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Safety Notices

Important Information

T1-042

The Operator Manual

⚠ WARNING

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

INT-1-4-2

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

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

Safety Warnings



This safety alert system identifies important safety messages in this manual. When you see this symbol, be alert, your safety is involved, carefully read the message that follows, and inform other operators.

In this publication and on the machine, there are safety notices. Each notice starts with a signal word. The signal word meanings are given below.

⚠ DANGER

Denotes an extreme hazard exists. If proper precautions are not taken, it is highly probable that the operator (or others) could be killed or seriously injured.

INT-1-2-1

⚠ WARNING

Denotes a hazard exists. If proper precautions are not taken, the operator (or others) could be killed or seriously injured.

INT-1-2-2

⚠ CAUTION

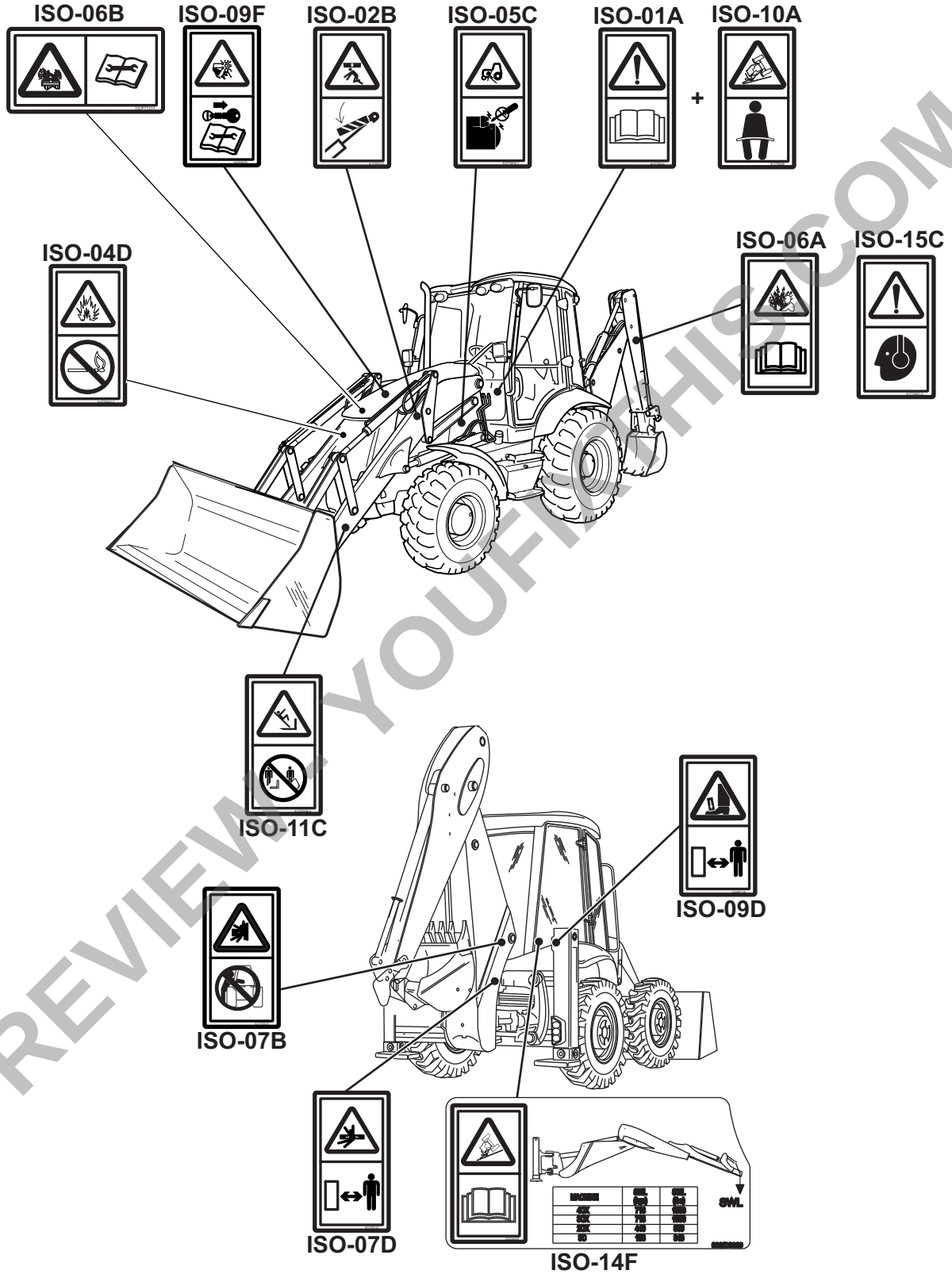
Denotes a reminder of safety practices. Failure to follow these safety practices could result in injury to the operator (or others) and possible damage to the machine.

INT-1-2-3

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Safety Label Identification



711680-21

Fig 3.

