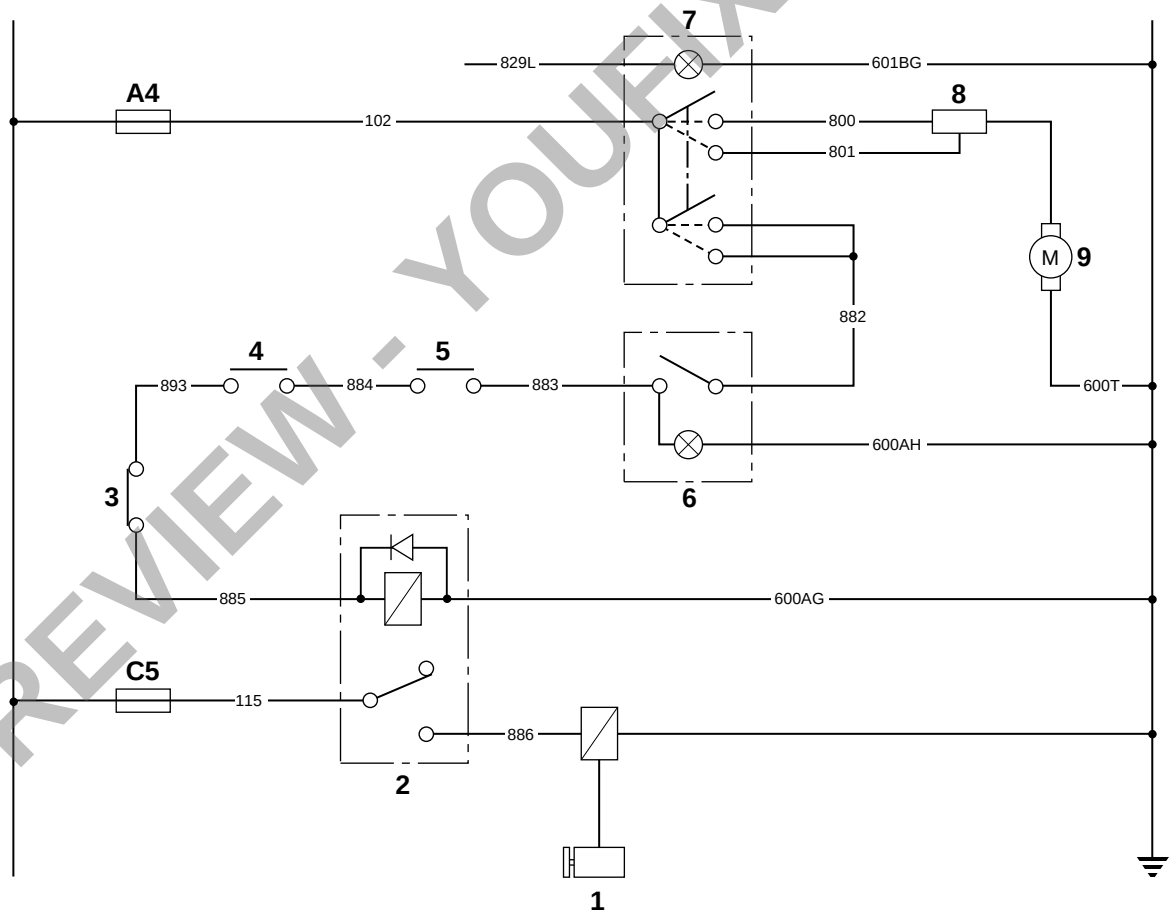
Wiring Diagram

Harness Wires

Use the illustration below to complete continuity checks on the air conditioning system and heater harness wires.

Key

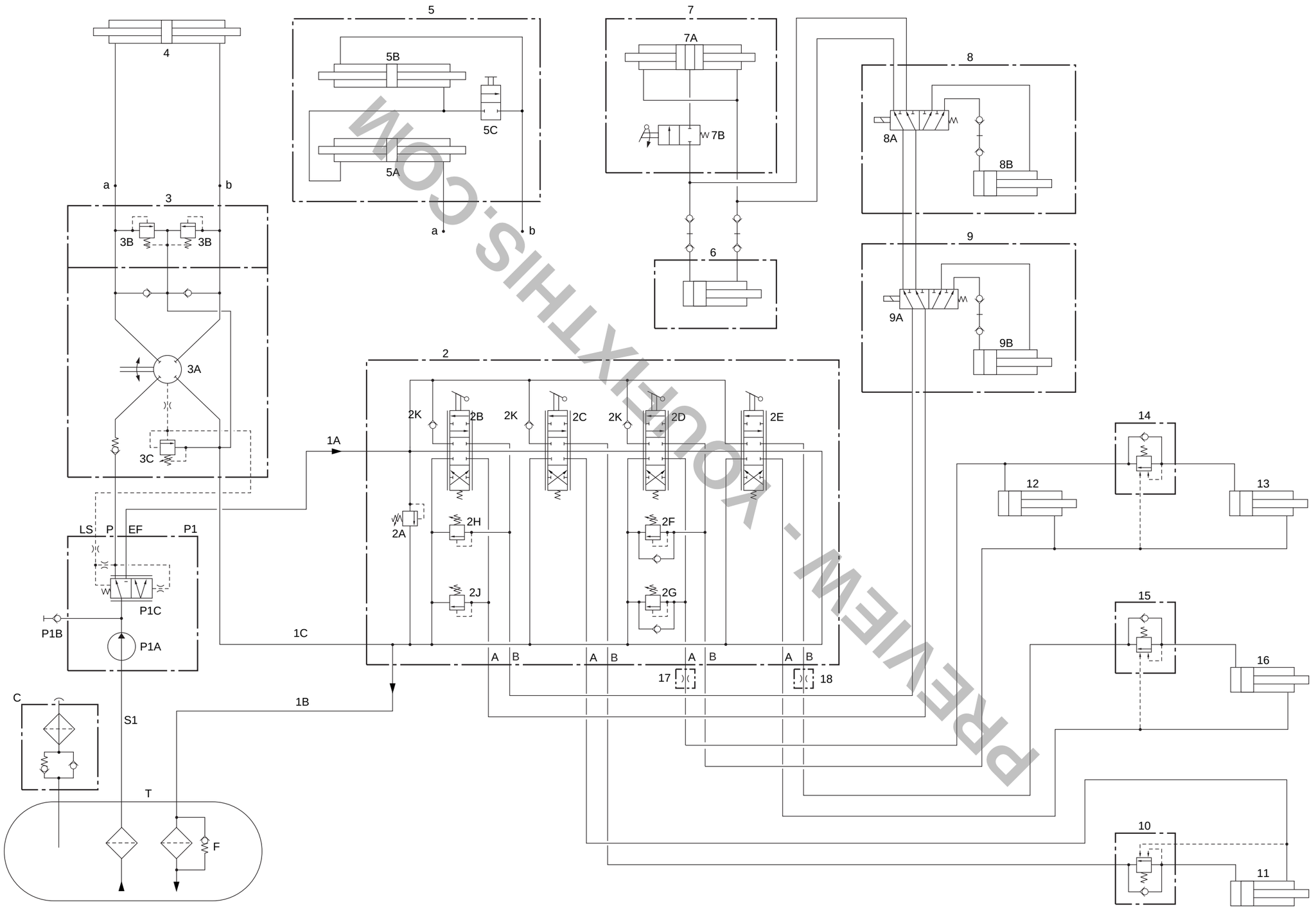
A4 Fuse 15A
C5 Fuse 15A
1 Compressor Field Coil
2 Compressor Relay
3 Water Temprature Switch (if fitted)
4 Pressure Switch
5 Thermostat Switch
6 Air Conditioning ON/OFF Switch
7 Heater Switch
8 Heater Fan Resistor
9 Heater Blower



