Contents

Page No.

Contents

ii

Introduction

About This Handbook

Machine Model and Serial Number

This handbook provides information for the following models in the JCB machine range:

- 535-125 from SN 1086000
- 535-140 from SN 1086000
- 540-140 from SN 1086000
- 540-170 from SN 1086000

Using this Manual

INT-1-2-5_2

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

This manual is arranged to give you a good understanding of the machine and its safe operation. It also contains maintenance information and specification data. Read this manual from front to back before using the machine for the first time. Particular attention must be given to all the safety aspects of operating and maintaining the machine.

General warnings in this chapter are repeated throughout the book, as well as specific warnings. Read all the safety statements regularly, so you do not forget them. Remember that the best operators are the safest operators.

Finally, treat this manual as part of the machine. Keep it clean and in good condition. Do not operate the machine without a manual in the cab. If there is anything you are not sure about, ask your JCB distributor or employer. Do not guess, you or others could be killed or seriously injured.

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 publication.

Units of Measurement

T1-001_2

In this publication, the S.I. system of units is used. For example, liquid capacities are given in litres. The Imperial units follow in parentheses ( ) eg 28 litres (6 gal).

Left Side, Right Side

In this handbook, 'left' **A** and 'right' **B** mean your left and right when you are seated correctly in the machine.

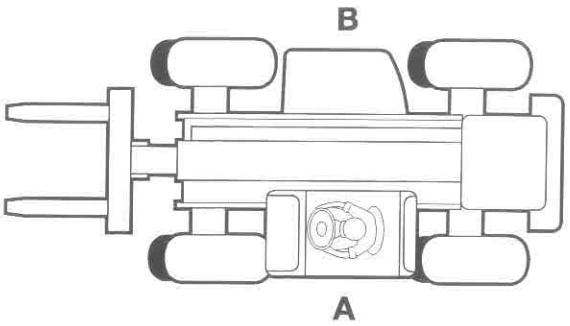


Fig 1.

Using the Machine

T1-002_2

To use the machine efficiently and 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. This manual instructs you on the machine, its controls and its safe operation; it is not a training manual. If you are a new operator, get yourself trained in the skills of using a machine before trying to work with it. If you don't, you will not do your job well, and you will be a danger to yourself and others.

Cab/Canopy

T1-003_2

This manual frequently makes references to the cab. For instance, 'do not operate the machine without a manual in the cab'. It should be noted that these statements also apply to canopy build machines.

Cross References

T1-004_2

In this publication, page cross references are made by presenting the subject title printed in bold, italic and underlined. It is preceeded by the 'go to' symbol. The number of the page upon which the subject begins, is indicated within the brackets. For example: ⇨ ***Cross References (2)***.

Machine Description

The JCB Loadall

P5-1001

Self propelled, seated operator, wheeled machine for operation on unimproved natural terrain and disturbed terrain. A main structural support is designed to carry an extending boom with a carriage mounted on the front to which forks or an approved attachment can be fitted.

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

Note: *The illustration(s) show a typical machine model; your machine may look different from the model shown.*

Component Locations

1 Boom
2 Carriage
3 ROPS/FOPS Cab
4 Auxiliary Circuit Quick Release Couplings (QRC)
5 Engine Cover
6 Hydraulic Tank
7 Fuel Tank
8 Battery
10 Mechanical Tow Hitch (Option)
11 Isolator Key

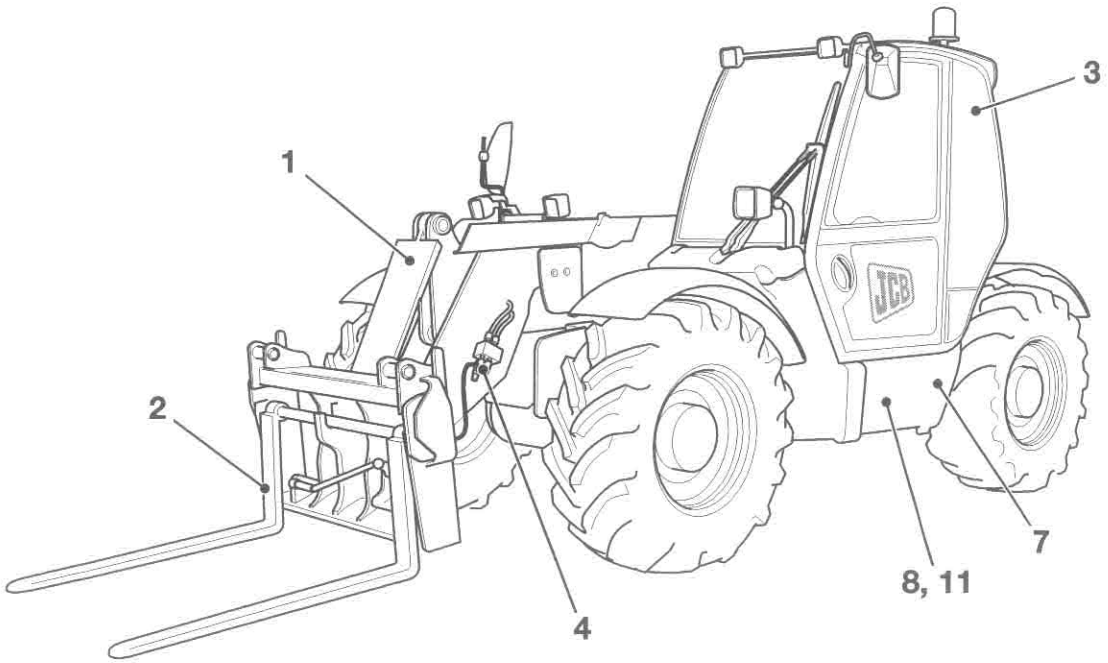


Fig 2.

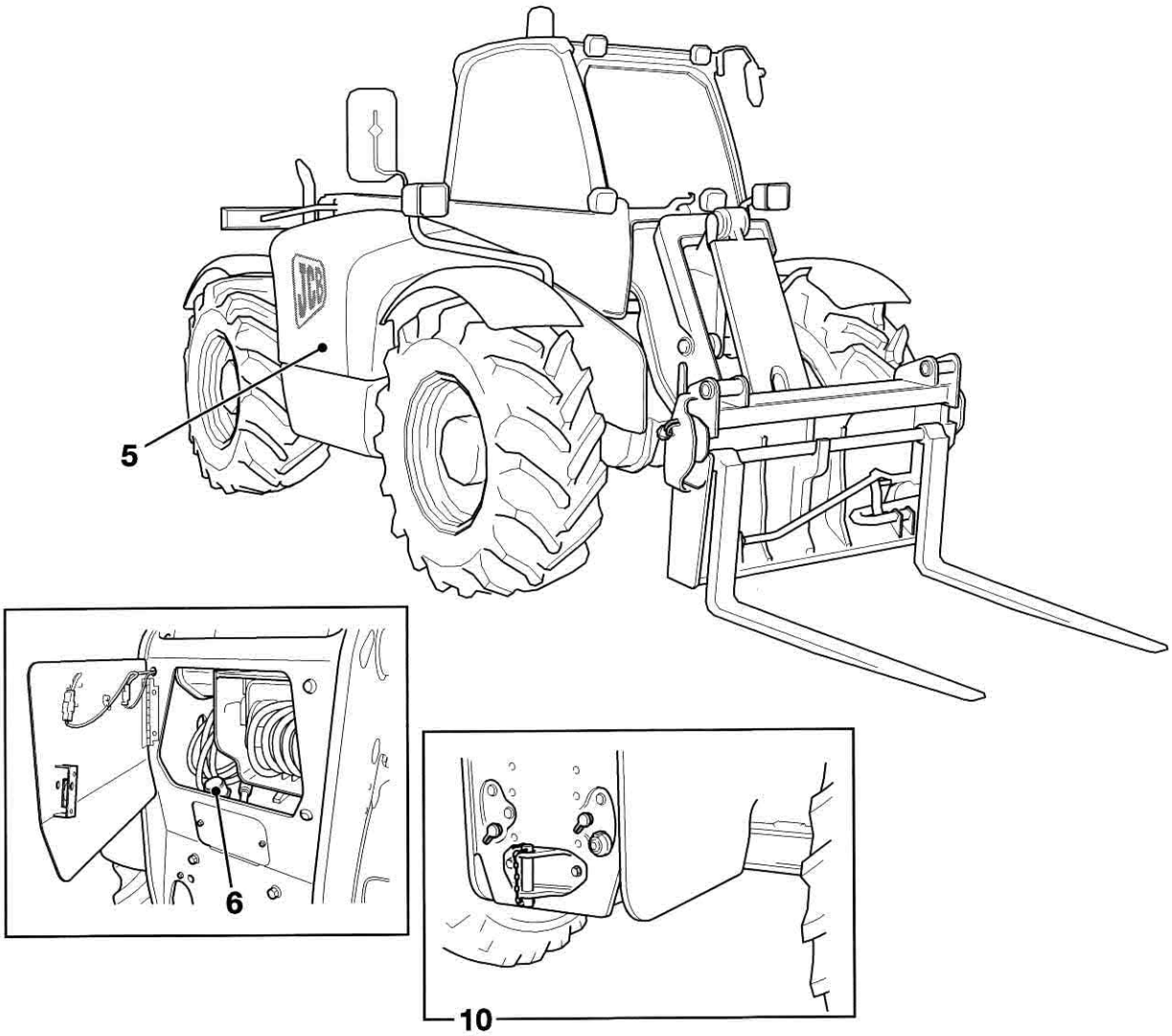


Fig 3.

Safety Check List

Safety - Yours and Others

INT-1-3-1_3

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

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

But 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 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 job until you are sure that you and those around you will be safe.

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

Remember

BE CAREFUL
BE ALERT
BE SAFE

General Safety

T1-007

⚠ WARNING

Operator Manual

You and others can be injured if you operate or maintain the machine without first studying the Operator Manual. Read the safety instructions before operating the machine. If you do not understand anything, ask your employer or JCB dealer to explain it. Keep the Operator Manual clean and in good condition. Do not operate the machine without an Operator Manual in the cab, or if there is anything on the machine you do not understand.

INT-1-3-2_2

⚠ WARNING

Care and Alertness

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

INT-1-3-5

⚠ WARNING

Clothing

You can be injured if you do not wear the proper clothing. Loose clothing can get caught in the machinery. Wear protective clothing to suit the job. Examples of protective clothing are: a hard hat, safety shoes, safety glasses, a well fitting overall, ear-protectors and industrial gloves. Keep cuffs fastened. Do not wear a necktie or scarf. Keep long hair restrained.

INT-1-3-6

⚠ WARNING

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.

INT-1-3-9_2

⚠ WARNING

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.

8-1-2-4

⚠ WARNING

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.

INT-3-3-9

⚠ WARNING

Lifting Equipment

You can be injured if you use faulty lifting equipment. Make sure that lifting equipment is in good condition. Make sure that lifting tackle complies with all local regulations and is suitable for the job. Make sure that lifting equipment is strong enough for the job.

INT-1-3-7

⚠ WARNING

Raised Equipment

Raised equipment can fall and injure you. Do not walk or work under raised equipment unless safely supported.

13-1-1-6

⚠ WARNING

Raised Machine

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

INT-3-3-7_1

⚠ DANGER

Lightning

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

5-1-1-2

⚠ WARNING

Machine Modifications

This machine is manufactured in compliance with legislative and other requirements. It should not be altered in any way which could affect or invalidate any of these requirements. For advice consult your JCB Distributor.

INT-1-3-10_2

Operating Safety

⚠ WARNING

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.

INT-2-1-2_2

⚠ WARNING

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.

INT-2-1-4

⚠ WARNING

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.

INT-2-1-5

⚠ WARNING

Engine

The engine has exposed rotating parts. Do not open the engine cover while the engine is running. Do not use the machine with the cover open.

INT-2-1-6_1

⚠ WARNING

Exhaust Gases

Breathing the machine exhaust gases can harm and possibly kill you. Do not operate the machine in closed spaces without making sure there is good ventilation. If possible, fit an exhaust extension. If you begin to feel drowsy, stop the machine at once and get into fresh air.

INT-2-1-10_2

⚠ WARNING

If the machine is fitted with a Roll Over Protection Structure (ROPS) and a Falling Objects Protection Structure (FOPS). You could be killed or seriously injured if you operate the machine with a damaged or missing ROPS/FOPS. If the ROPS/FOPS has been in an accident, do not use the machine until the structure has been renewed. Modifications and repairs that are not approved by the manufacturer may be dangerous and will invalidate the ROPS/FOPS certification.

INT-2-1-9_4

⚠ WARNING

Work Sites

Work sites can be hazardous. Inspect the site before working on it. Look for potholes, weak ground, hidden rocks etc. 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.

INT-2-2-1

⚠ WARNING

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. Work sites can be noisy, do not rely on spoken commands.

INT-2-2-3

⚠ WARNING

Parking

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

INT-2-2-4_2

⚠ WARNING

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.

INT-2-2-5

⚠ WARNING

Ramps and Trailers

Water, mud, ice, grease and oil on ramps or trailers can cause serious accidents. Make sure ramps and trailers are clean before driving onto them. Use extreme caution when driving onto ramps and trailers.

INT-2-2-6

⚠ WARNING

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.

INT-2-2-8

⚠ DANGER

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.

INT-2-2-10

⚠ WARNING

Hazardous Atmospheres

This machine is designed for use in normal out door atmospheric conditions. It should 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 Distributor.

INT-2-1-14

⚠ CAUTION

Regulations

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

INT-1-3-3

⚠ WARNING

Practice

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

INT-2-1-1

⚠ WARNING

Reversing

Reversing at high speeds can cause accidents. Do not reverse in a high gear with full throttle. Always drive at a safe speed to suit working conditions.

INT-2-2-9_1

⚠ WARNING

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

5-3-1-12_3

⚠ WARNING

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

2-2-3-6

⚠ WARNING

Visibility

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

Do not operate the machine if you cannot see clearly.

5-1-4-7

⚠ WARNING

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.

2-2-5-4

⚠ CAUTION

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

5-5-1-1_2

⚠ WARNING

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

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

2-4-5-2_1

⚠ CAUTION

Fork Spacing

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

5-1-4-2

⚠ CAUTION

One-Fork Lifting

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

5-1-4-3

⚠ CAUTION

Unloading

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

5-1-4-4_2

⚠ CAUTION

Uneven Ground

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

5-1-4-5

⚠ WARNING

Scaffolding

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

5-1-4-6

⚠ CAUTION

Overhead Clearance

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

5-1-5-1

⚠ WARNING

Boom/Travelling

Operating the boom while travelling can cause accidents. You will not have total control of the machine. Never operate the boom while travelling.

5-1-5-2

⚠ DANGER

Forks/Working Platform

Using the forks alone as a working platform is hazardous; you can fall off and be killed or injured. Never use the forks as a working platform.

5-1-5-3

⚠ WARNING

Forks/Turning

The forks extend beyond the end of the boom. Make sure there is enough clearance for the forks when making turns.

5-1-5-4

⚠ WARNING

High Loads

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

5-1-3-2

⚠ WARNING

Slopes

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

5-1-4-1

⚠ WARNING

Hillsides

Operating the machine on hillsides can be dangerous if proper precautions are not taken. Ground conditions can be changed by rain, snow, ice etc. Check the site carefully. Operate in first gear on hillsides, when applicable, keep all attachments low to the ground. Never coast down a hill with the engine off or the transmission in neutral.

INT-2-2-7

⚠ WARNING

Controls

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

INT-2-1-3

⚠ CAUTION

Passengers

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

INT-2-2-2_1

⚠ WARNING

Fires

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

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

INT-3-2-7_2

⚠ WARNING

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

INT-2-1-12

⚠ WARNING

Entering/Leaving

Entering or leaving the cab or canopy must only be made where steps and handrails are provided. Always face the machine when entering and leaving. Make sure the step(s), handrails and your boot soles are clean and dry. Do not jump from the machine. Do not use the machine controls as handholds, use the handrails.

INT-2-1-7_1

⚠ WARNING

Road Wheel Alignment

At the start of each working period, and at least once a day, or if having difficulty in steering, check and, if necessary, re-align the road wheels.

2-1-1-10

Maintenance Safety

⚠ WARNING

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.

INT-3-1-5

⚠ WARNING

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.

GEN-1-5_2

⚠ WARNING

Metal Splinters

You can be injured by flying metal splinters when driving metal pins in or out. Use a soft faced hammer or copper pin to remove and fit metal pins. Always wear safety glasses.

INT-3-1-3_2

⚠ WARNING

Electrical Circuits

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

INT-3-1-4

⚠ CAUTION

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

INT-3-1-14

⚠ WARNING

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.

0125

⚠ WARNING

Battery Gases

Batteries give off explosive gases. Keep flames and sparks away from the battery. Do not smoke close to the battery. Make sure there is good ventilation in closed areas where batteries are being used or charged. Do not check the battery charge by shorting the terminals with metal; use a hydrometer or voltmeter.

INT-3-1-8

⚠ DANGER

Electrolyte

Battery electrolyte is toxic and corrosive. Do not breathe the gases given off by the battery. Keep the electrolyte away from your clothes, skin, mouth and eyes. Wear safety glasses.

INT-3-2-1_3

⚠ WARNING

Battery Terminals

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.

INT-3-1-9

⚠ WARNING

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 protective glasses. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

INT-3-1-10_2

⚠ WARNING

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.

INT-3-1-11_2

⚠ WARNING

Petrol

Do not use petrol in this machine. Do not mix petrol with the diesel fuel; in storage tanks the petrol will rise to the top and form flammable vapours.

INT-3-1-6

⚠ WARNING

Diesel Fuel

Diesel fuel is flammable; keep naked flames away from the fuel system. Do not smoke while refuelling or working on the fuel system. Do not refuel with the engine running. There could be a fire and injury if you do not follow these precautions.

INT-3-2-2_1

⚠ WARNING

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.

INT-3-2-3

⚠ 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.

INT-3-2-14

⚠ WARNING

Soft Ground

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

INT-3-2-4

⚠ WARNING

Hot Coolant

The cooling system is pressurised when the engine is hot. Hot coolant can spray out when you remove the filler cap. Let the system cool before removing the filler cap. To remove the cap; turn it to the first notch and let the system pressure escape, then remove the cap.

INT-3-2-9_1

⚠ WARNING

Always wear safety glasses when dismantling assemblies containing components under pressure from springs. This will protect against eye injury from components accidentally flying out.

GEN-6-2

⚠ CAUTION

Rams

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.

INT-3-2-10

⚠ CAUTION

Cleaning

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

INT-3-2-11

⚠ WARNING

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

GEN-1-9

⚠ CAUTION

'O' rings, Seals and Gaskets

Badly fitted, 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.

INT-3-2-12

⚠ WARNING

Hydraulic Hoses

Damaged hoses can cause fatal accidents. Inspect the hoses regularly for:

- Damaged hose ends
- Chafed outer covers
- Ballooned outer covers
- Kinked or crushed hoses
- Embedded armouring in outer covers
- Displaced end fittings.

INT-3-3-2

⚠ CAUTION

Waxoyl contains turpentine substitute which is flammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period.

Do not weld near the affected area during the drying period. Take the same precautions as for oil to keep Waxoyl off your skin. Do not breathe the fumes. Apply in a well-ventilated area.

5-3-1-9

⚠ WARNING

Working Under the Machine

Make the machine safe before getting beneath it. Ensure that any fitments on the machine are secure; engage the park brake, remove the starter key, disconnect the battery.

INT-3-3-8_2

⚠ WARNING

Certain seals and gaskets (e.g. crankshaft oil seal) on JCB machines contain fluoroelastomeric materials such as Viton, Fluorel and Technoflon. Fluoroelastomeric materials subjected to high temperatures can produce highly corrosive hydrofluoric acid. THIS ACID CAN SEVERELY BURN.

New fluoroelastomeric components at ambient temperature require no special safety precautions.

Used fluoroelastomeric components whose temperatures have not exceeded 300°C (572°F) require no special safety precautions. If evidence of decomposition (e.g. charring) is found, refer to the next paragraph for safety instructions DO NOT TOUCH COMPONENT OR SURROUNDING AREA.

Used fluoroelastomeric components subjected to temperatures greater than 300°C (572°F) (e.g. engine fire) must be treated using the following safety procedure. Make sure that heavy duty gloves and special safety glasses are worn:

1 Thoroughly wash contaminated area with 10% calcium hydroxide or other suitable alkali solution, if necessary use wire wool to remove burnt remains.

2 Thoroughly wash contaminated area with detergent and water.

3 Contain all removed material, gloves etc. used in this operation in sealed plastic bags and dispose of in accordance with Local Authority Regulations.

DO NOT BURN FLUOROELASTOMERIC MATERIALS.

If contamination of skin or eyes occurs, wash the affected area with a continuous supply of clean water or with calcium hydroxide solution for 15-60 minutes. Get medical attention immediately.

INT-3-3-5_2

⚠ WARNING

Protect your eyes when grinding metal. Wear safety glasses or goggles. Remove or protect any combustible materials from the area which could be ignited by sparks.

GEN-1-12

⚠ WARNING

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

HYD-1-3

⚠ WARNING

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 (E.C.U.s), 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, i.e. boom or dipper, to avoid damage to pivot pins, bearings and bushes. Attach the welder earth (ground) cable no more than 0.6 metres (2 feet) from the part being welded.

INT-3-1-15_2

⚠ WARNING

Counterweights

Your machine may be fitted with counterweights. They are extremely heavy. Do not attempt to remove them.

INT-3-2-5

⚠ WARNING

Turning the Engine

Do not try to turn the engine by pulling the fan or fan belt. This could cause injury or premature component failure.

0094

⚠ WARNING

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 exhausted by a JCB distributor, as the sudden release of the hydraulic fluid or gas may cause injury.

INT-3-1-17

⚠ 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.

2-3-2-7_2

⚠ WARNING

Jacking

A machine can roll off jacks and crush you unless the wheels have been chocked. Always chock 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.

INT-3-2-8

⚠ WARNING

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.

INT-3-1-16

⚠ 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.

13-3-1-7_1

⚠ CAUTION

Never use water or steam to clean inside the cab. The use of water or steam could damage the on-board computer and render the machine inoperable. Remove dirt using a brush or damp cloth.

8-3-4-8

⚠ WARNING

Boom Safety Strut

A raised boom can drop suddenly and cause serious injury. Before working under a raised boom, fit the boom safety strut. See Boom Safety Strut, MAINTENANCE section.

5-1-5-7

⚠ WARNING

Asbestos

Asbestos dust can damage your lungs. Some engine gaskets contain asbestos. Do not dismantle the engine or exhaust system; get these jobs done by a qualified person who has a copy of the engine service manual.

5-1-6-1

Safety Decals

⚠ WARNING

Decals

Decals on the machine warn you of particular hazards. You can be injured if you do not obey the decal safety instructions.

Each decal is attached close to a part of the machine where there is a possible hazard. Make sure replacement parts include warning decals where necessary.

Keep all decals clean and readable. Replace lost or damaged decals. Each decal has a part number printed on it, use this number to order a new decal from your JCB distributor.

INT-3-3-3_1

⚠ WARNING

If you need eye-glasses for reading, make sure you wear them when reading the safety decals. Decals are strategically placed around the machine to remind you of possible hazards. Do not over-stretch or place yourself in dangerous positions to read the decals.

INT-3-3-4_1

The illustration(s) show a typical machine model, your machine may look different from the model shown.

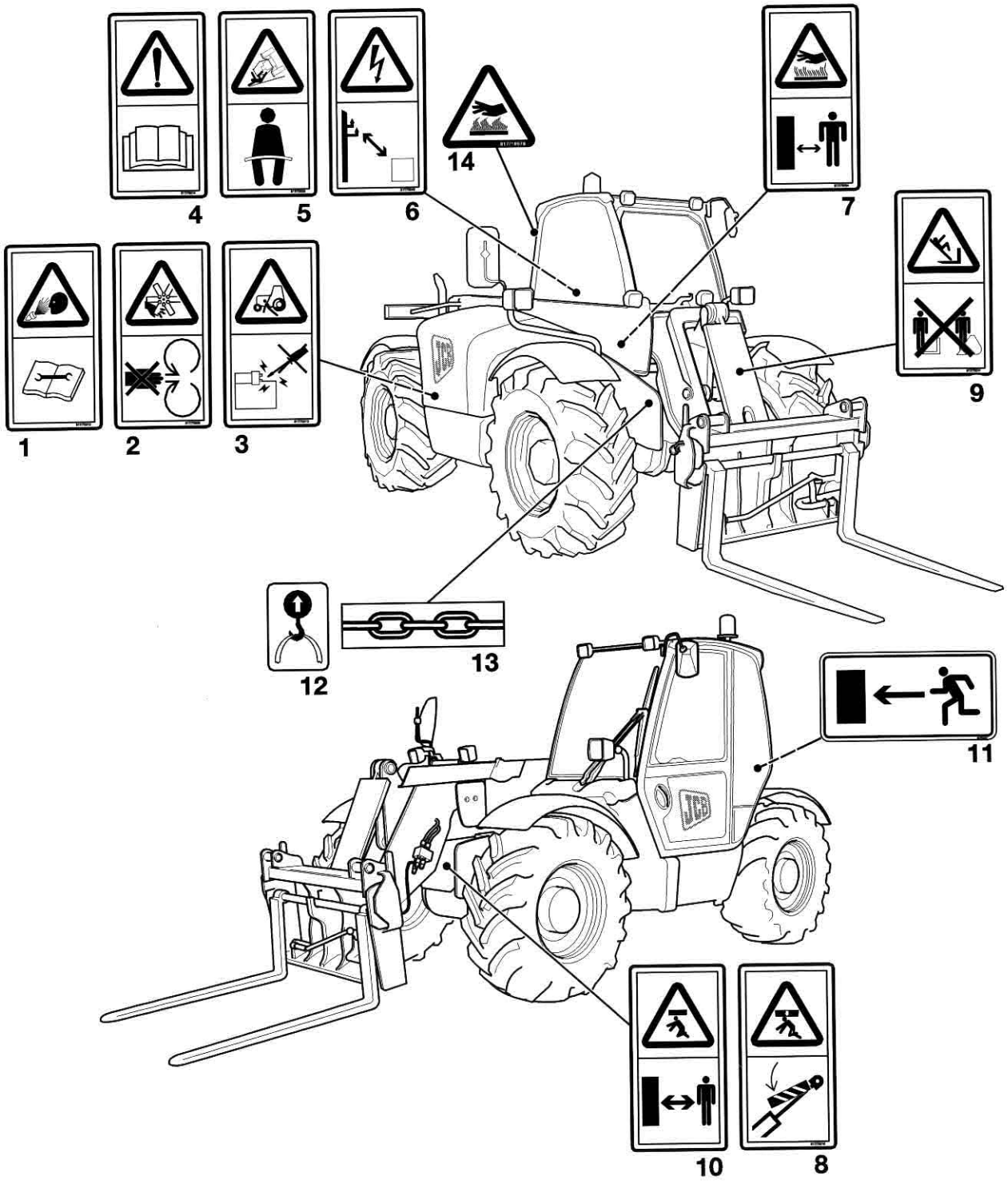


Fig 4. Safety Decal Locations

Safety Decal Definitions

1

⚠ WARNING

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.

INT-3-1-11_2

2

⚠ WARNING

Engine

The engine has exposed rotating parts. Do not open the engine cover while the engine is running. Do not use the machine with the cover open.

INT-2-1-6_1

3 **WARNING**

Start the machine from the operator seat.

4

⚠ WARNING

Operator Manual

You and others can be injured if you operate or maintain the machine without first studying the Operator Manual. Read the safety instructions before operating the machine. If you do not understand anything, ask your employer or JCB dealer to explain it. Keep the Operator Manual clean and in good condition. Do not operate the machine without an Operator Manual in the cab, or if there is anything on the machine you do not understand.

INT-1-3-2_2

5

⚠ WARNING

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

8-2-9-2_1

6

⚠ WARNING

Make sure it is clear overhead before extending a raised boom. Keep an adequate safe distance from all electrical power lines. Contact your local power company for safety procedures.

5-2-2-1_1

7 **CAUTION**

Do not touch. The surface of this item may be hot and liable to burn.

8

⚠ WARNING

Boom Safety Strut

A raised boom can drop suddenly and cause serious injury. Before working under a raised boom, fit the boom safety strut. See Boom Safety Strut, MAINTENANCE section.

5-1-5-7

9 **WARNING**

Do not stand on or under forks or attachments.

10 **WARNING**

Stay at a safe distance from the machine.

11 Emergency Exit

12 Lifting Point

13 Anchor Point

14 **CAUTION**

Do not touch. The surface of this item may be hot and liable to burn.

Identifying Your Machine

Machine Identification Plate

Your machine has an identification plate mounted as shown. ⇒ *Fig 5. (🗋 18)*. The serial numbers of the machine and its major units are stamped on the plate.

The serial number of each major unit is also stamped 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 stamp the new number of the unit on the identification plate, or simply stamp out the old number. This will prevent the wrong unit number being quoted when replacement parts are ordered.

The machine and engine serial numbers can help identify exactly the type of equipment you have.

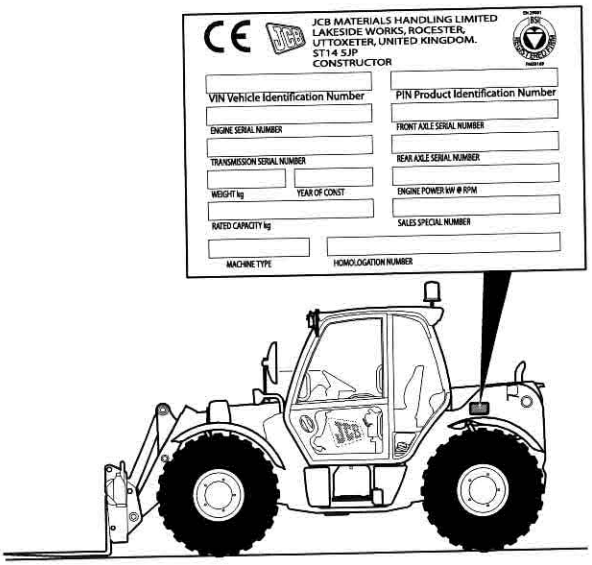


Fig 5.

Typical Vehicle Identification Number (VIN)

SLP	5AJ	J	A	2	E	0123456
1	2	3	4	5	6	7

1 World Manufacturer Identification (3 Digits)

2 Machine Model (3 Digits)

Standard Builds:

5AJ = 535-125
5AK = 535-140
5AL = 540-140
5AF = 540-170

3 Engine Type (1 Digit)

J = Naturally Aspirated
K = Turbo Charged
L = Turbo Charged and Intercooled

4 Gearbox Model (1 Digit)

E = 3 Speed (PS750)
F = 3 Speed (PS760)
G = 4 Speed (PS750)
H = 4 Speed (PS760)

5 Year of Manufacture:

5 = 2005
6 = 2006
7 = 2007
8 = 2008

6 Manufacturer Location (1 Digit)

E = England

7 Machine Serial Number (7 Digits)

Each machine has a unique serial number.

Component Identification Plates

Typical Engine Identification Number

T1-005

The full engine serial number is on the engine labels which are located on the rocker cover **A** and the side of the engine **B**. ⇒ *Fig 6. (19)*. Part of the serial number is also stamped on the engine block at **C**.

SA	320/40001	U	00001	04
1	2	3	4	5

1 Engine Type

S = 4.4 litre series.

A = naturally aspirated.

B = turbocharged.

C = turbocharged and intercooled.

2 Engine part number

3 Country of manufacture

U = United Kingdom

4 Engine Serial Number

5 Year of Manufacture

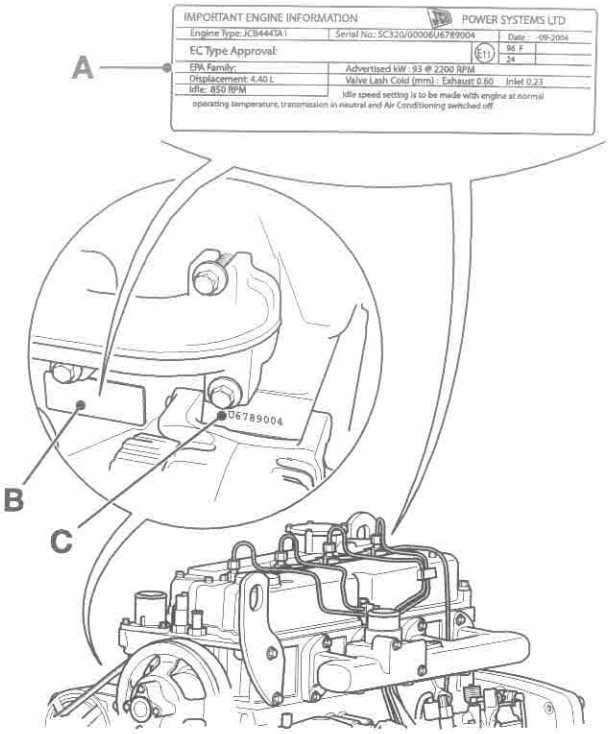


Fig 6. Engine

Transmission Identification Numbers

The transmission serial number is stamped on label **Y** which is mounted on the front face.

