Service Manual

500 Series

From m/c No. 561001

PUBLISHED BY THE TECHNICAL PUBLICATIONS DEPARTMENT OF
JCB SERVICE; © ROCESTER,STAFFORDSHIRE, ST14 5LS, ENGLAND
Tel. ROCESTER (01889) 590312 PRINTED IN ENGLAND

Publication No. 9803/3600

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This Service Manual covers the following Machines:-

525-58 and 525-58 Farm Special - from machine Serial Number 561001
525-67 and 525-67 Farm Special - from machine Serial Number 561001
525-58 and 525-67 Farm Special Plus
525-58 and 525-67 Basic Servo Options
527-58 and 527-67 - from machine Serial Number 572775
530-95 - from machine Serial Number 564980
530-110 - from machine Serial Number 563359
530-110 and 530-120 - PlaceAce
530-110 and 530-120 Servo Options
530-120 - from machine Serial Number 562601
530-67 and 530-67 Farm Special - from machine Serial Number 571001
535-67 - from machine Serial Number 572775
* 537-120 and 537-130 from machine Serial Number 572900

Information covers two stage and three stage boom machines.

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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 Technical Training Department.

It is assumed that these personnel have a sound knowledge of workshop practice, safety procedures, and general techniques associated with the maintenance and repair of hydraulic earthmoving equipment. Therefore these basic subjects generally are omitted from this manual, the intention being to convey only more specialised information concerning particular aspects of a machine or component.

For example, renewal of oil seals, gaskets, etc., and any component showing obvious signs of wear or damage is expected as a matter of course, and therefore information of this nature is included only in the context of specialised procedures or where a range of wear tolerances is required. Similarly, it is expected that components will be cleaned and lubricated where appropriate, also that any opened hose or pipe connections will be blanked to prevent excessive loss of hydraulic fluid and ingress of dirt.

For convenience this manual is compiled in sections, e.g. "Hydraulics", "Electrics", etc. but, to find details of a specific component, reference should be made to the alphabetical index at the back of the book.

Illustrations which show a dismantled component are numbered as a guide to the dismantling sequence, which generally can be reversed for assembly.

Torque settings are given as a 'mean' figure which 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. Where no figure is quoted in the text, refer to page 1/1 - 3.

'Left Hand' and 'Right Hand' are as viewed from the rear of the machine looking forward.

⚠ WARNING

Asbestos

Asbestos dust can damage your lungs. Some engine joints and gaskets may contain asbestos. Take the following precautions when working on them.

1 Wear a face mask and gloves.

2 Work in a well ventilated area and do not smoke.

3 Do not use a rotary wire brush, use a hand scraper.

4 Make sure the material to be removed is wet with oil or water to contain loose particles.

5 Place all material into plastic bags and dispose in accordance with local regulations.

GEN-1-8

⚠ 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.

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CONTROL VALVE NEUTRAL CIRCUIT

Oil from the pump enters the control valve at **1**, passing main relief valve (M.R.V.) **2A** and pressure test connector **2X** (Early machines), into the neutral and parallel galleries (blue). As the spools (**2B**, **2C**, **2D**, and **2E**) are in neutral, the oil passes round their central waists, the spool lands preventing the oil from entering the service ports. On reaching the end housing the oil enters the exhaust galleries (green) and is discharged back to tank. The control valve also incorporates auxiliary relief valves (A.R.V.'s) **2H**, **2J**, **2K** and **2L**.

The control valve shown is a typical four spool type. Some machines are fitted with five or six spool valves depending on the number of services required.

Note:On later machines pressure test connector **2X** has been installed in the main hydraulic pump outlet.

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* TECHNICAL DATA (530-120, 537-120/130)

Service Brakes

Type JCB Oil-Immersed Discs	
Actuation	Tandem Circuit Hydraulic, Direct Actuation
Location	Front Axle (2 Brake Packs)
	Rear Axle (2 Brake Packs)

Note: As the front service brakes are located in the front axle, instructions for dismantling and assembly are shown under Axles (Section 7).

