Loadall Range

Publication No. 9803/3350

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This Service Manual covers the following machines:-

**520 from machine No. 500001, 520HL, 520 Farm Special, 520M,
525, 525B, 525B HL, 525B Farm Special,
530, 530 HL, 530B, 530B HL,
540B, 540BM.**

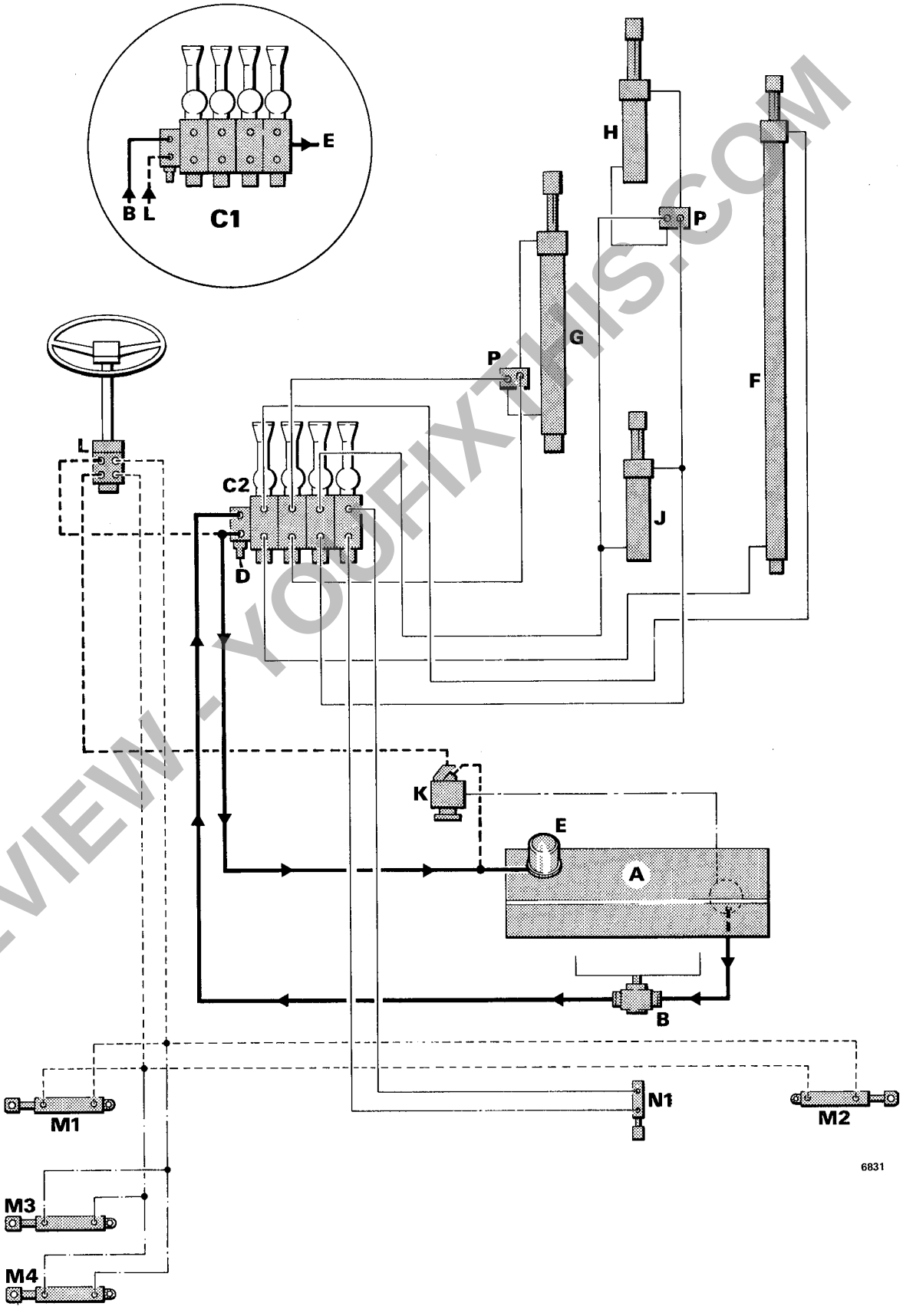
Information covers 2 and 4 wheel drive machines.

