



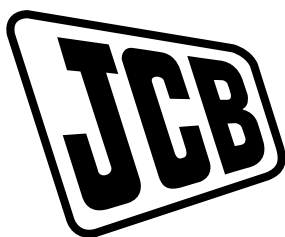
OPERATOR'S MANUAL



EXCAVATOR
210X, 220X

EN - 9831/3750 ISSUE 3 - 03/2018

THIS MANUAL SHOULD ALWAYS STAY WITH THE MACHINE



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EXCAVATOR
210X, 220X

EN - 9831/3750 - ISSUE 3 - 03/2018

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

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Foreword

The Operator's Manual



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

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

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

Machine Delivery and Installation

Even if you have operated this type of equipment before, it is very important that your new machines operations and functions are explained to you by a JCB Dealer Representative following delivery of your new machine.

Following the installation you will know how to gain maximum productivity and performance from your new product.

Please contact your local JCB dealer if the Installation Form (included in this manual) has not yet been completed with you.

Your local JCB Dealer is



Notes:



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Acronyms Glossary

ARV	Auxiliary Relief Valve
CAN	Controller Area Network
CESAR	Construction Equipment Security and Registration
DC	Direct Current
DEF	Diesel Exhaust Fluid
ECM	Engine Control Module
ECU	Electronic Control Unit
EGR	Exhaust Gas Recirculation
FEAD	Front End Accessory Drive
FOGS	Falling Object Guard System
FOPS	Falling Object Protective Structure
HVAC	Heating Ventilation Air Conditioning
ISO	International Organization for Standardization
LC	Long Carriage
LC D	Long Carriage Dozer
LED	Light Emitting Diode
LR	Long Reach
NOx	Nitrogen Oxide
PIN	Product Identification Number
PPE	Personal Protective Equipment
RMS	Root Mean Square
ROPS	Roll-Over Protective Structure
RPM	Revolutions Per Minute
SAE	Society of Automotive Engineers
SC	Standard gauge Carriage
SCR	Selective Catalytic Reduction
SLC	Standard gauge Long Carriage
SLCD	Standard gauge Long Carriage Dozer
SWL	Safe Working Load
TAB	Triple Articulated Boom
TOPS	Tip-Over Protective Structure
VGT	Variable Geometry Turbocharger
WIF	Water in Fuel
XD	Extra Duty

Introduction

About this Manual

Model and Serial Number

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

Model	From:	To:
210X	2500051	
220X	2500051	

Using the Manual

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

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

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

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

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

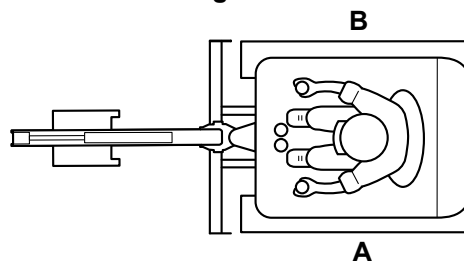
The manufacturer's policy is one of continuous improvement. The right to change the specification of the machine without notice is reserved. No responsibility will be accepted for discrepancies which may occur between specifications of the machine and the descriptions contained in this manual.

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

Left-Hand Side, Right-Hand Side

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

Figure 1.



A Left

B Right

Cross References

In this manual, cross references are made by presenting the subject title in blue (electronic copy only). The number of the page upon which the subject begins is indicated within the brackets. For example: [Refer to: Cross References \(Page 1\)](#).

Safety

Safety - Yours and Others

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

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

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

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

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

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

Remember:

- Be careful
- Be alert
- Be safe.

Safety Warnings

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

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

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

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

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

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

Figure 2. The safety alert system symbol



General Safety

Training

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

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

Clothing and Personal Protective Equipment (PPE)

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

About the Product

Introduction

General

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

Name and Address of the Manufacturer

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

Product Compliance

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

For its compliance as a new product, your JCB and some of its components may bear approval numbers and 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 Tracked Excavator is a self propelled machine with a tracked undercarriage and a revolving upper structure which has a boom, dipper, bucket and swing mechanism.

The excavator is mainly used to dig below ground level with bucket motions towards the machine. The upper structure can slew 360° and discharge material when the tracked undercarriage is stationary.

Waste Applications

The machine is mainly used to lift materials or scrap with an attachment. The upper structure can slew 360° and discharge the materials or scrap when the tracked undercarriage is stationary.

Intended Use

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

When used normally with a bucket fitted to the machine the work cycle consists of, digging, elevating, slewing and the discharging of material without movement of the undercarriage.

Applications include earthmoving, road construction, building and construction, landscaping and similar applications.

An excavator can also be used for object handling if it is suitably equipped with relevant parts and systems. [Refer to: Lifting and Loading \(Page 97\).](#)

The machine must not be used in the following scenarios because of the risk of overturning; used for forestry, used with attachments of unknown weight, used on surfaces of unknown stability. This list is not exhaustive.

