Section 1

General Information

Service Manual - Side Engine Loadalls - SH,SL Engines - from May 2014

Section 1 - General Information

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Section C - Electrics

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Section F - Transmission

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World Class
Customer Support

Safety

Safety - Yours and Others

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

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

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

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

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

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

Remember:

- Be careful
- Be alert
- Be safe.

Safety Warnings

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

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

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

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

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

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

Figure 2. The safety alert system

General Safety

Training

To operate the machine safely you must know the machine and have the skill to use it. You must abide by all relevant laws, health and safety regulations that apply to the country you are operating in. The operator's manual instructs you on the machine, its controls and its safe operation; it is not a training manual. 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.

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.

Clothing

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

Alcohol and Drugs

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

Feeling Unwell

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

Mobile Phones

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

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

Lifting Equipment

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

Raised Equipment

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

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

Raised Machine

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

Lightning

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

Machine Modifications

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

Clothing and Personal Protective Equipment (PPE)

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

About the Product
Introduction

General

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

Name and Address of the Manufacturer

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

Product Compliance

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

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

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

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

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

Description

General

The JCB Loadall is a self propelled, seated operator, wheeled machine for operation on unimproved natural terrain and disturbed terrain.

A main structural support is designed to carry an extending boom with a carriage mounted on the front to which forks or an approved attachment can be fitted.

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

Intended Use

The machine is intended to be used in normal conditions for the applications described in this manual. If the machine is used for other applications or in dangerous environments, for example in a flammable atmosphere or in areas with dust containing asbestos, special safety regulations must be obeyed and the machine must be equipped for use in these environments.

Log Moving/Object Handling

Do not use the machine to move or handle logs unless sufficient log protection is installed. You could cause serious injury to yourself and damage to the machine. For more information, contact your JCB dealer.

Optional Equipment and Attachments

A wide range of optional attachments are available to increase the versatility of your machine. Only the JCB approved attachments are recommended for use with your machine. Contact your JCB dealer for the full list of approved attachments available.

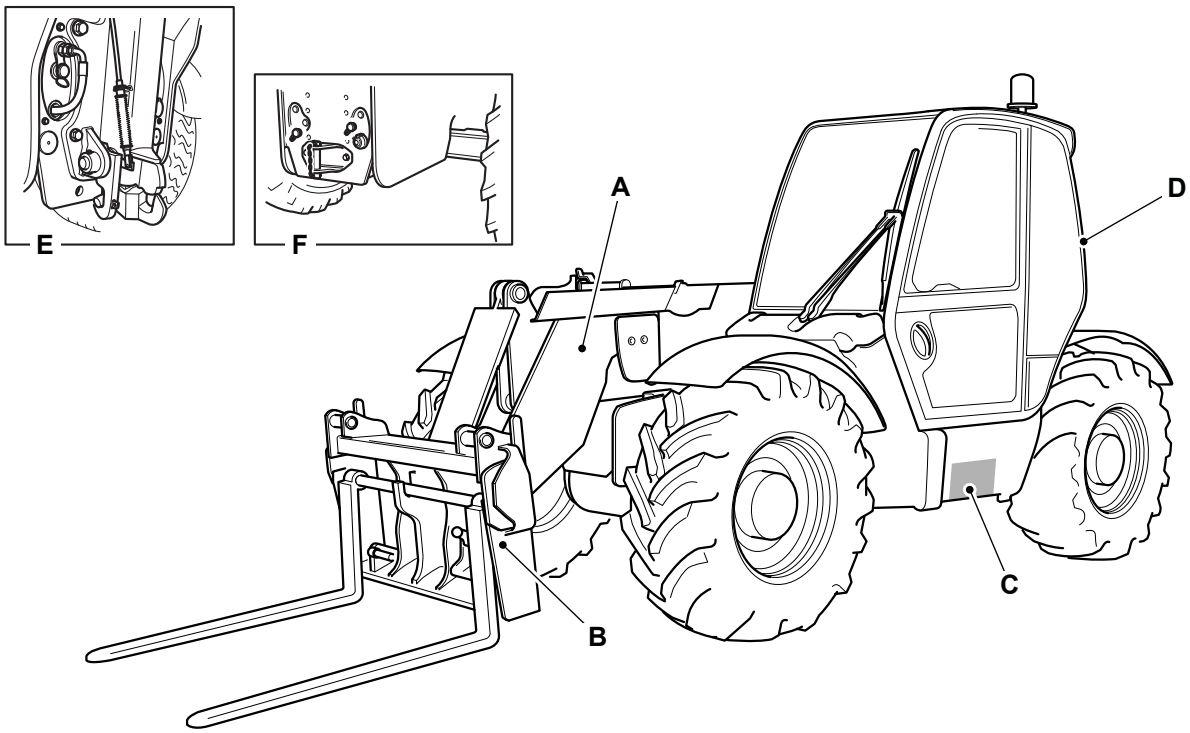
Danger Zone

The danger zone is any zone within and/or around the machinery in which a person is subject to a risk to their health or safety. During operation of the product, keep all persons out of the danger zone. Persons in the danger zone could be injured. Refer to: Technical Data (Page 319).

Before you do a maintenance task, make the product safe. Refer to: Maintenance > Maintenance Positions (Page 248).

Main Component Locations

Figure 3.