General	1
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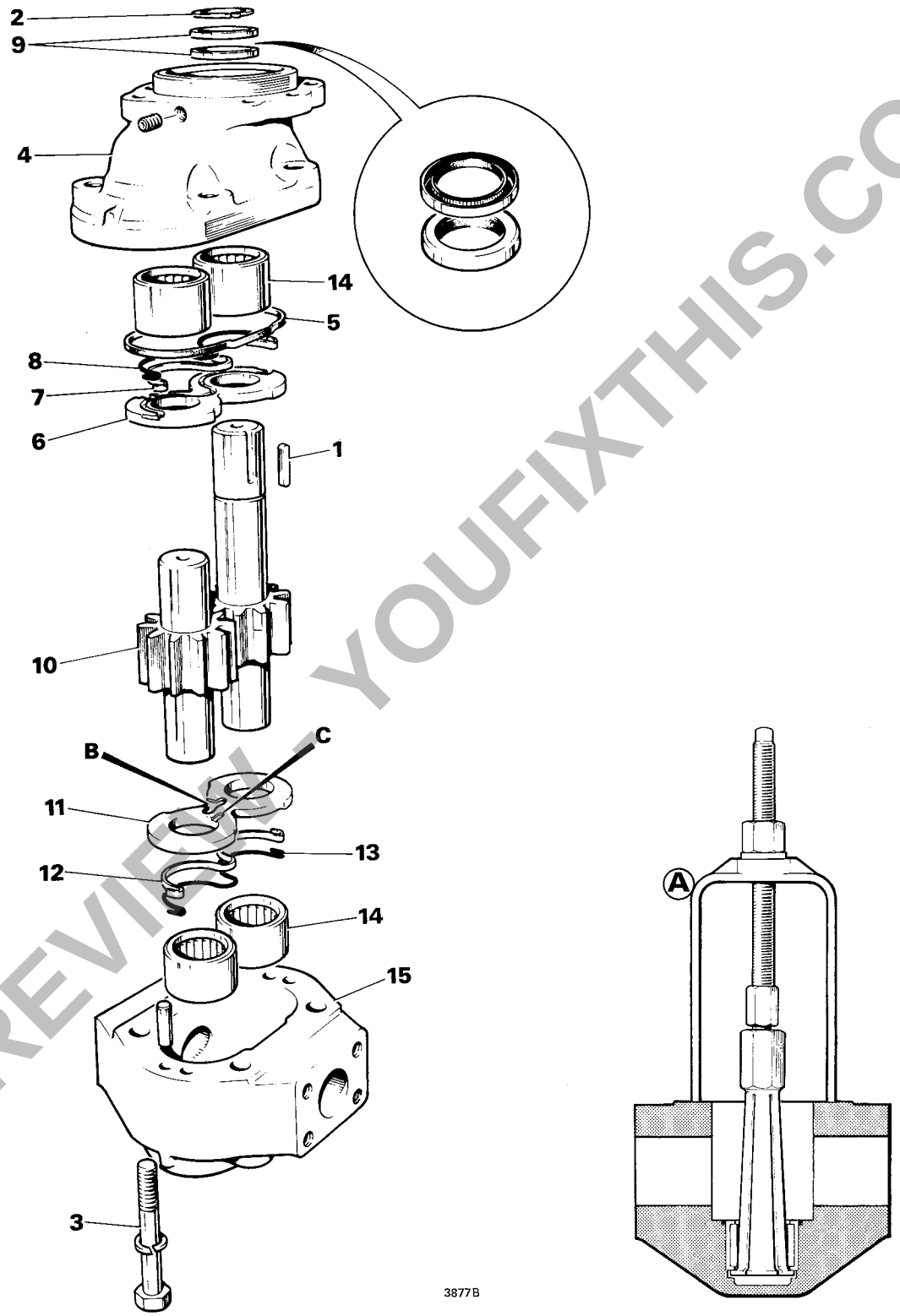
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JCB 520-2/4 & 525B



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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.

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

UNF Grade 'S' Bolts

Bolt Size in.	(mm.)	Hexagon (A/F) in.	Torque Settings Nm.	kgf m	lbf ft
1/4	(6.3)	7/16	14	1.4	10
5/16	(7.9)	1/2	28	2.8	20
3/8	(9.5)	9/16	49	5.0	36
7/16	(11.1)	5/8	78	8.0	58
1/2	(12.7)	3/4	117	12.0	87
9/16	(14.3)	13/16	170	17.3	125
5/8	(15.9)	15/16	238	24.3	175
3/4	(19.0)	1.1/8	407	41.5	300
7/8	(22.2)	1.5/16	650	66.3	480
1	(25.4)	1.1/2	970	99.0	715
1.1/4	(31.7)	1.7/8	1940	198.0	1430
1.1/2	(38.1)	2.1/4	3390	345.0	2500

Metric Grade 8.8 Bolts

*Bolt Size	(mm.)	Hexagon (A/F) mm.	Torque Settings 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

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HYDRAULIC TANK & SUCTION STRAINER

CHECK FLUID LEVEL **Every 10 Hours**

The correct level is to 'full' line on sight tube as at **A** when boom is retracted and forks are resting on the ground.

DRAIN & REFILL **Every 1600 Hours**

Rest forks on the ground and remove plug **B** to drain tank. Refit plug and refill at **C** to correct level on sight tube.

CLEAN SUCTION STRAINER

Whenever tank is empty.

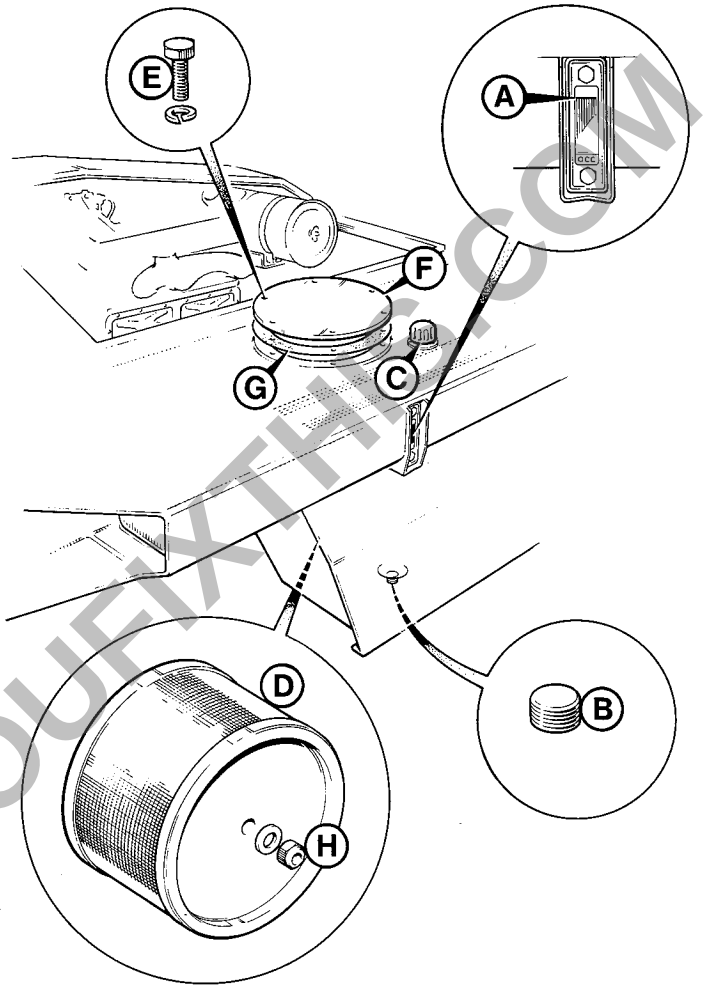
To remove suction strainer **D**:

