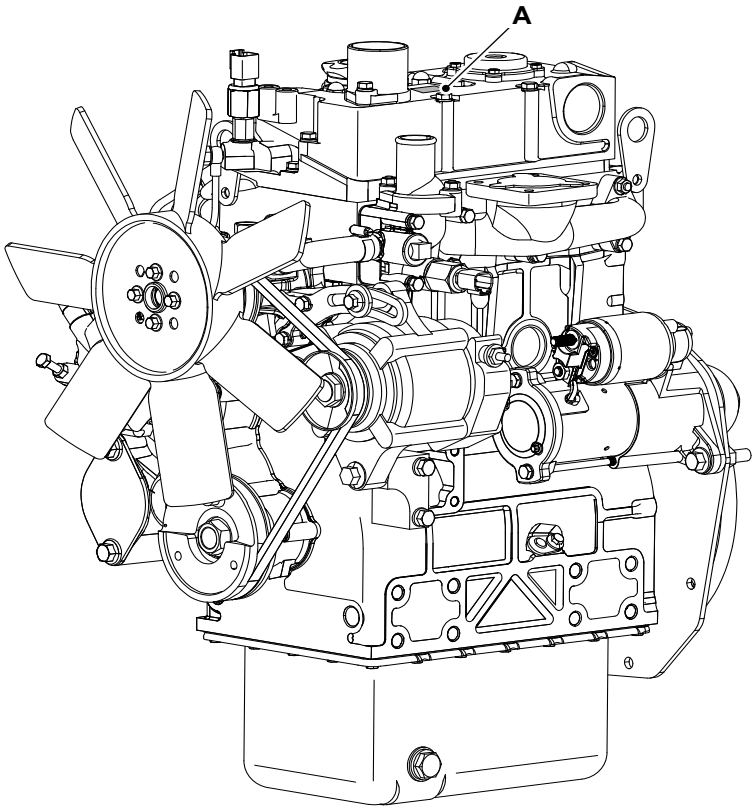
Chassis Stamping Location

The PIN is stamped on the left side of the chassis below the data plate.

Engine

The engine data label is located on the engine top cover. Refer to Figure 7.

Figure 7.



A Identification plate

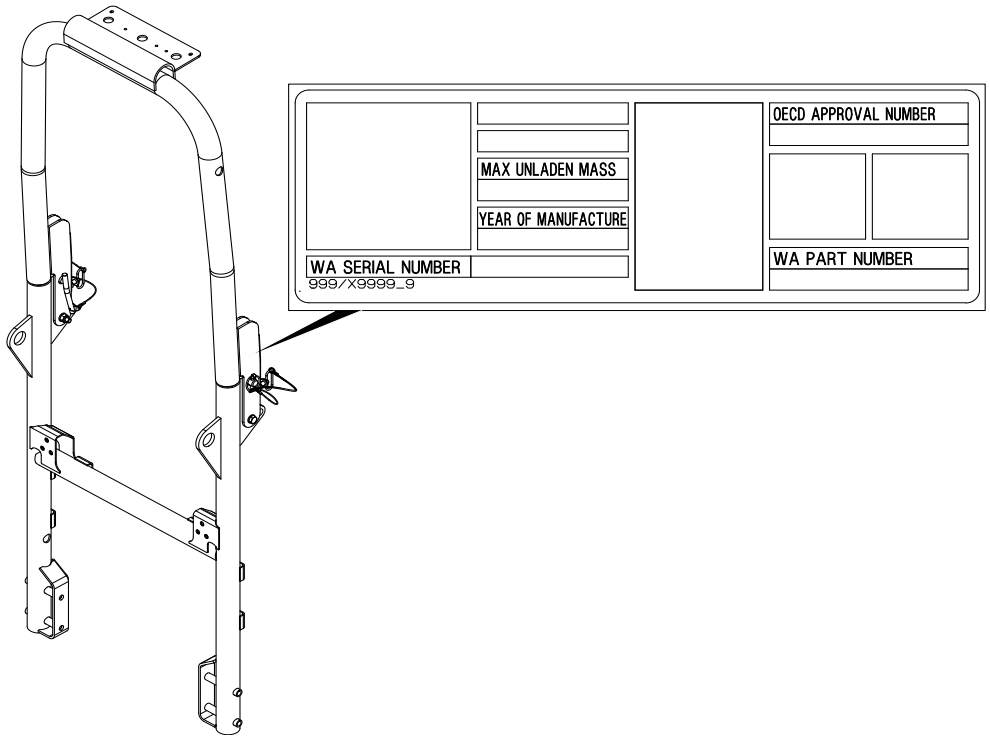
Operator Protective Structure

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

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

Machines built to ROPS (Roll-Over Protective Structure) standards have an identification label installed on the inside of the frame hinge as shown. Refer to Figure 8.

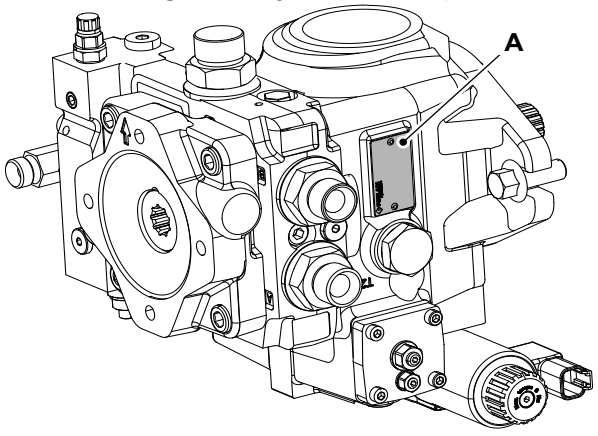
Figure 8. ROPS



Hydraulic Pump

The data label is located as shown. Refer to Figure 9.

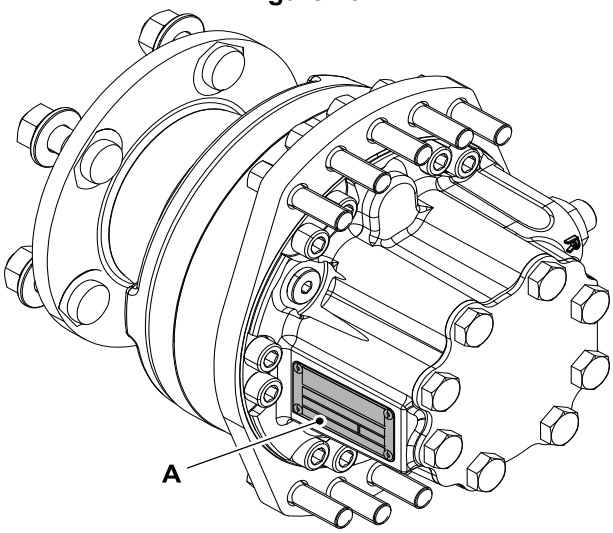
Figure 9. Hydraulic Pump



A Identification plate

Drive Motor

Figure 10.



A Identification plate

Safety Labels

General

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

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

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

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

Safety Label Identification

Figure 11.

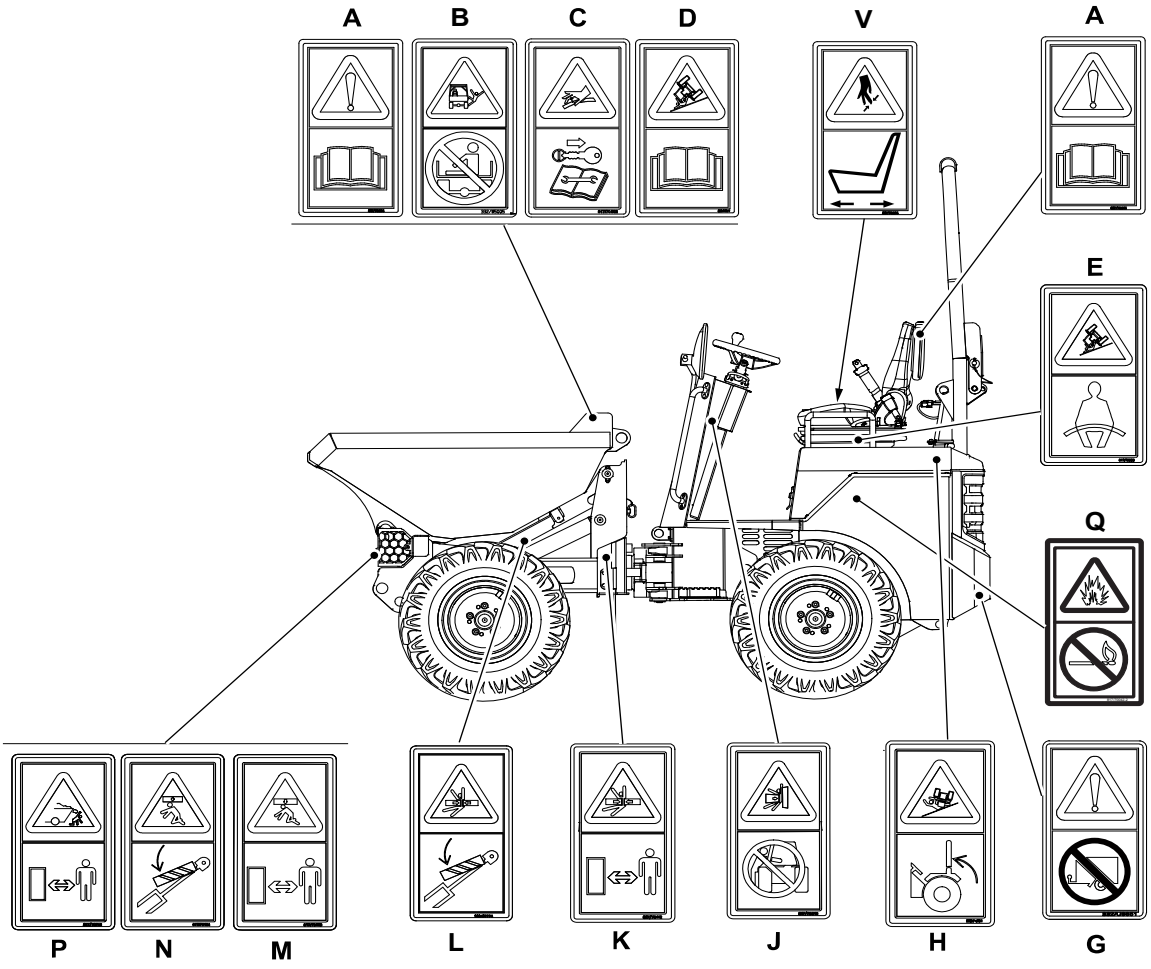


Figure 12.

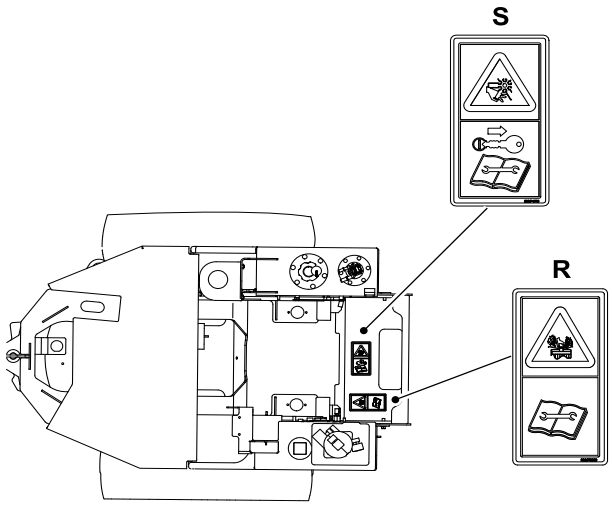


Figure 13.

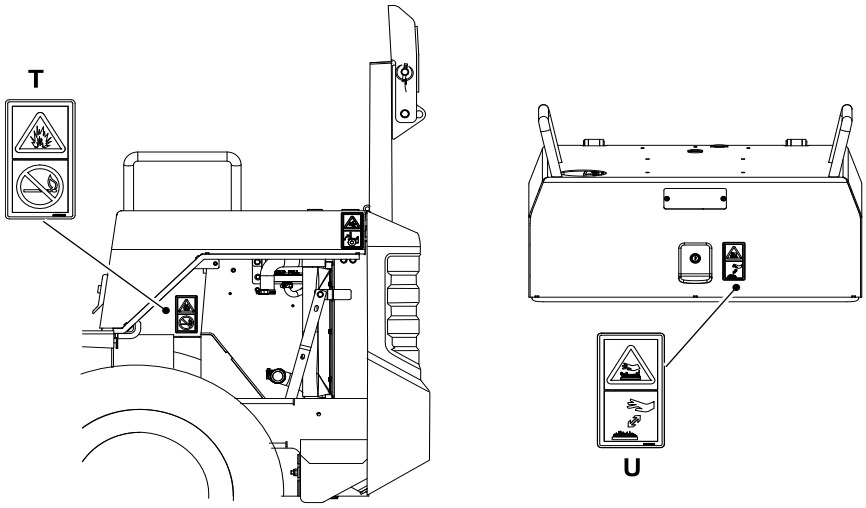


Table 4. Safety Labels

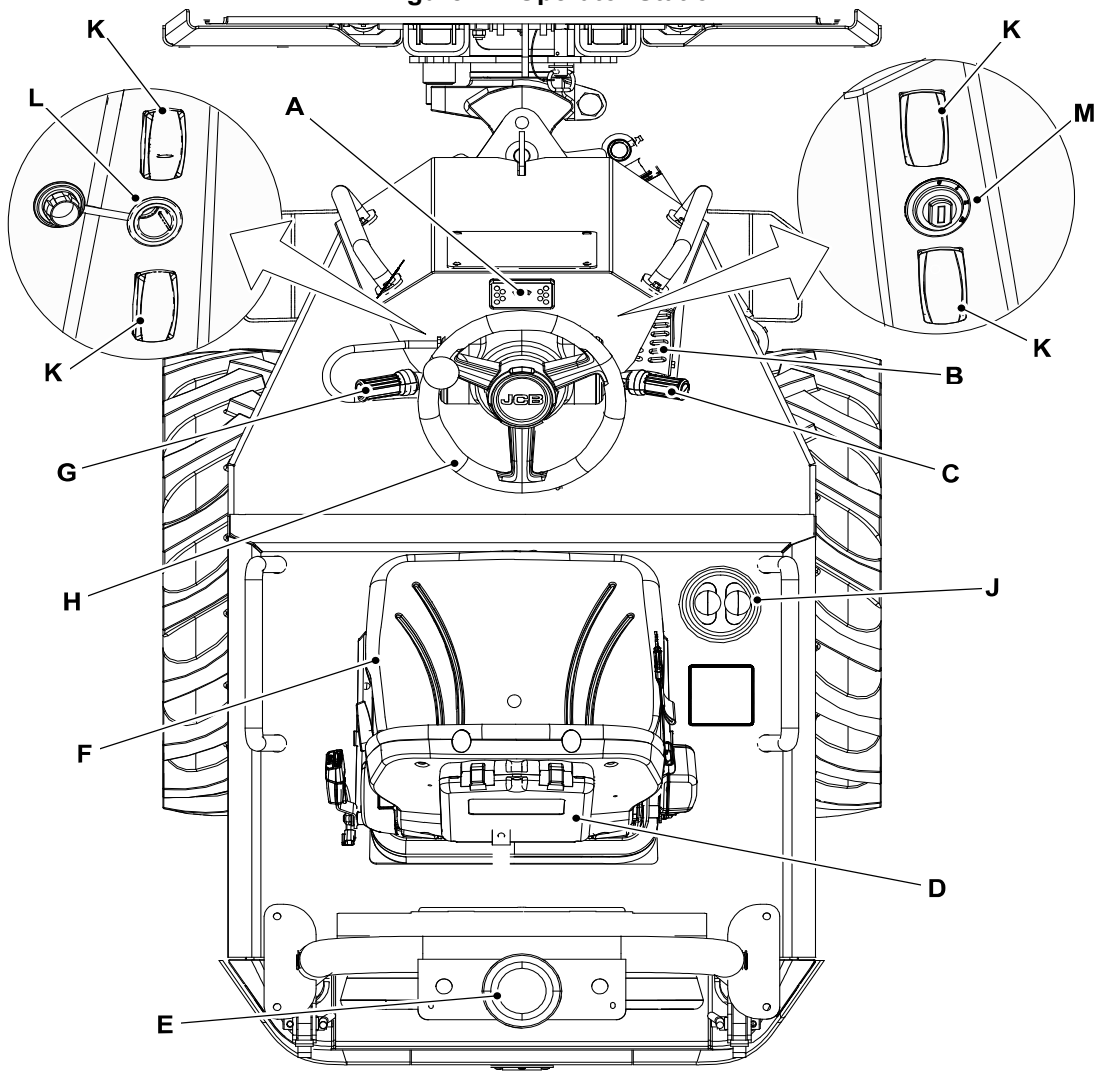
Item	Part No.	Description	Qty.
A	817/70014	Warning. Read the Operator's Manual before you operate the machine.	1
B	332/W5005	Falling hazard. Do not ride on this vehicle as a passenger.	1
C	817/70002	Pressure hazard. Stop the engine/motor, remove the starter key and consult the service manual before you complete any service or maintenance work.	1
D	332/F0279	Stability hazard. Ensure the load is within the capability of the machine. Read the operator's manual.	1
E	817/70029	Warning. Crush hazard. Wear seat belt.	1
G	332/U9851	Warning. Trailer towing forbidden (If Installed).	1
H	332/P4631	Warning. Crush hazard. Operate with the ROPS (Roll-Over Protective Structure) frame in the upright position where a risk of rollover exists.	2
J	817/70018	Warning. Crushing of whole body. Do not operate the controls from outside of the machine.	2
K	817/70112	Warning. Crushing of whole body. Keep a safe distance.	2

Item	Part No.	Description	Qty.
L	332/S9994	Crushing of whole body. Insert the articulated frame or skip safety strut lock during maintenance and shipping.	1
M	817/70110	Warning. Crushing of whole body. Keep a safe distance from machine.	1
N	817/70104	Crushing of whole body. Insert the safety support device/devices before you do any service or maintenance work under raised areas of the machine.	1
P	817/70148	Crush hazard, falling material. Stay a safe distance from machine.	1
R	332/F5860	Warning. Hot fluid under pressure. Read the Operator's Manual.	1
S	332/P4679	Warning. Severing of hands and fingers. Keep clear of/do not reach into rotating parts. Read the Service Manual.	1
T	817/70042	Explosion hazard. Remove sources of ignition.	1
U	817/70004	Warning. Burns to fingers and hands. Stay a safe distance away.	1
V	402/R9769	Warning. Finger trap- operate seat forward/ back carefully.	1

Operator Station

Component Locations

Figure 14. Operator Station



A Instrument panel
Refer to: Instruments (Page 49).
B Accelerator pedal
Refer to: Accelerator Pedal (Page 47).
C Multi-purpose switch
Refer to: Multi-Purpose Switch (Page 18).
D Operator manual holder
Refer to: Location of Manual (Page 2).
E Beacon
Refer to: Beacon (Page 41).
F Operator seat
Refer to: Suspension Seat (Page 31).
G Forward/reverse lever
Refer to: Transmission Drive Lever (Page 47).
H Steering wheel
Refer to: Steering Wheel (Page 47).
J Skip operating lever
Refer to: Skip Controls (Page 57).
K Console switches
Refer to: Console Switches (Page 19).
L Power socket
Refer to: Auxiliary Power Socket (Page 60).
M Ignition switch
Refer to: Ignition Switch (Page 20).

Interior Switches

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.

Light Switch

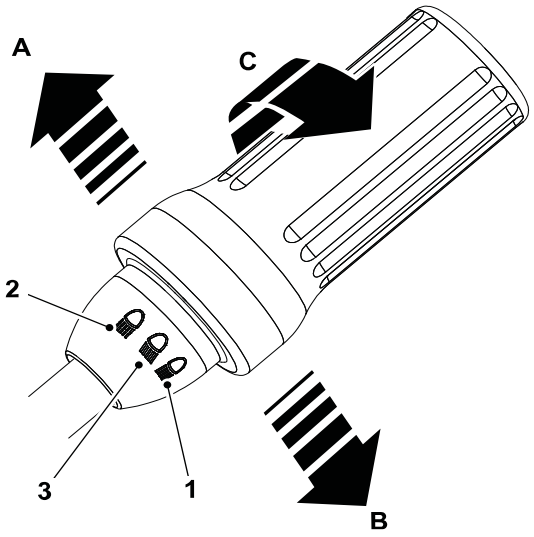
When the lights are switched on via main switch on console, rotate the switch barrel to activate and cancel the headlight flash, high beam and low beam. Switch off high beam for oncoming vehicles.

Position 1 - Headlights flash

Position 2 - High beam

Position 3 - Low beam

Figure 15.



A Forwards - Left turn
B Backwards - Right turn
C Rotate - Headlights flash, high beam and low beam

Console Switches

General

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

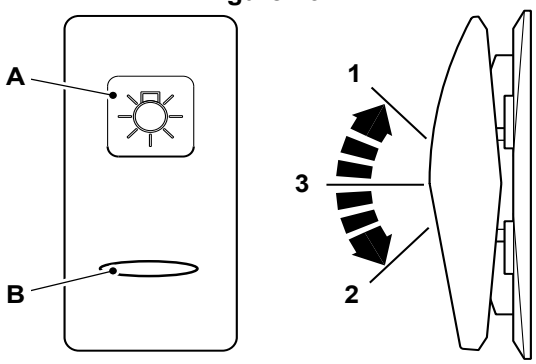
Each switch has a graphic symbol to show the function of the switch. Before you operate a switch, make sure that you understand its function.

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.

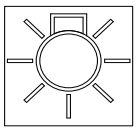
Figure 16.



A Graphic symbol

B Light bar

Road Lights



Three position rocker switch. The switch functions operate sidelights and headlights. 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 road lights are designed for site use. You may be breaking local laws if you travel on the road without road lights.
Position **1**: Off.
Position **2**: Sidelights and headlights on.
Position **3**: Sidelights on.

Hazard Warning Lights

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

Work Lights

Two position rocker switch. The switch functions operate when the ignition switch is in the on positions.
Position **1**: Work light off
Position **2**: Work light on

Park Brake

Two position rocker switch. The switch functions operate when the ignition is in the on position.
Position **1**: Park brake off
Position **2**: Park brake on

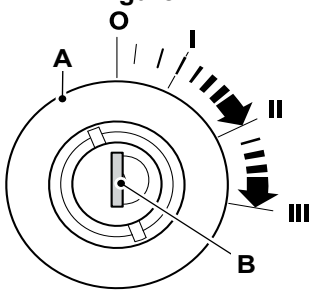
Ignition Switch

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 10s 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 17.



A Ignition switch **B** Ignition key

Table 5. 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 skip 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	To operate pre-heat: Turn and hold the ignition key to this position
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.

Operation
Introduction

General

The aim of this part of the manual is to guide the operator step-by-step through the task of learning how to operate the machine efficiently and safely. Read the Operation section through from beginning to end.

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

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

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

Remember:

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

Operating Safety

General

Training

Make sure that you have had adequate training and that you are confident in your ability to operate the machine safely before you use it. Practice using the machine and its attachments until you are completely familiar with the controls and what they do. 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. Do not operate the machine outside its limits. Do not try to upgrade the machine performance with unapproved modifications or additional equipment.

Engine/Steering Failure

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

Exhaust Gases

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

Worksites

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

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

Communications

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

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

Parking

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

Banks and Trenches

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

Safety Barriers

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

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.

Machine Safety

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

Hot Components

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

Travelling at High Speeds

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

Hillsides

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

Visibility

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

Do not operate the machine if you cannot see clearly.

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

Hands and Feet

Keep your hands and feet inside the machine.

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

Controls

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

Passengers

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

Fires

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

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

Roll Over Protection

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

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.

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.

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.

Start-up Checks

- Complete the daily checks.
- Start the engine and allow to run for a few minutes to warm up.
- Check all instruments and warning lights are functioning correctly.
- Check lighting and indicators operate (if fitted).
- Stop the engine and check for any fluid leaks or signs of overheating.
- Re-start the engine.
- Drive the machine a short distance to check operation of transmission, brakes and steering.
- Check if the skip tips and lowers. Check if the skip rotates in either direction (swivel skip models only). Check if the skip elevates and lowers (high tip models).
- Park up and stop the engine. Report and have rectified any faults before placing machine into service.

Risk Assessment

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

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

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

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

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

General

The area selected as a loading/unloading area must be large enough to accommodate all the tracks of the machine. It must not be necessary for the machine to make tight turns with an elevated load.

The area must be of consolidated solid ground, capable of accepting the weight of the machine and its load without significant deformation. Ideally, the ground must be substantially level in both planes.

Your machine may safely be used for loading/unloading operations in areas which are not substantially level if 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.

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?
- Are personnel to dismount the machine when it is being loaded?

The Machine

- Is it in good working order?
- Have any reported defects been corrected?
- Have the daily checks been carried out?

The Load

- How heavy is it? Is it within the capabilities of the machine?
- How bulky is it?
- Is it an awkward shape? How is the weight distributed? Uneven loads are more difficult to handle.
- Is there a possibility of the load shifting while being moved?

Loading/Unloading Area

- Is 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 tracks?
- Are there any obstacles or hazards in the area, for example, debris, excavations, man-hole 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 machine.
- Is it raining or is rain likely? The ground that was solid and smooth when dry will become uneven and slippery when wet, and it will not give the same conditions for traction, steering or braking.

Walk-Around Inspection

General

⚠ **WARNING** Standing or working under a raised skip is hazardous. You could be crushed by the skip or get caught in the linkages. Lower the skip before doing these checks.

Do these checks 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.

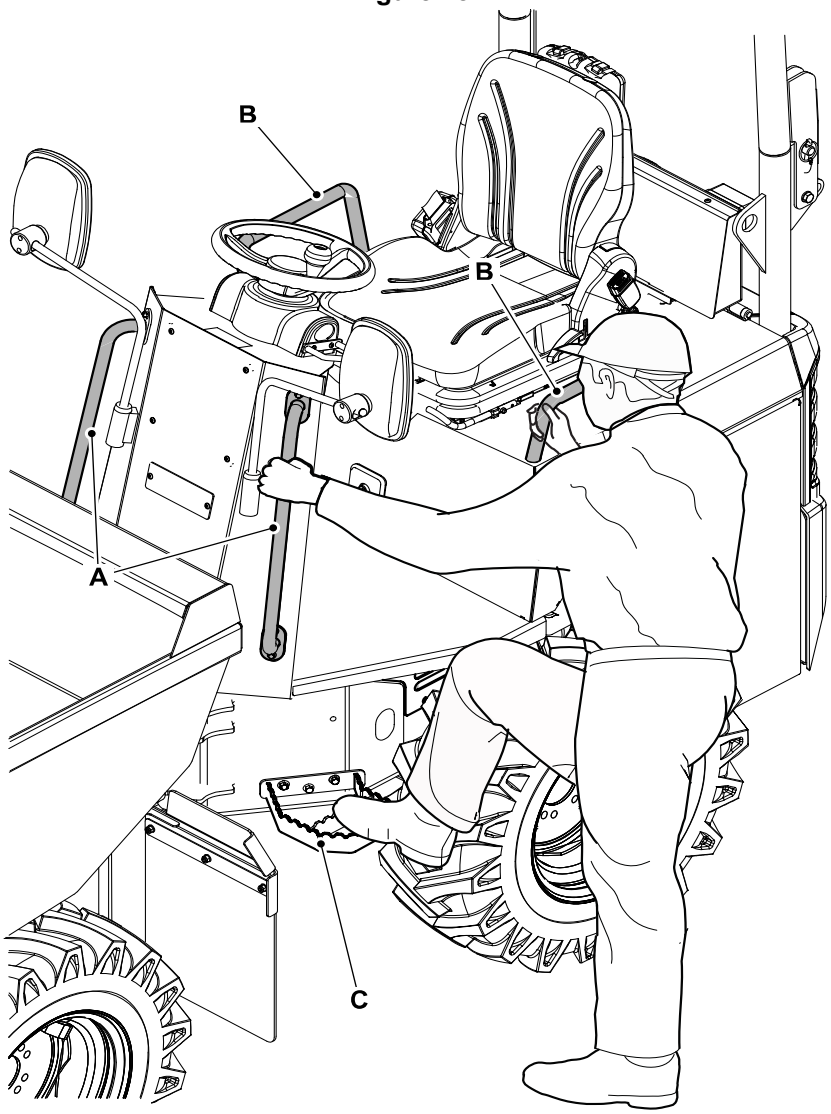
1. Cleanliness:
   1.1. Clean the windows, light lenses, rear view mirrors and cameras (if applicable).
   1.2. Remove dirt and debris, especially from around the linkages, rams, pivot points and radiator.
   1.3. Make sure the machine step and handrails are clean and dry.
   1.4. Clean all of the safety and instructional labels. Replace any label that is missing or cannot be read.
2. Damage:
   2.1. Examine the machine generally for damaged and missing parts.
   2.2. Look for oil, fuel and coolant leakages below the machine.
3. Make sure the tyres are correctly inflated. Check for cut rubber and penetration by sharp objects. Do not use a machine with damaged tyres.
   Refer to: Check (Condition) (Page 130).
4. Make sure that all of the filler caps are installed correctly.
5. Make sure that all of the access panels are closed correctly.
   Refer to: Access Apertures (Page 105).
6. If the filler caps and access panels are installed with locks, we recommend that you lock them to prevent theft or tampering.
7. Check the cab windows for cracks and damage (if applicable).

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.

Figure 18.



A Handrail
B Handrail
C Step

Make sure the machine is stopped and correctly parked before mounting the dumper.
Refer to: Stopping and Parking (Page 39).

When you get on and off the machine always maintain a three point contact with the handrails and step. Do not use the machine controls or steering wheel as handholds.

Primary entry and exit is via the left side of the machine. If the left side can not be used secondary entry and exit is via the right side.

The illustration shows a typical machine model, your machine may look different from the model shown.

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.

The battery isolator can be used as an anti-theft security device as well as a safety device when carrying out maintenance. Make sure that the battery isolator key is removed before carrying out any maintenance work or, when the machine is left unattended to prevent unauthorised use of the machine.

Disconnect the Machine Electrics:

1. Turn the ignition key to the off position.
2. Get access to the battery isolator.
   Refer to: Service Points (Page 102).
3. Turn the battery isolator key in a counter-clockwise direction and remove.

Connect the Machine Electrics:

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

Before Starting the Engine

General

⚠ **DANGER** The machine must not be used until the ROPS has been raised and secured in the work position. It is prohibited to use a machine without the ROPS installed in the work position.

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.

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

CAUTION Keep the machine controls clean. Take extra care if the controls are wet. Your hands and feet could slide off slippery controls. If that happens you could lose control of the machine.

1. For your own safety (and others) and for a maximum service life of your machine, do a pre-start inspection before starting the engine.
   1.1. If you haven't already done it, do a walk around inspection of the outside of the machine.
   1.2. Remove dirt and rubbish around the pedals, control levers, mirrors and cameras (if installed).
   1.3. Remove oil, grease and mud from the pedals (if installed) and control levers.
   1.4. Secure all loose articles.
   1.5. Make sure that your hands and shoes are clean and dry.
   1.6. Inspect the ROPS (Roll-Over Protective Structure) structure for damage. Get your JCB dealer to repair any damage. Make sure all its securing bolts are installed and correctly tightened.
   1.7. Inspect the seat belt and its mountings for damage and excessive wear.
   1.8. Check that the following are in working order: lights, warning lights, horn, indicator lights, all switches, direction indicators and hazard warning lights.
2. Check the engine oil level.
   Refer to: Check (Level) (Page 116).
3. Check the hydraulic oil level.
4. Check the fuel level.
   Refer to: Filling the Tank (Page 76).
5. Check the battery and battery cable condition.
   Refer to: Clean (Page 137).
6. Check for adequate ventilation if the machine is to be started or run in a building etc.
7. Make sure the ROPS is in the work position.
   Refer to: Preparing for Travel (Page 40).
8. Enter the operator station and seat yourself.
   Refer to: Entering and Leaving the Operator Station (Page 28).
9. Adjust the seat so that you can comfortably reach all the driving controls.
   Refer to: Operator Seat (Page 31).
10. Fasten the seat belt.
    Refer to: Seat Belt (Page 33).
11. Make sure the drive lever is in the neutral position and park brake is switched on. The engine will not start unless the drive lever is in the neutral position and park brake is switched on.
12. Adjust rear view mirrors and camera (if installed) to give acceptable rear vision.

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.

Make sure that the engine cover is closed and locked.

The operator's seat can be adjusted for your comfort. A correctly adjusted seat will decrease 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.

Stop using the machine if the operators seat becomes defective. Repair or replace the seat before using the machine again.

Suspension Seat

General

The operator must only do these adjustments when sat on the seat and the machine has stopped.

Seat Adjustments

Fore/Aft

1. Lift the handle and move the seat forwards or backwards to the required position.
2. To lock the seat in position, release the handle.