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Cab Layout (Manual Controls)

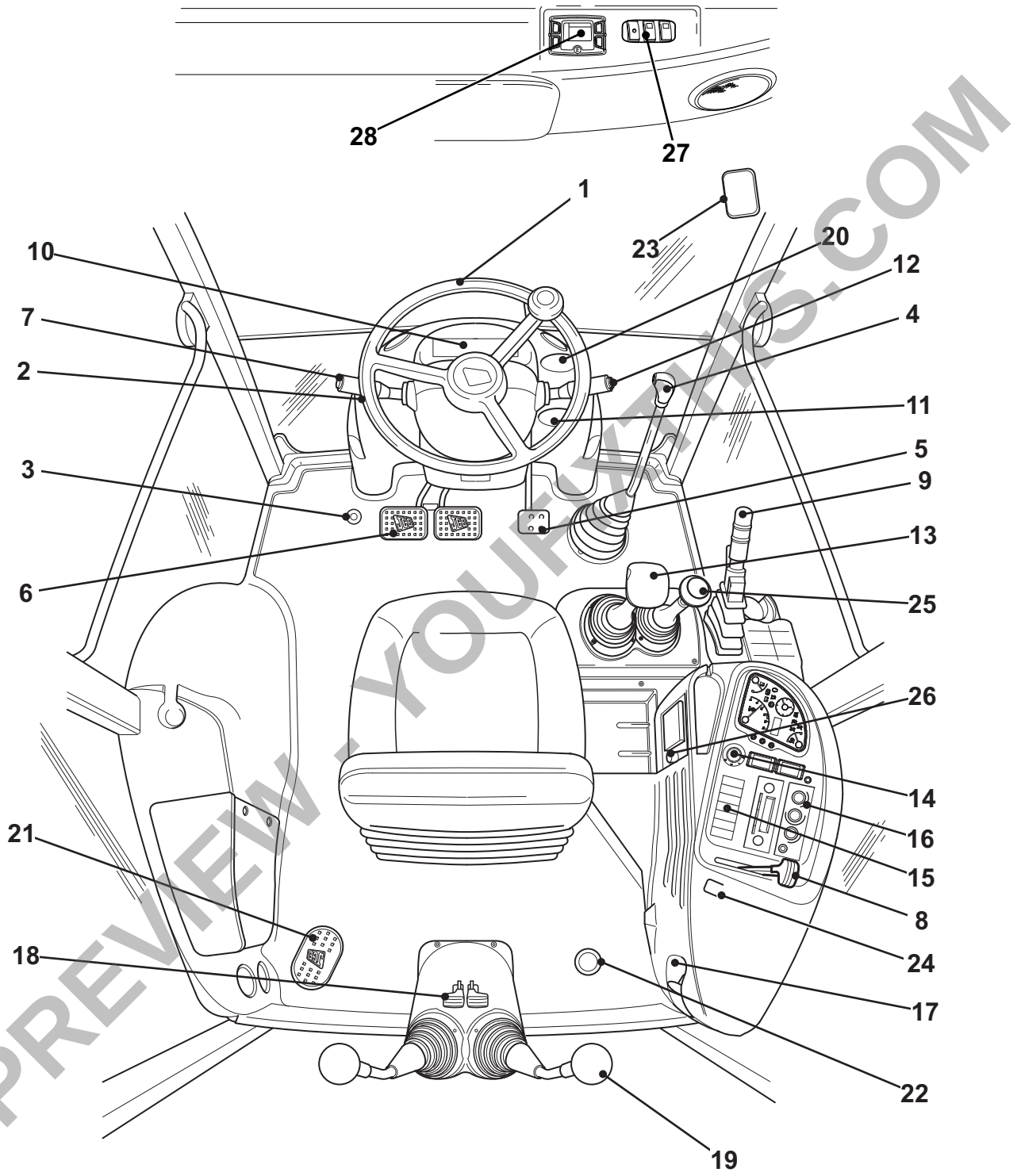
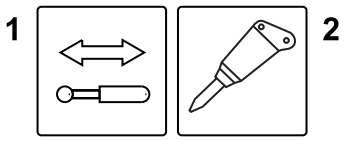


Fig 25.

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Bi-Directional and Hammer Mode Selector (if fitted)



332-F8808-1

Three position rocker switch with backlights. The switch functions operate when the starter switch is in the ON position.

Position **1**: Bi-Directional mode - for use with double acting attachments (Bi-directional Backlight ON)

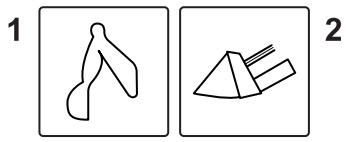
Position **3**: OFF (Backlight OFF)

Position **2**: Hammer mode - for use with single acting attachments (Hammer Backlight ON)

Before you operate the switch, refer to ***Bi-Directional and Hammer Circuits (Optional Attachments Section)*** or **Hydraulic Flow Control (HI / LO mode)** ***⇨ Bi-Directional and Hammer Circuits (If fitted) (328)***, ***⇨ Hydraulic Flow Control - EcoDIG (If fitted) (66)***.

Seat Mounted Switches

Excavator/Loader Control Selector (if fitted)



T027680-5

Three position rocker switch with backlights. The switch functions operate when the starter switch is in the ON position.

Position **1**: Excavator controls enabled (Excavator Backlight ON)

Position **3**: Neutral (Backlight OFF)

Position **2**: Loader controls enabled (Loader Backlight ON)

Before you operate the switch, refer to ***Operating Levers***.

Excavator/Loader Control Selector (if fitted)



A340000-1

Two position rocker switch with backlight. The switch functions operate when the starter switch is in the ON position.