1 Unscrew bolts **E**, remove cover plate **F** and gasket **G**.

2 Unscrew Nut **H**, remove strainer and wash in petrol or carbon tetrachloride.

Note:-
If a new strainer is fitted it should be similarly washed to remove protective coating.

3 Reassemble in reverse order using new gasket **G**.



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*SHUTTLE REVERSER

Fault Finding

Before carrying out the checks listed, the machine should be operated to determine the fault area and to bring the systems to their normal working temperatures.

The shuttle reverser should also be checked to ensure that the correct grade of oil is used and it is at the correct level and that there are no obvious leaks.

A If the reverser is noisy, start at check 1.

B If the valve is noisy, start at check 4.

C If the reverser overheats, start at check 8.

D If the reverser will not pull, start at check 10.

CHECK		ACTION	
1.	In what condition is the reverser noisy?	FORWARD & REVERSE NEUTRAL ONLY	See check 2. See check 3.
2.	Is the shuttle reverser misaligned?	YES: NO:	Replace mountings and correct position. Check universal joints.
3.	Are the pump bushings worn?	YES: NO:	Renew Check converter for wear.
4.	Is there air in the hydraulic system?	YES: NO:	Continue running and the air will be expelled. Check 5
5.	Is there an air leak on the pump suction side?	YES: NO:	Find leak and cure Check 6
6.	Are the oil passages restricted?	YES: NO:	Find restriction and clear Check 7
7.	Is the oil screen restricted?	YES: NO:	Remove and clean Check if valve is sticking.
8.	Are the oil passages restricted?	YES: NO:	Find restriction and clear Check 9
9.	Is the pump pressure low?	YES: NO:	Renew pump Check converter sprag clutch for wear or slip
*10.	In which condition is the reverser not pulling?	FORWARD & REVERSE FORWARD OR REVERSE	Check 11 Check 12
11.	Is the converter driving the pump?	YES: NO:	Check pump pressure Renew damaged parts
12.	Are the clutch sealing rings damaged?	YES: NO:	Renew Check clutch plates for damage

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LUBRICANTS & CAPACITIES

*** Note: To promote thorough running-in, engines of new machines are filled at the factory with JCB 10W/30 Multi–grade oil. This oil should be drained after the first 100 hours operation and the engine filled with the appropriate recommended grade as shown in the engine lubrication chart. JCB 10W/30 Multigrade should also be used for the first 100 hours operation whenever a new or reconditioned engine is fitted to the machine. Alternatively, where a new or reconditioned engine requires protection against corrosion during prolonged storage, Mobilarma 524 may be used during the storage period and for the first 100 hours operation. It is essential that both these oils are replaced by the recommended lubricant after the first 100 hours operation.**

ITEM	LUBRICANT	CAPACITY	Litres	UK gal	US gal
* ENGINE	(See separate chart)	4/98 Engine:	9.7	2.1	2.5
		4.236 Engine:	11	2.4	2.9
SHUTTLE REVERSER See Note 2	† JCB T/C Oil Type C3 (SAE 10W)	From dry:	11	2.4	2.9
GEARBOX See Note 2	† JCB 15W/40 Multigrade		2.6	0.6	0.7
* JCB TRANSMISSION See Note 2	JCB Special Transmission Fluid	From dry: 2WD	17.25	3.8	4.5
		4WD	18.25	4.0	4.8
DRIVE AXLE (FRONT)	JCB Special Gear Oil		29.5	6.5	7.8
DRIVE AXLE (REAR–4WD)					
520–4 to m/c 500281 520M–4 to m/c 560019 525–4 to m/c 271055	JCB HD90 Gear Oil ††	Differential: Hubs (each):	6.0 0.75	1.3 0.17	1.6 0.2
520–4 from m/c 500282 520M–4 from m/c 560020 525–4 from m/c 271056 525B–4 530–4 from m/c 271300 530B–4/540B–4/540BM–4	JCB HD90 Gear Oil††	Differential: Hubs (each):	15 1.3	3.3 0.3	4.0 0.3
HYDRAULIC SYSTEM					
Below 38 deg C	JCB Special Hydraulic Fluid	520/520M/525B:	87–100	19–22	23–26
		525/530:	225–228	49–51	58–60
Above 38 deg C	JCB High Performance Hydraulic Fluid Note: Capacities vary according to number of services fitted.	530B/540B/540BM	160–170	35–37	42–45
* BRAKE SYSTEM	JCB Light Hydraulic Fluid				

Note 2: The JCB Transmission replaces the shuttle reverser and gearbox from the following machine serial numbers:–

JCB520: 502201
JCB520M: 560401
JCB525B: 272701
JCB530B: 580601
JCB540B: 274201

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OVERLOAD WARNING SYSTEM

* Adjusting Read–out Unit using a Test Weight

Balance Setting

JCB 525–2 or 525–4 With MULTI–HITCH CARRIAGE & FORKS, SIDE TILT CARRIAGE & FORKS, or MAST CARRIAGE & FORKS.