A Boom
B Carriage
C Battery
D ROPS (Roll-Over Protective Structure)/FOPS (Falling-Object Protective Structure) cab
E Hydraulic tow hitch
F Mechanical tow hitch

Product and Component Identification

Machine

Machine Identification Plate

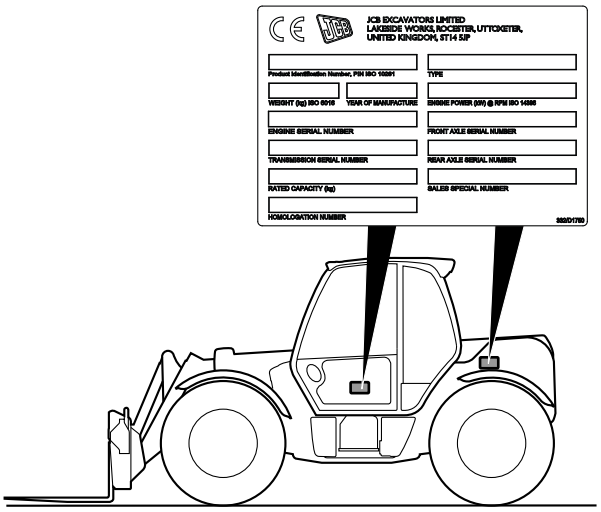
Your machine has an identification plate mounted in one of two positions as shown. The serial numbers of the machine and its major units are shown on the plate.

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

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

The machine identification plate fitted to European Tractor Type Approved builds is different. Refer to Figure 5.

Figure 4.



Typical Product Identification Number

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

Table 1. Typical PIN

JCB	5AA	J	E	C	12345678

Table 2.

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

Table 3.

Digit 4 to 6	Machine Model
5AA	531-70
5AB	535-95
5AC	536-60
5AD	541-70
5AF	540-170
5AH	533-105
5AL	540-140
5AN	535-125 HiViz
5AP	535-140 HiViz
5AR	536-70
5AS	526-56
5AW	550-80
5AY	560-80
5A1	536-70 LP
5TA	531T70
5TB	541T70
5TC	536T60
5TD	535T95
5TE	536T70
5T1	536T70 LP
5UW	550U80
5UY	560U80

Table 4.

Digit 7	Engine Type
JCB Dieselmax (Tier 2):	
J	Naturally Aspirated, 63kW
K	Turbocharged, 74kW
JCB Dieselmax (Tier 3):	
P	85kW
R	Turbocharged and after-cooled, 97kW
S	Turbocharged, 74kW
T	Turbocharged, 63kW
V	Turbocharged and after-cooled, 108kW
JCB Dieselmax (Tier 4):	
W	55kW
X	81kW
Y	93kW
Z	108kW

Table 5.

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

Table 6.

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

Table 7.

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

European Tractor Type Approved Builds

Figure 5.

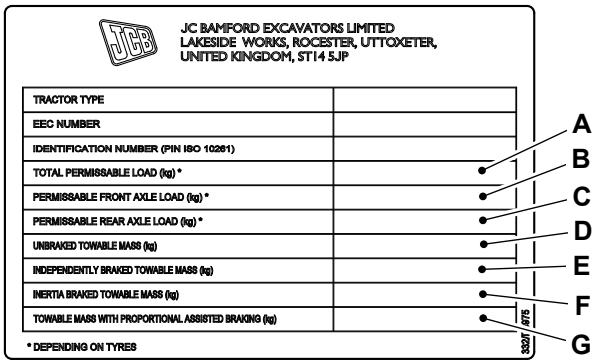


Table 8. Hitch Descriptions

H1	JCB Hydraulic Pick-up Hitch
H2/H3	Rockinger Fixed Clevis (Auto & Manual)
H4/H5/H6	Rockinger Ladder Clevis (Top Position)
H4b/H5b/H6b	Rockinger Ladder Clevis (Bottom Position)
H7/H8	Rockinger Ladder with Piton/ Ball Ø80
H9	JCB Ladder with Clevis (Manual)
H10	JCB Piton

Table 9.

			5TA	**5TB**	**5TC**	**5TD**
	Item		**531-70**	**541-70**	**536-60**	**535-95**
			kg	**kg**	**kg**	**kg**
A	Total Permissible Mass		10,250	10,250	10,250	10,250
B	Permissible Front Axle Load[(1)]	From	2,400	2,400	2,400	2,400
		To	8,500	8,500	8,500	8,500
C	Permissible Rear Axle Load[(1)]	From	2,400	2,400	2,400	2,400
		To	7,500	7,500	7,500	7,500
D	Unbraked Towable Mass		750	750	750	750
E	Independently Braked Towable Mass		6,000	6,000	6,000	6,000
F	Intertia Braked Towable Mass		3,500	3,500	3,500	3,500
G	Towable Mass Fitted with a Proportionaly Assisted Braking System	H1	11,570	9,915kg	11,250kg	9,205kg
		H2-H10	17,865	16,840kg	17,735kg	14,890kg

(1) Dependent on tyre option.

Table 10.