Position **1**: Excavator controls enabled (Backlight OFF)

Position **2**: Loader controls enabled (Backlight ON)

Before you operate the switch, refer to ***Operating Levers***.

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Digital Display

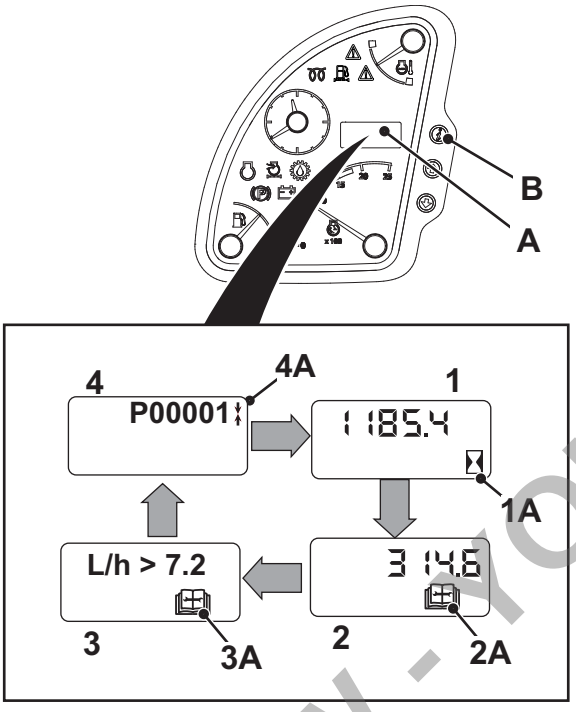
The digital display **A** is located on the side console. ⇒ *Fig 51. (63)*. The digital display contains the following information screens:

1 Total Vehicle Hours

2 Time Until Next Service

3 Fuel Computer

4 Fault Code List (only when faults are active)



T039550-81

Fig 51.

Starter Switch OFF

To view the current vehicle hours, switch ON the side lights. In this mode, the digital display will show the Total Vehicle Hour screen **1** ⇒ *Fig 51. (63)*.

Starter Switch ON

As a system check, all of the LCD segments illuminate briefly when the starter switch is set to position **I** ⇒ *Starter Switch (56)*.

Press the Information switch **B** to move to the next information screen.

Example of operation:

1 Display 1 - Vehicle Hours

The total running time of the engine is shown in increments of 0.1 hours. In the example, the current running time is 1185.4 hours. A service book icon will flash if a service is due.

Note: *When the display is set to the Vehicle Hour screen, the Hour Glass symbol **1A** comes on ⇒ Fig 51. (63).*

2 Display 2 - Hours to Service

The Time Until Service is the difference between the next service interval and the current *Vehicle* hours. In the example, the Time Until Service is 314.6 hours (1500 hours - 1185.4 hours).

Note: *When the display is set to the Time Until Service screen, the Service symbol **2A** comes on permanently. A negative number means you have gone past the service interval ⇒ Fig 51. (63).*

Note: *When you complete a machine service, make sure that you reset the value shown on the Time Until Service screen. ⇒ Resetting The Time Until Service Screen (64).*

3 Display 3 - Fuel Computer -

a current fuel rate

b Trip average fuel rate

c Fuel range of the machine (based in hours, assuming the average fuel rate is maintained)

Use the arrow buttons **C** to navigate around the fuel data ⇒ *Fig 53. (64)*.

The **trip average fuel rate** and the **fuel range** use a fuel trip computer. To reset the trip computer, short press the information button **B**. The display will show **RESET** and a buzzer tone will sound to acknowledge the reset.

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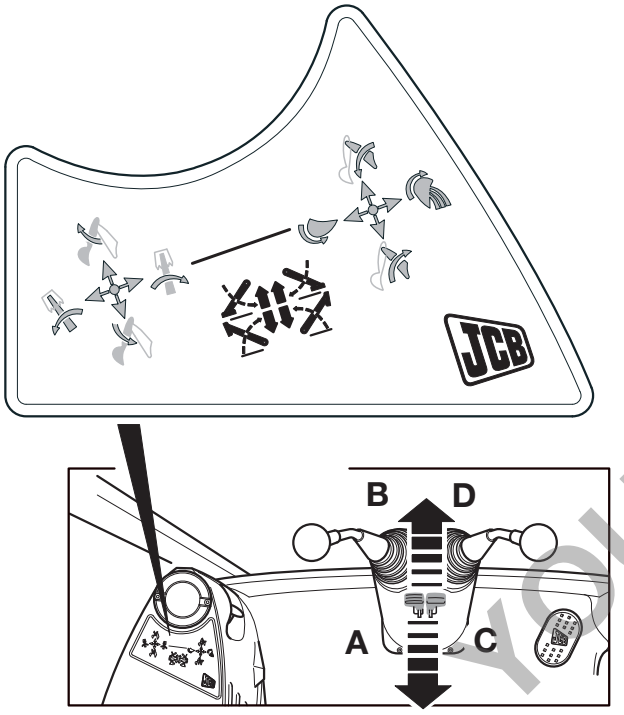
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Raise Stabilisers

To raise the stabilisers **A** and **C**, pull the levers towards the front of the machine.