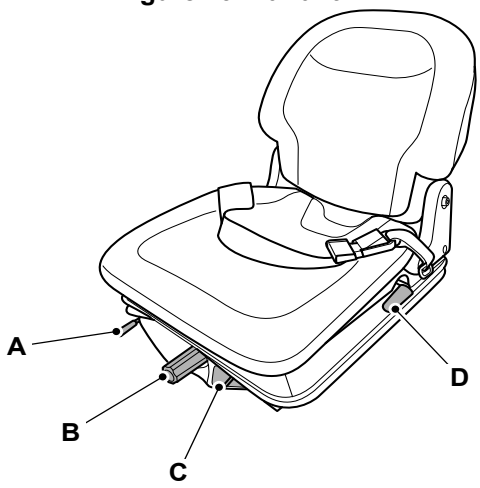
Backrest

1. Lift the lever and adjust the seat to the required angle.
2. To lock the seat in position, release the lever.

Weight

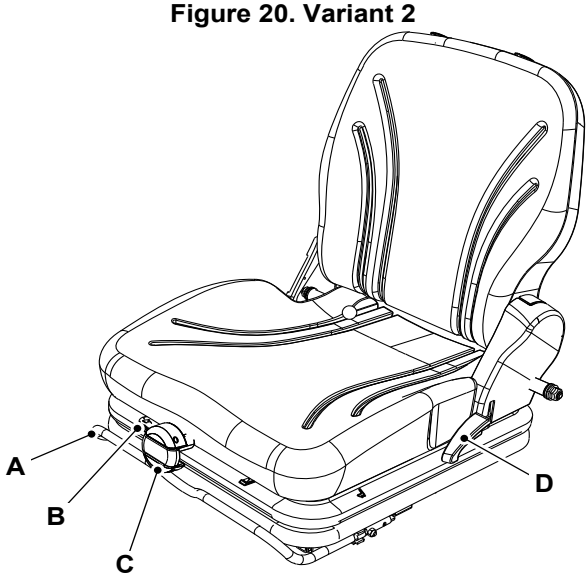
1. Turn the weight adjustment knob to increase or decrease the suspension of the operator seat to match the operator weight.
2. Check the weight indicator, turn the weight adjustment knob as necessary to select the correct weight from the scale.

Figure 19. Variant 1



A Lever - seat fore/aft
B Weight adjustment knob
C Weight scale
D Lever - backrest angle adjustment

Figure 20. Variant 2



A Lever - seat fore/aft
B Weight scale
C Weight adjustment knob
D Lever - backrest angle adjustment

Seat Belt

General

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

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

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.

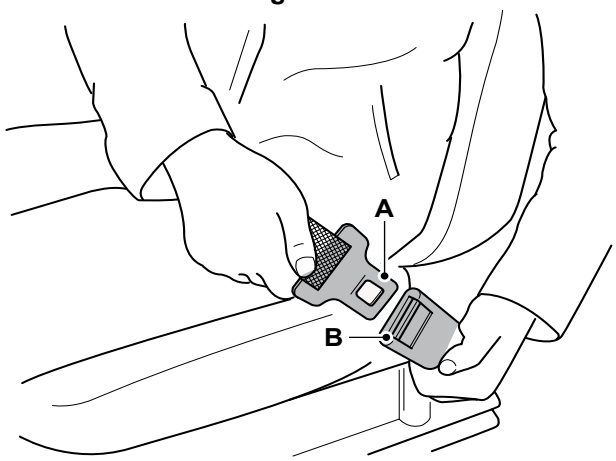
WARNING When a seat belt is checked for condition if it is damaged, if the fabric is worn, or if the machine has been in an accident, replace it with a complete seat belt assembly.

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

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 21.

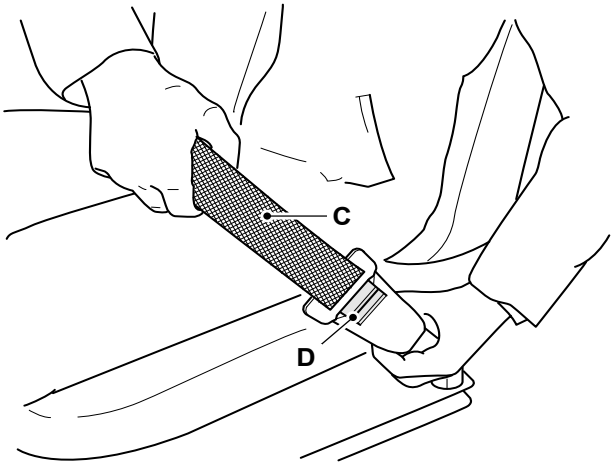


A Tongue **B** Latch

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 22.

Figure 22.



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.

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

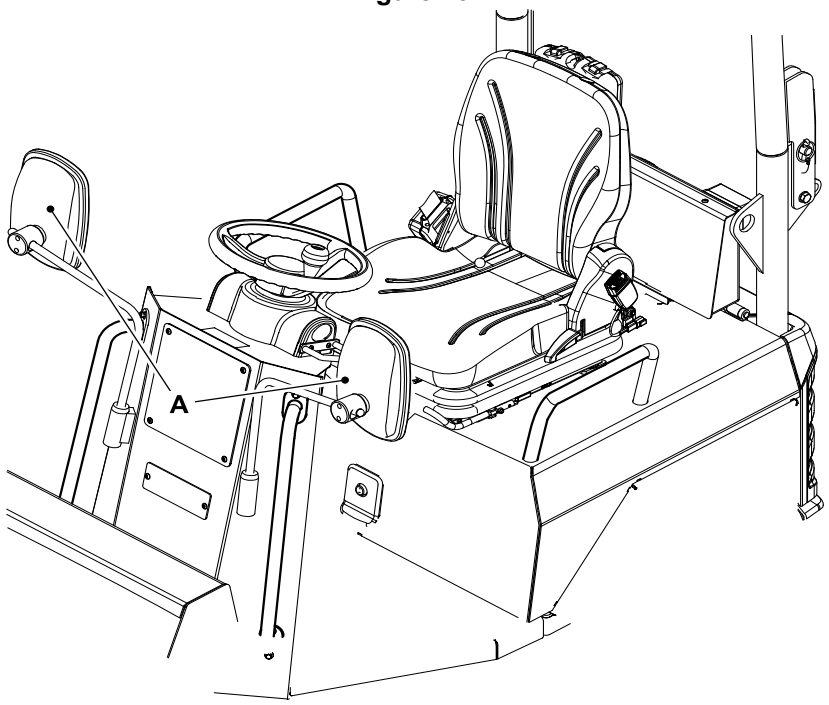
A DIS (Drive Inhibit System) is fitted with the machine which prevents the operator from moving the machine until seat belt is fasten.

Refer to: Getting the Machine Moving (Page 51).

Mirrors

General

Figure 23.



A Rear view mirror

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 behind the machine.

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

Adjusting the Mirrors

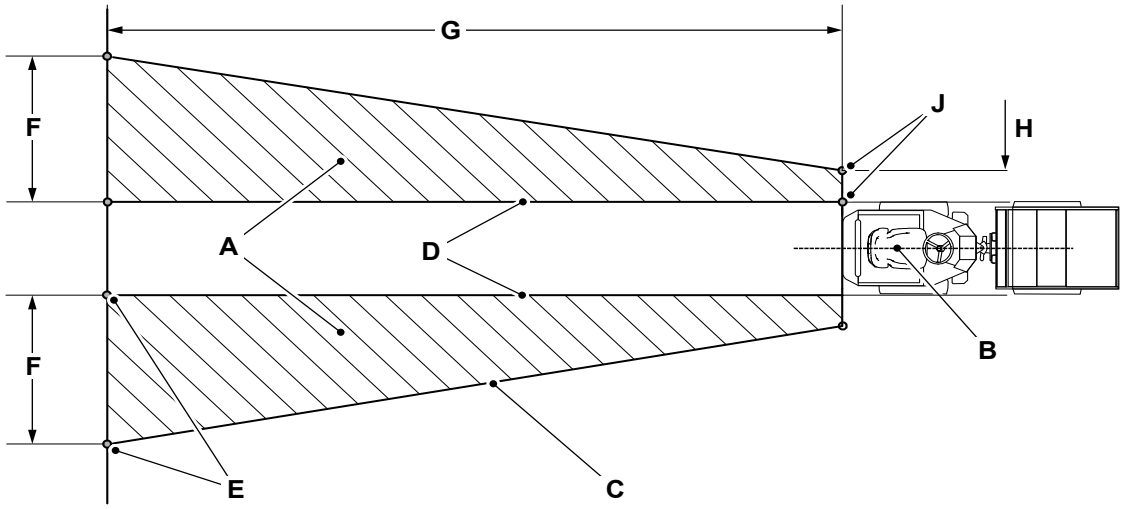
1. Adjust the seat to suit the operator.
2. Adjust the mirror to suit your specific working requirements before you drive or operate the machine.
3. Check the field of vision.

Checking the Field of Vision

Side Mirrors

The field of vision shall be such that the operator can see, using the mirrors, at least a flat portion bounded on the left and right of the machine, starting at the rear end of the machine at a height of 1.5m above ground level and a width of 1m, continuing to a width of 7.5m at ground level, 30m behind the rear end of the machine.

Figure 24.



A Field of vision
B Centre point position
C Outer borderline
D Inner borderline
E Measurement at ground level
F Width = 7.5m
G Length = 30m
H Width = 1m
J Measurement at 1.5m above ground level

Starting the Engine

General

⚠ **DANGER** If you try to charge a frozen battery, or jump start and run the engine, the battery could explode. Do not use a battery if its electrolyte is frozen. To prevent the battery electrolyte from freezing, keep the battery at full charge.

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.

An interlock is installed for safety purpose and prevents the engine from starting.

1. Make sure that the machine is ready to start.
   Refer to: Before Starting the Engine (Page 30).
2. Make sure the battery isolator key is installed and switched on.
   Refer to: Battery Isolator (Page 29).
3. Sit on the operator seat.
4. Make sure the seat belt is correctly fastened and adjusted.
   Refer to: Seat Belt (Page 33).
5. Make sure the drive lever is in the neutral position and park brake is switched on. The engine will not start unless the drive lever is in the neutral position and park brake is switched on.
   Refer to: Transmission Drive Lever (Page 47).
6. Turn the ignition key to position 1. An audible warning will sound.
7. Turn the ignition key to position 2. The engine pre-heat warning light should illuminate on display.
   7.1. Hold the key in position 2 and wait for the pre-heat light to go off.
8. Turn the ignition key switch to position 3 and hold it there to crank the engine.
9. Do not operate the starter motor without engine firing for more than specified duration.
   Duration: 10s
   9.1. Let the starter motor cool at least a few minutes between starts.
   Duration: 2min
10. Never engage the starter motor when the engine is running.
11. When the engine has started, check that all the warning lights have gone off and audible alarm is silent.
12. If any of the warning light fails to go off, or come on while engine is running, stop the engine as soon as it is safe to do so.
13. Check lighting and indicators operate (if installed).
14. Stop the engine and check for any fluid leaks or signs of overheating.
15. Re-start the engine, drive the machine a short distance to check operation of transmission, brakes and steering.
16. Check that the skip tips and lowers. Check that the skip rotates in either direction (swivel skip models only).
17. Park up and stop the engine.
18. Report and have rectified any faults before placing machine into service.

Warming Up

Before starting work in low temperatures the hydraulic fluid must be warmed.

1. Warm up the engine.
   1.1. Make sure that the machine is ready to start.
   1.2. Start the engine.
   1.3. Run the engine at idle speed for the specified time. Do not operate any hydraulic service during this time.
   Duration: 10min
2. After the warm up period make sure that everyone is clear of the machine.
3. Warm up the hydraulic oil.
   3.1. Increase the engine speed to approximately half throttle pedal travel.
   3.2. Warm the hydraulic oil by repeatedly selecting skip down for several minutes.
   3.3. Operate and move all dumper services (steering, skip up/down and swivel) for the minimum time specified to warm all hydraulic valve components. Check for correct speed/control of operation.
   Duration: 5min
4. If the operation still appears slow then repeat steps 3.1 to 3.3

Stopping and Parking

General

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

1. Stop the machine on solid, level ground where the machine will not be a hazard or danger.
2. Slowly release the accelerator pedal to bring the machine to a smooth stop.
3. Set the drive lever in neutral position and switch on the park brake.
   Refer to: Transmission Drive Lever (Page 47).
4. If you are leaving the machine, make sure that all the switches are turned off. If necessary, leave the hazard warning and/or side lights switched on.
5. Turn the ignition key to position 0 and remove the key.
6. Get access to the battery isolator.
   Refer to: Service Points (Page 102).
7. Turn the battery isolator key in a counterclockwise direction and remove.

Brake Operational Limits

The machine park brakes have been certified to ISO 3450 and comply with the operational gradient limits below:

Park brake: 15%, 8.5°

It is recommended that the machine is not parked and left unattended on slopes greater than specified above for the park brake.

It is the responsibility of the operator to assess the ground and atmospheric conditions before using or parking the machine on gradients.

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.

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** Use of a steering wheel knob when travelling on the public highway is illegal and strictly prohibited. Its use at travelling speeds may cause accidents leading to serious injury or even death.

WARNING Do not dismount a moving machine.

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

WARNING A loaded dumper must drive forward up a slope and reverse down a slope. The opposite applies when the dumper is unladen - the machine must be reversed up the slope and driven down the slope.

Refer to: Working on Slopes (Page 53).

Do not turn on or drive across a slope.

Take particular care when reversing. Make sure that the way behind is clear before reversing. Make sure that the reverse alarm (if fitted) is functioning correctly and can be heard clearly by people around the machine.

1. Fully lower the skip.
2. Lock the controls (as required).
3. Check that all road lights are working correctly.
4. The traffic regulations may require you to have a rotating beacon operating on some public roads.
   Refer to: Beacon (Page 41).

Preparing for Worksite Travel

⚠ **DANGER** Great care must be taken when moving the machine with the ROPS in the folded position, otherwise you could be seriously injured or killed. Do not fasten the seat belt so that the machine can be dismounted easily in an emergency. Move the machine on firm, level ground only. Do not operate the skip during the movement. The ROPS must be re-installed as soon as the machine has cleared the low height.

DANGER Do not use the machine until the ROPS has been raised and secured in the work position. Never use a machine without the ROPS raised and secured in the work position.

WARNING A high skip or heaped skip can block your view and reduce the machine's stability. Travel with the skip lowered. Travel slowly and with caution over rough, muddy or loose surfaces.

CAUTION The folding ROPS is heavy. A gas strut is installed to assist in operation during folding and raising but always use a second person on the opposite side of the machine to assist with folding and raising.

1. Lower the skip. Keep the skip in this position when you travel with a full skip or across a slope.
2. If you drive or turn the machine with the skip in the raised position, the stability of the machine is decreased.
3. Set the ROPS (Roll-Over Protective Structure)/FOPS (Falling Object Protective Structure) in the work position (if applicable).

4. Install the beacon.

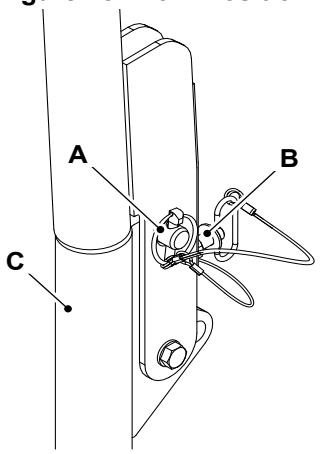
Folding the ROPS Frame (Lowered Position)

1. Park the machine on firm level ground and apply the park brake.
2. Unscrew the tension bolt until resistance is not felt.
3. Remove the lynch pins from the locking pins.
4. Remove the locking pins.
5. Slowly lower the ROPS down with one person on each side of the machine.
6. Install the locking pins and secure with the lynch pins for safe keeping.

Installing the ROPS Frame (Work Position)

1. Park the machine on firm level ground and apply the park brake.
2. Remove the lynch pins and locking pins from storage.
3. Slowly raise the ROPS up with one person on each side of the machine.
4. Install the locking pins and secure with the lynch pins. Tighten the tension bolts to remove any play in the hinge.
5. Tighten the tension bolts to remove any play in the hinge.

Figure 25. Work Position



A Linch pin
B Locking pin
C ROPS

Machine Travel with a Lowered ROPS Frame

Where the machine needs to move through a low height entrance the ROPS can be folded down. The ROPS must be re-installed as soon as the machine has cleared the low height.

Beacon

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.

When in use the beacon is installed to the machines ROPS (Roll-Over Protective Structure) and is controlled via the ignition circuit. When not in use the beacon is stored inside the engine compartment.

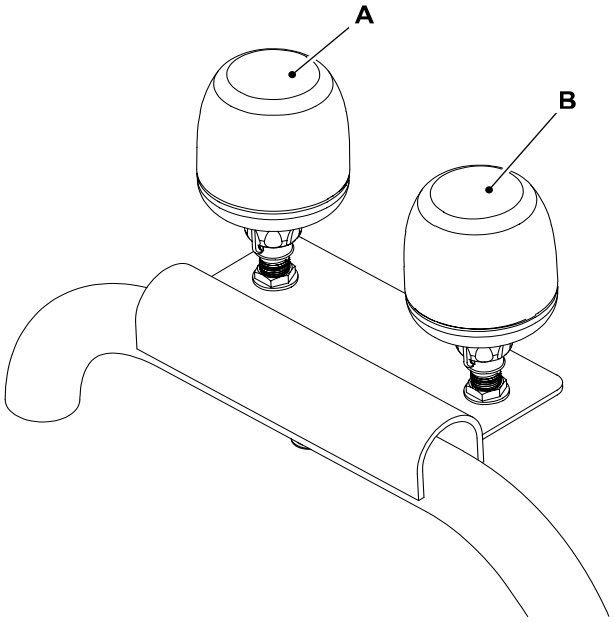
Your machine may be fitted with a green beacon. This gives a site supervisor visibility that the operator is wearing their seatbelt.

Before traveling on roads remove the beacon from the machine as a green beacon is not compliant with road legislation. Do not use the green beacon when driving on roads.

Working Position

1. Put the beacon on the top of the mounting stem on the ROPS. Refer to Figure 26.
2. Tighten the lock nut to secure the beacon to the mounting stem. Refer to Figure 26.
3. The beacon will operate automatically when the ignition is switched on. Refer to Figure 26.

Figure 26.



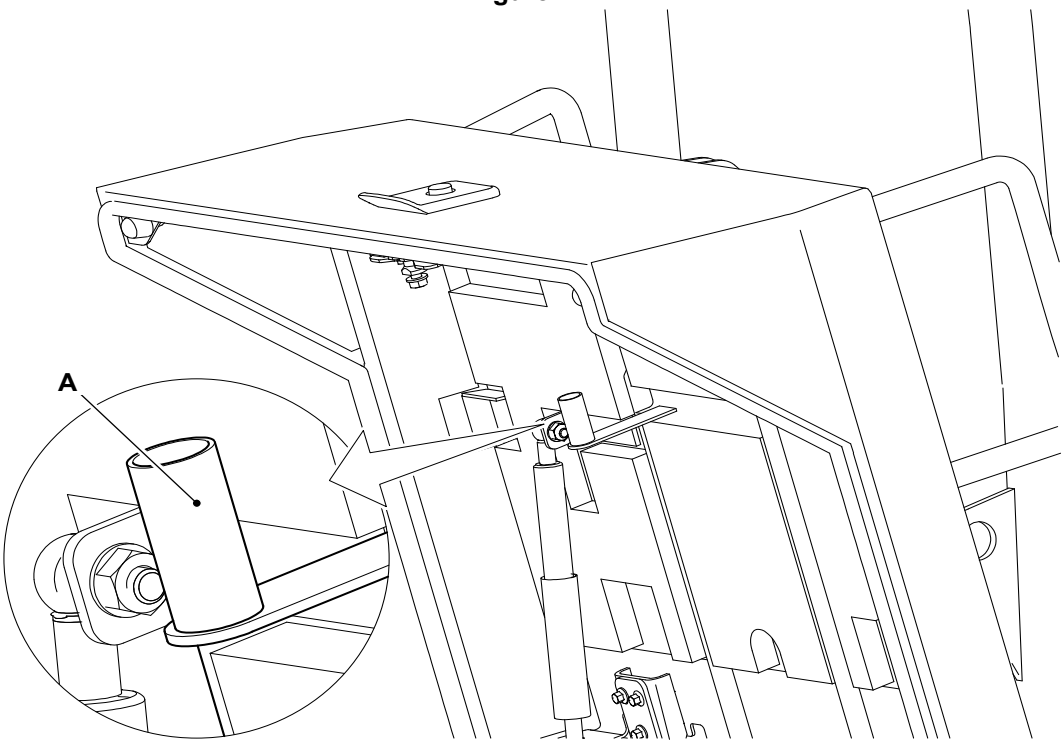
A Beacon (Amber)

B Beacon (Green)

Storage Position

1. Remove the beacon from the ROPS and fixed onto the tube spigot under the engine cover. Refer to Figure 27.

Figure 27.



A Tube spigot

Safety Equipment

Articulation Lock

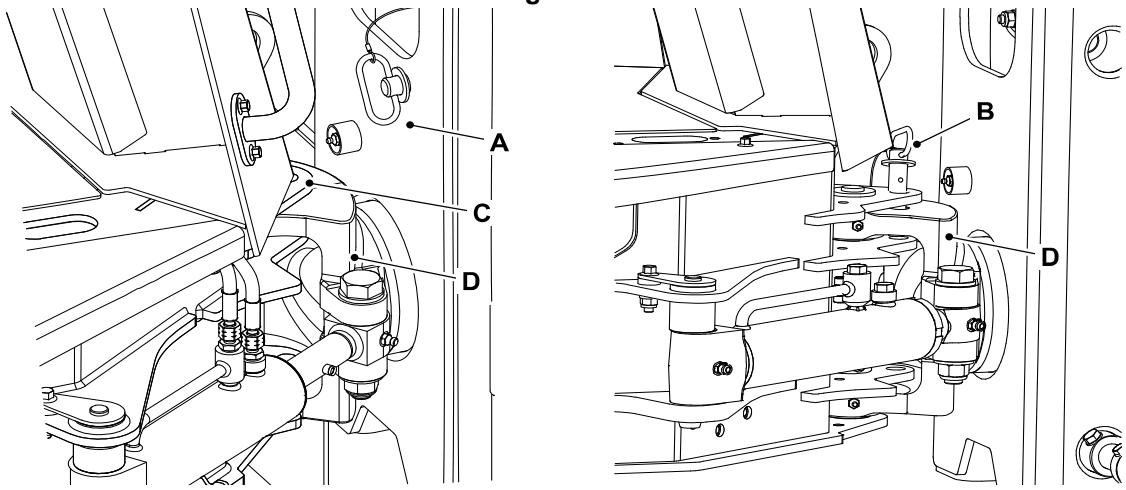
Transport Position

⚠ **WARNING** Make sure the articulation lock is in the transport position before you transport the machine. The articulation lock must also be in the transport position if you are carrying out daily checks or doing any maintenance work in the articulation danger zone. If the articulation lock is not in the transport position you could be crushed between the two parts of the chassis.

The articulation lock prevents the machine movement when lifting the machine or during transport or maintenance.

1. Steer the machine to put the front and rear wheels in a straight line.
2. Set the drive lever in the neutral position and switch on the park brake.
   Refer to: Transmission Drive Lever (Page 47).
3. Stop the engine and remove the ignition key.
4. Remove the locking pin from its drive (stowage) position. Refer to Figure 28.
5. Install the locking pin. Refer to Figure 28.
6. Adjust the locking pin around until the hole in the articulation joint aligns with the hole in the rear chassis. Refer to Figure 28.
7. If necessary, turn the steering wheel slightly to align the holes.
8. Install the locking pin and secure with the clip. Make sure that the pin is correctly secured to prevent the articulation lock becoming insecure. Refer to Figure 28.

Figure 28.



A Locking pin and stowage position
C Locking hole
B Locking pin in installed position
D Articulation joint

Drive (Stowage) Position

⚠ **WARNING** Always make sure the articulation lock has been removed before attempting to drive the machine. The machine cannot be steered with the articulation lock installed.

1. Stop the machine.
2. Set the drive lever in the neutral position and switch on the park brake.
   Refer to: Transmission Drive Lever (Page 47).

3. Stop the engine and remove the ignition key.
4. Remove the locking pin that secures the articulation joint in the transport position.
5. Position the locking pin in its drive (stowage) position.

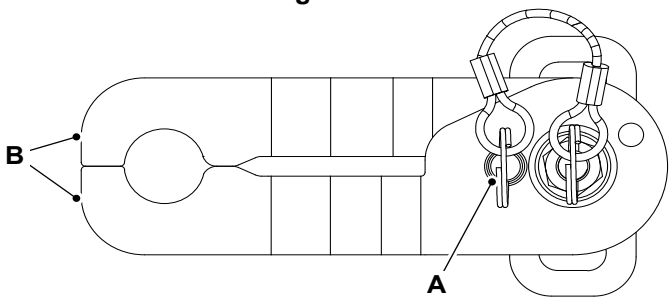
Control Lock

Skip Lever Control Lock (If Installed)

To prevent the skip from being accidentally operated when the driver is moving around on the machine or driving on the highway, the skip lever lock can be installed.

Always install the lever lock before leaving the operator position and remove it when you are correctly seated on the machine.

Figure 29.



A Locking pin **B** Lock arms

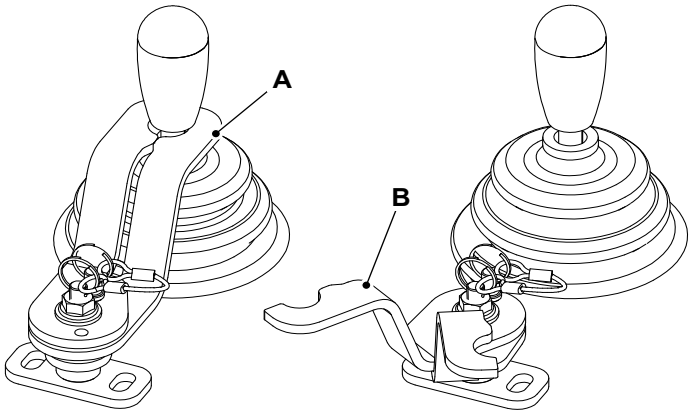
To Lock the Lever

1. Remove the locking pin. Refer to Figure 29.
2. Rotate the lock arms so that the skip lever is held within the lock arms. Refer to Figure 30.
3. Replace the locking pin to secure lever lock.

To Unlock the Lever

1. Remove the locking pin. Refer to Figure 29.
2. Rotate the locking arms to the open position. Refer to Figure 30.
3. Replace locking pin to secure lever lock in open position.

Figure 30.



A Lever lock- locked position

B Lever lock- open position

Drive Controls

Steering Wheel

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

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. When drive is selected push the pedal to increase travel speed. The machine brakes are hydraulically operated and are applied automatically when you release the pedal.

Park Brake

⚠ **WARNING** The parking brake may not hold on gradients steeper than 8.5° (15%). If possible always park on flat level ground. If it is necessary to park on a slope it must not exceed the figures stated above and the machine must be parked across the slope and the wheels chocked to prevent movement.

The park brake switch is located on the right hand side of the instrument panel. Apply the park brake before leaving the machine.

The park brake must be switched on to start the engine.

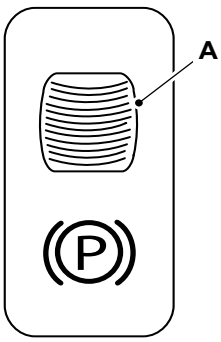
Transmission drive is automatically disconnected when the park brake is applied. If the park brake is engaged when forwards or reverse drive is selected the park brake engaged light will come on.

1. To engage the park brake, put the forward or reverse lever into neutral or press the park brake switch to the on position.

   1.1. A catch prevents the brake from being released accidentally.

2. To release the park brake switch, operate the switch lock button before turning the park brake switch off. Then select forward or reverse with the drive lever.

Figure 31.



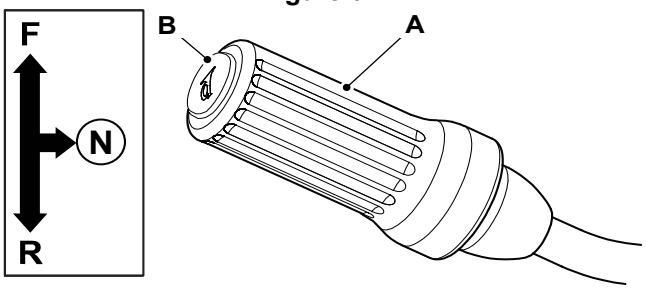
A Catch

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.

The engine will not start unless the drive lever is in the neutral position and the park brake is switched on.

Figure 32.



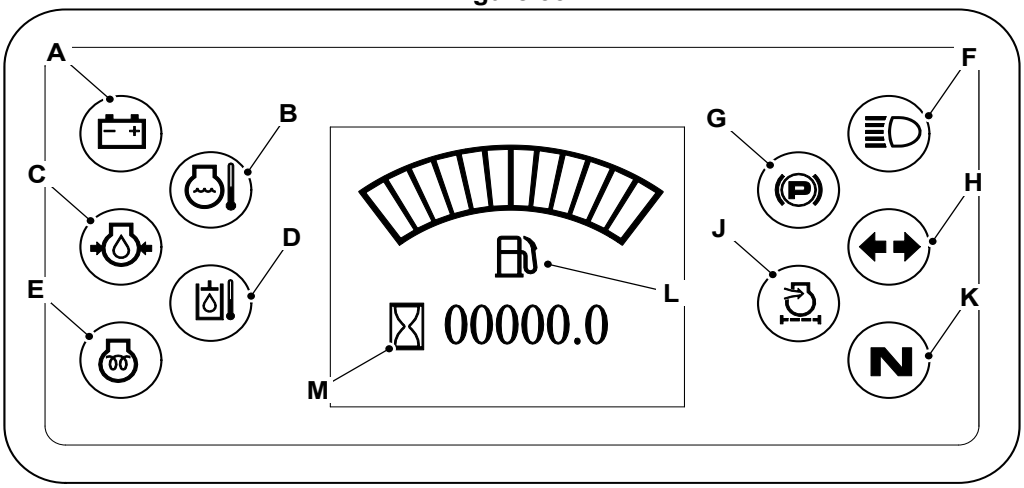
A Drive lever
F Forward direction
R Reverse direction
B Horn
N Neutral

1. Use the drive lever to move the machine in the forward or backward direction.
2. Put the drive lever into the neutral position in order to stop the machine.

Instruments

Instrument Panel

Figure 33.

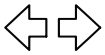


A Battery charging condition
B Engine oil temperature
C Engine oil pressure
D Hydraulic oil temperature
E Engine pre-heat
F Main-beam lights
G Park brake
H Direction indicators
J Engine intake air filter
K Neutral
L Fuel level indicator
M Hour meter

Instrument Panel (continued)

Table 6.

	Description	Symbol	Symbol on Condition
A	Battery charging condition		Illuminates when the ignition switch is on and the engine is not running. When the engine starts and full RPM (Revolutions Per Minute) is selected the charge warning light goes off. The warning light should stay off while the engine is running. If the light fails to go off when the engine is running - stop the engine immediately. Do not use the machine until the fault has been rectified.
B	Engine oil temperature		Illuminates when the engine oil temperature exceeds a predetermined level.
C	Engine oil pressure		Illuminates when the ignition switch is in the on position. When the engine starts, the light should go off. If the light fails to go off or comes on when the engine is running - stop the engine immediately. Do not use the machine until the fault has been rectified.
D	Hydraulic oil temperature		Illuminates when the transmission oil temperature exceeds a predetermined level. If the light comes on, stop the machine and investigate the cause.

	Description	Symbol	Symbol on Condition
E	Engine pre-heat		Illuminates when the ignition is switched to position II and the pre-heat is in operation.
F	Main-beam lights		Illuminates when the main beam headlights are turned on.
G	Park brake		Audible/Visual. Comes on when the park brake is engaged. The buzzer operates if the lamp is on and the transmission is not in neutral. If the lamp flashes, this indicates a fault with this function and is accompanied with a fault code on the LCD (Liquid Crystal Display).
H	Direction Indicators		Illuminates when the indicator switch is moved to the left or right turn position. If the light fails to perform this function, do not use the machine until the fault has been rectified.
J	Engine intake air filter		Illuminated if the engine air filter is blocked. If the air filter warning light comes on, stop the machine and switch off the engine. After a short pause start the engine. If the warning light has extinguished carry on operating the machine in the normal manner. If the warning light is still illuminated after the engine has been started check that the engine air filter elements are not blocked.
K	Neutral		Illuminates when the transmission is in neutral.
L	Fuel level indicator		Indicates the level of diesel fuel in the tank. Do not let the tank run dry, or air will enter the fuel system. Do not run the machine if the indicator needle goes into the red area. Refuel the tank as soon as possible.
M	Hour meter		The hour meter records the engine operating hours.

Getting the Machine Moving

General

⚠ **DANGER** The machine must not be used until the ROPS has been raised and secured in the work position. It is prohibited to use a machine without the ROPS installed in the work position.

Drive Inhibit System

The machine may be installed with a DIS (Drive Inhibit System). The system requires that the operator performs a set series of events before the machine will select drive and pull away. The system also gives surrounding workers an audible warning (double beep of the machine horn) that the machine is moving after it has been standing or started. The system will also light up the green beacon (if installed) indicating that the sequence has been done correctly.