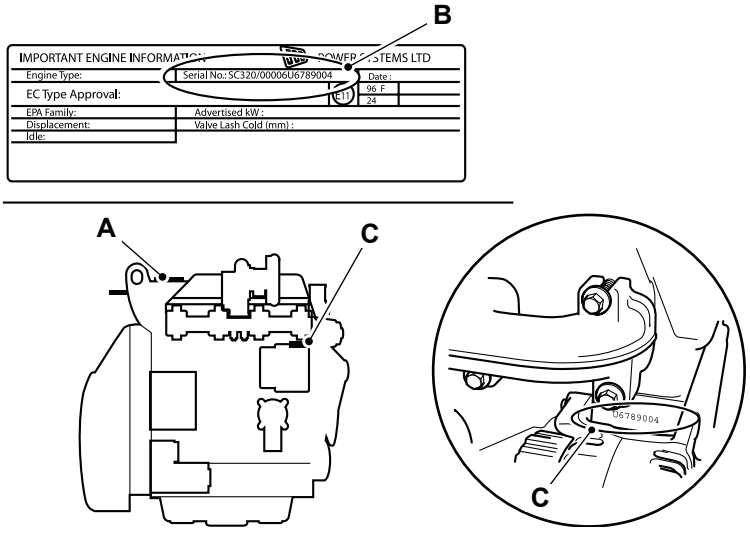
			5TE	5T1	5UW	5UY
	Item		**536-70**	**536-70LP**	**550-80**	**560-80**
			kg	**kg**	**kg**	**kg**
A	Total Permissible Mass		10,250	10,250	12,005	12,005
B	Permissible Front Axle Load(1)	From	2,400	2,400	2,400	2,400
		To	8,500	8,500	10,000	10,000
C	Permissible Rear Axle Load(1)	From	2,400	2,400	2,400	2,400
		To	7,500	7,500	10,000	10,000
D	Unbraked Towable Mass		750	750	750	750
E	Independently Braked Towable Mass		6,000	6,000	6,000	6,000
F	Intertia Braked Towable Mass		3,500	3,500	3,500	3,500
G	Towable Mass Fitted with a Proportionaly Assisted Braking System	H1	9,960	10,240kg	7,720kg	7,510kg
		H2-H10	16,970	17,245kg	11,350kg	10,910kg

(1) Dependent on tyre option.

Engine

The engine data labels are attached to the cylinder block as shown.

Figure 6.



A Engine data label - rocker cover
B Engine identification number
C Stamp

The data label includes the engine identification number.

Table 11. Example of the engine identification number

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

Table 12.

Digit 1-2	Engine Type
SH	4.4L turbocharged and aftercooled electronic common rail fuel injection (Tier 4i)
SJ	4.4L turbocharged and aftercooled electronic common rail fuel injection (Tier 4) > 56kW
SL	4.4L turbocharged and aftercooled electronic common rail fuel injection (Tier 4) < 56kW
DH	4.8L turbocharged and aftercooled electronic common rail fuel injection (Tier 4i)
DJ	4.8L turbocharged and aftercooled electronic common rail fuel injection (Tier 4) > 56kW
DL	4.8L turbocharged and aftercooled electronic common rail fuel injection (Tier 4) < 56kW

Table 13. Explanation of the engine identification number

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

The country of manufacturer, engine serial number and year of manufacture of the engine are also stamped on the cylinder block. Refer to Figure 6.

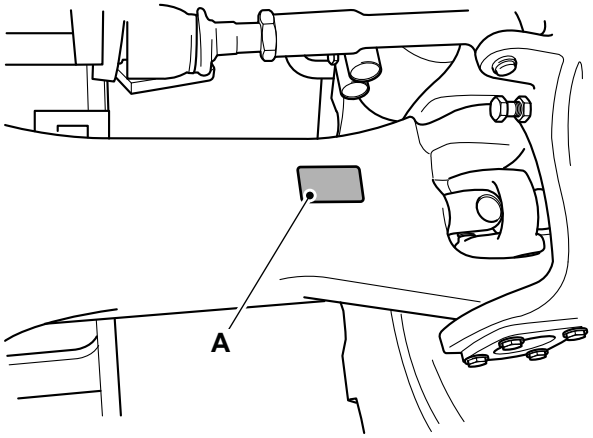
Axle

For: 526-56, 531-70, 533-105, 535-125, 535-140, 535-95, 536-60, 536-70, 536-70LP, 540-140, 540-170, 541-70 ..... Page 12
For: 550-80, 560-80 ..... Page 13

(For: 526-56, 531-70, 533-105, 535-125, 535-140, 535-95, 536-60, 536-70, 536-70LP, 540-140, 540-170, 541-70)

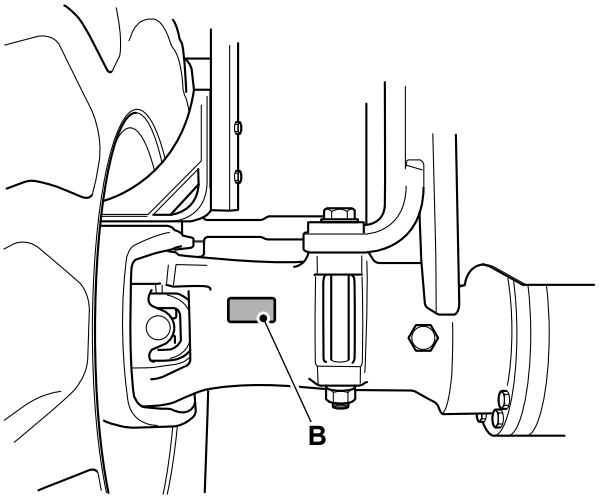
The axles have a serial number stamped on a data plate as shown.