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

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

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

Waste Applications

The boom/arm should not be operated so as to punch the waste in order to compact it. To compact waste the boom/arm can be used to exert pressure on the material, lowering the attachment onto the waste and continuing to lower the boom so as to exert the weight of the machine on the material being compacted, but without causing the machine to be lifted clear of the ground. Excessively raising the machine above ground, punching the waste, lifting with the dozer during compacting and any other actions that impart significant shock loads into the machine structure are outside of the intended use of the machine and can have a damaging effect on the machine structure and hydraulic system.

The dozer blade must be raised clear off the ground where applicable during the correct compaction procedures as outlined above.

Log Moving/Object Handling

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

Optional Equipment and Attachments

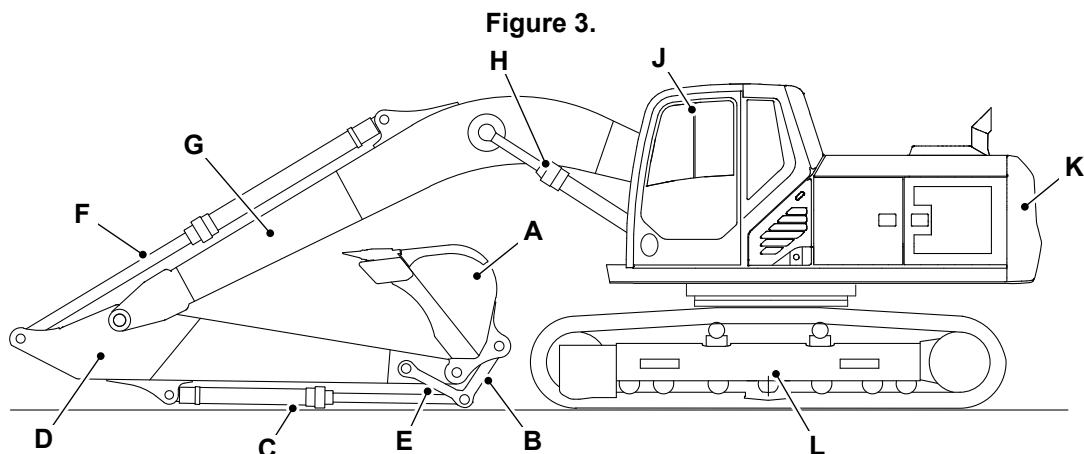
A wide range of optional attachments are available to increase the versatility of your machine. Only the JCB approved attachments are recommended for use with your machine. Contact your JCB dealer for the full list of approved attachments available.

Danger Zone

The danger zone is any zone within and/or around the machinery in which a person is subject to a risk to their health or safety. The danger zone includes the area in immediate proximity to any hazardous moving parts, areas into which working equipment and attachments can be moved to quickly, the machine normal stopping distances and also areas into which the machine can quickly turn under normal conditions of use. Depending on the application at the time, the danger zone could also include the area into which debris, from use of an attachment or working tool, could be projected and any area into which debris could fall from the machine. During the operation of the machine, keep all persons out of the danger zone. Persons in the danger zone could be injured.

Before you do a maintenance task, make the product safe.

Main Component Locations



- | | |
|------------------------|------------------------|
| A Bucket | B Bucket link |
| C Bucket ram | D Dipper |
| E Dipper link | F Dipper ram |
| G Boom | H Boom ram |
| J Operators cab | K Counterweight |
| L Undercarriage | |

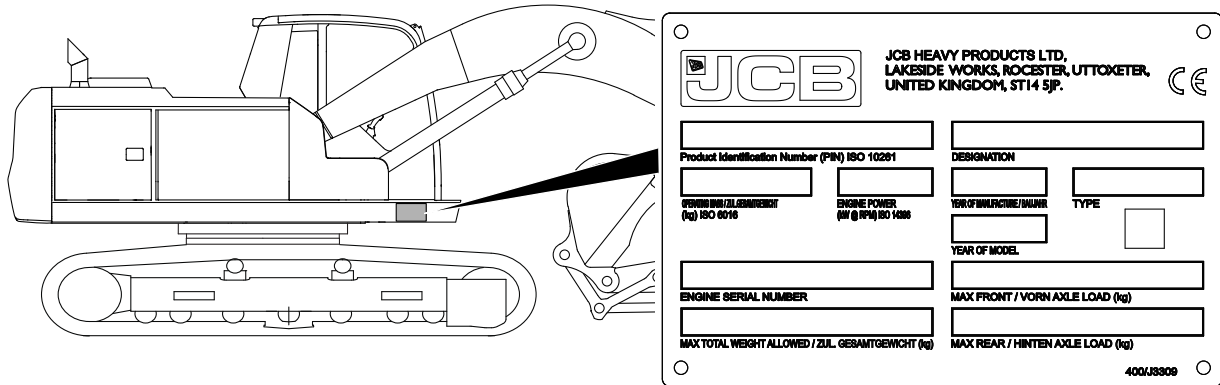
The boom dipper and bucket are collectively referred to as the excavator end, or dig end.

Product and Component Identification

Machine

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

Figure 4.