The rear axle serial number is stamped on plate **X** mounted on the axle.

The front axle serial number is stamped on plate **Z** mounted on the axle.

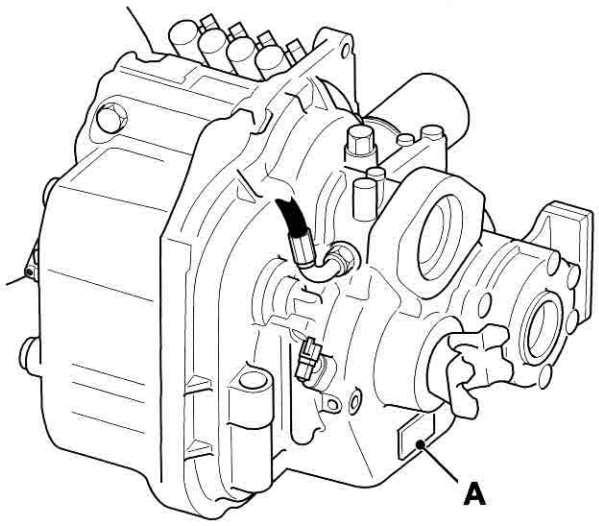


Fig 7.

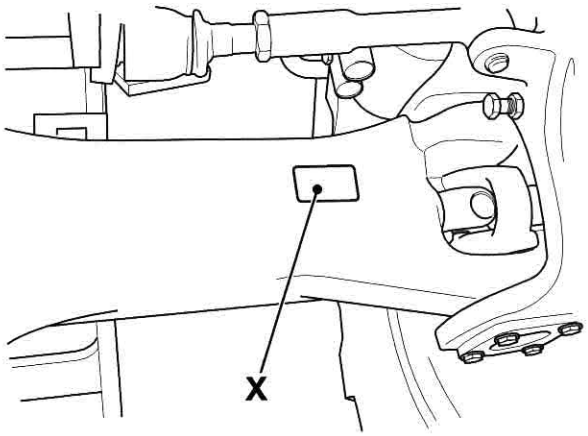


Fig 8.

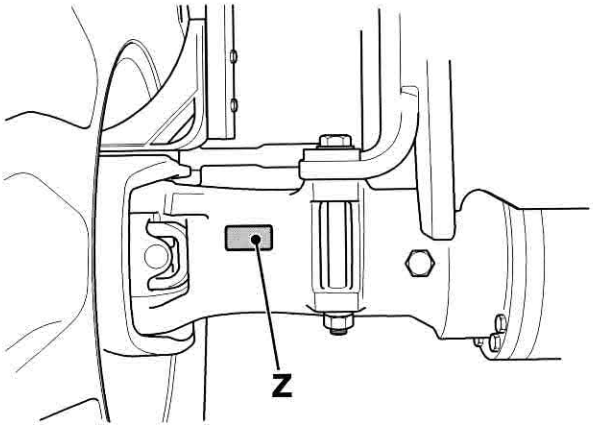


Fig 9.

ROPS/FOPS Certification Plate

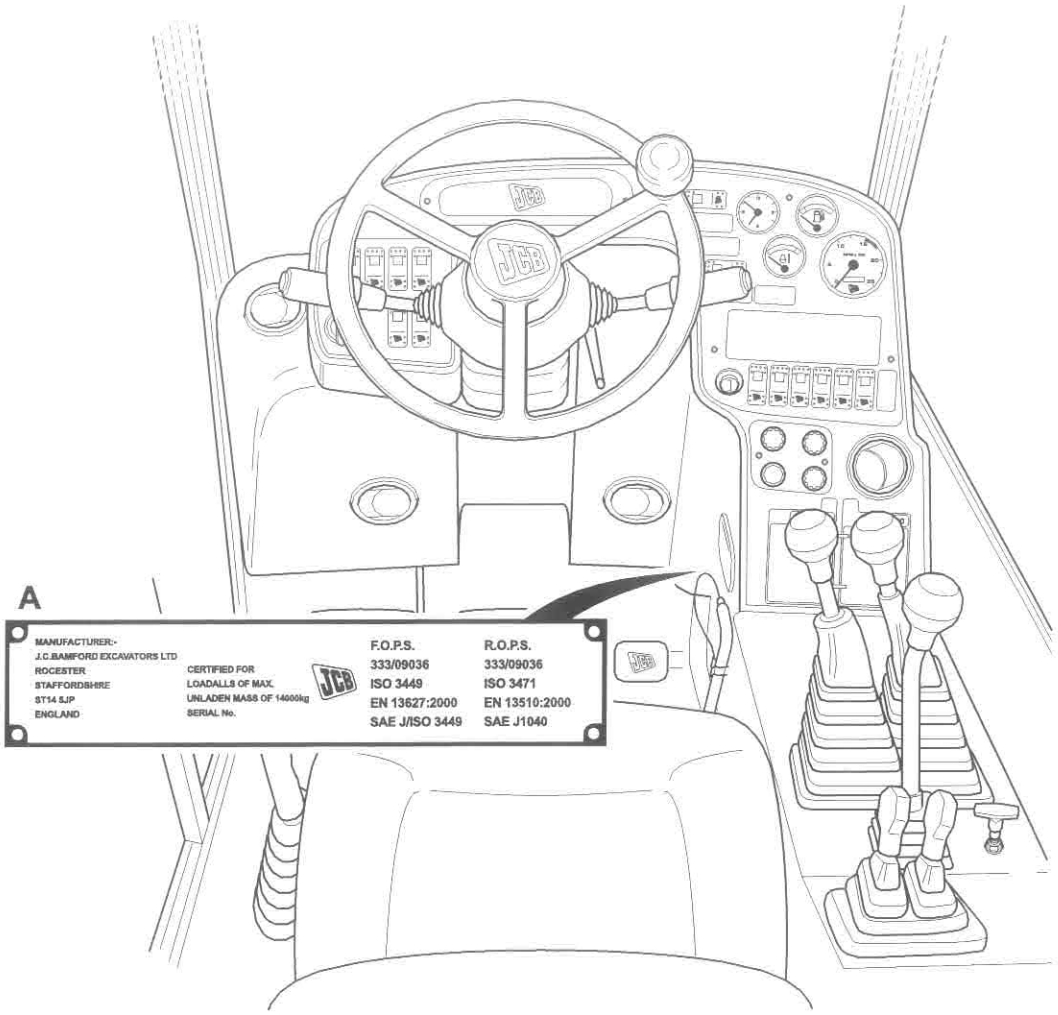


Fig 10.

Machines built to ROPS/FOPS standards have identification label **A** fitted to the inside of the cab.

Machine Security

JCB Plantguard

INT-1-2-4U_2

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

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.

Remember that the fitting 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 result in reduced insurance premiums.

Your JCB Distributor or Dealer will be pleased to provide information on any of these sensible precautions. ACT NOW!

Operation

Introduction

T2-006

The aim of this part of the handbook 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.

Before starting the machine, sit in the drivers seat and familiarise yourself with the layout of the cab. Use your handbook to identify each control lever, switch, gauge, button and pedal. Do not guess. If there is anything you do not understand, ask your JCB distributor.

The operator must always be aware of events happening outside the cab as well as inside the cab. Safety must always be the most important feature when operating the machine.

When you have familiarised yourself with 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.

Finally, 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**

Before Entering the Cab

The following checks should be made each time you return to the machine after leaving it for any period of time. We advise you also to stop the machine occasionally during long work sessions and do the checks again.

All these checks concern the serviceability of the machine. Some concern your safety. Get your service engineer to check and correct any defects.

⚠ WARNING

Walking or working under a raised boom can be hazardous. You could be crushed if the boom falls or is inadvertently lowered.

Lower the boom fully before doing these checks. If you are new to this machine, get an experienced operator to lower it for you.

If there is nobody to help you, study this manual until you have learned how to lower the boom. Also make sure that the park brake is engaged before doing these checks.

5-2-1-1

1 Check for cleanliness.

- **a** Clean the windows, light lenses and rear view mirrors.
- **b** Remove dirt and debris, especially from around the linkages, rams, pivot points and radiator.
- **c** Make sure the cab step and handholds are clean and dry.
- **d** Clean all safety decals. Replace any that are missing or cannot be read.

2 Check for damage.

- **a** Inspect the machine generally for damaged and missing parts.
- **b** Make sure that all pivot pins are secured correctly in place.
- **c** Inspect the windows for cracks and damage. Glass splinters can blind.
- **d** Check for oil, fuel and coolant leakages underneath the machine.

⚠ WARNING

You could be killed or injured if a machine tyre bursts. Do not use the machine with damaged, incorrectly inflated or excessively worn tyres.

2-2-1-2

3 Make sure the tyres are correctly inflated. ⇨ *Tyre Inflation (🗋 178)*.

Check for cut rubber and penetration by sharp objects. Do not use a machine with damaged tyres.

4 Make sure the fuel filler cap is tight. We also recommend that you lock it.

5 Make sure the hydraulic oil filler cap is tight and the rear cover is closed.

6 Make sure the engine cover is closed and secure. ⇨ *Engine Cover (🗋 145)*.

7 Make sure the battery cover is closed and locked. ⇨ *Battery Cover (🗋 145)*.

Entering and Leaving the Cab

⚠ WARNING

Entering/Leaving

Entering or leaving the cab or canopy must only be made where steps and handrails are provided. Always face the machine when entering and leaving. Make sure the step(s), handrails and your boot soles are clean and dry. Do not jump from the machine. Do not use the machine controls as handholds, use the handrails.

INT-2-1-7_1

Make sure the machine is stopped and correctly parked before entering or leaving the cab. When you get on and off the machine always maintain a three point contact with the handrails and step. ⇨ ***Fig 11. (🗋 25)***. Do not use the machine controls or steering wheel as handholds.

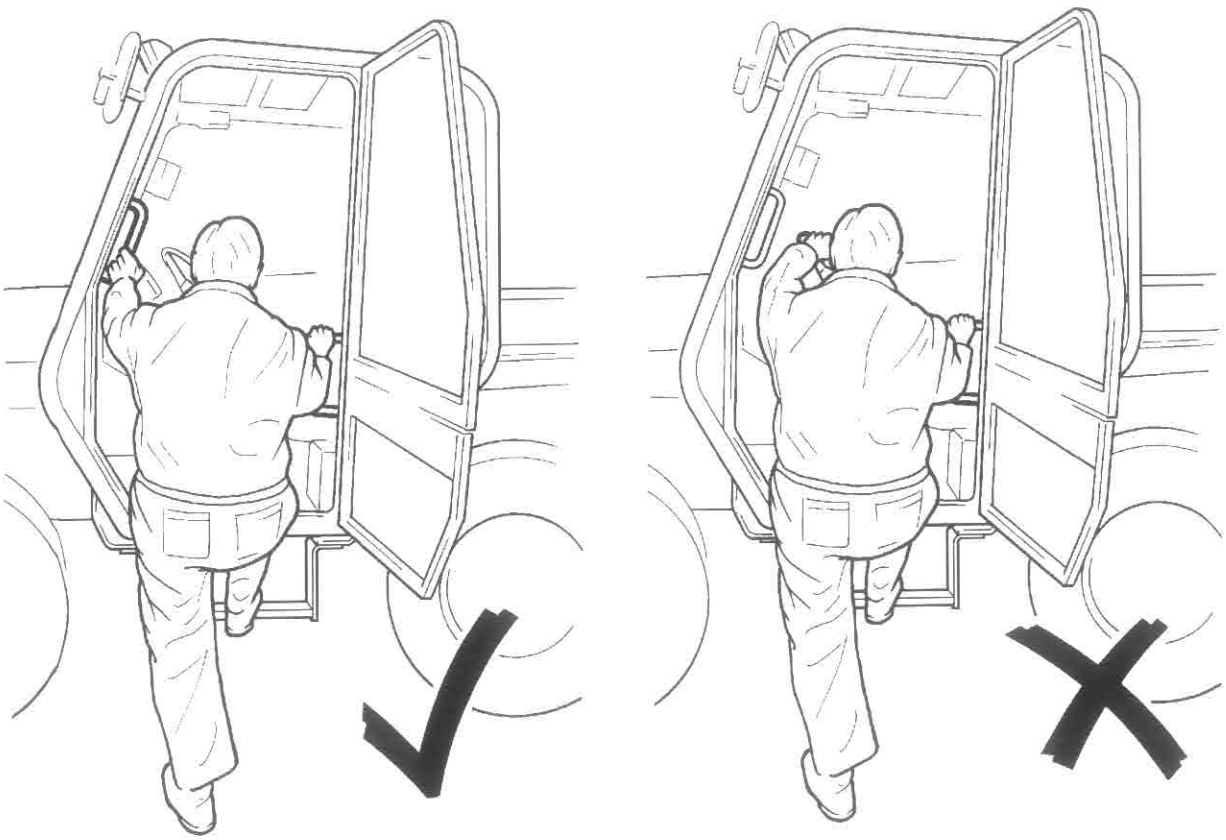


Fig 11.

Doors and Windows

Opening and Closing the Doors

To open a door from the outside, unlock it with the key and pull the handle **A**.

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

To open the door from the inside, operate lever **B**.

Note: *Do not drive the machine with the door unlatched.*

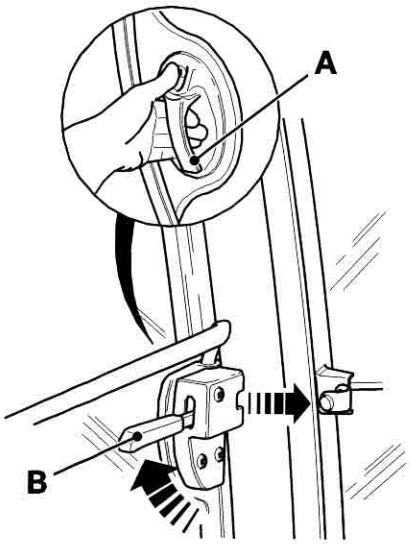


Fig 12.

Opening and Closing the Upper Door Section

With the door closed, release the upper section by pulling lever **E** to the rear. Swing the door fully open until it latches.

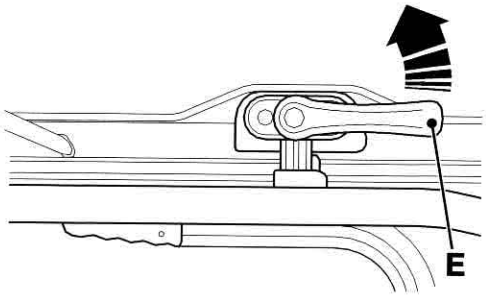
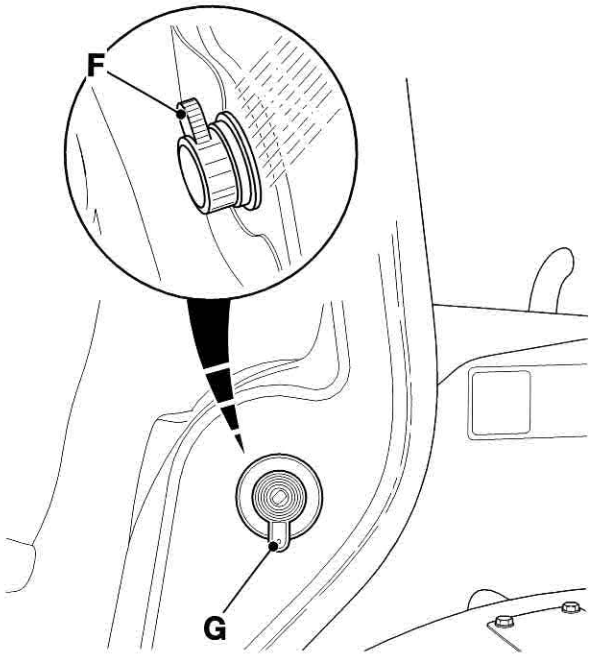


Fig 13.

To close the upper door section, release catch **F** (if inside the cab) or catch **G** (if outside the cab) and swing the door closed. Latch the upper door onto the lower door by pushing lever **E** forward and down.



Opening and Closing the Rear Window

To open the window, swing catches **A** and **B** in the direction shown, as far as required.

To close the window, swing catches **A** and **B** in the direction shown until it 'locks' in position.

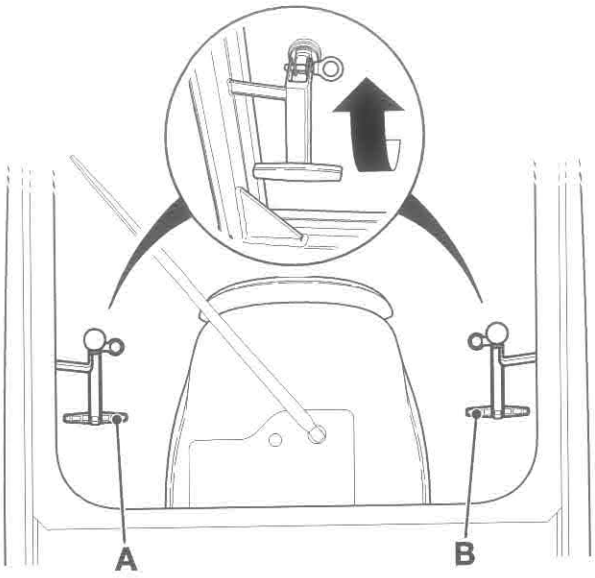


Fig 14.

Emergency Exit

⚠ WARNING

Do not obstruct the rear cab window, this is an Emergency Exit.

5-2-1-9

The rear window can be quickly opened in the event of an emergency. To fully open the window, do the following:

1 Remove pins **D** and open the window fully.

Note: *Pins **D** should only be removed in the event of an emergency exit. Do not remove it simply to increase the rear window opening.*

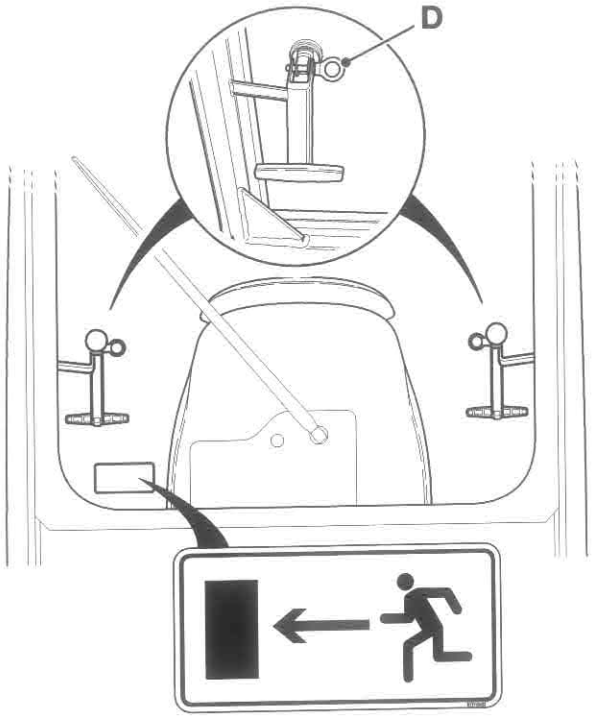


Fig 15.

Seat Controls

Introduction

T2-007_2

⚠ WARNING

Do not adjust the seat when the machine is in operation.

GEN-2-1

The operator's seat can be adjusted for your comfort. A correctly adjusted seat will reduce operator fatigue. Position the seat so that you can comfortably reach the machine controls. For driving the machine, adjust the seat so that you can depress the pedals fully with your back against the seat back.

Heated Seat Option

Note: *The heated seat option is only available on Suspension Seat (Type 3).*

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

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

Suspension Seat (Type 1)

P5-2027_2

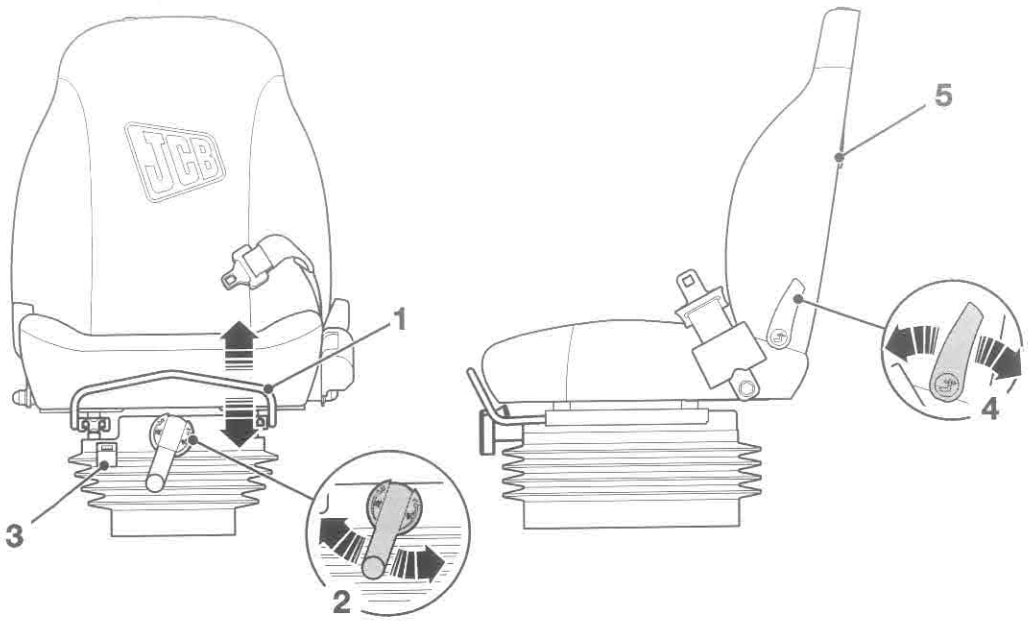


Fig 16.

Note: *Adjustments should only be made by the operator when sat on the seat.*

1 Horizontal Adjustment (Slide rails)

2 Height Adjustment

Check that the ride height indicator **3** is in the green 'comfort' zone. Within the green band there is 75mm (3 in.) of height adjustment for any driver.

Note: *The seat is designed so that it is unnecessary to make any adjustment for the driver weight.*

3 Ride Height Indicator. See ***Height Adjustment***.

4 Backrest Angle Adjustment (if fitted).

5 Document Pocket

Suspension Seat (Type 2)

P5-2028_2

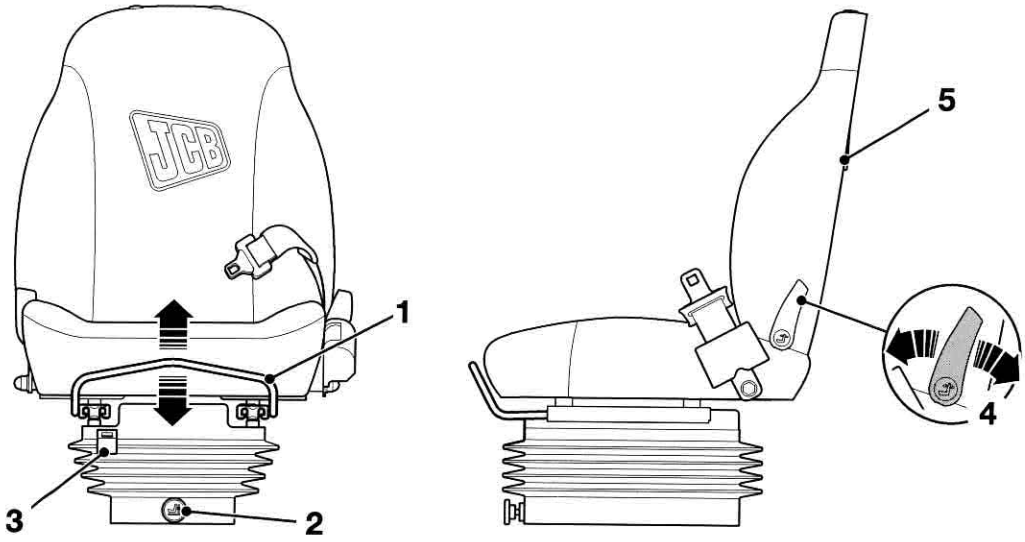


Fig 17.

Note: *Adjustments should only be made by the operator when sat on the seat.*

1 Horizontal Adjustment (Slide rails)

2 Height Adjustment

Check that the ride height indicator **3** is in the green 'comfort' zone. Within the green band there is 75mm (3 in.) of height adjustment for any driver.

Note: *The seat is designed so that it is unnecessary to make any adjustment for the driver weight.*

3 Ride Height Indicator. See ***Height Adjustment***.

4 Backrest Angle Adjustment

5 Document Pocket

Suspension Seat (Type 3)

P5-2029_2

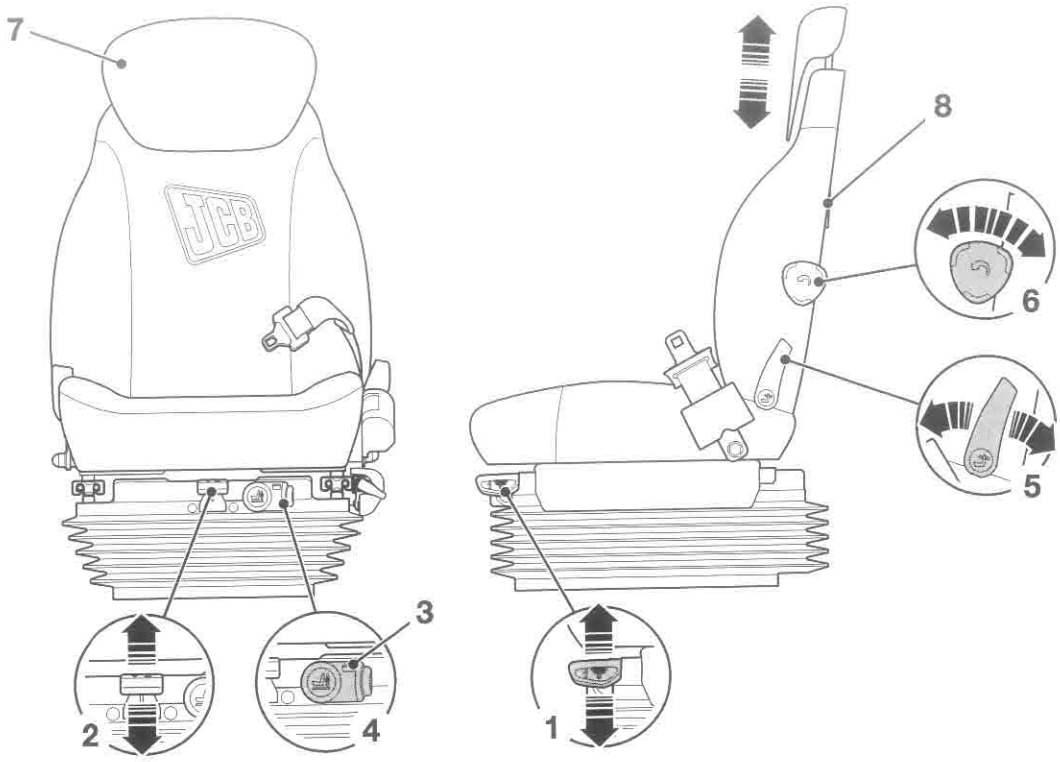


Fig 18.

Note: *Adjustments should only be made by the operator when sat on the seat.*

1 Up = Horizontal Adjustment.

Middle = Horizontal Suspension.

Down = Locked.

2 Height Adjustment

Check that the ride height indicator **3** is in the green 'comfort' zone. Within the green band there is 75mm (3 in.) of height adjustment for any driver.

Note: *The seat is designed so that it is unnecessary to make any adjustment for the driver weight.*

3 Ride Height Indicator. See ***Height Adjustment***.

4 'One Touch Riser' (OTR) (If fitted)

When the seat is below mid ride position, pressing the OTR button **4** automatically adjusts to the mid ride position (it may take a few seconds to do so). This makes it then easier to find the exact height you need, using lever **2**.

5 Backrest Angle Adjustment

6 Lumbar Support Adjustment

7 Backrest Extension (if fitted)

8 Document Pocket

Seat Belt

Inertia Reel Seat Belt

T2-001

⚠ WARNING

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

8-2-9-2_1

⚠ WARNING

When a seat belt is fitted to your machine replace it with a new one if it is damaged, if the fabric is worn, or if the machine has been in an accident. Fit a new seat belt every three years.

2-3-1-7_1

Fasten the Seat Belt

1 Sit correctly in the seat. Pull the belt from its reel holder in one continuous movement.

2 Push the male fitting **A** into the buckle **B** until it latches into position. Make sure the seat belt is not twisted and that it is over your hips not your stomach.

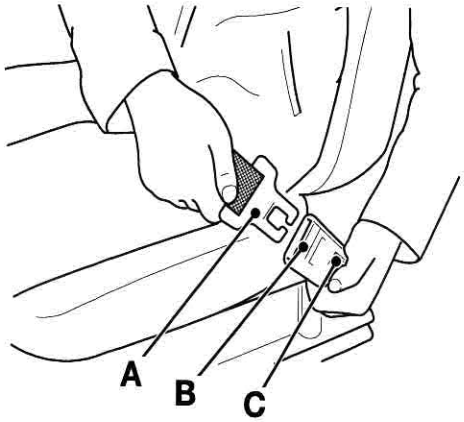


Fig 19.

Note: *If the belt 'locks' before the male fitting **A** has been engaged, allow the belt to fully retract in its reel holder and then try again. The inertia mechanism may lock if you pull the belt too sharply or if the machine is parked on an incline. In such cases, ease the belt gently from its reel holder.*

Check the Seat Belt is Operating Correctly

1 Sit correctly in the seat and fasten the seat belt as described.

2 Hold the middle of the seat belt as shown at **D** and tug. The seat belt should 'lock'.

⚠ 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.

2-2-2-1

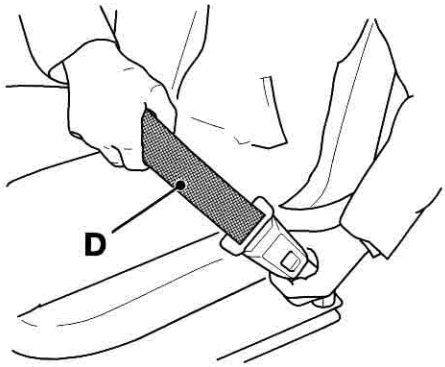


Fig 20.

Release the Seat Belt

⚠ WARNING

Release the seat belt only after switching off the engine.

2-2-1-10

1 Press button **C** and pull the male fitting **A** from the buckle.

2 Let the seat belt retract into its reel holder.

Static Seat Belt

T2-002

⚠ WARNING

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

8-2-9-2_1

⚠ WARNING

When a seat belt is fitted to your machine replace it with a new one if it is damaged, if the fabric is worn, or if the machine has been in an accident. Fit a new seat belt every three years.

2-3-1-7_1

Fasten the Seat Belt

1 Sit correctly in the seat.

2 Push the male fitting **A** into the buckle **B** until it latches into position. Make sure the seat belt is not twisted and that it is over your hips not your stomach.

⚠ 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.

2-2-2-1

Release the Seat Belt

⚠ WARNING

Release the seat belt only after switching off the engine.

2-2-1-10

Press button **C** and pull the male fitting **A** from the buckle **B**.

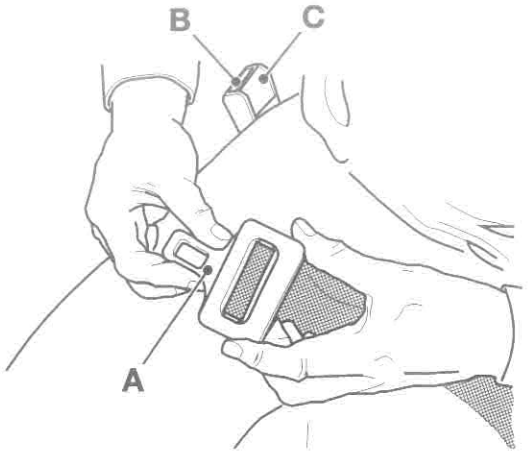


Fig 21.

Adjusting the Seat Belt

Make sure the belt is across your hips and not over your stomach.

To adjust the male fitting **A**:

1 Pull toggle **D** down the strap by the required distance.

- **a** To make the strap longer, pull end **E** as far as it will go.
- **b** To make the strap shorter, pull end **F** as far as it will go.