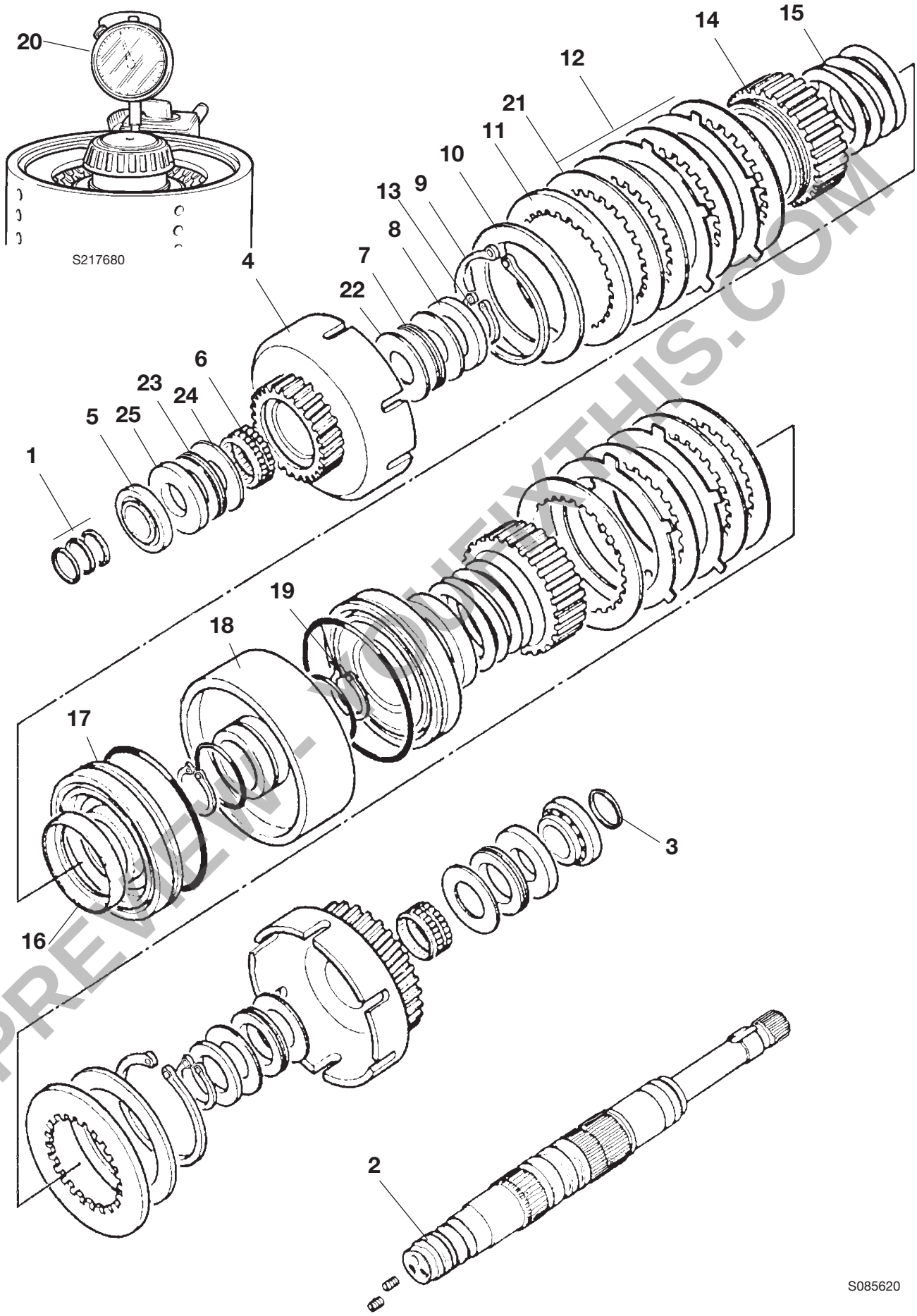
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Torque Settings

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.

UNF Grade 'S' Bolts

Bolt Size		Hexagon (A/F)	Torque Settings		
in	(mm)	in	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		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 Settings (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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Diagnostic Fault Codes - LMI System Only

When the system detects a fault, the audible alarm will sound and various combinations of lights on the display will indicate a fault code for approximately 10 seconds.

The audible alarm and the fault code display cancel after 10 seconds and ALL LEDs on the display will flash continuously as long as the fault remains. Press and release display button **A** to show the fault for a further 10 seconds. When the fault clears, the display will return to normal.

If any of the fault codes are displayed, switch the starter key off and on again. Refer to the list of fault codes below if the fault does not clear.

Note: A new display box will not be calibrated. Always calibrate the system when fitting a new display box.

	FAULT CODE	POSSIBLE CAUSE	REMEDY
	**Fault Code 1** **Transducer signal fault**	Transducer not connected. Faulty harness. Faulty transducer.	Check transducer connection. Check for trapped or damaged wires. Check for water ingress. Replace transducer.
	**Fault Code 2** **Calibration out of range**	System is incorrectly calibrated. Transducer not fixed down correctly. Faulty transducer.	Re-calibrate system. Check mounting surfaces are clean and flat. Check mounting bolts are not bottoming-out. Check tightness of transducer mounting bolts (70 Nm). Replace transducer.
	**Fault Code 3** **Calibration required**	System not calibrated.	Calibrate system.
	**Fault Code 4** **Display unit faulty**	The display box has detected an internal error.	Switch the starter key off and then on again. Replace the display box if the fault does not clear.
	**Fault Code 5** **Low battery voltage**	Battery voltage is below 9 Volts.	Do 12V supply test at display box. Check battery voltage.

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Fault Finding Guide

The purpose of this section is to help you trace electrical faults to a faulty unit. Once you have traced the faulty unit, refer to the appropriate dismantling, inspecting and test instructions given elsewhere in the Service Manual.

To help identify circuits, refer to the electrical schematic diagrams. Refer to Section F, Fault Finding as this section deals with the mechanical aspects.

1 Before you begin fault finding, read the Safety Information at the beginning of this manual.

2 Make simple checks before stripping a major component.

3 Make any relevant electrical checks before commencing work.

FAULT	POSSIBLE CAUSE	REMEDY
Machine will not start	Forward/reverse lever not in neutral	Place forward/reverse lever in neutral before starting the engine (machines with neutral start relay only).
No drive and continuous warning buzzer.	Attempting to select drive with the park brake engaged.	Release park brake
No drive in forward or reverse.	Blown ECU fuse.	Check ECU fuse
	ECU mainframe connector loose.	Check connector is mating correctly with ECU.
No drive.	Faulty gear selection switch.	Check switches and wiring.
	Park brake sticking.	Check park brake assembly.
	Faulty transmission harness.	Check transmission harness for continuity and connector.
Missing gears.	ECU damaged by overtightening	Check/Change ECU.
	Faulty transmission dump input.	Check transmission dump switch and wiring.
	Faulty solenoid(s).	Check solenoids and wiring.
	Faulty gear selection switch.	Check switch and wiring.
	Low oil pressures.	Check clutch pack pressures. Check mainline pressure.
	ECU damaged by overtightening.	Check/change ECU.
No 4th gear (not applicable to three speed).	Mechanical problems.	See Service manual - Transmission
	Faulty speed sensor signal.	Check speed sensor and wiring. Check speed sensor installation (ie. distance from transfer gear)
	Incorrect ECU fitted.	Check parts information.
	Water ingress/sticking clutch pistons.	See General 069 (F105 N.Am).

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520-55 RS (Rear Steer) Machines

ITEM	CAPACITY Litres	UK Gal	US Gal	FLUID/LUBRICANT	INTERNATIONAL SPECIFICATION
Fuel Tank					
Up to serial No. 279000	120	26.4	31.7	Diesel Oil (See **Types of Fuel**)	ASTM D975-66T Nos. 1D, 2D
From serial No. 279001	160	35.2	42.2		
Engine (Oil)	10	2.2		**JCB High Performance Engine Oil** -10 °C to 50 °C (14 °F to 122 °F)	SAE15W/40 API CF4/SG (ACEA E2:B2:A2)
				JCB Super Universal Agricultural -15 °C to 30 °C (5 °F to 86 °F)	SAE10W/30 API CD/SF
				JCB Torque Converter Fluid -18 °C to 0 °C (0 °F to 32 °F)	SAE10W API CD/SF
			2.6	**NORTH AMERICA** **JCB 15W/40 Engine Oil** 14°F to 122°F (-10°C to 50°C)	SAE 15W/40 API CF4/SG
				JCB 10W Engine Oil -4°F to 50° F (-20°C to 10°C)	SAE 10W API CF4/SG
Engine (Coolant)	20	4.4		**JCB Four Seasons Antifreeze And Summer Coolant** Starts to freeze -36 °C (-33 °F)	ASTM D3306-74
55% Antifreeze	11	2.4			
			5.3	**NORTH AMERICA** **Permanent Antifreeze**	ASTM D3306-74
			2.9	Starts to freeze -33 °F (-36 °C)	
Syncro Shuttle Transmission	17	3.7	4.5	**JCB High Performance Transmission Fluid**	JCB: 4000/0900 Friction modified oils MUST NOT be used (eg Dexron ATF type).
Front Axle				**JCB High performance Gear Oil Plus**	JCB: 4000/2200 MUST be suitable for use with oil immersed brakes and limited slip differentials (LSD).
Housing	9.7	2.1	2.5		
Hubs (x2)	0.6	0.1	0.16		
Rear Axle					
Housing	5.0	1.1	1.3		
Hubs (x2)	1.5	0.3	0.4		
Hydraulic Tank (1)				**JCB High Performance Hydraulic Fluid 46** (Above 38 °C, 100 °F)	ISO VG46
Up to serial No. 279000	100	22.0			
From serial No. 279001	110	24.2		**JCB High Performance Hydraulic Fluid 32** (Below 38 °C, 100 °F)	ISO VG32
				JCB Light Hydraulic Fluid	ISO VG15
Up to serial No. 279000			26.4	**NORTH AMERICA** (All Machines)	
From serial No. 279001			29.0	**JCB Hydraulic Fluid**	ISO VG46
Grease Points (2)				**JCB HP Grease**	Lithium complex NLGI No. 2 constsituency including extreme pressure additives.
				JCB Special MPL-EP Grease	Lithium based NLGI No. 2 constsituency including extreme pressure additives.
Wear Pad Runways				**JCB Waxoyl**	
Boom Hoses				**JCB Special Slide Lubricant**	