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	A220G	H	H	1234567
-----	-------	---	---	---------

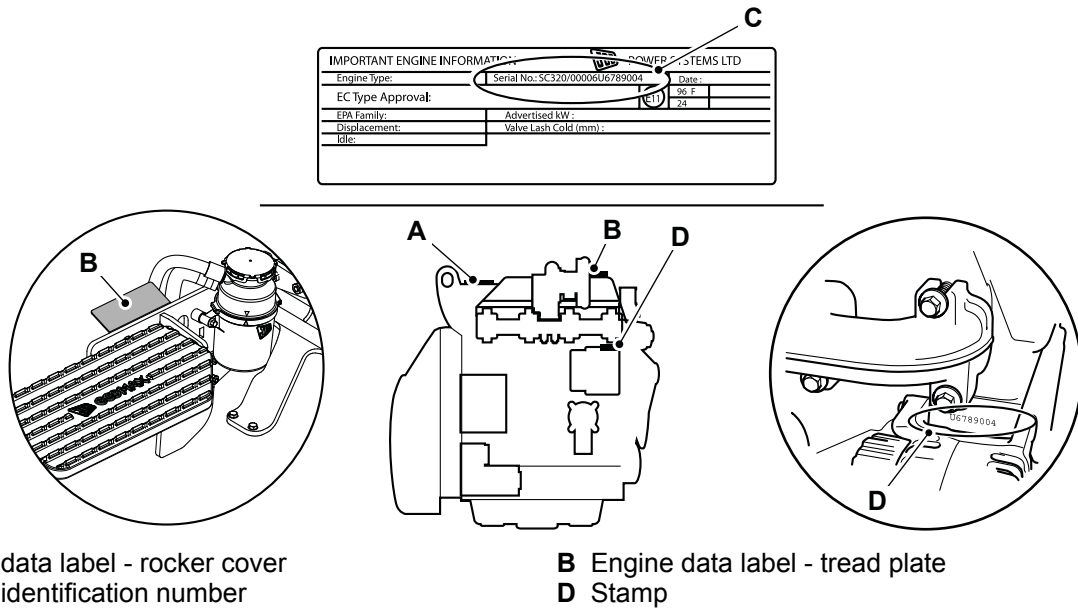
Table 2. Explanation of the PIN

Digit	Description
1 to 3	World manufacturer identification. For example, JCB = UK Build.
4 to 8	Machine type and model.
9	Random check letter. The check letter is used to verify the authenticity of a machine's PIN.
10	Year of manufacture. H = 2017, J = 2018
11 to 17	Machine serial number.

Engine

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

Figure 5.



The data labels include the engine identification number.

Table 3. Example of the engine identification number

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

Table 4.

Digit 12	Engine Type
SJ	4.4L turbocharged and aftercooled electronic common rail fuel injection (tier 4F) >55kW
SL	4.4L turbocharged and aftercooled electronic common rail fuel injection (tier 4F) <55kW
DJ	4.8L turbocharged and aftercooled electronic common rail fuel injection (tier 4F) >55kW

Table 5. 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 5.

Operator Protective Structure

▲ WARNING Modified and wrongly repaired ROPS and TOPS are dangerous. Do not modify the ROPS or TOPS. Do not attempt to repair the ROPS or TOPS. If the ROPS or TOPS has been in an accident, do not use the machine until the structure has been examined and repaired. This must be done by a qualified person. For assistance, contact your JCB dealer. Failure to take precautions could result in death or injury to the operator.

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.

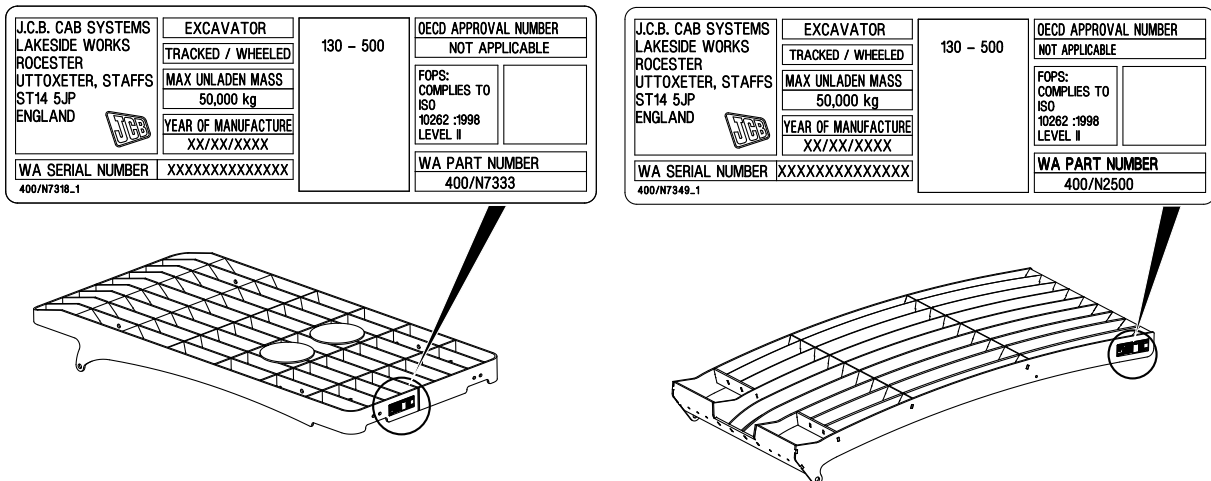
The FOPS has a data plate attached. The data plate indicates what level of protection the structure provides.