Friction Plates (front axle 5 per brake pack and rear axle 3 per brake pack)	
Outside Diameter	220 mm (8.66 in)
Inside Diameter	180 mm (7.10 in)
Nominal Facing Area	12616 mm2 (19.3 in^2)
Hydraulic Piston Diameter	216 mm (8.5 in)

Master Cylinder

Type	Frenos Iruna Tandem Cylinder
Piston Diameter	38.1mm (1.50 in)

Servo Unit

Type	Frenos Iruna
Piston Diameter	203.2mm (8 in)

Exhauster

Type	Clayton Dewandre H175
Ratio	1.4 times engine speed driven off timing gear

Parking Brake

Type	Manually Adjusted Caliper
Disc Diameter	279.4 mm (11 in)

GENERAL DESCRIPTION

The service (foot) brakes act on the front axle halfshafts and rear axle halfshafts. They are oil-immersed, multi-disc brakes which are operated hydraulically by means of a single pedal and a tandem master cylinder. The brake cylinder reservoirs are situated in front of the instrument panel in the cab.

The brake system is servo assisted to minimise the amount of effort required to operate the brake pedal. An exhauster unit driven from the engine timing gear creates a vacuum in the servo unit.

On machines with the optional electric 2/4-wheel drive selection, pressing the brake pedal will automatically select 4-wheel drive (if it has not already been selected manually). This gives increased braking effect. The transmission will switch back to 2-wheel drive when the brake pedal is released.

The cable operated parking brake acts on a disc which is mounted on the gearbox output shaft to the front axle.

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STEERING RAM

(See Section Contents for machine models)

Dismantling and Assembly

The numerical sequence shown on the illustration is intended as a guide to dismantling.

For assembly the sequence should be reversed.

Place ram assembly on a locally manufactured strip/rebuild bench as shown.

Dismantling

Use spanner part No. 992/09300 to release end cap **1** and remove the piston rod assembly **8** from the cylinder.

⚠ WARNING

If air or hydraulic pressure is used to force out the piston assembly, ensure that the end cap is securely fitted. Severe injury can be caused by a suddenly released piston rod.
HYD 1-2

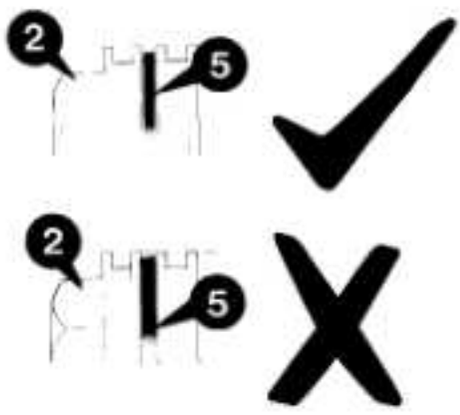
Position piston rod assembly on bench in place of ram cylinder. Remove seals **4**, **5** and wear rings **3**, **6** from piston head **2**.

Heat piston head to 180-210 °C to degrade the Loctite between the piston head and rod. To check temperature, use Surface Temperature Probe.

Do not exceed 300 °C or the Loctite will char causing thread pick-up.

Remove end cap **1** from piston rod **8** and remove the seals and 'O' ring.

Ensure that metal components are free from scoring, nicks and burrs. A damaged rod will impair the life of the gland seal.



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Assembling

Clean threads of piston rod, piston head, end cap and cylinder using a wire brush.

Use JCB Cleaner and Degreaser to ensure that all threads are free from grease, hydraulic oil and old Loctite. Allow 15 minutes for solvent to dry before applying Loctite.

Ensure that lubricants used during assembly do not come in contact with Loctite.

Fit seals **9**, **10** and **11** into end cap **1** then fit the end cap onto the piston rod **8**.

Apply Loctite Activator N to threads of piston rod, end cap and cylinder. Allow Activator to dry for 15 minutes before bringing into contact with Loctite

Note: Neither Loctite Nor Activator must be allowed to contact seals, or 'O' rings.

Apply Loctite 262 to all threads of piston rod. Renew 'O' ring in piston head, lubricating only the 'O' ring with JCB MPL Grease. Fit and torque tighten the piston head.

Fit piston seal **4** to piston head **2** then put seal outer **5** over piston seal **4**.