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Calibration - SLI System

Adjustment of Balance Setting

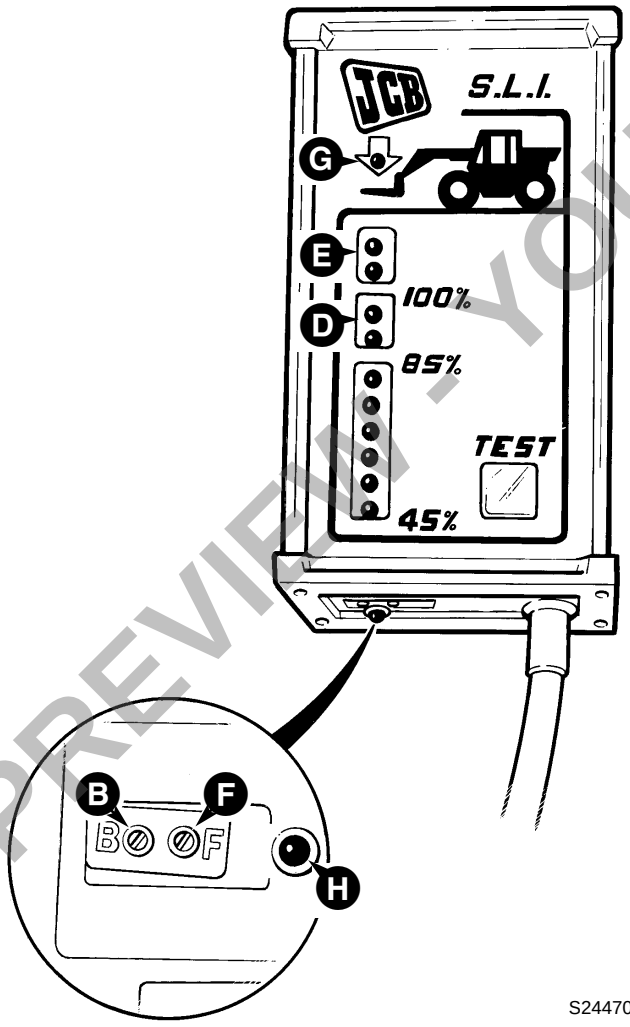
1 Park the machine on firm level ground.

2 Remove any attachment other than pallet forks. Set the steering to the straight ahead position and release the brakes.

3 Raise boom to horizontal position with machine unladen and the inner boom fully retracted.

4 Adjust balance screw **B** until all lights are extinguished.

Note: Some readout boxes have LED **H** fitted. If LED **H** is ON, turn screw **B** anticlockwise until the LED is flashing. If LED **H** is OFF, turn screw **B** clockwise until the LED is flashing. LED **G** is a power-ON indication only.



S244700

Adjustment of Full Scale Setting

⚠ WARNING

During the following procedure, do not raise the load more than 600mm above ground level otherwise the machine may be able to tip forward at a dangerous angle. Keep all personnel clear of the front and rear of the machine.

Elec 4-1

1 With boom fully retracted, pick up any load between 1800 and 2000 kg. Use either pallet forks loaded with a test weight or a bucket filled with a high density material.

2 Slowly extend the boom, keeping the load close to the ground, until the machine is balanced about the front axle. Lower the boom to the ground and measure the distance the boom is extended (millimetres).

3 Refer to the chart shown overleaf for the machine concerned and on the scale, find the extension figure measured at step 2 above.

4 Read vertically from the extension figure (example line X) to the Tipping Line AA**.**

5 Read horizontally (example line Y) to the maximum working limit Line BB.

6 Read vertically (example line Z) down to the scale and read off the extension figure (example 640mm).

7 Retract the boom to the extension figure obtained from the chart.

8 Adjust screw **F** until both amber LEDs **D** (but not the red LEDs **E**) are flashing.

9 Fully retract the boom then slowly extend it until the amber LEDs **D** are flashing. Check the boom is within 20mm of the figure obtained from the chart.

Note: The buzzer will sound when the load exceeds the maximum working limit by 10% and red LEDs **E** are flashing.

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Pre-start Cold Checks Service Points and Fluid Levels	Operation	Daily 10 Hr	Weekly 50 Hr	100 Hr	6 Monthly 500 Hr	Yearly 1000 Hr	2 Yearly 2000 Hr
ENGINE							
Engine Air Filter Pre-cleaner	Clean	●	●	●	●	●	●
Oil Level and Condition	Check	●	●	●	●	●	●
Oil and Filter (AA - AS build)	(1) Change			●	●	●	●
Oil and Filter (RE - RG build)	(1) Change				●	●	●
Hydraulic Tank Filler Cap	Change					●	●
Air Cleaner Dust Valve	Clean			●	●	●	●
Air Cleaner Outer Element	Change				●	●	●
Air Cleaner Inner Element	Change						●
Fuel System For Leaks and Contamination	Check	●	●	●	●	●	●
Fuel Filter	Drain		●	●	●	●	●
* Fuel Filter (AA - AS build)	Change			●	●	●	●
* Fuel Filter (RE - RG build)	Change				●	●	●
Coolant Level and Antifreeze Strength	Check	●	●	●	●	●	●
Fuel Sedimenter (AA - AS build)	Drain and clean		●	●	●	●	●
* Fuel Sedimenter (RE - RG build)	Drain and clean		●		●	●	●
* Fan/ AC Belt Tension/Condition	(5)Check			●	●	●	●
Valve Clearances (AA - AC codes)	Check and Adjust#						●
* Valve Clearances (AJ-AS,RE-RG codes)	Check and Adjust#					●	●
Engine Mount Security	Check			●	●	●	●
Rain Cap/Pre-cleaner Installed if fitted	Check			●			
Radiator	Clean				●	●	●
TRANSMISSION AND AXLES							
Transmission Oil Level	Check	●	●	●	●		
Transmission Oil	(2) Change					●	●
Transmission Oil Filter	Change			●	●	●	●
Axle(s) Oil Level	Check		●	●			
Axle(s) Oil	Change				●	●	●
Hub Oil Level	Check		●				
Hub Oil	(3) Change			●	●	●	●
Drive Shafts and Universal Joints	(4) Security/Grease			●	●	●	●
Axle Pivots and Linkages	Grease		●	●	●	●	●
Axle Breather(s)	Check			●	●	●	●
Tyre Pressures/Condition	Check	●	●	●	●	●	●
Hub Wheel Bearings	Check			●	●	●	●
Transmission Strainer	Clean					●	●
Wheel Nut Security	Check	●	●	●	●	●	●
Wheel Alignment	Check	●	●		●	●	●
Trunnion Bearings	Check/Adjust#			●	●	●	●
Steering Stops (if fitted)	Security			●	●	●	●
Transmission Mount Security	Check			●			
Axle Mount Security	Check			●			

(1) In arduous conditions (eg. refuse rehandling, waste paper reclamation etc). Change the oil and filter every **250 hours** or three months (whichever comes first).

(2) After a major transmission repair, the new oil should be run to operating temperature and changed again to remove any contamination which entered during the repair. Change the oil and filter after a further 100 hours if the oil was heavily contaminated because of, or from the failure (e.g. water contamination).

(3) After a hub repair, the new oil should be run to temperature and changed again to remove any contamination which entered during the repair. Change the oil again after a further 100 hours to remove any bedding-in wear. This is particularly important if new brake plates have been fitted.

(4) In arduous conditions, grease the driveshaft and universal joints at **250 Hours** or 3 months (whichever comes first).

* (5) If a new belt is fitted check tension and condition after first 20 hours of operation.

Note *Jobs which should be done by a specialist are shown by #.*
First 100 Hours Service only to be completed by JCB Distributor.

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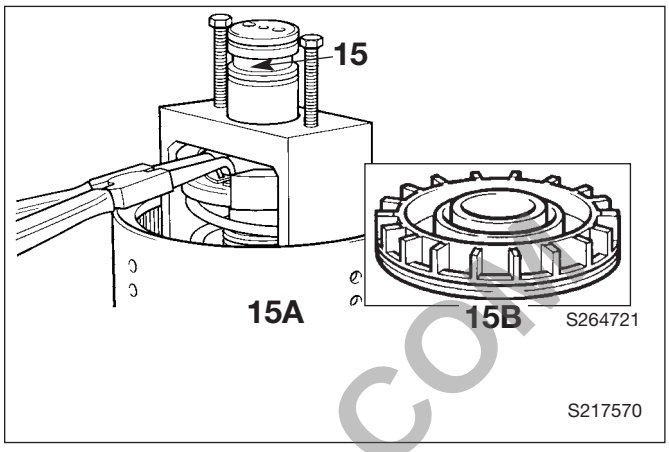
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REVERSER UNIT (Later Type) - ASSEMBLY

1 Fit new 'O' rings onto the piston and shaft, lubricate with oil then press piston fully into bore of clutch housing.

Note: Previous type plastic piston **15A** and latest aluminimum type **15B** are shown. It is recommended that aluminimum piston is fitted in place of plastic piston if water ingress has occured.