The operator must sit in the operator seat and then fasten the seat belt before the machine will allow drive. If this sequence is not followed, the machine warning buzzer will intermittently sound when drive is selected. Machine will not move away. If this happens select neutral and fasten the seat belt. When drive is selected again the machine will drive away.

Operating Practices

⚠ **WARNING** Do not dismount a moving machine.

WARNING A loaded dumper must drive forward up a slope and reverse down a slope. The opposite applies when the dumper is unladen - the machine must be reversed up the slope and driven down the slope.

WARNING Do not turn across a slope. The machine could tip over.

WARNING Take particular care when reversing. Make sure the way behind is clear before reversing. Make sure that the reverse alarm is working (if installed) and can be clearly heard by people around the machine.

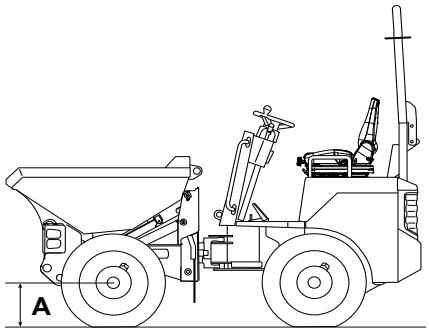
When moving the machine, keep it under control at all times. Stay alert for obstructions and possible hazards.

Do not use the brake pedals as footrests.

Approach deep mud with the front wheels straight.

Notice: *If you intend to drive the machine through water, the maximum depth without modification is the centre of the front wheel hub from the ground. Above this depth water can enter the engine, cooling fan and axles causing damage/early failure. Modification to the wading depth may be available. Consult your JCB dealer.*

Figure 34.



A Maximum wading depth

Getting the Machine Moving

1. Check your seat belt and seat.
   1.1. Make sure that your seat belt is correctly fastened.
   1.2. Make sure that the seat is correctly adjusted.

2. Set the transmission drive lever in neutral and switch the parkbrake on, otherwise the engine will not start. Start the engine.
3. Set the transmission drive lever to forward or reverse.
   3.1. When forward/reverse is selected, the reverse alarm will sound or front horn will double beep, as a warning to personnel around the machine.
   3.2. Make sure it is safe to move off and push down on the accelerator pedal. The machine will move smoothly away.
4. When the machine is travelling slowly, check the steering. Do not drive the machine unless the steering and brakes are working correctly. If you are not sure, consult your JCB dealer.

The drive inhibit system will not allow the operator to select drive unless the seat belt is fastened after they have sat in the seat.

In this case, set the transmission drive lever in neutral, fasten the seat belt and then select drive.

If the machine detects neutral is selected for more than 10s the front horn will double beep again when drive is selected.

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.

DANGER The machine must not be used until the ROPS has been raised and secured in the work position. It is prohibited to use a machine without the ROPS installed in the work position.

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

Muddy, slippy ground conditions will adversely affect the ascending and descending capabilities of the machine.

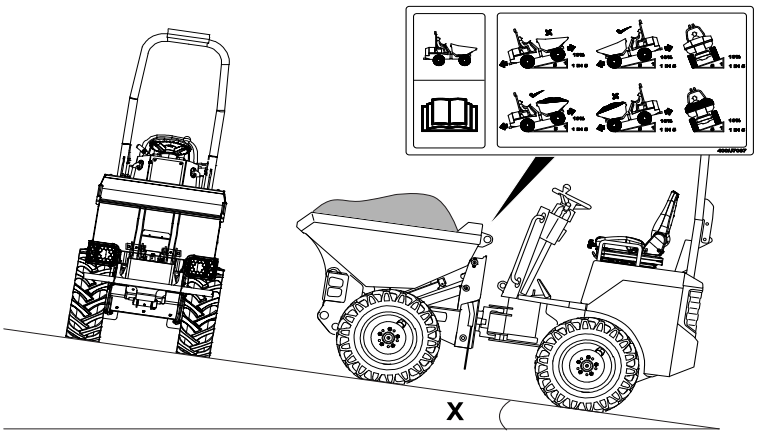
Ground conditions can be even more hazardous when crossing a slope. Extreme care must be taken when crossing sloping ground to prevent the machine sliding sideways out of the operators control.

Drive the machine across slope only when necessary. If possible, plan your route to avoid driving across slopes. If you have to drive across slopes, always drive with the skip fully lowered and facing uphill. Refer to Figure 35.

Do not attempt to exceed the limits.
Refer to: Driving Performance (Page 144).

The maximum operating slope information is shown by a decal fitted to skip facing the operator.

Figure 35.



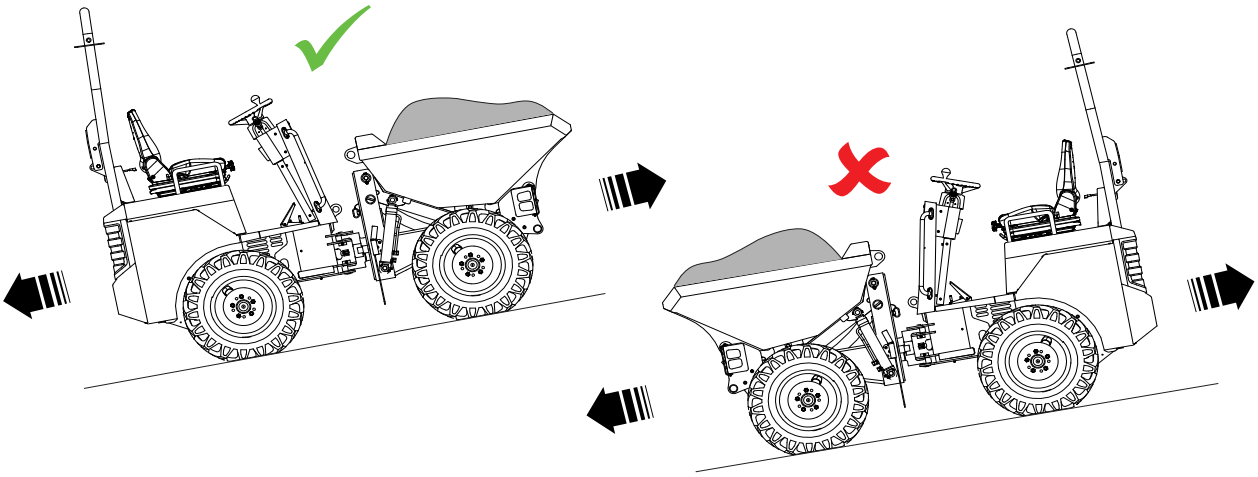
X Maximum operating slope

Working on Slopes

Laden Machine

When ascending or descending on a slope, the skip must always face the top of the slope. Always drive forwards up the slope and reverse down the slope. Do not attempt to drive forwards down the slope, there is a serious risk of overturning. Refer to Figure 36.

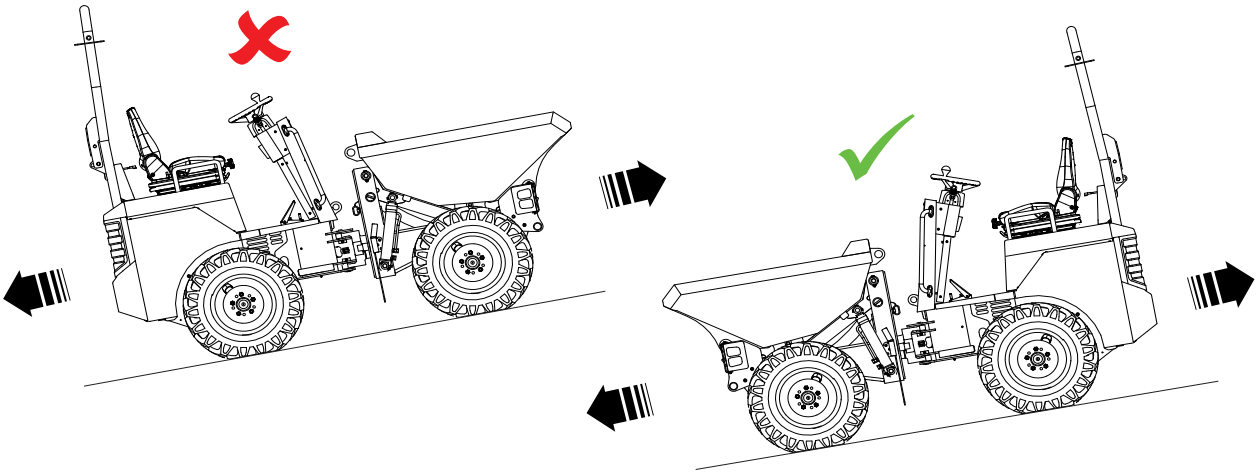
Figure 36.



Unladen Machine

When ascending or descending on a slope, the skip must always face the bottom of the slope. Always reverse up the slope and drive forwards down the slope. Refer to Figure 37.

Figure 37.



It should be noted that adverse ground conditions will limit the machine's gradient capabilities.

Driving the Machine

General

Driving Techniques

Puddles

Do not drive into puddles. The puddle could be covering a hole which could cause the machine to roll over.

Obstructions and Debris

Do not drive over obstructions or debris. This could jerk or jolt the machine and cause it to roll over.

Driving

Do not drive around the site with the skip raised. The skip must be fully lowered when travelling. You must remain seated when driving the machine. Do not stand.

Driving Forward

When driving a loaded machine forwards, always accelerate smoothly and slowly. If you accelerate quickly or with jerky movements, the load could fall off or the machine could become unstable. Always drive the machine slowly to avoid the risk of needing to brake sharply. Always make sure your route is clear of obstructions and take care to avoid endangering pedestrians.

Braking

Throttle braking is controlled by the throttle pedal. Throttle hydraulic braking is applied when the throttle is lifted. Apply the throttle smoothly and slowly. If you throttle sharply, the load could fall off or the machine could become unstable.

Restricted View

If your view is restricted due to the size of the load, then manoeuvre the machine by reversing if possible.

Reversing

When reversing, do not rely on mirrors or cameras - either turn your head to face the direction of travel or get the assistance of a reliable person to guide you. Always make sure your route is clear of obstructions and take care to avoid endangering pedestrians.

If a reverse alarm is installed, make sure it is functioning correctly and can be heard clearly by people around the machine.

Turning

⚠ **DANGER** Only reverse at slow speeds. Look behind while reversing and be aware of bystanders in the vicinity of the machine.

The machine could become unstable if you turn too quickly or too sharply. Always turn slowly and smoothly. If you turn too quickly or too sharply, the load could fall off or the machine could become unstable. Keep the load as low as possible.

Always make sure you have enough clearance around obstructions and pedestrians before turning.

Gradients

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

If driving up or down a gradient with an unloaded machine, always keep the rear of the machine pointing uphill.

If driving up or down a gradient with a loaded machine, always keep the load pointing uphill. This will improve the stability of the machine.

Drive the machine across gradients only when necessary. If possible, plan your route to avoid driving across gradients. If you must traverse a gradient, always drive with the skip fully lowered and facing uphill.

Operating Levers/Pedals

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.

WARNING Do not operate any machine controls from outside the machine. You or others could be injured or killed by movement of the machine or its working tools or attachments.

The control levers and switches may vary on machines.

Skip Controls

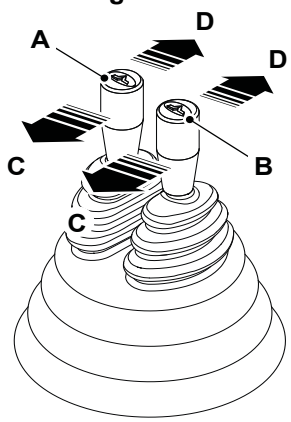
⚠ **WARNING** Applicable to certain markets only: The control lock must be installed when travelling on the public highway to prevent the skip raising or tipping accidentally.

WARNING If driving with a raised skip is required, take extra care as the machine is less stable. Lower the skip fully whenever possible before driving the machine.

To Tip the Skip

1. Position the machine where the load is to be discharged.
2. Make sure that the area is clear of people.
3. Make sure the lever lock is off.
4. Push the tip skip lever forwards towards the front of the machine to tip the skip and the load will be discharged. Refer to Figure 38.

Figure 38.



A Skip Lift
B Skip Tip
C Pull to lower skip, pull to return skip
D Push to lift skip, push to tip skip

To Lower the Skip

1. Discharge the load.
2. Pull the tip skip lever towards the back of the machine. Refer to Figure 38.
3. The skip will lower.

To Elevate the Skip

1. Position the machine where required.
2. Make sure that the area is clear of people.

3. Push the control levers forwards towards the front of the machine to raise the lift arm and skip. Refer to Figure 38.
4. Refer to Figure 38.

To Return to the Travel Position

Never attempt to move the machine with the lift arm and skip in the elevated position. Danger of overturning.

1. Pull the control levers towards the back of the machine. Refer to Figure 38.
2. The lift arm and skip will lower.

Working with the Skip

General

⚠ **WARNING** It is important to get off and stand clear of the machine when loading the dumper with a backhoe loader, digger loader shovel or similar to prevent injury from falling objects.

WARNING Tipping the skip and discharging a load changes the machine centre of gravity.

The load carrying skip is located over the front axle, ahead of the driver and is designed to carry free flowing materials. It is raised and lowered hydraulically. The machine discharges its load to the front of the machine. If necessary the skip can be raised 1m before tipping to provide an higher discharge point. This feature is particularly useful when tipping loads into builders skips, trucks etc.

The skip must only be used to carry free flowing loads. The skip must only be raised or tipped with the machine on firm level ground.

The dumper vehicle is basically a load carrier and the skip can be used for a multitude of building/ contracting site functions, but essentially it is used for carrying free flowing materials from excavations or demolitions and general site building activities.

The skip is tipped and lowered by a double acting hydraulic cylinder mounted between the lift arm/carriage and the underside of the skip and controlled by joystick operated control valve.

Twin hydraulic cylinders mounted between the front chassis and the lift arm/carriage assembly permit the skip to be elevated by 1m for high discharge purposes.

The joystick control for skip operations is positioned to the right of the drivers seat.

Raised Skip

⚠ **DANGER** Before you work under a raised skip you must install and lock the maintenance strut. Do not reach or work under a raised skip unless the strut is installed and locked.

As a safety aid when working on the machine a maintenance strut is provided that installs over the skip ram rod when the skip is raised. This prevents the skip lowering accidentally and causing injury. You must not reach or work under a raised skip without the ram stop installed.

Power Sockets

Auxiliary Power Socket

Your machine is installed with one or more 12V auxiliary power sockets, which can be used for mobile phone chargers or other 12V powered devices.
Refer to: Component Locations (Page 17).

Only connect items which are compatible with the power rating (10A) of the socket and have the correct plug.

Always operate the engine during the prolonged use of the electrical accessories, or the battery can discharge.

Make sure that the socket cap is closed when the socket is not in use.

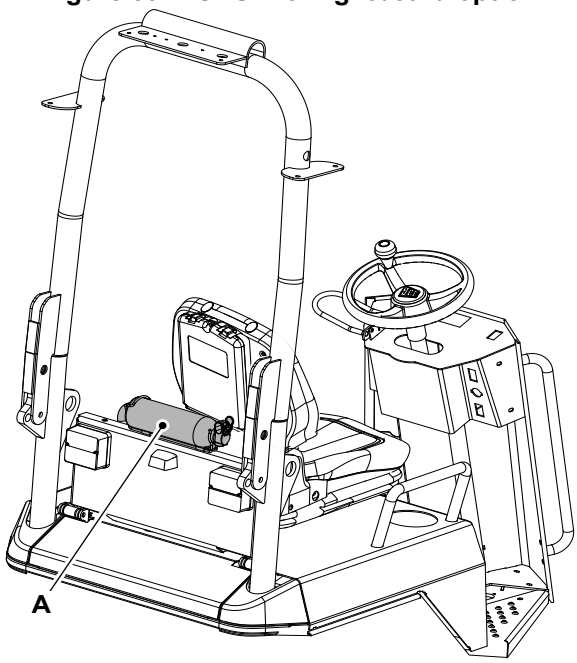
Fire Extinguisher

General

Location

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

Figure 39. ROPS with lightboard option



A Fire extinguisher

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.

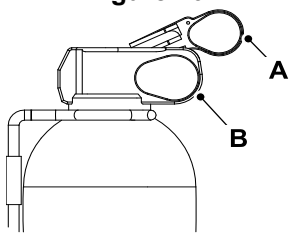
Make sure that you understand how to use the fire extinguisher. If necessary, refer to the instructions found on the fire extinguisher.

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. Aim directly at the fire from an upwind position, if possible.
4. Squeeze the trigger to operate the fire extinguisher, release the trigger to stop the flow.

Figure 40.



A Lock pin

B Trigger

Moving a Disabled Machine

General

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

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

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

Jump-Starting the Engine

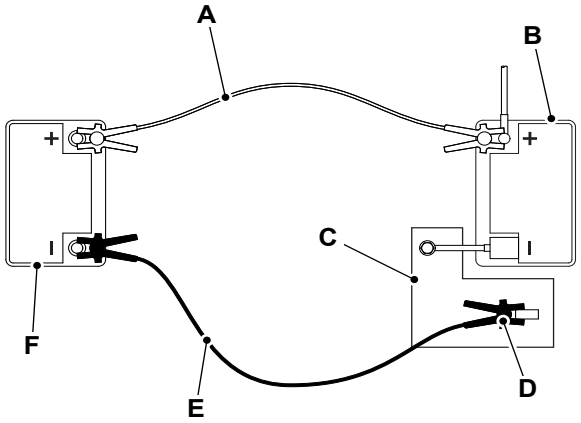
⚠ **DANGER** It is essential to avoid sparks when connecting cables to a discharged battery because the battery generates inflammable gases and may pose a fire risk. If the battery is frozen it may explode if the machine is “jump started” and the engine run.

DANGER Contact with battery acid can cause serious burns, blindness or even death. Protective clothing, gloves and a face shield must be worn at all times when handling or working on a battery.

1. Wear suitable gloves and a face shield.
2. Use booster cables of sufficient capacity to carry the starting current.
3. Set all switches in the machine to their off positions.
4. Get access to the battery.

   Refer to: Access Apertures (Page 105).
5. Connect the booster cables:
   - 5.1. 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.
   - 5.2. 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.
   - 5.3. Connect the other end of this cable to the negative (-) terminal on the booster supply.
6. Do the pre-start checks.

Figure 41.



A Positive (+) jump lead
B Discharged battery on machine
C Machine chassis
D Jump lead connection on chassis
E Negative (-) jump lead
F Slave battery

7. Start the engine.

8. Disconnect the booster cables:
   8.1. Disconnect the negative booster cable from the machine frame earth. Then disconnect if from the booster supply.
   8.2. Disconnect the positive booster cable from the positive (+) terminal on the battery. Then disconnect it from the booster supply.

Retrieval

⚠ **CAUTION** With the engine off the hydraulic system will not function, the steering will still operate but under these circumstances steering wheel loads are high. The dumper must only be towed at very slow speeds.

If the machine becomes disabled, it is possible to tow the machine but before doing so it is necessary to release the rear brakes.

The machine should be towed at a maximum speed of 2km/h (1.2mph) for a maximum distance of 50m.

Release plates are supplied with and stored on the machine.

All scenarios cannot be listed, due to the vastly different situations that could occur, dependent on the problem and the reason for towing. It is advised you contact your JCB dealer for help and advice on the correct and safest procedure for machine preparation before attempting to move the machine.

Towing Procedure

1. Lower the skip to the machine.
2. Release the brakes.
3. Set gear lever to neutral.
4. 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.

To Release the Brakes

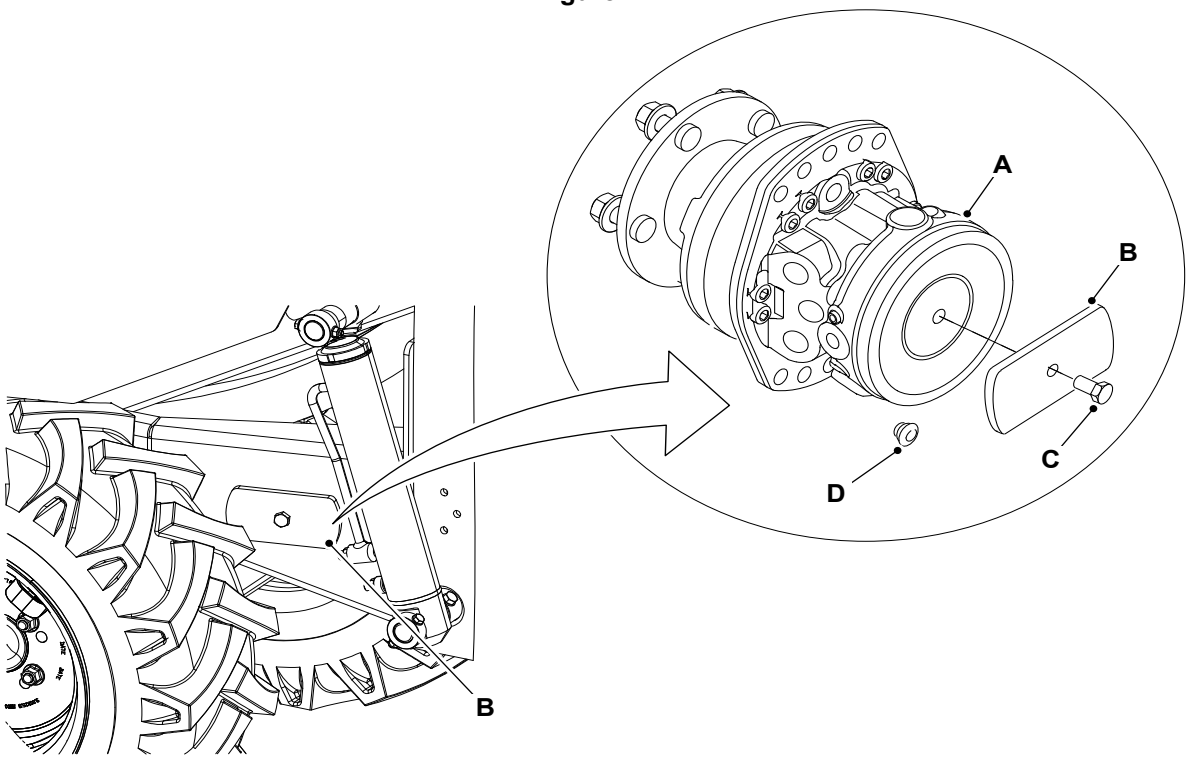
1. Make sure the machine is on firm level ground and block the wheels to prevent movement.
2. Loosen the release plates from their storage positions. Refer to Figure 42.
3. Remove the rubber caps from the rear wheel motors.
4. Place the plates over the end of the motors.
5. Fit the bolts through the holes and screw into the motors.
6. Tighten the bolt to release the brakes.
7. The machine can now be towed with care.

Do not use bolts which exceeds 30mm in length. Use of longer bolts will damage the motor.

To Apply the Brakes

1. Loosen the bolt from the wheel motor. Refer to Figure 42.
2. Fit the plates in their storage position.
3. Fit the rubber caps to the rear motors.
4. Test to make sure the brakes work correctly before returning the machine to work.

Figure 42.



A Wheel motor
B Release plate
C Bolt
D Rubber plug

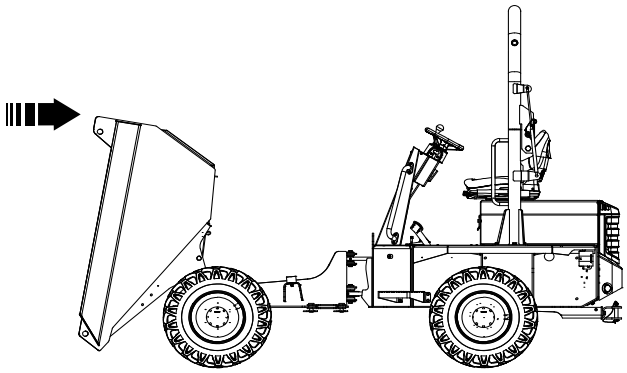
Emergency Recovery of Skip in Dump Position

Recovery of skip from fully dumped position may require secondary force to be applied to top edge of skip.

1. Make sure that skip is empty of material.
2. Access the machine and sit in the operator seat.
3. Select neutral and make sure the park brake is switched on.
4. Set the skip control lever to skip lower position.
5. If the skip will not lower on its own, apply appropriate force to the skip top edge to lower skip while operating skip lower control. Refer to Figure 43.

   Weight/Force: 60kg
6. Remove the force and lower the skip fully down.
7. Lowering speed can be controlled by skip lever movement.

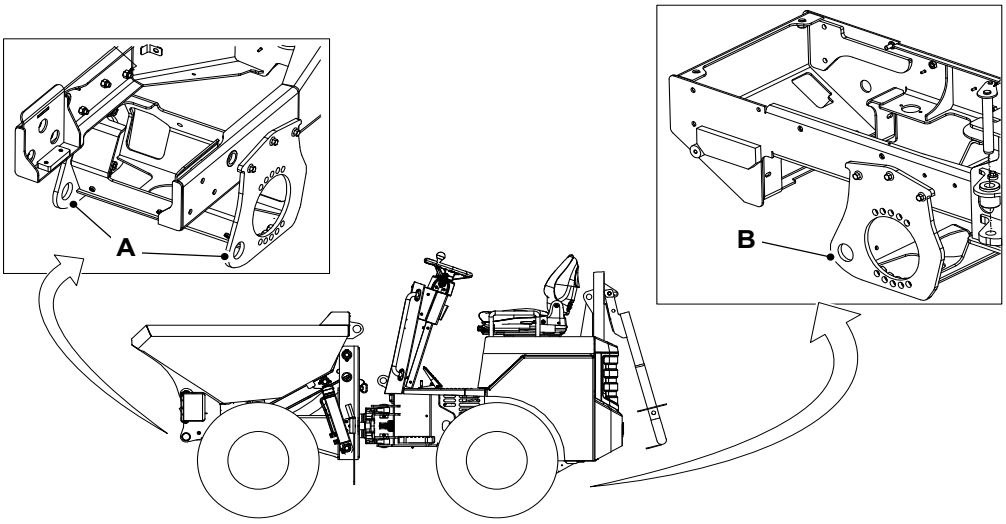
Figure 43.



Retrieval

The machine is installed with two front and two rear retrieval points. Towing slings must be installed to both points and equal force should be used when towing.

Figure 44.



A Front retrieval points

B Rear retrieval points

Lifting the Product

General

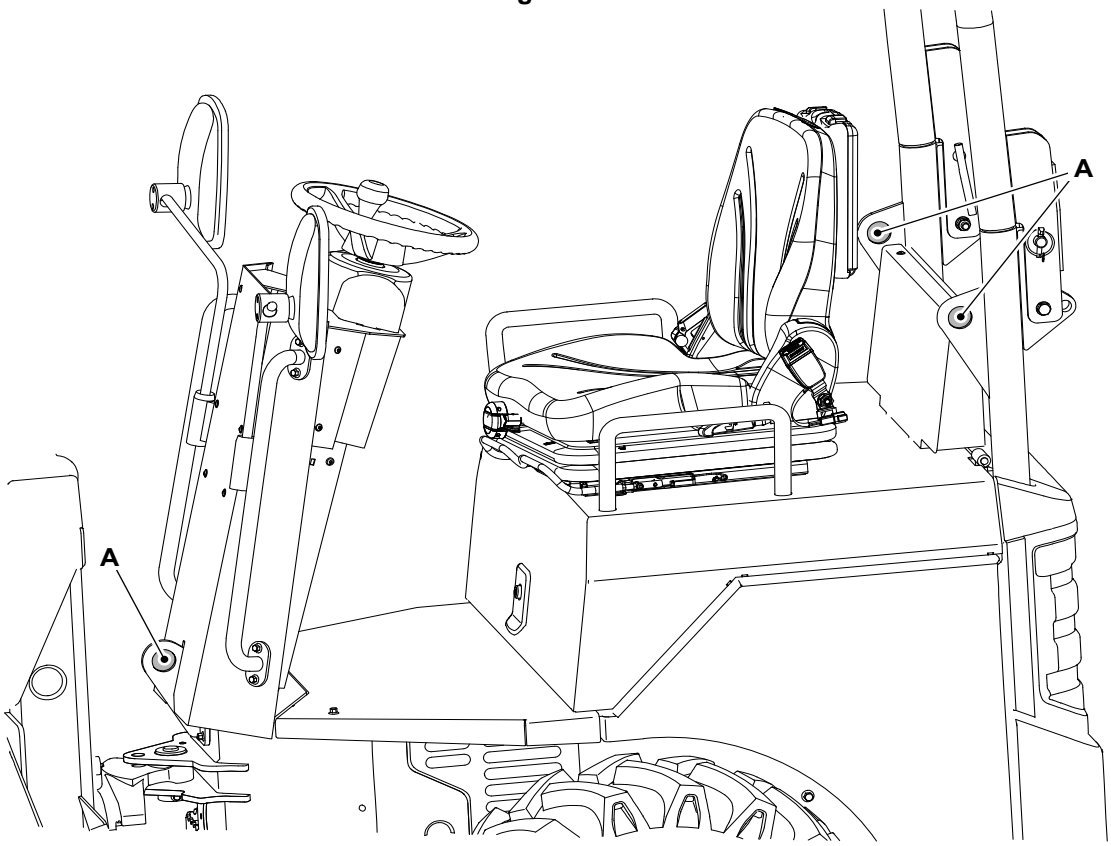
⚠ **CAUTION** You can be injured if you use incorrect or faulty lifting equipment. You must identify the weight of the item to be lifted then choose lifting equipment that is strong enough and suitable for the job. Make sure that lifting equipment is in good condition and complies with all local regulations.

Notice: Do not use the ROPS frame for towing.

All spoil and materials must be removed from the machine before attempting to lift the machine. Make sure there are no loose items in the operator compartment.

Three lifting points are provided for lifting the machine. Using these points will give a safe stable lift. Other methods of lifting are not recommended. Refer to Figure 45.

Figure 45.

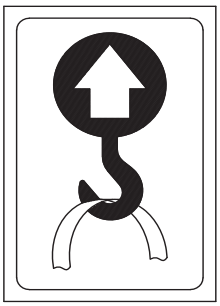


A Lifting points

Lifting Procedure

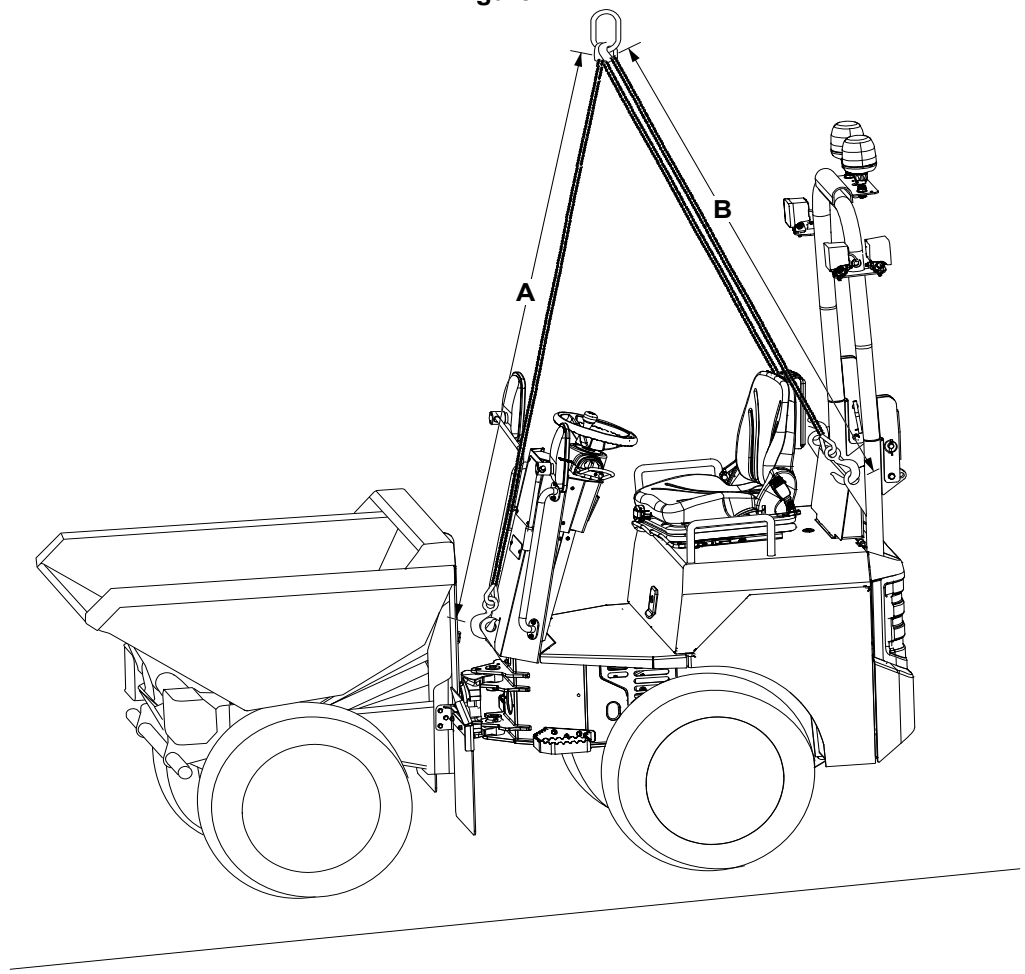
1. Position the crane for a level machine lift. The crane must have adequate capacity to lift the machine.
2. The correct lift-point positions are identified on the machine by a label. Refer to Figure 46.