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.

There are two FOPS available for your machine, A roof guard system and a hammer glass system.

Figure 6. Roof Guard



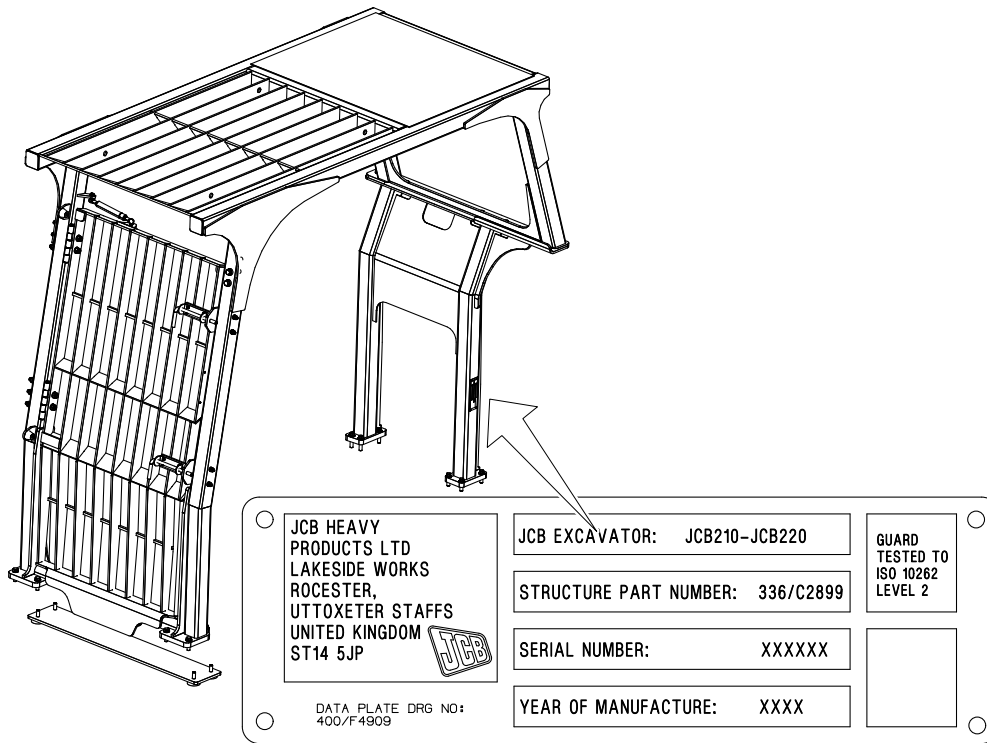
ROPS/TOPS Data Plate

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

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

An excavator with a TOPS (Tip-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 excavator with a TOPS.

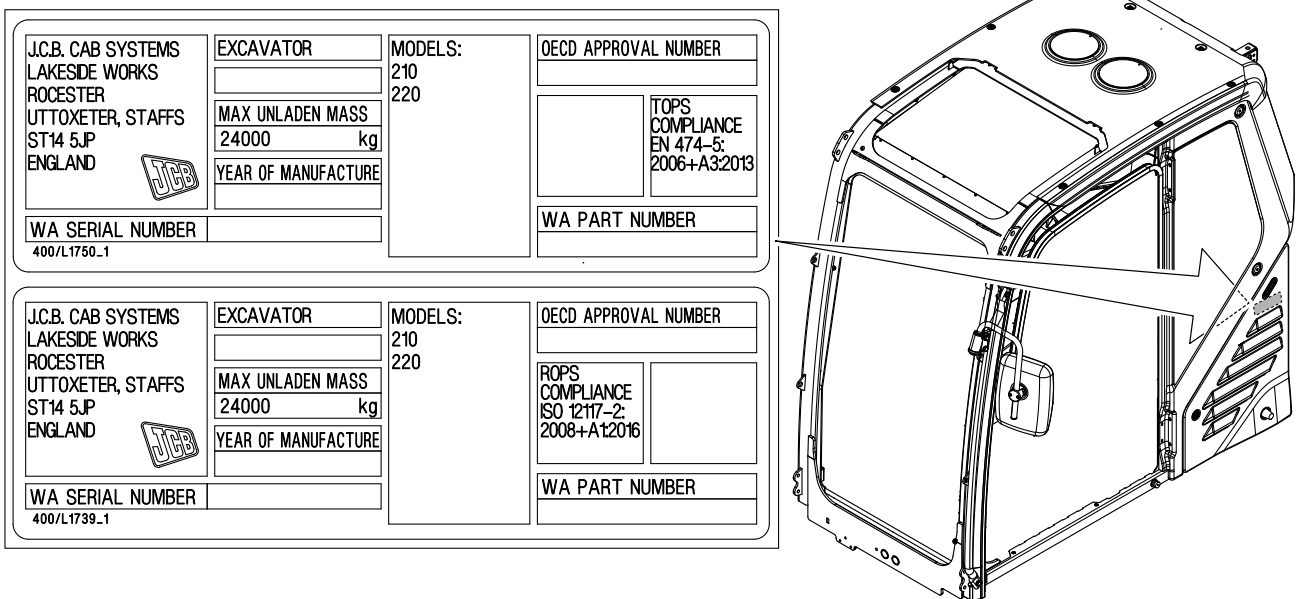
Figure 7.