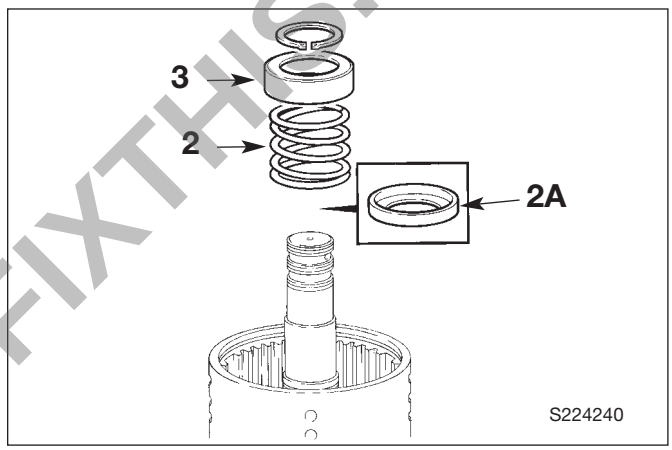
Make sure the liner is a tight fit.



2 Install the piston spring, make sure that the spring seats on the piston.

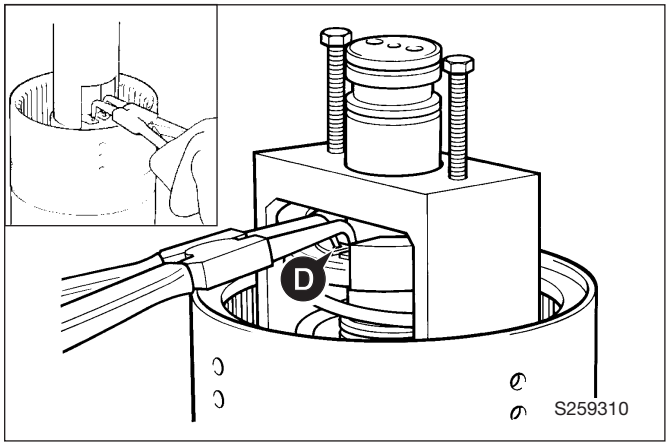
Note: Earlier assemblies, fit oil baffle plate **2A**, make sure that the oil baffle seats on the piston.

3 Fit the spring retaining plate.



4 Position clutch assembly in press, with a cut away tube compress piston spring then fit circlip.

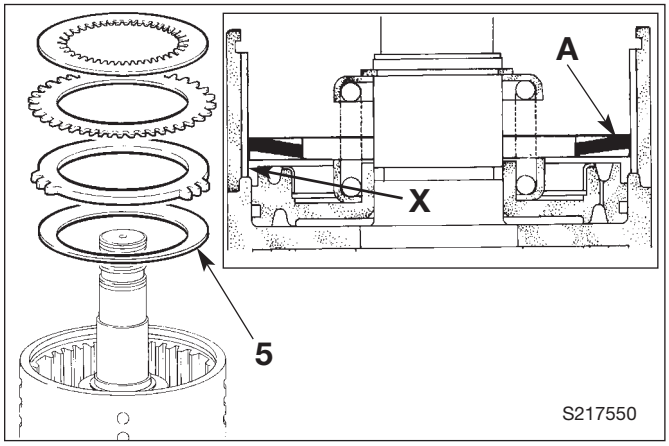
If a press is not available use compressor spring tool 892/00916 and fit circlip **D**.



5 Inspect belleville for signs of contact at **X** with piston or plate support carrier or loosening in the crimped housing. Fit washer assembly, make sure the belleville washer is fitted the right way round as shown at **A**.

Note: The belleville washer is assembled within a liner (not shown) to protect the hub support spline.

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Adjusting

Carry out General Safety procedures, *see* ***Machine Safety****, Section 3.*

Remove panel from the underside of the cab.

Select cab control lever to 2 wheel drive position, undo locknut **A** several threads to allow for adjustment.

Remove clevis pin **C** and spring **D**.

When fitting a new cable screw fork end **E** onto cable until no more than two threads are showing through the fork end, lock in position.

Select cab control lever to 4 wheel drive position.

Push lever **F** up to the 4 wheel drive position.

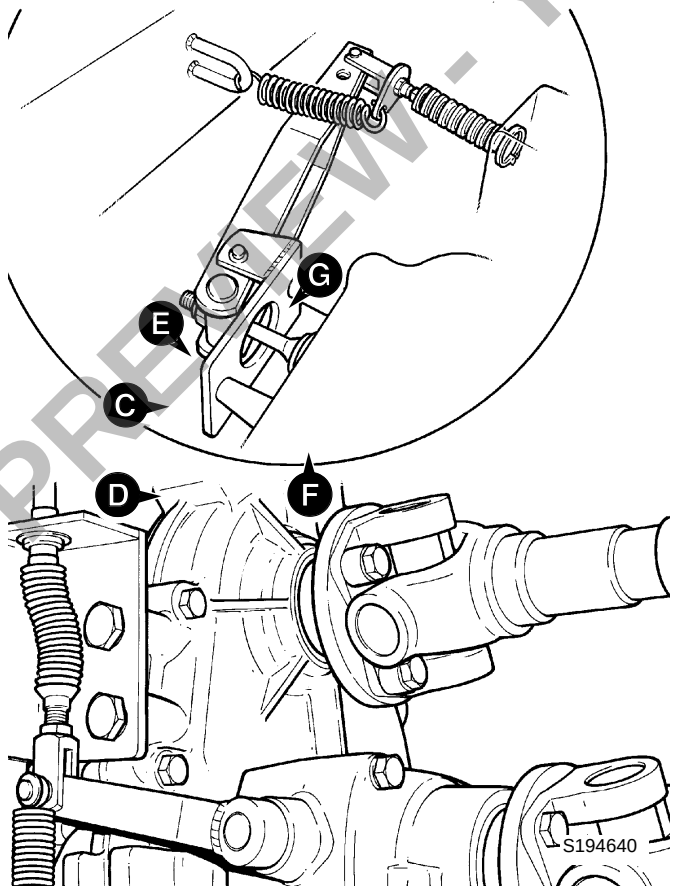
Adjust nuts **A/B** until fork end **E** and lever **F** align.

Tighten nuts **A/B** without altering the setting.

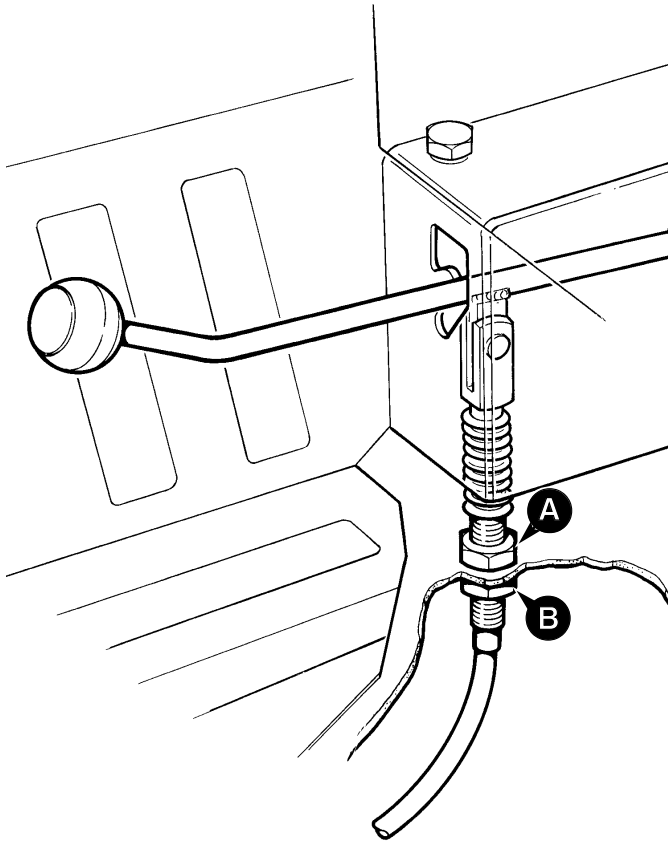
Refit clevis pin **C**, (lock with new split pin), fit spring **D**.

Operate the lever in the cab, check there is clearance between lever **F** and bolt **G**.