Figure 46.



3. Before lifting the machine, position it in the straight ahead position with the front and rear chassis in line. You must install the articulation lock in the transport position.
4. Install and secure the articulation lock before lifting.
   Refer to: Articulation Lock (Page 44).
5. Engage the transmission drive lever to neutral and switch on the park brake.
6. Switch off the engine, remove the ignition key, and vacate the machine.
7. Use the correct length lifting attachments. Any chains, ropes and straps used must be of sufficient strength to support the machine safely.
   Weight/Force: 33.5kN

Figure 47.



A 2,150mm **B** 1,850mm

8. Make sure the area is clear of personnel before attempting to lift the machine.
9. Lift the machine slightly, check the balance of the machine. If necessary, the skip can be raised to level the machine during lift.

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.

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

⚠ **DANGER** Keep all bystanders well clear when loading or unloading a dumper.

When loading dumper onto a trailer or lorry, strong loading ramps must be used. Ramps must be strong enough to take the weight of the machine.

The angle of the loading ramps must not exceed the grade ability of the dumper.
Refer to: Performance Dimensions (Page 144). In wet, muddy or icy conditions this angle will be reduced considerably.

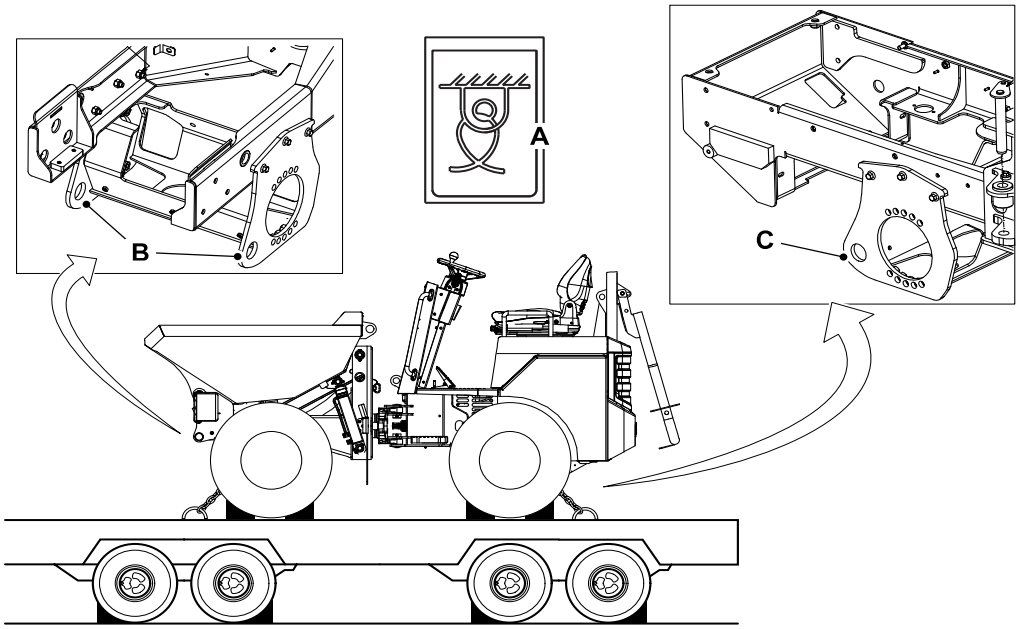
Make sure that the trailer or lorry will not move during loading by applying its brakes and also chocking its wheels if necessary.

The skip must be empty when transporting the machine.

Position the machine correctly onto trailer and install the articulation lock.

Tie down points are provided at the front and rear of the machine. The chains, straps, ropes etc. must be attached to the machine's tie down points. Refer to Figure 48.

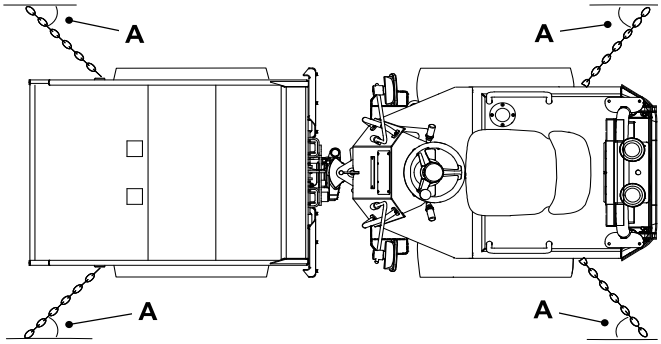
Figure 48.



A Tie-down decal
B Front tie down points
C Rear tie down points

1. Place the machine in a suitable position onto transporting vehicle/trailer.
2. Install the articulation lock.
   Refer to: Articulation Lock (Page 44).
3. Remove the battery isolator key.
4. Remove the beacon and store it safely.
5. Lower the ROPS (Roll-Over Protective Structure) to transport position.
   Refer to: Preparing for Road Travel (Page 40).
6. Put blocks at the front and rear of all four tyres. Make sure they are securely in place.
7. Secure the machine to the trailer bed with chains. Use the tie down points indicated by the safety decals.
8. Tension the chain as close as possible to the angle specified. The chains must be strong enough to carry a load of the figure specified. Refer to Figure 49.
   Weight/Force: 58kN

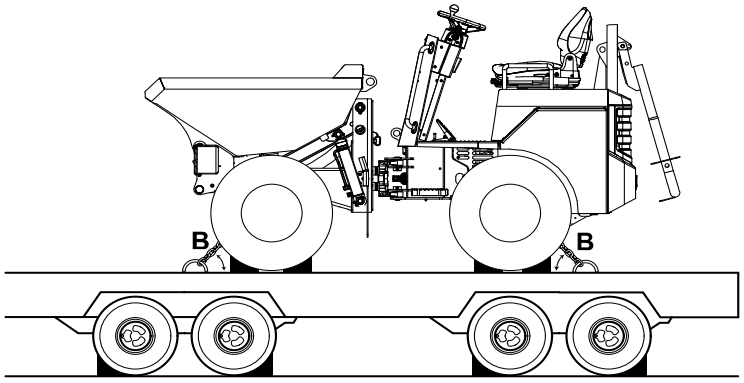
Figure 49.



A 45°

9. The tie down true angle to the ground plane is shown, for both the front and rear. Refer to Figure 50.

Figure 50.



B 35°

Unloading from the Transporting Vehicle

1. Position the transporting vehicle on solid, level ground.
2. Set the drive lever to neutral and lower any stability jacks.
3. Attach the loading ramps on to the transporter. Ramps must be strong enough to take the weight of the machine.
4. Remove the chains, straps or ropes from the machine and stow them.
5. Remove the blocks/chocks from the front, rear and outside of each wheel.
6. Remove the locking pin from the articulation joint.
   Refer to: Articulation Lock (Page 44).
7. Drive the machine slowly to the ramps.
8. Slowly drive off the transport trailer.

Operating Environment

General

The machine has been designed to operate in atmospheric temperatures between -20°C (-4.0°F) and 46°C (114.7°F).

Operating in Dusty or Sandy Areas

1. Air Cleaner. Frequently check, clean or replace the elements regardless of the inspection interval. (Not the safety element).
2. Securely tighten the hydraulic oil tank filler cap to prevent sand and dust from entering the hydraulic system.
3. Check for debris accumulation below the engine.

Operating in Coastal Regions

1. Check that all the plugs, bolts and fasteners are all tightened properly.
2. After daily operations, wash the machine thoroughly and take special care when cleaning the electrical devices and hydraulic cylinders to prevent salt entry and eventual corrosion.

Operating on Wet or Soft Ground

1. Clean the Machine. Moisture or mud will cause the paint, wiring and metallic parts to deteriorate. When operating the machine keep it as dry as possible and regularly grease the machine.
2. Check for debris accumulation below the engine.

Operating in Low Temperatures

⚠ **Notice:** Do not connect two batteries in series to give 24 V for starting as this can cause damage to the electrical circuits.

1. Use the correct viscosity engine lubricating oil.
   Refer to: General (Page 148).
2. Use the correct viscosity hydraulic oil.
3. If available, use a low temperature diesel fuel.
4. Use the correct coolant mixture.
5. Keep the battery at full charge.
6. Fill the fuel tank at the end of each work period, this will help to prevent condensation forming on the tank walls.
7. Protect the machine when its not in use. Park the machine inside a building or cover it with a tarpaulin.
8. Install a cold weather starting aid. Examples are fuel, oil and coolant heaters. Ask your JCB dealer for advice.
9. Before the engine is started, remove any snow from the engine compartment or snow could get into the air filter.

Operating in Extremely Low Temperatures

In extremely low temperatures (below 0°C (32.0°F)) special care must be taken. Extend the warm up time.
Refer to: Warming Up (Page 37).

1. Until the machine is thoroughly warmed up never try to operate the travel system, or damage can occur.

2. Before the machine is operated after a warm up, make sure that the services all operate correctly. A time lag may occur when selecting these services if the hydraulic oil is not sufficiently warm.
3. If the machine will be left outside for more than one day without being used, remove the battery and take it indoors.
4. Drain the water collected in the fuel system to prevent it freezing.
5. Clean the machine after use and put it on wooden blocks. Keep the rams as fully retracted as possible. Remove any water from the exposed portion of the piston rods.
6. Additional low temperature fuel and lubricants and batteries may be required. Contact your local JCB dealer for advice.

Operating in High Temperatures

1. Use the correct viscosity engine lubricating oil.
2. Use the correct coolant mixture.
3. If applicable, check the coolant system regularly, keep the coolant at the correct level. Make sure there are no leaks.
4. If applicable, keep the radiator/oil cooler clean, regularly remove dirt and debris from the radiator/oil cooler and the engine.
5. Check the V-belt regularly.
6. Check the air vents. Make sure that the air vents to and from the engine compartment are not blocked.
7. Check the engine pre-cleaner regularly (if applicable).
8. Check the battery electrolyte level.

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.

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

Running Out of Fuel on a Slope

1. If possible place the machine across the slope in a safe position.
2. Apply parking brake.
3. Chock or block the wheels.
4. Re-fuel the machine.
5. Bleed the fuel system.

Refer to: Fuel System (Page 122).

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 fuel.

WARNING 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.

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 at the end of each work period, this will help to prevent condensation forming on the tank walls.

To fill the diesel tank:

1. Make the machine safe.

Refer to: Maintenance Positions (Page 97).

2. Remove any unwanted material around the diesel fuel cap.
3. Remove the diesel fuel tank filler cap.
   Refer to: Service Points (Page 102).
4. Add the fuel through the filler neck until the tank reaches the full mark.
5. Install the diesel fuel tank filler cap.
   Refer to: Service Points (Page 102).
6. Clean any spilt fuel immediately.

Notes:

Preservation and Storage
Cleaning

General

⚠ **WARNING** When using cleaning agents, solvents or other chemicals, you must adhere to the manufacturer's instructions and safety precautions.

CAUTION To avoid burning, wear personal protective equipment when handling hot components. To protect your eyes, wear goggles when using a brush to clean components.

Notice: Cleaning metal parts with incorrect solvents can cause corrosion. Use only recommended cleaning agents and solvents.

Notice: The efficiency of the rams will be affected if they are not kept free of solidified dirt. Clean dirt from around the rams regularly. When leaving or parking the machine, close all rams if possible to reduce the risk of weather corrosion.

Clean the product with water and/or steam. Do not let mud, debris etc. to collect on the product.

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 product must be cleaned.
- When cleaning is complete, move the product away from the wash area or alternatively, remove the material washed from the product.

When you remove components, be aware of exposure to dirt and debris. Cover any open ports and remove the deposits before proceeding.

Keeping the machine clean will aid maintenance and identification of any fluid leaks. Make sure strict cleanliness is observed especially when dealing with hydraulic systems. Wash the machine using a biodegradable cleaner.

Refer to the individual clean procedures throughout the Maintenance section.
Refer to: Maintenance Schedules (Page 93).

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 product.

Pressure Washing and Steam Cleaning

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

Notice: The engine and other components could be damaged by high pressure washing systems. Special precautions must be taken if the machine is to be washed using a high pressure system.

Make sure that the alternator, starter motor and any other electrical components are shielded and not directly cleaned by the high pressure cleaning system. Do not aim the water jet directly at bearings, oil seals or the engine air induction system.

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

Use a steam cleaner to remove soft dirt and oil.

When cleaning around decals:

- Ensure the water pressure is kept below 138bar (2,001.5psi).
- Keep water temperature below 80°C (175.9°F).
- Use a spray nozzle with a 40° wide angle spray pattern.

- Keep the nozzle at least 300mm 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 97).
2. Stop the engine and let it cool for at least one hour. Do not try to clean any part of the engine while it is running.
3. Make sure that all of the electrical connectors are correctly coupled. If the connectors are open, attach the correct caps or seal with water proof tape.

Checking For Damage

General

Refer to the individual condition checks throughout the Maintenance section.
Refer to: Maintenance Schedules (Page 93).

Storage

General

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

Storage Area

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

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

Prepare the Product for Storage

1. Clean the product to remove all unwanted material and corrosive products.
2. Dry the product to remove solvents and moisture.
3. Touch-up any damaged paint.
4. Apply grease to the moving parts (if applicable).
5. Examine the product for worn or damaged parts. Replace if necessary.
6. Fill the fuel tank 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.

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 skip.
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.
8. Chock the wheels.
9. Seal off the air intake and exhaust opening.

During Storage

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

1. Remove any air cleaner covers or exhaust covers.

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

Take out of Storage

1. Remove covers from air cleaner and exhaust pipe.
2. Check condition of air filter elements and replace if necessary.
3. Lubricate the machine in accordance with the lubrication diagram.
4. Examine tyres and replace if necessary.
5. Examine the coolant condition. Replace if necessary.
6. Examine all fluid levels. If necessary, add more fluid.
7. Clean the machine to remove all unwanted material and corrosive products. Dry the machine to remove solvents and moisture
8. Remove the grease or petroleum jelly from the ram piston rods.
9. Install a charged battery.
10. Start the engine.
11. Operate the hydraulic controls. Make sure that the hydraulic functions operate correctly.

If stored for more than a period of 6 months:

1. Replace the hydraulic filters. Examine the hydraulic oil for degradation and replace if necessary.
2. Drain and replace the oils in transfer box and axles.

Security

General

Vandalism and the theft of unattended machines is an ever increasing problem and JCB is doing everything possible to help stop this.

Your JCB dealer will be pleased to provide information on any of these sensible precautions. Act now!

JCB Plantguard

JCB Plantguard is a comprehensive package available to help you safeguard your machine. It includes such devices as vandal proof covers, window etching, immobiliser, concealed serial number, battery isolator, tracker security system etc.

Remember that the installation of any one of these security devices will help to minimise not only the damage or loss of your machine, but also subsequent lost productivity. It could also help to reduce insurance premiums.

Construction Equipment Security and Registration Scheme (CESAR)

CESAR (Construction Equipment Security and Registration) is a simple, effective method of machine identification and registration that operates throughout the United Kingdom and Ireland and across the whole spectrum of JCB products.

CESAR is a scheme to help decrease plant theft, and was developed by the Metropolitan Police and the Home Office Plant Theft Action Group.

The key to the scheme is its simplicity and it will mean that every police officer in the country will know how to identify construction machinery and verify ownership. This will provide a major leap forward in both protecting machinery, and recovering it.

The Construction Equipment Association is managing the scheme, and Datatag are providing the security material and support. JCB is fully supportive of the CESAR initiative and will offer it as a factory option across the range.

The CESAR kit includes 2 tamper proof triangular identification plates installed on either side of the machine, a unique transponder, mini radio frequency identification tags concealed throughout the machine, Datatag micro dots, and a unique DNA coded chemical painted on the machines major components. Plus a registration certificate logged onto the CESAR or DVLA databases, and a change of keeper form.

LiveLink

Your JCB machine may be installed with LiveLink, JCB's advanced machine monitoring system. LiveLink monitors a range of information about your machine and sends it through cellular and satellite communication back to JCB's secure monitoring centre.

The machine owners and JCB dealers can then view that information through the LiveLink website, by email and even through text message. If you want to know how LiveLink can help manage your JCB machines, contact your local dealer for more information.

Maintenance
Introduction

General

Your machine has been designed and built to give maximum performance, economy and ease of use under a wide variety of operating conditions. Prior to delivery, your machine was inspected both at the factory and by your dealer to make sure that it reaches you in optimum condition. To maintain this condition and trouble free operation it is important that the routine services and maintenance, as specified in this manual, are done at the recommended specified intervals and it is recommended that this is done by an approved JCB dealer using genuine JCB parts. Servicing/repairs carried out by unauthorised personnel or the use of non-genuine inferior quality parts could limit machine warranty.

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

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

It can be seen from the service schedules on the following pages that many essential service checks must only be done by a JCB trained specialist competent person. JCB dealer service engineers have been trained by JCB to do such specialist tasks, and are equipped with the necessary special tools and test equipment to do such tasks, thoroughly, safely, accurately and efficiently.

JCB regularly updates its dealers to advise them of any machine developments, changes in specifications and procedures. Therefore only a JCB dealer is fully able to safely service the machine to the latest requirements, which makes them best placed to maintain and service your machine.

A service record sheet or book is provided at the back of this publication which will enable you to plan your service requirements and keep a service history record. It must be dated, signed and stamped by your dealer each time your machine is serviced.

Remember, if your machine has been correctly maintained, not only will it give you improved reliability but its resale value will be greatly enhanced.

When the machine is removed from service, local regulations for machine decommissioning and disposal will vary. Contact your nearest JCB dealer for further information.

Owner/Operator Support

JCB together with your dealer wants you to be completely satisfied with your new JCB product. However, if you do have a problem, you can contact your dealers service department who are there to help you!

You will have been given the names of the relevant service contacts at your dealer when the product was supplied.

To get the most from your dealer please help them to satisfy you by:

1. Giving your name, address and telephone number.
2. Quoting your product model and serial number.
3. Date of purchase and hours of work.
4. Nature of the problem.

You must take action and comply with any safety critical information transmitted to you by your JCB dealer. Make sure the details of ownership of the machine are recorded by your dealer and the information is accurate and up to date. Failure to do so may result in critical safety information being withheld. The information can only be issued to the recorded owner or keeper of the equipment. It is your responsibility to make sure that your dealer has your correct details. If you are the new owner contact your local dealer with your details and quote the machines serial number to make sure you receive any future information.

If you sell or otherwise dispose of your machine you must tell your dealer:

1. The name and address of the new owner.
2. The product model and serial number of the machine.
3. The date of transfer or disposal.

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.

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.

Decommissioning

At the end of its life the machine must be disassembled by a competent person using safe working practices, wearing the appropriate PPE and working in accordance with local regulations. The appropriate lifting equipment, chocks and stands must be used to maintain a stable machine as components are removed and the machines centre of mass changes. Care must be taken when dealing with flammable liquids and the machine parts that contained those liquids. Any process that could ignite flammable materials must not be used on components that have contained flammable liquids in them or have residual flammable liquids on them. Fire extinguishers must be readily available if cutting/welding equipment is so used. Fluids must be drained off into suitable containers and if possible recycled or otherwise disposed of in an environmentally friendly way in accordance with local regulations. Where possible recyclable materials must be separated out and processed in accordance with local regulations using an authorised agent.

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.

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.

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.

Antifreeze

Never perform checks or maintenance on the cooling system when it is hot. Never remove radiator cap when engine is hot - severe risk of scalding. Never remove radiator cap when the engine is running. Antifreeze is toxic. If accidentally swallowed, medical advice must be sought Immediately. Antifreeze is corrosive to the skin. If accidentally spilled on to skin, it must be washed off immediately. Protective clothing and eye protection must be worn when handling antifreeze.

Hygiene

JCB lubricants are not a health risk when used correctly for their intended purposes.

However, excessive or prolonged skin contact can remove the natural fats from your skin, causing dryness and irritation.

Low viscosity oils are more likely to do this, so take special care when handling used oils, which might be diluted with fuel contamination.

Whenever you are handling oil products you must maintain good standards of care and personal and plant hygiene. For details of these precautions we advise you to read the relevant publications issued by your local health authority, plus the following.

Storage

Always keep lubricants out of the reach of children.

Never store lubricants in open or unlabelled containers.

Waste Disposal

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

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

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

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

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

Handling

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

New Oil

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

Used Oil

Used engine crankcase lubricants contain harmful contaminants.

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

- Avoid prolonged, excessive or repeated skin contact with used oil
- Apply a barrier cream to the skin before handling used oil. Note the following when removing engine oil from skin:
  - Wash your skin thoroughly with soap and water
  - Using a nail brush will help
  - Use special hand cleansers to help clean dirty hands
  - Never use petrol, diesel fuel, or paraffin for washing
- Avoid skin contact with oil soaked clothing
- Don't keep oily rags in pockets
- Wash dirty clothing before re-use
- Throw away oil-soaked shoes

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.

Battery

⚠ **DANGER** Batteries give off an explosive gas. Do not smoke when handling or working on the battery. Keep the battery away from sparks and flames.

Battery electrolyte contains sulphuric acid. It can burn you if it touches your skin or eyes. Wear goggles. Handle the battery carefully to prevent spillage. Keep metallic items (watches, rings, zips etc) away from the battery terminals. Such items could short the terminals and burn you.

Set all switches to off before disconnecting and connecting the battery. When disconnecting the battery, take off the earth (-) lead first.

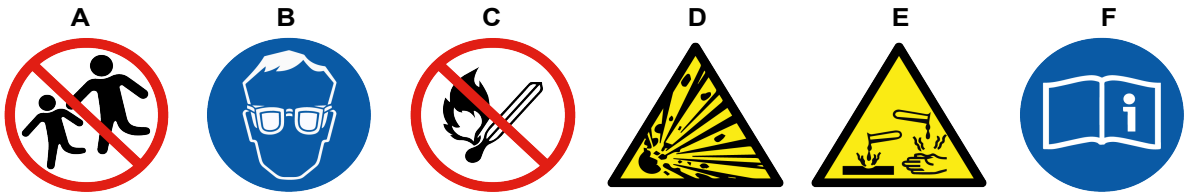
Re-charge the battery away from the machine, in a well ventilated area. Switch the charging circuit off before connecting or disconnecting the battery. When you have installed the battery in the machine, wait 5 min before connecting it up.

When reconnecting, attach the positive (+) lead first.

Warning Symbols

The following warning symbols may be found on the battery.

Figure 51.



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

Disposal

When the battery reaches the end of its usual life it must be removed from the machine and recycled in an approved way in accordance with local environmental regulations. This service is usually operated by battery vendors. Machine users that cannot find a suitable battery recycling facility should contact their JCB dealer for assistance.

First Aid - Electrolyte

Eyes

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

Swallowing

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

Skin

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

Maintenance Schedules

General

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

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

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

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

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

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

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

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

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

How to Use the Maintenance Schedules

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

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

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

Table 7.

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

Maintenance Intervals

General

Table 8.

Interval (h)	Calendar Equivalent
3	Daily
16	Weekly
50	Monthly
250	6 Months

Interval (h)	Calendar Equivalent
500	Yearly
1000	Two Years

Pre-start Cold Checks, Service Points and Fluid Levels

Table 9.

Component	Task	3	16	50	250	500	1000	2000	3000
Visual check for fluid leaks, damage, missing safety signs, paintwork and structural welds or damage including lifting and tie down points	Check (condition)	O	O	O	□	□	□	□	□
Operator platform and steps	Check (condition)	O	O	O	□	□	□	□	□
Articulation lock	Check (condition)	O	O	O	□	□	□	□	□
Articulated joint	Lubricate			O	□	□	□	□	□
Articulated joint pin nut security	Check (condition)					□	□	□	□
All other greasing point	Lubricate		O	O	□	□	□	□	□
Skip maintenance strut	Check (condition)	O	O	O	□	□	□	□	□
ROPS (Roll-Over Protective Structure)	Check (condition)	O	O	O	□	□	□	□	□
Engine oil	Check (level)	O	O	O	□	□	□	□	□
Engine oil and filter[1]	Replace					□	□	□	□
Engine coolant hoses and clamps	Check (condition)					□	□	□	□
Air filter blockage indicator warning light (instrument panel)	Check if illuminated	O	O	O	□	□	□	□	□
Air inlet/filter outer element[2]	Replace					□	□	□	□
Air inlet/filter inner element	Replace						□	□	□
Fuel	Check (level)	O	O	O	□	□	□	□	□
Fuel pipes and clamps	Check (condition/leaks)					□	□	□	□
Fuel tank	Drain and refill						□	□	□
Fuel filter water separator	Drain		O	O	□	□	□	□	□
Fuel filter element (main)	Replace					□	□	□	□
Pre fuel filter	Replace					□	□	□	□
Engine coolant - expansion tank (engine cold)	Check (level)	O	O	O	□	□	□	□	□
Engine coolant antifreeze/water ratio	Check (condition)				□	□	□	□	□
Engine coolant	Drain and refill						□	□	□
Engine crankcase breather	Replace							□	
Cooling fan and alternator belt	Check (condition)				□	□	□	□	□
Cooling fan and alternator belt	Replace						□	□	□
Radiator hoses and clamps	Check (condition)					□	□	□	□
Valve clearance	Check					□	□	□	□
Fuel injectors	Test/replace								□

Component	Task	3	16	50	250	500	1000	2000	3000
Hydraulic oil	Check (level)	○	○	○	□	□	□	□	□
Hydraulic tank	Drain and refill						□	□	□
Hydraulic filter (main)	Replace					□	□	□	□
Hydraulic tank suction strainer	Replace						□	□	□
Hydraulic tank filler cap	Replace					□	□	□	□
Hydraulic hoses	Check (condition)				□	□	□	□	□
Wheel nut security	Check (torque)	○	○	○	□	□	□	□	□
Tyre pressure	Check (condition)	○	○	○	□	□	□	□	□
Wheel motor mounting bolts	Check (condition)					□	□	□	□
Battery terminal	Check (condition)		○	○	□	□	□	□	□
Lights (warning lights and gauges)	Check (condition)	○	○	○	□	□	□	□	□
Electrical wiring and connectors	Check (condition)				□	□	□	□	□

(1) Change at first 50 hours. Every 500 hours thereafter.
(2) Replace more often in dusty conditions

Functional Tests and Final Inspection

Table 10.

Component	Task	3	16	50	250	500	1000	2000	3000
Seat and seat belts	Check (condition)	○	○	○	□	□	□	□	□
Engine idle speed[(2)]	Check (condition)				□	□	□	□	□
Engine maximum no load speed[(2)]	Check (condition)				□	□	□	□	□
Engine (excessive smoke, vibration, noise, overheating, performance, unusual smells)	Check (condition)		○	○	□	□	□	□	□
Exhaust system security[(2)]	Check (condition)				□	□	□	□	□
Air Inlet system security	Check (condition)				□	□	□	□	□
Throttle system and control cable[(2)]	Check (condition)				□	□	□	□	□
Operation all services	Check (condition)		○	○	□	□	□	□	□
Forward/reverse and gear	Check (operation)				□	□	□	□	□
Neutral start	Check (operation)	○	○	○	□	□	□	□	□
Park brake	Check (operation)	○	○	○	□	□	□	□	□
Starter motor	Check (condition)				□	□	□	□	□
Alternator - output	Check (condition)				□	□	□	□	□
All electrical equipment	Check (operation)	○	○	○	□	□	□	□	□
Green beacon (if fitted)	Check (operation)	○	○	○	□	□	□	□	□
Start inhibit (system)	Check (operation)	○	○	○	□	□	□	□	□
Drive inhibit (system)	Check (operation)	○	○	○	□	□	□	□	□

Component	Task	3	16	50	250	500	1000	2000	3000
Raised skip warning	Check condition		O	O	□	□	□	□	□
Slope inclinometer	Check condition				□	□	□	□	□

(2) Jobs which should only be done by a specialist.

Maintenance Positions

General

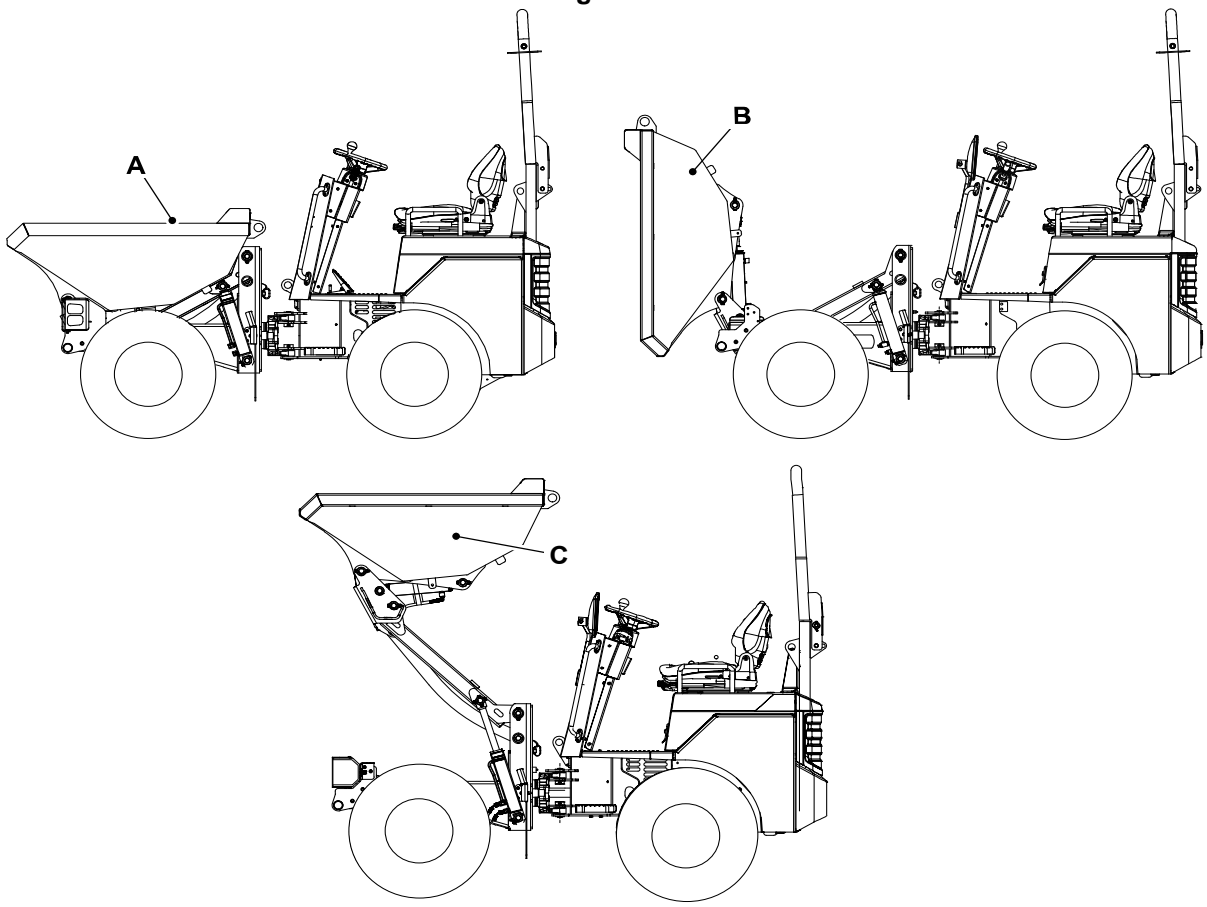
⚠ **WARNING** A machine can sink into soft ground. Never work under a machine on soft ground.

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

Make the machine safe before you start a maintenance procedure.
Refer to: Maintenance Position (Skip Lowered) (Page 97).

If you tip or raise the skip to get access for maintenance, you must install the maintenance strut on the skip.
Refer to: Maintenance Position (Skip Raised) (Page 98).
Refer to: Maintenance Position (Skip Tipped) (Page 99).

Figure 52.



A Skip lowered
B Skip tipped (dump position)
C Skip raised (dump position)

Maintenance Position (Skip Lowered)

1. Park the machine on level solid ground.
   Refer to: Stopping and Parking (Page 39).
2. Lower the skip.
3. Stop the engine and remove the ignition key.
4. Disconnect the battery to prevent accidental operation of the engine.