1. With machine unladen and inner boom fully retracted, raise boom until dimension X is:–
   700mm. for multi-hitch or side tilt carriage and forks
   or 750mm. for mast carriage and forks.

2. Adjust screw **B** until light **C** just goes out.

ALL OTHER MACHINES

1. Remove any attachment fitted.

2. With machine unladen and inner boom fully retracted, raise boom to horizontal position.

3. Adjust screw **B** until light **C** just goes out.

Full Scale Setting

1. With boom fully retracted, pick up any load within following limits (refit attachment if necessary):
   520–2/4: 1300 to 2000 kg.
   520–2/4HL: 1100 to 2000 kg.
   525–2/4: 1250 to 2500 kg.
   525B–2/4: 1700 to 2500 kg.
   525B–2/4HL: 1500 to 2500 kg.
   530–2/4: 1400 to 3000 kg.
   530–2/4HL: 1500 to 2500 kg.
   530B–2/4: 2000 to 4000 kg.
   530B–2/4HL: 1000 to 3500 kg,
   540B–2/4: 2000 to 3500 kg.

WARNING: THE LOAD MUST NOT BE RAISED MORE THAN 600mm. ABOVE GROUND LEVEL.

On 530B machines the top surface of the forks should be kept precisely 500mm above the ground.

2. Slowly extend boom until machine just begins to tip forwards then lower boom to ground. Measure distance boom is extended (millimetres).

3. Refer to graph for machine concerned.
   Note: Lines **C, D** and **E** have been drawn on the graphs as examples only.

4. Find the measured extension figure on the scale and from this point read vertically (example line **C**) to the **Tipping Line AA.**

5. Read horizontally (example line **D**) to the **Safe Working Load Line BB.**

6. Read vertically (example line **E**) back to the scale and read off the Safe Load Extension Figure. (520 example : 610mm.).

7. Retract the boom to the Safe Load Extension Figure.

8. Adjust screw **F** until buzzer sounds and all warning lights flash.

9. Fully retract boom then slowly extend until buzzer sounds and all warning lights flash. Check that boom is extended to within 20mm. of the Safe Load Extension Figure.

Note: The graph for the 530HL machines shows two pairs of lines, one with the stabilisers raised and the other with the stabilisers down. Carry out the setting first with the stabilisers raised then check the setting with the stabilisers down.

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SERVICE SCHEDULE

Check		Every 10 Hours	Every 50 Hours	Every 100 Hours	Every 250 Hours	Every 500 Hours	Every 1000 Hours	Every 2000 Hours
Hydraulic fluid level	1	■	■	□■	■	■	■	
Hydraulic system for leaks	2	■	■	□■	■	■	■	■
Condition of ram piston rods	4			□■	■	■	■	■
Pump drive	5			□■	■	■	■	■
Operation of all services:–	6							
–Boom lift	7	■	■	□■	■	■	■	■
–Boom extend	8	■	■	□■	■	■	■	■
–Fork tilt	9	■	■	□■	■	■	■	■
–Optional Attachments	10	■	■	□■	■	■	■	■
–Steering	11	■	■	□■	■	■	■	■
Operation of hose burst check valves	12			□			■	■
* M.R.V. pressure	13					■	■	■
* A.R.V. pressure	14					■	■	■
* Steering relief pressure	15					■	■	■
Hoses/pipework for chafing/damage	16			□■	■	■	■	■
Tyre pressures and condition	21	■	■	□■	■	■	■	■
Tightness of wheel nuts	22	■	■	□■	■	■	■	■
Axle oil level	23		■	□■	■	■		
Shuttle Reverser/Transmission oil level	24	■	■	□■	■	■		
Gearbox oil (not JCB Transmission)	25		■	□■	■	■		
Operation of transmission	26	■	■	□■	■	■	■	■
* Clutch oil pressures	27			□		■	■	■
* Torque Converter Main Line Pressure	28			□		■	■	■
Brake reservoir contents	31	■	■	□■	■	■	■	■
Parking brake adjustment	32					■	■	■
Footbrake operation	33	■	■	□■	■	■	■	■
Parking brake operation	34	■	■	□■	■	■	■	■
Wheel alignment	41			□		■	■	■
Wheel bearings	42			□		■	■	■
King pins and bushes	43			□		■	■	■
Axle beam clearance	44			□		■	■	■
Pivot pins and bushes	46					■	■	■
Wear pads and boom runways	47			□	■	■	■	■
Optional mast leaf chains	48			□			■	■

□ First 100 hours or one month whichever occurs sooner

■ Routine Service

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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 the JCB Technical Training Department.

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

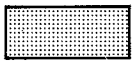
For example, renewal of oil seals, gaskets etc. and any component showing obvious wear or damage is expected as a matter of course and information on these matters is therefore only included where a specialised procedure or range of wear tolerances is required. Similarly, it is expected that components will be thoroughly cleaned and lubricated where appropriate, also that any opened hose or pipe connections will be blanked to prevent entry of dirt and excessive loss of hydraulic fluid.

For convenience the 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 showing a dismantled component are numbered as a guide to the dismantling sequence which can generally be reversed for assembly.