Note: Make sure when fitting piston seal that it is correctly located and square in the piston head before fitting seal outer.

Locate seal **7** into piston head **2**.

Fit new seal wear rings **6** and **3** to piston head.

Position cylinder on bench and install rod assembly into cylinder

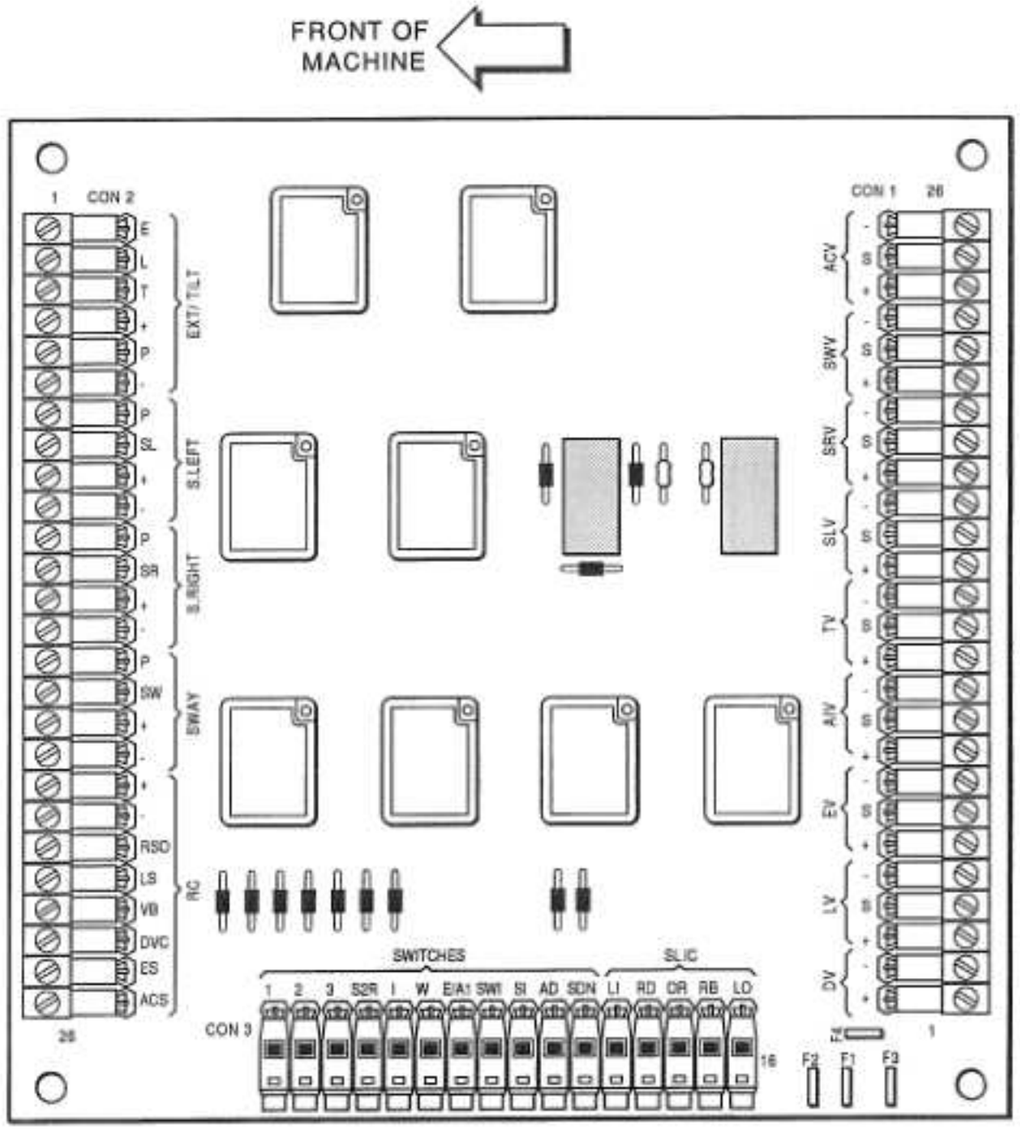
Note: If hydraulic oil contacts uncured Loctite a weakening of the bond will result. Cure times vary according to ambient temperature and type of Activator used. The following approximate cure times apply at 20 °C and are the minimum periods between assembly and filling the ram with oil.