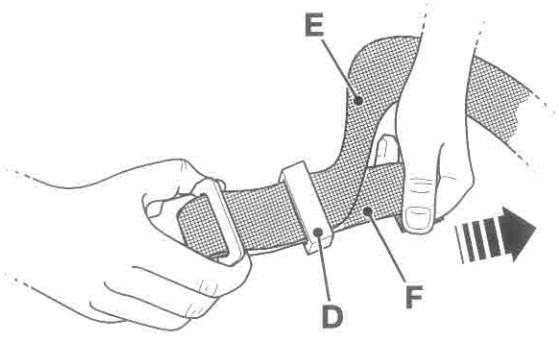


Fig 22.

Cab Layout

Note: *The cab layout illustration is of a typical machine, for variations see the relevant page in this handbook.*

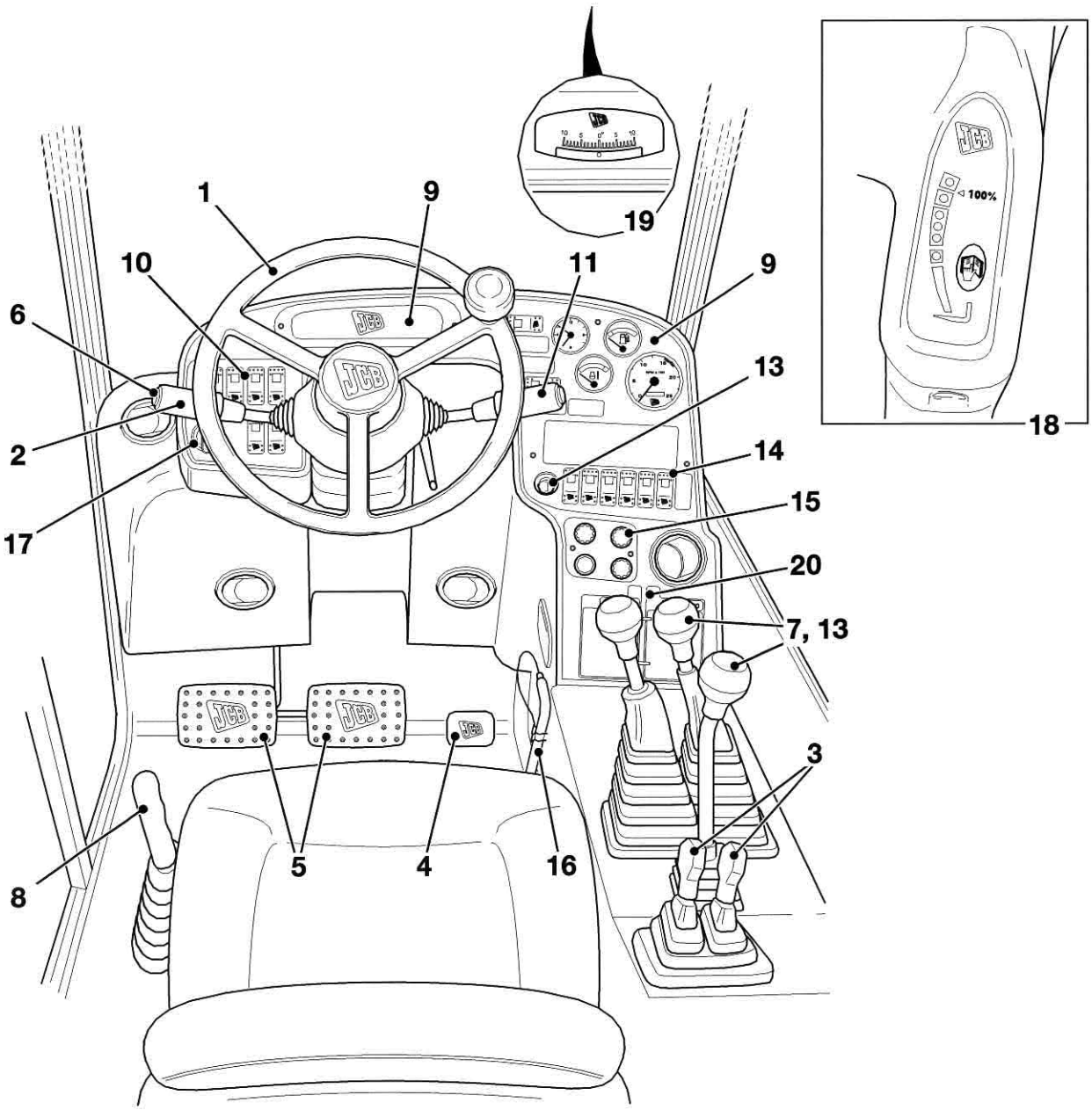


Fig 23.

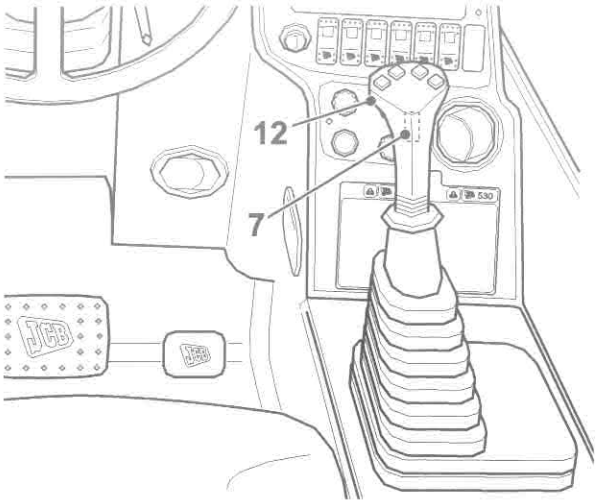


Fig 24.

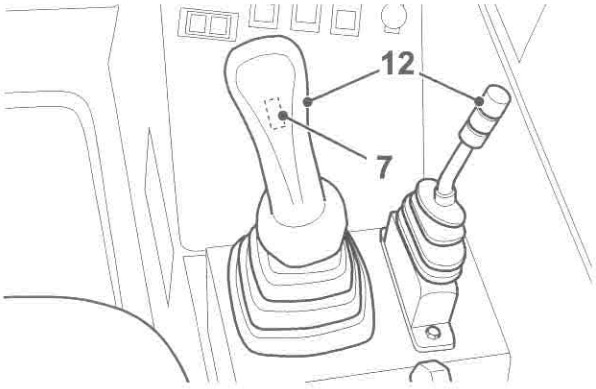


Fig 25.

Component Key

1 ⇨ *Steering Wheel (📄 36)*
2 ⇨ *Gear Select Switch (📄 36)*
3 ⇨ *Chassis Levelling (Sway) Option (📄 58)*
4 ⇨ *Accelerator Pedal (📄 37)*
5 ⇨ *Brake Pedal (📄 37)*
6 ⇨ *Forward, Reverse Lever and Horn (📄 37)*
7 ⇨ *Transmission Dump Switch (📄 37)*
8 ⇨ *Parking Brake Lever (📄 38)*
9 ⇨ *Instrument Panel (📄 45)*
10 ⇨ *Instrument Panel Switches (📄 40)*
11 ⇨ *Multi-Purpose Steering Column Switch (📄 42)*
12 ⇨ *Operating Levers (📄 49)*
13 ⇨ *Starter Switch (📄 43)*
14 ⇨ *Instrument Panel Switches (📄 40)*
15 ⇨ *Air Conditioning and Heater Controls (📄 48)*
16 ⇨ *Control Lever Locks (📄 61)*
17 ⇨ *Steer Mode Selector (📄 38)*
18 ⇨ *Load Moment Indicator (LMI) (📄 66)*
19 ⇨ *Inclinometer (📄 83)*
20 ⇨ *Load Charts (📄 63)*

Drive Controls, Switches and Instruments

Drive Controls

Steering Wheel

Turn the steering wheel in the direction you want to go. Note that this machine is a four wheel steer machine.

Note: ⇨ Tilt Adjustment (🗋 36).

Tilt Adjustment

Angle the steering column to the most comfortable position when you are correctly seated in the cab.

Slacken the steering column by turning lever **A** anticlockwise. *⇨ Fig 26. (🗋 36)*. Pull or push the steering wheel until it is in the position you want. Turn lever **A** clockwise to clamp the steering column.

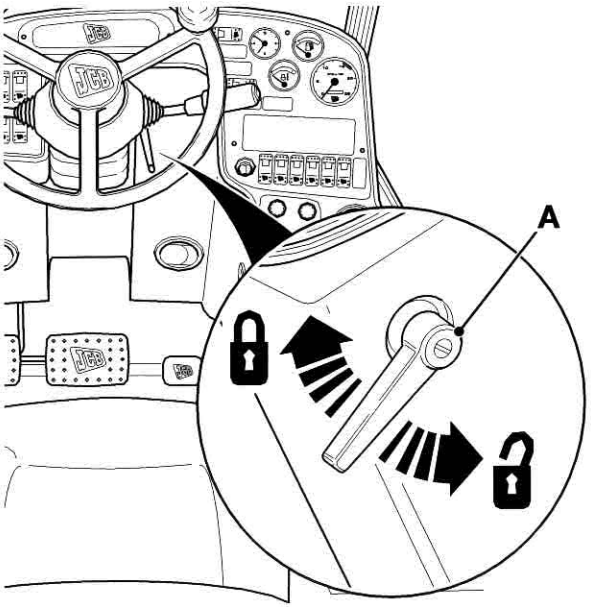


Fig 26.

Gear Select Switch

When the machine is stationary, make sure that forward/reverse lever is in neutral position **(N)** and the engine at idle, before selecting a gear.

To change gear when the machine is moving rotate the barrel **A** so that the arrow marked on the barrel aligns with the required gear, you do not need to depress the dump switch.

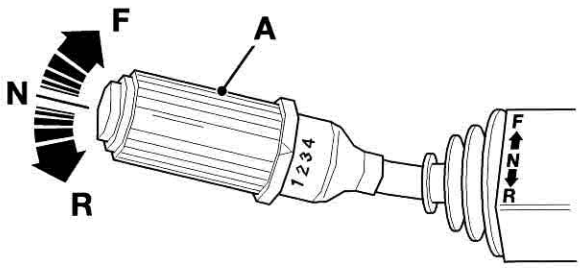


Fig 27.

A lower gear will not engage if the machine is travelling too fast.

⚠ CAUTION

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

2-1-1-14

Some machines are protected by an electronic control unit (ECU). This prevents downward gear changes and forward/reverse direction changes until the machine predetermined speed is achieved.

⚠ WARNING

If 4th gear fails to engage it could indicate a failure of the transmission electronic protection system. You can continue to use the machine but do not select forward/reverse or change from a high gear to a low gear (for instance, 3rd to 1st) in one sudden movement when the machine is moving.

2-1-1-13_2

If the transmission electronic protection system fails contact your nearest JCB Distributor to get the fault rectified as soon as possible.

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

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

Brake Pedal

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

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

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

Forward, Reverse Lever and Horn

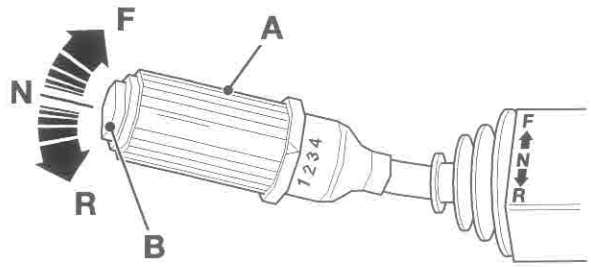


Fig 28.

28-A ⇒ *Forward, Reverse Lever (🗋 37)*

28-B ⇒ *Horn (on Forward/Reverse Lever) (🗋 37)*

Forward, Reverse Lever

⚠ WARNING

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

2-2-2-4

Stop the machine before moving this lever **28-A**. To select forward **(F)**, reverse **(R)** or neutral **(N)**, 'lift' and move the lever to the required position. All four gears are available in forward and reverse. When reverse is selected an alarm will sound. The engine will only start if the lever is at neutral.

The lever has `detent' positions in forward, reverse and neutral. To move the lever from the detent position pull the lever towards you.

Procedure for reversing direction:

1 Stop the machine: keep the foot brakes applied.

2 Let the engine speed drop to idle.

3 Select the new direction.

4 Release the foot brakes and accelerate away.

If the parking brake is engaged when the forward/reverse lever is moved away from neutral an audible warning will sound and the Parking Brake Engaged Indicator will light.

Horn (on Forward/Reverse Lever)

The horn button **28-B** is at the end of the forward/reverse lever **28-A**. Push the button to operate the horn. It functions only with the starter switch set to on.

Transmission Dump Switch

You do not need to depress the switch when changing gear. The dump switch can be used to momentarily dump the transmission pressure to improve the hydraulic performance and reduce engine load.

Note: *The position of this switch depends on the type of controls fitted. Check the position on your machine before using.*

Parking Brake Lever

⚠ CAUTION

The parking brake must not be used to slow the machine from travelling speed, except in an emergency, otherwise the efficiency of the brake will be reduced. Whenever the parking brake has been used in an emergency, always renew both brake pads.

4-2-1-1_2

Use this lever to engage the parking brake before leaving the machine. With the parking brake engaged, an audible warning will sound and the Parking Brake Engaged indicator will light when the forward/reverse lever is moved away from neutral.

To engage the parking brake, pull the lever up as shown. To release the parking brake, simply lower the lever all the way.

Steer Mode Selector

⚠ DANGER

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

5-2-6-7

⚠ WARNING

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

5-2-3-3

Important: *Changing the machine's steer mode affects it's turning circle. Understand how your machine functions before operating in confined spaces. Failure to do so may result in damage occurring to protruding parts such as the roof mounted air-conditioning unit.*

Steer Mode Selector Switch

The selector is a three-position rotary switch **A**, which is equipped with a spring-loaded lockplate **B**. ⇒ ***Fig 29. (🗋 38)***. This enables the selector switch to be locked into the 2-wheel steer mode when the machine is driven on public highways. Use the selector switch to select the mode of steering which is most suitable for the terrain and the work you are doing.

Important: *Never change from 4-wheel steer to crab steer (or vice versa) without first selecting 2-wheel steer for approximately 5 seconds.*

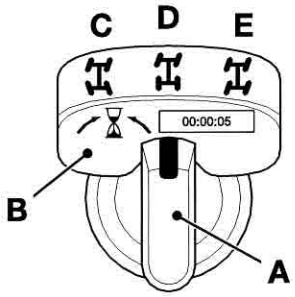


Fig 29.

C 4-Wheel Steer

D 2-Wheel Steer

E Crab Steer

Indicator lights on the instrument panel tell you what steer mode the machine is in. ⇒ ***Fig 29. (🗋 38)***. An illuminated light indicates that this is the steer mode currently in operation.

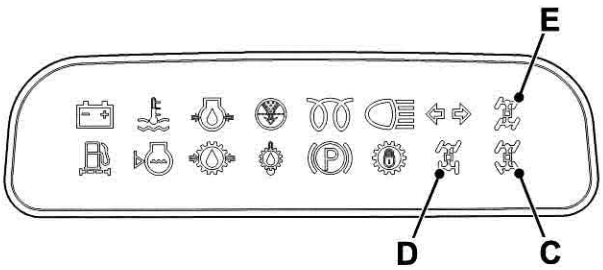


Fig 30.

When a change of steer mode is requested:

- The indicator light for the current steer mode will remain illuminated until the change is complete; the light will then extinguish.
- The indicator light for the 2-wheel steer mode will flash (two flashes per second) until the change is complete. The indicator light for the new steer mode will then illuminate.

Sensors on the axles prevent the steer mode from changing until all wheels straighten up or pass through the 'straight ahead' position. Because of this, there will be a

short period when the indicator lights do not agree with the switch position.

If you have any doubt about what steer mode the machine is in, always remember that it is the indicator light which is correct.

The steer mode system is controlled by an electronic control unit (ECU). The steer mode selector lights are used to indicate faults within the system:

- As a bulb and system check, each of the indicators lights illuminate briefly when the starter switch is set to position **I**.
- If the 2-Wheel Steer Engage indicator light **D** repeatedly flashes (four flashes per second) when the machine is operating in any of the three steer modes, the steering requires aligning. ⇨ ***Re-phasing the Steer System (🗋 114)***.
- If the 2-Wheel Steer Engage indicator light **D** repeatedly flashes (irregular flash pattern) when the machine is operating in any of the three steer modes, contact your JCB dealer.

Note: *Until the fault has been rectified, the machine is restricted to the 2-wheel steer mode.*

Manual Steer Mode Selection (if fitted)

⚠ WARNING

Over a long period of time, the front and rear axles may get slightly out of phase. At the start of each working period, before travelling on public roads and at least once a day, or if having difficulty in steering, check and, if necessary, re-align the road wheels. Failure to re-align the road wheels at least once per day may mean a reduction in steering effectiveness. This can lead to tyre scuffing and difficulty in steering a straight line.

5-2-6-4

Some machines may be fitted with a manual steer mode selection control. At the start of each working period, and at least once per day or when having difficulty in steering do the following:

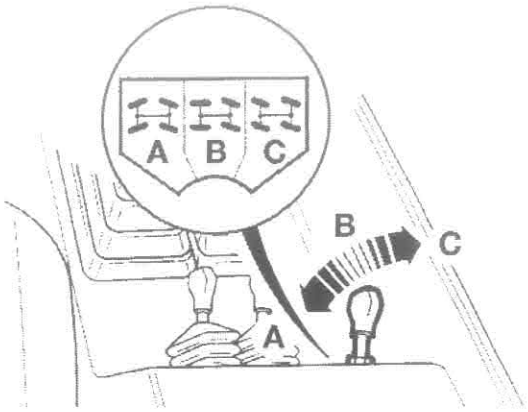


Fig 31.

1 Stop the machine. Select the neutral position on the forward reverse lever.

2 Select four-wheel steering **A**. Turn the steering wheel until the rear wheels are pointing in the straight ahead position.

3 Select two-wheel steering **B**. Turn the steering wheel until the front wheels are pointing in the straight ahead position.

4 All wheels are now pointing straight ahead, select the steer mode required and continue in the normal manner.

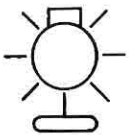
Switches

Instrument Panel Switches

Each switch has an insert with a graphic symbol, this symbol and the switch descriptions are detailed below.

Left Hand Group

Side Lights and Headlights



Rocker Switch. Press down for side lights only. Press further down for side lights and headlights.

⚠ WARNING

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

2-2-2-5_1

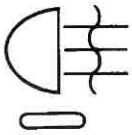
Working Lights (if fitted)

Rocker Switch. Press to switch on the work lights. The work lights will come on only when the engine is running.

Boom Working Lights (if fitted)

Rocker Switch. Press to switch on the boom work lights. The boomwork light will come on only when the engine is running.

Fog Light (if fitted)



Rocker switch. Press down to switch on high intensity fog light. Functions only with side and headlights on.

Warning Beacon

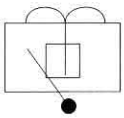
Rocker switch. Press to switch on the warning beacon when the beacon is plugged in. ⇨ *Beacon (🗋 83)*.

Right Hand Group

Hazard Warning Lights

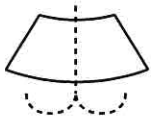
Rocker Switch. Press to switch on the hazard warning lights. A light on the instrument panel flashes with the outside lights.

Rear Wiper



Rocker switch. Press down to switch on the rear wiper. Functions only with the starter switch set to on.

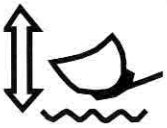
Roof Wiper



Rocker switch. Press down to switch on the roof wiper. Press further down for the washers. Functions only with the starter switch set to on.

Smooth Ride System (if fitted)

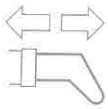
⇨ *Smooth Ride System (🗋 44)*.



Joystick Isolation (if fitted)

Rocker switch. Press to isolate the button functions on the joystick. ⇨ *Control Lever Locks (🗋 61)*.

Inner Boom Extend and Retract

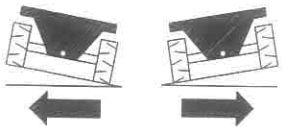


⚠ WARNING

Operation of this switch can be dangerous in certain conditions. Do not operate before reading the relevant control operation section.

0174

Sway Left/Sway Right



⚠ WARNING

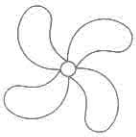
Operation of this switch can be dangerous in certain conditions. Do not operate before reading the relevant control operation section.

0174

Trailer Direction Indicator Lights

⇨ *Mechanical Tow Hitch Option (🗋 112)*

Fan Reverse (if fitted)



Press down to reverse the cooling fan. If necessary, increase engine speed whilst the fan is reversed to help to clear grilles. Release to revert to normal operation.

Note: *To avoid damage to the machine, an audible alarm will sound indicating that a change of fan direction is prohibited until the engine speed is reduced (below 1050 rpm).*

Note: *Always reduce engine speed before releasing the switch.*

Note: *Always position the machine in a relatively clean area before reversing the fan to make sure that other debris (chaff, silage, etc.) is not drawn in.*

Four Wheel Drive Disconnect Switch Option

Use 2-wheel drive where possible, only select 4-wheel drive on soft uneven ground when traction is limited.

For towing, see ***Mechanical Tow Hitch***, ***Hydraulic Tow Hitch*** Options (this section).

Press switch **F** to disengage 4-wheel drive. The switch will illuminate when 2-wheel drive is selected.

Note: *When the brake pedal is pressed the machine will automatically go into 4-wheel drive and the indicator light will go out.*

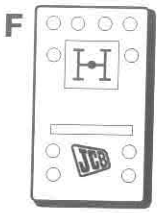


Fig 32.

Multi-Purpose Steering Column Switch

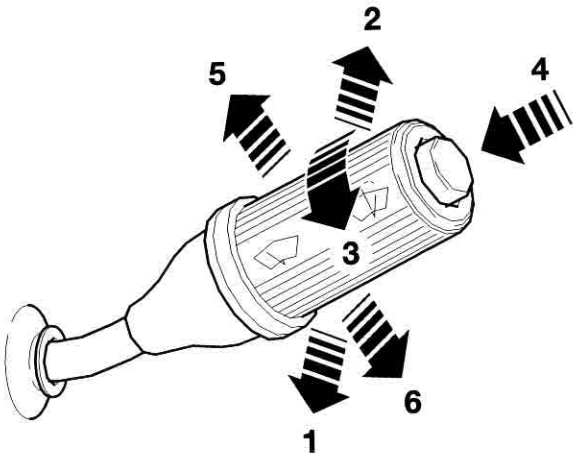


Fig 33.

1 Direction indicators (Right)

Pull the lever towards you to indicate a right turn. Switch the indicators off when you have completed the turn. Functions only with the starter switch at position I.

2 Direction indicators (Left)

Push the lever away from you to indicate a left turn. Switch the indicators off when you have completed the turn. Functions only with the starter switch at position I.

3 Windscreen Wiper

Rotate the lever barrel to switch the windscreen wipers on and off. The following functions are available (only with the starter switch turned on).

Single Speed (Standard)

0 Off

I On

Two Speed (Optional)

0 Off

I Intermittent Wipe

II Slow

III Fast

4 Windscreen Washer

Push the button towards the steering wheel to operate the windscreen washer. Functions only with the starter key at position I.

5 Headlights Flash

Lift the lever to flash the headlights. Functions only with the starter switch at position I.

6 Headlight/Mainbeam

Push the lever down for high beam. Centre position is dipped beam. Functions only with the side/head lights on.

Starter Switch

This is operated by the starter key. It has four positions. The key can be removed only with the switch set to **0**.

0 Turn the key to this position to stop the engine. Make sure the transmission is in neutral, the attachments have been lowered and the parking brake is engaged before stopping the engine.

I Putting the switch to this position connects the battery to all the electrical circuits except the lights and the 4-way flashers warning circuit. (The lights and hazard warning circuits are permanently live.) The starter key will spring back to this position when it is released from **II** or **III**. At -6°C (21°F) warning light **5** will illuminate to indicate the cold start inlet manifold heater has come on. ⇨ ***Warning Lights (🗋 46)***.

II This position is not used in this application

III Operates the starter motor to turn the engine.

Note: *Do not operate the starter motor for more than 10 seconds without the engine firing. If the engine fires but does not fully start, do not operate the starter motor for more than 40 seconds. Let the starter motor cool for at least two minutes between starts.*

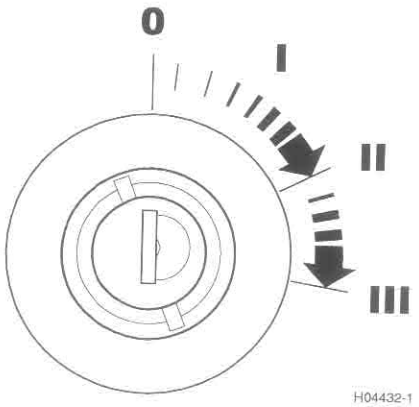


Fig 34.

Cab Interior Light

Press either end of the light unit **A** to switch on the cab interior light. Pressing the other end will switch the light off.

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

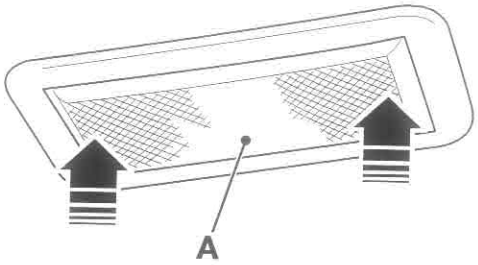


Fig 35.

Smooth Ride System

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

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

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

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

To activate the system:

1 Press and hold switch **A** fully down.

2 Operate the boom lower control, until indicator light **B** illuminates. SRS is now engaged.

Note: *Indicator light **B** remains illuminated when SRS system is engaged.*

If the indicator does not illuminate, make sure the boom is fully lowered before repeating steps 1 and 2.

3 Release the boom lower control and switch **A**.

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

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

⚠ DANGER

Do not attempt to use the boom to raise the front of the machine. With the Smooth Ride System activated, the machine will drop suddenly when the control lever returns to the neutral position.

Switch off SRS before working on the machine

0032_1

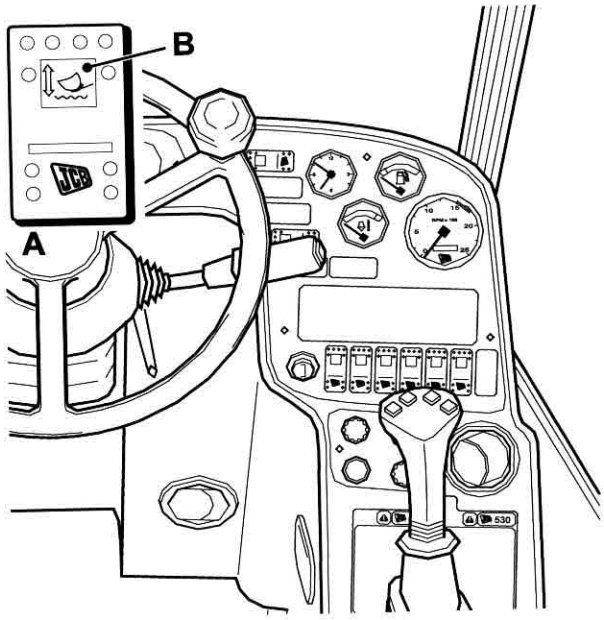


Fig 36.

Instrument Panel

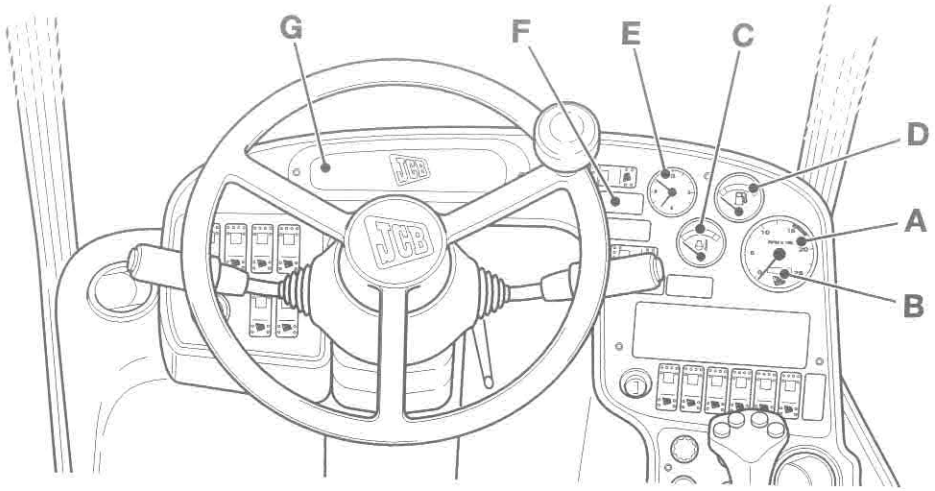


Fig 37.

The instruments and indicator lights are grouped together on an instrument panel. ⇨ *Fig 37. (🗋 45)*.

Instruments provided are a tachometer/speedometer/ hourmeter, a coolant temperature gauge and a fuel level gauge.

As well as indicator lights for the direction indicators, main beam etc. there are warning lights for various fault conditions. When a warning light comes on an alarm will sound. The only way to cancel the alarm is to set the starter to 'off'.

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

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

Instruments

A Tachometer

Indicates the engine speed in revolutions per minute (**RPM**). The RPM is shown on the outer ring. Each division is 100 RPM. A green band on the scale indicates the RPM which gives best fuel economy. Operate within that band whenever possible.

B Hourmeter

Records the total running time of the engine. Use it to keep a check of running hours during maintenance intervals.

C Coolant Temperature Gauge

Indicates the temperature of the engine coolant. The gauge pointer will gradually swing upwards as the coolant temperature rises.

Note: *The machine can be operated until the red warning light illuminates then stop the engine.* ⇨ *Warning Cluster (🗋 46)*.

D Fuel Level Gauge

Indicates the level of diesel fuel in the tank. Do not let the tank run dry, or air will enter the fuel system.

E Clock

F Warning Lights

⇨ *Instrument Panel (🗋 47)*.

G Warning Lights

⇨ *Warning Cluster (🗋 46)*.

Warning Lights

Warning Cluster

The following warnings are on the warning cluster.

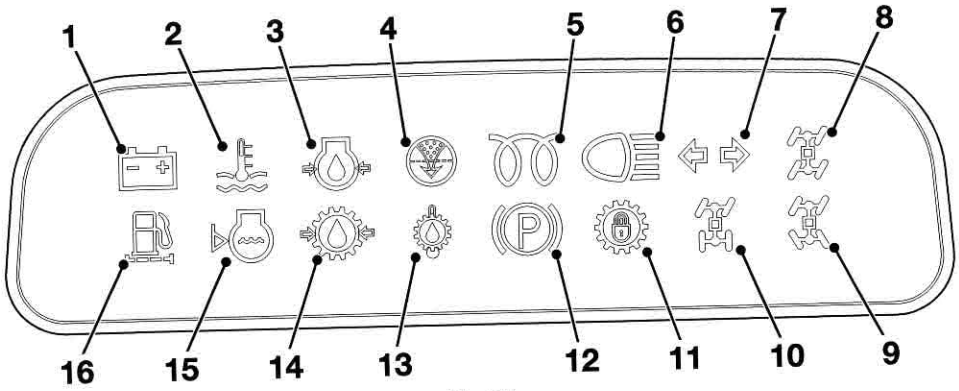


Fig 38.

⚠ CAUTION

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

4-2-1-2

Note: *An audible alarm will sound when the starter switch is set to position* ***I****. The alarm should stop when the engine is started.* ⇨ ***Starting the Engine (🗋 87)***.

1 No Charge

Audible/Visual. Lights if the battery charging circuit fails while the engine is running. The light should go out a few seconds after the engine is started.

2 Engine Coolant Temperature High

Audible/Visual. Lights if the engine coolant temperature rises too far.

3 Engine Oil Pressure Low

Audible/Visual. Operates if the engine oil pressure drops too far. The light should go out when the engine is started.

4 Air Filter Blocked

Audible/Visual. Lights if the engine air filter blocks up.

5 Cold Start

Visual Only. With the starter switch in position **III**, if the outside air temperature is -6°C (21°F) or below the light will illuminate indicating that the manifold heater is ON. When the light extinguish the engine is ready to start.

6 Main Beam On

Visual only. Lights up when the headlight main beams are switched on. Switch the main beams off for on-coming vehicles.

7 Direction Indicators

Visual only. Flashes with the direction indicators. Use the indicators to signal before turning the machine.

8 Crab Steer Engage

Visual only. ⇨ ***Steer Mode Selector (🗋 38)***.

Note: *Lights briefly as a bulb and system check when the starter switch is set to position* ***I****.*

9 4-Wheel Steer Engage

Visual only. ⇨ *Steer Mode Selector (🗋 38)*.

Note: *Lights briefly as a bulb and system check when the starter switch is set to position I.*

10 2-Wheel Steer Engage

Visual only. ⇨ *Steer Mode Selector (🗋 38)*.

