

# Service Manual

## 435 Wheeled Loader

From M/C No. 523778

JCB SERVICE ©  
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# Contents

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General	1
Hydraulics	2
Attachments	3
Body and Framework	4
Engine	5
Transmission	6
Axles	7
Brakes	8
Hydraulic Steering	9
Electrics	10
Service Tools	11
Index	

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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 a sound knowledge of good workshop practice, safety procedures and general techniques associated with the maintenance and repair of hydraulic earthmoving equipment. Details of such may therefore be omitted from this manual, the primary intention being to convey the more specialised information concerning particular aspects of the machine or component in question.

Renewal of oil seals, gaskets, etc. and any component showing obvious wear or damage is expected. It is also 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 or its application, reference should be made to the alphabetical index at the back of the manual.

Except where a maximum and minimum figure is given, torque settings quoted in the text are intended as 'mean' figures which may be varied by + or - 3%. Where no figure is quoted in the text, refer to page 1/1 - 2.

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

### 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 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 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.**

INT - 3 - 3 - 5

### 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 of in accordance with local regulations.

GEN-1-8

## Colour Coding

The following colour coding, used on illustrations to denote various conditions of oil pressure and flow, is standardised throughout JCB Service Publications.



**Blue:** Neutral Circuit Pressure.



**Red:** Pressure generated by the operation of a service. Depending on application this may be anything between Neutral Circuit Pressure and M.R.V. Operating Pressure.



**Pink:** Pressure that is above Neutral Circuit Pressure but lower than that denoted by Red.



**Green:** Exhaust.



**Light Green:** Oil subjected to a partial vacuum due to a drop in pressure (cavitation).



**Yellow:** Oil trapped within a chamber or line, preventing movement of components (lock-up).



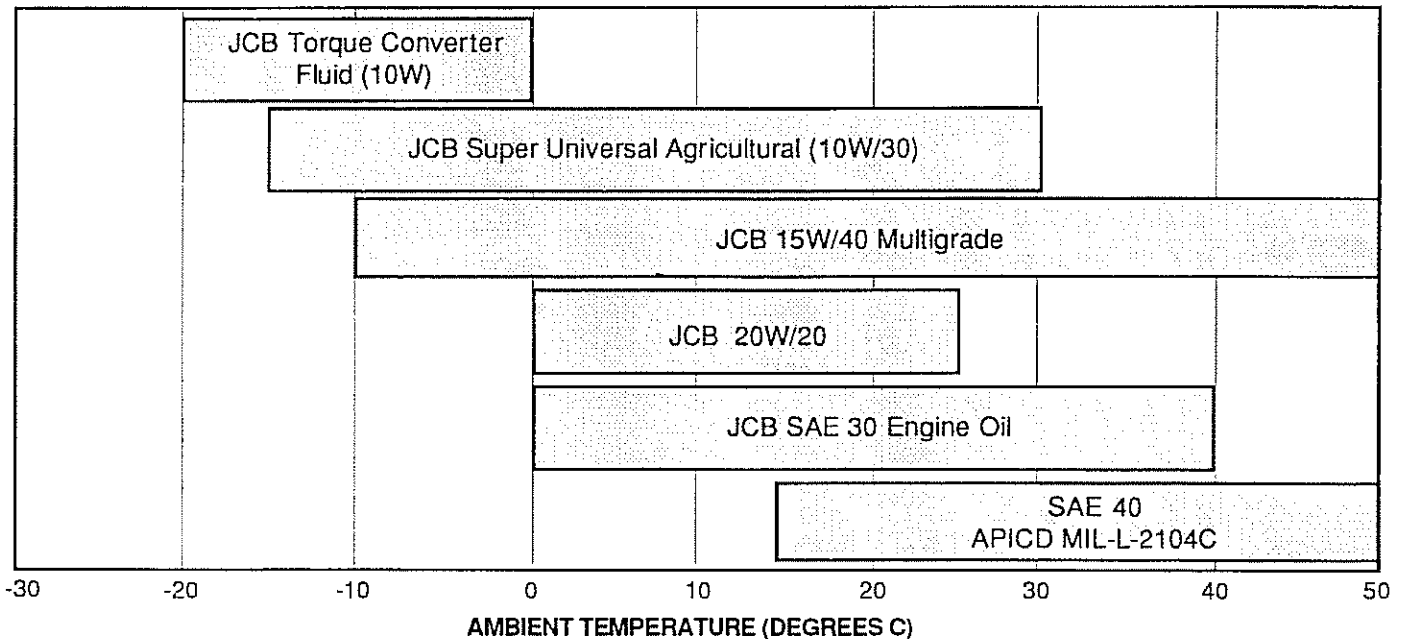
**Orange:** Oil pressure used in a controlling device (servo).