Torque settings quoted are given as 'mean' figures which may be varied by $\pm$ 3%. 'Left Hand' and 'Right Hand' are as viewed from the rear of the machine.

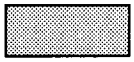
The following coding is used on hydraulic circuit illustrations to denote various conditions of oil pressure and flow.



1. Neutral Circuit Pressure.



2. Pressure generated by the operation of a service. Depending on application, this may be anything between Neutral Circuit Pressure and MRV Operating Pressure.



3. Pressure that is above neutral pressure but lower than that denoted by 2.

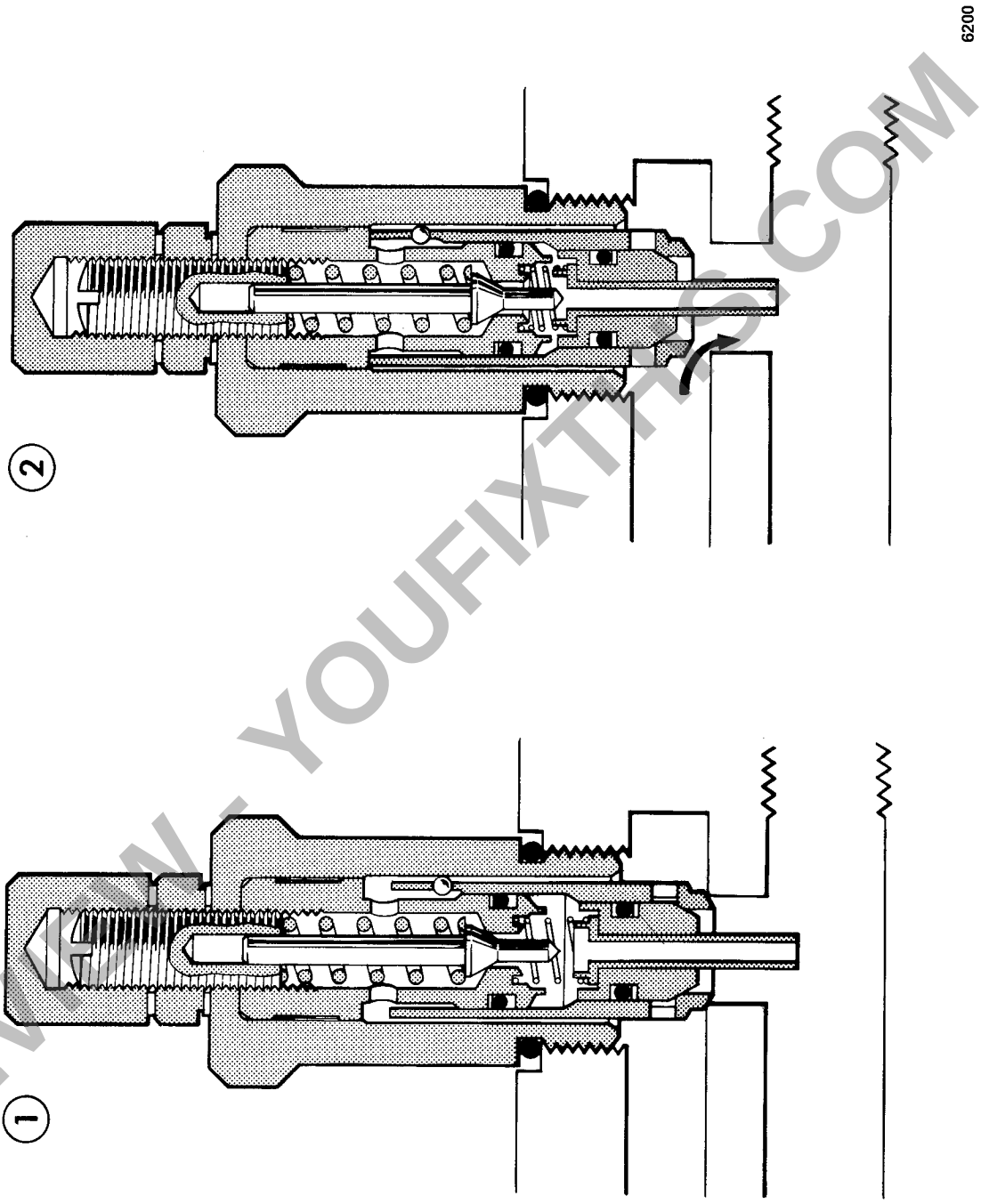


4. Exhaust.