Note*: If a washer is fitted under bolt* ***G****, remove bolt and discard washer.*



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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

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.

General Safety

⚠ WARNING

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

⚠ WARNING

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

⚠ WARNING

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.

INT-1-3-5

⚠ 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

⚠ WARNING

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

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Machine History

Date	Machine	Description
1993 **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.
1994 **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.
1994 **Serial No.** 277468	**526-55** **(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.
1996 **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.
1996 **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.
1996 **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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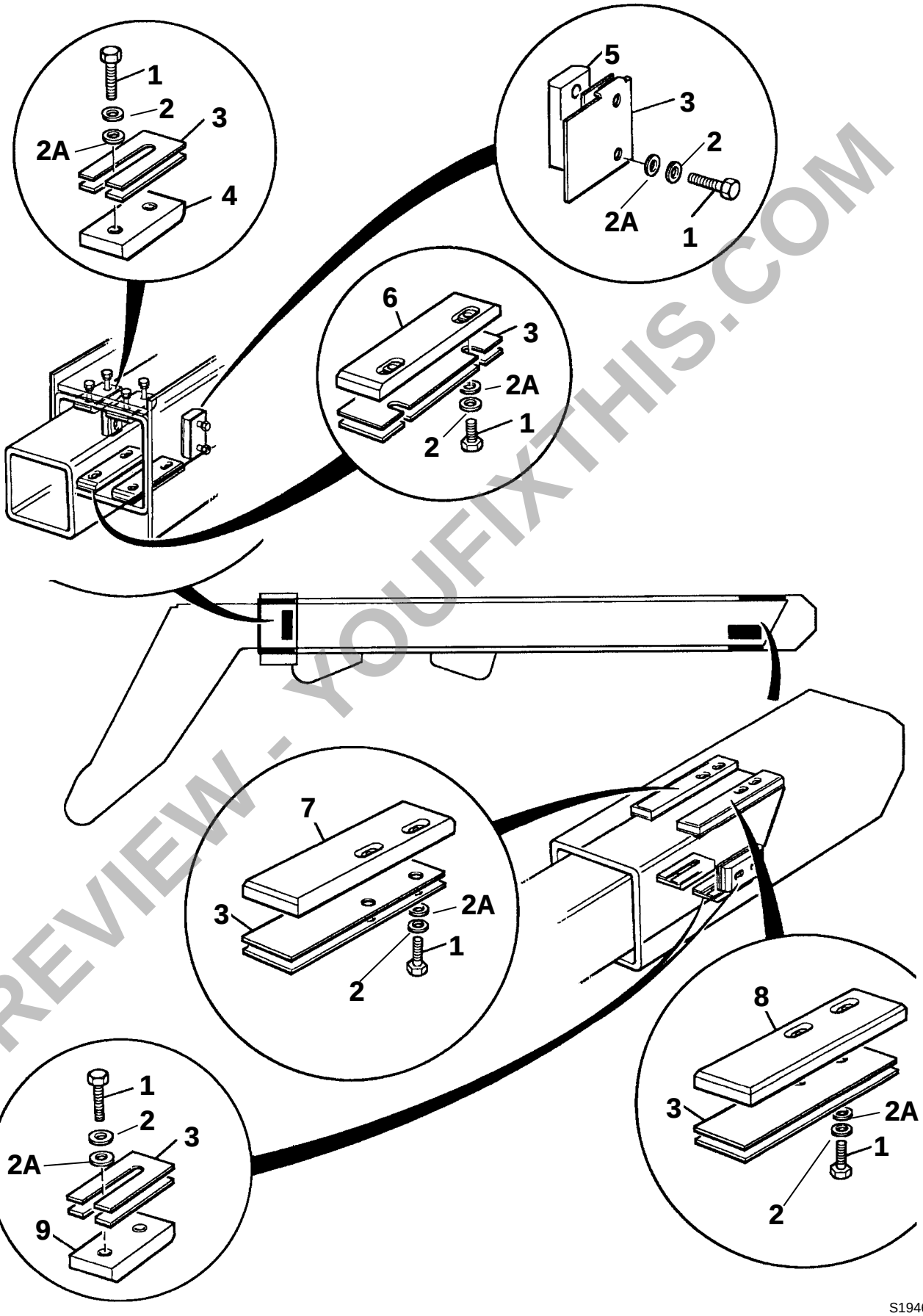
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Functional Test and Final Inspection	Operation	Daily 10 Hr	Weekly 50 Hr	100 Hr	6 Monthly 500 Hr	Yearly 1000 Hr	2 Yearly 2000 Hr
ELECTRICS							
Starter Motor	*Check			•	•	•	•
Alternator	*Check Output			•	•	•	•
All Electrical Equipment Operation (warning lights, beacon, alarms, horn, wipers)	Check	•	•	•	•	•	•
Safe Load Indicator	Check/Calibrate	•	•	•	•	•	•
Stabiliser Indicators	Check	•	•	•	•	•	•
BODYWORK AND CAB							
Inclinometer (if fitted)	Check			•	•	•	•
Glazing for Correct Fit/Leaks	Check			•			
Seat/Seat Belts	Check	•	•	•	•	•	•
Air Conditioning (if fitted)	Check			•	•	•	•
Forks	Fit and Check Security	•	•	•	•	•	•
Generally for damage, leaks & wear	Check	•	•	•	•	•	•

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Note *Jobs which should be done by a specialist are shown by *.*

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Component Key

520-55 Machines from Serial Number 281847, 526, 526S Machines from Serial Number 280300 with Syncro Shuttle Transmission

The complete electrical circuit is shown on pages 41-18 to 41-22. Fuses are numbered as shown on the fuse box in the cab.

Component Key

Sheet 2

Item	Description
41	Rear indicator - right hand
42	Rear side light - right hand
43	Trailer light socket
44	Number plate light
45	Sidelights relay
46	Front side light - left hand
47	Front indicator - left hand
48	Rear side light - left hand
49	Rear indicators - left hand
50	Trailer side light connection - left hand
51	Road lights switch
52	Dip beam - left hand
53	Main beam - left hand
54	Dip beam - right hand
55	Main beam - right hand
56	Front side lights - right hand
57	Front indicators - right hand
58	Fog lamp
59	Fog light switch
60	Steering column switch - right hand
61	Trailer indicators
62	Wash pump
63	Roof wiper motor
64	Roof wiper switch
65	Front wiper motor
66	Rear wiper motor
67	Hazard warning lights switch
68	Flasher relay
69	Trailer indicator light
70	Interior light
71	Warning beacon
72	Warning beacon switch
73	Face level fan
74	Air conditioning compressor
75	Air conditioning relay
76	Heater
77	Receiver dryer
78	Air conditioning switch
79	Heater switch

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Checking the Panel Harness

Note: The following checks should be carried out with the park brake in the in the OFF position.

1 Chock the roadwheels and remove fuse A2 to prevent the engine starting.

2 Release the parkbrake.

3 Clean the area around the panel harness connection to the ECU and remove the connector.

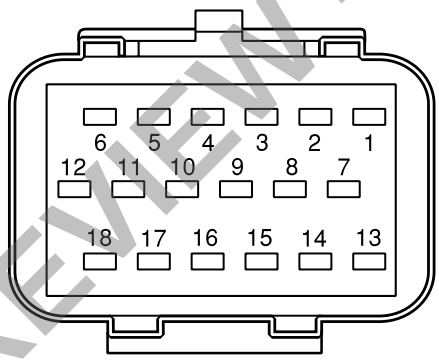
4 Check the condition of the connector and socket. Check the condition of the rubber seal in the panel harness connector.

5 Switch ON the ignition and select a gear.

Check for battery voltage on the pins of the panel harness connector using pin 16 as an earth. Refer to the following table to identify the correct pins for each gear selection.

6 If the lamp illuminates where indicated (**Y**), the integrity of the harness, switches and power supply to the ECU is proven.

Note: Depending on machine specification, there may be no electrical connections to pins 6, 8, 11 and 14.



299230

Panel Harness Connector Plug Voltage Readings:

FORWARD GEARS

PIN	F1	F2	F3	F4
1	**Y**	**Y**	**Y**	**Y**
2	-	-	**Y**	**Y**
3	-	-	-	**Y**
4	**Y**	-	-	-
5	-	-	-	-
6	-	-	-	-
7	-	-	-	-
8	-	-	-	-
9	**-**	**-**	**-**	**-**
10	-	**Y**	-	-
11	-	-	-	-
12	**Y**	**Y**	**Y**	**Y**
13	**Y**	**Y**	**Y**	**Y**
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	**Y**	**Y**	**Y**	**Y**
18	**Y**	**Y**	**Y**	**Y**

REVERSE GEARS

PIN	R1	R2	R3	R4
1	-	-	-	-
2	-	-	**Y**	**Y**
3	-	-	-	**Y**
4	**Y**	-	-	-
5	-	-	-	-
6	-	-	-	-
7	**Y**	**Y**	**Y**	**Y**
8	-	-	-	-
9	**-**	**-**	**-**	**-**
10	-	**Y**	-	-
11	-	-	-	-
12	**Y**	**Y**	**Y**	**Y**
13	**Y**	**Y**	**Y**	**Y**
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	**Y**	**Y**	**Y**	**Y**
18	**Y**	**Y**	**Y**	**Y**

Note: the ECU is powered by pins **17** and **18** (+VE) and earthed by pins **15** and **16**.