5. If necessary, put blocks against the two sides of the wheels before you get below the machine.

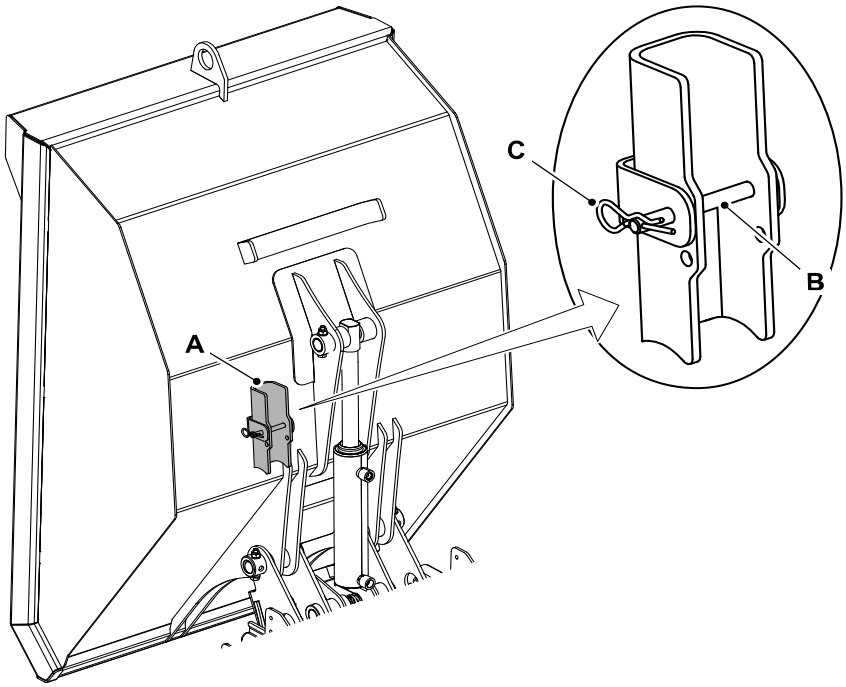
Maintenance Position (Skip Raised)

⚠ **DANGER** A maintenance strut or other method of supporting the skip in the raised position must be installed and locked in position before working under a tipped or raised skip. Do not reach or work under a tipped or raised skip unless a prop is installed.

A maintenance strut is provided to support the skip in the raised position when maintenance is being carried out.

The maintenance strut is stowed on the underside of the skip when not in use secured in position by a pin and R clip. Refer to Figure 53.

Figure 53.

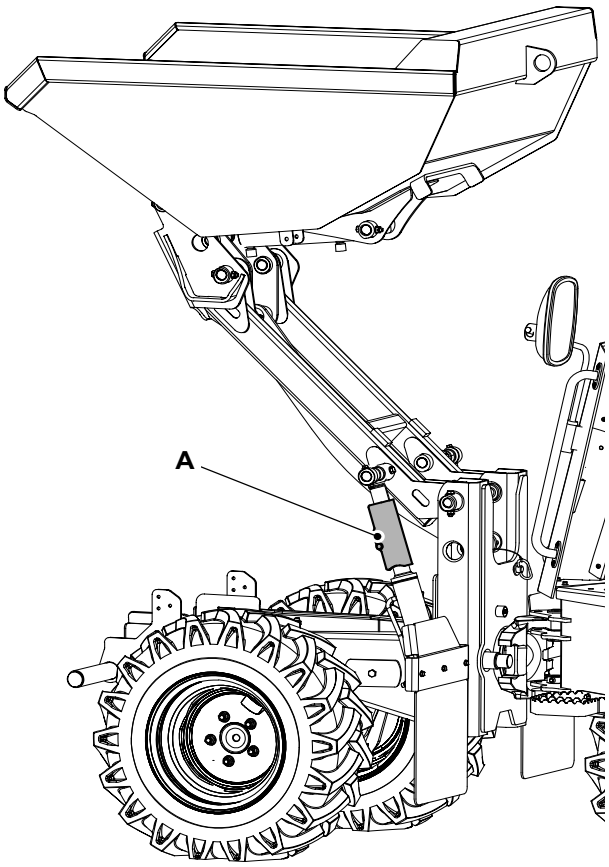


A Maintenance strut- stowage position
B Pin
C R clip

Installation of the Maintenance Strut

1. Fully raise the skip.
2. Remove the maintenance strut from its stowage position and place over the piston rod of the ram. Refer to Figure 54.
3. Install the pin to the support and secure with the R clip.
4. Carefully lower the skip until the weight is supported on the maintenance strut.

Figure 54.



A Maintenance strut - installed position

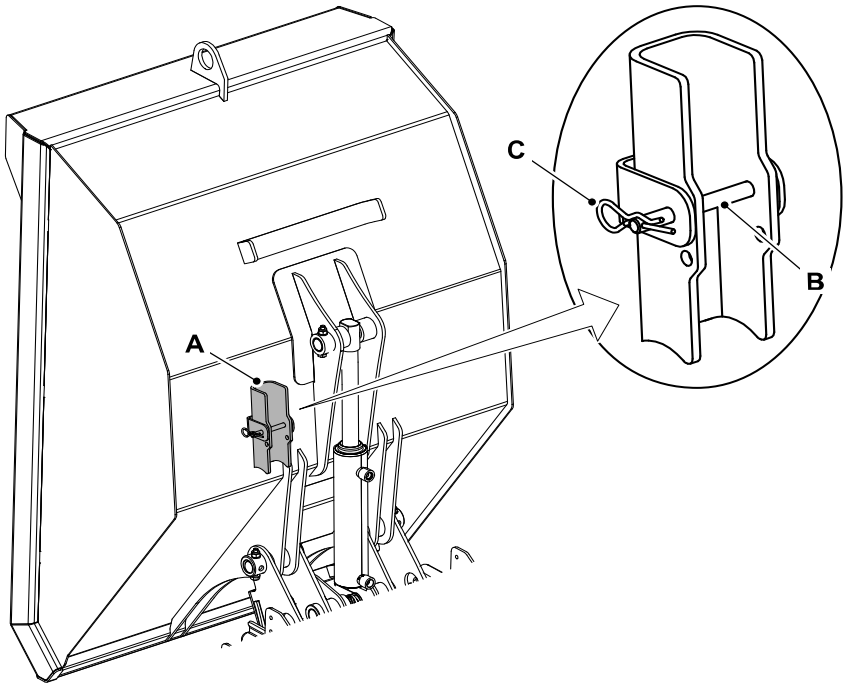
Maintenance Position (Skip Tipped)

⚠ **DANGER** A maintenance strut or other method of supporting the skip in the raised position must be installed and locked in position before working under a tipped or raised skip. Do not reach or work under a tipped or raised skip unless a prop is installed.

A maintenance strut is provided to support the skip in the tipped position when maintenance is being carried out.

The maintenance strut is stowed on the underside of the skip when not in use secured in position by a pin and R clip. Refer to Figure 55.

Figure 55.

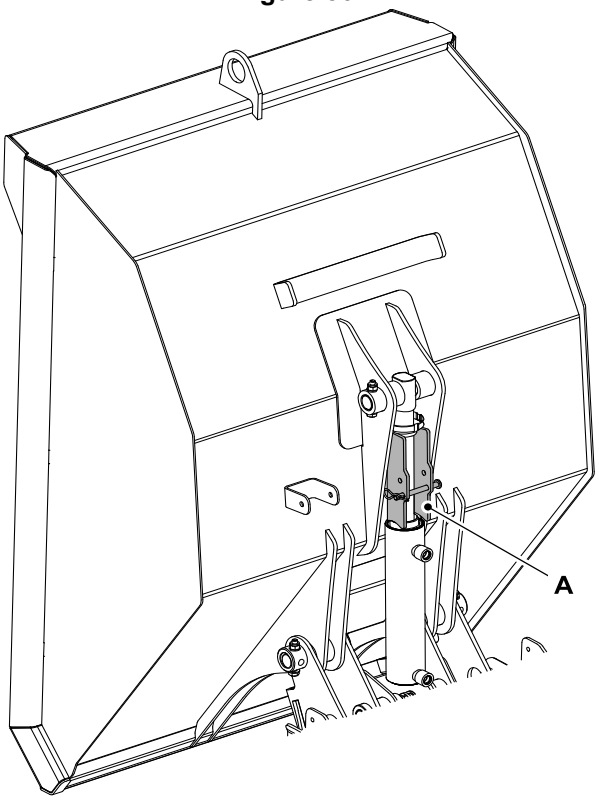


A Maintenance strut- stowage position
B Pin
C R clip

Installation of the Maintenance Strut

1. Fully tip the skip.
2. Remove the maintenance strut from its stowage position and place over the piston rod of the ram. Refer to Figure 56.
3. Install the pin to the support and secure with the R clip.
4. Carefully lower the skip until the weight is supported on the maintenance strut.

Figure 56.

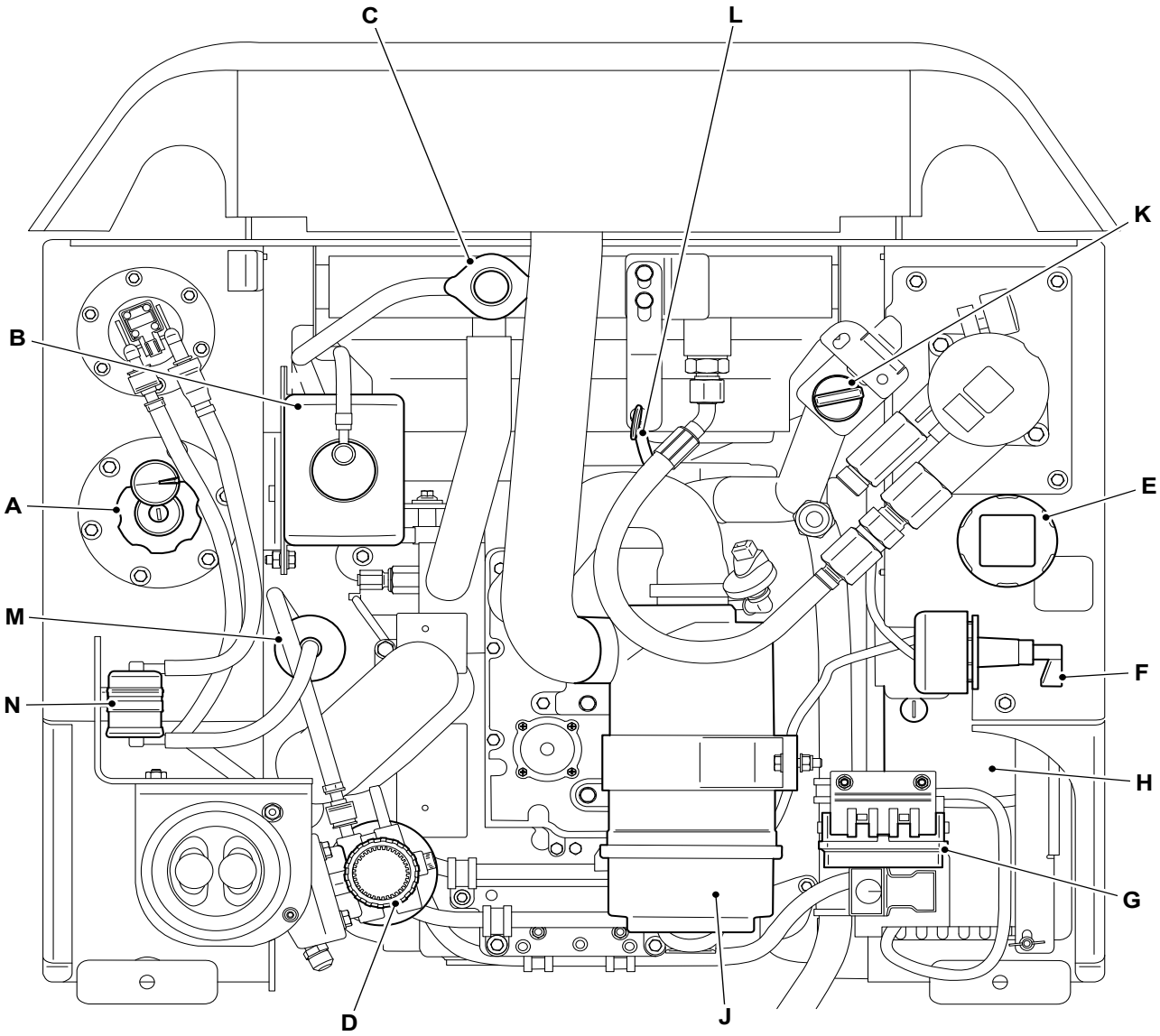


A Maintenance strut- installed position

Service Points

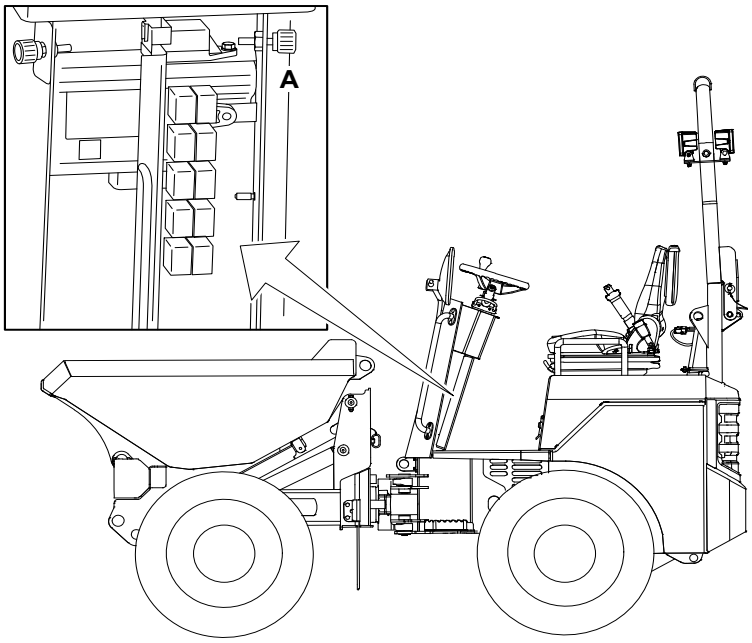
General

Figure 57.



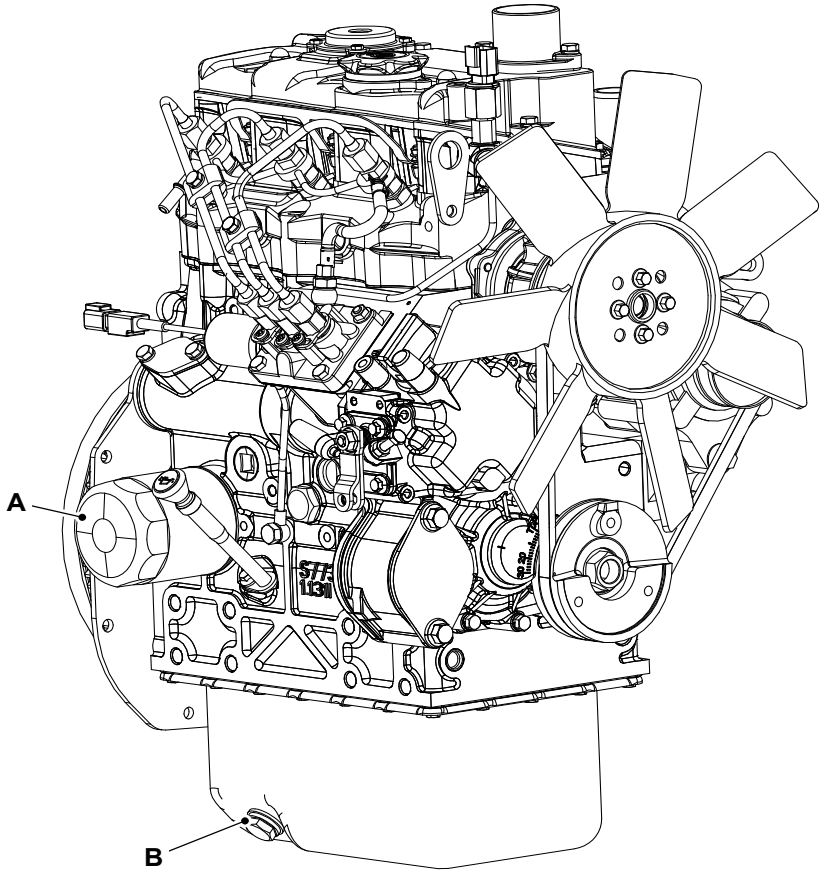
A Fuel tank filler cap
B Coolant expansion tank
C Radiator cap
D Main fuel filter
E Hydraulic tank filler cap
F Battery isolator
G Primary fuse box
H Battery
J Air filter
K Engine oil filler cap
L Engine oil dipstick
M Electrical fuel feed pump
N Fuel Pre-filter

Figure 58.



A Relays
Refer to: Relays (Page 153).

Figure 59.



A Engine oil filter

B Drain plug

Access Apertures

General

When moved to their maintenance position, the access panels give you access to parts or areas of the machine that are not required during machine operation.

Before you operate the machine, make sure that all of the access panels are correctly in their closed or installed positions.

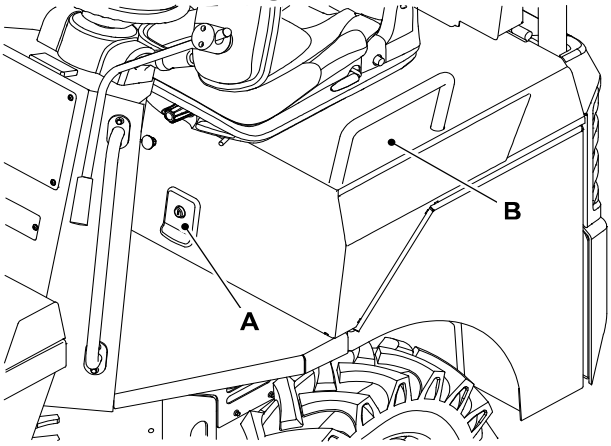
Engine Compartment Cover

⚠ **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.

Open

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Stop the engine and remove the ignition key.
3. Use the ignition key to unlock the engine compartment cover. Refer to Figure 60.
4. Check around and above the machine to make sure that it is safe to open.
5. Lift the engine compartment cover. Refer to Figure 60.
6. Do not open the engine compartment cover when the engine is running.

Figure 60.



A Lock

B Engine compartment cover

Close

1. Check around the machine to make sure that no object will become trapped with lowering of the engine compartment cover.
2. Close the engine compartment cover. Refer to Figure 60.
3. Use the ignition key to lock the engine compartment cover. Refer to Figure 60.

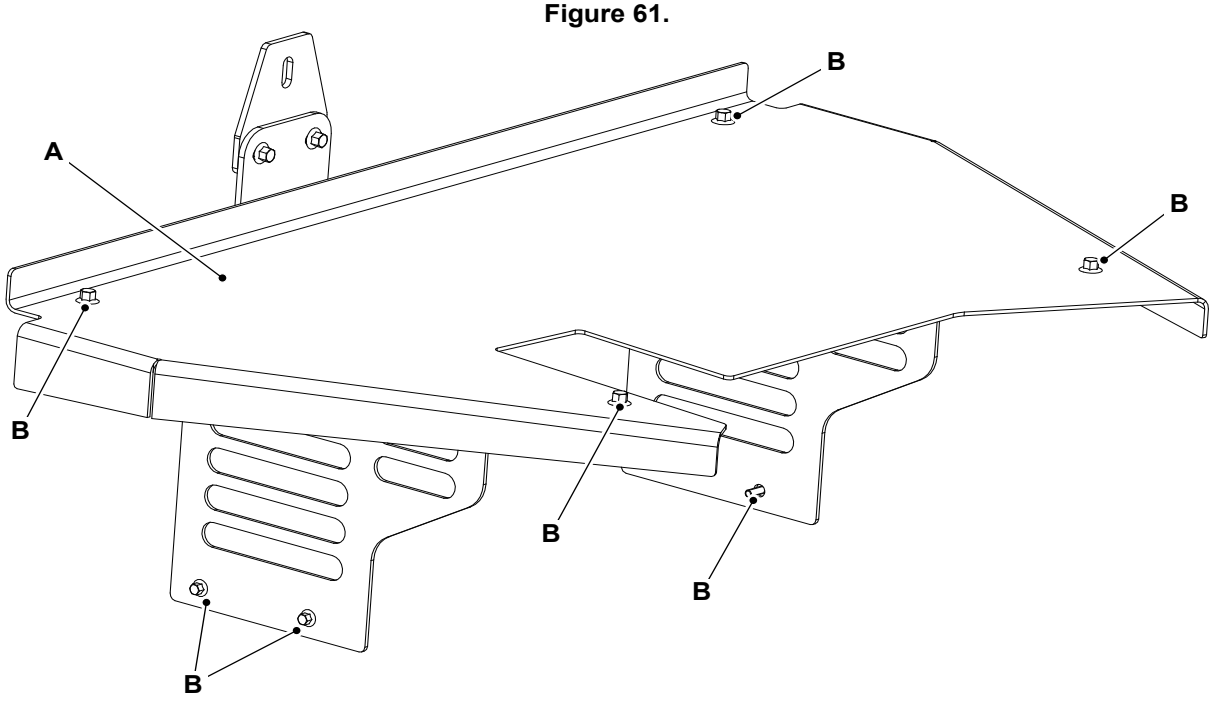
Transmission Cover

⚠ **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.

Open

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Stop the engine and remove the ignition key.
3. Use the ignition key to unlock the engine cover.
   Refer to: Engine Compartment Cover (Page 105).
4. Lift the engine cover.
5. Remove the bolts and washers from the floor plate. Refer to Figure 61.
6. Lift the floor plate and clear of the machine to gain access to the engine compartment.
7. Do not open the floor plate when the engine is running.

Figure 61.



A Floor plate

B Floor plate bolts

Close

1. Check around the machine to make sure that no object will become trapped with lowering of the floor plate.
2. Use the bolts and washers to install the floor plate. Refer to Figure 61.
3. Close the engine cover.
4. Use the ignition key to lock the engine cover.

Lubrication

General

You must grease the machine regularly to keep it working efficiently. Regular greasing will also lengthen the machine's working life.

Refer to the individual condition checks throughout the Maintenance section.

The machine must always be greased after pressure washing or steam cleaning.

Greasing must be done with a grease gun. Normally, two strokes of the grease gun is sufficient. Stop greasing when fresh grease appears at the joint.

Use only the recommended type of grease. Do not mix different types of grease, keep them separate.

Preparation

⚠ **WARNING** You will be working close into the machine for these jobs. Lower the skip. Remove the ignition key and isolate the battery. This will prevent the engine being started.

Make the machine safe before you start a greasing procedure.
Refer to: Maintenance Position (Skip Lowered) (Page 97).

You can complete most of the greasing procedures with the skip lowered. If you raise the skip to get access for greasing, you must install the maintenance strut on the skip ram.
Refer to: Maintenance Position (Skip Raised) (Page 98).

Body and Framework

General

Check (Condition)

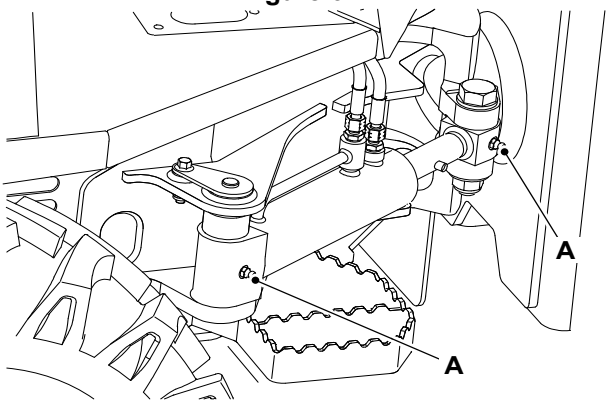
1. Make sure that all of the guards and protective devices are in position, secured by their locking devices and free from damage.
2. Inspect all of the steelwork for damage. Include the following:
   2.1. Examine all of the lifting point welds.
   2.2. Examine all of the pivot point welds.
   2.3. Examine 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.
5. Check that the lamp lenses are undamaged.
6. Check that all of the safety and instructional labels are undamaged and in position. Install new labels where necessary.
7. Note any damaged paintwork for future repair.
8. Inspect the machine for broken or loose fasteners.

Lubricate

Steering Ram

The steering ram has two grease points.

Figure 62.

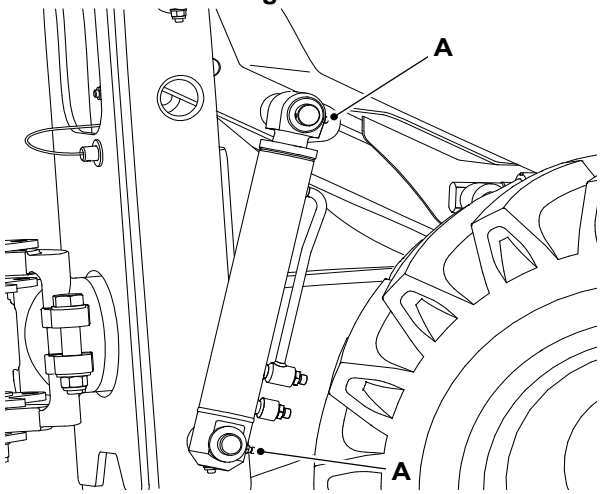


A Grease nipple

Skip Lift Arm Ram

There are two lift arm rams one on each side of the skip. Each ram has two grease points.

Figure 63.

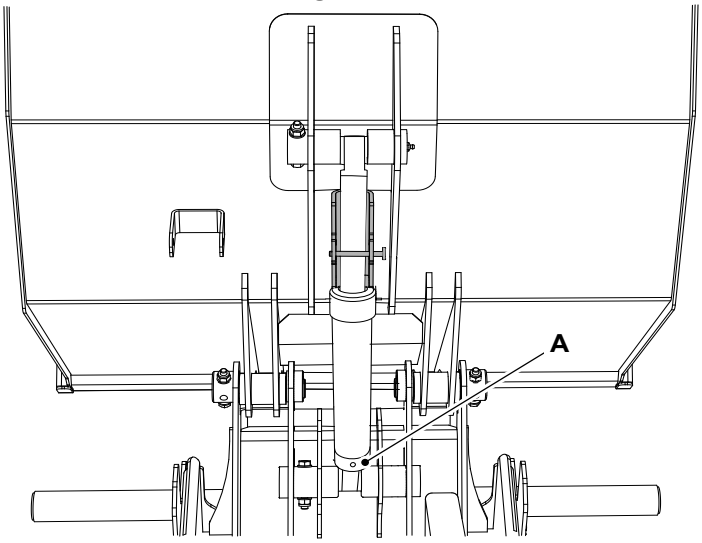


A Grease nipple

Skip Ram

Lubricate the skip ram.

Figure 64.



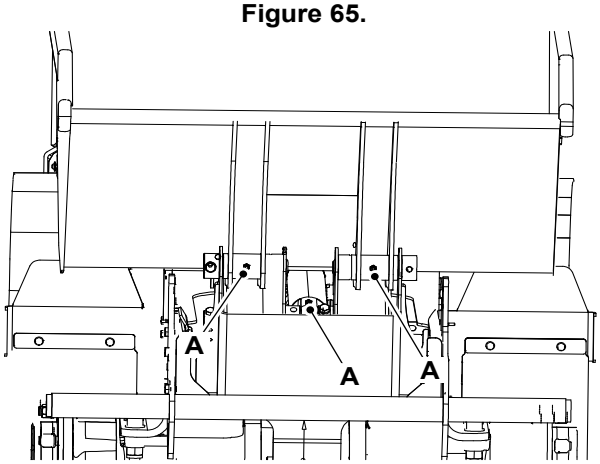
A Grease nipple

Pivot Pins

Lubricate

Skip Pivot Pins and Bottom Skip Lift Ram

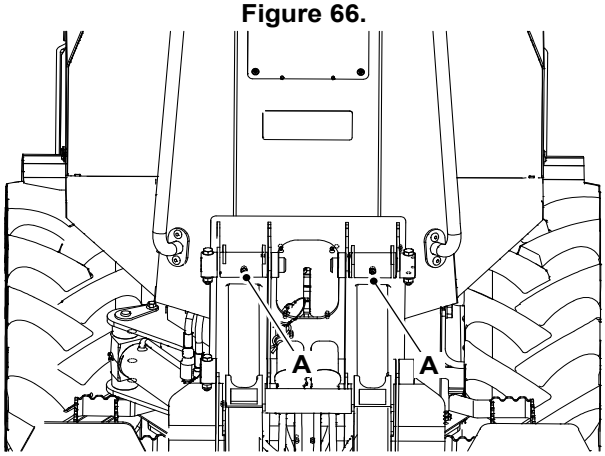
Figure 65.



A Grease nipple

Lift Frame Rear Pivots

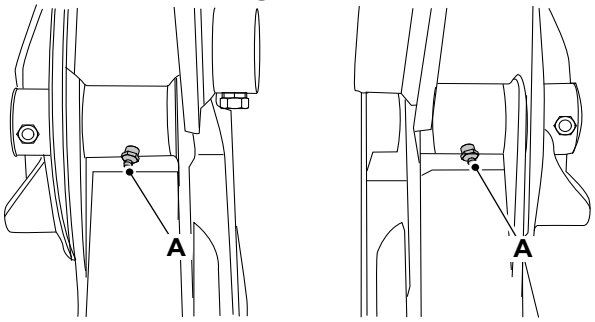
Figure 66.



A Grease nipple

Lift Frame Front Pivots

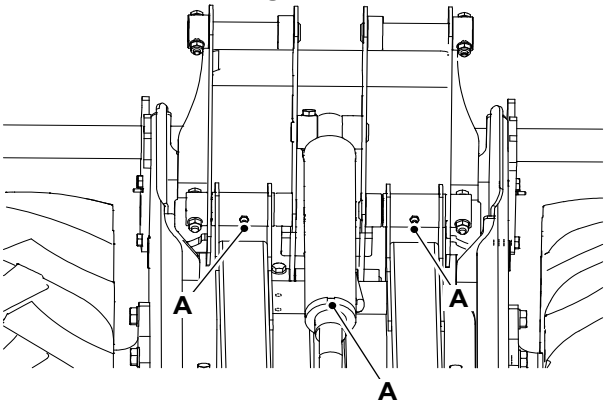
Figure 67.



A Grease nipple

Skip Lift Frame Lower Pivots

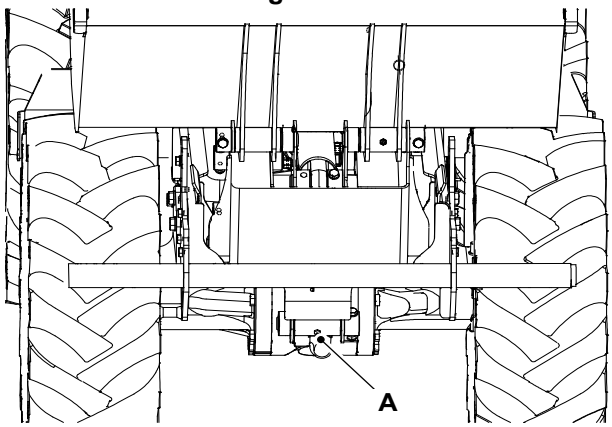
Figure 68.



A Grease nipple

Skip Inter Lever Bottom Pivot

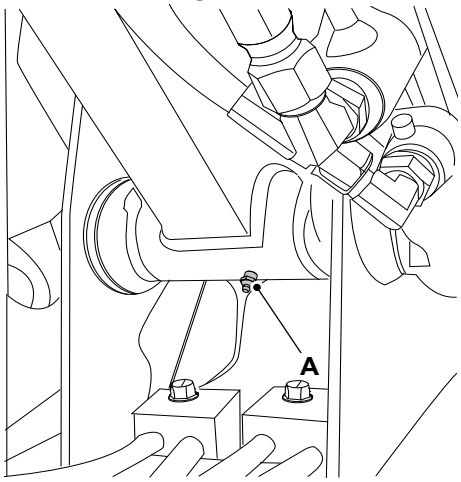
Figure 69.



A Grease nipple

Rear Self Level Arm Pivot (Both Ends)

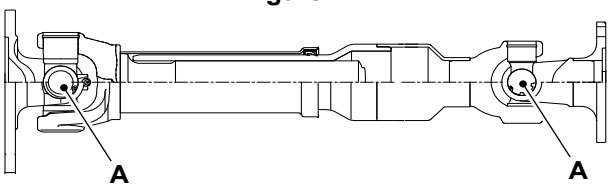
Figure 70.



A Grease nipple

Propshaft

Figure 71.



A Grease nipple

Articulated Joint

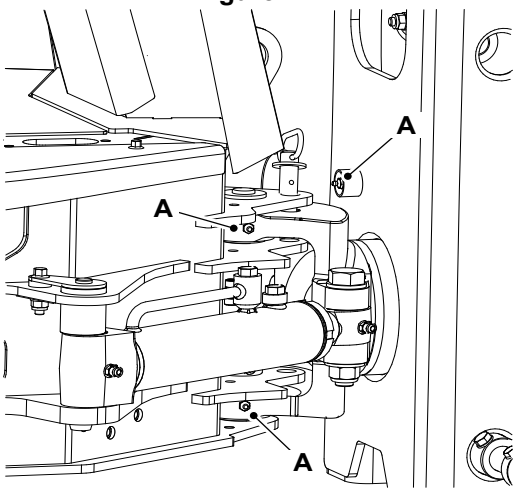
Lubricate

⚠ **DANGER** The articulation lock must be installed before working in the area of the centre pivot, failure to install the lock could cause a pinch point or trap that will result in death or serious injury.

Make the machine safe.
Refer to: Maintenance Positions (Page 97).

Apply grease to the centre pivot grease points.

Figure 72.



A Grease nipples

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. If the ROPS 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.

A failure to do these precautions can cause death or injury to the operator. For assistance, contact your JCB dealer.

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Check the structure for damage.
3. Make sure that all of the ROPS (Roll-Over Protective Structure) mounting bolts are undamaged and in position.
4. Make sure that the ROPS mounting bolts are tightened to the correct torque setting.
   Refer to: Torque Values (Page 150).