Note: *Lights briefly as a bulb and system check when the starter switch is set to position I.*

11 Not Used.

12 **Parking Brake Engaged**

Visual only. Lights when the parking brake is engaged with the machine in forward or reverse. The alarm will sound if forward or reverse drive is selected.

13 **Transmission Oil Temperature High**

Audible/Visual. Lights if the transmission oil temperature rises too far.

14 **Transmission Oil Pressure Low**

Audible/Visual. Lights if the transmission oil pressure drops too far. The light should go out when the engine is started.

15 **Low Level Coolant Indicator**

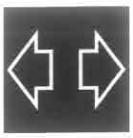
Audible/Visual. Lights up when the coolant level is low, top up as soon as it safe to do so.

16 **Water in Fuel Indicator**

Audible/Visual. Lights up when there is water in the fuel system. Drain the water seperator and engine filter.

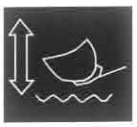
Instrument Panel

Trailer Indicators On



Green Flashing Light. Flashes with the trailer direction indicators (if fitted).

Smooth Ride System Engaged (when fitted)

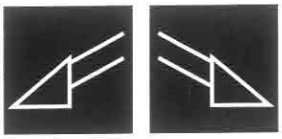


Green Light. Lights when Smooth Ride System is engaged. ⇨ *Smooth Ride System (🗋 44)*.

Boom Retracted (540-170 only)

Green Light (no graphic symbol). Lights when the boom is fully retracted. ⇨ *Stabiliser Control Option (🗋 59)*.

Stabiliser Indicator Lights (when fitted)



Two Green Lights. Light when both stabilisers legs are in the down position and the weight of the machine is supported. ⇨ *Stabiliser Control Option (🗋 59)*.

Air Conditioning and Heater Controls

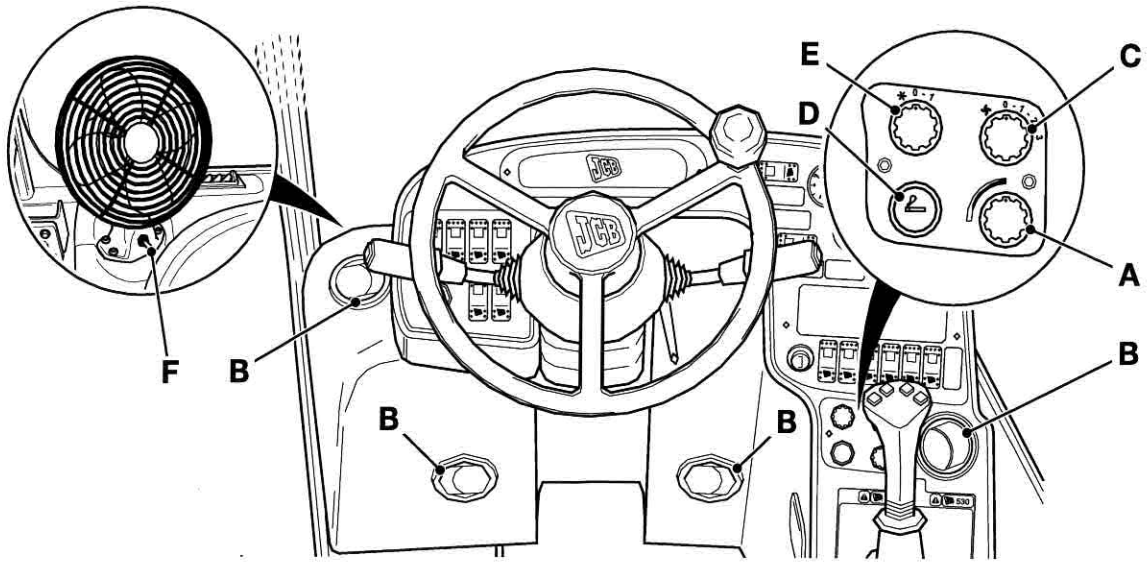


Fig 39.

Heater

Heated or unheated air is provided from a heater unit which includes a two- or three-speed fan (depending on machine specification). The air can be directed to the windscreen and/or the cab interior.

Heater On-Off

Turn knob **A** in clockwise to increase the temperature. To reduce the temperature turn counterclockwise.

Cab/Windscreen Heating

Position vents **B** as required to direct air.

Heater/Air Conditioning Fan

Turn knob **C** clockwise to position **1** to turn the fan on. Turn further to positions **2** or **3** increase speed. Functions only with the starter switch set to on.

Cigar/Cigarette Lighter

Press in knob **D** and wait until it pops out again.

Air Conditioning Option

To provide cool air in warm climates and during hot seasons the air conditioning system delivers cool dehumidified air into the cab.

Air conditioning reduces moisture from the air and can be used to demist windows quickly in damp weather. Used in conjunction with the heater, it also makes the interior of the cab warm and dry.

Important: *Operate the air conditioning for at least 10 minutes per month.*

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

Turn knob **E** clockwise to position **1** to turn the air conditioning on. To obtain best results from the air conditioning system ensure that all doors and windows are closed.

Operate the fan control as previously described for operator comfort.

Face-Level Fan Option

Switch on or off at **F**.

Operating Levers

Introduction

⚠ WARNING

Controls

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

INT-2-1-3

⚠ WARNING

Boom/Travelling

Operating the boom while travelling can cause accidents. You will not have total control of the machine. Never operate the boom while travelling.

5-1-5-2

⚠ DANGER

Overhead Electrical Power Lines

You can be electrocuted if you get your machine too close to live electrical power lines. Before starting work, find out if there are electrical power lines on the jobsite. If there are, contact the local electricity supplier and ask what safety precautions you must take. Also find out if there are any local laws and regulations concerned with work near electrical power lines.

When you have found out what safety precautions, laws and regulations apply to the jobsite, make sure they are all obeyed.

5-1-5-6

⚠ WARNING

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

5-2-1-5_1

⚠ WARNING

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

5-2-1-11

Control levers and switches may vary on machines. The machine may be fitted with any of the following control layouts.

- Dual lever control with loading and placing pattern options and manual auxiliary control levers.
- Servo control.

⚠ WARNING

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

5-2-2-9

The levers are spring-loaded to their central hold positions. The speed of movement of the associated hydraulic rams depends on how far you move a lever - the further you move the lever, the faster the ram action.

The rams will stay in any position until you move them with the levers or switches.

The following pages describe the operation of the various control patterns.

Re-phasing of 3 Stage Booms

Three stage booms can go out of phase if the hydraulic cylinders are not fully retracted regularly. Fully retract the boom at least once every day.

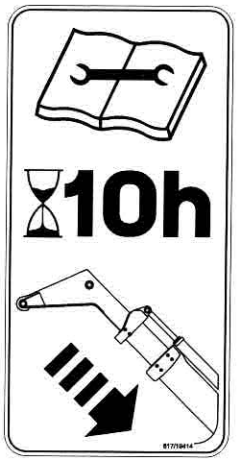


Fig 40.

To re-phase the boom sections - hold the control in the retract position with the engine at high idle speed until the boom sections are fully retracted.

Boom and Carriage Controls

Dual Lever Control (Loading Pattern)

Raise Boom/Lower Boom

A Raise

B Lower

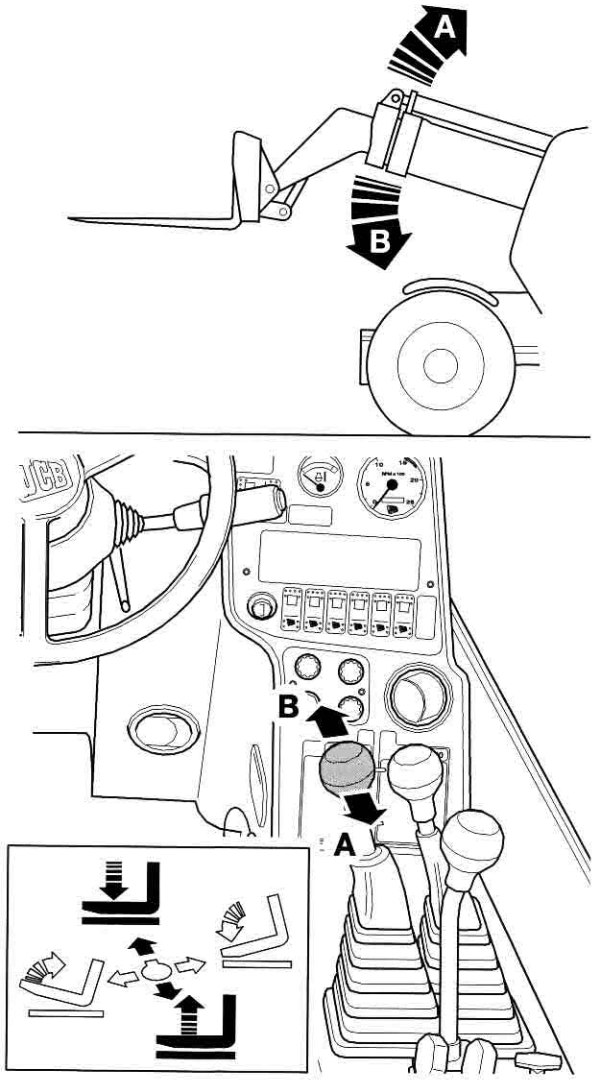


Fig 41.

Extend Boom/Retract Boom

Important: *Three stage booms can go out of phase if the hydraulic cylinders are not fully retracted regularly.* ⇨ ***Re-phasing of 3 Stage Booms (📄 50)***.

C Extend
D Retract

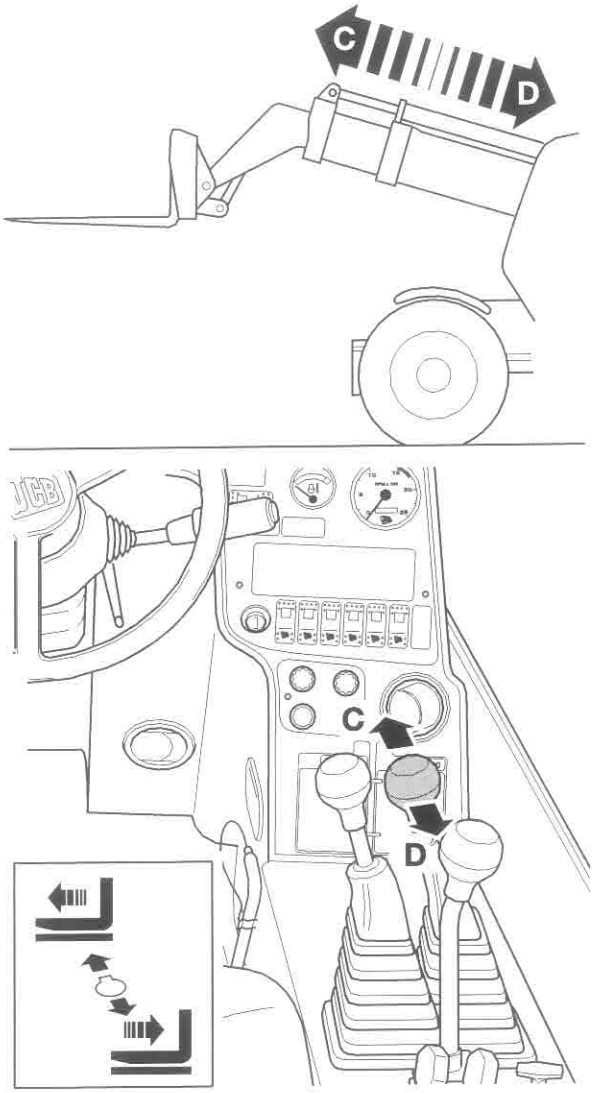


Fig 42.

Tilt Carriage Forward/Back

E Forward
F Back

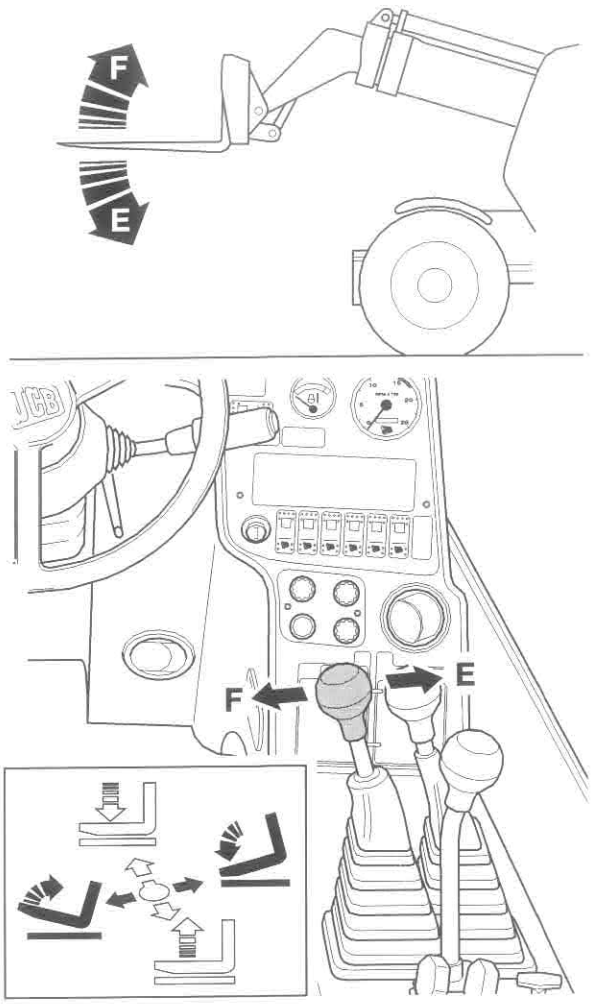


Fig 43.

Dual Lever Control (Placing Pattern)

Raise Boom/Lower Boom

A Raise

B Lower

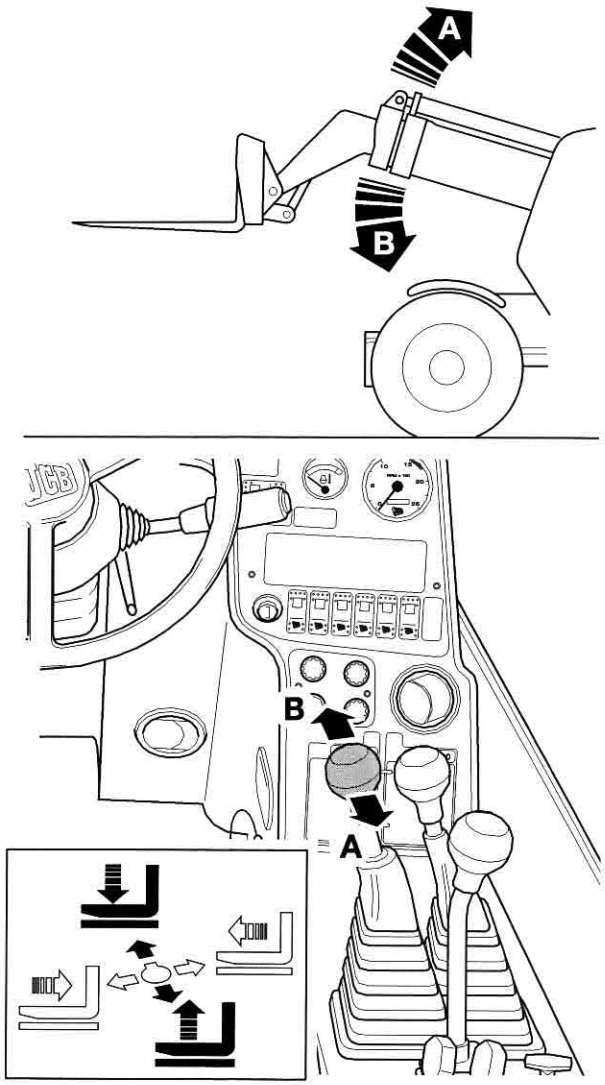


Fig 44.

Extend Boom/Retract Boom

Important: *Three stage booms can go out of phase if the hydraulic cylinders are not fully retracted regularly.* ⇨ ***Re-phasing of 3 Stage Booms (50)***.

C Extend

D Retract

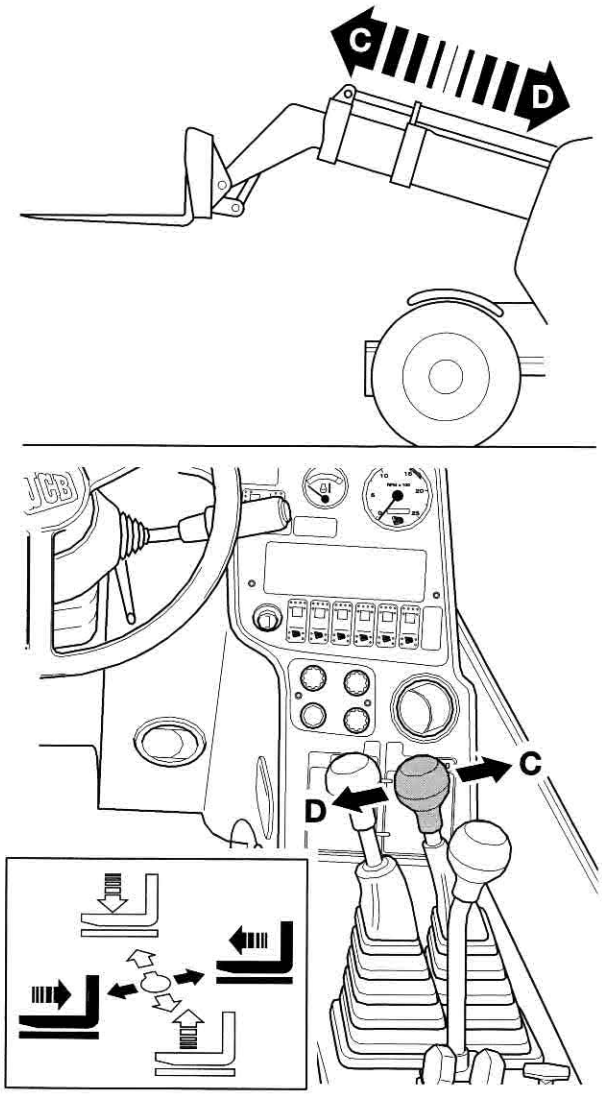


Fig 45.

Tilt Carriage Forward/Back

E Forward
F Back

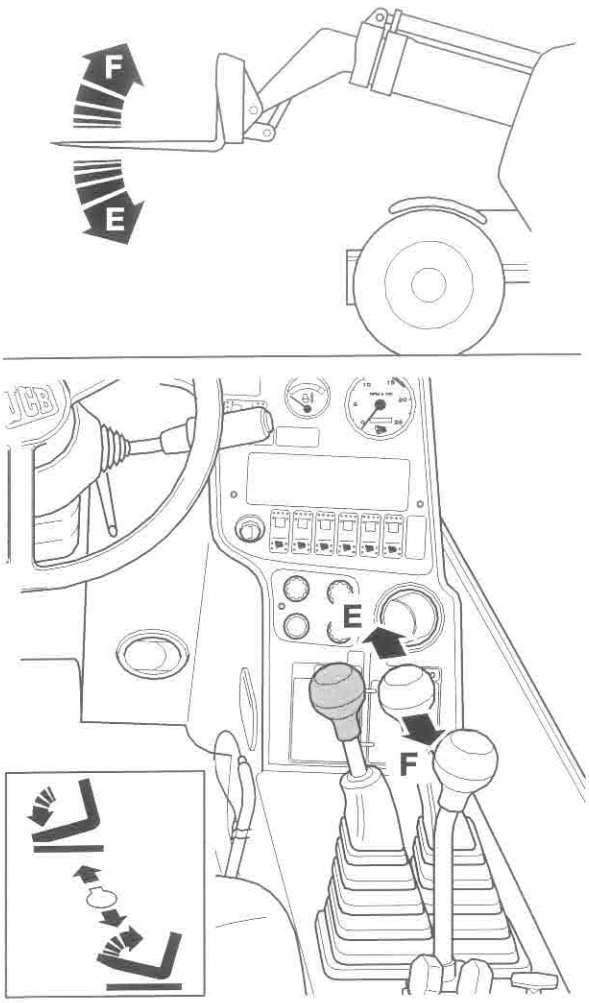


Fig 46.

Servo Control

Raise Boom/Lower Boom

Note: The boom cannot be raised above 57° without lowering the stabiliser legs. ⇨ ***Chassis Levelling (Sway) Option (🗋 58)***.

A Raise

B Lower

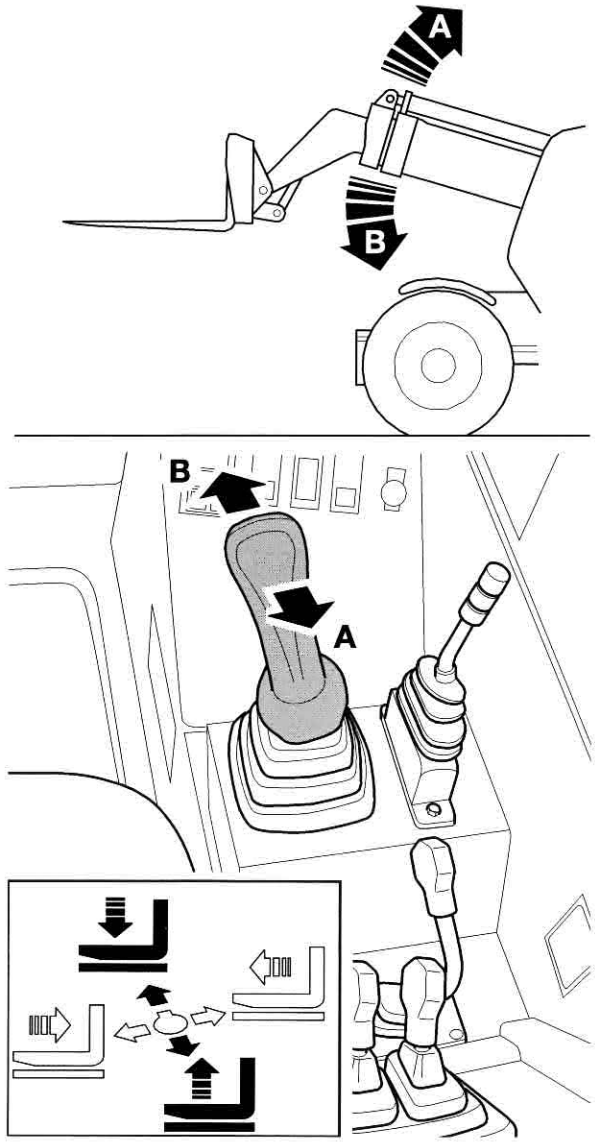


Fig 47.

Extend Boom/Retract Boom

⚠ CAUTION

Do not extend the boom when an attachment is connected to the high flow auxiliary connectors (if fitted). Severe damage to the hoses will result.

0054_2

C Extend

D Retract

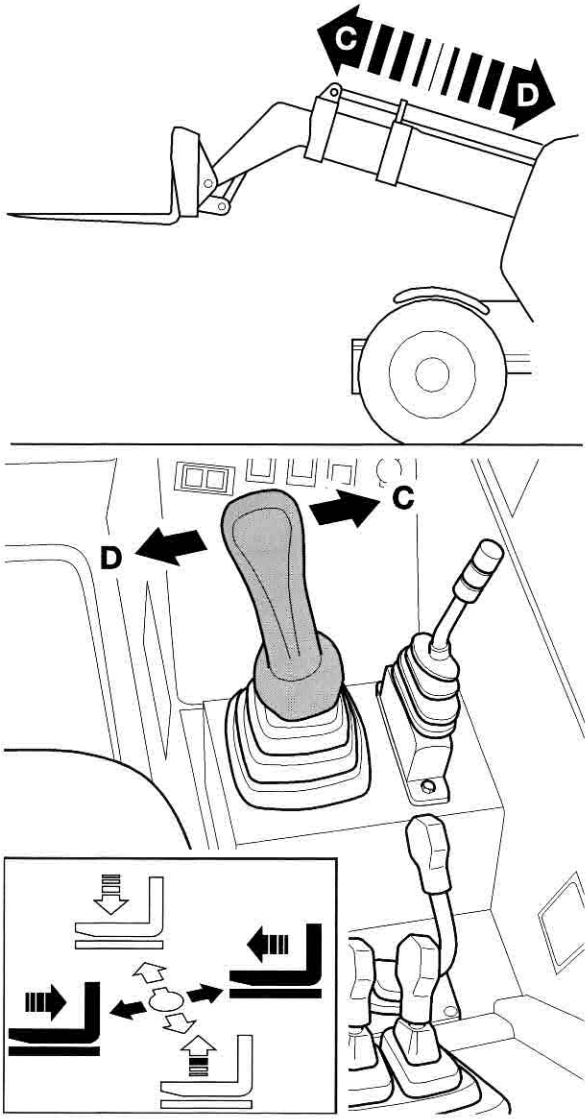


Fig 48.

Extend Boom/Retract Inner Boom

⚠ CAUTION

Do not extend the inner boom section until all intermediate sections are fully extended. This will reduce the load on the boom. Always extend the intermediate boom sections first for routine operation of the machine.

0052

Note: *The inner boom section will not operate until the stabiliser legs are lowered.*

1 Lower the stabilisers. ⇨ ***Chassis Levelling (Sway) Option (🗋 58)***.

2 Press switch **Y** to activate the inner boom section.

Fig 49.

3 Operate main control lever as required. ⇨ ***Extend Boom/Retract Boom (🗋 54)***.

Tilt Carriage Forward/Back

E Forward
F Back

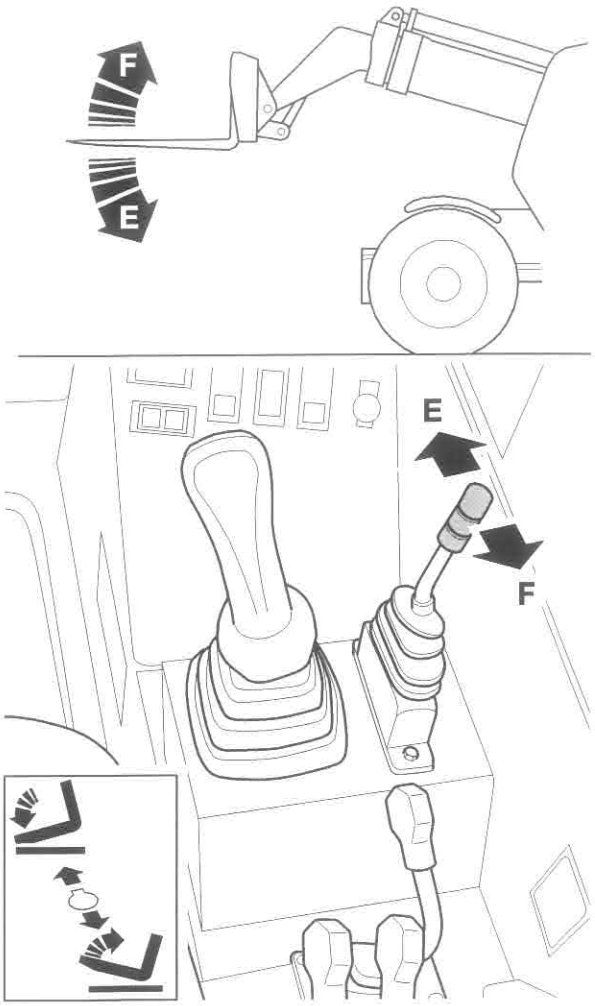


Fig 50.

Auxiliary Controls

Note: *To fit an attachment, see* ***Connecting/ Disconnecting Attachments (OPTIONAL ATTACHMENTS section).***

⚠ WARNING

Before operating the Auxiliary control system make sure that you are aware of all WARNINGS and CAUTIONS that apply to the attachment you are using. Also make sure you have fitted the attachment correctly. (See OPTIONAL ATTACHMENT section).

5-2-2-6

Dual Lever Control

The machine is fitted with one auxiliary circuit (AUX 1) only.

AUX 1 - Move control lever in direction **E** or **F** depending on the attachment fitted and the function required.

Hitch Operation: ⇨ ***Mechanical Tow Hitch Option (🗋 112)***.

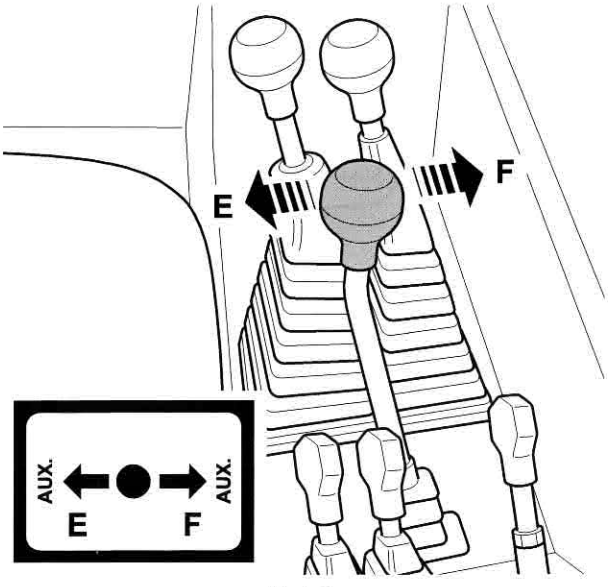


Fig 51.

Servo Controls

The machine is fitted with one auxiliary circuit (AUX 1). This circuit has standard couplings **D** at the end of the boom and (if fitted) a set of high flow couplings **E** on the outer boom. High flow will only operate if the standard couplings are not connected.

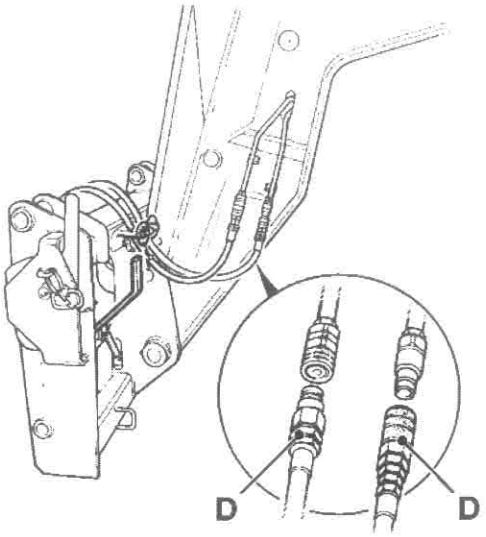


Fig 52. Standard Couplings

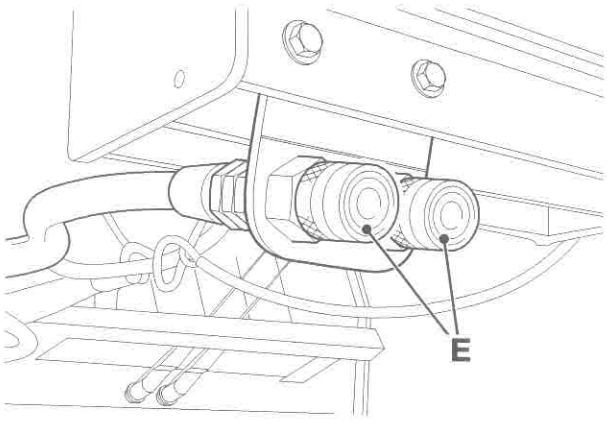


Fig 53. High Flow Couplings

⚠ CAUTION

Do not extend the boom when an attachment is connected to the high flow auxiliary connectors (if fitted). Severe damage to the hoses will result.

0054_2

Standard and high flow attachments use the same controls.

AUX 1 - Move control lever in direction **B** or **C** depending on the attachment fitted and the function required.

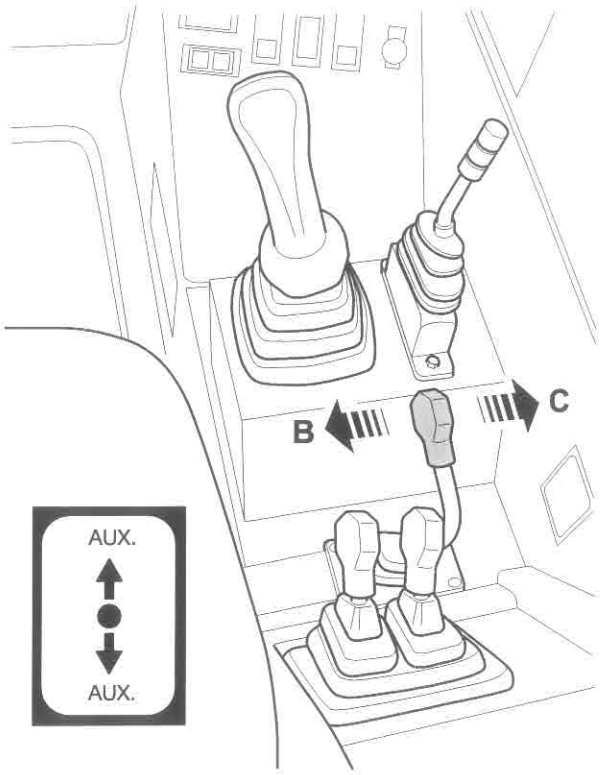


Fig 54.