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INTRODUCTION TO HYDRAULIC SCHEMATIC SYMBOLS (continued)

Control Valves

Control valves are usually represented by one or more square boxes.

Fig. 1 shows a control valve represented by three boxes. The number of boxes indicates the number of possible valve operating positions, (4 boxes - 4 positions etc).

Fig. 2 - In circuit diagrams the pipework is usually shown connected to the box which represents the unoperated condition. (Hydraulic circuit diagrams are usually shown in the unoperated condition).

Fig. 3 shows a valve described as a 3- position, 4-port control valve. Port describes the openings to and from the valve by which the hydraulic fluid enters or leaves. In the fig shown, Position 2 indicates that in an unoperated condition all 4 ports are blocked.

If the valve spool was moved to Position 1, movement of the spool would connect Port 1 to Port 2, and Port 3 to Port 4.

If the valve spool was moved to Position 3, movement of the spool would connect Port 1 to Port 4, and Port 3 to Port 2.

It must be noted that not all spools are of the same type. Their operating designs can be seen by following the path the flow arrows take in their respective operating squares.

Three typical JCB style spools are known as 'D' spools, 'F' spools and 'N' spools.

The 'D' spools generally control rams because when in the neutral position the outlet ports are blocked, preventing ram movement. Fig 3 shows a 'D' type spool.

Fig 4 - 'F' spools are often shown as four position spools with the three normal positions for neutral and service control; and the forth position, which has a detent, connects both sides of the ram together to allow the service to 'float'.

Fig 5 - 'N' spools are sometimes used to control hydraulic motors, and it can be seen from the flow arrows, that in neutral position both service ports are connected to the exhaust oil port

FIG 1

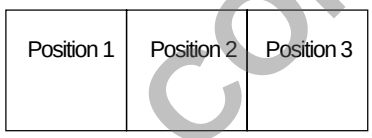


FIG 2

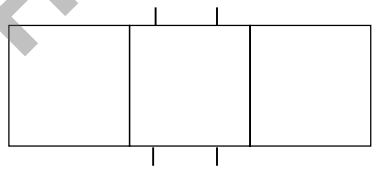


FIG 3

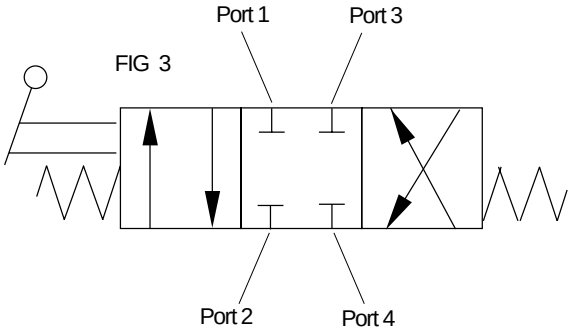


FIG 4

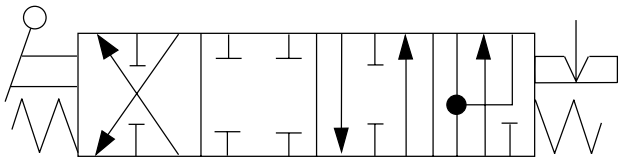
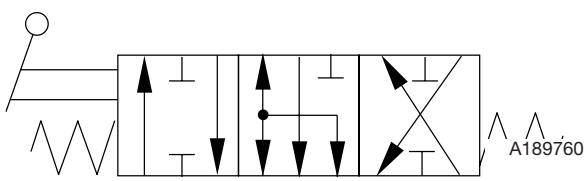
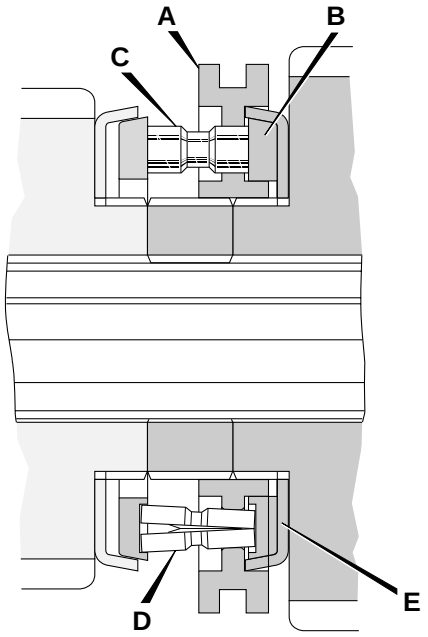


FIG 5

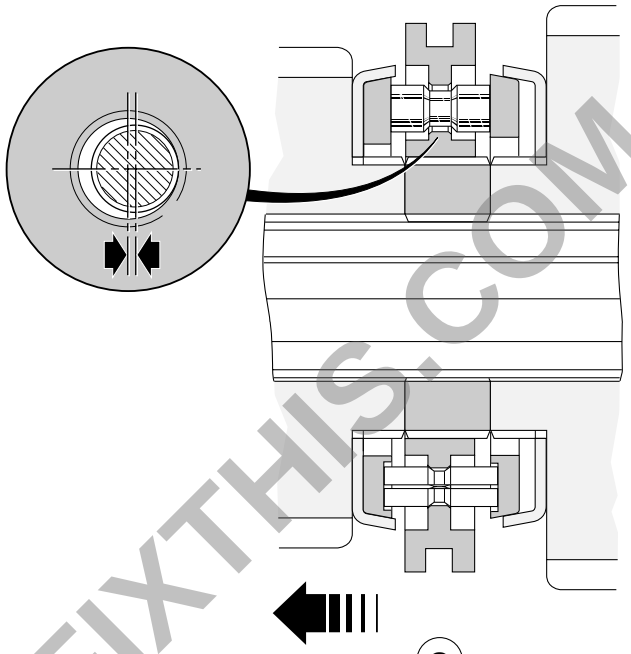


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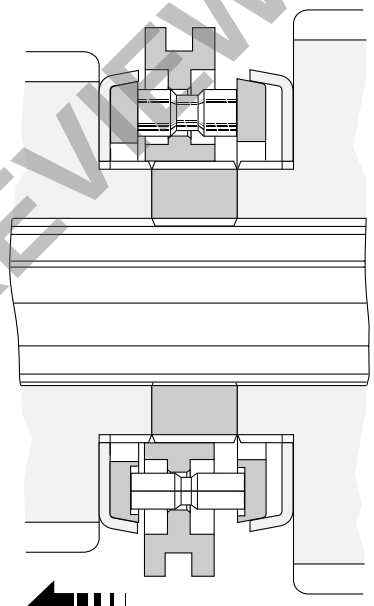
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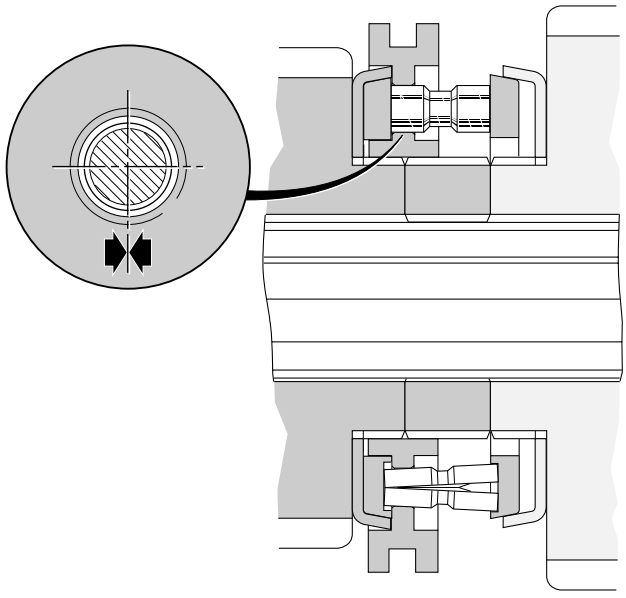
F



G



H



J

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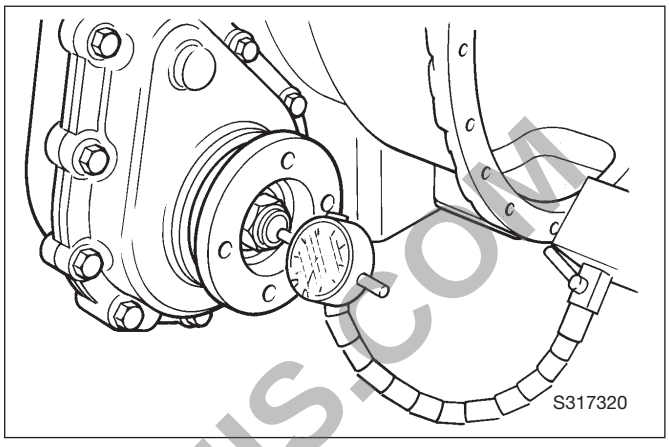
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MECHANICAL 4 WHEEL DRIVE UNIT - ASSEMBLY (cont'd)

5 Fit the 4WD assembly to the transmission using a new gasket. Apply JCB Threadlocker and Sealer to mounting bolts **D** and tighten to 56 Nm (42 lbf ft).