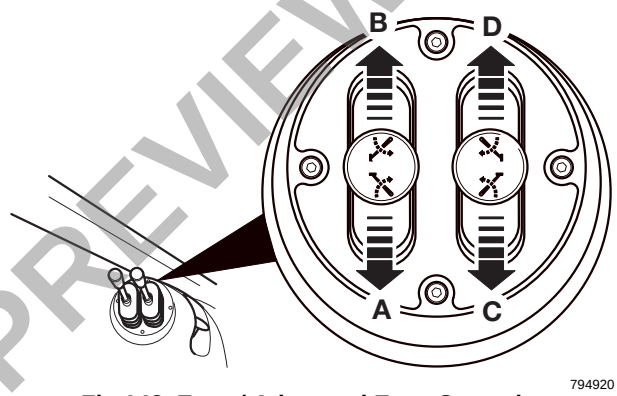
Lower Stabilisers

To lower the stabilisers **B** and **D**, push the levers towards the rear of the machine.



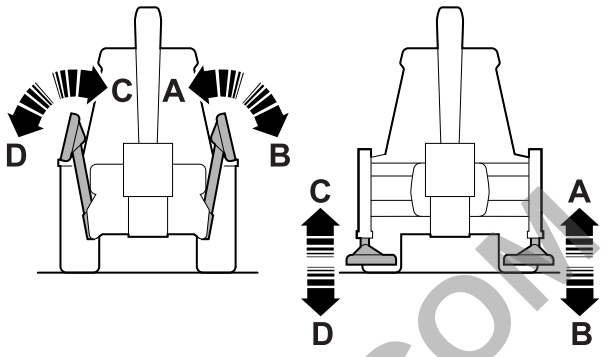
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Fig 142. Manual Controls



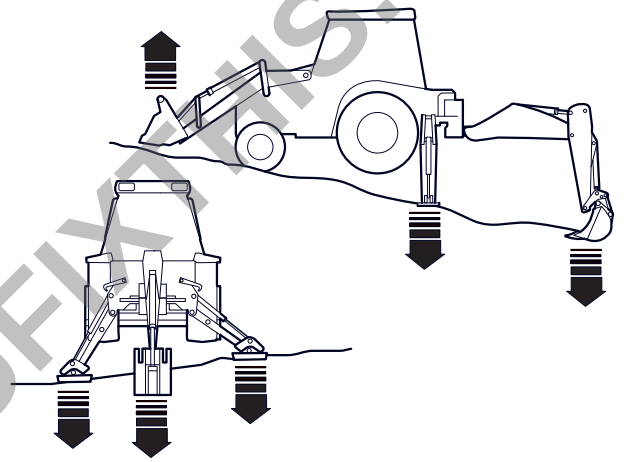
794920

Fig 143. Easy / Advanced Easy Controls



338901-2

Fig 144.



366080

Fig 145.

Occasionally there may be a need for fully extending one or both stabiliser legs and rams in order to level the machine on steep slopes. In these conditions it may be necessary to use the boom to apply a down force to enable the stabiliser to fully extend, also raising the shovel off the ground can help.

Stabiliser indicator lights (If fitted)

Some machines are fitted with optional stabiliser indicator lights. The lights will illuminate and the buzzer will sound when both stabiliser legs are in the down position and the weight of the machine is supported.

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.

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Lifting (Object Handling)

Introduction

Note: *Using the excavator without stabilisers can reduce the stability of the machine. Make sure the stabilisers and the loader shovel are set on stable ground before using the excavator.*

⚠ WARNING

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

8-2-8-19_2

⚠ WARNING

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

2-2-7-38

Before using this machine for lifting, refer to ⇒ ***Lifting (Object Handling) Regulations and Safe Working Loads (🗋 339)***.

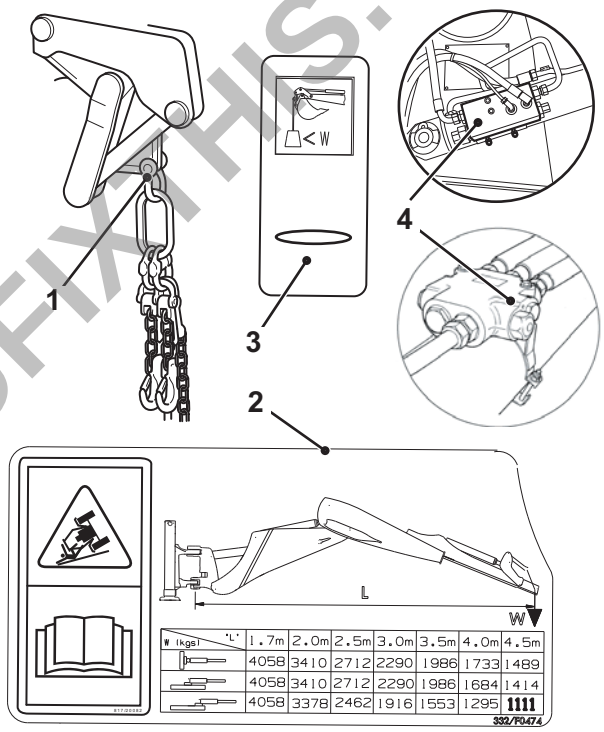
Your machine may be used for object handling if it has been fitted with an approved lifting point such as a hook / shackle and hose burst check valve(s), if it has been tested, plated and certified for its safe working load, and if all other regulation requirements have been met (consult your JCB distributor). If your machine is not fitted with this equipment you must use the machine for earthmoving purposes only.