Seat Belt

Check (Condition)

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

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

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

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

Engine

General

Check (Condition)

Start the engine and check for:

- Excessive smoke
- Excessive vibration
- Excessive noise
- Overheating
- Performance
- Unusual smells.

Oil

Check (Leaks)

Before you start the machine, do a check for oil leaks:

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Get access to the engine compartment (if applicable).
   Refer to: Access Apertures (Page 105).
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 97).
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 105).
4. Remove and clean the dipstick.
   Refer to: Service Points (Page 102).
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 102).

8.2. Add the recommended oil slowly through the filler point
Refer to: Fluids, Lubricants and Capacities (Page 148).

8.3. Replace the dipstick.

8.4. Remove the dipstick.

8.5. Check the oil level, if necessary add more oil.

8.6. Replace the dipstick

8.7. Replace the filler cap.

9. Close and secure the engine cover (if applicable).

Replace

⚠ **Notice:** Do not exceed the maximum level of engine oil in the sump. If the maximum is exceeded, the excess must be drained to the correct level. An excess of engine oil could cause the engine speed to increase rapidly without control.

WARNING Hot oil and engine components can burn you. Make sure the engine is cool before doing this job.

Used engine crankcase lubricants contain harmful contaminants. In laboratory tests it was shown that used engine oils can cause skin cancer.

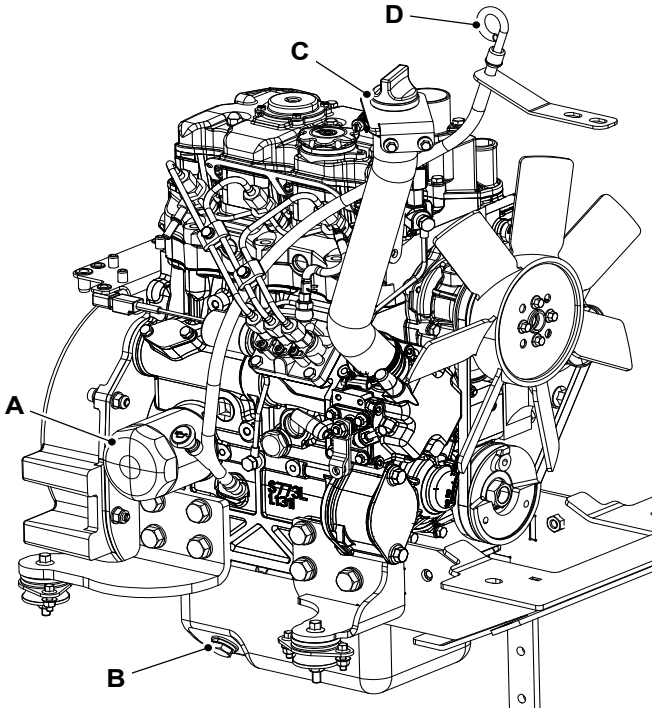
CAUTION It is illegal to pollute drains, sewers or the ground. Clean up all spilt fluids and/or lubricants.

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

Drain the oil when the engine is warm as contaminants held in suspension will then be drained with the oil.

1. Make the machine safe.
Refer to: Maintenance Positions (Page 97).
2. Get access to the engine compartment.
Refer to: Access Apertures (Page 105).
3. Remove the oil filler cap.
Refer to: Service Points (Page 102).
4. Remove the sump protection plate.
5. Remove the engine oil drain plug at the bottom of the engine. Drain the oil in to a suitable container. Refer to Figure 73.
6. Clean the drain plug. Install the drain plug. Tighten the drain plug to the correct torque value.
7. Remove and discard the oil filter cartridge. Refer to Figure 73.
8. Install a new oil filter cartridge, hand tighten the cartridge.
9. Add the correct specification and quantity of oil.
Refer to: Fluids, Lubricants and Capacities (Page 148).
10. Check the oil level.
Refer to: Check (Level) (Page 116).
11. Install the oil filler cap.
12. Close and secure the engine cover.

Figure 73.



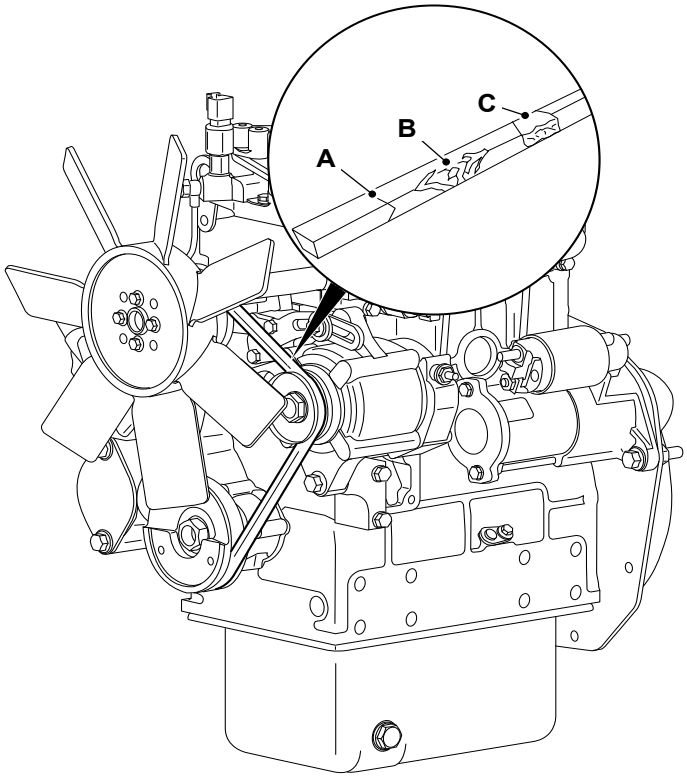
A Engine oil filter cartridge
B Drain plug
C Oil filler cap
D Dipstick

Front End Accessory Drive (FEAD) Belt

Check (Condition)

The drive belt does not require adjustment. Renew the belt if it has cracks or if it is frayed or has pieces of material missing.

Figure 74.



A Cracks
B Fraying
C Missing pieces

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.

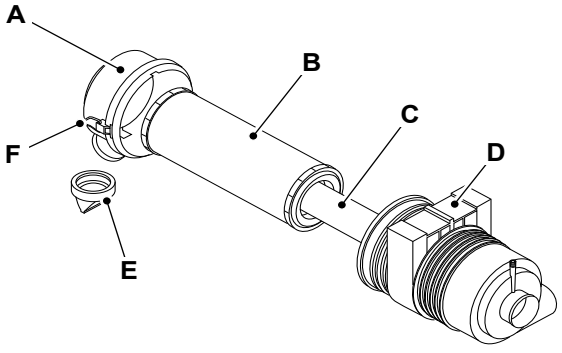
1. Make the machine safe.
2. Get access to induction system.
   Refer to: Service Points (Page 102).
3. Check the system hoses for:
   3.1. Condition.
   3.2. Damage.
   3.3. Security.
4. Replace the system hoses if necessary.

Replace

Inner/Outer Elements

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Get access to the air filter.
3. Clean the area around the air cleaner.
4. Loosen the clamps holding the cover assembly to the air cleaner body and pull cover clear. Refer to Figure 75.
5. Remove the outer element from the body.
   5.1. Replace the outer element.
6. Remove the inner element from the body.
   6.1. Replace the inner element.
7. Clean the dust valve.
8. Clean the outer body and cover assembly.
9. Assemble the cleaner.

Figure 75.



A Cover assembly **B** Outer element

C Inner element
D Bracket and body
E Dust valve
F Clamps

Fuel System

General

Bleed

⚠ **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. Turn the ignition to the on position for the duration specified to prime the fuel system.
   Duration: 2min
2. Turn the key switch to the off position then turn on again.
3. The engine is primed and ready to start.

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.

Fuel Filter

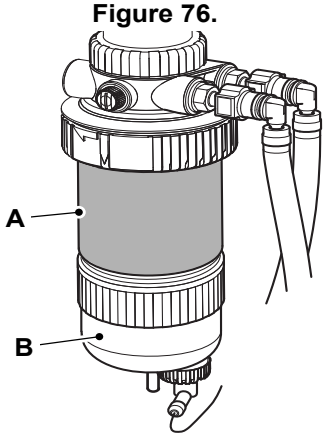
Replace

⚠ **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.

Figure 76.



A Filter **B** Bowl

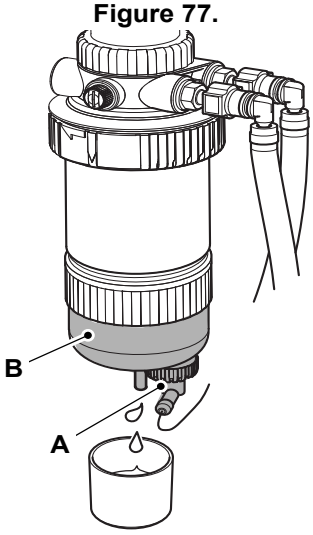
Water Separator

Clean

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.

Figure 77.



A Tap **B** Bowl

Cooling System

General

Check (Leaks)

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

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Get access to the cooling pack.
   Refer to: Access Apertures (Page 105).
3. Check the cooling system for leaks.
4. If necessary, contact your JCB dealer.

Coolant

Check (Condition)

Refer to: Coolant (Page 148).

Check (Level)

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Let the engine cool.
3. Get access to the radiator filler cap and expansion bottle.
   Refer to: Service Points (Page 102).

   CAUTION! *The cooling system is pressurised when the coolant is hot. When you remove the cap, hot coolant can spray out and burn you. Make sure that the engine is cool before you work on the cooling system.*
4. Check the level of coolant in the radiator and in the expansion bottle. If necessary, top-up the system:
   4.1. Carefully remove the filler cap.
   4.2. If necessary top-up the coolant to the neck of the expansion tube.
   4.3. If necessary top-up the coolant in the expansion bottle so that it is half full.
   4.4. Install the filler cap, make sure that it is tight.

Cooling Pack

Clean

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Let the engine cool.
3. Open the engine cover.
   Refer to: Engine Compartment Cover (Page 105).
4. Get access to the radiator.

5. If necessary, use a soft bristle brush or compressed air to remove all debris from the radiator.
6. Close the engine cover.

Check (Condition)

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Let the engine cool.
3. Get access to the cooling pack.
   Refer to: Access Apertures (Page 105).
4. Check the condition of the hoses, radiator and fan for:
   4.1. Condition.
   4.2. Damage.
   4.3. Security.
5. Replace the system hoses/radiator if necessary.

Brakes

Park Brake

Check (Operation)

The machine has a spring applied brake system, in the event of engine stop or hydraulic pressure loss the brakes will automatically apply. The brakes are also applied when the drive lever is in the neutral position. The system needs to be regularly checked for correct operation.

To check the brakes.

1. Enter the machine. Fasten your seat belt and park the machine on a level dry surface.
2. Keep the skip at the travel position.
3. Fully load skip.
4. Move the machine onto a 15% gradient with machine positioned up/down slope.
5. Put the drive lever in the neutral position with the park brake off.
6. The machine should not move and is held by the brakes.
7. Turn the engine off, the machine should continue to hold on slope.
8. Restart the engine and drive the machine off the slope safely.
9. If the machine moved during the test then do not use the machine until the system has been checked or repaired.

To check the park brake switch:

1. Enter the machine. Fasten your seat belt and park the machine on a level dry surface.
2. Keep the skip at the travel position.
3. On flat level ground drive the machine very slowly in forward and reverse.
4. Switch on the park brake, the machine should stop quickly and put drive to neutral. If the machine fails to stop do not use the machine until the system has been checked or repaired.

Steering System

General

Check (Operation)

1. Park the machine on hard level ground.
2. Set the transmission to neutral and switch on the park brake.
3. With engine running turn the steering wheel so that the front and rear chassis are fully articulated.
4. Stop the engine. Use both hands to turn the steering wheel so that the front wheels lock, turn the steering wheel until the wheels lock in the opposite direction.

Full movement of the front and rear chassis, from lock to lock in both directions confirms correct steering function.

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 a raised skip can be hazardous. You could be crushed by the skip or get caught in the linkages. Lower the skip before doing these checks. Also make sure that the park brake is engaged before doing these checks.

WARNING Whenever a wheel has been changed, check the nut torques every two hours. When the nuts stay tight for 8 h, the interval for checking can revert to the period stated in the servicing schedule.

WARNING A machine can roll off jacks and crush you unless the wheels have been blocked. Always block the wheels at the opposite end of the machine that is to be jacked. Do not work underneath a machine supported only by jacks. Always support a jacked-up machine on axle stands before working underneath it.

WARNING Wheels and tyres are heavy. Take care when lifting or moving them. Store with care to ensure that they cannot fall and cause injury. Use suitable lifting equipment if necessary.

Changing a Wheel

If for whatever reason a wheel bolt is renewed, all the bolts for that wheel must be replaced as a set, since the remaining bolts may have been damaged.

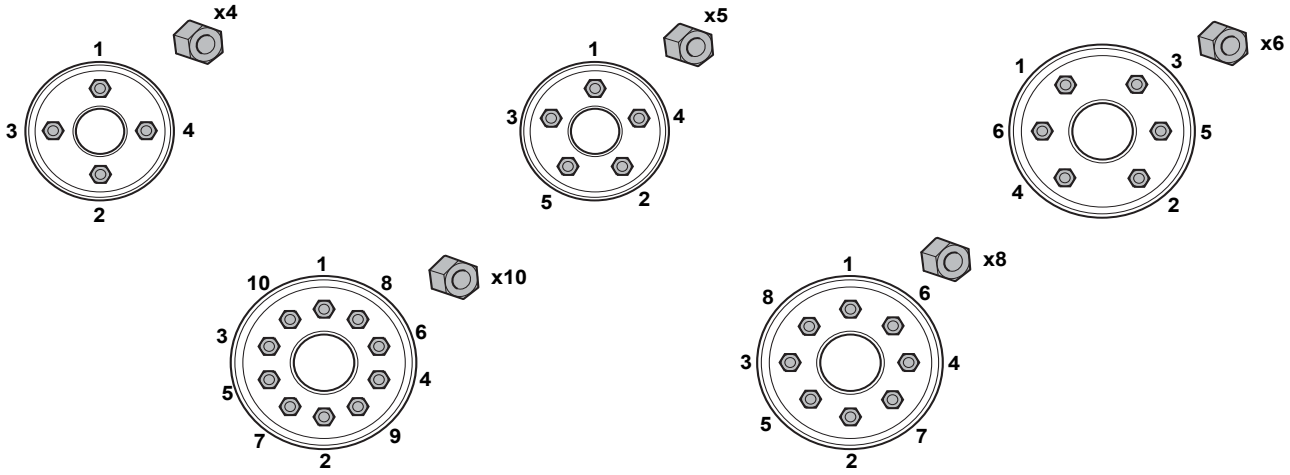
Remove

1. Make the machine safe.
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 78.



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

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 150).

Tyres

General

Check (Condition)

⚠ **WARNING** Do not use the machine with damaged, incorrectly installed, incorrectly inflated or excessively worn tyres. Recognise the speed limitation of the tyres installed and do not operate at more than their recommended maximum speed.

WARNING An exploding tyre can kill. Inflated tyres can explode if over-heated or over-inflated. Follow the instructions given when inflating the tyres. Do not cut or weld the rims. Use a tyre/wheel specialist for all repair work.

WARNING Wheels and tyres are heavy. Take care when lifting or moving them. Store with care to ensure that they cannot fall and cause injury. Use suitable lifting equipment if necessary.

Checking the Tyre Condition

Always drive with consideration for the condition of the tyres. Incorrect tyre pressures will affect the stability of the machine. Check the tyres daily for the correct tyre pressure and signs of damage. For example:

- Signs of distortion (bulges)
- Cuts or wear
- Embedded objects (nails, etc.)

Install the valve caps firmly to prevent dirt from entering the valve. Inspect for leaks when you check the tyre pressures.

Inspect the tyre valve for leaks, when you check the tyre pressures.

Tyre Inflation

Always try to maintain your tyre pressure to the recommended settings. Using your machine with under-inflated tyres means:

- Decreasing the machines stability
- Higher tyre temperatures
- Excessive strain of the tyre fabric
- More bulging of the sidewalls
- Shortens the tyres life.

Using the machine with over-inflated tyres is dangerous:

- It causes excessive tensile loads in the fabric: this makes a tyre more susceptible to cuts and punctures.

Do not cut or weld on the rim of an inflated tyre.

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

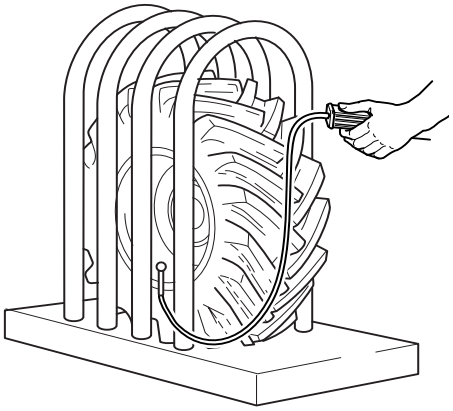
Always deflate the tyre before removing foreign obstacles from the tread.

Procedure

These instructions are for adding air to a tyre which is already inflated. If the tyre has lost all its air pressure, call in a qualified tyre mechanic. The tyre mechanic should use a tyre inflation cage and the correct equipment to do the job.

1. Prepare the wheel. Before you add air to the tyre, make sure it is correctly installed on the machine or installed in a tyre inflation cage.

Figure 79.



2. Prepare the equipment.
   2.1. Use only an air supply system which includes a pressure regulator. Set the regulator no higher than the recommended tyre pressure.
   2.2. Use an air hose installed 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.
   Refer to: Tyre Sizes and Pressures (Page 157).

Hydraulic System

General

Discharge

Before breaking into the hydraulic circuit you must discharge the circuit pressure.

1. Make the machine safe.
   Refer to: Maintenance Position (Skip Lowered) (Page 97).
2. Move the control levers in all directions.
3. Slowly open the hydraulic filler cap to relieve tank pressure.

Check (Condition)

Hydraulic Hoses

⚠ **WARNING** Damaged hoses can cause fatal accidents. Examine the hoses regularly. Do not use the machine if a hose or hose fixture is damaged.

WARNING Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear personal protective equipment. Hold a piece of cardboard close to suspected leaks and then examine the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

Examine the hoses for:

- Damaged hose ends
- Worn or cracked outer covers
- Ballooned outer covers
- Kinked or crushed hoses
- Exposed armouring in the outer covers
- Displaced hose end fittings.
- Worn cover sheathing or hose burst protection covering

Replace a damaged hose before you use the machine again.

The replacement hoses must be of the same size, standard and pressure rating. If necessary, for more information contact your JCB dealer.

Check (Leaks)

⚠ **Notice:** If the fluid is cloudy, then water or air has contaminated the system. This could damage the hydraulic pump. Contact your JCB dealer immediately.

1. Make the machine safe.
2. Open the access covers.
3. Check the hydraulic hoses for damage.
4. Close the access covers.
5. If necessary, contact your JCB dealer.

Services

Check (Operation)

Check the operation of all the hydraulic services. Check for:

- Speed of operation
- Strength of operation

- Juddering
- Abnormal noises.

Do not use the machine if one or more of these faults are found. You must make sure that the hydraulic service is repaired immediately.

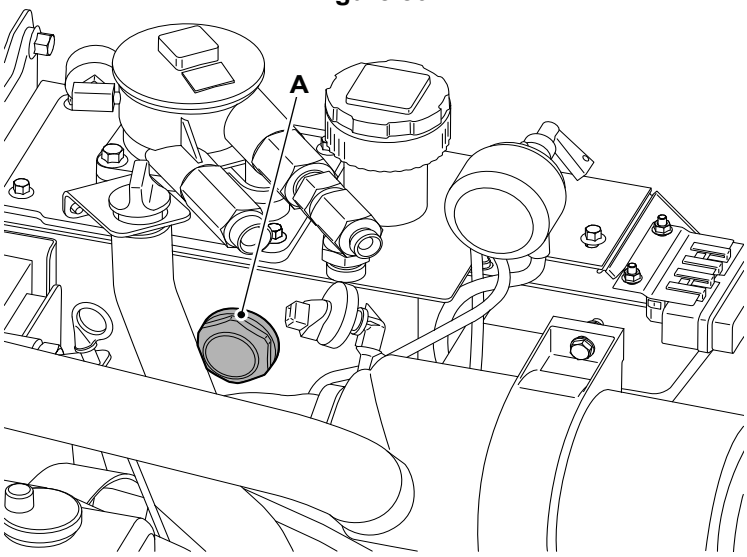
Hydraulic Oil

Check (Level)

⚠ **CAUTION** Do not run the machine with the hydraulic tank filler cap removed.

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Check the level of hydraulic fluid from the inspection window. The level of hydraulic fluid should be in the middle of the inspection window. Refer to Figure 80.
3. If necessary, add the recommended hydraulic fluid:

Figure 80.



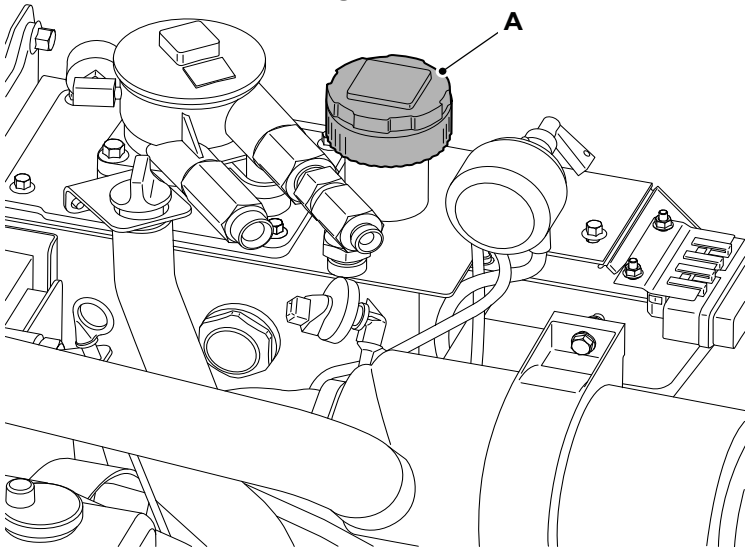
A Inspection window

   3.1. Release the pressure from the hydraulic tank.
   3.2. Open the hydraulic filler cap.
   3.3. Use a suitable container to add the hydraulic fluid through the filler port.
   3.4. Check the level of hydraulic fluid.

Hydraulic Tank Filler Cap

The hydraulic tank breather (and filter) forms an integral part of the hydraulic tank filler cap. Replace the cap (and breather filter) with a new one at the recommended interval. Refer to Figure 81.

Figure 81.



A Hydraulic tank filler cap

1. Remove the filler cap from the hydraulic tank.
   1.1. Turn the filler cap anticlockwise to quarter turn with supplied special tool.
   1.2. Loosen and remove the filler cap with hands.
   1.3. Make sure that no foreign objects or contamination can enter the hydraulic tank.
2. Install the filler cap.
   2.1. Tighten the filler cap with hands.
   2.2. Turn the filler cap clockwise to quarter turn with supplied special tool.

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.

Electrical System

General

Check (Operation)

Make sure all of the electrical equipment operates correctly, for example:

- Switches
- Warning lights
- Beacon
- Alarms
- Horn
- Wipers
- Hourmeter/display
- Battery
- Lights

All defective equipment must be repaired before the machine is used.

Neutral Start (Check For Correct Operation)

The engine should only crank and start when the transmission lever is in the neutral position and the parkbrake is switched on.

1. Park the machine on firm level ground. Set the transmission to neutral.
2. With the engine off select forwards on the transmission lever.
3. Switch off the parkbrake.
4. Try to start the engine. The engine should not turn over.
5. Switch on the parkbrake.
6. Try to start the engine. The engine should not turn over.
7. Select reverse on the transmission lever.
8. Switch off the parkbrake.
9. Try to start the engine. The engine should not turn over.
10. Select neutral on the transmission lever.
11. Try to start the engine. The engine should not turn over.
12. If the engine turns over or starts rectify the fault immediately. Do not use the machine until the fault is rectified.

Drive Inhibit (Check For Correct Operation)

⚠ **WARNING** Before testing the drive inhibit make sure the area around the machine is clear of people.

1. Park the machine on firm level ground. Set the transmission to neutral.
2. Switch on the parkbrake.
3. Disengage the seatbelt.
4. Start the engine.
5. Select forward or reverse drive on the transmission lever.
6. The park brake light must illuminate.
7. Release the parkbrake switch.

8. Slowly apply engine throttle.
9. No drive should be selected and the warning buzzer gives an audible intermittent warning.
10. Switch on the parkbrake.
11. Select neutral on the transmission lever.
12. Engage the seat belt. If installed, green beacon will illuminate when seat belt is latched.
13. Select forwards on the transmission lever. The front horn must double beep.
14. Switch off the parkbrake.
15. Machine should now select drive when the throttle is slowly applied.

Raised Skip Warning System (Check For Correct Operation)

⚠ **WARNING** Before testing the skip raised warning and slope inclinometer make sure the area around the machine is clear of people.

1. Make sure the machine is on a firm, level surface and the skip is empty.
2. Enter the operator station and seat yourself.
3. Apply parkbrake, engage the seatbelt.
4. Start the engine.
5. Fully lower skip. Check that raised skip indicator light is not illuminated.
6. With engine at idle, select forward drive, release parkbrake.
7. Slowly raise the skip, the raised skip warning indicator should illuminate and a buzzer sound.
8. Lower the skip, check the raised skip warning light and buzzer goes off.
9. Select neutral and apply parkbrake.
10. If the raised skip warning does not function as described, rectify the fault immediately. Do not use the machine until the fault is repaired.

Slope Inclinometer

⚠ **WARNING** Before testing the skip raised warning and slope inclinometer make sure the area around the machine is clear of people.

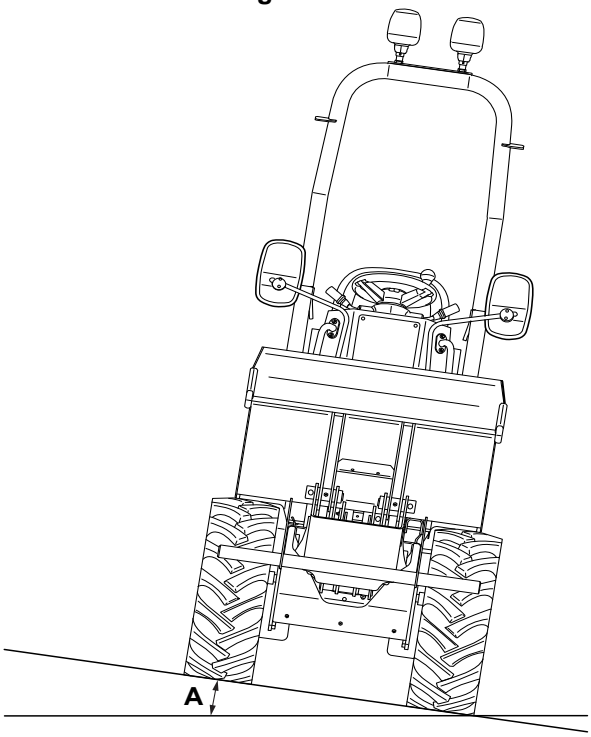
1. Make sure the machine is on a firm, level surface and the skip is empty.
2. Enter the operator station and seat yourself.
3. Apply parkbrake, engage the seatbelt.
4. Start the engine.
5. Fully lower skip. Check that skip raised warning light is not illuminated.
6. Select forward drive, release parkbrake.
7. Drive machine carefully along a curb as shown.
   Length/Dimension/Distance: 100mm
8. With machine stationary (engine idle) and drive still selected check that sections of LED (Light Emitting Diode) inclinometer display are illuminated as below. Refer to Table 11.
9. Drive machine off the curb carefully, apply parkbrake , select neutral and switch off machine.

10. If the slope inclinometer does not function as described, rectify the fault immediately. Do not use the machine until the fault is repaired.

Table 11.

Standard tyres - 850mm track	LED segments
Extra wide tyres - 920mm track	LED segments

Figure 82.



A 100mm

Check (Condition)

Examine the electrical circuits regularly for:

- Damaged connectors
- Loose connections
- Chafing on the wiring harnesses
- Corrosion
- Missing insulation
- Incorrect routing of the wiring harnesses.

Do not use the machine if one or more of these faults are found. You must make sure that the electrical circuit is repaired immediately.

Battery

Clean

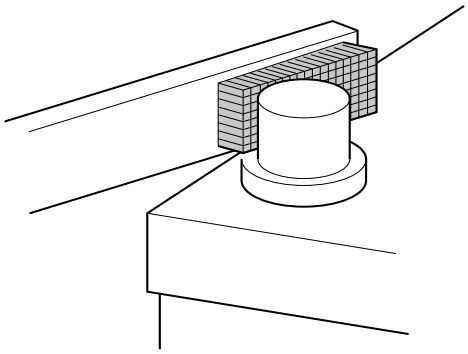
⚠ **WARNING** Keep metal watch straps and any metal fasteners on your clothes, clear of the positive (+) battery terminal. Such items can short between the terminal and nearby metal work. If it happens you can get burned.

1. Make the machine safe.

Refer to: Maintenance Positions (Page 97).

2. Get access to the battery.
   Refer to: Access Apertures (Page 105).
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 83.

Figure 83.



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 97).
2. Get access to the batteries.
   Refer to: Disconnect (Page 138).
3. Connect the battery leads. Connect the earth (-) terminal last.
4. If the machine has a battery isolator, move the switch to the on position.

Disconnect

⚠ **WARNING** Keep metal watch straps and any metal fasteners on your clothes, clear of the positive (+) battery terminal. Such items can short between the terminal and nearby metal work. If it happens you can get burned.

CAUTION The machine is negatively earthed. Always connect the negative pole of the battery to earth.

When connecting the battery, connect the earth (-) lead last.

When disconnecting the battery, disconnect the earth (-) lead first.

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

Notice: Do not disconnect the battery while the engine is running, otherwise the electrical circuits may be damaged.

1. Make the machine safe.
   Refer to: Maintenance Positions (Page 97).
2. Get access to the batteries.
   Refer to: Access Apertures (Page 105).
3. If the machine has a battery isolator, switch off the battery isolator and remove the key.
   Refer to: Battery Isolator (Page 29).
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. Note the timed delay.
   Refer to: Battery Isolator (Page 29).

A defective isolator must be repaired before the machine is used. For more information, contact your JCB dealer.

Fuses

Replace

⚠ **Notice:** Always replace fuses with ones of correct ampere rating to avoid electrical system damage.

The electrical circuits are protected by fuses. The primary fuses are situated in the engine compartment on the left hand side of the machine.
Refer to: General (Page 102).

If a fuse blows, find out why before a new one is installed.
Refer to: Fuses (Page 151).

Relays

Replace

The relays are located below the steering wheel.
Refer to: General (Page 102).

Notes:

Technical Data
Static Dimensions

Dimensions

Figure 84.

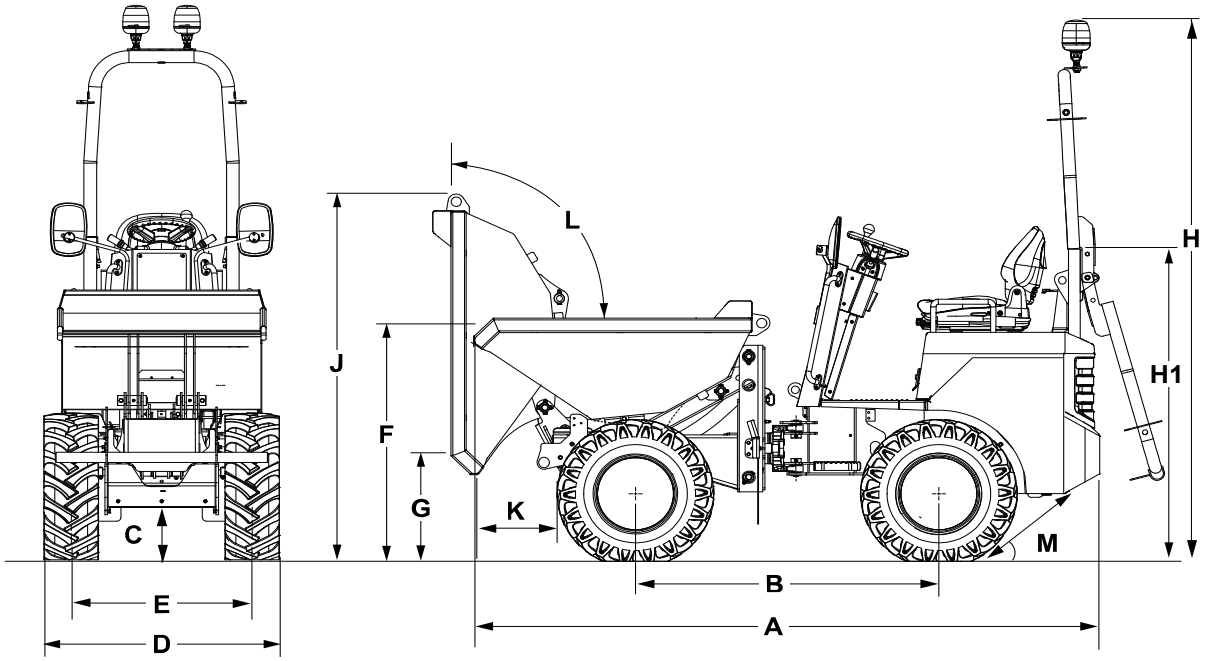


Figure 85.