XD Cage

An excavator with a XD can be identified by referring to the identification plate. Work place (work site, job site) risk assessment should facilitate the machine selection and the need for an excavator with a XD cage.

Figure 8.



Safety Labels

General

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

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

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

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

Safety Label Identification

Figure 9.

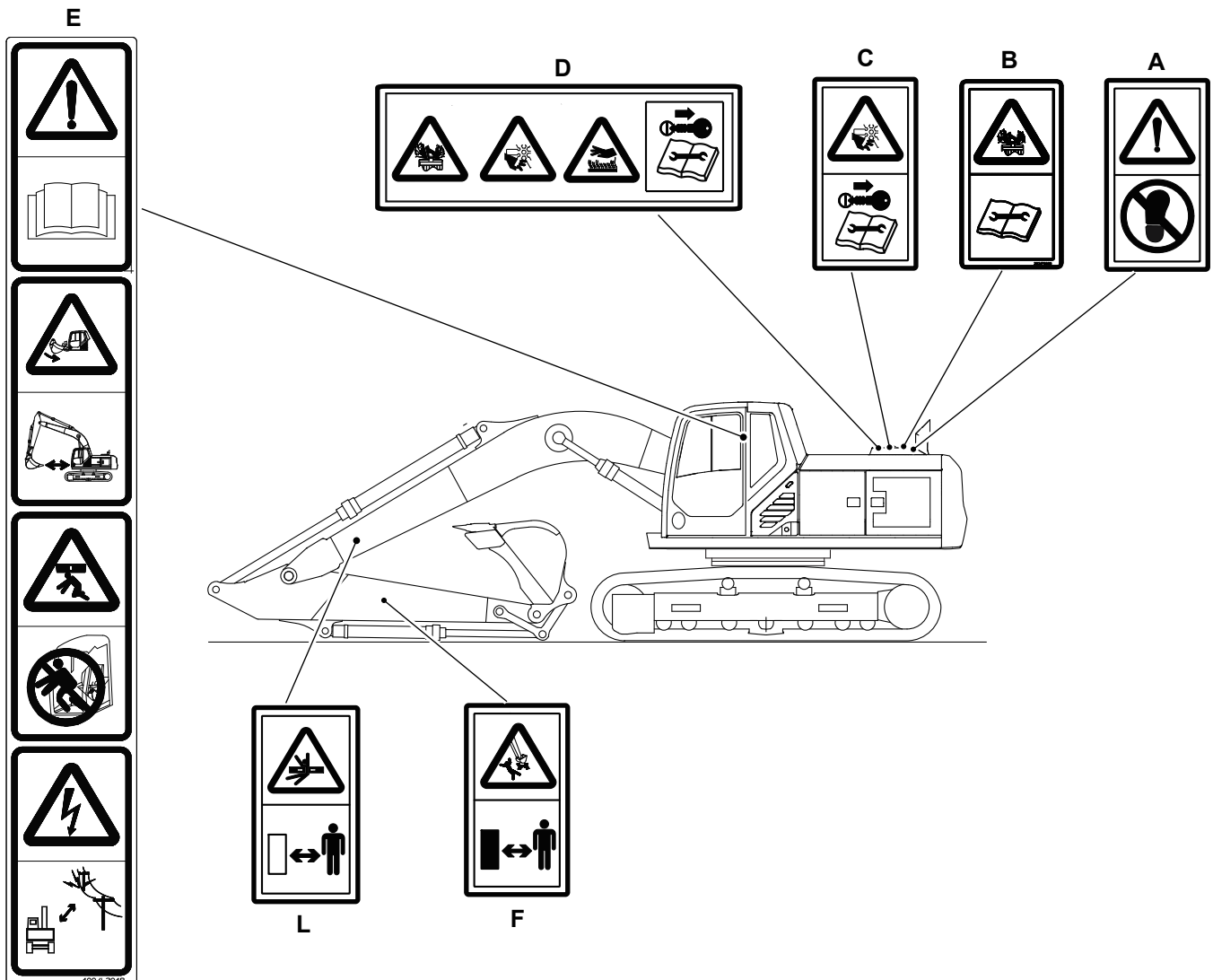


Figure 10.

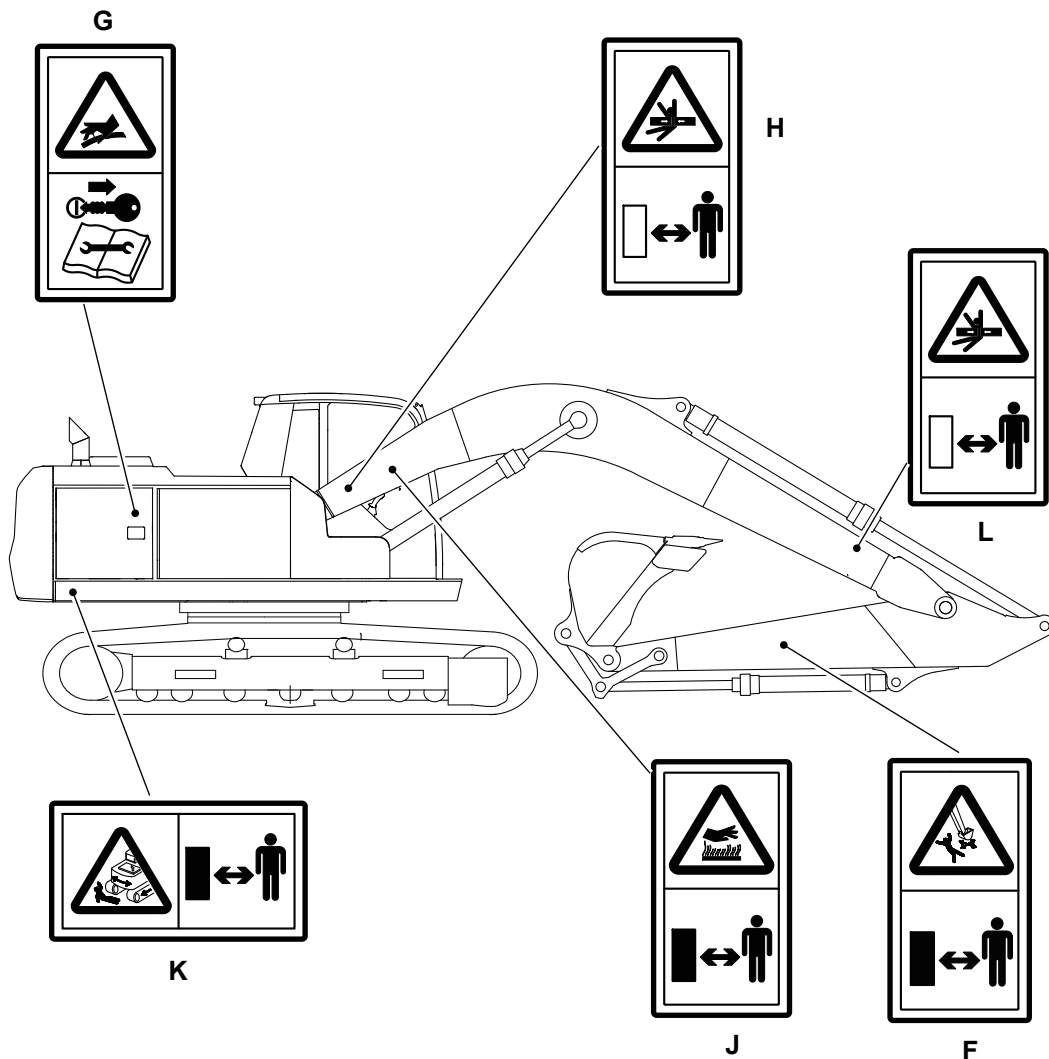


Table 6. Safety Labels

Item	Part No.	Description	Qty.
A	817/70024	Warning. Do not use as a step.	1
B	332/F5860	Warning. Hot fluid under pressure. Read the Operator's Manual.	1
C	332/P4679	Warning. Severing of hands and fingers. Keep clear of/do not reach into rotating parts. Read the Service Manual.	1
D	332/J2896	(Combination label) Warning. The coolant is under pressure. Risk of severing of hands/fingers in the rotating parts. Hot surfaces. Remove the ignition key and refer to the operator's manual and the service manual.	1
E	400/L2048	(Combination label) Warning. Danger of collision, maintain the clearance between the bucket and cab. Risk of tripping, lower the control lock lever before you exit the machine. Risk of injury by crushing, do not lean out of the window. Risk of electrocution, maintain the minimum clearance recommended by your local electricity supplier.	1
F	817/19470	The arm or bucket may move, keep clear.	2
G	817/18532	Warning. Pressure hazard. Stop the engine, remove the ignition key and release the hydraulic pressure before you start maintenance work. Refer to Maintenance Section in the operator's manual.	1
H	817/70027	Warning. Crushing of whole body. Keep a safe distance.	1
J	335/E7623	Warning. Burns to fingers and hands. Keep a safe distance from machine.	1

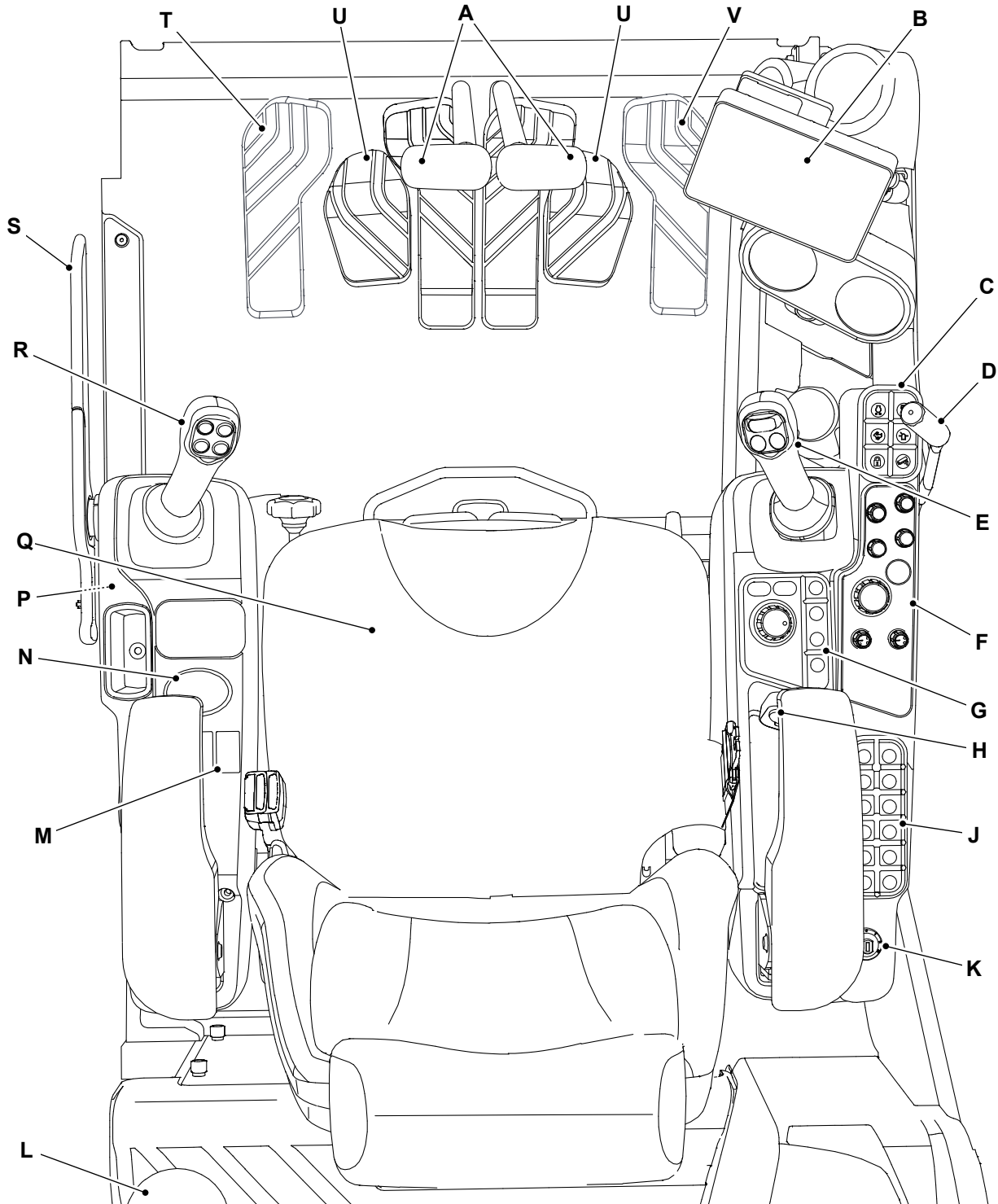


Item	Part No.	Description	Qty.
K	400/F8445	Warning. Strike. Keep clear of the reversing machine.	1
L	400/F8139	Warning. Crushing of whole body. Keep a safe distance.	2

Operator Station

Component Locations

Figure 11.



- A** Track controls Refer to: [Track Controls \(Page 60\)](#).
- C** Switch panel Refer to: [General \(Page 19\)](#).
- E** Right joystick Refer to: [Excavator End Controls \(Page 85\)](#).

- B** Display unit Refer to: [Instrument Panel \(Page 64\)](#).
- D** Dozer control (option) Refer to: [Dozer Blade Controls \(Page 93\)](#).
- F** Dial control panel Refer to: [General \(Page 19\)](#).

- G** Display control panel [Refer to: General \(Page 19\)](#).
- J** Switch panel (option) [Refer to: General \(Page 19\)](#).
- L** Fire extinguisher (option) [Refer to: Fire Extinguisher \(Page 116\)](#).
- N** Winter control panel (option)
- Q** Operator seat [Refer to: Operator Seat \(Page 43\)](#).
- S** Control isolation lever [Refer to: Control Lock \(Page 58\)](#).
- U** Foot rest
- H** Auxiliary power socket/media socket [Refer to: Auxiliary Power Socket \(Page 115\)](#).
- K** Ignition switch [Refer to: Ignition Switch \(Page 17\)](#).
- M** Option switches
- P** Engine stop and courtesy switches [Refer to: Interior Switches \(Page 17\)](#).
- R** Left joystick [Refer to: Excavator End Controls \(Page 85\)](#).
- T** TAB (Triple Articulated Boom) foot pedal (option) [Refer to: Excavator End Controls \(Page 85\)](#).
- V** Hammer- auxiliary foot pedal (option) [Refer to: Auxiliary Circuit Controls \(Page 93\)](#).

Interior Switches

General

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

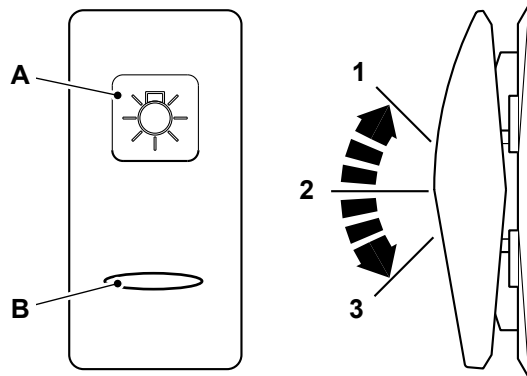
Each switch has a graphic symbol to show the function of the switch. Before you operate a switch, make sure that you understand its function.

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 12.



A Graphic symbol

B Light bar

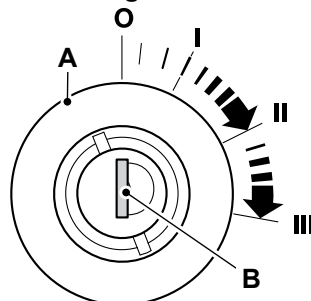
Ignition Switch

The ignition key operates the four-position ignition switch. The ignition key can only be inserted or removed in position 0.

If the engine fails to start, the ignition key must be returned to position 0 before the starter motor is re-engaged.

Do not operate the starter motor for more than 20s without the engine firing. If the engine fires but does not fully start, let the starter motor cool for at least 2min between starts.

Figure 13.



A Ignition switch

B Ignition key

Table 7. Switch Positions

Position	Function
0	Off/Stop the Engine: Turn the ignition key to this position to stop the engine. Make sure the controls are in neutral and the excavator and dozer are lowered before you stop the engine.
I	On: Turn the ignition key to this position to connect the battery to all of the electrical circuits. The ignition key will return to this position when it is released from position II or position III.
II	This position is not used.
III	Start: Turn the ignition key to this position to operate the starter motor and turn the engine. The ignition switch has an inhibitor to stop the ignition switch being turned on when the engine is running. There may be a delay of up to 1s between switch operation and engine cranking.

Cab Interior Light

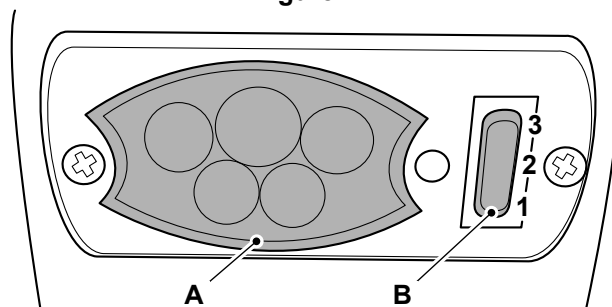
Three position switch. Make sure the cab interior light is turned off when you intend to leave the machine for a long period of time.

Position : 1 = Interior light comes on when the door is open

Position : 2 = Off

Position : 3 = Interior light comes on permanently

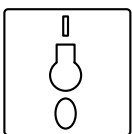
Figure 14.



A Cab interior light

B Switch

Engine Stop Switch



Two position rocker switch. The switch functions operate when the ignition switch is in the on position.

Position : 1 = Engine run

Position : 2 = Engine stop. Engine cannot be cranked.

Service Lights



Two position rocker switch. The switch functions operate when the ignition switch is in the on position.

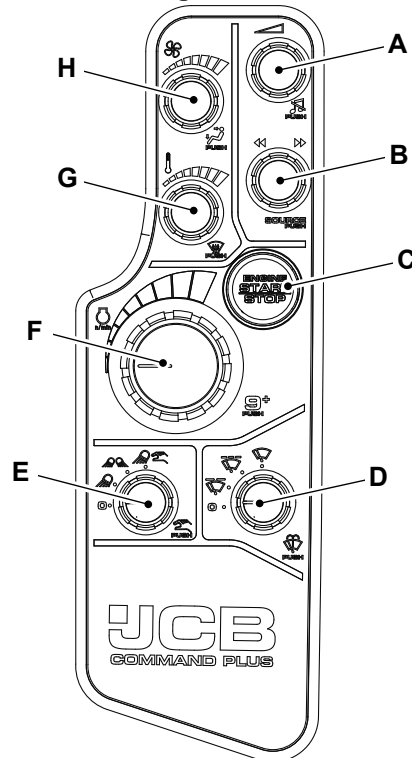
Position 1: Service lights off.

Position 2: Service lights on.

Console Switches

General

Figure 15.



A Rotary media volume control. Rotate clockwise to increase, anti-clockwise to decrease. Push to mute.

C Engine start/stop button.

E Rotary worklight control. Worklights off, worklights front, worklights rear, worklights custom. Push to configure custom.

G Rotary HVAC (Heating Ventilation Air Conditioning)/heater temperature control. Rotate clockwise to increase temperature, anti-clockwise to decrease temperature. Push to select demister.

B Rotary media track/source control. Rotate clockwise to skip forward, anti-clockwise to skip backwards. Push to select source.

D Rotary wiper control. Wiper off, intermediate 1, intermediate 2, continuous. Push to wash screen.

F Rotary machine operating powerband control. Push to select heavy power band.

H Rotary HVAC/heater fan speed control. Rotate clockwise to increase fan speed, anti-clockwise to decrease fan speed. Push to select vent mode.

The console switches may change according to machine specification. Some are used for machine options.

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 switch LED (Light Emitting Diode) will illuminate to show that the switch function is active.

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