Loctite 262 or 932 with Activator N - 1 hour
Loctite 262 or 932 with Activator T - 2 hours

Torque Settings

Item	Nm	kgf m	lbf ft
1	400	40.7	295
2	300	30.6	221

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SERVO CAB AND CHASSIS ELECTRICAL CIRCUITS (530-110 and 530-120)

Operation

The printed circuit board is illustrated to assist locating terminal connections when fault finding. The identification numbers on this page relate to the electrical schematic, ***see (Wiring Diagram) this section.***

The servo valve has an independent feed which picks up from the engine starter circuit and is protected by fuse C5.

The supply is controlled by the starter switch operated relay **(10)** and protected by fuse B2. Fuse B2 also protects the transmission forward/ reverse circuit.

For location of the relay **(10)** on the machine, *see page 10/3-1.*

To isolate the transmission when the servo machine is operated in remote control, the transmission forward/ reverse circuit is isolated by the servo console key switch.

The servo panel harness connects into the standard machine panel harness at the diode wire on the B2 feed located above the forward/reverse/neutral start relays on the steering column.

To prevent remote operation without the stabilisers taking the weight of machine a connection is made at the back of the stabiliser down light on the right hand cab panel.

Auxiliary/extend Changeover

When the auxiliary switch **(32)** is operated relay **(15)** is energised. Both the power and the signal to the extend valve are switched to the auxiliary valve, the extend control lever will now operate the auxiliary valve.

The switch **(32)** can only be operated when switch **(31)** is selected to cab control when contacts 1 and 2 are made. The feed for switch **(32)** comes from switch **(31)** by contact 5.

Printed Circuit Board

The purpose of the printed circuit board (PCB) is to distribute voltage to the valve block, proportional valve electric (PVE), joystick control lever and the stabiliser control lever.

The (PCB) enables the Safe Load Indicator (SLI) to be interlocked with the valve block to prevent an overload condition being reached. It also incorporates the interlocks necessary for the dual operating positions of cab controls or remote controls.

There are two types of Printed Circuit Board (PCB). For stabilised machines 704/16700 and Non Stabilised machines 704/16600.

Relays

Remote Controls Supply **(9)**
Cab Controls Supply **(10)**
Valve Block Supply **(11)**

The valve block supply relay allows power to the valve block for the joystick functions to be switched at the cab control position and the remote control position without the need for full load having to go up the boom and back to the cab controls which would result in a large voltage drop.

Dump Valve Supply **(12)**

The dump valve supply relay allows power to the dump valve to be switched at the cab control position and the remote control position without the need for full load having to go up the boom and back to the cab controls which would result in a large voltage drop.

Safe Load Indicator Override **(13)**

Boom extension and dump are switched out by relay **(13)**, this is controlled by the Safe Load Indicator (SLI) when the maximum safe working load is reached.

The boom lower signal is modified by the SLI electronics to the valve block, the signal starts to decrease when 50% of the safe working load is reached. Boom lower signal is progressively reduced to zero when the maximum safe working load is reached.

If the boom lower signal was cut off instantly the same as boom extension and dump signal there is a danger of the machine tipping forward due to inertia of the load and boom.

Tilt Isolation **(14)**

The tilt service has to be isolated when a platform is used with the machine.

The tilt service is isolated by relay **(14)** which is energised by contacts 1 and 2 on the remote control selector switch **(30)**. When the remote control selector switch **(30)** is in the remote control position, contacts 3 and 4 are open and isolate the power supply.

When the remote control selector switch **(30)** is in the cab control position the cab control selector switch **(31)** controls relay **(14)**. When the cab control selector switch **(31)** is in position 0, contacts 1 and 2 energise relay **(14)**. In position 1 contacts 5 and 6 energise relay **(14)**. In position 2 the contacts 3 and 4 are open and isolate the power supply.

Extend/ Auxiliary Changeover **(15)**
Stabiliser down/remote lock **(16)**

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