Figure 7. Front axle



A Data plate - front axle

Figure 8. Rear axle



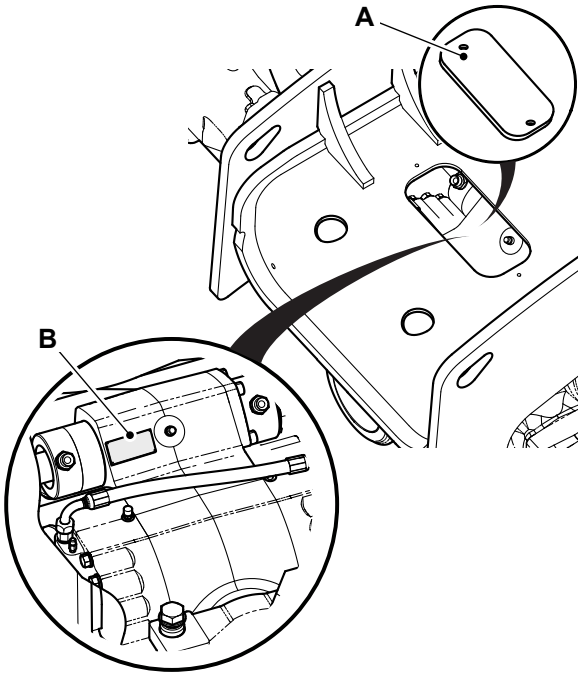
B Data plate - rear axle

(For: 550-80, 560-80)

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

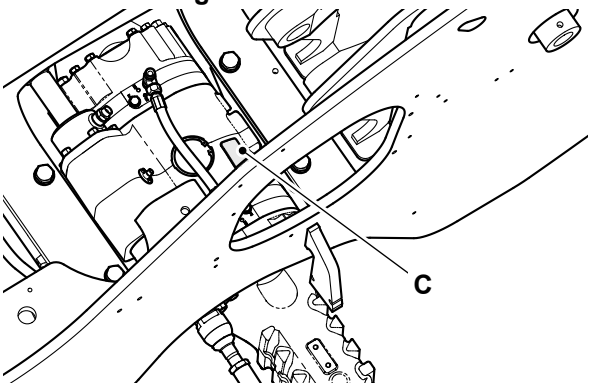
To view the front axle data plate remove the cover. The plate will be visible through hole.

Figure 9. Front axle



A Cover
B Data plate - front axle

Figure 10. Rear axle



C Data plate - rear axle

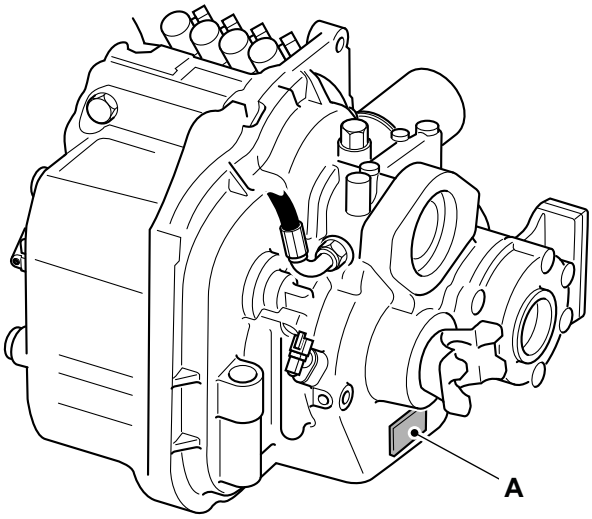
Gearbox

For: 531-70, 533-105, 535-125, 535-140, 535-95, 536-60, 536-70, 536-70LP, 540-140, 540-170, 541-70 ..... Page 14
For: 526-56 ..... Page 14

(For: 531-70, 533-105, 535-125, 535-140, 535-95, 536-60, 536-70, 536-70LP, 540-140, 540-170, 541-70)

The gearbox has a serial number stamped on a data plate as shown.

Figure 11. Power-shift Transmission

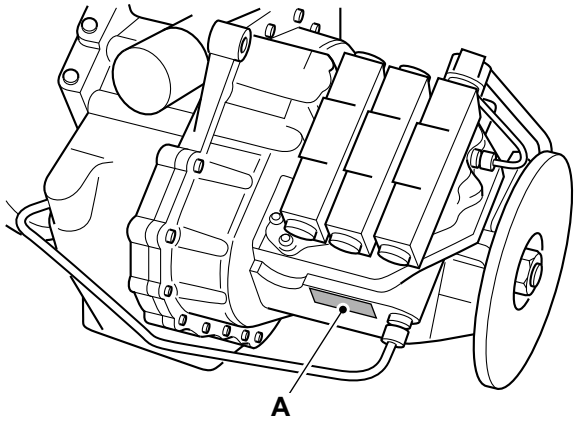


A Data plate

(For: 526-56)

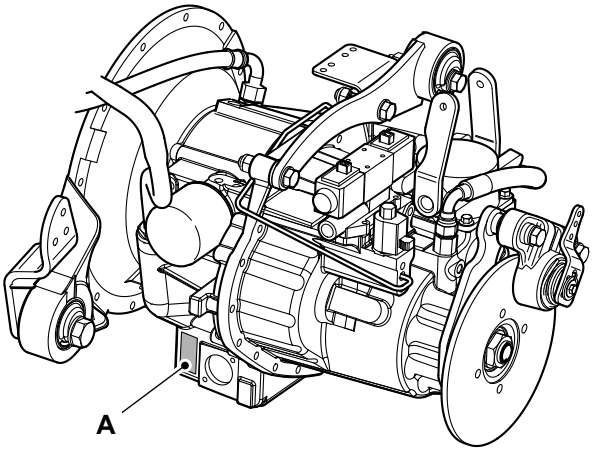
The gearbox has a serial number stamped on a data plate as shown.