The kit comprises:

Table 4.

Key	⇒ ***Fig 213. (🗋 165)***.
1	Lifting Shackle.
2(1)	Load Charts. ⇒ ***Load Charts (🗋 167)***.
3	Overload Warning switch. ⇒ ***Overload Override Warning Switch (🗋 168)***.
4	Hose Burst Protection Valve (HBPV). Refer to ***Routine Maintenance, Hose Burst Protection Valves (If fitted).***

(1) For load charts for specific machines, refer to Load Charts, Specifications Section.



T032730-10

Fig 213. Object Handling kit

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Health and Safety

Lubricants

T3-060_3

Introduction

It is most important that you read and understand this information and the publications referred to. Make sure all your colleagues who are concerned with lubricants read it too.

Hygiene

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

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

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

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

Storage

Always keep lubricants out of the reach of children.

Never store lubricants in open or unlabelled containers.

Waste Disposal

⚠ CAUTION

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

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

INT-3-2-14

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

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

Handling

⚠ 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

New Oil

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

Used Oil

Used engine crankcase lubricants contain harmful contaminants.

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

1 Avoid prolonged, excessive or repeated skin contact with used oil.

2 Apply a barrier cream to the skin before handling used oil. Note the following when removing engine oil from skin:

- **a** Wash your skin thoroughly with soap and water.
- **b** Using a nail brush will help.
- **c** Use special hand cleansers to help clean dirty hands.
- **d** Never use petrol, diesel fuel, or paraffin for washing.

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7 Engage the boom and slew locks. ⇒ ***Boom Lock (114)***, ⇒ ***Slew Lock (115)***.

8 If the machine has an extendable dipper make sure that the locking pin is securely in place. ⇒ ***Manual Controls (157)***.

9 Engage the Park Brake, Set the gear lever to Neutral

10 Switch OFF the engine, remove the starter key, shut the doors and windows and vacate the machine.

11 Use correctly rated slings **A** either side of the front axle. Use rubber protectors **B** beneath the axle.

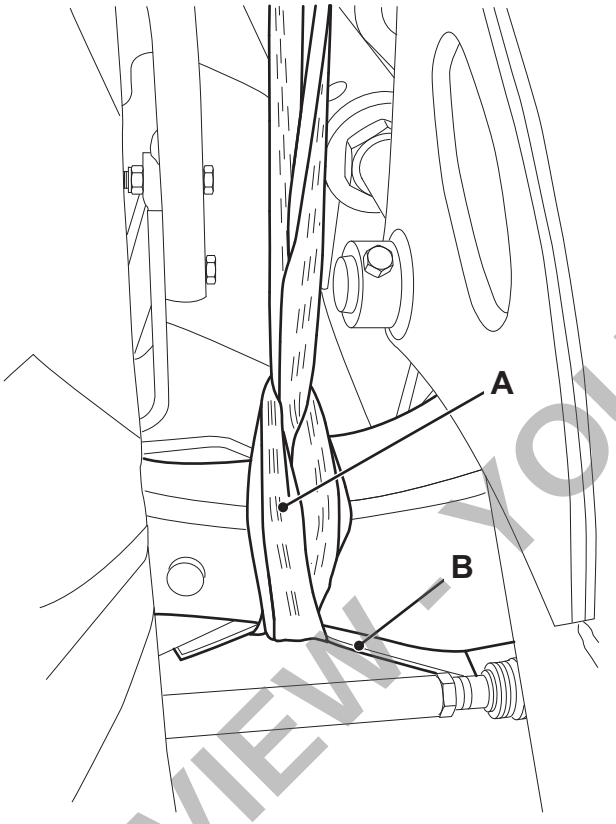


Fig 228.

12 For the rear lifting points, use:

a The top of the rear frame on side shift machines. ⇒ ***Fig 229. (180)***.

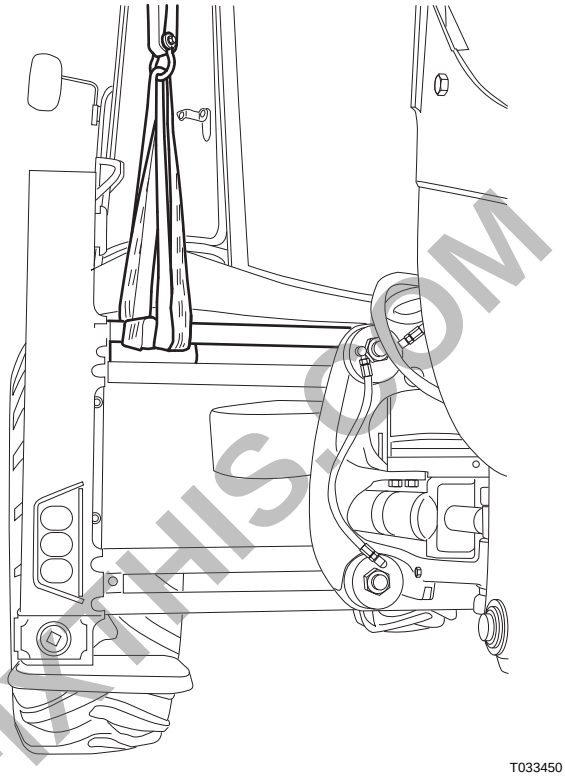


Fig 229. Sideshift machine

b The lifting eyes on Centremount machines.