6 Tighten output yoke (or flange) nut to 400 Nm (295 lbf ft). Check shaft end float which should be 0.03 mm (0.001 in) maximum.

Note: Rotate shaft whilst measuring to seat bearings fully.

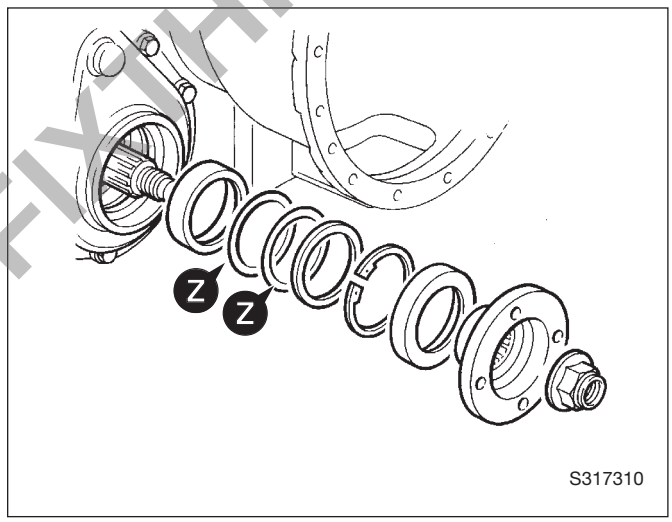


7 If the end float is incorrect, remove output yoke (or flange) and bearing retaining circlip.

8 Add or subtract shims **Z** to correct end float. Shims must be installed only between bearing outer race and spacer. Replace circlip and yoke (or flange) and re-check end float.

9 When shaft end float is correct, remove yoke (or flange) and fit new oil seal.

10 Refit output yoke (or flange), tighten nut to 400 Nm (295 lbf ft) and stake into slot.



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Input Clutch and Reverser Clutch - Dismantling (continued)

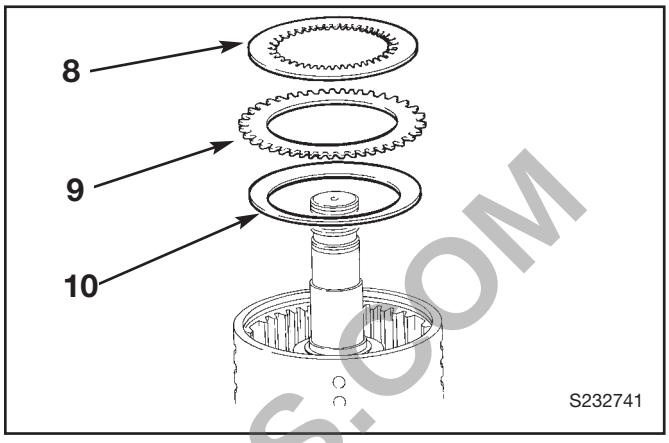
8 Remove the clutch friction/counter plates. Keep them together in sets, DO NOT mix the plates with those from other clutches.

9 Remove last counter plate.

Note: In later clutches an additional counterplate is fitted beneath the pressure plate.

10 Remove disc spring assembly.

Note: The disc spring is assembled within a liner (not shown) to protect the hub support spline.



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11 Position clutch assembly in a press, with a cutaway tube **Y** compress the piston spring then remove circlip.

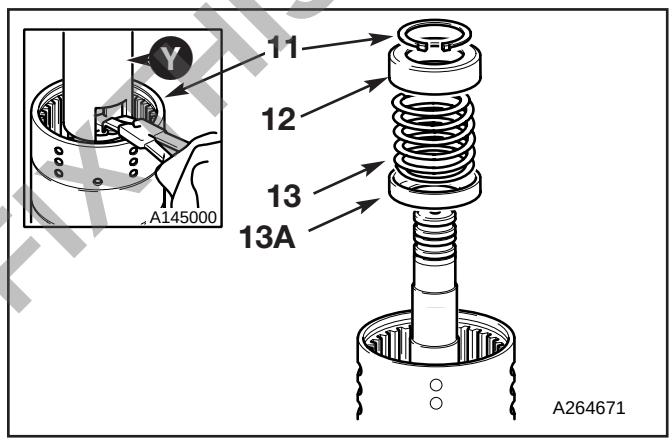
Note: If no press is available, spring compressor tool 892/00916 can be used.

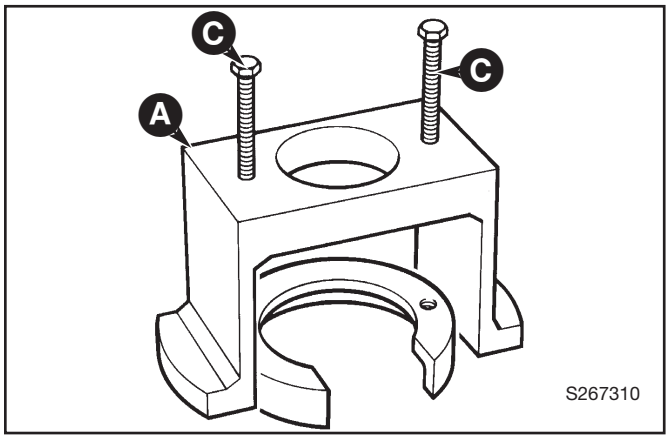
Refit the circlip removed at step 6, and locate the feet of the tool underneath the circlip. Fit the 'C' plate **B** over the spring retaining plate, use the two bolts **C** to relieve spring tension and remove the circlip **D**.

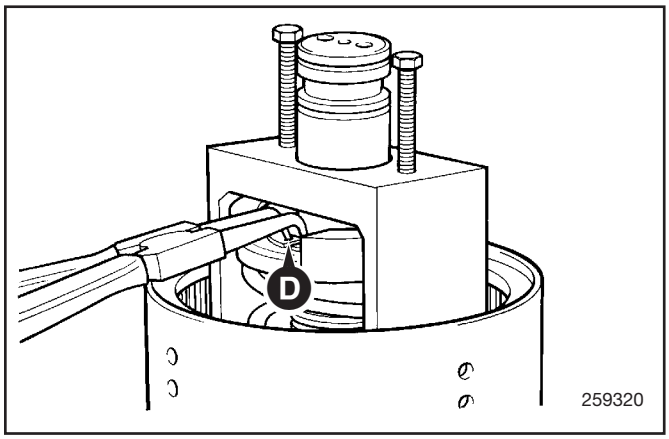
12 Lift off spring retaining plate.

Note: Assemblies with aluminium pistons have an oil plate **13A** fitted.

13 Remove spring and oil baffle plate.







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Rear Hub - Unbraked

Dismantling

Carry out **General Safety** procedures, *see Machine Safety, Section 3.*

⚠ WARNING

A raised and badly supported machine can fall on you. Position the machine on a firm, level surface before raising one end. Ensure the other end is securely chocked. Do not rely solely on the machine hydraulics or jacks to support the machine when working under it.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.
GEN-001

Remove the road wheel.

Turn the wheel so that the filler/drain plug **1** is at the lowest point. Remove filler/drain plug **1** and drain the oil, discard the 'O' ring seal **2**.

To remove the planet carrier **3** release screws **4**.

Prise off the planet carrier **3**, discard the 'O' ring seal **5**.

To remove the planet gear **8** remove circlip **6** and thrust washer plate **7**.

Take care that the needle bearing rollers **10** are not misplaced.

Release circlip **15**, remove thrust washer **16** and spacer **17**.

Remove annulus carrier **11** and annulus ring **12** as a complete assembly. Release bolts **13**, use two bolts **13** in threaded holes **A** to push assembly off.

Mark the relationship between the annulus carrier **11** and annulus ring **12** remove circlip **14**.

Prise off bearing carrier **19**.

Remove taper bearings **20** and **23**.

Assembling

For assembly the sequence should be reversed.

* Check that thrust washer **A** is in place and secure before fitting the hub.

Fit new seals.

The taper bearings **20** and **23** are machined to fine tolerances and do not require pre-load or clearance checks. When fitting new components check that the dimensions are within limits. If any component is outside the limits replace with a new item.