Figure 12. Power-shift Transmission



A Data plate

Figure 13. Syncro Shuttle Transmission



A Data plate

Operator Protective Structure

⚠ **Warning!** You could be killed or seriously injured if you operate a machine with a damaged or missing ROPS/FOPS. If the ROPS/FOPS has been in an accident, do not use the machine until the structure has been renewed. Modifications and repairs that are not approved by the manufacturer may be dangerous and will invalidate the ROPS/FOPS certification.

Warning! Machines with a ROPS, FOPS or TOPS are equipped with a seat belt. The ROPS, FOPS or TOPS is designed to give you protection in an accident. If you do not wear the seat belt you could be thrown off the machine and crushed. You must wear a seat belt when using the machine. Fasten the seat belt before starting the engine.

FOPS Data Plate

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

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

The FOPS has a data plate attached. The data plate indicates what level of protection the structure provides.

There are two levels of FOPS:

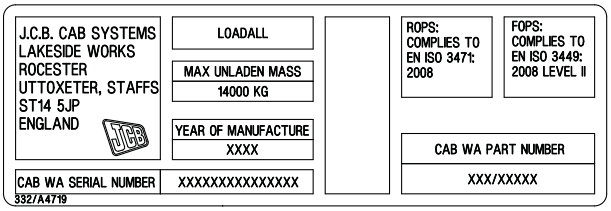
- Level I Impact Protection - impact strength for protection from small falling objects (e.g. bricks, small concrete blocks, hand tools) encountered in operations such as highway maintenance, landscaping and other construction site services.
- Level II Impact Protection - impact strength for protection from heavy falling objects (e.g. trees, rocks) for machines involved in site clearing, overhead demolition or forestry.

ROPS Data Plate

⚠ **Warning!** Your machine may be fitted with a Roll-Over Protective Structure (ROPS) indicating that the purchaser specified the machine for use in applications where there is risk of roll-over. ROPS is a device to protect the operator in the event of roll-over. Any damage or modification to the cab structure may invalidate the ROPS certification. If damage has occurred then an authorised JCB dealer should be consulted

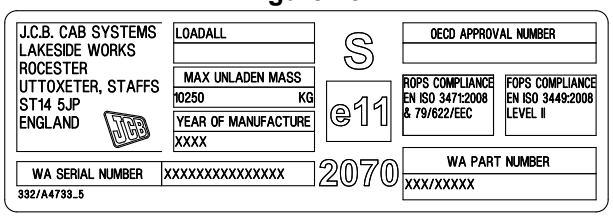
A machine with a ROPS (Roll-Over Protective Structure) can be identified by referring to the cab identification plate. Work place (work site, job site) risk assessment should facilitate the machine selection and the need for an machine with a ROPS.

Figure 14.



Data plate - ROPS/FOPS standards

Figure 15.



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

Safety Labels

General

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

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

If you need eye-glasses for reading, make sure you wear them when reading the safety labels. Do not over-stretch or put yourself in dangerous positions to read the safety labels. If you do not understand the hazard shown on the safety label, then refer to Safety Label Identification. Refer to: About the Product > Safety Labels > Safety Label Identification (Page 17).

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

Safety Label Identification

Figure 16.

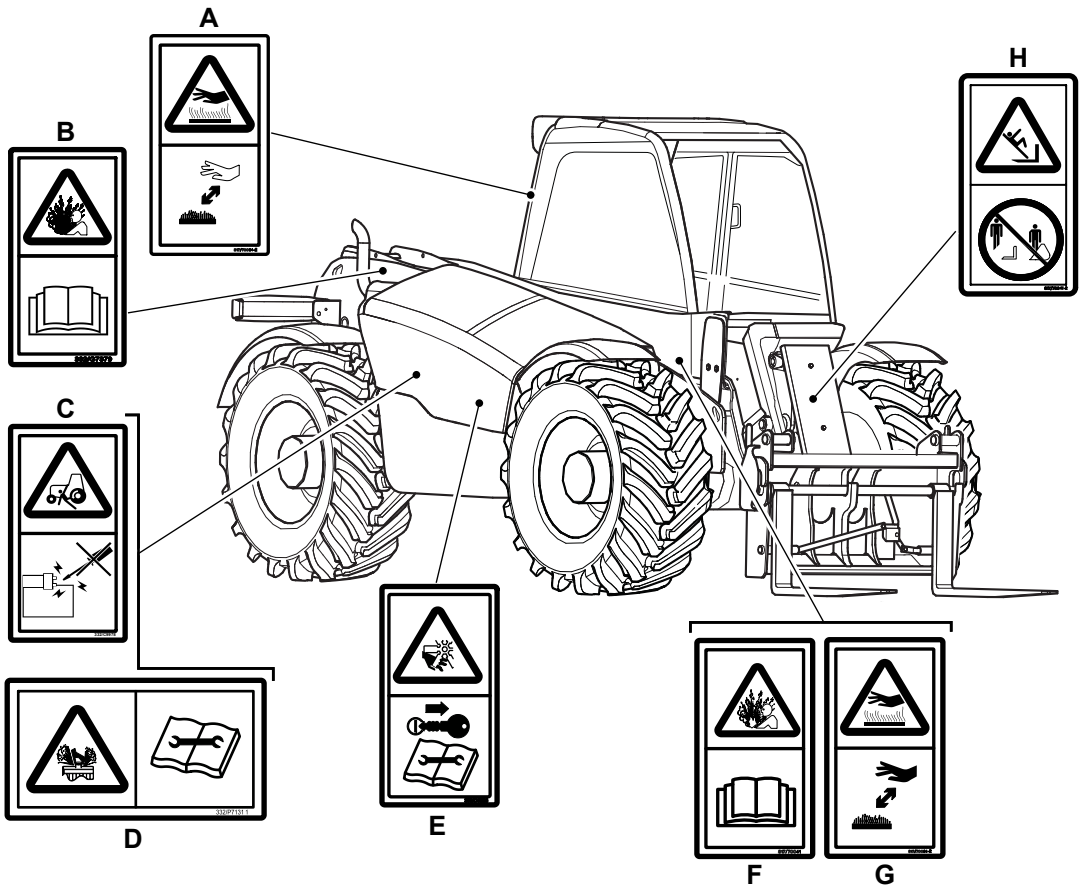


Figure 17.