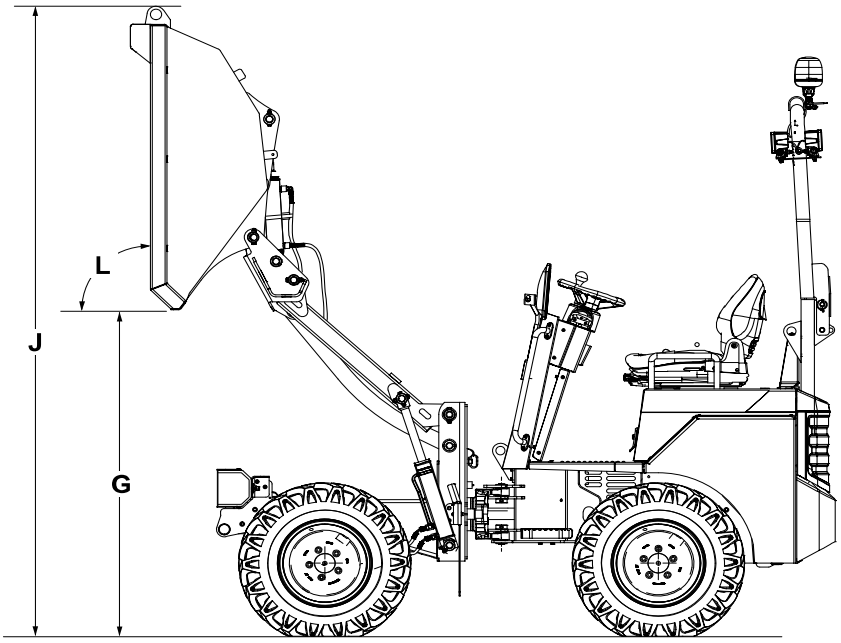


Figure 86.

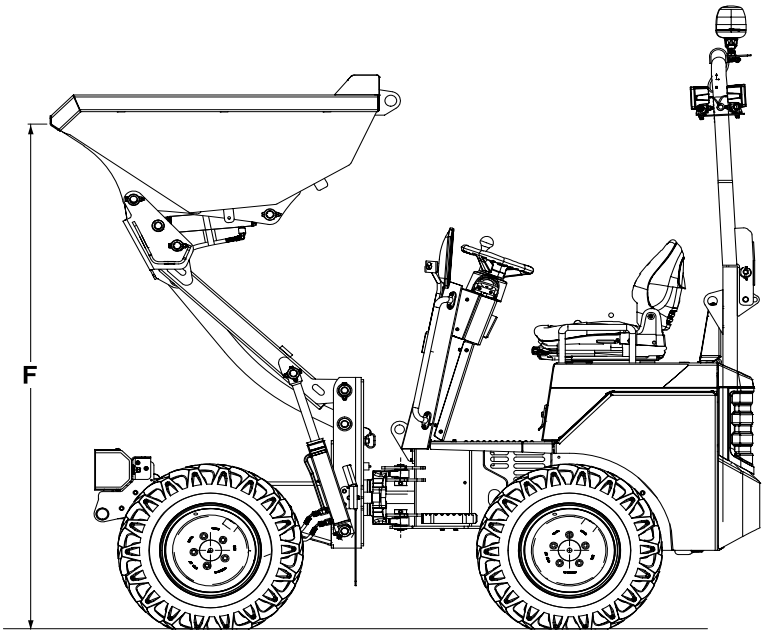


Table 12.

Item	Description	Machine with Standard Tyres	Machine with Narrow Tyres	Machine with Extra Wide Tyres
A	Overall length	3,095mm	3,095mm	3,095mm
B	Wheelbase	1,500mm	1,500mm	1,500mm
C	Minimum ground clearance	263mm	225mm	263mm
D	Width over tyres	1,106mm	980mm	1,245mm
E	Track width	850mm	782mm	920mm
F	Height to front lip of skip - untipped (lowered/raised)	1,134mm/2,259mm	1,096mm/2,221mm	1,134mm/2,259mm
G	Height to front lip of skip - tipped (lowered/raised)	452mm/1,573mm	414mm/1,535mm	452mm/1,573mm
H	Height to top of ROPS (raised, with/without beacon)	2,792mm/2,602mm	2,754mm/2,564mm	2,792mm/2,602mm
H1	Height to top of ROPS (folded)	1,624mm	1,586mm	1,624mm
J	Dump height (untipped/tipped)	1,865mm/3,037mm	1,827mm/2,999mm	1,865mm/3,037mm
K	Discharge distance front (lowered/raised)	391mm/263mm	436mm/308mm	391mm/263mm
L	Skip tip angle	90°	90°	90°
M	Departure angle	36°	33°	36°

Turning Circle

Figure 87.

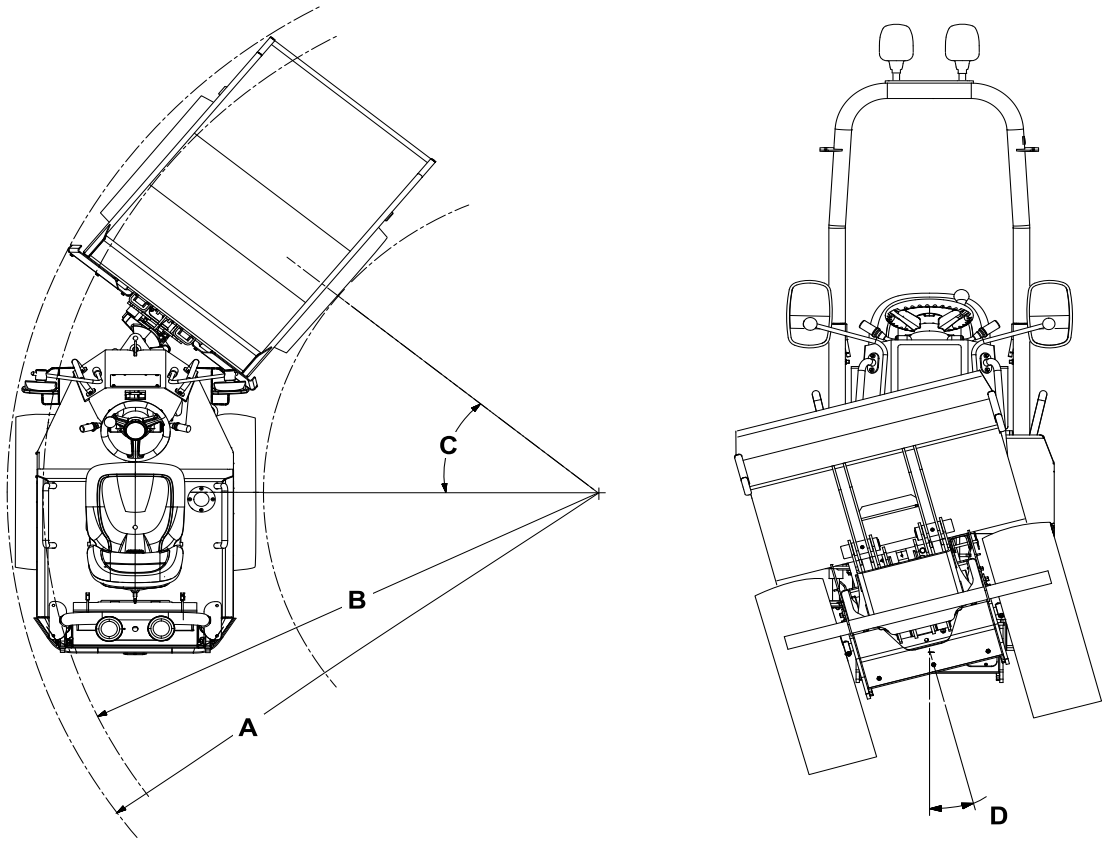


Table 13.

Item	Description	Length		
		Standard Tyres	Narrow Tyres	Extra Wide Tyres
A	Turning circle of skip (radius)	2,712mm	2,713mm	2,713mm
B	Turning circle of tyres (radius)	2,559mm	2,524mm	2,628mm
C	Steering angle	39°	39°	39°
D	Body oscillation angle	15°	15°	15°

Weights

Table 14.

Description	
Total weight unladen with full fuel tank and oils and 75kg operator.(1)	1,515kg
Total weight unladen with full fuel tank and oils.	1,440kg

(1) According to ISO6016

Skip Capacity

Table 15.

Maximum Safe Payload	Heaped Capacity	Water Capacity	Struck Capacity
1,000kg	0.54m³	0.31m³	0.44m³

Performance Dimensions

Driving Performance

Speed

Table 16. Speed in Gears (Unladen)

Gear	Speed	
	Standard Tyres	Narrow Tyres
1	11.9km/h (7.4mph)	10.5km/h (6.5mph)

Operating Slope

Table 17. Maximum Operating Slope

	Standard Tyres		Narrow Tyres		Extra Wide Tyres	
	Percentage Slope	Degree	Percentage Slope	Degree	Percentage Slope	Degree
1HT	18	10.2°	17	9.6°	19.8	11.2°

Noise Emissions

General

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

To assist in compliance with European Directives 2000/14/EC and 2005/88/EC, the noise data values for this type of machine have been provided on the following page(s) and may be used for the assessment of risks to exposure from noise.

The noise data values shown only apply to CE marked machines.

For information relating to this machine when used with other JCB approved attachments, please refer to the literature accompanying the attachments.

Table 18. Definition of terms

Term	Definition	Notes
LpA	A-weighted sound pressure level measured at the operator's station.	Determined in accordance with the test method defined in ISO 6396 and the dynamic test conditions defined on 2000/14/EC.
LwA	Equivalent A-weighted sound power level emitted by the machine.	Guaranteed equivalent sound power (external noise) determined in accordance with the dynamic test conditions defined in 2000/14/EC.

Noise Data

Table 19.

Engine Rating[1]	LpA	LwA
16.1kW	79	101

(1) Gross power per ISO 3046.

Vibration Emissions

General

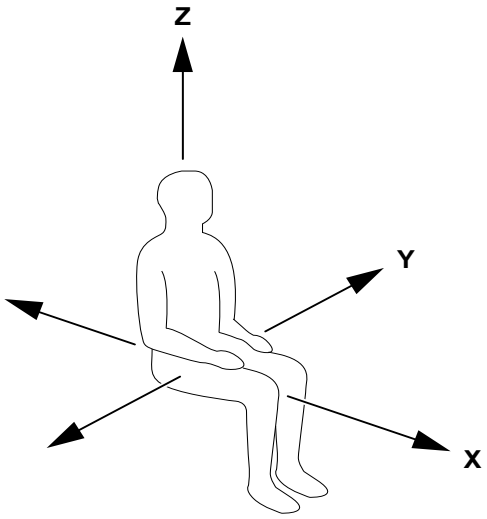
To assist in compliance with the European Directive 2002/44/EC, the duty specific vibration emission values for this machine type have been provided on the following page(s) and may be used for the assessment of risks to exposure from vibration.

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 88.



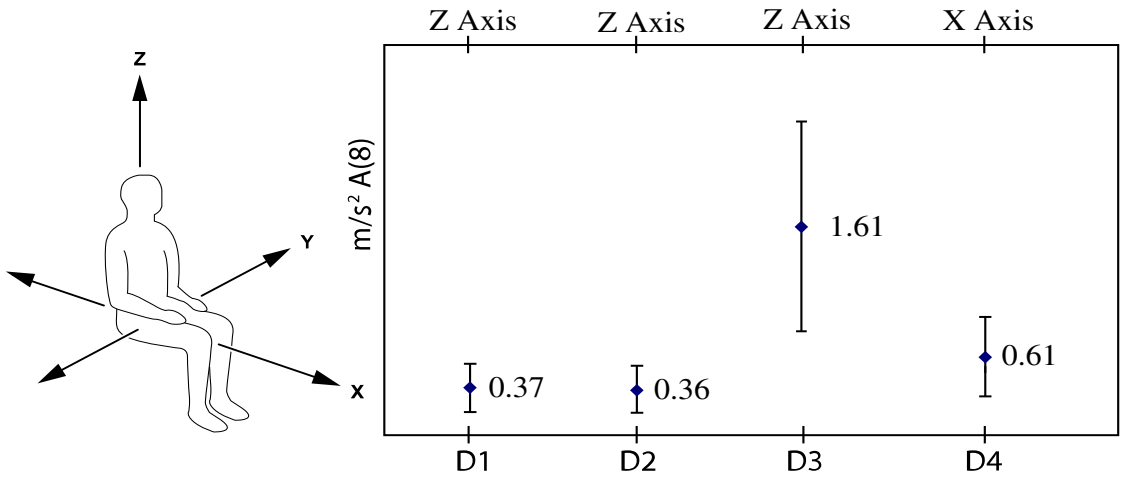
Exposure to Vibration

Exposure to vibration can be minimised through:

- Selection of the correct size and capacity of machine, equipment and attachments for a particular application
- Use of a machine equipped with an appropriate seat, keeping the seat maintained and adjusted
- Checks to make sure that the machine is correctly maintained, reporting and correcting any faults
- Steering, braking, accelerating, shifting gears, moving the attachments and load smoothly
- Adjusting the machine speed and travel path to minimise the vibration level
- Keeping the terrain on worksites where the machine works and travels in good condition, removing any large rocks or obstacles and filling in any ditches and holes
- Choosing routes that avoid rough surfaces and, if this is not possible, drive more slowly to avoid bumping and jolting
- Travel over longer distances at an adjusted (medium) speed
- Avoiding bad postures, i.e. slumping in your seat, constantly leaning forward or sideways or driving with your back twisted.

Vibration Data

Figure 89.



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: Dumping

The whole-body vibration emission under representative operating conditions (according to the intended use) are shown.

Whole-body vibration emission determined in accordance with ISO (International Organization for Standardization) 2631-1:1997 for this machine type is 0.973m/s² normalised to an 8h reference period [A(8)] and based upon a test cycle comprising of roading laden/unladen on tarmac and rough terrain.

Hand-arm vibration determined in accordance with dynamic test conditions defined in ISO 5349-2: 2001 is 2.626m/s².

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

Fluids, Lubricants and Capacities

General

⚠ **Notice:** No warranty liability will be accepted for engine failures where unacceptable fuel grades (or their equivalent) have been used at any stage.

Table 20.

Item	Capacity	Fluid/Lubricant	Part Number	Container Size(1)	Specification
Fuel tank	30L	Diesel			Refer to 'Fuel'
Engine Oil	4.4L (Max.) 3.4L (Min.)	JCB Advanced Engine Oil 15W40	4001/4001	5L	CK-4, ACEA E9, ECF-3
Engine Coolant	3.4L	JCB Antifreeze HP/Coolant	4006/1120	20L	ASTM D6210
Hydraulic Fluid (including motors)	28L	JCB Hydraulic Fluid OP46	4002/2005	20L	
Grease points	As required	JCB Special HP Grease	4003/2017	0.4kg	

(1) For information about the different container sizes that are available (and their part numbers), contact your JCB dealer.

Fuel

No.2-D is a distillate fuel oil of lower volatility for engines in industrial and heavy mobile service. (SAE J313 JUN87) Grade of Diesel Fuel Oil According to ASTM D975.

Table 21.

Flash Point	Water and Sediment Volume	Carbon Residue on 10 Percent Residuum	Ash Weight
Minimum	**Maximum**	**Minimum**	**Maximum**
52°C (126°F)	0.05%	0.35%	0.01%

Table 22.

Distillation Temperatures, 90% Point		Viscosity Kinematic cSt or mm²/s at 40°C		Viscosity Saybolt, SUS at 100°F		Sulfur, weight	Copper Strip Corrosion	Cetane Number
Minimum	**Maximum**	**Minimum**	**Maximum**	**Minimum**	**Maximum**	**Minimum**	**Maximum**	**Minimum**
282°C (539°F)	338°C (640°F)	1.9	4.1	32.6	40.1	0.5%	No. 3	40

The cetane number is required not to be less than 45.

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 23.

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.

Torque Values

General

Table 24. Torque Values

Component	Torque
Front and rear wheel nut	250N·m
ROPS (Roll-Over Protective Structure) mounting bolts	116N·m
ROPS hinge bolts	Tighten to remove the gap
Engine oil drain bolt	34N·m

Electrical System

General

Table 25.

Item	Specification
System voltage	12V negative earth
Alternator output	40A
Battery voltage	12V, 80Ah
Battery cold cranking amps	750A

Bulbs

Table 26. Bulb Specifications

Item	Specification
Front main beam	12V, 60W
Front dipped beam	12V, 55W
Front side	12V, 10W
Front /rear side indicator	12V, 21W
Rear side/stop	12V, 10W/21W
Front/rear work lamps	12V, LED (Light Emitting Diode)
Number plate lamp	5W

Fuses

Primary Fuses

Figure 90.

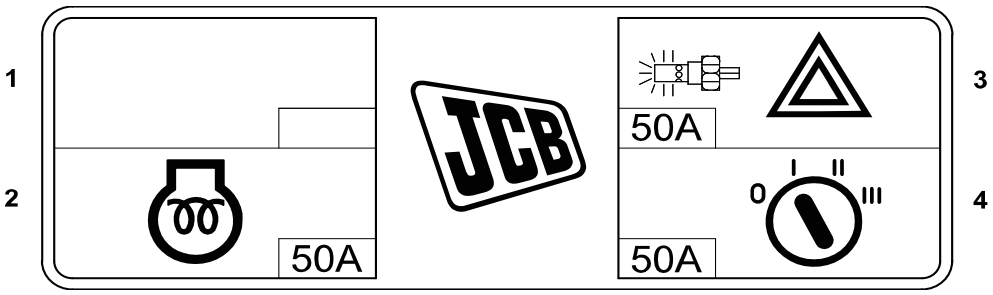


Table 27.

Fusebox	Function	Rating
1	Not used	-
2	Glow plugs	80A
3	Hazard warning, grid heater	50A
4	Ignition	50A

Secondary Fuses

Figure 91.

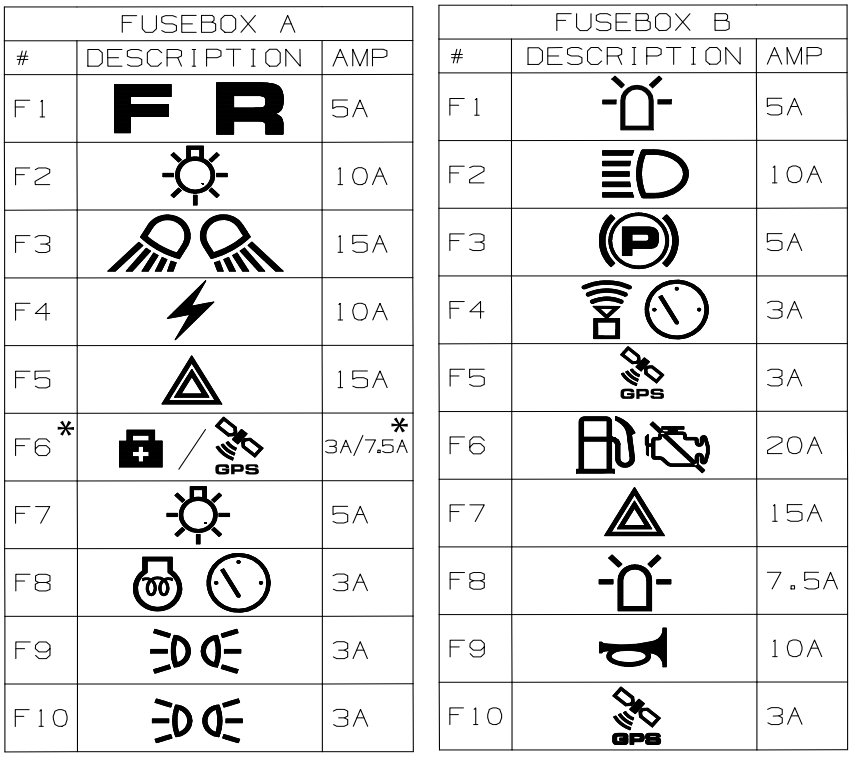


Table 28.

Fusebox A	Function	Rating
A1	Column switch	5A
A2	Head lamp, tail lamp, illumination	10A
A3	Work lights	15A
A4	ACC socket	10A
A5	Hazard	15A
A6*	Livelink and diagnostic (For Standard Machine)	3A
	Livelink and diagnostic (For Machines with Immobiliser)	7.5A
A7	Head lamp, tail lamp, illumination	5A
A8	Glow plug timer, start relay	3A
A9	Position side lights	3A
A10	Position side lights	3A

Table 29.

Fusebox B	Function	Rating
B1	Green beacon	5A
B2	Head lamp	10A
B3	Park brake	5A
B4	Buzzer, cluster and ignition relay	3A
B5	Livelink	3A
B6	ESOS (Engine Shut-Off Solenoid), Fuel pump and Alternator W	20A
B7	Hazard Lamps	15A
B8	Amber beacon	7.5A

Fusebox B	Function	Rating
B9	Horn	10A
B10	Livelink	3A

Relays

Figure 92.

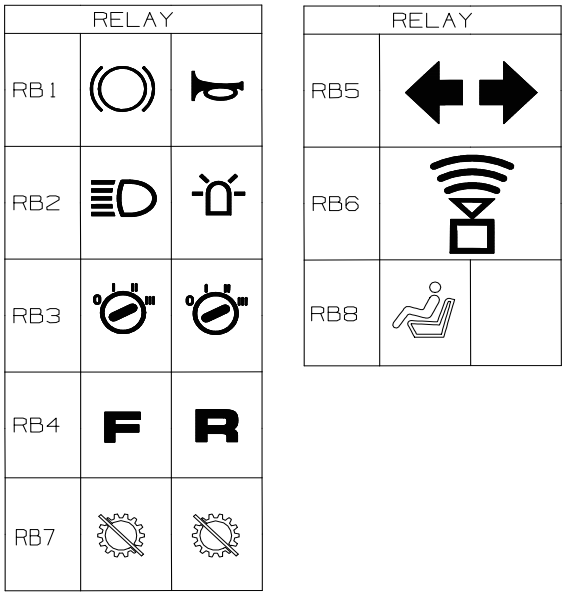


Table 30.

Relay	Circuit(s)
1	Brake relay
	Brake/horn relay
2	Head lights
	Green beacon relay
3	Start/ignition relay
	Ignition relay
4	Reverse drive
	Forward drive
5	Indicators
6	Reverse alarm
7	Transmission disconnect
	Transmission disconnect
8	Operator seat switch

Engine

General

Table 31.

Manufacturer	Perkins
Model	403J-11
Type	Mechanical, Vertical, water-cooled, three cylinder, four cycle diesel engine
Emission standard	Stage V
Engine rating	16.1kW @2400 RPM (Revolutions Per Minute)
Capacity	1.13L

Hydraulic System

General

The information is included to advise the machine operator of the hydraulic hose burst pressures for all hoses used on this machine.

JCB prefix number can be found stamped on the swaged end of a hose immediately behind the hose nut. The JCB prefix is the two or three digit prefix of the JCB part number, e.g., 612/21100 or 34AP/BA130.

Hydraulic Hose Burst Pressures

Old Type Hose

Table 32. 3 Digit JCB Part Number Prefix

JCB Prefix	Bore Size	Range	Maximum Working Pressure	Minimum Burst Pressure
607/	19.05mm	MP (Medium Pressure)	235bar (3,408psi)	950bar (13,779psi)
611/	6.35mm	HP (High Pressure)	400bar (5,802psi)	1,600bar (23,206psi)
612/	9.6mm	HP	330bar (4,786psi)	1,320bar (19,145psi)
613/	12.7mm	HP	275bar (3,989psi)	1,100bar (15,954psi)
614/	15.9mm	HP	250bar (3,626psi)	1,000bar (14,504psi)
615/	19.05mm	HP	275bar (3,989psi)	1,100bar (15,954psi)
629/	5mm	SAE (Society of Automotive Engineers) 100 R7 (or 4.76mm)	207bar (3,002psi)	827bar (11,995psi)
631/	6.35mm	LP (Low Pressure)	190bar (2,756psi)	760bar (11,023psi)
632/	9.6mm	LP	155bar (2,248psi)	620bar (8,992psi)
633/	12.7mm	LP	140bar (2,031psi)	550bar (7,977psi)
634/	15.9mm	LP	100bar (1,450psi)	415bar (6,019psi)
635/	19.05mm	LP	85bar (1,233psi)	345bar (5,004psi)
637/	25.4mm	LP	70bar (1,015psi)	275bar (3,989psi)

New Type Hose

Table 33. 2 Digit JCB Part Number Prefix (From Serial number 2006051)

JCB Prefix		Bore Size	Type/Range	Maximum Working Pressure	Minimum Burst Pressure
1st Digit	2nd Digit				
1	1	6.4mm	Pilot servo hose	103bar (1,494psi)	412bar (5,976psi)
1	2	9.5mm	Pilot servo hose	103bar (1,494psi)	412bar (5,976psi)
2	1	6.4mm	LP hose	190bar (2,756psi)	760bar (11,023psi)
2	2	9.5mm	LP hose	155bar (2,248psi)	620bar (8,992psi)
2	3	12.7mm	LP hose	140bar (2,031psi)	560bar (8,122psi)
2	4	15.9mm	LP hose	100bar (1,450psi)	400bar (5,802psi)
2	5	19.1mm	LP hose	85bar (1,233psi)	340bar (4,931psi)
2	6	25.4mm	LP hose	70bar (1,015psi)	280bar (4,061psi)
2	7	31.8mm	LP hose	40bar (580psi)	160bar (2,321psi)
2	8	38.1mm	LP hose	35bar (508psi)	140bar (2,031psi)
2	9	50.8mm	LP hose	25bar (363psi)	100bar (1,450psi)
3	1	6.4mm	HP hose	350bar (5,076psi)	1,400bar (20,305psi)
3	2	9.5mm	HP hose	330bar (4,786psi)	1,320bar (19,145psi)

JCB Prefix		Bore Size	Type/Range	Maximum Working Pressure	Minimum Burst Pressure
1st Digit	2nd Digit				
3	3	12.7mm	HP hose	275bar (3,989psi)	1,100bar (15,954psi)
3	4	15.9mm	HP hose	275bar (3,989psi)	1,100bar (15,954psi)
3	5	19.1mm	HP hose	275bar (3,989psi)	1,100bar (15,954psi)
3	6	25.4mm	HP hose	275bar (3,989psi)	1,100bar (15,954psi)
3	7	31.8mm	HP hose	210bar (3,046psi)	840bar (12,183psi)
4	1	6.4mm	HP static hose	350bar (5,076psi)	1,400bar (20,305psi)
4	2	9.5mm	HP static hose	330bar (4,786.2psi)	1,320bar (19,145psi)
4	3	12.7mm	HP static hose	275bar (3,989psi)	1,100bar (15,954psi)
4	4	15.9mm	HP static hose	275bar (3,989psi)	1,100bar (15,954psi)
4	5	19.1mm	HP static hose	275bar (3,988.5psi)	1,100bar (15,954psi)
4	6	25.4mm	HP static hose	275bar (3,989psi)	1,100bar (15,954psi)
4	7	31.8mm	HP Static hose	210bar (3,046psi)	840bar (12,183psi)
5	5	19.1mm	Extra HP hose	350bar (5,076psi)	1,400bar (20,305psi)
5	6	25.4mm	Extra HP hose	350bar (5,076psi)	1,400bar (20,305psi)
5	7	31.8mm	ExtraHP hose	350bar (5,076psi)	1,400bar (20,305psi)
6	1	6.4mm	Ultra HP hose	420bar (6,092psi)	1,420bar (20,595psi)
6	2	9.5mm	Ultra HP hose	420bar (6,092psi)	1,420bar (20,595psi)
6	3	12.7mm	Ultra HP hose	420bar (6,092psi)	1,420bar (20,595psi)
6	4	15.9mm	Ultra HP hose	420bar (6,092psi)	1,420bar (20,595psi)
6	5	19.1mm	Ultra HP hose	420bar (6,092psi)	1,420bar (20,595psi)
6	6	25.4mm	Ultra HP hose	420bar (6,092psi)	1,420bar (20,595psi)
6	7	31.8mm	Ultra HP hose	420bar (6,092psi)	1,420bar (20,595psi)
7	5	19.1mm	MP hose	235bar (3,408psi)	940bar (13,634psi)
7	6	25.4mm	MP hose	185bar (2,683psi)	740bar (10,733psi)
7	7	31.8mm	MP hose	165bar (2,393psi)	660bar (9,572psi)
7	8	38mm	MP hose	100bar (1,450psi)	400bar (5,802psi)
7	9	51mm	MP hose	90bar (1,305psi)	360bar (5,221psi)
9	1	51mm	Extra HP hose	373bar (5,410psi)	1,400bar (20,305psi)
9	2	51mm	Extra HP hose	373bar (5,410psi)	1,400bar (20,305psi)
9	3	51mm	Extra HP hose	373bar (5,410psi)	1,400bar (20,305psi)
9	4	51mm	Extra HP hose	373bar (5,410psi)	1,400bar (20,305psi)
9	5	51mm	Extra HP hose	373bar (5,410psi)	1,400bar (20,305psi)
9	6	51mm	Extra HP hose	373bar (5,410psi)	1,400bar (20,305psi)

Wheels and Tyres

General

The maximum pressure marked on the tyre may be different from the pressure shown below. Inflate the tyres to the pressures shown below.

These pressures are agreed with the tyre manufacturer(s) in accordance with the ETRTO (European Tyre and Rim Technical Organisation) standards to satisfy the machines stability performance.

If the tyres fitted to your machine are not shown, then contact your JCB dealer for advice. Do not guess the tyre pressures.

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

In special conditions (for example on sand) the air pressure in the tyre may be reduced, refer to your JCB dealer or tyre manufacturer.

Tyre Sizes and Pressures

Table 34.

Make	Size	Pressure - Front Tyre	Pressure - Rear Tyre
Starco	255/75x15.3 8PR AS Dumper	2.3bar (33psi)	1.4bar (20psi)
Starco (Narrow option)	7.00 x 12 - 6PR	3.2bar (46psi)	2.6bar (38psi)

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 158).

Data

Table 35.

A	Refer to: Name and Address of the Manufacturer (Page 7).
B	Dumper- Forward/Side Tip Dumper.
C	
D	Refer to: Machine (Page 10).
E	EN 474-1: 2006+A6: 2019, EN 474-6: 2006+A1: 2009.
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	Vincotte NV, Jan Olieslagerslaan 35, B-1800 Vilvoorde, Belgium or AND LTD, BN8500 Manchester, M14 4PN
K	Refer to: Noise Data (Page 145).
L	Refer to: Noise Data (Page 145).
M	Rocester.
N	Managing Director.

Figure 93.

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 TRADE NAME:	B 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 DATE OF DECLARATION dd/mm/yyyy NAME OF AUTHORISED SIGNATORY POSITION	M XX/XX/XXX
SIGNATURE	N XXXXXX

JCB Part No:

Warranty Information

Service Record Sheet

Table 36.