Note: *When using the lifting eyes, suitably rated D links must be used.*

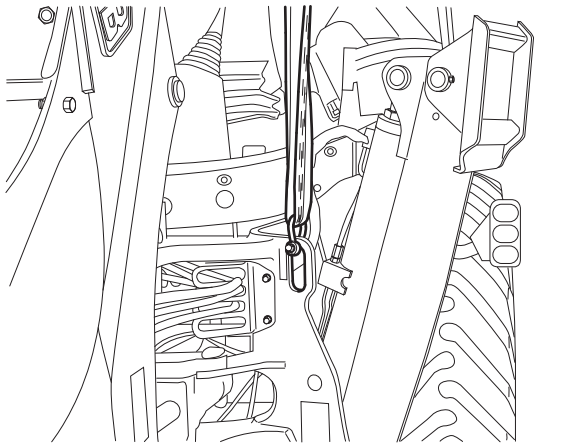


Fig 230. Centremount machine

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Loader Arms

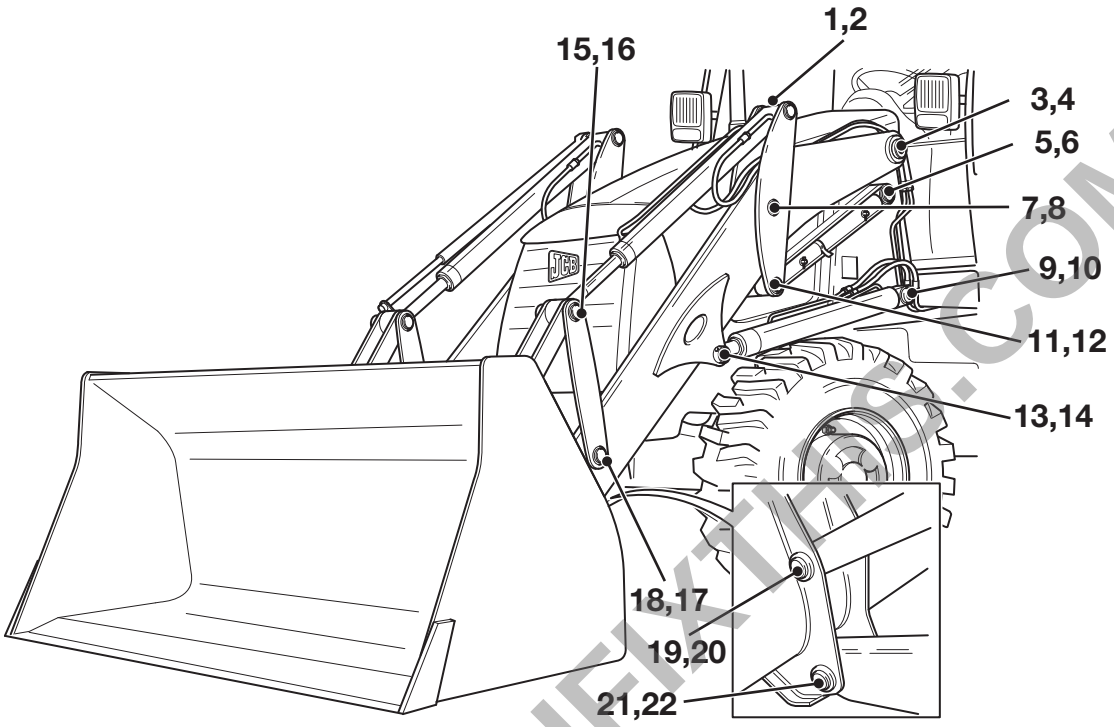


Fig 241.

For each grease point shown, there is another on the other side of the machine.

Total 22 grease points.

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Do not use the machine if a hose or hose fitting is damaged. Replace damaged hoses before you use the machine again.

Replacement hoses must be of the same size and standard.

Check the Electrical Circuits

T3-099

Inspect the electrical circuits regularly for:

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

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

Checking The ROPS/FOPS Structure

⚠ WARNING

You could be killed or seriously injured if you operate a machine with a damaged or missing ROPS/FOPS. If the Roll Over Protection Structure (ROPS)/Falling Objects Protection Structure (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_6

Check the structure for damage. Check that the mounting bolts are installed and undamaged. Check the bolt torques. ⇨ *Torque Settings (216)*. Tighten them to the correct torque if necessary.

1 Remove the rear wheels to gain access to the rear mounting bolts **A** ⇨ *Fig 240. (217)*.

2 Remove the covers **C** and external trim panels **D** to gain access to the front mounting bolts **B** ⇨ *Fig 240. (217)*.

Table 7. Torque Settings

Bolts **A** and **B**	205 Nm (150 lbf ft)

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Wheel Alignment

Introduction

T3-038

DANGER

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

5-2-6-7

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).

Electronic Steer Mode Selector

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

2 Use the switch **A** to select 2-wheel steer **B**.

Sensors on the axles prevent the steer mode from changing until the wheels 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.

The indicator lights will still show 4-wheel steer.

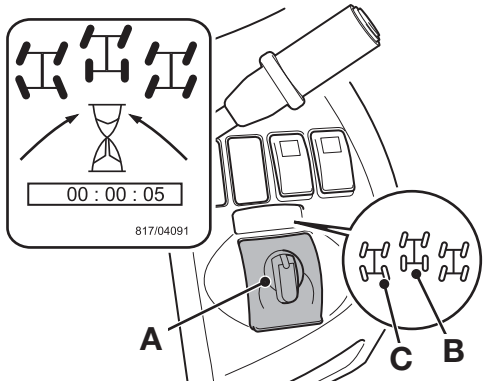
3 Operate the machine until the rear wheels straighten up.

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.

4 Use the switch **A** to select 4-wheel steer **C**.

Turn the steering wheel left then right until the indicator light shows that 4-wheel steer has engaged.

The front and rear wheels are now back in phase.



762190-2

Fig 309.

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Bi-Directional and Hammer Circuits (If fitted)

The following procedure details the method for mounting and operating attachments using the bi-directional and hammer circuit.

If you have any doubts or queries concerning auxiliary attachment operation please consult your JCB distributor.

Procedure

1 Bi-directional and hammer circuits operate in two different modes to suit the attachment being used. The two modes are bi-directional and hammer they provide different characteristics and attachments must only be used in the correct mode setting. First determine which mode is suited to the attachment you are intending to use.

Hammer Mode - For single acting attachments (i.e. feed flow is only required in one direction). Examples of this include Rockbreakers and patch planers.

Bi-Directional Mode – For double acting attachments (i.e. feed flow is required in both directions). Examples of this include jaw buckets, augers and tilting buckets.

2 Check your attachments pressure and flow requirements and limitations and make sure the circuit is suitable for use with your attachment.

Feed Pressure	In both modes the feed pressure is limited to 207Bar (Gear Pump Machines), 210Bar (Variable Pump Machines). ARV's may be changed if this limit is not suitable for your attachment. Please consult your JCB distributor with regards to changing ARV's.
Feed Flow	In both modes feed flow is determined by three factors:
	a. Pump size (Not applicable to Gear Pump Machines)
	b. Engine speed
	c. Flow mode setting
	d. Load sense pressure (Variable Pump Machines)

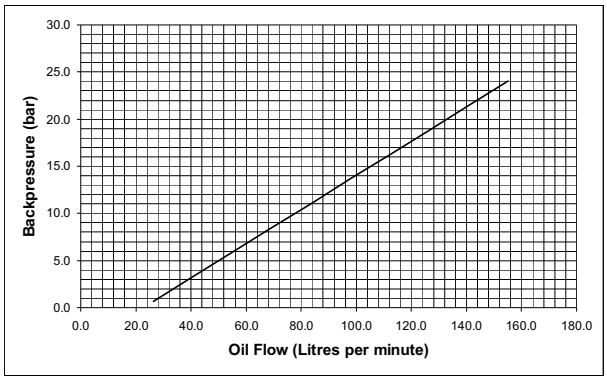
Back Pressure — When operating a single acting attachment such as a Rockbreaker (in hammer mode) the back-pressure on the attachment is often a limiting factor. ⇨ *Fig 378. (328)* shows the back pressure against oil flow which will be exerted at the 1"coupler **C2**.
⇨ *Fig 380. (329)*.

Note: *The values are approximate, if in doubt please consult your JCB distributor.*

Note: *Variable Pump Machines have a flow control switch **N**. Flow is pressure compensated in low flow mode hence flow will be maintained at up to 50 litres/min with 11 bar back pressure. High flow mode is dependent on engine speed and load sense pressure* ⇨ *Fig 382. (330)*.

Table 19. Variable Pump Machines

Engine Speed (rpm)	Flow Switch Setting	Flow to Breaker (Litre per min.)	Return Line Back Pressure (bar)
850 - 220	LO	up to 50	11.0
1000	HI	up to 74	12.0
1500	HI	up to 100	18.0
2200	HI	up to 150	22.0



T050040-2

Fig 378. Back pressure (bar) at C2 v Oil Flow Hammer mode setting (Litres per minute)

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Manual Controls - ISO Plus ('+') Pattern

⚠ WARNING

Do not operate the excavator controls from outside the machine, or you could be crushed by the excavator.

2-2-3-1

On machines with ISO Plus ('+') Pattern control, there are two excavator control levers. The left hand lever **A** operates the slew and dipper. The right hand lever **B** operates the boom and bucket ⇨ *Fig 107. (89)*.

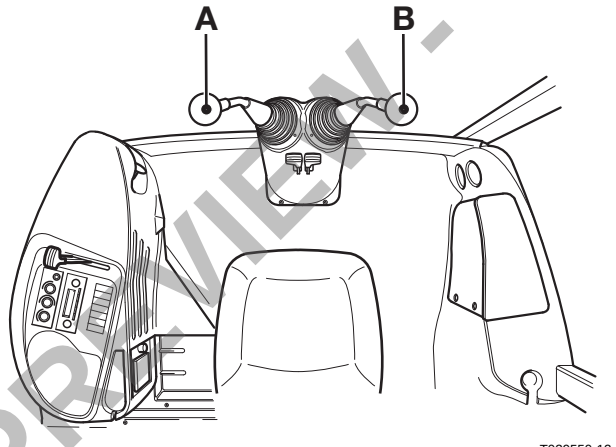
For operation of the stabilisers. ⇨ *Stabiliser Controls (107)*.