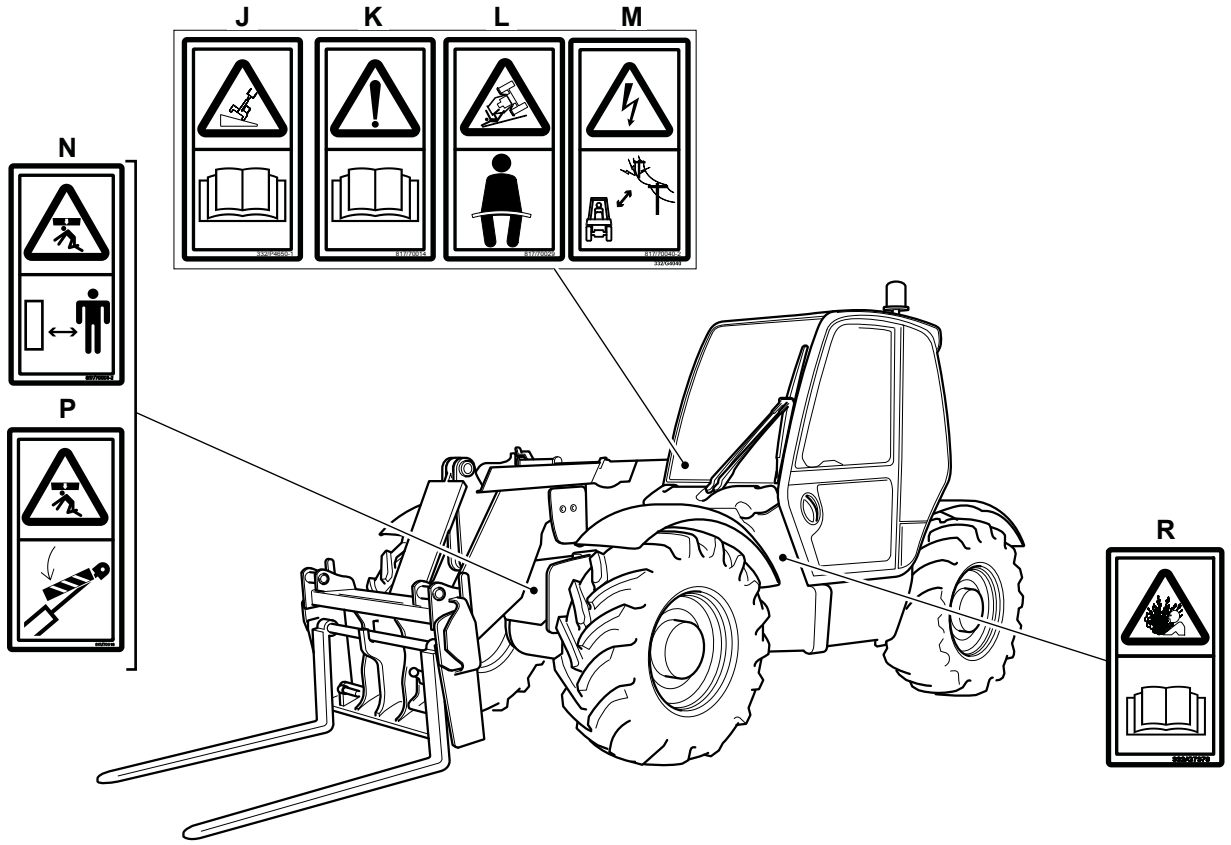


Table 14. Safety Labels

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

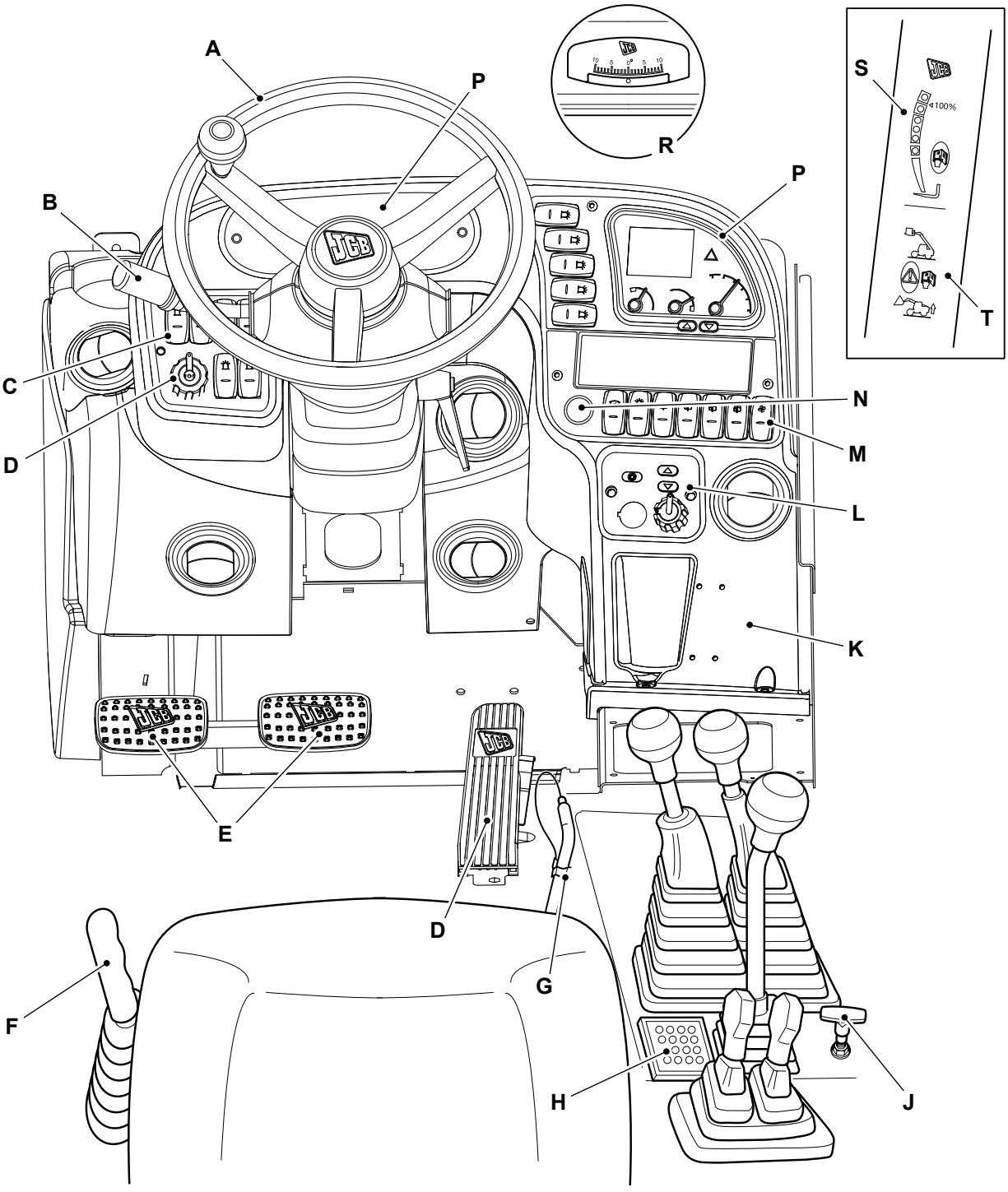
Operator Station

Component Locations

For: 531-70, 533-105, 535-125, 535-140, 535-95, 536-60, 536-70, 540-140, 540-170, 541-70, 550-80, 560-80, 536-70LP ..... Page 19
For: 526-56 ..... Page 21

(For: 531-70, 533-105, 535-125, 535-140, 535-95, 536-60, 536-70, 540-140, 540-170, 541-70, 550-80, 560-80, 536-70LP)

Figure 18.

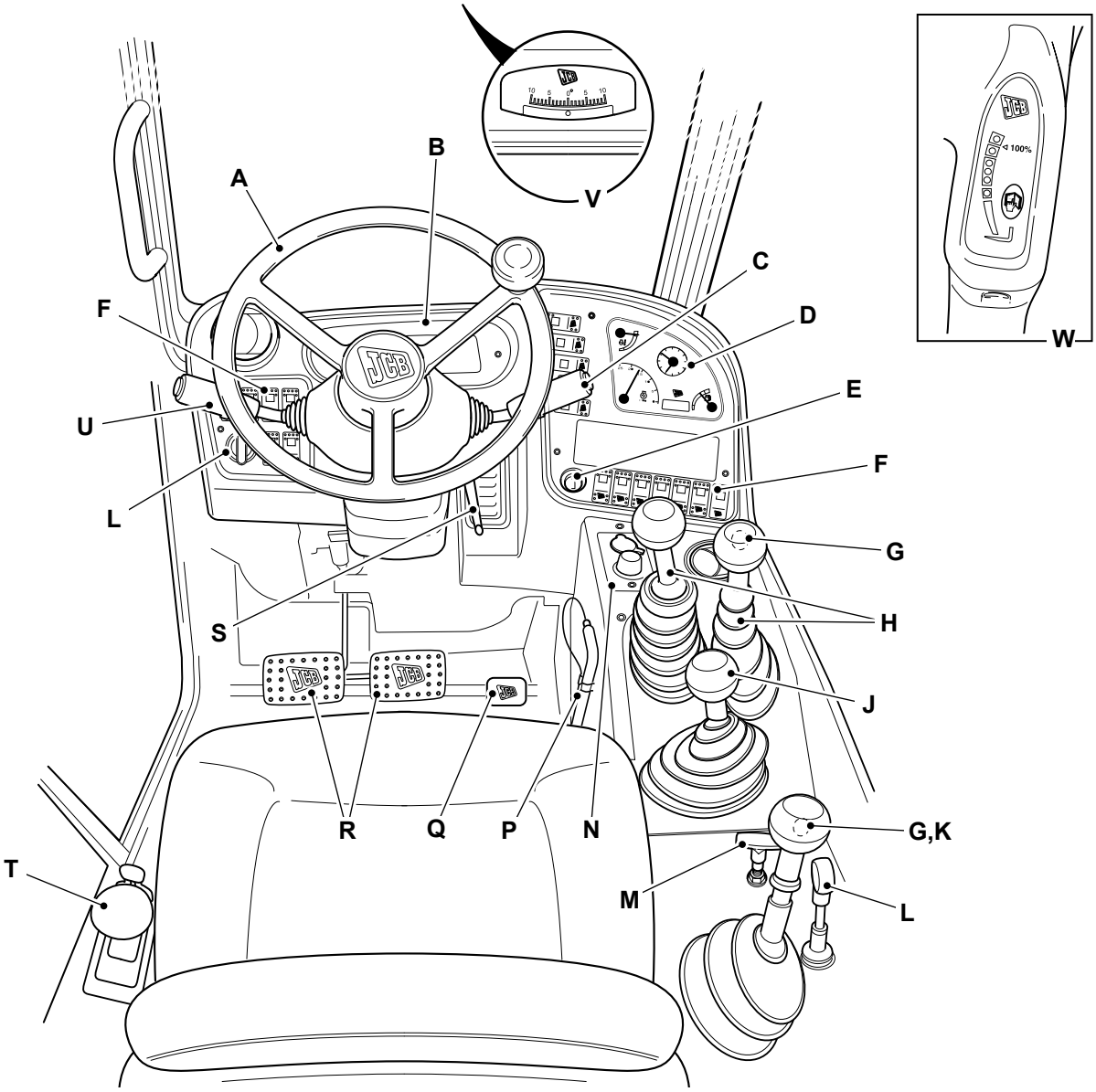


A Steering wheelRefer to: Operation > Drive Controls > Steering Wheel (Page 78).

B Transmission Lever and Gear SelectionRefer to: Operation > Drive Controls > Gear Lever (Page 81).
C Console switchesRefer to: About the Product > Console Switches (Page 23).
D Steer mode selectorRefer to: Operation > Drive Controls > Steer Mode Control (Page 85).
E Service brake pedalRefer to: Operation > Drive Controls > Service Brake Pedal (Page 78).
F Park brake leverRefer to: Operation > Drive Controls > Park Brake (Page 79).
G Control locks
H Immobiliser
J Hydraulic tow hitch
K Load charts
L HVAC (Heating Ventilation Air Conditioning)Refer to: Operation > Heating, Ventilating and Air-Conditioning (HVAC) (Page 188).
M Console switchesRefer to: About the Product > Console Switches (Page 23).
N Ignition switchRefer to: About the Product > Interior Switches > Ignition Switch (Page 28).
P Instrument panelRefer to: Operation > Instruments > Instrument Panel (Page 87).
R Inclinometer
S LLMI (Longitudinal Load Moment Indicator)
T Load control system

(For: 526-56)

Figure 19.



A Steering wheelRefer to: Operation > Drive Controls > Steering Wheel (Page 78).
B Instrument panelRefer to: Operation > Instruments > Instrument Panel (Page 87).
C Multi-Purpose switchRefer to: About the Product > Interior Switches > Multi-Purpose Switch (Page 28).
D Instrument panelRefer to: Operation > Instruments > Instrument Panel (Page 87).
E Starter switchRefer to: About the Product > Interior Switches > Ignition Switch (Page 28).
F Console switchesRefer to: About the Product > Console Switches (Page 23).
G Transmission dumpRefer to: Operation > Drive Controls > Transmission Dump Switch (Page 85).