Chassis Levelling (Sway) Option

⚠ WARNING

Never operate the chassis levelling (sway) control when the boom is above the horizontal position. Never operate the boom if the machine is not level.

Use the chassis levelling (sway) control to level the machine before operating the boom. Reposition the machine if a level position cannot be achieved.

Never operate chassis levelling (sway) when the machine is moving.

The machine could tip over if you do not obey these safety rules.

5-2-2-5_3

⚠ WARNING

Controls

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

INT-2-1-3

The chassis levelling (sway) control switch allows the machine to be levelled from side to side before loading and unloading. The switch must also be used to level the machine from side to side before travelling.

The ram will stay in any position until you move it with the switch.

Chassis levelling (sway) cannot be operated once the boom is higher than 10° above the horizontal **T**.

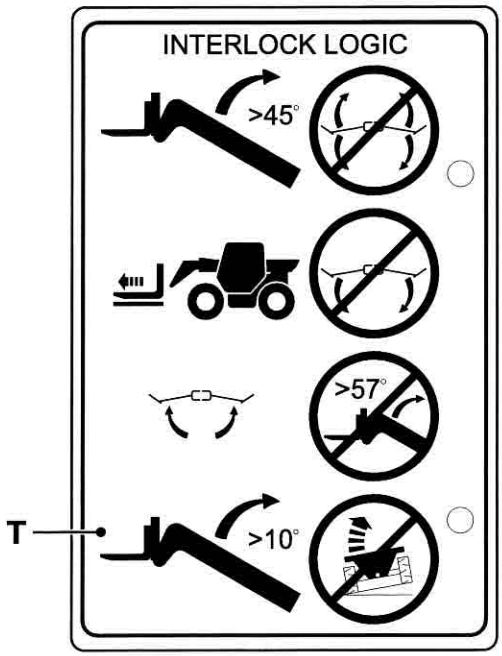


Fig 55.

Use inclinometer **A** to check that the machine is level before operating the boom. The machine is level when the inclinometer shows zero degrees (0°).

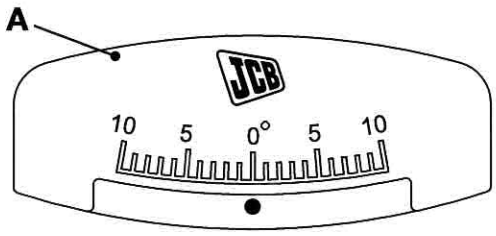


Fig 56.

Use indicator **B** to check that the body of the machine is square to the axles before driving the machine. The machine is square to the axles when rod **C** is level with the top end of tube **D**. When the rod is above the tube, the machine is swayed to the right. When the rod is down inside the tube, the machine is swayed to the left.

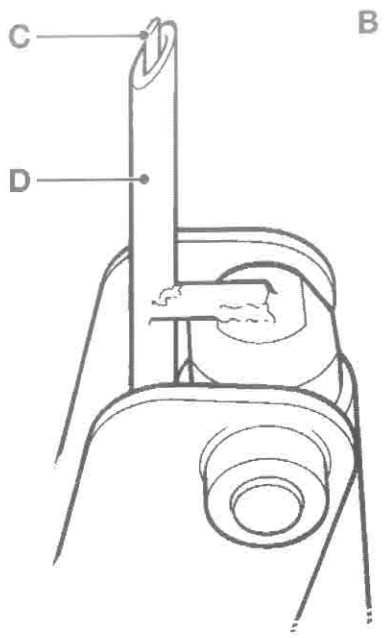


Fig 57.

Sway Left/Sway Right

The switch movements and chassis levelling movements are indicated on a decal:

E Sway Left

F Sway Right

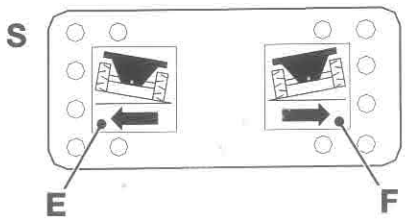


Fig 58.

Stabiliser Control Option

⚠ WARNING

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

0001

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

The lateral position of the machine is indicated by an inclinometer **A** fitted in the cab. Use inclinometer to check that the machine is level before operating the boom. The machine is level when the inclinometer shows zero degrees (0°).

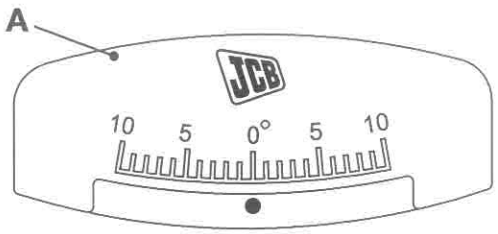


Fig 59.

Reposition the machine if a level position cannot be achieved.

Ensure the stabiliser legs are in the down position and the weight of the machine is supported. Do not extend the boom more than necessary. Isolate the stabiliser control levers before operating the machine.

***Note:** The inner boom section will not operate until the stabiliser legs are lowered **X**. ⇒ Fig 61. (□ 60).*

Lower and Raise Stabilisers

On 540-170 machines, the stabilisers cannot be raised until all the boom sections are fully retracted. The Boom Retracted light illuminates when the boom is fully retracted. ⇨ ***Stabiliser indicator lights (🗋 60)***.

To isolate the control levers **C** press bottom of switch **F**. To make the control levers operable press top of switch **G**.

Before travelling on the public highway, fully raise both stabiliser legs and isolate control levers **C**.

When working with the stabilisers lowered isolate the control levers **C** before operating the boom controls.

D Lower

E Raise

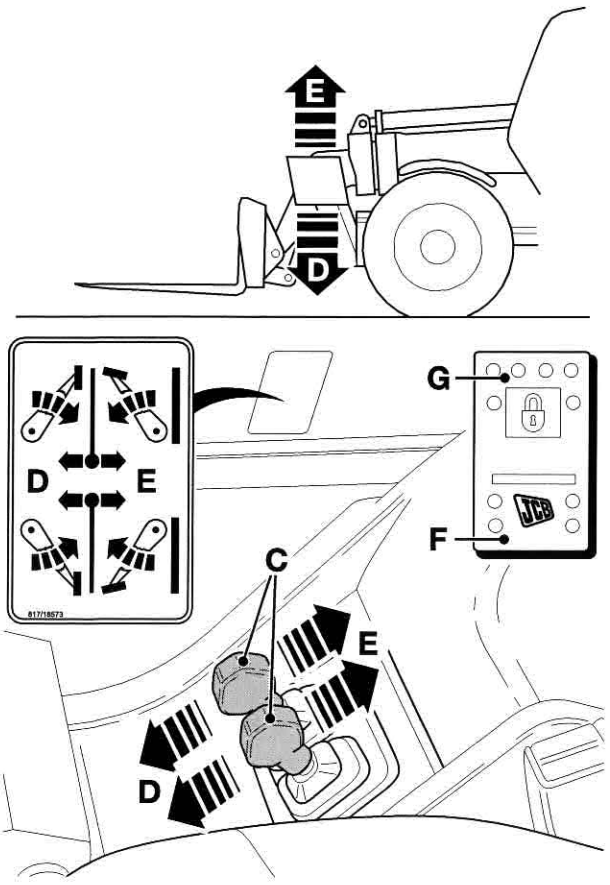


Fig 60.

Stabiliser indicator lights

Some machines are fitted with optional stabiliser indicator lights **B** (fitted as standard on 540-170 machines). The lights will illuminate when both stabiliser legs are in the down position and the weight of the machine is supported.

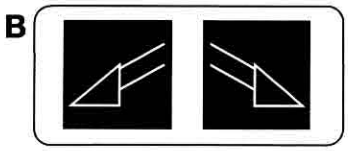


Fig 61.

If fitted, ensure both indicator lights illuminate when the stabiliser legs are in the down position. If the lights do not illuminate do not use the machine until the fault is investigated and corrected.

As a safety feature, the stabilisers cannot be operated once the boom is higher than 45° above the horizontal **Y**.

On 540-170 machines, the boom can not be raised above 57° without lowering the stabiliser legs **Z**.

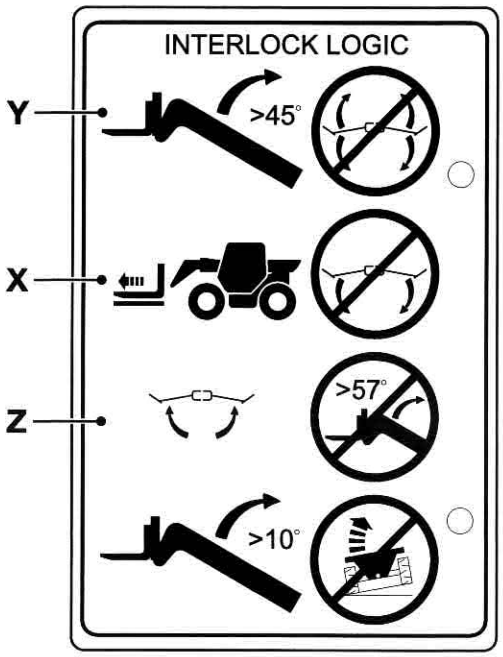


Fig 62.

Safety Equipment

Control Lever Locks

The requirement for control lever lock/isolation varies according to local legislation. You must comply with local legislation at all times. The locks/switches are designed to lock or isolate the control(s) in the neutral position.

Control levers and switches may vary on machines. The machine may be fitted with any of the following control layouts.

- Dual lever control with loading and placing pattern options and manual auxiliary control levers.
- Single lever control.
- Servo control

Dual Lever Control

All Lever Lock

Lock all the controls before travelling on public roads. To lock the controls, ensure the levers are in the neutral position, then press down pin **A** as far as it will go. Before starting the engine make sure the controls are locked. To release the lock raise the pin fully.

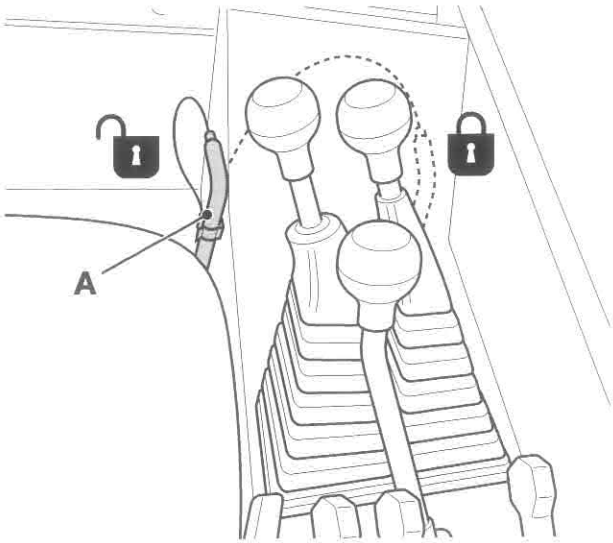


Fig 63.

Tilt Lever Lock

This lock must be fitted when using a platform. To lock the controls ensure the lever tilt lever is in the neutral position, then press down pin **A** as far as it will go. Before starting the engine make sure the controls are locked. To release the lock raise the pin fully.

Auxiliary Lever Lock

To lock the controls, ensure the auxiliary lever is in the neutral position and move the mechanical lock **B** to the lock position. Before starting the engine make sure the lever is locked. Move the lock away from the lever to release.

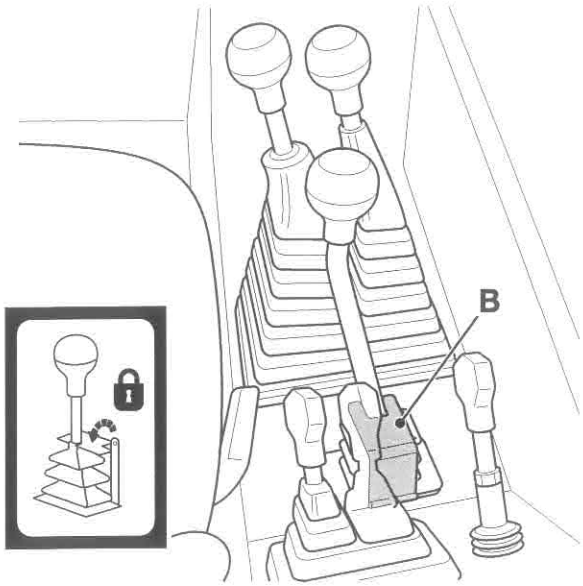


Fig 64.

Single Lever Control

All Lever Lock

Lock all the controls before travelling on public roads. To lock the controls, ensure the lever **F** is in the neutral position, then press down pin **G** as far as it will go. Before starting the engine make sure the controls are locked. To release the lock raise the pin fully.

Isolate the joystick button functions before travelling on public roads. To isolate the buttons, operate the Joystick Isolation Switch **H**.

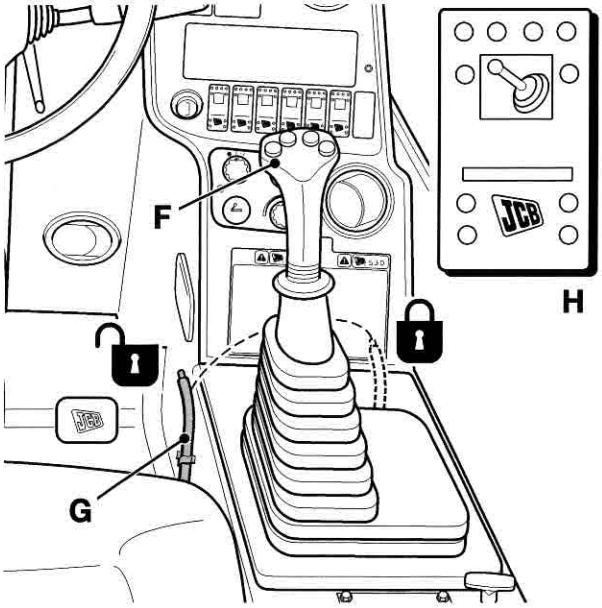


Fig 65.

Servo Control

All Lever Lock

Lock all the controls before travelling on public roads. To lock the controls:

1 Ensure the levers are in the neutral position

2 Turn switch **A** to position **B**.

Before starting the engine make sure the controls are locked.

Turn the switch to the central position **C** to release the lock.

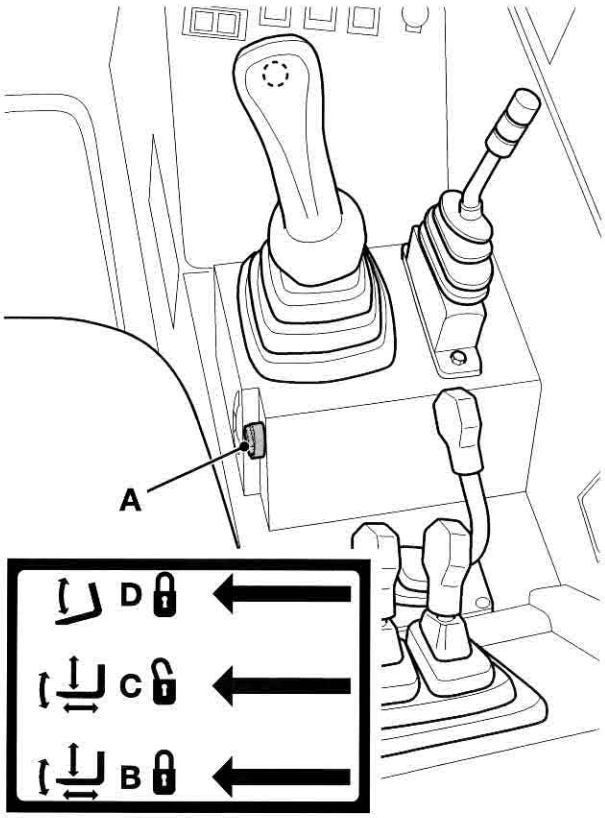


Fig 66.

Tilt Lever Lock

This lock must be fitted when using a platform. To lock the controls:

1 Ensure the levers are in the neutral position

2 Turn switch **A** to position **D**.

Turn the switch to the central position **C** to release the lock.

Load Charts

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

Before operating the machine it is important to identify which of the following items are also fitted:

⇨ *Load Moment Indicator (LMI) (🗋 66)*
⇨ *Boom Indicators (🗋 65)*

The following explanation is for the Load Charts.

Introduction to Load Charts

P5-2015

⚠ CAUTION

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

5-2-4-2

The SWL at different boom positions is shown on the load charts in the cab. ⇨ *Fig 67. (🗋 63)*.

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

Load charts are shown in this book for reference only. Always refer to the charts in the cab before lifting or placing a load.

Check the relevant load chart is available for any alternative carriage or attachment. Where appropriate, the load chart shows the part number **A** of the carriage or attachment it refers to. If you are unsure of the correct load chart to use, contact your JCB distributor for advice.

Renew any damaged or missing charts.

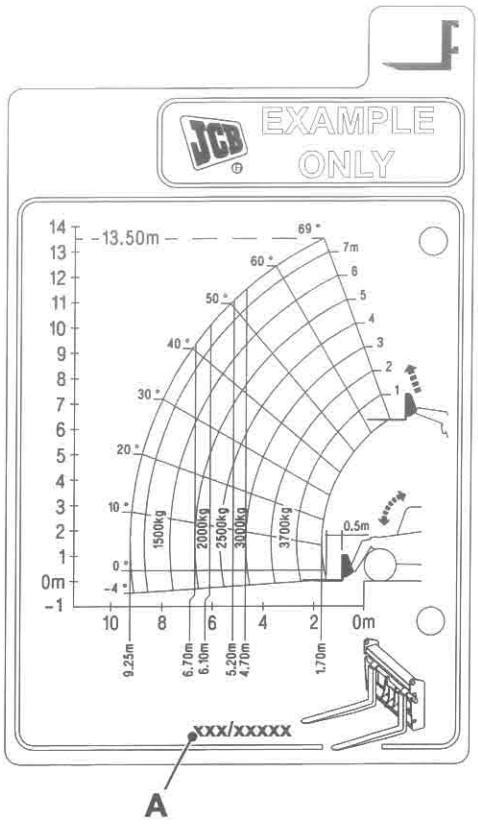


Fig 67. Example Only

Using the Load Charts

P5-2016

⚠ CAUTION

The limits shown on the Load Charts are for a stationary level machine. Do not raise or extend the boom while the machine is moving. Retract the boom fully and lower it as far as possible before travelling with a load.

5-2-4-3_1

1 Check what boom attachment is fitted to your machine, then turn to the correct Load Chart in the cab.

2 You must know the weight of a load before picking or placing it. Check that the loads Centre of Gravity **X** will not be more than 500 mm (20 in) in front of the fork uprights.

Note: *The load's centre of gravity **Y** may not be in the middle of the load. You will have to find out where it is.*

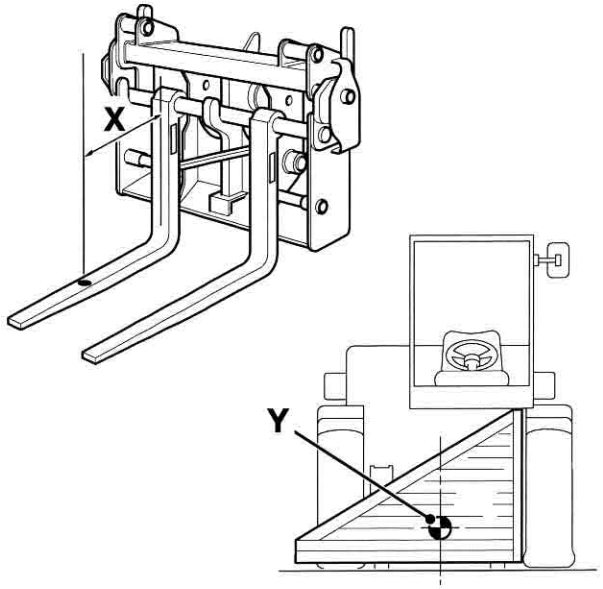


Fig 68.

3 When you know the weight of the load, look on the Load Chart and find the coloured segment with the next highest weight.

For example, on the example Load Chart shown, if your load weight is 1800 kg, find the 2000 kg segment. This is the Maximum Load Segment for your load.

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

4 After inserting the forks beneath the load, and before lifting the load, check the readings on the boom angle and extension indicators. Find the same readings on the Load Chart.

You will see on the chart that lines run from the boom angle and extension scales, through the coloured area of the chart. Find where the lines for your readings cross. If they cross inside your Maximum Load Segment or to the right of it (see Step 3) the load is within safe limits.

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

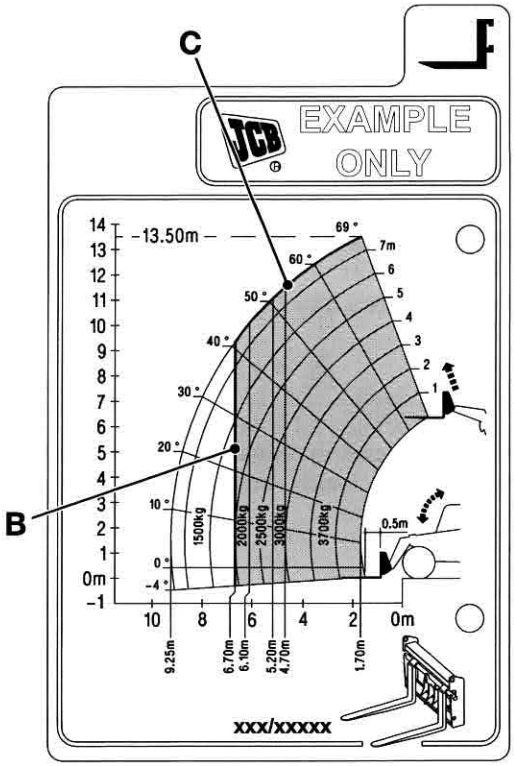


Fig 69. Example Only

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

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

6 Before placing a load, use the Load Chart to find how close you should get the machine to the unload point. You must be able to place the load without crossing the left-hand or upper boundaries of your Maximum Load Segment.

Boom Indicators

P5-2009

The machine may be fitted with additional boom indicators **A** and **B**.

The SWL at different boom positions is shown on the load charts in the cab. Boom angle and extension indicators are installed on the boom itself. Boom extension is indicated by numbered labels **A**. The numbers represent boom extension in metres. Boom angle is indicated by an indicator **B**. It has a scale marked in degrees.

Always refer to the charts in the cab before lifting or placing a load. See ***Load Charts***.

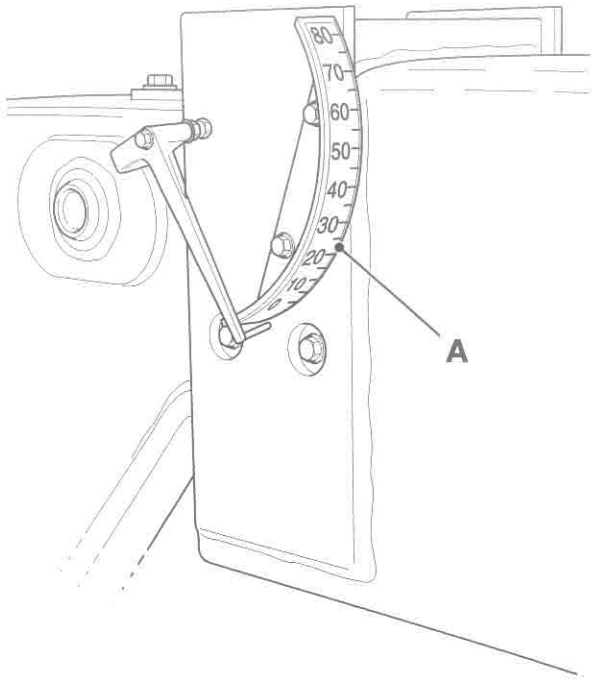


Fig 70. Typical Installation

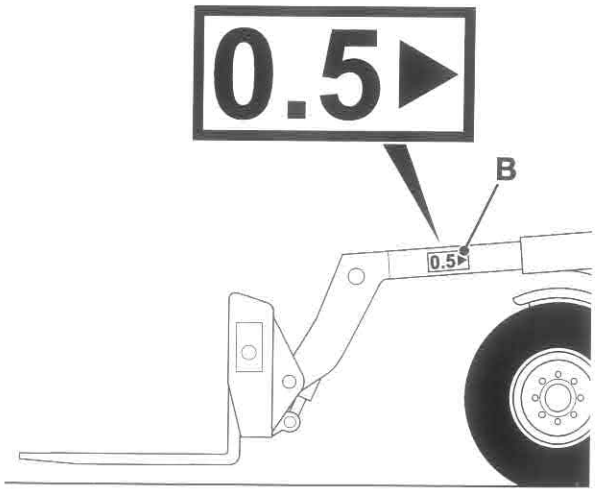


Fig 71. Typical Installation

Load Moment Indicator (LMI)

Introduction

P5-2011_2

The machine may be fitted with a Load Moment Indicator (LMI). The LMI warns the operator when the machine is nearing its maximum working limit (ie, when it could tip forward).

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

All LEDs will flash as the load nears the maximum working limit. If this happens, move the load into a stable position by reducing the load, or retracting the boom.

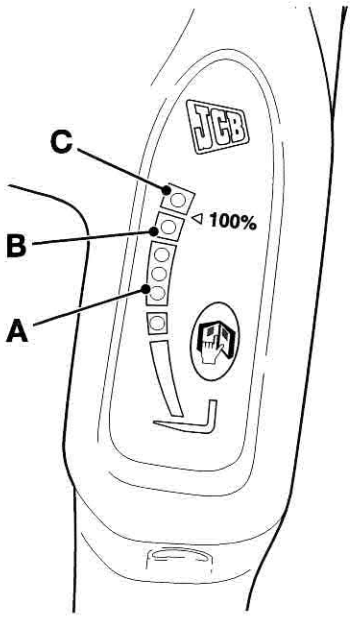


Fig 72.

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

If a system fault is detected, various combinations of LEDs will indicate a fault code. See ***Diagnostic Fault Codes***.

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

⚠ WARNING

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

5-2-4-4

⚠ WARNING

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

5-2-4-15

⚠ WARNING

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

5-2-4-13

Checking the Indicator

P5-2012_2

⚠ WARNING

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

5-2-4-15

1 Park the machine (unloaded) on level ground with the engine running. Apply the park brake and place the forward/reverse lever in the neutral position.

2 The green LED **D** at the bottom of the display illuminates to show that the indicator is receiving power.

3 Press the display button **E** and release.

4 All LEDs on the indicator flash and the audible alarm sounds if the unit is functioning correctly.

⚠ WARNING

If the Load Moment Indicator is faulty, contact your JCB Distributor. Do not try to repair it yourself.

12-2-1-1

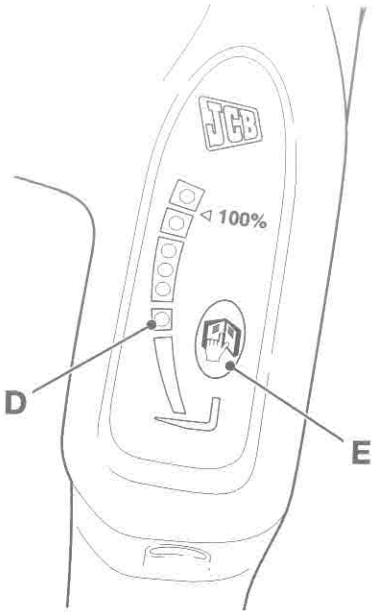


Fig 73.

Setting the Volume and Brightness

P5-2013_2

The volume of the audible alarm, and the brightness of the display LEDs can be set by the operator using display button **E**. This allows the volume and brightness to be reduced for night time use. The possible options are:

1 Full volume and full brightness (default setting)

2 Reduced volume and full brightness

3 Full volume and reduced brightness

4 Reduced volume and reduced brightness

Setting Procedure

1 Park the machine (unloaded) on level ground with the engine running. Apply the park brake and place the forward/reverse lever in the neutral position.

2 The green light **D** at the bottom of the display will illuminate to show that the indicator is receiving power.

3 Press and hold the display button **E**.

The display will cycle through the volume and brightness options, pausing for approximately three seconds to demonstrate each option.

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

Note: *The system will reset to the default setting when the starter key is switched to the off position.*

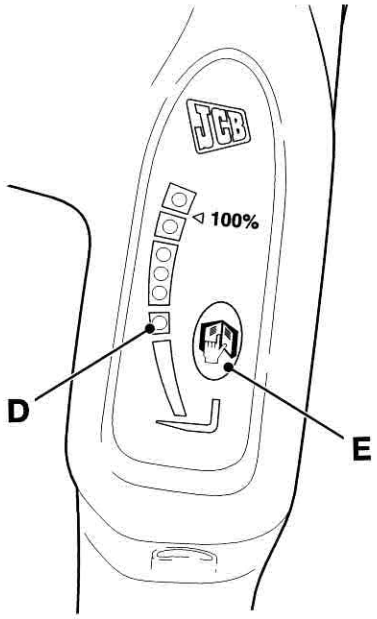


Fig 74.

Diagnostic Fault Codes

P5-2014

When the system detects a fault, the audible alarm will sound and various combinations of lights on the display will indicate a fault code for approximately 10 seconds.

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

When the fault clears, the display will return to normal.

⚠ WARNING

If the Load Moment Indicator is faulty, contact your JCB Distributor. Do not try to repair it yourself.

12-2-1-1

If any of these fault codes are displayed, switch the starter key off and on again. Contact your JCB distributor if the fault does not clear.

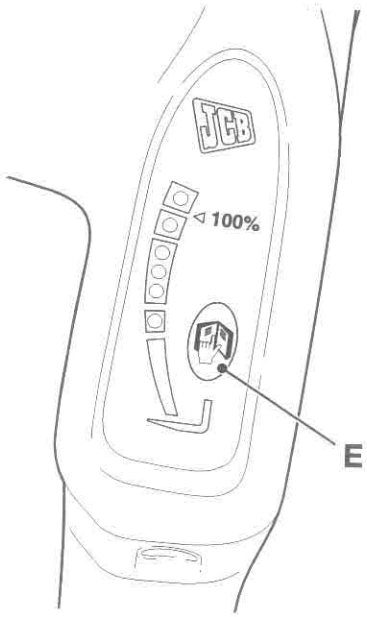


Fig 75.

Error Code 1 - Transducer signal fault

Transducer disconnected or wiring damaged.

Error Code 2 - Calibration out of range

System is incorrectly calibrated.

Error Code 3 - Calibration required

System not calibrated.

Error Code 4 - Display unit faulty

The display box has detected an internal error.

Error Code 5 - Low battery voltage

Battery voltage is below 9 Volts.

LC1 and LC4 Load Control Systems

Introduction

This section of the handbook provides information for the LC1 and LC4 Load Control Systems (LCS) as fitted to the following machines:

– 540-170

General Information

P5-2024

The LCS is only an enhancement to the devices that JCB currently fit as standard, i.e. loadcharts, boom extension markers and LMI. These are still the primary source of information to allow the operator to operate the machine correctly. The system is there to offer additional control of the load if an operator makes an inadvertent movement of the load by mistake. It is not to be relied upon as the primary source of protection for the machine. The duty of care is still with the operator/site agent to:

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

When the LCS is selected, it reduces the risk of tipping forward when the machine reaches a predetermined point near to its maximum working limit.

This is achieved by stopping boom lower, boom extend, dump and crowd functions, in order to prevent further movement of a load past the predetermined point.

The system has two working modes, Load Control Mode and Ground Work Mode. There is an additional Emergency Override mode. These modes are described in the following pages.

Note: *The LCS provides a degree of protection only against the machine tipping forward. It does not protect against tipping sideways or rearwards, nor tipping due to the machine being used on unsuitable ground nor operator mishandling (sharp direction changes, etc.). See* ***Working With the Machine*** *and particularly* ***Use of Machines on Gradients or Slopes****.*

Neither will the system protect against instability due to the stabiliser legs being lifted nor misuse of the chassis levelling (sway) function (if either of these options are fitted). See ***Stabiliser Control Option*** and/or ***Chassis Levelling (Sway) Option*** in OPERATION section of the machine Operator Handbook.

It is important that the correct functioning of the system is checked at the start of each working day, see ***Daily Functional Check***.