Both levers move in a '+' pattern for individual excavator actions. Combined actions can be selected by moving the levers in directions between the four main ones.

Both levers can be operated at the same time, for more efficient operation. The speed of the excavator action depends on how far you move the levers. The further you move a lever, the faster the action.

Both levers are spring-loaded to their central (hold) positions. The excavator will stay in any position until you move it with the levers.

A decal near the controls shows, by symbols, what lever movements cause which excavator actions. The symbols, lever movements and excavator actions are explained on the following pages.



T039550-12

Fig 107.

Dipper In

To bring the dipper in **A**, pull the lever towards the front of the machine.

Note: *Some excavator attachments may collide with the boom if brought too far in. Check this before using different attachments.*

Dipper Out

To push the dipper out **B**, push the lever towards the rear of the machine. If the boom is already up, check that it is clear overhead before swinging the dipper out ⇨ *Fig 108. (89)*.

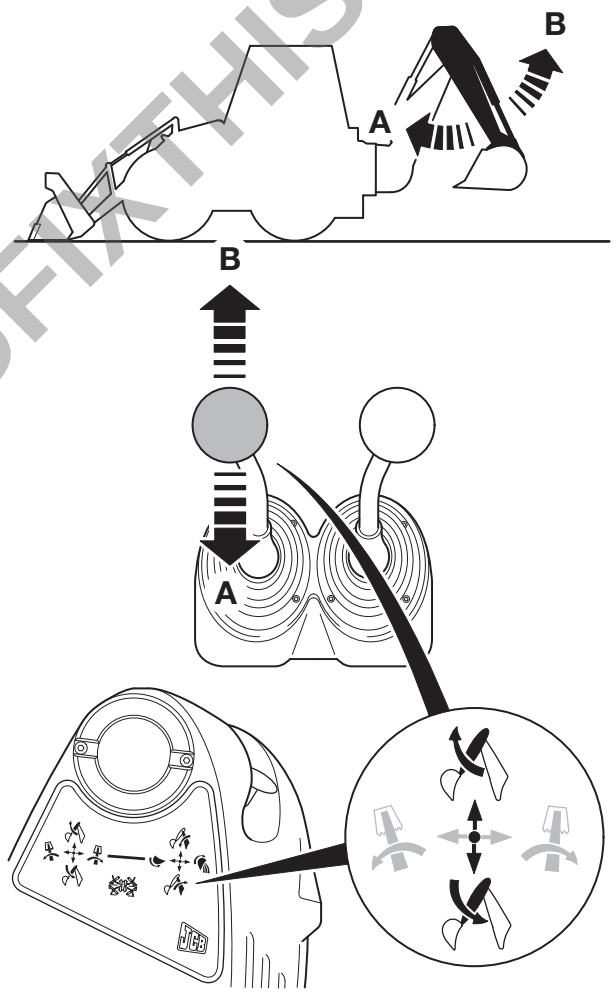


Fig 108.

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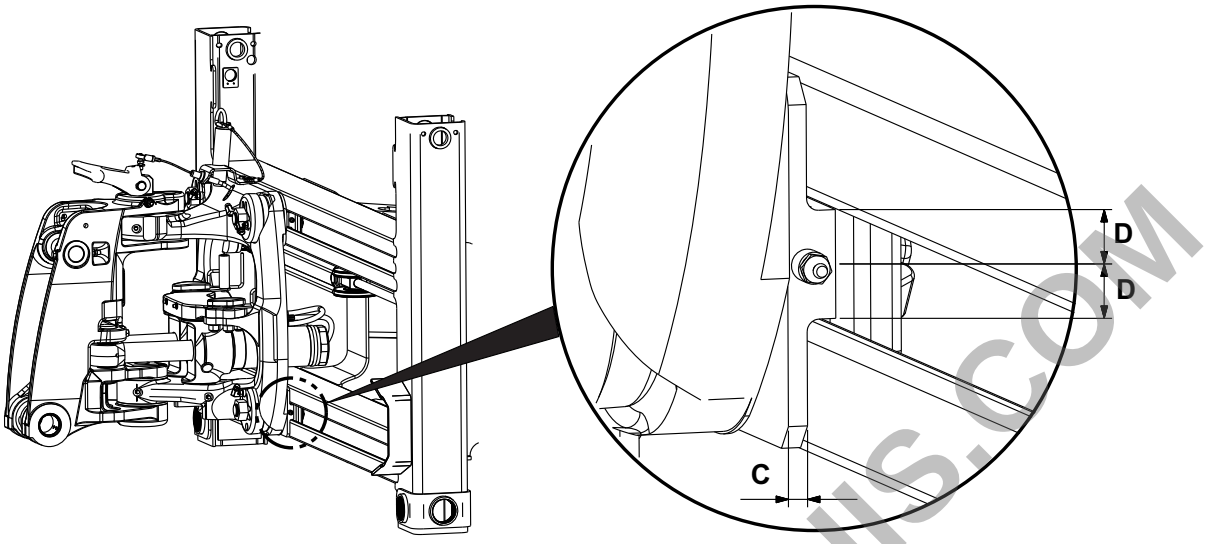


Fig 315.

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