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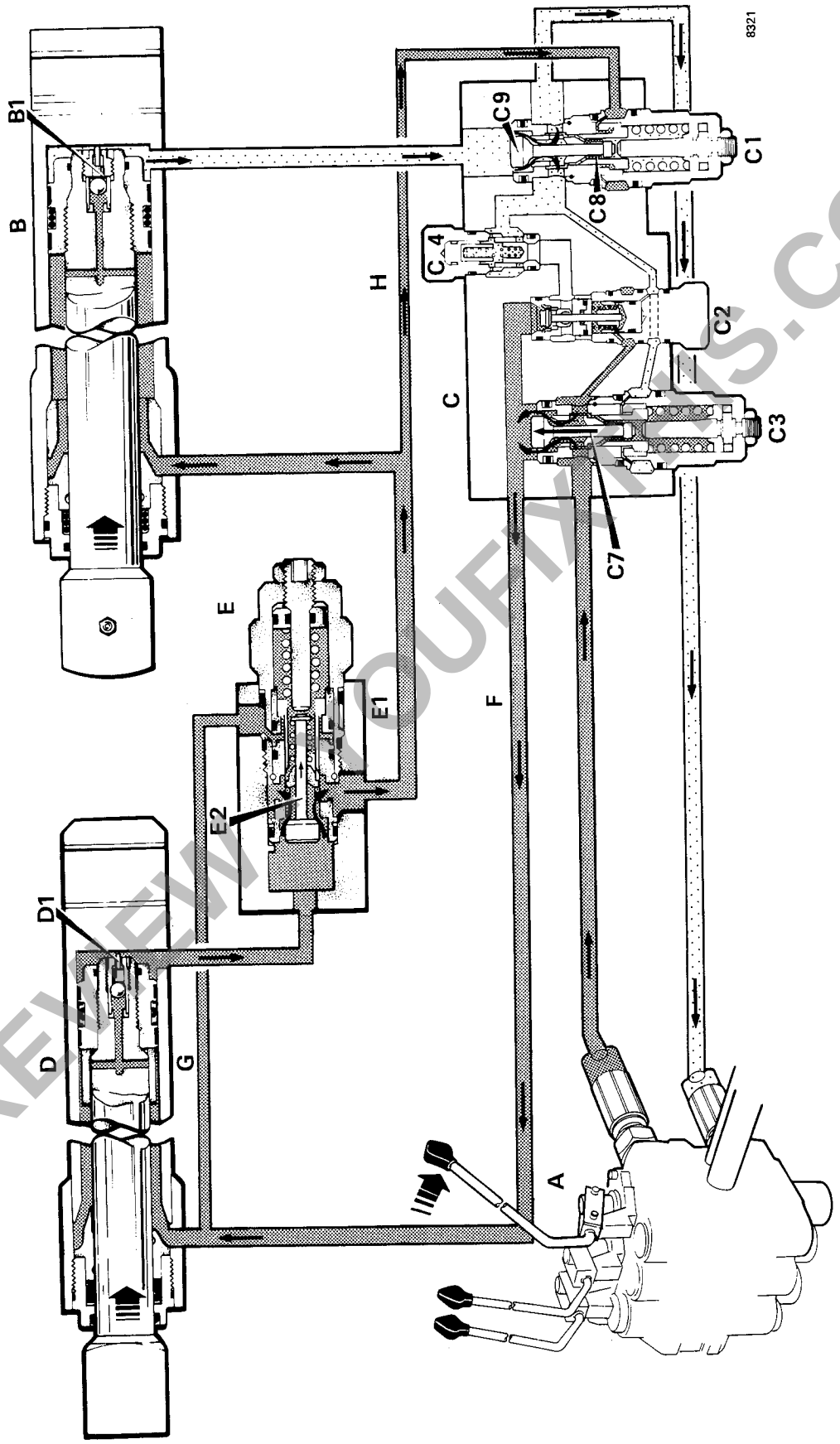
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ANTI–CAVITATION VALVE



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FUEL SYSTEM (4.236)

Bleeding

If engine fails to start or misfires or if any part of the fuel system has been disconnected or become empty, bleed the system as follows:—

1 Slacken screw **C**, operate lift pump lever until air free fuel flows from union, then re-tighten.

Note: If the lift pump lever does not operate, turn the engine crankshaft one complete turn.

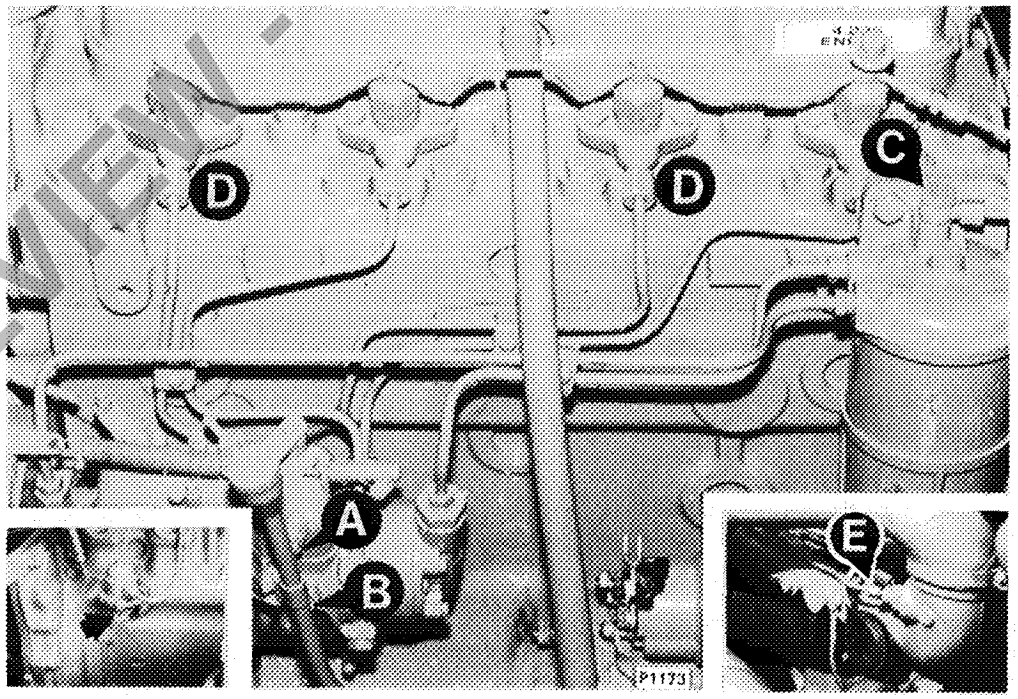
2 Repeat this procedure for union **E**.