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

⚠ WARNING

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

0184_2

⚠ WARNING

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

5-2-4-13

The LC1 and LC4 Indicator Display

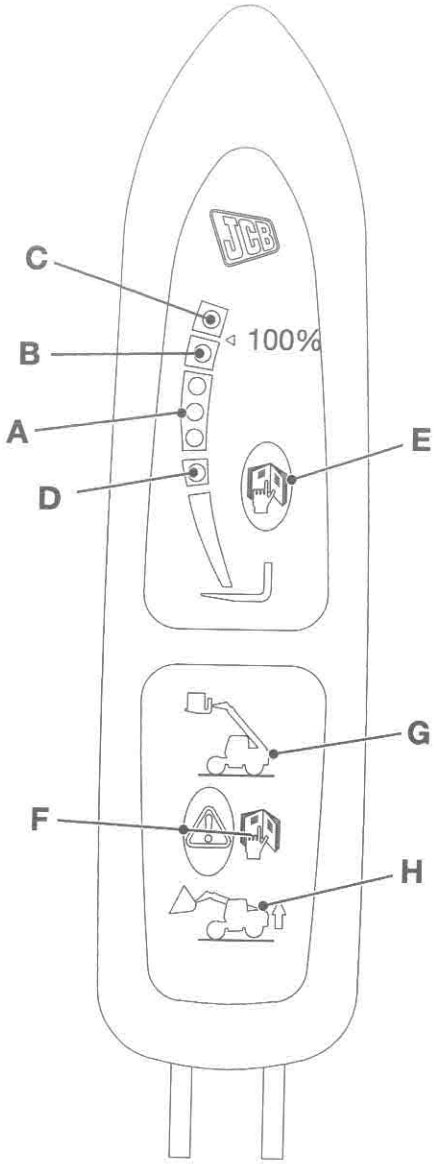


Fig 76.

A	Green LEDs (3)	Safe when lit
B	Amber LED	Caution when lit - approaching machine stability limits
C	Red LED	Danger when lit - machine at limit of stability
D	Power ON indicator	
E	Display button	
F	Mode change button	
G	Load Control mode symbol	Lit when Load Control mode selected, flashes when red LED **C** is lit (in Load Control mode)
H	Ground Work mode symbol	Lit when Ground Work mode selected

Load Control Mode

When the machine is started, Load Control Mode is selected automatically (indicator **G** lit) and should remain engaged whenever the machine is being used for loading and placing operations.

A sensor measures the load exerted on the rear axle and sends a signal to the indicator. The indicator converts the signal into a display in the form of three green LEDs **A**, one amber LED **B** and one red LED **C**. The LEDs illuminate progressively as the load on the rear axle decreases, that is, as the machine approaches the point at which it will tip forward.

⚠ WARNING

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

5-2-4-4

All LEDs flash as the load nears the maximum working limit. If this happens, move the load into a stable position by retracting the boom (this is the best option, if possible), lifting the boom or reducing the load.

If the load exceeds the maximum working limit, the red LED **C** illuminates and an audible warning activates.

Any movement of the load which would further reduce the rear axle load is now prevented. This means that extend, lower, crowd and dump functions are all disabled.

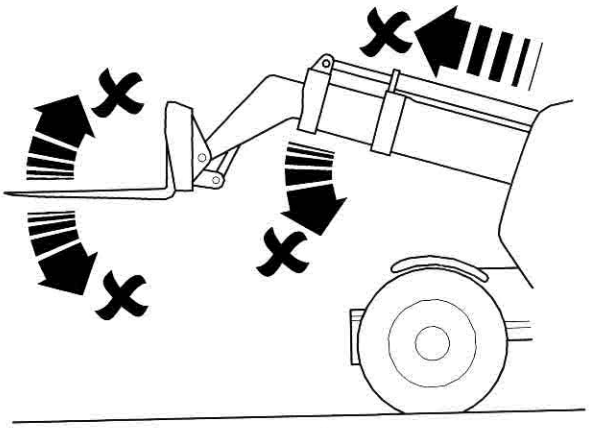


Fig 77.

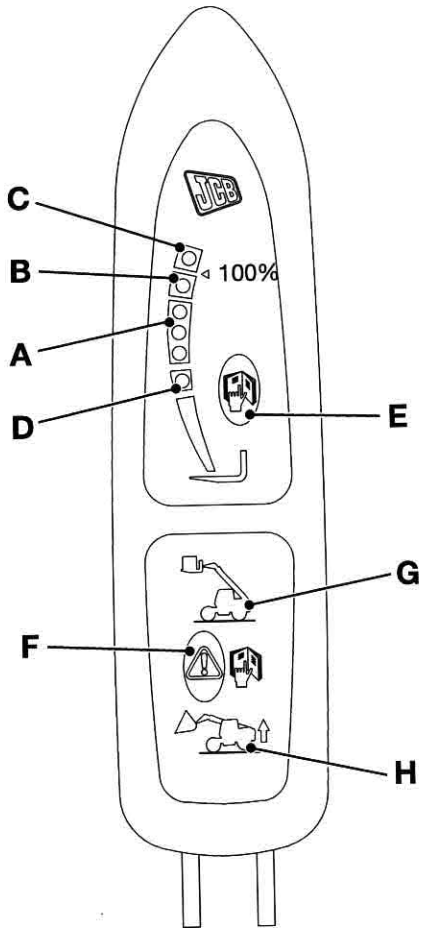


Fig 78.

In Load Control mode, the boom lower hydraulic supply is progressively reduced (derated) as the weight on the rear axle becomes less, ensuring that the load movement is stopped smoothly and without jerking. The tilt hydraulic flow is also restricted; this restriction is constant throughout the range. The extend function operates as normal until the limit is reached.

It is, therefore, a characteristic of the system that lowering and tilt movements are slightly slower than when Ground Work mode is selected. This is normal and does not indicate a machine fault.

You must use either retract **J** or lift **K** to put the machine back into a stable condition, or reduce the load, if possible.

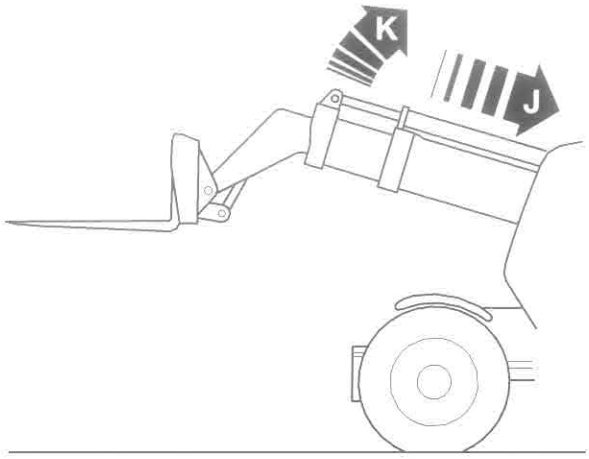


Fig 79.

Under certain conditions, for example, if you attempt to lift a load which is too heavy for the machine, the LCS may activate. In this situation, it may be that the boom is already fully retracted and cannot be raised. If it is not practical to reduce the load to allow the lift to continue, then you will have to select Emergency Override. ⇨ ***Emergency Override (🗋 74)***.

The boom may only be raised above 57° if the stabilisers are down. Make sure that the stabiliser indicator lights are lit before attempting to raise the boom above 57°.

Important: *On machine fitted with LC4, the stabilisers can not be operated if the boom is raised above 10°.*

Ground Work Mode

This should be selected only when the machine is used as a wheeled loader. ⇨ ***Working with a Shovel (🗋 107)***.

Before changing mode, fully retract and lower the boom and remove any load.

To select Ground Work mode, press and hold button **F** for 5 seconds. If the load moment is within allowable limits, all LEDs flash while button **F** is pressed. Release button F and symbol **H** lights, showing that the system is now in Ground Work mode.

If the load moment is too great to permit safe use of Ground Work mode, the system remains in Load Control mode. No change takes place, symbol **G** remains lit and symbol **H** remains unlit.

It is necessary to retract the boom or to reduce the load before again attempting to change to Ground Work mode.

In Ground Work mode, the hydraulic supplies for the lowering, extension and tilt movements are not derated and all the controls work as normal.

LEDs **A** to **D**, display button **E** and the audible alarm all work as in a machine equipped with a standard LMI, warning the operator when the machine is nearing its maximum working limit (ie, when it could tip forward).

⚠ WARNING

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

5-2-4-4

The Load Control features of the system do not operate in Ground Work mode. You must watch the LED display and use the load charts, together with the boom angle and extension markers.

Before changing mode, fully retract and lower the boom and remove any load.

To return to Load Control from Ground Work mode, press and hold button **F** for 5 seconds. Providing the load moment is within limits, the LEDs flash and symbol **G** lights.

If the load moment is too great to permit safe use of Load Control mode, the system remains in Ground Work mode. No change takes place, symbol **H** remains lit and symbol **G** remains unlit.

Note: *The system will reset to Load Control mode when the machine is turned off and on again at the starter switch.*

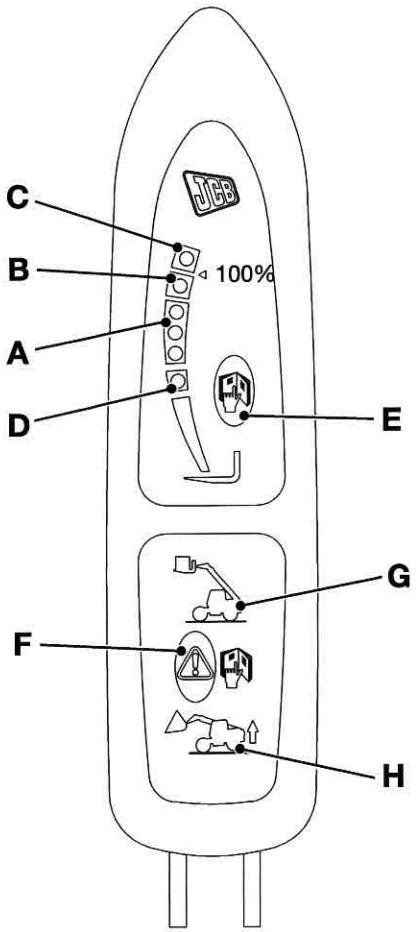


Fig 80.

Emergency Override

⚠ WARNING

Do not use emergency override to attempt to continue handling too heavy a load. You or someone else could be seriously injured or killed.

0185

An Emergency Override is available when working in Load Control mode. This may be required in some circumstances, for example, if the boom is fully retracted but cannot be lowered.

To select emergency override, press and hold button **E** followed by button **F**. The LMI LEDs and both symbols **G** and **H** flash. Both buttons must be held pressed for ten seconds for Emergency Override to become active, and they then must be held pressed to remain in Emergency Override. If either button is released, the system returns to Load Control mode.

Once in Emergency Override mode, the machine operates as normally except the lower function which operates at a reduced fixed speed.

⚠ WARNING

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

0186

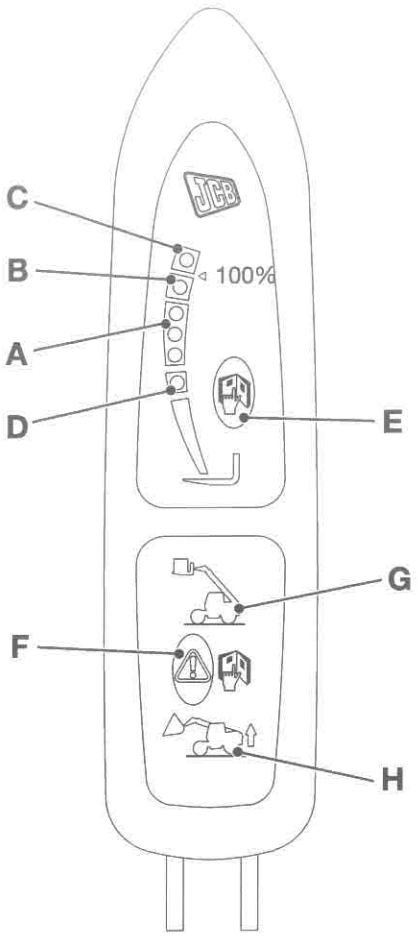


Fig 81.

Daily Functional Check

At the start of each shift, you need to check that the LCS is working.

1 Park the machine (unloaded) on level ground with the engine running. Apply the parking brake and place the forward/reverse lever in the neutral position.

2 The green LED **D** at the bottom of the display illuminates to show that the indicator is receiving power.

3 Press the display button **E** and release.

4 All LEDs on the indicator flash and the audible alarm sounds if the unit is functioning correctly.

Note: *If a system fault is detected, various combinations of LEDs indicate fault codes.* ***⇨ Diagnostic Fault Codes (🗋 77)***.

5 Raise the stabilisers, if fitted, and then select boom raise. The boom should stop at 57°.

On machine fitted with LC4, check that the stabilisers can not be operated if the boom is raised above 10°.

6 Lower the boom, put down the stabilisers. Check that stabiliser leg lights illuminate. Select boom raise. The boom should raise fully.

7 Select a suitable load (for example, a pack of blocks). Make sure that the machine is on level ground and apply the parking brake.

8 With the stabilisers up, position the boom so that the load is about 500mm clear of the ground. Extend the boom slowly and carefully, watching the green LEDs **A** progress up the scale, followed by the amber LED **B**. When the red LED **C** flashes, extension should stop.

9 At this cutout point, and the engine at idle, select boom lower. Nothing should happen. Select dump/ crowd. Nothing should happen. Increase the engine speed to around 1500 to 2000 rpm. Again select lower, dump and crowd. Nothing should happen.

10 Reduce the engine speed. Select boom raise. The boom should raise. Select boom retract. The boom should retract. Use retract and lower to place the load on the ground.

Note: *If any test gives results other than that stated, contact your JCB distributor.*

⚠ WARNING

If the Load Control System is faulty, contact your JCB distributor. Do not try to repair it yourself.

0187

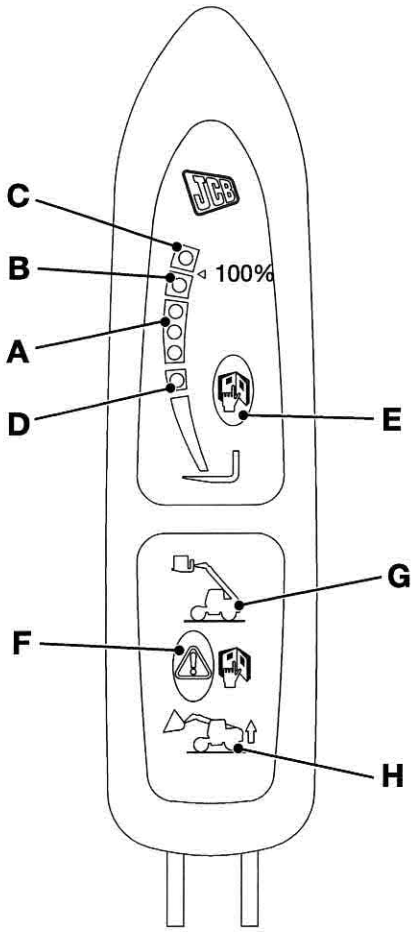


Fig 82.

Warm Up Procedure

P5-2025_2

For the machine hydraulic system to work efficiently, the hydraulic oil should be at a temperature of 10°C (50°F) or above. If the air temperature is above freezing (0°C, 32°F), the oil will reach this temperature during start up without any special warm up procedure.

If the air temperature is below freezing, the following warm up procedure should be carried out.

1 Park the machine (unloaded) on level ground with the engine running. Apply the park brake and place the forward/reverse lever in the neutral position.

2 With the engine at about half throttle (about 1500rpm),

- **a** Raise and lower the boom - five times,
- **b** Extend and retract the boom - five times,
- **c** Dump and crowd the forks - five times.

3 Then perform the daily functional check.

Setting the Volume and Brightness

⇨ *Setting the Volume and Brightness (🗋 68)*.

Diagnostic Fault Codes

When the system detects a fault, the audible alarm will sound and various combinations of lights on the display will indicate a fault code for approximately 10 seconds.

The audible alarm and the fault code display cancel after 10 seconds and ALL LEDs on the display will flash continuously as long as the fault remains. Press and release display button **E** to show the fault code for a further 10 seconds.

When the fault clears, the display will return to normal.

⚠ WARNING

If the Load Control System is faulty, contact your JCB distributor. Do not try to repair it yourself.

0187

If any of these fault codes are displayed, switch the starter key off and on again. Contact your JCB distributor if the fault does not clear.

Error Code 1 - Transducer signal fault

Transducer disconnected or wiring damaged.

Error Code 2 - Calibration out of range

System is incorrectly calibrated.

Error Code 3 - Calibration required

System not calibrated.

Error Code 4 - Display unit faulty

The display box has detected an internal error.

Error Code 5 - Low battery voltage

Battery voltage is below 9 Volts.

Error Code 6 - Fault in LCS manifold

Note: *This code will be accompanied by either or both of the mode symbols lighting, either continuously or flashing. Note pattern of mode symbol illumination.*

LC2 and LC3 Load Control System

Introduction

This section of the handbook provides information for the LC2 and LC3 Load Control Systems (LCS) as fitted to the following machines:

- 535-125
- 535-140
- 540-140

General Information

P5-2024

The LCS is only an enhancement to the devices that JCB currently fit as standard, i.e. loadcharts, boom extension markers and LMI. These are still the primary source of information to allow the operator to operate the machine correctly. The system is there to offer additional control of the load if an operator makes an inadvertent movement of the load by mistake. It is not to be relied upon as the primary source of protection for the machine. The duty of care is still with the operator/site agent to:

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

When the LCS is selected, it reduces the risk of tipping forward when the machine reaches a predetermined point near to its maximum working limit.

This is achieved by stopping boom lower, boom extend, dump and crowd functions, in order to prevent further movement of a load past the predetermined point.

The system has two working modes, Load Control Mode and Ground Work Mode. There is an additional Emergency Override mode. These modes are described in the following pages.

Note: *The LCS provides a degree of protection only against the machine tipping forward. It does not protect against tipping sideways or rearwards, nor tipping due to the machine being used on unsuitable ground nor operator mishandling (sharp direction changes, etc.). See* ***Working With the Machine*** *and particularly* ***Use of Machines on Gradients or Slopes****.*

Neither will the system protect against instability due to the stabiliser legs being lifted nor misuse of the chassis levelling (sway) function (if either of these options are fitted). See ***Stabiliser Control Option*** and/or ***Chassis Levelling (Sway) Option*** in OPERATION section of the machine Operator Handbook.

It is important that the correct functioning of the system is checked at the start of each working day, see ***Daily Functional Check***.

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

⚠ WARNING

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

0184_2

⚠ WARNING

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

5-2-4-13

The LC2 and LC3 Indicator Display

P5-2030

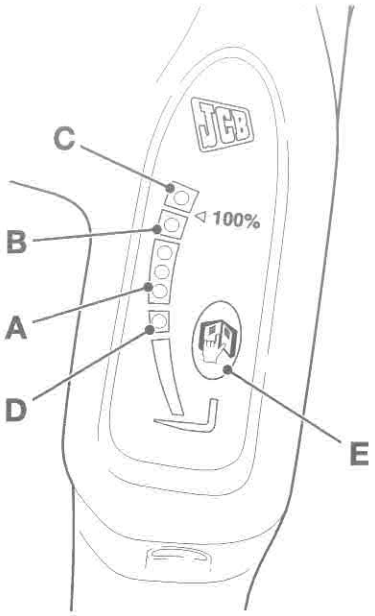


Fig 83.

A	Green LEDs (x3)	Safe when lit
B	i Amber LED (Lit)	Caution - approaching machine stability limits; hydraulic functions slow down.
	ii Amber LED (Flashing)	All functions disabled. See ***Emergency Override***.
C	Red LED	Danger when lit - machine at limit of stability
D	Power ON indicator	
E	Display button	

Load Control Mode

P5-2031

When the machine is started, Load Control Mode is selected automatically and should remain engaged whenever the machine is being used for loading and placing operations.

A sensor measures the load exerted on the rear axle and sends a signal to the indicator. The indicator converts the signal into a display in the form of three green LEDs **A**, one amber LED **B** and one red LED **C**. The LEDs illuminate progressively as the load on the rear axle decreases, that is, as the machine approaches the point at which it will tip forward.

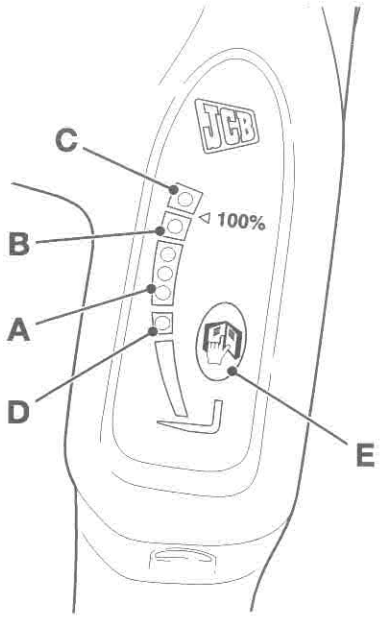


Fig 84.

⚠ WARNING

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

5-2-4-4

All LEDs flash as the load nears the maximum working limit. If this happens, move the load into a stable position by retracting the boom (this is the best option, if possible), lifting the boom or reducing the load.

If the load exceeds the maximum working limit, the amber LED **B** flashes and an audible warning activates. All functions are now disabled.

For machines fitted with stabilisers, the boom may only be raised above 45° if the stabilisers are down. Make sure that the stabiliser indicator lights are lit before attempting to raise the boom above 45°.

Note: *On machines with LC3, the stabilisers can not be operated if the boom is raised above 10°.*

Under certain conditions, for example, if you attempt to lift a load which is too heavy for the machine, the LCS may activate. In this situation, it may be that the boom is already fully retracted and cannot be raised. If it is not practical to reduce the load to allow the lift to continue, then you will have to select Emergency Override. ⇨ ***Load Control Mode (79)***.

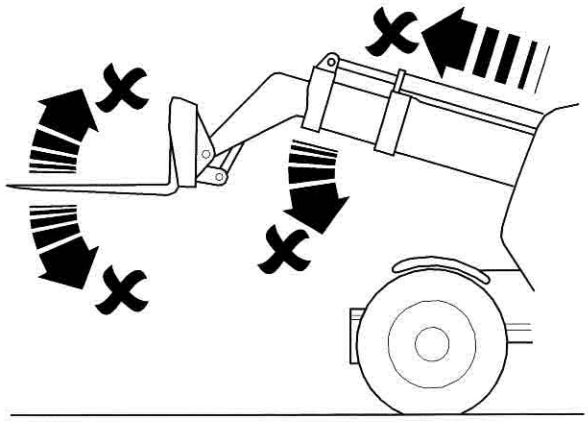


Fig 85.

Ground Work Mode

This should be selected only when the machine is used as a wheeled loader, see ***Working With a Shovel***, OPERATION section.

Before changing mode, fully retract and lower the boom and remove any load.

To select Ground Work mode, press the top of switch **F**. Symbol **G** lights, showing that the system is now in Ground Work mode.

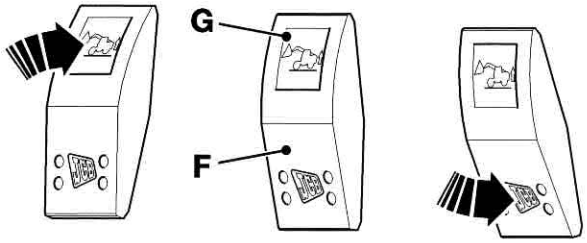


Fig 86.

In Ground Work mode, the hydraulic supplies for the lowering, extension and tilt movements are not derated and all the controls work as normal.

LEDs **A** to **D**, display button **E** and the audible alarm all work as in a machine equipped with a standard LMI, warning the operator when the machine is nearing its maximum working limit (ie, when it could tip forward).

⚠ WARNING

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

5-2-4-4

The Load Control features of the system do not operate in Ground Work mode. You must watch the LED display and use the load charts, together with the boom angle and extension markers.

Before changing mode, fully retract and lower the boom and remove any load.

To return to Load Control from Ground Work mode, press the bottom of switch **F**. Symbol **G** should go out.

Note: The system will reset to Load Control mode when the machine is turned off and on again at the starter switch.

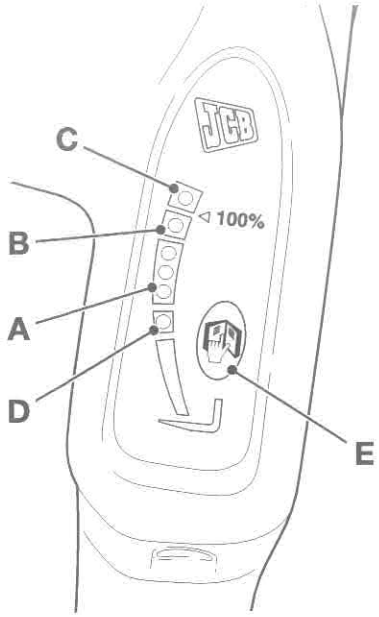


Fig 87.

Emergency Override

⚠ WARNING

Do not use emergency override to attempt to continue handling too heavy a load. You or someone else could be seriously injured or killed.

0185

An Emergency Override is available when working in Load Control mode. This may be required in some circumstances.

To select emergency override, press and hold the bottom of switch **F**. Operate the control levers accordingly to recover the machine.

***Note:** If switch **F** is released, the system returns to load control mode.*

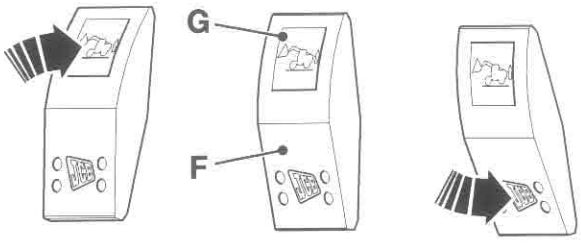


Fig 88.

Once in Emergency Override mode, the machine operates as normal.

⚠ WARNING

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

0186

Warm Up Procedure

P5-2025_2

For the machine hydraulic system to work efficiently, the hydraulic oil should be at a temperature of 10°C (50°F) or above. If the air temperature is above freezing (0°C, 32°F), the oil will reach this temperature during start up without any special warm up procedure.

If the air temperature is below freezing, the following warm up procedure should be carried out.

1 Park the machine (unloaded) on level ground with the engine running. Apply the park brake and place the forward/reverse lever in the neutral position.

2 With the engine at about half throttle (about 1500rpm),

- **a** Raise and lower the boom - five times,
- **b** Extend and retract the boom - five times,
- **c** Dump and crowd the forks - five times.

3 Then perform the daily functional check.

Daily Functional Check

P5-2032_2

At the start of each shift, you need to check that the LCS is working.

1 Park the machine (unloaded) on level ground with the engine running. Apply the park brake and place the forward/reverse lever in the neutral position.

2 The green LED **D** at the bottom of the display illuminates to show that the indicator is receiving power.

3 Press the display button **E** and release.

4 All LEDs on the indicator flash and the audible alarm sounds if the unit is functioning correctly.

Note: *If a system fault is detected, various combinations of LEDs indicate fault codes, see* ***Diagnostic Fault Codes****.*

5 Raise the stabilisers and then select boom raise. The boom should stop at 45°.

6 Lower the boom, put down the stabilisers. Check that stabiliser leg lights illuminate. Select boom raise. The boom should raise fully, slowing down when it exceeds 45°. Check that the stabilisers can not be operated when the boom is raised above 45°.

On machines fitted with LC3, check that the stabilisers can not be operated when the boom is raised above 10°.

7 Select a suitable load (for example, a pack of blocks). Make sure that the machine is on level ground and apply the park brake.

8 With the stabilisers up, position the boom so that the load is about 500mm (20 in.) clear of the ground. Extend the boom slowly and carefully, watching the green LEDs **A** progress up the scale. When the amber LED **B** illuminates, hydraulic operation should slow down. Finally extension should stop, when the amber LED **B** flashes.

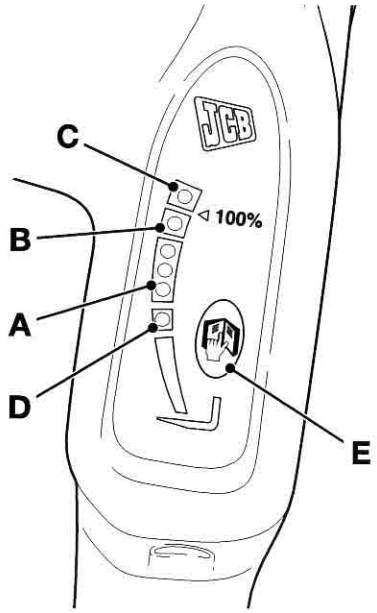


Fig 89.

9 At this cutout point, and the engine at idle, select boom lower. Nothing should happen. Select dump/ crowd. Nothing should happen. Increase the engine speed to around 1500 to 2000 rpm. Again select lower, dump and crowd. Nothing should happen.

10 To recover the machine select Emergency Override, see ***Emergency Override****.*

Note: If any test gives results other than that stated, contact your JCB distributor.

⚠ WARNING

If the Load Control System is faulty, contact your JCB distributor. Do not try to repair it yourself.

0187

Setting the Volume and Brightness

⇨ *Setting the Volume and Brightness (🗋 68)*.

Diagnostic Fault Codes

⚠ WARNING

If the Load Control System is faulty, contact your JCB distributor. Do not try to repair it yourself.

0187

⇨ *Diagnostic Fault Codes (🗋 69)*.

Inclinometer

P5-2010

The lateral position of the machine is indicated by an inclinometer **A** fitted in the cab. Use inclinometer to check that the machine is level before operating the boom. The machine is level when the inclinometer shows zero degrees (0°).

Reposition the machine if a level position cannot be achieved.

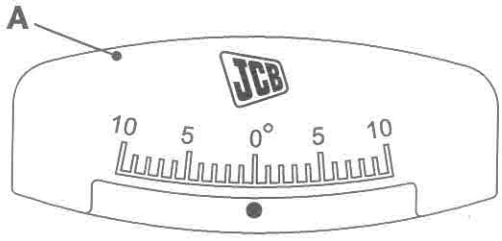


Fig 90.

Beacon

Important: We recommend that a flashing beacon is fitted if the machine is travelling on public highways. In certain territories you will be breaking the law if you do not fit a flashing beacon when travelling on public highways - make sure you are complying with local laws.

A yellow or amber warning beacon kit is available as an option in two different types, either magnetic or retractable:

Beacon **B** has a magnetic base for mounting on the roof.

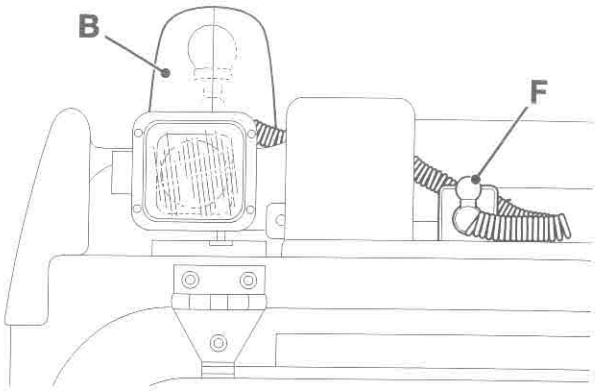


Fig 91.

⇨ *Fig 93. (🗋 84)*. The beacon shown is permanently fitted. When in use it should be raised as at **D**. When not in use it should be lowered as at **E**.

In each case, the beacon's plug connects into a socket **F** on the cab roof.

Switch the beacon on by pressing switch **G**. An indicator light in the switch lights when the beacon is operating.

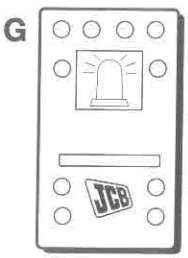


Fig 92.

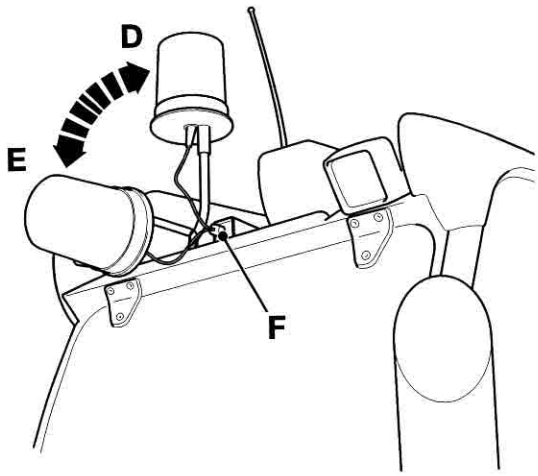


Fig 93.

Before Starting the Engine

P5-2033

*Note: Read **Operating in Low Temperatures** or **Operating in High Temperatures** in Operation section if you will be using the machine in very cold or very hot climates.*

*Note: If the fuel tank has been empty or if any part of the fuel system has been drained or disconnected, the fuel system must be primed before attempting to start the engine. See **Bleeding the System**, Maintenance section.*

1 The parking brake should have been engaged when the machine was last parked. But if it is not already engaged, engage it now.