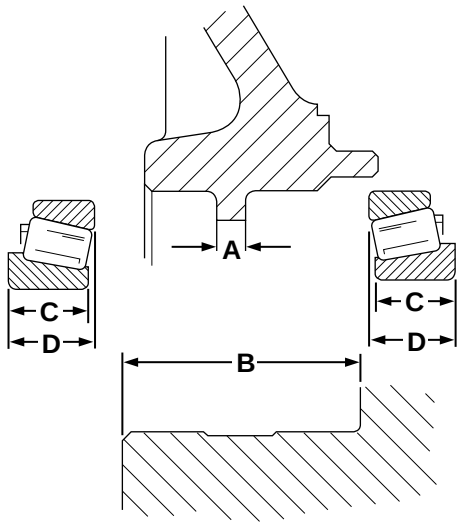
A 11.975 mm + 0.050 mm
B 52.229 mm + 0.050 mm
C 20.00 mm
D 20.00 mm + 0.10 mm

Fill the hub to the correct level with the appropriate grade of oil.

Refit road wheels and carry out tightness check, *see* ***Tyres and Wheels*** *in Section 3.*

Torque Settings

Item	Nm	Kgf. m	lbf. ft
1	80	8.0	60
4	25	2.5	18.5
13	78	7.9	57.5



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Axle and Gearbox Drive Shaft Flange - Salvage After Oil Seal Failure

When rectifying oil leaks from drive shaft flanges (typically shown at **X**) always ensure that the cause of seal failure is identified, performing additional service as required. this will ensure maximum service life from replacement seals.

Oil leaks can be caused by one or more of the following:

1 Dirt ingress/contamination

Dirt can enter an oil seal if the unit or flange is not thoroughly cleaned before removal and before fitting a new seal. Contamination can also occur if high pressure water washing jets are directed at oil seals.

2 Damage to the seal housing when removing seal

Take care when removing seals and avoid damaging the housing. On the outer diameter small scratches/marks can be cured by using a silicon sealant on the seal outer diameter. For excessive damage fit a new pomponent.

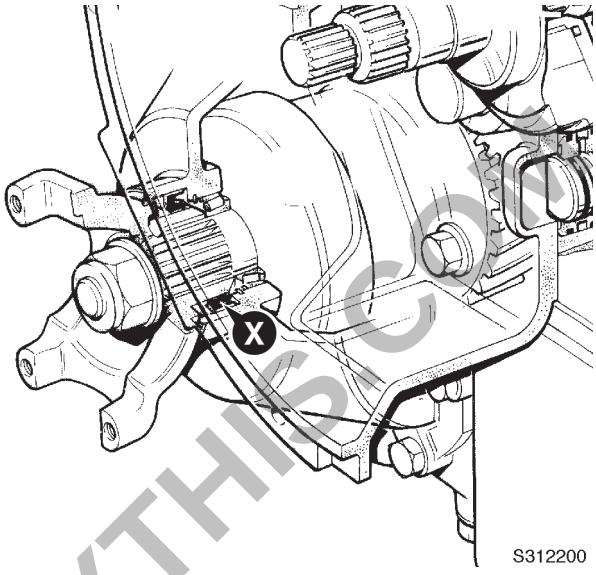
3 Oil seal damaged when fitting

Check that the oil seal is not damaged, distorted or the lips cut or torn. When fitting an oil seal use a suitable tool or tube that does not touch the seal lip and fully supports the casing of the seal without distorting the seal during fitting. Lubricate the seal's external and internal diameters sparingly with JCB HP grease and check the spring was not displaced during fitting.

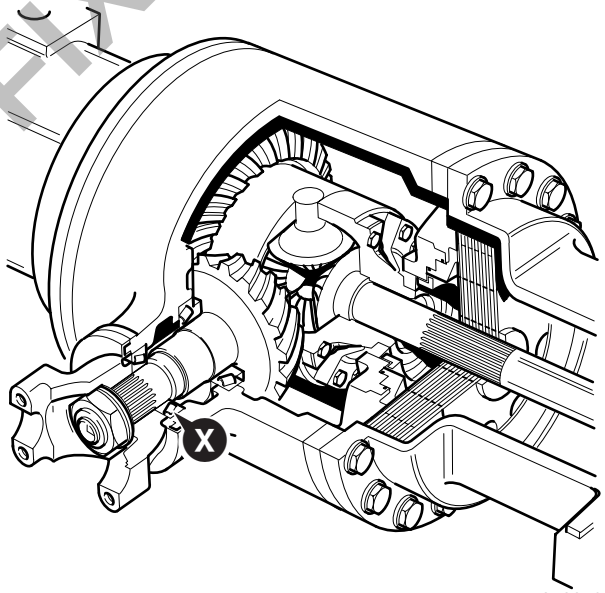
4 Oil seal not fitted square

After fitting, measure the oil seal depth **B** in four places as shown at **A**, if the depth varies by more than 0.50 mm (0.0195 in) carefully tap the new seal unit square or fit another seal.

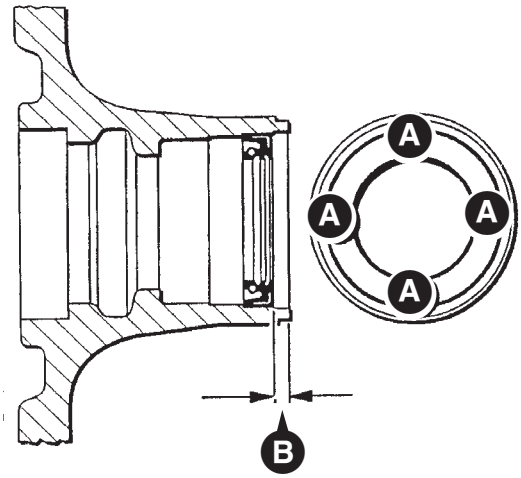
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Brake Seal or Component Leakage - continued

The most common reason for internal piston seal leakage is a build-up of axle contamination from excessive brake wear caused by extended service periods. This allows metal particles to build-up on the sealing surfaces causing scoring and allowing low pressure leaks.

There are two types of internal leakage that can occur within the axle and hub:

(a) **Low Pressure Leaks** - Seal damage, or scoring to seal component surfaces.

(b) **High Pressure Leaks** - Mechanical leakage through a porous casing, or blanking screw threads.

Note: The low pressure leak test should be performed first. Low pressure leaks are difficult to find using a high pressure test - seals and other components can distort and form a seal under pressure.

The following areas identify where leakage can commonly occur.

Low Pressure:

A Swivel to annulus carrier sealing o-rings and sealing surfaces.

B Brake piston seals.

C Annulus carrier to swivel sealing o-ring surfaces.

D Piston and annulus carrier sealing surfaces (porosity, scores, nicks & scratches etc.).

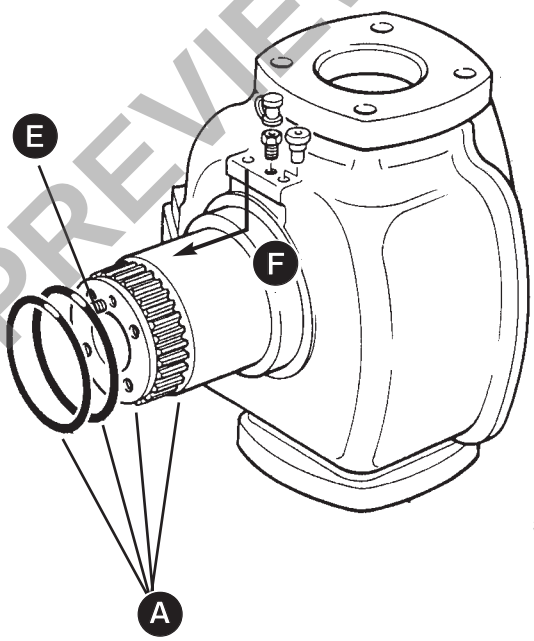
High Pressure:

E Blanking screws (x2) - missing, loose or no thread sealant used.

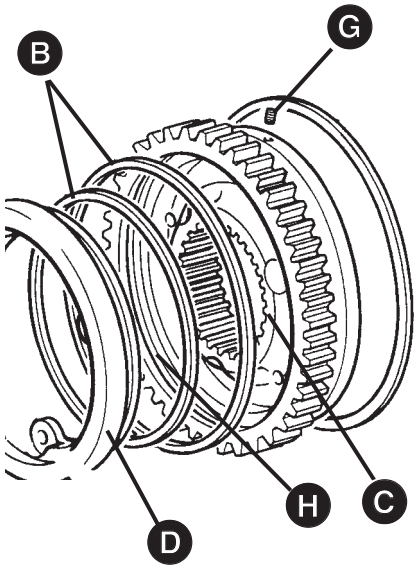
F Porosity through casing from internal galleries.

G Blanking screws (x2) - missing, loose or no thread sealant used.

H Annulus carrier to piston seals sealing surfaces.



316000



316010

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