3 Slacken screws **A** and **B**, operate lift pump lever until air free fuel flows from both screws, then re-tighten in the sequence **B** followed by **A**.

4 Push in engine stop control to 'run' position.

5 Slacken unions **D**, open throttle and operate starter until air free fuel flows from unions, then re-tighten.

Note: On LJ prefix engines, injector feed pipe unions **D** are fitted on top of the injectors.



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GEARBOX
END COVER

Dismantling and Assembly

Illustration A – 525 & 525–4 to m/c no. 270750
*Illustration B – 525 & 525–4 from m/c no. 270751
Other machines

When Assembling

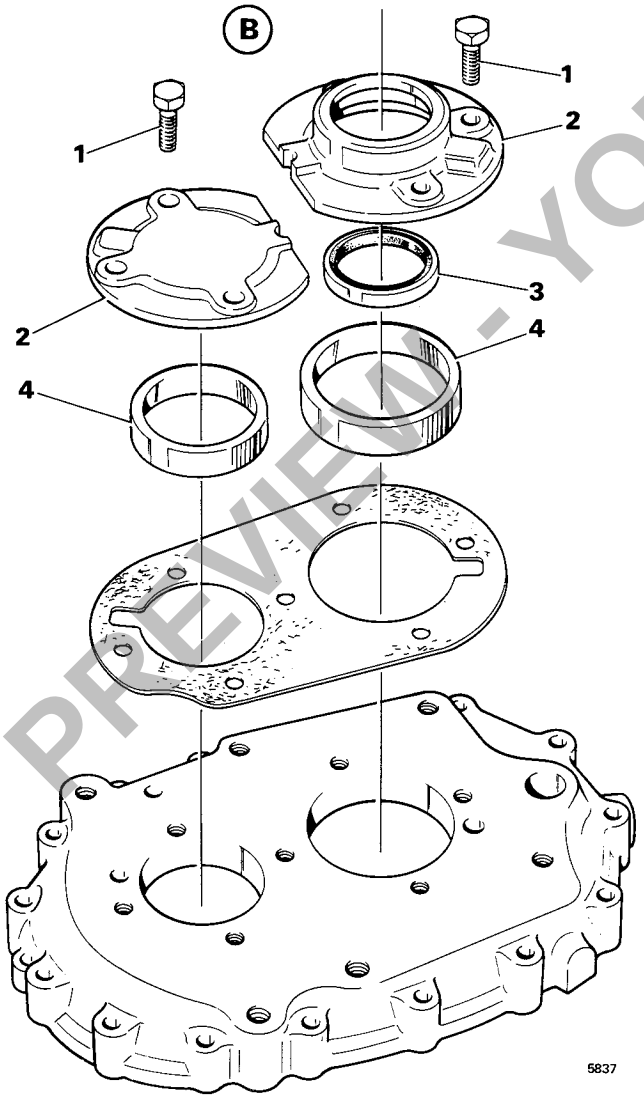
Start bearing sleeve **4** into the end cover and pull down using bolts **1** and retainer **2.**

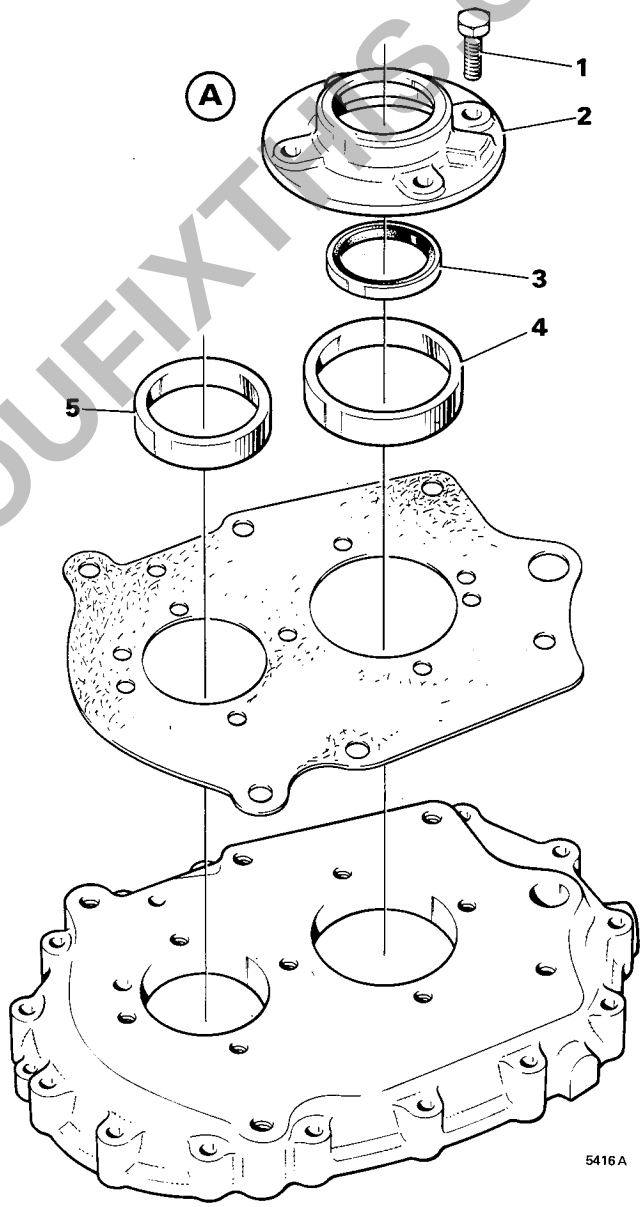
Bolt **1** is fitted with a nylon locking patch and may be re-used providing that a torque of 2Nm. (0.2 kgf m; 17.5 lbf in) is required to overcome the patch resistance.