⚠ DANGER

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

2-2-3-4

2 The carriage should have been lowered to the ground when it was last parked. If not, start the engine and lower the carriage to the ground. Then stop the engine before continuing with Step 3.

⚠ CAUTION

On machines fitted with hose burst protection valves the attachments cannot be lowered with the engine stopped. On these machines start the engine and lower the attachments before doing the walk round inspection.

2-2-3-5

3 For your own safety (and others) and for a maximum service life of your machine, do a pre-start inspection before starting the engine.

a If you haven't already done it, do a walk round inspection of the outside of the machine. See ***Before Entering the Cab***.

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

⚠ WARNING

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

2-2-3-6

c Remove oil, grease and mud from the pedals, control levers and the steering wheel.

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

⚠ WARNING

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.

2-2-3-7_1

e Remove or secure all loose articles in the cab - such as lunch boxes, tools etc.

f Inspect the ROPS/FOPS structure for damage. Get your JCB Distributor to repair any damage. Make sure all its securing bolts are fitted and correctly tightened.

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

h Inspect the seat belt and its mountings for damage and excessive wear.

⚠ WARNING

When a seat belt is fitted to your machine replace it with a new one if it is damaged, if the fabric is worn, or if the machine has been in an accident. Fit a new seat belt every three years.

2-3-1-7_1

i Check that the following are in working order:

Lights, Warning Lights, Horn, Indicator Lights, All Switches, Direction Indicators, Hazard Warning Lights, Windscreen Washer and Wipers (if fitted).

4 Adjust the seat so that you can comfortably reach all the driving controls. You should be able to apply full brake pedal travel with your back against the seat back. See ***Seat Controls***.

5 Adjust the steering column so that you can reach the steering wheel and the steering column switches without stretching. See ***Tilt Adjustment***.

6 Set the rear view mirror(s) to give you a good view close behind the machine when you are correctly seated.

7 Fasten the seat belt. See ***Seat Belt***.

Starting the Engine

1 Read and comply with ***Before Starting The Engine***.

2 Put the Forward, Reverse lever in neutral.

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

3 The battery isolator key must be fitted and switch on before attempting to start the engine. ⇨ ***Battery Isolator (🗋 151)***.

⚠ WARNING

Exhaust Gases

Breathing the machine exhaust gases can harm and possibly kill you. Do not operate the machine in closed spaces without making sure there is good ventilation. If possible, fit an exhaust extension. If you begin to feel drowsy, stop the machine at once and get into fresh air.

INT-2-1-10_2

4 If an immobiliser is fitted, touch the key **F** on the console receptacle **H** for 1 to 2 seconds. Remove the key from the receptacle, the light in the receptacle will go off. If the ignition is not switched on within 30 seconds the immobiliser will arm and the light in the receptacle will start flashing.

5 Normal engine start.

a Slightly depress the accelerator pedal **D**.

Note: *If the temperature is above -6°C (21°F), the cold climate heater warning light will flash momentarily to indicate the system is functioning correctly.* ⇨ ***Warning Lights (🗋 46)***.

b Turn the starter switch **E** to position **III** and hold it there until the engine starts.

6 Cold climate engine start, -6°C (21°F).

a Turn the starter switch **E** to position **I**, the cold start inlet manifold heater warning light will come ON. ⇨ ***Warning Lights (🗋 46)***.

b Fully depress the accelerator pedal to the floor.

c When the warning light goes OFF, turn the starter switch **E** to the `start' position **III** and hold it there until the engine starts.

Note: *Do not operate the starter motor for more than 10 seconds without the engine firing. If the engine fires but does not fully start, do not operate the starter motor for more than 40 seconds. Let the starter motor cool for at least two minutes between starts.*

7 Release the starter key as soon as the engine starts. The switch will return to `IGN' position **I**.

⚠ WARNING

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.

3-2-1-9

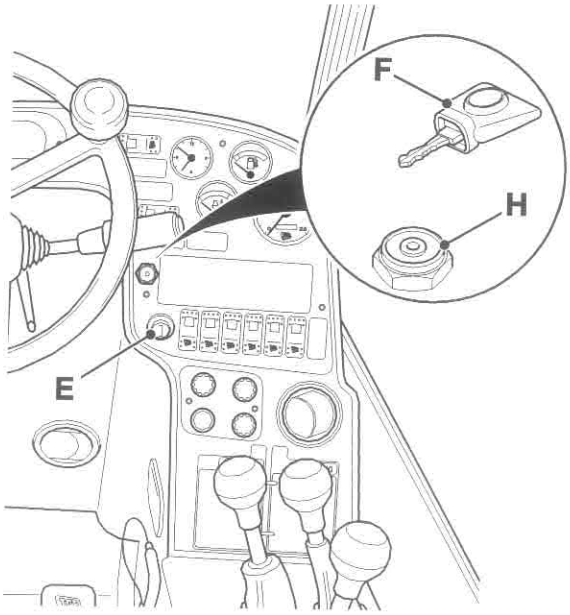


Fig 94.

8 Ease off on the accelerator pedal to reduce engine speed.

9 Once the engine has started, check that all the warning lights have gone off. Do not race the engine until the oil pressure low light has gone out.

⇨ ***Warning Lights (🗋 46)***. Racing the engine too soon could damage the turbo-charger due to under lubrication. Check that the audible alarm is silent.

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

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

10 Operate the hydraulic services to ensure each function is working correctly and to help warm up the hydraulic system.

11 Machines with Three stage booms only:

Three stage booms can go out of phase if the hydraulic cylinders are not fully retracted regularly. Check the boom stages are phased correctly before working with the machine. ⇨ ***Re-phasing of 3 Stage Booms (🗋 50)***.

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

Preparing the Machine for Travel

When travelling on the road or on site there are usually local rules and safety regulations for the machine travelling position. The ***Preparing for Road Travel*** and ***Preparing for Site Travel*** described on the following pages are recommendations that should help you meet the requirements of these regulations; they are not necessarily the applied law.

Please make sure that before travelling on the road or on site, you and your machine comply with all the relevant local yours - it is your responsibility.

Preparing for Road Travel

Important: *Make sure you will be obeying all pertinent laws and regulations before you take the machine on public roads.*

Important: *Machines without headlights and sidelights are designed for site use, you may be breaking local laws if you travel on the road without headlights or sidelights.*

1 In certain countries ie. Italy, legislation requires the front windscreen guard (if fitted) is removed before travelling on public roads.

2 Use the chassis levelling (sway) switch, (if fitted) to set the body of the machine square to the axles. ⇨ ***Chassis Levelling (Sway) Option (🗋 58)***.

3 Ensure both stabiliser legs, (if fitted) are fully raised and isolated. ⇨ ***Stabiliser Control Option (🗋 59)***.

4 Fully retract the boom. Lower the boom fully then raise it slightly. Tilt the carriage back, to keep the heel of the forks **A** 300 mm (12 in) above the ground.

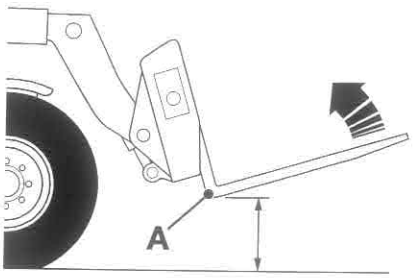


Fig 95.

Note: *In certain countries legislation requires the forks to be folded back before travelling on public roads.*

⚠ WARNING

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

0002

Fit fork retention brackets **B** (as required) and secure with retaining pin **C** and locking pin **D**.

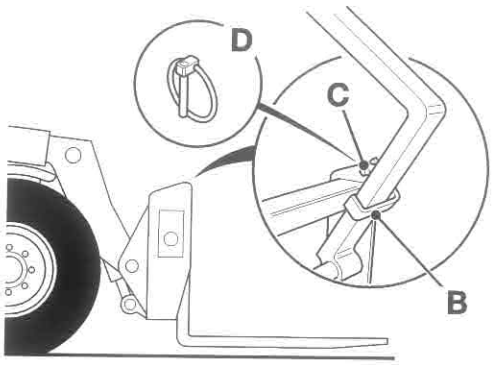


Fig 96.

5 In certain countries ie. Germany, legislation requires the forks to be removed and safety guard **E** fitted. Check local requirements.

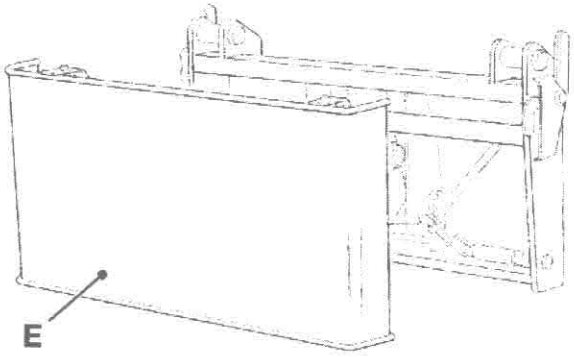


Fig 97.

6 If pivoting lights are fitted, complete step 6a, otherwise continue at step 7.

a Move the rear light cluster **F** to the horizontal position. The cluster **F** is spring loaded by its rubber mounting bush. To swing it up or down, whichever is applicable to your machine, pull the cluster slightly rearward to disengage, then swing it to the new position.

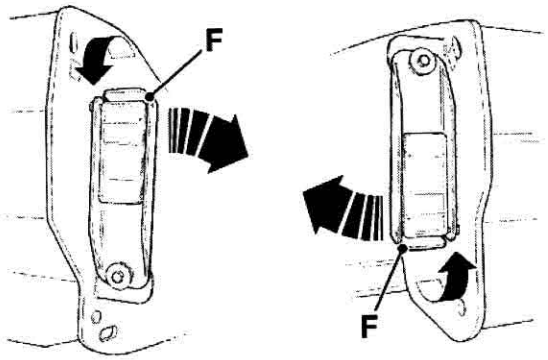


Fig 98.

⚠ CAUTION

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

5-2-3-2

7 In the UK, before travelling on public roads, it is your responsibility as a user to comply with The Road Vehicles (Construction and Use) (Amendment) Regulations 1997 (`Bridge Bashing Regulations'). By way of guidance only, the following steps may be taken to comply:

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

b Utilise the restraining device (Described) to ensure the equipment is in the travelling position.

Important: *Whilst this information is believed to be correct, JCB cannot be aware of all circumstances in which the JCB machine may be operated on a Public Highway and it is the responsibility of the user to ensure compliance with the regulations.*

With the boom in the travel position, fit restraining strap **G** over the boom and attach to the lifting lugs on the chassis side plates.

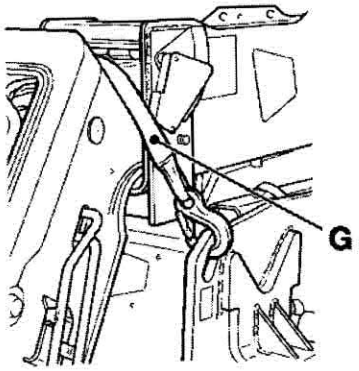


Fig 99.

8 If any optional attachments are fitted, make them safe as detailed in ***OPTIONAL ATTACHMENTS*** section.

When travelling with a bucket, tooth guard **J** must be fitted.

Important: *In certain countries ie. Italy, legislation requires safety marker plate **K** to be fitted before travelling on public roads.*

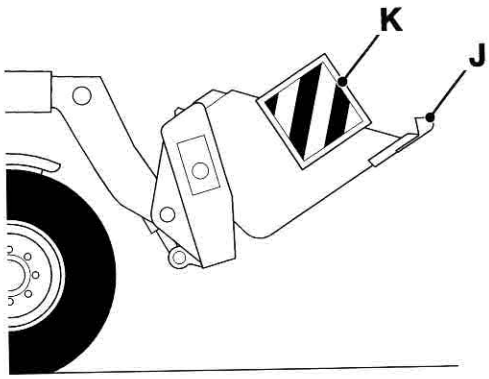


Fig 100.

⚠ CAUTION

Do not travel on public roads with the machine loaded.

5-2-3-1

9 Lock the controls (as required). ⇒ ***Control Lever Locks (🗋 61)***.

10 Align the road wheels. ⇒ ***Re-phasing the Steer System (🗋 114)***. Select 2 wheel steer, do not use

crab steer or 4-wheel steer on public roads. Lock the steer mode selector by lowering the hinged flap H.

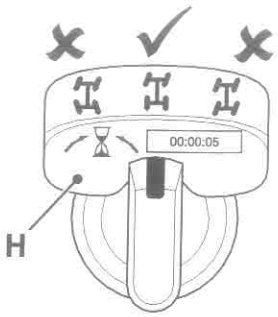


Fig 101.

11 The traffic regulations may require you to have a warning beacon operating on some public roads. ⇨ ***Beacon (🗋 83)***. Check that all road lights are working correctly.

12 If towing: ⇨ ***Mechanical Tow Hitch Option (🗋 112)***.

13 Switch on Smooth Ride System (if fitted). ⇨ ***Smooth Ride System (🗋 44)***.

Preparing for Site Travel

1 Use the chassis levelling (sway) switch, (if fitted) to set the body of the machine square to the axles. ⇨ ***Chassis Levelling (Sway) Option (🗋 58)***.

2 Ensure both stabiliser legs, (if fitted) are fully raised and isolated. ⇨ ***Stabiliser Control Option (🗋 59)***.

3 Fully retract the boom. Lower the boom fully then raise it slightly. Tilt the carriage back, to keep the heel of the forks **A** 300 mm (12 in) above the ground.

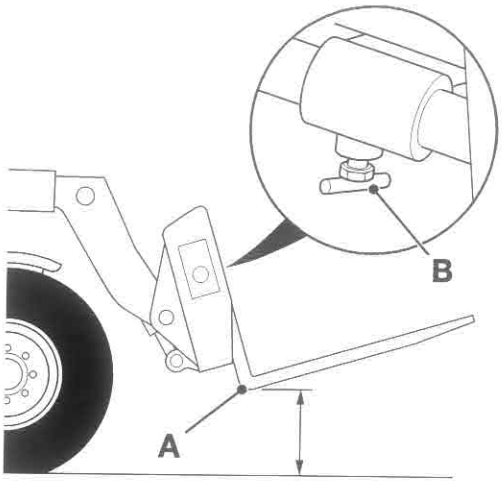


Fig 102.

Note: *When attachments are fitted, position the boom in the 'low carry' position so that the right hand mirror is not hidden from the operator's view.*

4 Fully tighten the clamping screws **B** to prevent side movement of the forks (if fitted).

5 Move the rear light cluster **F** to the vertical position. The cluster **F** is spring loaded by its rubber mounting bush. To swing it up or down, whichever is applicable to your machine, pull the cluster slightly rearward to disengage, then swing it to the new position.

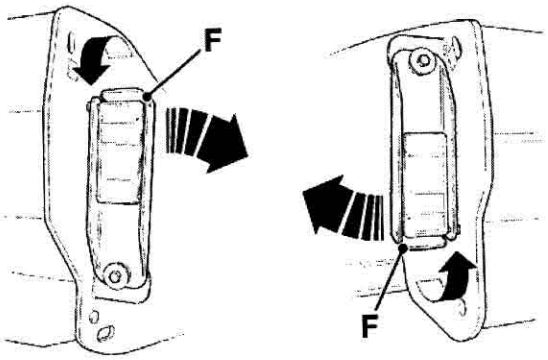


Fig 103.

6 If fitted select the steer mode required. ⇨ ***Steer Mode Selector (🗋 38)***.

7 If any optional attachments are fitted, make them safe. ⇨ ***Optional Attachments (🗋 185)***.

8 Switch on Smooth Ride System (if fitted). ⇨ ***Smooth Ride System (🗋 44)***.

Testing the Parking Brake

Important: Ensure all routine health and safety precautions are observed before operating machines.

Note: If you have any queries concerning this test procedure or parking brake adjustment, consult your local JCB distributor.

⚠ WARNING

Before testing the park brake make sure the area around the machine is clear of people.

2-2-4-5

1 Enter the machine. Fasten your seat belt (if fitted) and park the machine on a level dry surface.

2 Fully apply parking brake **1**.

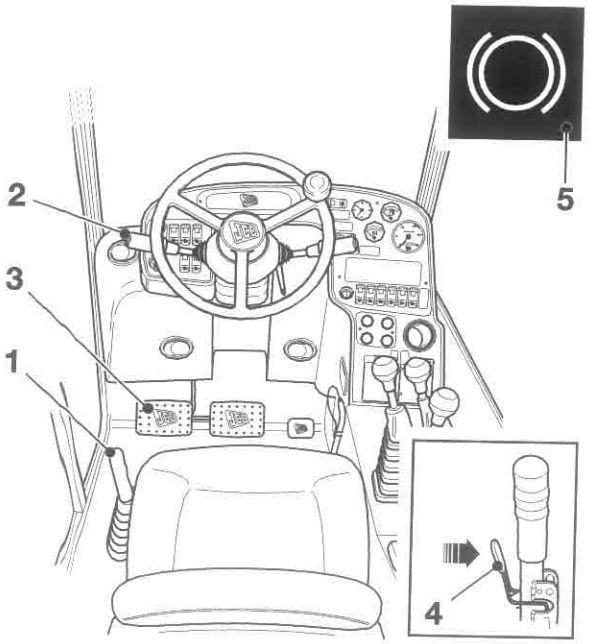


Fig 104.

3 Start the engine and raise the attachments to the appropriate travelling position.

4 Select fourth gear **2**.

5 Push down hard on foot brake pedal **3**.

6 Select forward drive **2**.

⚠ WARNING

If the machine starts to move during the following test, immediately apply the foot brake and reduce the engine speed.

2-2-5-1

7 Test the parking brake as follows:

a Depress the locking lever **4** to disengage the parking brake switch. Warning light **5** should go off.

b Slowly release the foot brake pedal **3**.

c If the machine has not moved, use the accelerator to gradually increase the engine speed to approximately 1500 RPM. The machine should not move.

***Note:** Do not do this test for longer than 20 seconds.*

d Reduce engine speed to idle and select neutral **2**.

e Release locking lever **4**.

f Lower attachments and stop the engine.

g If the machine moved during the test, adjust the parking brake and repeat the test. ⇨ ***Parking Brake Adjustment (🗋 148)***.

⚠ WARNING

Do not use a machine with a faulty park brake.

3-2-3-10_2

⚠ WARNING

Non approved modifications to drive ratios, machine weight or wheel and tyre sizes may adversely affect the performance of the parking brake.

3-2-3-11

Getting the Machine Moving

Operating Practices

P5-2020

⚠ WARNING

Hillsides

Operating the machine on hillsides can be dangerous if proper precautions are not taken. Ground conditions can be changed by rain, snow, ice etc. Check the site carefully. Operate in first gear on hillsides, when applicable, keep all attachments low to the ground. Never coast down a hill with the engine off or the transmission in neutral.

INT-2-2-7

The machine can be put in motion in any gear. But do not over work the engine unnecessarily by using too high a gear for example, on a hill. Operating in too high a gear will overheat the torque converter fluid.

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

⚠ WARNING

Do not dismount a moving machine.

3-2-3-12

Do not use the brake pedals as footrests.

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

⚠ WARNING

Slopes

Always drive a LOADED machine FORWARD UPHILL and in REVERSE DOWNHILL.

Always drive an UNLOADED machine in REVERSE UPHILL and FORWARD DOWNHILL.

9-1-3-3

Do not turn on or drive across a slope.

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

If the load will be pushing the machine on a downslope, select first gear (1) before starting downhill.

Use the brake pedal to prevent overspeeding down a slope.

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

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

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

⚠ WARNING

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

INT-2-1-12

Limited Slip Differential (LSD)

T2-003

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

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

Operating Procedure

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

Note: *Control and switch locations are provided within this publication.* ⇨ ***Cab Layout (🗋 34)***.

1 Check your seat belt and seat.

a Make sure that your seat belt is correctly fastened.

b Make sure that the seat is correctly adjusted.

2 Select the required steer mode.

Important: *Remember that the steering may temporarily remain in the last selected mode until the rear wheels pass through the 'straight ahead' position.*

⚠ WARNING

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

5-2-3-3

3 Engage a gear. Select the required gear using gear select switch.

⚠ WARNING

Powershift Transmission

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

2-1-1-9_1

⚠ WARNING

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

2-2-2-4

4 Select Forward or Reverse and move off.

⚠ WARNING

Reversing

Reversing at high speeds can cause accidents. Do not reverse in a high gear with full throttle. Always drive at a safe speed to suit working conditions.

INT-2-2-9_1

a Check the boom is in the travel position.

b Push the brake pedal(s) hard down.

c Lift the forward/reverse lever from its detent position and select forward or reverse.

Note: *When forward or reverse is selected, an audible alarm will sound and a warning light will show to remind you that the parking brake is engaged.*

d Release the parking brake.

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

⚠ WARNING

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.

INT-2-1-5

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

Stopping and Parking the Machine

Note: *Control and switch locations are provided within this publication.* ⇨ ***Cab Layout (📄 34)***.

1 Stop the machine on dry and level ground where the machine will not be a hazard or danger.

⚠ WARNING

Parking

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

INT-2-2-4_2

2 Ease up on the accelerator pedal and down on the brake pedals to bring the machine to a smooth stop. Keep the foot brakes on until the parking brake has been engaged and the drive disengaged (Steps 3 and 4).

⚠ CAUTION

The parking brake must not be used to slow the machine from travelling speed, except in an emergency, otherwise the efficiency of the brake will be reduced. Whenever the parking brake has been used in an emergency, always renew both brake pads.

4-2-1-1_2

3 Pull the parking brake lever fully up. Make sure that the parking brake indicator lights up. Release the foot brakes.

Note: *An audible alarm will sound when the parking brake is engaged with the machine in forward or reverse drive. The alarm will stop when the drive is disengaged (see Step 4).*

⚠ WARNING

Do not dismount a moving machine.

3-2-3-12

4 Set the forward/reverse lever to neutral. Make sure the lever is in its detent position.

⚠ DANGER

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

2-2-3-4

5 Retract and lower the boom, rest the forks flat on the ground.

Note: *Do not leave a 3-stage boom machine with the boom fully elevated and at full extension. This can allow oil to seep past one of the makeup valves and cause the boom sections to become out of phase. This will damage the boom hose management system when the boom is retracted.*

⚠ CAUTION

Rams

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.

INT-3-2-10

6 Lock the controls. ⇨ ***Control Lever Locks (📄 61)***.

7 It is recommended that turbocharged engines are run at 1000 RPM (approximately) and reduced load for 2 - 3 minutes before shut down. This will allow the turbocharger to cool.

8 If you are leaving the machine, make sure that all switches are set to off. If necessary, leave the hazard warning and/or side lights switched on. Remove the starter key.

9 Use the handholds and step when you climb down from the machine. If you are leaving the machine, close and latch all windows and lock both doors. Make sure that the filler cap is locked on.

⚠ WARNING

Entering/Leaving

Entering or leaving the cab or canopy must only be made where steps and handrails are provided. Always face the machine when entering and leaving. Make sure the step(s), handrails and your boot soles are clean and dry. Do not jump from the machine. Do not use the machine controls as handholds, use the handrails.

INT-2-1-7_1

10 At the end of a working cycle or if the machine is being left unattended, provided the lights are not required remove the battery isolator key (if fitted). ⇨ *Battery Isolator (📄 151)*.

Working with the Machine

Introduction

P5-2001_2

This section explains some techniques and procedures for using the machine efficiently and safely.

However, there are a wide variety of situations in which your machine may be used. Consequently, in all cases, the applicability of these notes must be determined by the person seeking to apply them, on the basis of his/her own judgement, in the light of the conditions in which use is intended and subject to all relevant statutory requirements.

The information in this section is given in good faith and in light of the best information available, JCB can accept no responsibility for the recommendations, advice, statements, opinions and conclusions expressly or by implication set out below and gives no warranty or representation of assurance in respect of the accuracy of the same.

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.

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.

⚠ DANGER

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

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

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

0074

Read and understand this section and ***Using the Load Charts and Boom Indicators*** before you start working with your machine. Practice with it until you know exactly where the controls are and what they do.

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

This section deals with machines fitted with standard fork carriages. Operating information for other attachments is given in OPTIONAL ATTACHMENTS section.

Before using any attachment, consider how the attachment is going to affect operational safety. With the attachment fitted, there may be changes in the machine's centre of gravity or overall dimensions. This could have an effect on, for example, machine stability, the gradients on which it is safe to operate or the safe distance from power lines.

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

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

Read ***Operating Safety*** in INTRODUCTION section, plus the following information.

Safety Practices

P5-2002

Clothing and Safety Equipment

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.

Carrying a Load

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

Look in the direction of travel and keep a clear view of the way ahead. Seek assistance if forward vision is obscured by a bulky load.

Particular care is required when driving off level ground, see ***Use of Machines on Gradients or Slopes*** (OPERATION section).

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

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

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

Risk Assessment

P5-2003

It is the responsibility of the competent people planning the job and operating the machine to make judgement as to the safe use of the machine, having taken 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 complies with any safety precautions that the assessment identifies.

If you are unsure of the suitability of the machine for a specific task, contact your JCB distributor 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 making a risk assessment. Other factors may need to be considered.

Important: *An adequate risk assessment depends on the training and experience of the operator. Do not put your life or the lives of others at risk.*

General

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

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

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

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

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

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

These figures apply only to the machine in it's normal travelling mode, that is with boom retracted and with the upper surface of the heels of the fork arms not more than 500mm (20in) above mean ground level, and travelling no faster than walking pace. Particularly in the case of a lateral slope, some form of restraint on the load may be necessary.

Personnel

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

The machine

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

The load

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

Loading/unloading area

- Is it level? Any gradient of more than 2.5% (1 in 40) should be carefully considered.
- Is more than one direction of approach to the load possible? Approaching across the gradient should be avoided, if possible.
- Is the ground firm? Will it support the weight of the machine when loaded?
- How rough is the ground? Are there any sharp projections which could cause damage, particularly to the tyres?
- Are there any obstacles or hazards in the vicinity, for example, debris, excavations, man-hole covers, power lines?
- Is the space adequate for safe manoeuvring?
- Are any other vehicles or persons likely to be in or to enter the area whilst operations are in progress?

The route to be traversed

- How firm is the ground, will it provide adequate traction and braking?
- How steep are any gradients, up/down/across? Cross gradients are particularly hazardous, is it possible to detour to avoid them?

Weather

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

Lifting and Loading Operations

P5-2004

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

As an example, in the United Kingdom, the following publications are relevant (this list is not exhaustive):

- Safety in working with lift trucks (HS66) HSE 1999 ISBN 0-7176-1781-5
- Rider operated lift trucks - Operator training Approved Code of Practice and Guidance HSE 1999 ISBN 0-7176-2455-2
- BITA Operators Safety Code for Rough Terrain RTTHs
- BITA Stability Awareness Guidance for Powered Industrial and Rough Terrain RTTHs
- Provision and Use of Work Equipment Regulations 1998, Regulation 9
- Health and Safety at Work Act 1974
- Management of Health and Safety at Work Regulations 1992
- Construction (Health, Safety and Welfare) Regulations 1996
- Construction (Design and Management) Regulations 1996
- Lifting Operations and Lifting Equipment Regulations 1998 (LOLER 98)Working platforms on fork-lift RTTHs - HSE Guidance Note PM 28 Second Edition
- Hand signals:

BS 5744:1979	Code of practice for safe use of cranes
BS 6736:1986	Code of practice for hand signalling in agricultural operations
BS 7121:1989	Code of practice for safe use of cranes
CP 3010:1972	Code of practice for safe use of cranes

Note: *HSE Guidance Note PM 28 states that Rough Terrain trucks with a lift height of more than 6 metres are not suitable for Working Platforms unless they meet the safety requirements similar to a Mobile Elevated Work Platforms made to BS 7171 or equivalent. As this requirement is open to interpretation, we advise that users*

intending to use a working platform with the machine should contact their local HSE inspector for advice.

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

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

Safety Warnings

P5-2005

⚠ WARNING

Before you start using the machine, inspect the job site. 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.

5-2-3-4

⚠ DANGER

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

0004

⚠ CAUTION

Travelling too fast or with the load too high can make the machine tip over. Keep the load close to the ground when travelling.

Do not go faster than walking pace when the machine is carrying a load. Drive carefully over bumps and curbs.

Do not operate the boom/carriage controls while the machine is moving.

5-2-3-5_1

⚠ WARNING

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.

INT-2-2-5

⚠ WARNING

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.

INT-2-2-8

⚠ CAUTION

Make sure you know the weight of the load before trying to lift it. Raise the load only a few centimetres at first, to check that the machine is stable. Lower the load straight away if the machine begins to feel unstable. If the machine feels unstable when the boom is raised and extended, always retract the boom before lowering it.

Do not exceed the loading limits shown on the Load Charts (see Using the Load Chart and Boom Indicators, in OPERATION section).

5-2-3-6_1

⚠ CAUTION

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

5-2-3-7

⚠ DANGER

Overhead Electrical Power Lines

You can be electrocuted if you get your machine too close to live electrical power lines. Before starting work, find out if there are electrical power lines on the jobsite. If there are, contact the local electricity supplier and ask what safety precautions you must take. Also find out if there are any local laws and regulations concerned with work near electrical power lines.

When you have found out what safety precautions, laws and regulations apply to the jobsite, make sure they are all obeyed.

5-1-5-6

⚠ CAUTION

Fork Spacing

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

5-1-4-2

⚠ CAUTION

One-Fork Lifting

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

5-1-4-3

⚠ CAUTION

Unloading

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

5-1-4-4_2

⚠ WARNING

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

0003

⚠ WARNING

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

0005

Fork Ratings

P5-2006

⚠ WARNING

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

0003

JCB approved forks for this machine are marked with a maximum load capacity rating **A**. The rating shows the maximum load capacity in kilograms (kg) that the forks can carry safely at the maximum load centre **B** of 500mm (20 inches).

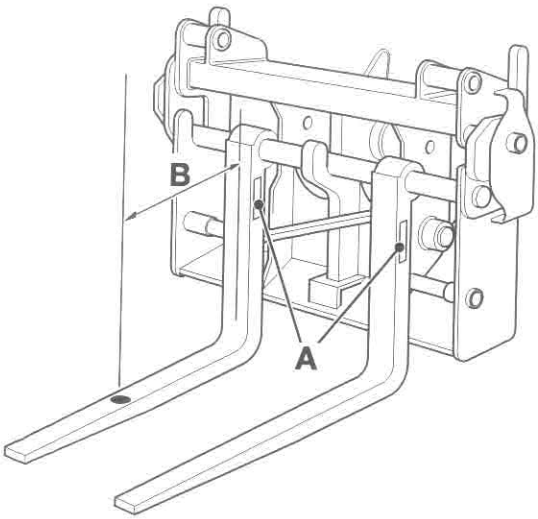


Fig 105.

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

Forks must be used in matched pairs.

The maximum rated load capacity of the machine is shown in ***Performance Dimensions*** (SPECIFICATIONS). The forks used on this machine must have a total load rating which is equal to, or exceeds the rated load capacity of the machine.

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

Important: *All lifting equipment, including forks and their mountings, may need regular inspection and testing by a competent person to ensure they are fit for purpose.*

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

Check with your local JCB distributor for further advice.

Handling Palleted Loads

P5-2007

⚠ CAUTION

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

5-2-4-7

⚠ WARNING

Make sure you know the weight of the load before lifting or placing it.

Do not exceed the Safe Working Load of your machine. Do not angle or extend the boom outside the limits shown on the Load Charts in the cab. See Using the Load Charts and Boom Indicators (in OPERATION Section).

5-2-4-8_1

⚠ WARNING

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

0002

Loading

1 Space the forks as wide as possible to suit the load. Tighten the fork clamping screws **A**.

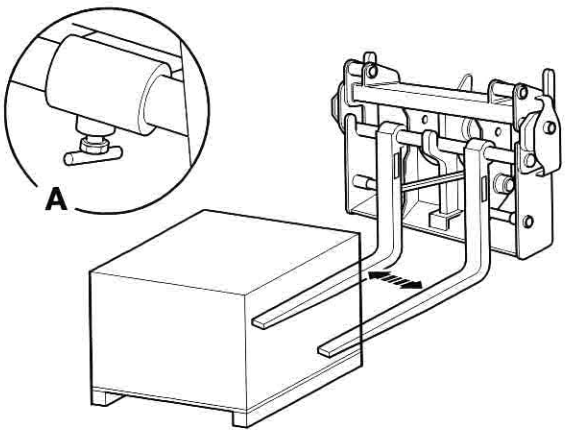


Fig 106.

2 Put the forks in the horizontal position. Fully retract the boom.

3 Approach the load straight-on, not at an angle, with all wheels straight. Stop the machine, leaving enough room to manoeuvre the boom. Engage the parking brake. Put the transmission in neutral.