	Signature and stamp		Date
	Annual Insurance (Yes)		Hours

Figure 94. Installation Checklist

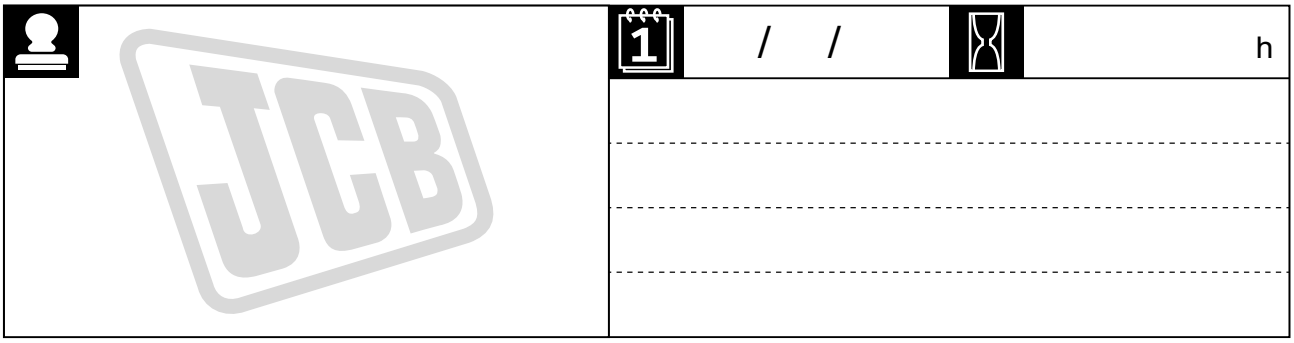


Figure 95. 250h/6 Month

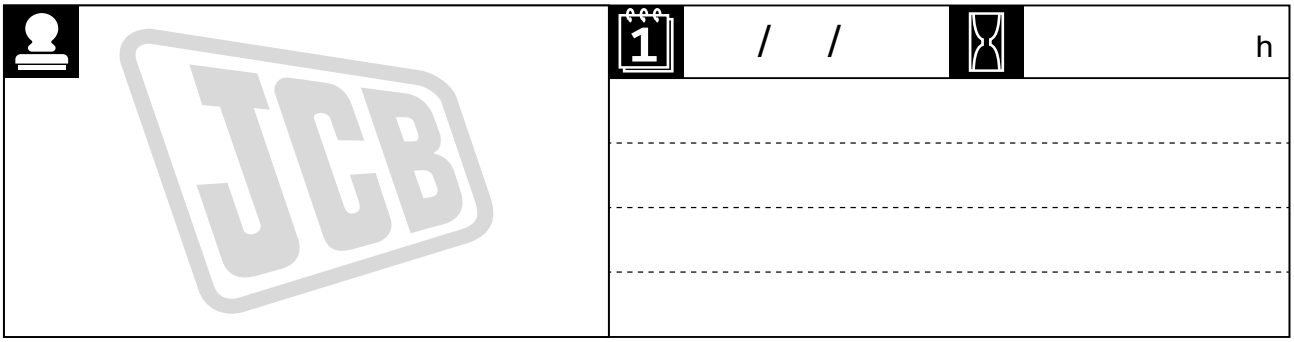


Figure 96. 500h/12 Month

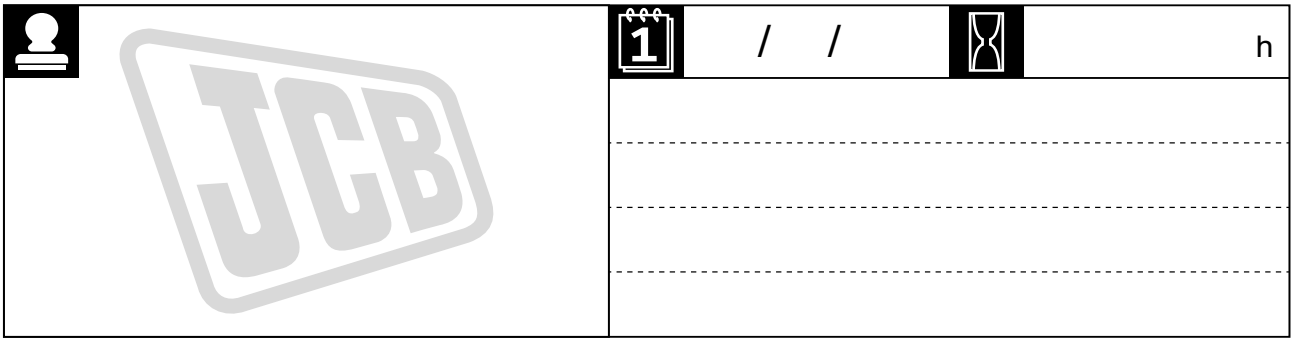


Figure 97. 750h/18 Month

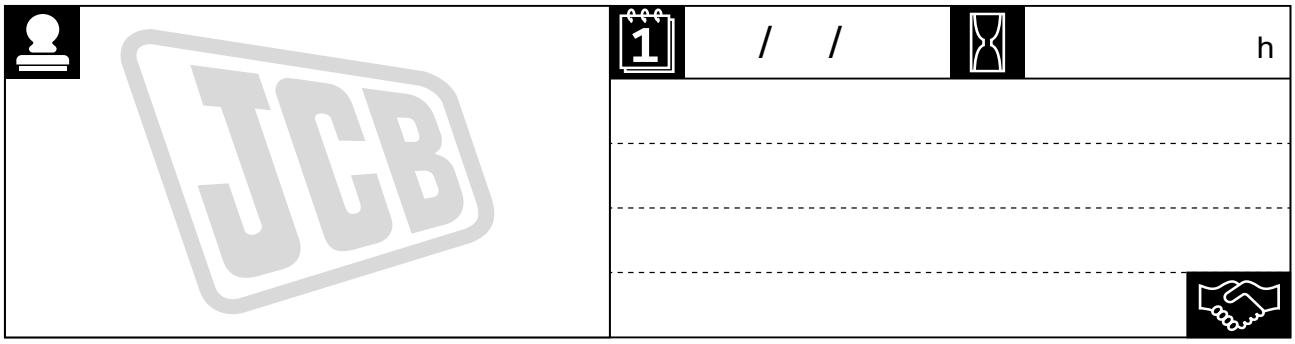


Figure 98. 1000h/24 Month

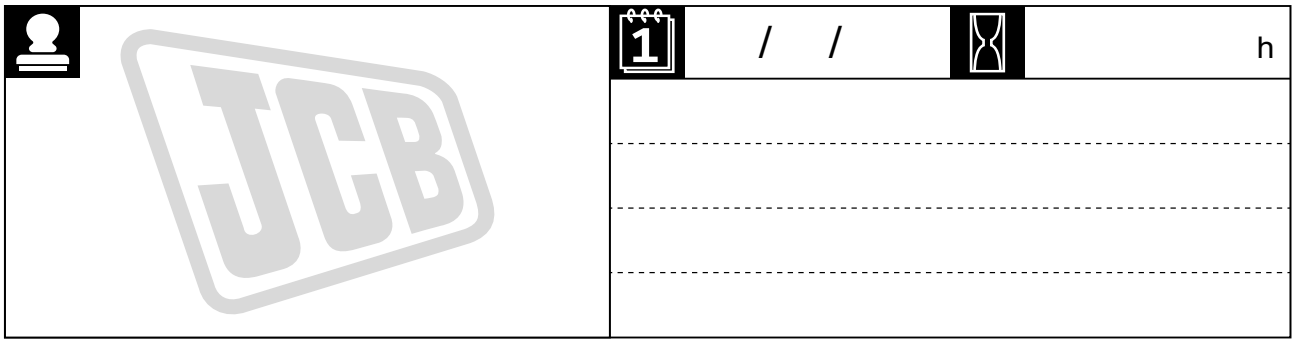


Figure 99. 1250h/30 Month

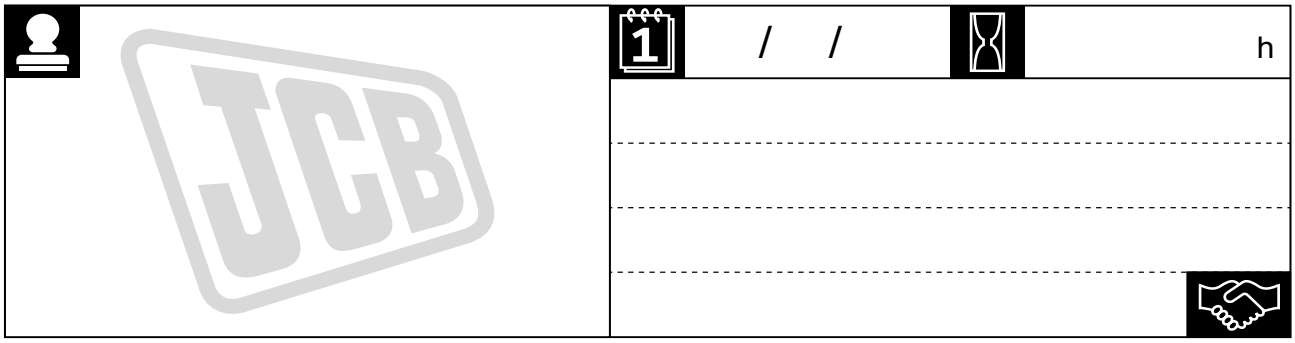


Figure 100. 1500h/36 Month

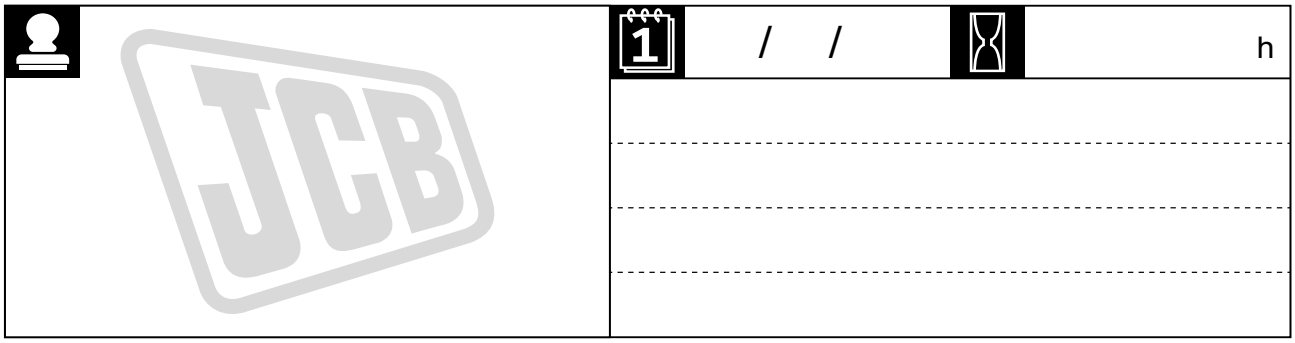


Figure 101. 1750h/42 Month

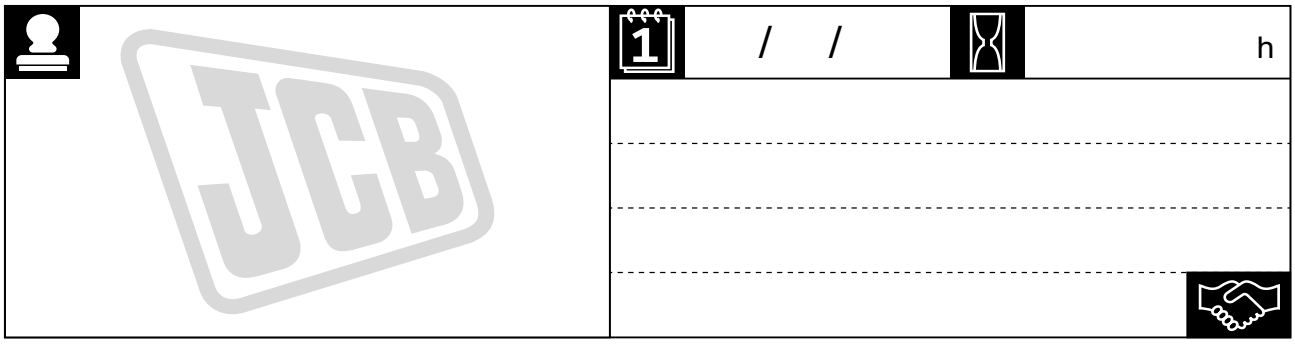


Figure 102. 2000h/48 Month

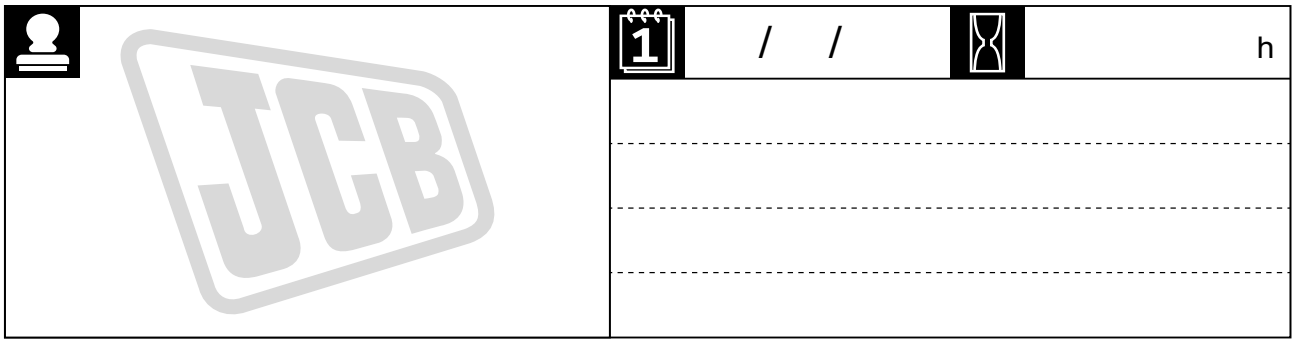


Figure 103. 2250h/54 Month

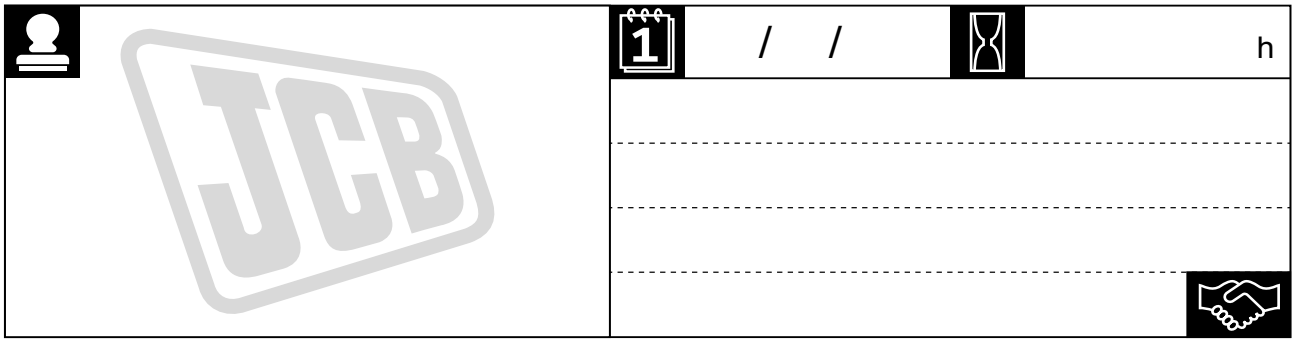


Figure 104. 2500h/60 Month

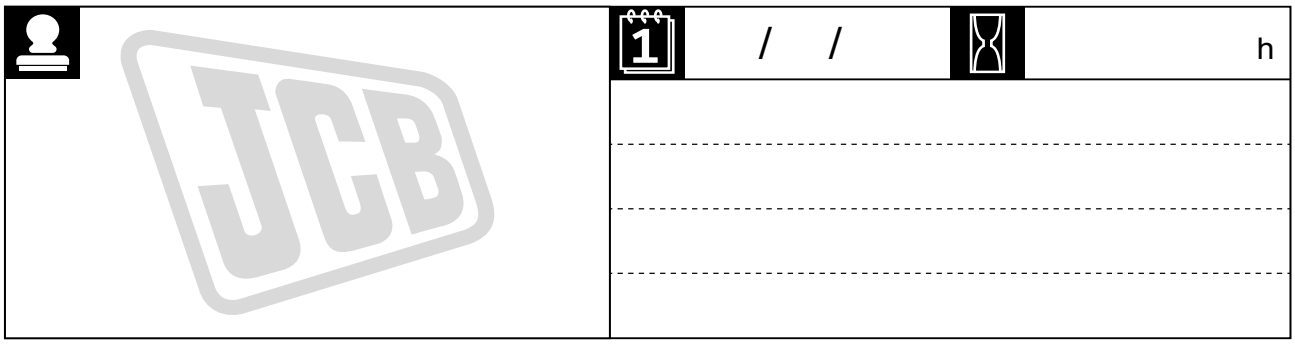


Figure 105. 2750h/66Month

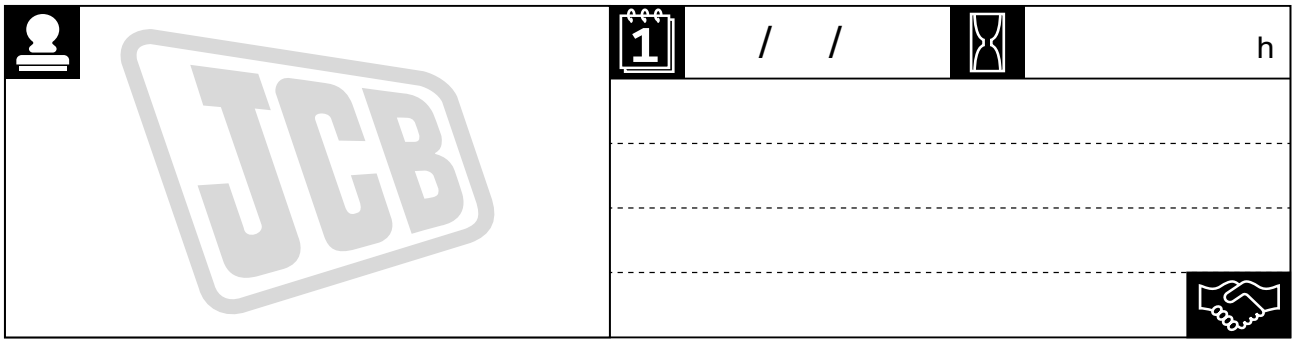


Figure 106. 3000h/72 Month

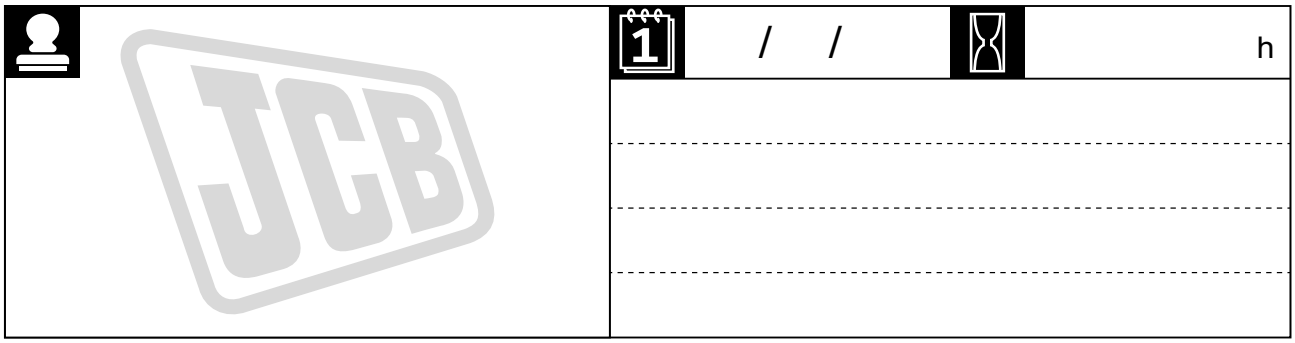


Figure 107. 3250h/78 Month

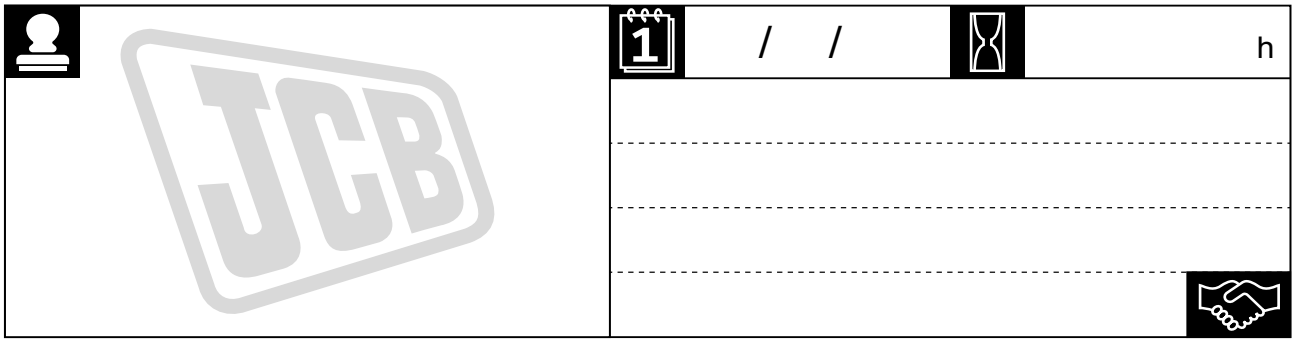


Figure 108. 3500h/84 Month

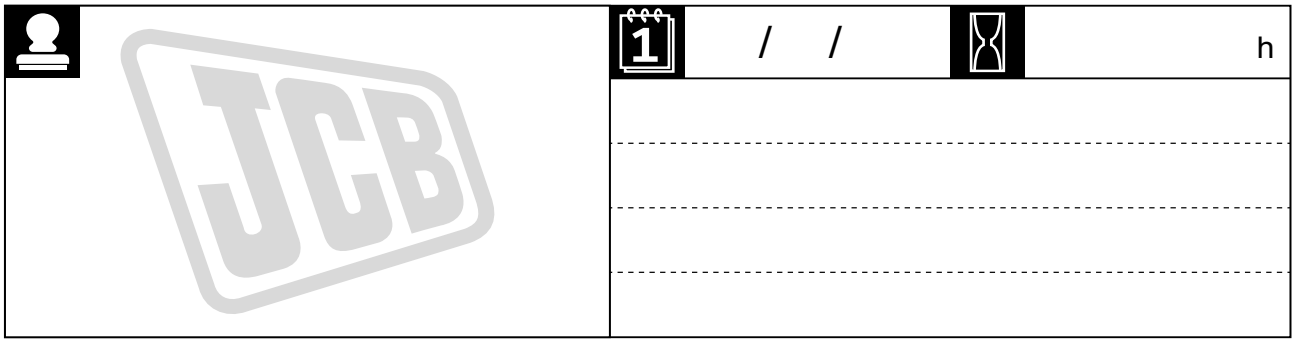


Figure 109. 3750h/90 Month

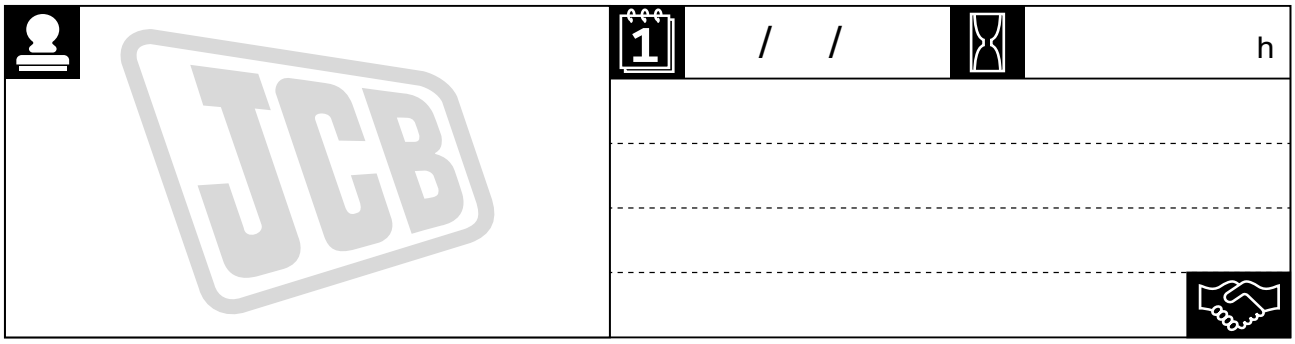


Figure 110. 4000h/96 Month

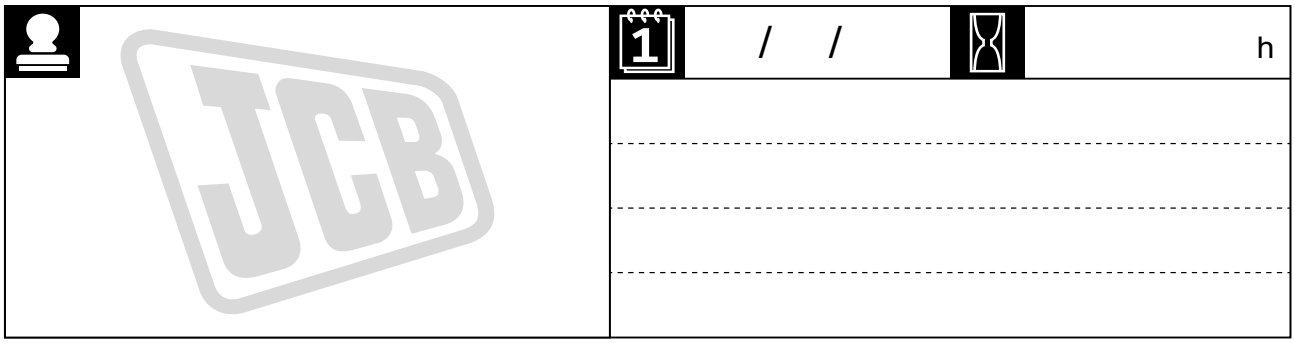


Figure 111. 4250h/102 Month

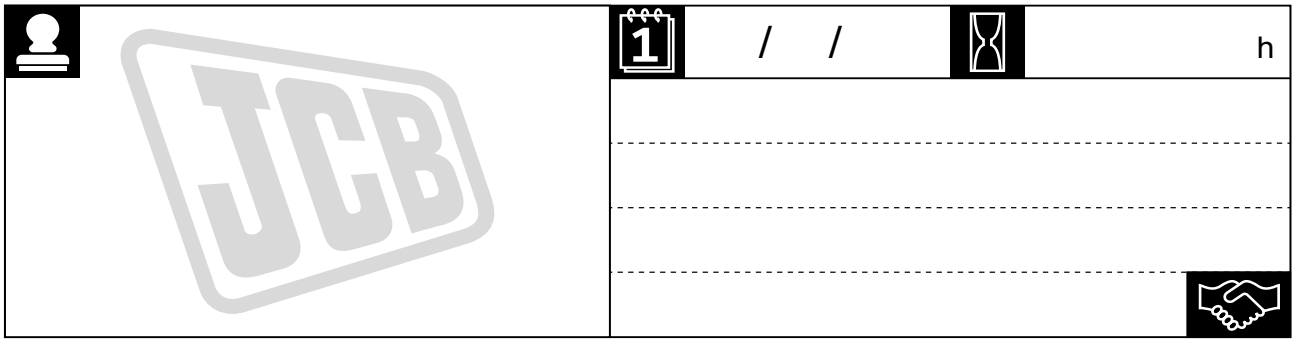


Figure 112. 4500h/108 Month

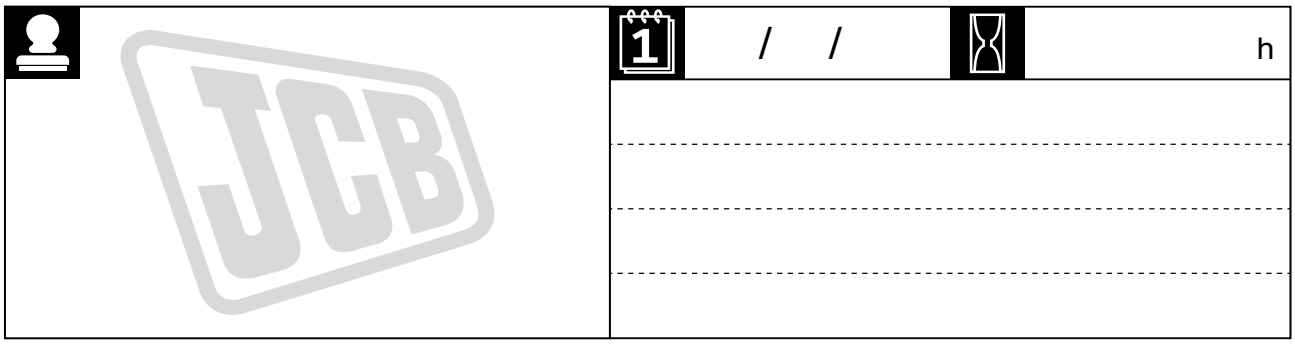


Figure 113. 4750h/114 Month

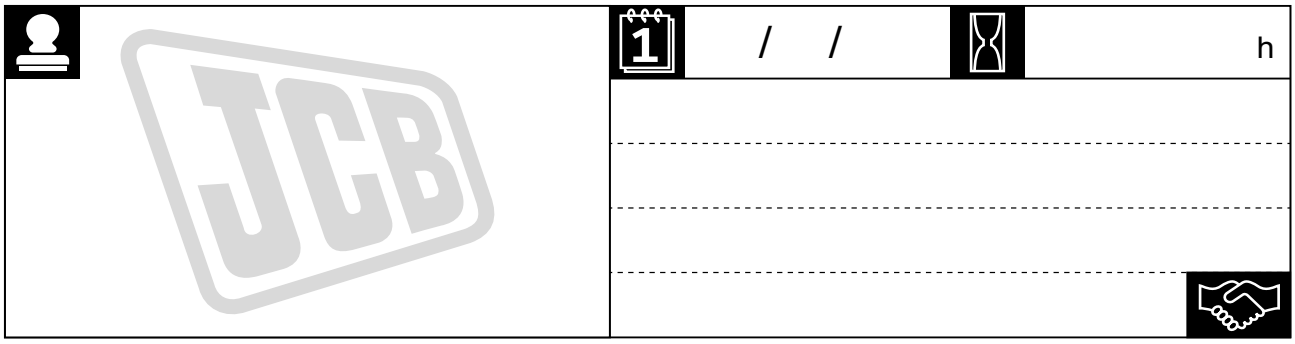


Figure 114. 5000h/120 Month

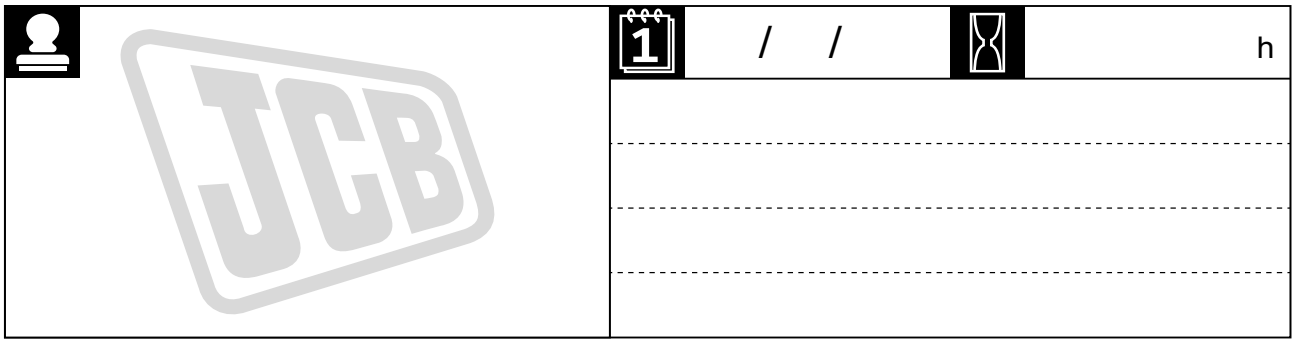


Figure 115. 5250h/126 Month

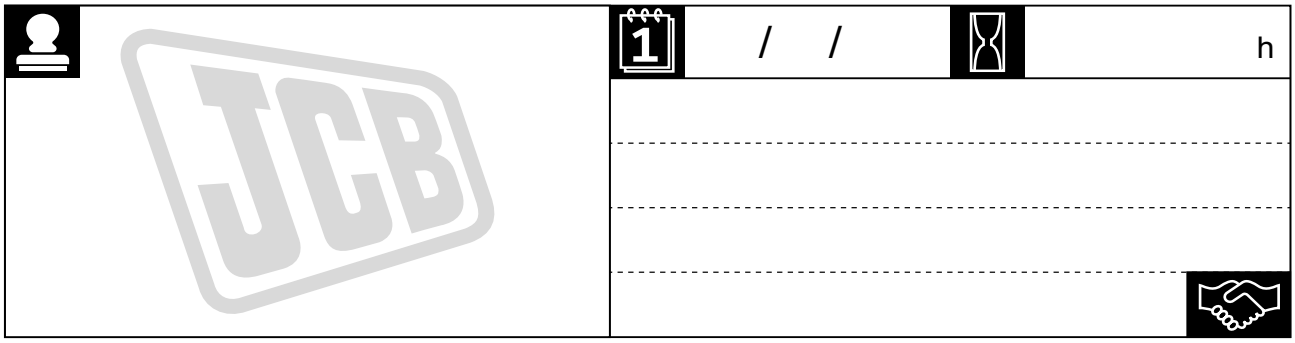
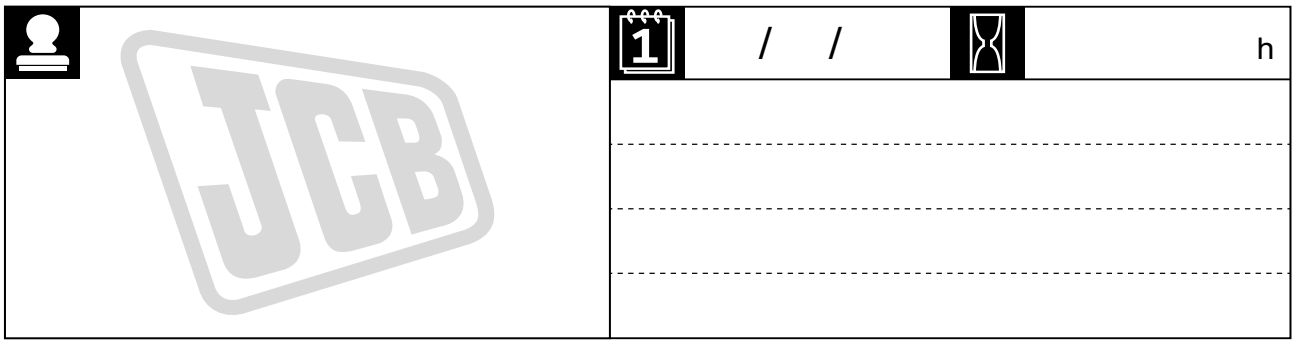


Figure 116. 5500h/132 Month



Notes: