

# Service Manual

# LOADALL

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### Introduction

This publication is designed for the benefit of JCB Distributor Service Engineers who are receiving, or have received, training by JCB International Training Centre.

These personnel should have a sound knowledge of workshop practice, safety procedures, and general techniques associated with the maintenance and repair of hydraulic earthmoving equipment.

Renewal of oil seals, gaskets, etc., and any component showing obvious signs of wear or damage is expected as a matter of course. It is expected that components will be cleaned and lubricated where appropriate, and that any opened hose or pipe connections will be blanked to prevent excessive loss of hydraulic fluid and ingress of dirt. Finally, please remember above all else **SAFETY MUST COME FIRST!** 

#### How to use this manual

The manual is compiled in sections, the first three are numbered and contain information as follows:

- 1 = General Information includes torque settings and service tools.
- 2 = **Care & Safety** includes warnings and cautions pertinent to aspects of workshop procedures etc.
- **3** = **Routine Maintenance** includes service schedules and recommended lubricants for all the machine.

The remaining sections are alphabetically coded and deal with Dismantling, Overhaul etc. of specific components, for example:

- A = Attachments
- **B** = **Body & Framework** ...etc.

The page numbering in each alphabetically coded section is not continuous. This allows for the insertion of new items in later issues of the manual.

Section contents, technical data, circuit descriptions, operation descriptions etc are inserted at the beginning of each alphabetically coded section.

READ the section contents to locate machine types, machine type identification IS NOT listed on individual pages.

All sections are listed on the title page; tabbed divider cards align directly with individual sections on the front cover for rapid reference.

Where a torque setting is given as a single figure it may be varied by plus or minus 3%. Torque figures indicated are for dry threads, hence for lubricated threads may be reduced by one third.

'Left Hand' and 'Right Hand' are as viewed from the rear of the machine facing forwards.

\* This Service Manual covers the following machines, from Serial Number 277001

520-55 RS (Rear Steering) Farm Special & Construction 520-55 AWS (All Wheel Steering) Farm Special & Construction 526-55 Farm Special & Construction 526-55 AWS (All Wheel Steering) Farm Special & Construction 526S AWS (All Wheel Steering) Farm Special & Construction

#### **Machine History**

Date	Machine	Description
<b>1993</b> Serial No. 277001	520-55 RS (277001 - 279114) Machine introduction	The machine incorporated twin brake pedals to operate an independent brake circuit controlling each of the front wheels. This allowed single wheel braking to reduce the turning circle. The pedals could be locked together for road use. The machine was also equipped with manually selectable 2/4-wheel drive.
<b>1994</b> Serial No. 277386 278610	520-55 AWS (504B N.Am) (277386 - 278966) Machine introduction JCB axles, drop box and 4 wheel power brakes fitted.	The machine was fitted with permanent four wheel steering and four-wheel braking.
<b>1994</b> Serial No. 277468	<b>526-55</b> (277467 - 278966) Machine introduction	Introduced as a development of the 520- 55 with a stronger inner boom and larger lift, tilt and displacement rams. The machine was fitted with JCB manufactured axles and drop box, and incorporated four-wheel power brakes. The machine was equipped with three manually selectable steering modes and an optional turbo-charged engine was available.
<b>1996</b> Serial No. 278967	520 & 526 520 (278967 onwards) 526 (278967 - 279567) Machine introduction	520-55 and 526-55 machines re-named 520 and 526. These machines incorporated a revised hydraulic tank, plastic fuel tank, fenders and engine cover.
<b>1996</b> Serial No. 279289 280300 280577	526, 526S (526 Am.N) (279289 onwards) Machine introduction ECU controlled powershift available as an option. Single lever control and trailer braking. Power brakes replaced by inboard, front axle brakes. ECU control was replaced by relay controlled transmission.	The 526 and 526S machine incorporated a longer wheelbase to allow for 24in. wheels and tyres on the 526S machine only. Drop box fitted with helical gears from axle serial number 453/275/00005.
<b>1996</b> Serial No. 279598	520S (279598 onwards) Machine introduction	Introduced as a 90 hp turbo-charged engine version of the 520 machine. The stronger inner boom on the 526 was introduced to cope with the increased engine power.

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### **Identification Plate**

Your machine has an identification plate V mounted as shown. The serial numbers of the machine and its major units are stamped on the plate.



S195340

**Explanation of Vehicle Identification Number (VIN)** 

## SLP52655RE0277001

A B C	World Manufa Machine Mode Year of Manufa	cturer Identification al acture	SLP = JCB 526-55 S
	P = 1993	V = 1997	1 = 2001
	R = 1994	W = 1998	2 = 2002
	S = 1995	X = 1999	3 = 2003
	T = 1996	Y = 2000	4 = 2004
D	Manufacturing	Location	E = England
E	Machine Seria	l Number	0277001

#### Machine Model Explanation

526	-	55
FG		н

- F 500 Series machine range
- G 2.6 tonnes lift capacity
- **H** 5.5 meters lift height

With the introduction of the longer wheel base machine the lift height has been deleted from the serial number.

#### 526 F G

F 500 Series machine range

G 2.6 tonnes lift capacity

#### \* Unit Identification

The engine serial number is stamped on label  ${\bf W}$  which is fastened to the right side of the cylinder block at  ${\bf Y},$  near the fuel filter.

#### Explanation of Engine Identification Number



#### **Typical Engine Identification Number**

٩A	50261	U	500405	Ρ
Α	В	С	D	Е

- \* A Engine Type:
- A series
  - AA = 4 cylinder naturally aspirated
  - AB = 4 cylinder turbo
  - AK = 4 cylinder turbo low emission, stage 1
  - AR = 4 cylinder naturally aspirated low emission, stage 1

#### **R** Series

- RE = 4 cylinder naturally aspirated, low emission, stage 2
- RG = 4 cylinder turbo, low emission stage 2
- B Build Number
- C Country of Manufacture
- D Engine Serial Number
- E Year of Manufacture

If service information or parts are required, the complete engine number should be quoted.

If there is also a number marked 'TPL No', this should be quoted also.

If a short engine has been fitted in service, two engine serial numbers and a TPL No. are stamped on the serial number plate as at Z. All the numbers should be quoted when requiring parts or information.

**Note:** Where the procedures in this service manual differ according to engine types, the text and/or illustrations will specify which engine types apply.

Transmission and axle identification is shown on the next page.





S196280



The Syncro Shuttle serial number is stamped on label Y as shown.

The rear axle serial number is stamped on plate X as shown. The front axle serial number is stamped on plate Z as shown.

## **Torque Settings**

Use only where no torque setting is specified in the text. Values are for dry threads and may be within three per cent of the figures stated. For lubricated threads the values should be REDUCED by one third.

#### UNF Grade 'S' Bolts

Bolt Size		Hexagon (A/F)		Torque Settings	
in	(mm)	in	Nm	kgf m	lbf ft
1 <sub>/4</sub>	(6.3)	<sup>7</sup> /16	14	1.4	10
<sup>5</sup> /16	(7.9)	1/2	28	2.8	20
<sup>3</sup> /8	(9.5)	<sup>9</sup> /16	49	5.0	36
<sup>7</sup> /16	(11.1)	5 <sub>/8</sub>	78	8.0	58
1 <sub>/2</sub>	(12.7)	3 <sub>/4</sub>	117	12.0	87
<sup>9</sup> /16	(14.3)	<sup>13</sup> /16	170	17.3	125
<sup>5</sup> /8	(15.9)	<sup>15</sup> /16	238	24.3	175
<sup>3</sup> /4	(19.0)	<b>1</b> <sup>1</sup> /8	407	41.5	300
7 <sub>/8</sub>	(22.2)	<b>* 1</b> <sup>5</sup> /16	650	66.3	480
1	(25.4)	<b>1</b> <sup>1</sup> /2	970	99.0	715
<b>1</b> <sup>1</sup> /4	(31.7)	<b>1</b> <sup>7</sup> /8	1940	198.0	1430
<b>1</b> <sup>1</sup> /2	(38.1)	<b>2</b> <sup>1</sup> /4	3390	345.0	2500

#### Metric Grade 8.8 Bolts

Bolt Size		Hexagon (A/F)		Torque Settings	
	(mm)	mm	Nm	kgf m	lbf ft
M5	(5)	8	7	0.7	5
M6	(6)	10	12	1.2	9
M8	(8)	13	28	3.0	21
M10	(10)	17	56	5.7	42
M12	(12)	19	98	10	72
M16	(16)	24	244	25	180
M20	(20)	30	476	48	352
M24	(24)	36	822	84	607
M30	(30)	46	1633	166	1205
M36	(36)	55	2854	291	2105

#### **Rivet Nut Bolts/Screws**

Bolt Size		Torque S	ettings (for steel	rivet nuts)
	(mm)	Nm	kgf m	lbf ft
M3	(3)	1.2	0.12	0.9
M4	(4)	3.0	0.3	2.0
M5	(5)	6.0	0.6	4.5
M6	(6)	10.0	1.0	7.5
M8	(8)	24.0	2.5	18.0
M10	(10)	48.0	4.9	35.5
M12	(12)	82.0	8.4	60.5

Note: All bolts used on JCB machines are high tensile and must not be replaced by bolts of a lesser tensile specification.

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## \* Sealing and Retaining Compounds

JCB Multi-Gasket	A medium strength sealant suitable for all sizes of gasket flanges, and for hydraulic fittings of 25-65mm diameter.	4102/1212	50ml
JCB High Strength Threadlocker	A high strength locking fluid for use with threaded components. Gasketing for all sizes of flange where the strength of the joint is important.	4102/0551	50ml
JCB Retainer (High Strength)	For all retaining parts which are unlikely to be dismantled.	4101/0651	50ml
JCB Threadlocker and Sealer	A high strength locking fluid for sealing and retaining nuts, bolts, and screws up to 50mm diameter, and for hydraulic fittings up to 25mm diameter.	4101/0250 4101/0251	10ml 50ml
Threadseal	A medium strength thread sealing compound.	4102/1951	50ml
Threadlocker	A locking fluid for use on threads larger than 50mm dia.	4101/0451	50ml
Activator	A cleaning primer which speeds the curing rate of anaerobic products. (200ml)	4104/0251 4104/0253	(1ltr) Bottle
Cleaner / Degreaser	For degreasing components prior to use of anaerobic adhesives and sealants.	4104/1557	400ml
Direct Glazing Kit	For one pane of glass, comprises items marked † below plus applicator nozzle etc.	993/55700	
† Ultra Fast Adhesive	For direct glazing	4103/2109	310 ml
† Active Wipe 205	For direct glazing	4104/1206 4104/1203	30 ml 250 g
† Black Primer 206J	For direct glazing	4201/4906	30 ml
Clear Silicone Sealant	To seal butt jointed glass	4102/0933	
Black Polyurethane Sealant	To finish exposed edges of laminated glass	4102/2309	310 ml
JCB Cleaner & Degreaser	For degreasing components prior to use of anaerobic adhesives and sealants.	4104/1538	Aerosol

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## **Safety Notices**

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

## **A** 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

## **A** 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

## 

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.  $_{\rm INT-1-2-3}$ 

All construction and agricultural equipment can be hazardous. When a JCB 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.

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

GEN-1-6

## **General Safety**



Decals

You can be injured if you do not obey the decal safety instructions. Keep decals clean. Replace unreadable or missing decals with new ones before operating the machine. Make sure replacement parts include warning decals where necessary.

INT-1-3-4



#### Clothing

You can be injured if you do not wear 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

As well as the warnings in this chapter, specific warnings are given throughout the book. This section is designed to give a safety code for use of the machine generally and for maintenance practices.



#### 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.  $_{\rm INT-1-3-5}$ 

## A WARNING

#### Raised Boom

A raised boom can fall or be lowered accidentally. Do not walk under a raised boom which is not fitted with a safety strut, or you could be injured. 5-1-1-1



#### 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 the lifting equipment is strong enough for the job. INT-1-3-7

2 - 2

## **Operating Safety**

## 

#### 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



#### Entering/Leaving

Always face the machine when entering and leaving the cab. Use the step(s) and handrails. 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

## **A** WARNING

#### Passengers

Passengers in or on the machine can cause accidents. The JCB Loadall is a one man machine. Do not carry passengers.

INT-2-2-2

## A 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. Get out of the cab into fresh air.

INT-2-1-10

## A 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.

## **WARNING**

#### Fires

If your machine is equipped with a fire extinguisher, make sure it is checked regularly. Keep it in the operator's cab 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-3-2-7/1



#### **Engine Panels**

The engine has exposed rotating parts. Do not open the bonnet while the engine is running. Keep other people clear while you raise the engine cover using the boom. Do not use the machine with the bonnet open or the cover raised. 5:1-2:1

## A WARNING

#### **ROPS/FOPS Structure**

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-2-1-9/3



## Reversing at high speed can cause accidents. Do not reverse in third or fourth (if fitted) gear with full throttle. Always drive at a safe speed to suit working conditions.

## A 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.



#### 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.



#### **Overhead Clearance**

A raised boom can strike overhead objects. Always check for overhead clearance before raising the boom. 5-1-5-1

#### Maintenance Safety

## A WARNING

#### Metal Splinters

You can be injured by flying metal splinters when driving metal pins in or out. Use a soft-faced hammer or drift to remove and fit metal pins. Always wear safety glasses. INT-3-1-3

## 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

## **A** WARNING

#### Communications

Bad communictions 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 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

## **A** 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



#### **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



## **A** 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. See Battery (MAINTENANCE section) for First Aid treatments.



#### 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. NT-3-2-8

#### WARNING Diesel Fuel

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



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

#### 

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.



#### 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



#### **Electrical Circuits**

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

## **A** WARNING

#### Hydraulic Fluid

Fine jets of hydraulic fluid at high pressure can penetrate the skin. Do not use your fingers to check for hydraulic fluid leaks. Do not put your face close to suspected leaks. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of hydraulic fluid. If hydraulic fluid penetrates your skin, get medical help immediately. INT-3-1-10/1

## A WARNING

#### Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, stop the engine and operate the controls to release pressure trapped in the hoses. Make sure the engine cannot be started while the hoses are open.

#### Battery

A battery with frozen electrolyte can explode if it is used or charged. Do not use a machine with a frozen battery. To help prevent the battery from freezing, keep the battery fully charged.

INT-3-1-7

## 

#### Cleaning

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

**A** 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

## **A** WARNING

#### Soft Ground

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

## **WARNING**

Hydraulic Hoses Damaged hoses can cause fatal accidents. Inspect the

hoses regularly for: Damaged end fittings Chafed outer covers Ballooned outer covers Kinked or crushed hoses Embedded armouring in outer covers Displaced end fittings.



#### 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.

## **A** WARNING

#### Fluoroelastomeric Materials

\* 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 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 (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 Ensure that components have cooled then remove and place material into plastic bags.
- 2 Thoroughly wash contaminated area with 10% calcium hydroxide or other suitable alkali solution, if necessary use wire wool to remove burnt remains.
- 3 Thoroughly wash contaminated area with detergent and water.
- 4 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 - 5/1



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