H Boom and carriage controlsRefer to: Operation > Operating Levers/Pedals > Boom Controls (Page 141).
J Auxiliary controlsRefer to: Operation > Operating Levers/Pedals > Auxiliary Circuit Controls (Page 150).
K Gear lever (syncro shuttle transmission)Refer to: Operation > Drive Controls > Gear Lever (Page 81).
L Steer mode selectorRefer to: Operation > Drive Controls > Steer Mode Control (Page 85).
M Hydraulic tow hitch release
N HVAC controlsRefer to: Operation > Heating, Ventilating and Air-Conditioning (HVAC) (Page 188).

P Control locks
Q Accelerator pedalRefer to: Operation > Drive Controls > Accelerator Pedal (Page 78).
R Service brake pedalRefer to: Operation > Drive Controls > Service Brake Pedal (Page 78).
S Steering column adjustmentRefer to: Operation > Drive Controls > Steering Column (Page 78).
T Park brakeRefer to: Operation > Drive Controls > Park Brake (Page 79).
U Transmission lever and gear selection
V Inclinometer
W LLMI

Console Switches

General

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

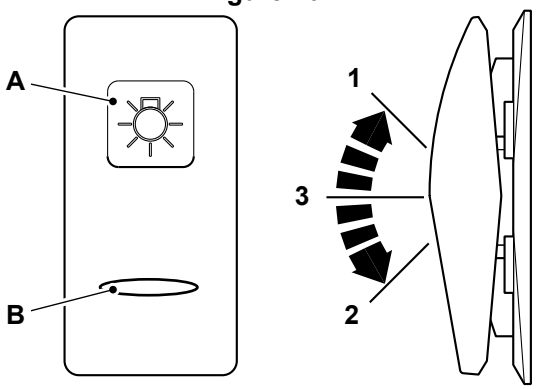
Each switch has a graphic symbol to show the function of the switch. Before you operate a switch, make sure that you understand its function.

The rocker switches have two or three positions (as shown).

If the switch has a backlight, then the graphic symbol illuminates when the ignition switch or side lights are in the on position.

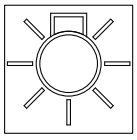
The light bar illuminates to show that the switch function is active.

Figure 20.



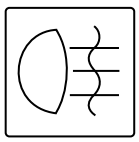
A Graphic symbol
B Light bar

Road Lights



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

Rear Fog Lights



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

Hazard Warning Lights

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