### ENGINE LUBRICANTS and CAPACITIES

**Note:** To promote thorough running-in, engines of new machines are filled at the factory with JCB 10W/30 Multigrade oil. This oil should be drained after the first 100 hours operation and the engine filled with the 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 into the machine. Alternatively, where a new or reconditioned engine requires protection against corrosion during prolonged storage, Mobilaroma 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	
Engine Oil	See chart below	14.5 litres	3.2 UK gals
Fuel		222.5 litres	49 UK gals
Transmission	† <sup>1</sup> JCB Torque Converter Fluid (SAE 10W)	24.5	5.4 UK gals
Hydraulic/Brake System	JCB Special Hydraulic Fluid	† <sup>3</sup> 177 litres	39 UK gals
Front Axle	* Mobil SAE 90LS Infilrex 33	25 litres	5.5 UK gals
Rear Axle	* Mobil SAE 90LS Infilrex 33	25 litres	5.5 UK gals
Grease Points	† <sup>2</sup> Mobilgrease Special		
Engine coolant	See page 5/5-1 for Anti-freeze recommendations	33 litres	7.5 UK gals

### ENGINE LUBRICATION CHART - PERKINS 1000 SERIES - MODEL YB



†<sup>1</sup> This oil meets the following specifications: API CD, MIL-L-46152, MIL-L-2104D.

†<sup>2</sup> Denotes Lithium based No. 2 consistency grease.

†<sup>3</sup> The hydraulic system capacity is approximate and will vary depending on the type of attachments fitted. Fill with rams closed.

**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 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

**ZF AXLES (USE ONLY ON ZF AXLES) - IN Nm****Metric Coarse Thread**

Bolt Size	Grade			
	6.9	8.8	10.9	12.9
M6	8.5	10	14	17
M8	21	25	35	41
M10	41	49	69	83
M12	72	86	120	145
M14	115	135	190	230
M16	180	210	295	355
M18	245	290	400	485
M20	345	410	580	690
M22	465	550	780	930
M24	600	710	1000	1200
M27	890	1050	1500	1800
M30	1200	1450	2000	2400

**Metric Fine Thread**

Bolt Size	Grade			
	6.9	8.8	10.9	12.9
M8 x 1	23	27	38	45
M10 x 1.25	44	52	73	88
M12 x 1.25	80	95	135	160
M12 x 1.5	76	90	125	150
M14 x 1.5	125	150	210	250
M16 x 1.5	190	225	315	380
M18 x 1.5	275	325	460	550
M20 x 1.5	385	460	640	770
M22 x 1.5	520	610	860	1050
M24 x 2	650	780	1100	1300
M27 x 2	970	1150	1600	1950
M30 x 2	1350	1600	2250	2700

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

## FITTING THE ARTICULATION SAFETY LOCK

**WARNING**

Make sure the articulation safety lock is fitted before transporting the machine. The articulation safety lock must also be fitted if you are inspecting and/or doing any maintenance work in the articulation danger zone.

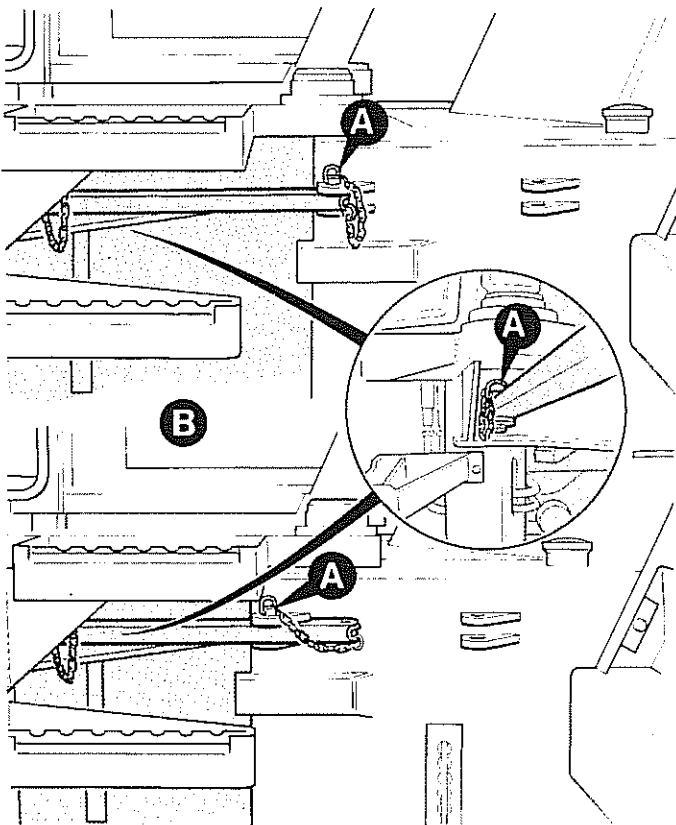
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**Installing**