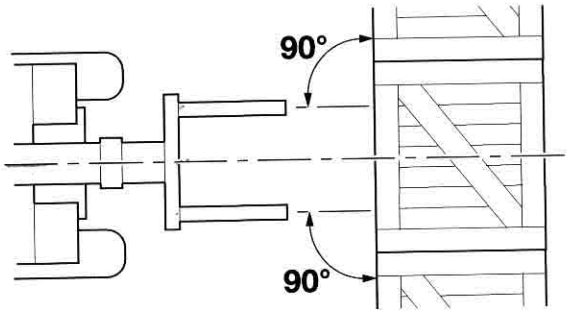


Fig 107.

Note: *If the load is on a high platform you may have to raise the boom to allow you to get the machine close enough to the load.*

4 Extend the boom, or drive the machine, to insert the forks under the load. Stop when the carriage just touches the load. Check the boom extension/angle, make sure they are in limits.

⚠ WARNING

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

5-2-4-9

5 Raise the load slightly. Tilt the carriage back. Retract the boom fully and lower it into the travel position.

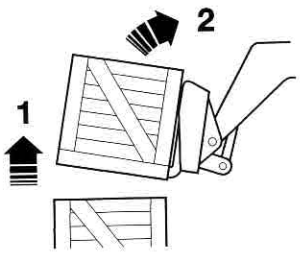


Fig 108.

6 Carefully drive the machine to the unloading point.

Unloading

⚠ CAUTION

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

5-2-4-7

⚠ WARNING

Make sure you know the weight of the load before lifting or placing it.

Do not exceed the Safe Working Load of your machine. Do not angle or extend the boom outside the limits shown on the Load Charts in the cab. See Using the Load Charts and Boom Indicators (in OPERATION Section).

5-2-4-8_1

1 Approach the unload area on centre, with all wheels straight. Stop the machine, leaving enough room to manoeuvre the boom. Make sure you will not exceed the loading limits shown on the Load Chart.

2 Engage the parking brake. Put the transmission in neutral.

3 Position the load just above its required position. If stacking box pallets, ensure that the stack is straight and square. For extra stability, stagger the top row.

4 Lower the load into position. Make sure the load is level.

5 Carefully withdraw the forks. Depending on the height of the load, you may have to raise or lower the boom as the forks come out.

6 When the forks are clear of the load, fully retract the boom. Lower the boom into the travel position.

Uneven Loads

P5-2008

Important: *Use extra caution when operating the boom and carriage with an uneven load.*

1 Find the load's Centre of Gravity. On packaged loads it may be marked on the box.

2 Position the machine so that the load's centre of gravity is halfway between the forks. ⇨ *Fig 109. (105)*.

3 Pick/Place the load, this will depend on what kind of load it is. If it is palleted, follow the procedure for palleted loads. If it is not palleted, it may be necessary to secure the load to the forks using suitable chains. Stop the engine before allowing anyone to approach the forks.

Note: *If you cannot find out the load's centre of gravity, do the following: Make trial lifts at different positions until you are sure the load is stable on the forks. Do not raise the load more than a few centimetres when you make the trial lifts.*

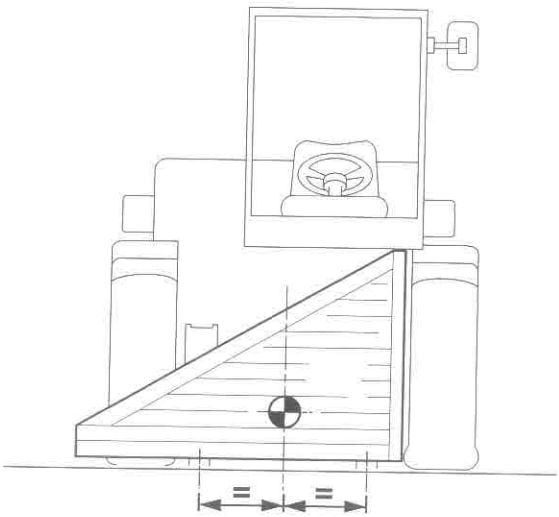


Fig 109.

Handling Bales

P5-2017

Handle bales only after you fully understand how to handle palleted loads. The basic procedure is the same, but remember the following points:

Lifting Bales

1 Lower the boom and tilt the carriage forward as shown.

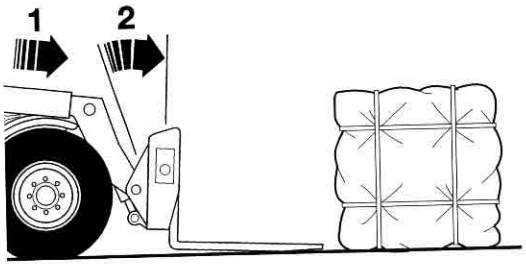


Fig 110.

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

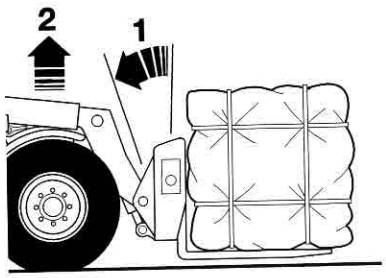


Fig 111.

Placing Bales

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

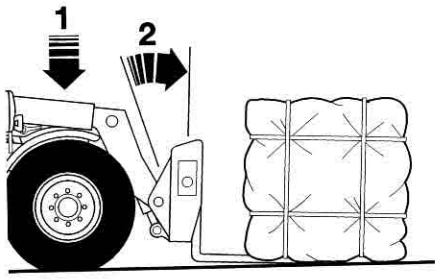


Fig 112.

2 Retract the boom, withdrawing the forks from under the bale. When the forks are clear, return the boom and carriage to the travelling position.

⚠ WARNING

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

5-2-4-10

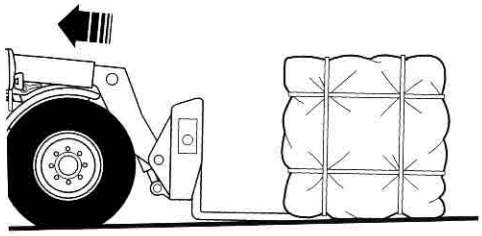


Fig 113.

Working with a Shovel

P5-2018

⚠ WARNING

Make sure you know the weight of the load before lifting or placing it.

Do not exceed the Safe Working Load of your machine. Do not angle or extend the boom outside the limits shown on the Load Charts in the cab. See Using the Load Charts and Boom Indicators (in OPERATION Section).

5-2-4-8_1

⚠ WARNING

When loading with material from a high bank or pile, remove any overhang first. Watch out for sliding material. If overhanging material falls, you and your machine could be buried.

2-2-6-3

⚠ CAUTION

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

5-2-4-7

⚠ CAUTION

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

0070

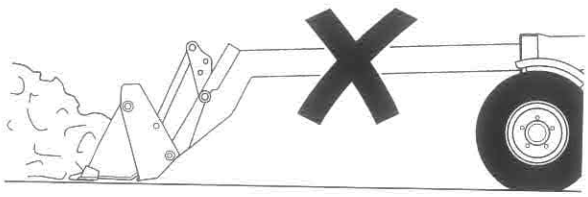


Fig 114.

The JCB Loadall may be used with a wide variety of attachments, including shovels, see Optional Attachments. The following paragraphs are intended to bring some of the relevant considerations to your attention. They are not intended to be comprehensive, nor to be a substitute for adequate training. Make sure you are trained before using any attachment.

As the shovel enters the pile, start rolling the shovel back while raising it at the same time. This will sweep the shovel up the pile, gathering material as it goes.

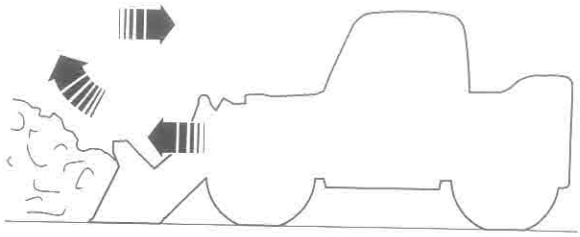


Fig 115.

Pressing the transmission dump switch will give more power to the loader and speed the operation. Try to fill the shovel in one pass. Half full shovels are less productive.

When moving the load, roll the shovel right back to prevent spillage.

When you are loading from a pile of loose material, start at the bottom and follow up the face as shown. Approach the pile with the shovel level and skimming the ground.

In tightly packed material, start at the top and work down.

When removing material from a stockpile, start at a shovel's height from the base. Once the height of the stockpile has been reduced, begin loading from the base.

Loading a Truck

T2-004

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

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

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

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

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

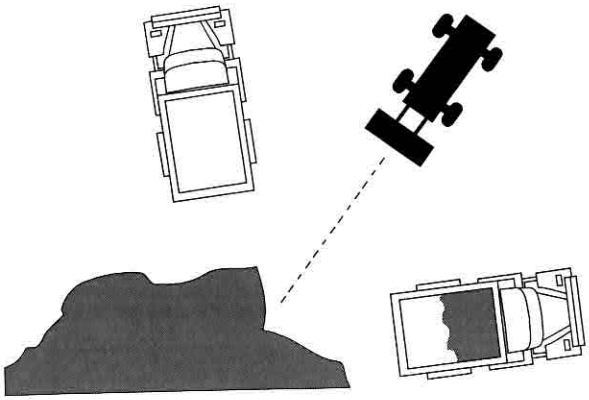


Fig 116.

Use of Machines on Gradients or Slopes

P5-2019

⚠ WARNING

Ensure that you have been trained and are familiar with the use of machines on gradients, and understand the adverse affects 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.

0017

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 gradient.

It is essential that a risk assessment of the work to be done is completed, see ***Risk Assessment*** (OPERATION section), and that the operator complies with any safety precautions that the assessment identifies.

Driving Up and Down Gradients

To ensure maximum traction do the following when driving on a gradient.

Drive an unladen machine forward down a gradient and in reverse up a gradient.

Drive a laden machine forward up a gradient and in reverse down a gradient.

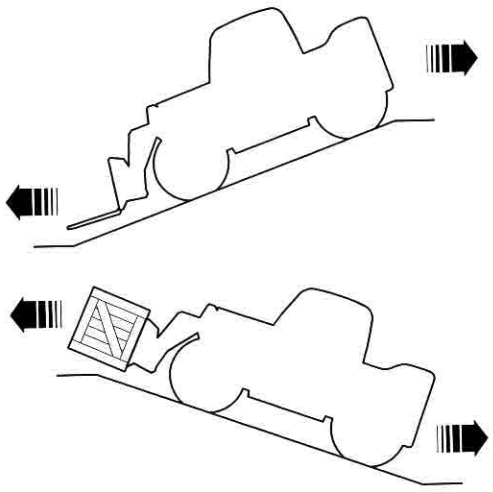


Fig 117.

Driving Across Gradients

Read and understand the instructions in this handbook before travelling across a gradient.

Maximum stability is achieved when the machine is operated on firm level ground. Stability will be reduced when the machine is operated on a cross gradient.

When travelling across a gradient, fully retract the boom and travel slowly at walking pace.

Do not raise the carriage higher than necessary. This would normally be that the lowest point of the load is not more than 500mm (20in) above the ground, with a load which is carried on top of the forks, as shown at **A**. Some loads may be carried suspended below the forks, as shown at **B**. In this case, assess the risk involved before raising the carriage sufficiently to achieve ground clearance.

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

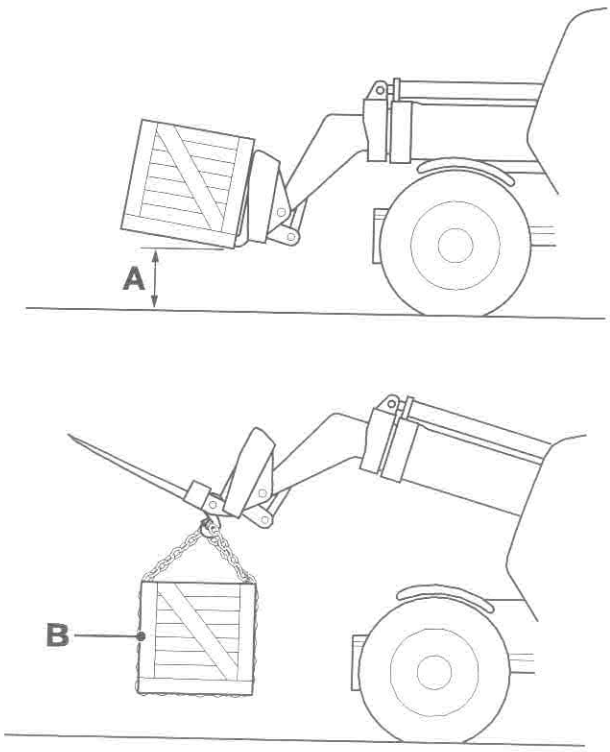


Fig 118.

Lifting Operations on Gradients

⚠ WARNING

Conducting lifting operations on gradients can be dangerous. The machine can become laterally unstable and tip over if the instructions in this section are not followed and understood. You and others can be seriously injured or killed. Ensure you follow and fully understand the guidelines given in this manual.

0019

Lifting operations should not be undertaken on gradients unless the machine is level across its width (i.e. laterally level).

⚠ WARNING

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

0020

Longitudinal and lateral stability are two important safety factors that must be considered if the boom is to be extended, or raised by more than 500mm (20in) above the ground with the machine on a gradient.

Longitudinal Stability

Longitudinal (forward) stability is measured and shown by the Load Moment Indicator (LMI), if fitted, in the cab. Read and understand the section describing the operation of the LMI before lifting with the machine. See ***Load Moment Indicator*** (OPERATION section).

Always operate the machine within the longitudinal stability limits indicated by the load moment indicator (if fitted) or load chart.

Lateral Stability

Ensure you have taken into account all factors that may affect machine stability before a lifting operation is started when working on a gradient. See ***Use of Machines on Gradients And Slopes*** (OPERATION section). Make sure the machine is level across its width to maintain lateral (sideways) stability.

Inclinometer **A** (if fitted) can be used to check if the machine is level. Some early machines were not fitted with an inclinometer on build. In view of the importance of machine lateral stability, JCB recommends that such

machines have an inclinometer fitted at the earliest opportunity. See your JCB Distributor for details.

Level the machine by one of the following methods, depending on machine model and specification.

1 Machines with chassis levelling (sway) option can be made level across their width using the sway control facility as shown at **B**. See ***Chassis Levelling (Sway) Option*** (OPERATION section).

2 Machines with stabilisers can be made level across their width using the stabilisers as shown at **C**. See ***Stabiliser Control Option*** (OPERATION section).

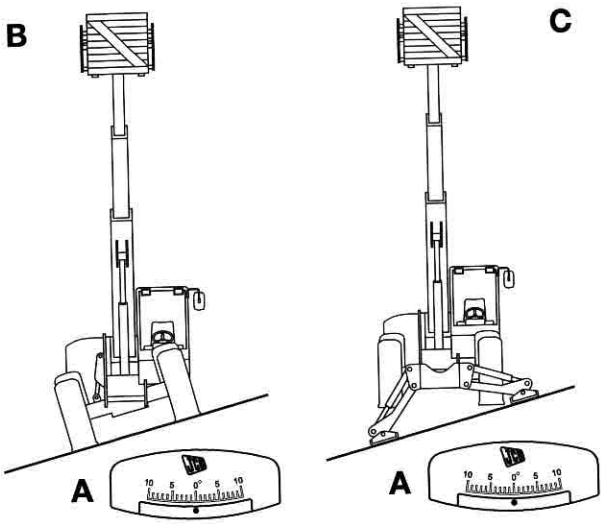


Fig 119.

3 If the machine is not fitted with either sway or stabilisers, reposition the machine, if possible, onto firm level ground as shown at **D**.

4 It is recommended that the machine should be operated on firm, level ground wherever possible for maximum machine stability. Where this is not possible, as shown at **E**, a risk assessment must be carried out by the operator before attempting a lifting operation, see ***Risk Assessment*** (OPERATION section).

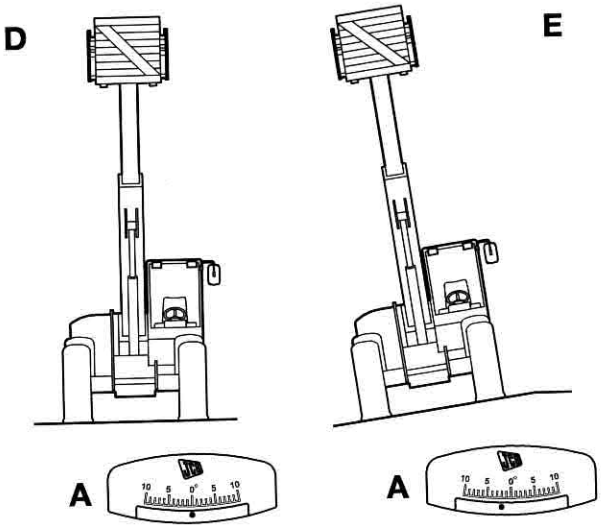


Fig 120.

Operating in Low and High Temperatures

P5-2022

Low Temperatures

In low temperature situations, take the following precautions. They will make for easier starting and prevent possible damage to your machine.

1 Use the correct viscosity engine lubricating oil.

2 If available use a low temperature diesel fuel.

3 Use the correct coolant mixture.

4 Keep the battery at full charge.

5 Fill the fuel tank at the end of each work period. This will help to prevent condensation forming on the tank walls.

6 Protect the machine when not in use. Park the machine inside a building or cover it with a tarpaulin.

7 Install a cold weather starting aid. In very low temperatures, -18°C (0°F) and below, additional starting aids may be needed. Examples are fuel, oil and coolant heaters. Ask your JCB distributor for advice.

Important: *Do not connect two batteries in series to give 24 volts for starting. This could burn out the induction manifold heater and starter motor.*

8 Remove snow from the engine compartment before starting otherwise snow could get into the air cleaner.

High Temperatures

In high temperature situations, take the following precautions to prevent possible damage to the machine.

1 Use the correct viscosity engine lubricating oil.

2 Use the correct coolant mixture.

3 Check the coolant system regularly, keep the coolant at the correct level. Make sure there are no leaks.

4 Keep the radiator clean, regularly remove dirt and debris from the radiator and the engine.

5 Check the fan belt regularly.

6 Check the engine pre-cleaner regularly.

Mechanical Tow Hitch Option

Your machine may be equipped with an optional trailer pickup hitch. ⇒ *Fig 121. (🗋 112)*.

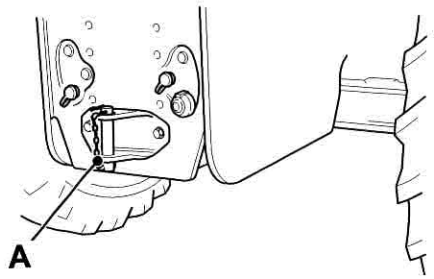


Fig 121. Mechanical Tow Hitch Option

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

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

⚠ WARNING

Examine the tow hitch and the trailer draw bar towing ring for signs of wear before each use. A badly fitting or worn hitch or towing ring could cause loss of the trailer and injury to yourself or other people.

0067

When towing, the machine must be unladen (without ballast) and have two wheel steering engaged.

Use the following procedure to operate the pickup hitch.

⚠ WARNING

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

0068

1 Check the trailer weights and tyre pressures. The maximum towing capacity depends on the type of braking system fitted. ⇒ *Specifications (🗋 207)*. Correct tyre pressures for your machine are shown on a chart in the cab.

2 Engage the parking brake. ⇒ *Cab Layout (🗋 34)*.

3 Adjust the mirror(s) to obtain a good view of the tow hitch area.

4 If your machine is fitted with a switch-operated 2/4 wheel drive selector, you can tow in 2-wheel drive if required. But before towing in 2-wheel drive, you must check that the transmission changes automatically to 4-wheel drive when the brake pedal is pressed (i.e. that the 2-wheel drive selected indicator light goes out).

⚠ WARNING

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

5-2-5-11

5 Engage the Trailer. The procedure for engaging the trailer to the tow hitch will depend on the type of trailer. In all cases observe the following precautions:

a Ensure that the trailer and its draw bars are correctly positioned for engagement before the machine begins to approach it.

b If a helper is available to manoeuvre the trailer he should stand well clear of the machine until the tow hitch is correctly aligned with the trailer towing eye.

c The helper should not approach the trailer or machine until the machine has been stopped, with the parking brake engaged and the engine switched off.

⚠ WARNING

Make sure the trailer hitch has correctly engaged and locked before driving off.

5-5-4-10

d Once the trailer has been engaged, with pin **A** secured in position, the machine operator must not start the engine until the helper is clear of the machine and trailer. ⇒ *Fig 122. (🗋 113)*.

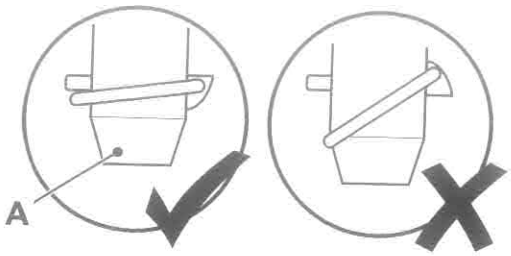


Fig 122.

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

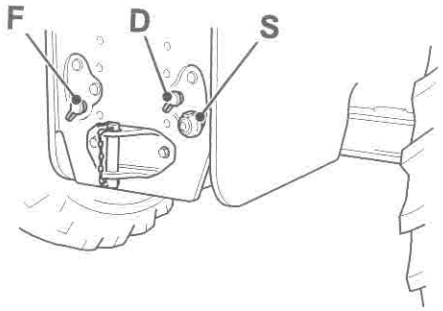


Fig 123.

7 If an optional trailer brake valve is fitted, connect the trailer brakes into socket **D**. Trailer braking is operated by the brake pedals.

Important: *Before travelling on the public highway check that the brakes work correctly and get used to the braking effect.*

8 Connect auxiliary hose to coupling **F**.

9 Select 2-wheel steer if towing on Public Roads. Make sure the indicator shows that 2-wheel steer has engaged. ⇨ ***Preparing for Road Travel (🗋 89)***.

⚠ WARNING

Make sure the trailer hitch has correctly engaged and locked before driving off.

5-5-4-10

Re-phasing the Steer System

4 Wheel Steer Machines Only

⚠ WARNING

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

5-2-1-6

The steering must be re-phased:

1 At least once per day.

2 If having difficulty in steering.

3 After travelling for 15 miles (24 km) or more on the road (in 2 wheel steer).

4 If the 2-wheel steer indicator lights flashes (at a rate of four flashes per second).

Follow the procedures below for re-phasing the steer system:

1 Select 2-wheel steer, the indicator lights will still show 4-wheel steer.

Sensors on the axles prevent the steer mode from changing until the wheels straighten up or pass through the `straight ahead' position. Because of this, there will be a short period when the indicator lights do not agree with the switch position.

2 Operate the machine until the rear wheels straighten up.

When the rear wheels straighten up the machine will go into 2-wheel steer. The indicator lights will show when 2-wheel steer has engaged.

3 Select 4-wheel steer again.

The front and rear wheels are now back in phase.

Moving a Disabled Machine

P5-2021

Do not tow a machine unless there is no alternative. Remember that further damage might be caused to the machine by towing it. If at all possible repair the machine where it stands. If the machine must be towed read the following ***CAUTIONS*** and ***WARNINGS*** and use the procedure given here.

⚠ CAUTION

Towing a machine too far or too fast can damage the transmission. Do not tow the machine further than one mile. Use a trailer for greater distances. When towing do not travel faster than 15 mph (25 km/h).

Use a rigid draw-bar. If a towing chain must be used, then use two towing vehicles. One towing vehicle should be coupled to the front of the disabled machine. The other towing vehicle should be coupled to the rear of the disabled machine, to provide braking power.

The towing vehicle(s) must have enough pulling and braking power to move and stop the machine.

2-2-7-3-2

1 Engage the parking brake.

2 Set the gear lever to neutral (syncro shuttle machines only) or forward/reverse lever to neutral on powershift machines.

3 Prepare the machine for travel. See ***Preparing for Road Travel***.

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

For this reason you should contact your JCB Distributor for help and advice before attempting this work.

4 Attach the drawbar to a suitable location.

5 The machine is now ready for towing. Make sure you understand what the towing driver will be doing. Obey his instructions and all relevant regulations.

Also note that if the engine cannot be started, the effort required to steer the machine is greatly increased.

Recovery Hitch

P5-2023

The recovery hitch is only suitable for occasional off highway towing with a maximum pay load of 1 ton. It is not approved as a permanent towing hitch. Make sure you will be obeying all pertinent laws and regulations before towing.

⚠ WARNING

Using the recovery hitch for towing may exceed the capability of the recovery hitch. This could damage or weaken the recovery hitch or pin which can result in the trailer becoming detached from the machine.

2-2-4-10

Fit pin **A** and secure in position with locking ring **B**.

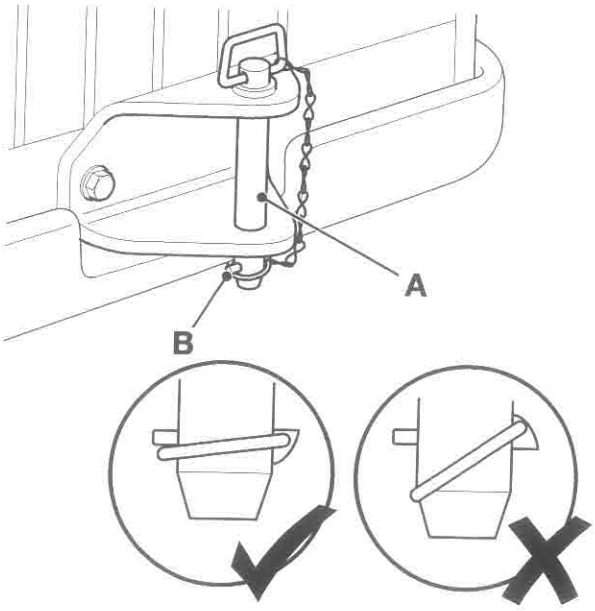


Fig 124.

Transporting the Machine

⚠ 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.

5-2-5-9

Note: *Before transporting the machine make sure you will be obeying the rules and laws of all the areas that the machine will be carried through.*

Make sure that the transporting vehicle is suitable. See ***Static Dimensions*** (SPECIFICATIONS section) for the dimensions of your machine.

⚠ WARNING

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. See Static Dimensions in SPECIFICATION section for the minimum ground clearance of your machine.

2-2-7-5_1

1 Place blocks at the front and rear of the trailer wheels.

2 Move the machine onto the trailer.

- a Make sure the ramps are correctly in place and secure.
- b Set the boom. ⇨ ***Preparing for Road Travel (📄 89)***.
- c Carefully drive the machine onto the trailer.
- d Engage the parking brake and set the drive to neutral.
- e Lower the carriage onto the trailer.
- f Secure the stabilisers in the raised position.
- g Check that the overall height of the load is within regulations. Adjust if necessary.
- h Switch off the engine and remove the starter key.
- i Secure the cab.
- j Cover the exhaust stack.

3 Put blocks at the front and rear of all four tyres. Anchor the machine to the trailer with chains. The anchor points are shown on the illustration. ⇨ ***Fig 125. (📄 116)***.

4 Measure the maximum height of the machine from the ground. Make sure the truck driver knows the clearance height before he drives away.

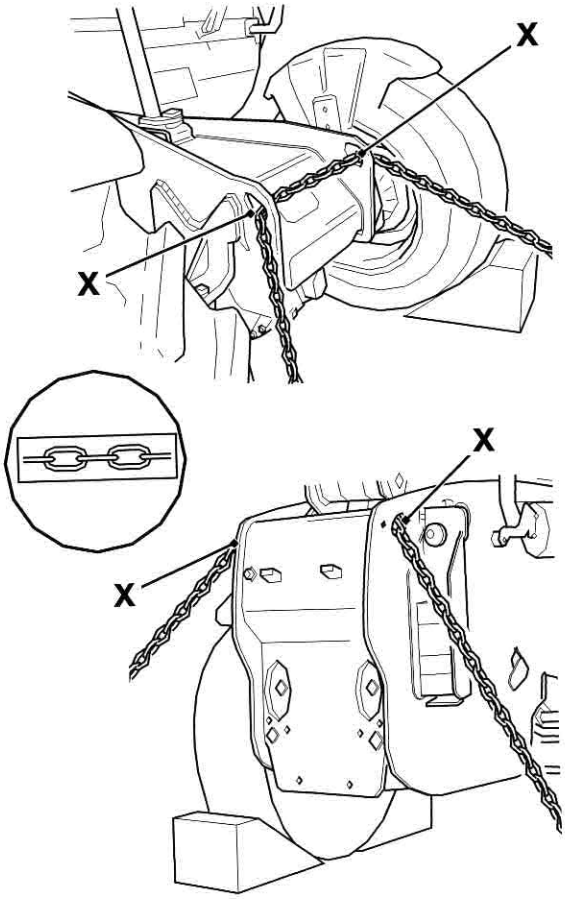


Fig 125.

Lifting a Machine

Carry out the following procedure when lifting a machine:

1 Retract the boom and lower to the ground.

2 Remove all attachments.

3 Switch OFF the engine, remove the key, shut window(s), vacate the machine and shut the door.

4 Remove all loose equipment from machine exterior.

5 Check the unladen weight of the machine, see ***Static Dimensions*** (SPECIFICATIONS section).

⚠ WARNING

Lifting Equipment

You can be injured if you use faulty lifting equipment. Make sure that lifting equipment is in good condition. Make sure that lifting tackle complies with all local regulations and is suitable for the job. Make sure that lifting equipment is strong enough for the job.

INT-1-3-7

6 Attach lifting equipment to lifting points as shown.

Note: *Lifting point positions can vary with machine. Look for decal* ***A*** *to identify position.*

7 Take the weight of the machine. If the lifting equipment is fouling on the machine use spreader bars to prevent damage.

8 Check that the lifting eye is positioned directly above the machine centre of gravity, see ***Static Dimensions*** (SPECIFICATIONS section).

⚠ DANGER

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

2-3-5-3

⚠ WARNING

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. Work sites can be noisy, do not rely on spoken commands.

INT-2-2-3

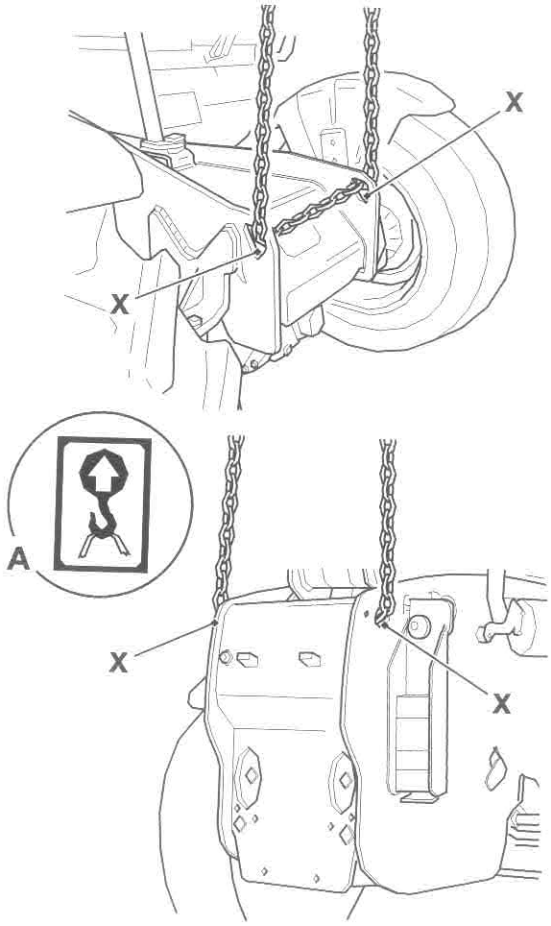


Fig 126.

Storage

Storing the Machine

T2-005

If the machine is not going to be used for an extended period of time, you must store it correctly to prevent deterioration.

1 Thoroughly clean the machine to remove corrosive products.

2 Fill the fuel tank to prevent condensation forming in the tank.

3 Park the machine on firm level ground (preferably under cover). Make sure you do not park the machine in an awkward position that would prevent it from being towed at the end of the storage period (in case the machine will not start).

4 Stop the engine, retract all rams and lower attachments to the ground. Release the hydraulic tank filler cap and operate the controls to relieve all hydraulic circuits of residual pressure.

5 Apply a light coating of suitable grease or petroleum jelly to all exposed ram piston rods.

6 Check all oil levels and replenish if necessary.

7 Check coolant level and condition. Replenish if necessary.

8 Remove and charge the battery. Store the battery in a warm dry place and recharge periodically.

9 Check the tyre pressures. Adjust if necessary.

10 Check the machine for worn or damaged parts. Replace if necessary.

11 Periodically rotate the road wheels to prevent distortion of the tyre ply.