Coat bolt **1** with Hylomar (or similar) prior to assembly.

Torque Setting

Item	Nm	kgf m	lbf ft
1	27	2.8	20





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* DRIVE AXLE—FRONT

Differential Bearing Pre-load

Fit differential assembly into casing and support on piece of 25mm. (1in.) timber.

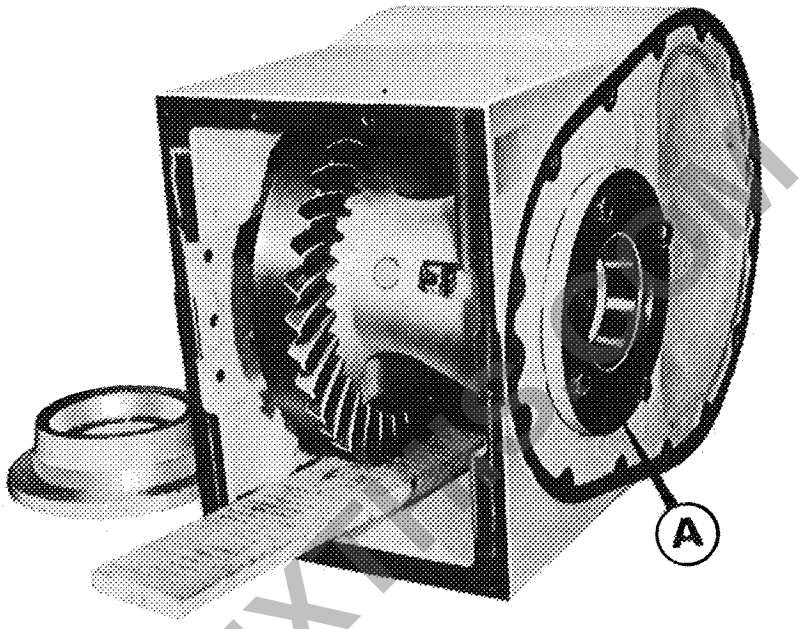
Fit left hand housing **A** with four bolts tightened to 98Nm (10 kgf m; 72 lbf ft) and right hand housing with four bolts left loose.

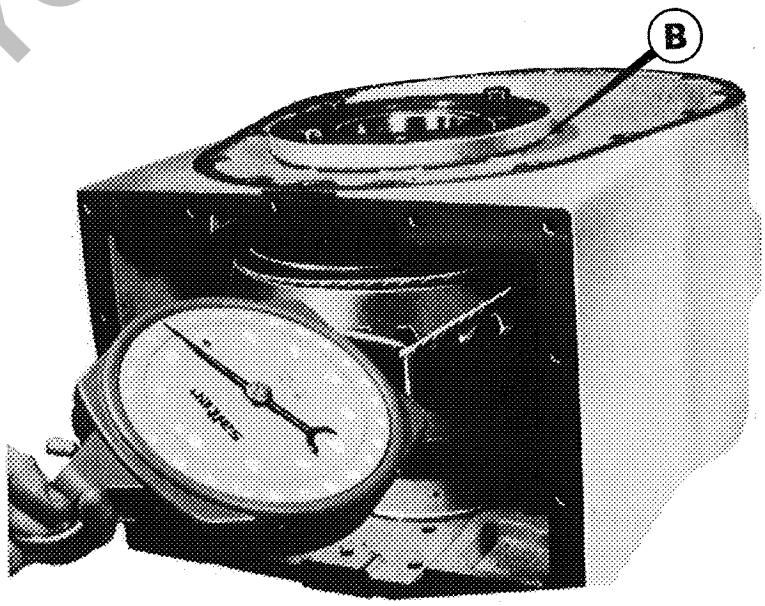
Turn casing on its left hand side, remove timber support and wrap a cord around the differential carrier.

Tighten the four housing bolts evenly and in turn until a moving pull of 36–40N (8-9lb) is recorded.

Select shims to fit gap **B**, reassemble housing with shims and tighten bolts to 98Nm (10 kgf m; 72 lbf ft).

If pull is incorrect adjust by adding or subtracting shims. Keep final shims together for backlash setting (see page 7/4–5).





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ALTERNATOR–A115

Dismantling and Assembly

When Dismantling

Before removing rectifier **11**, unsolder leads **A, B** and **C** at rectifier end.

When removing stator **16** note position of leads **A, B** and **C** relative to alternator fixing lugs.

Unsolder connection to outer slip-ring **28** and gently prise slip-ring off shaft. Repeat for inner slip-ring **29.** Take care not to damage the insulation covering the winding leads.

When Assembling

Pack bearings with high melting point grease.

Ensure that slip-ring faces are clean and smooth. Use very fine glass paper if required but do not use emery cloth.

Use resin cored solder when fitting slip-rings and rectifier. Do not allow solder to build up on upper face of inner slip-ring.

Renew brushes **4** if worn to a length of 10mm. (0.4in.) or less, or if brush spring pressure is less than 1.3N (4.7ozf). If necessary, lightly polish side faces of brushes to ensure free movement in brush box.

Torque Settings

Item	Nm	kgf m	lbf ft
10	3.7	0.4	2.7
14	5.3	0.5	4
17	37	3.9	28

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