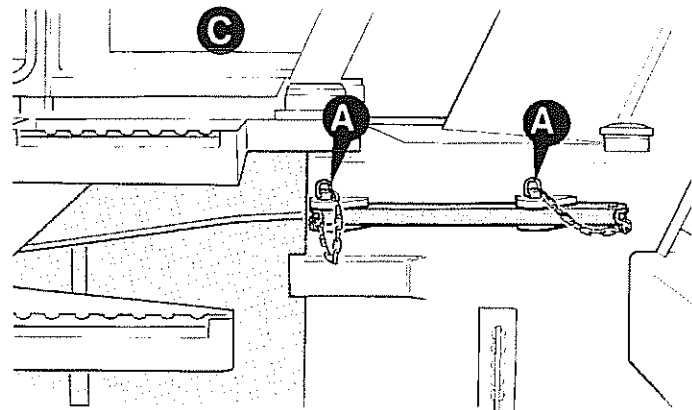
- 1 Position the machine straight ahead, or fully articulated, apply the parking brake, put the transmission in neutral and stop the engine.
- 2 Remove pins **A** and move the lock from the stowed position into one of the two lock positions, shown at **B**.
- 3 Fit pins **A** to lock the machine rigid.

**Note:** If the machine is slightly out of alignment it will not be possible to fit both pins. Under these circumstances continue as follows:

- 4 Fit one pin correctly in position and the other pin partly through.
- 5 Restart the engine and turn the steering wheel slightly to allow the the partly fitted pin to drop into position.
- 6 Switch the engine off and check that the pin has located properly.

**Removing**

- 1 Remove pins **A** and return the lock to the stowed position as shown at **C**. Replace the pins to secure the lock.



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## FITTING THE LOADER ARM SAFETY STRUT

**WARNING**

Raised loader arms can drop suddenly and cause serious injury. Before working under raised loader arms, fit the loader arm safety strut.

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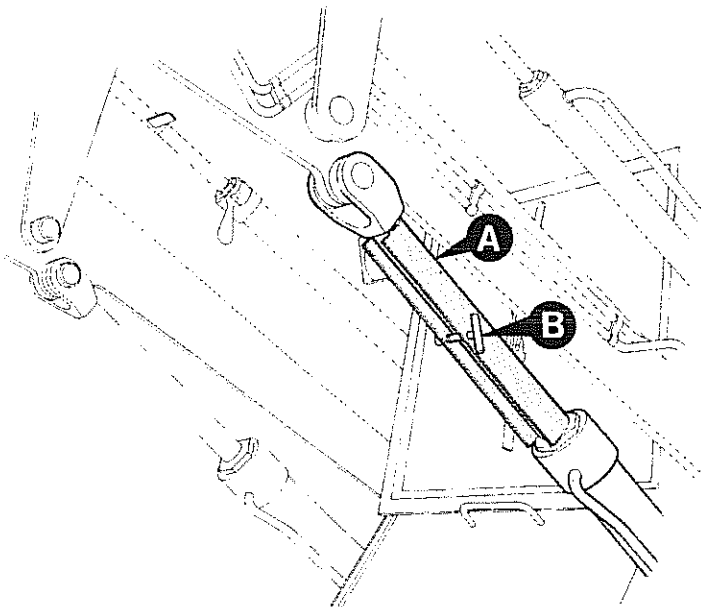
**Installing**

- 1 Empty the shovel and raise the arms so there is enough clearance to fit the strut **A** on the ram piston, apply the parking brake put the transmission in neutral and stop the engine.
- 2 Remove the strut from its stowage position and fit over the ram piston rod as shown. Secure the strut with screw **B**.
- 3 Start the engine and slowly lower the loader arm onto the safety strut. Stop the movement immediately the weight of the loader arms are supported by the safety strut.

**Note:** Lower the loader arms carefully onto the safety strut. 'Feather' the loader arm control lever to lower the arms slowly.

**Removing**

- 1 Make sure the parking brake is on and the transmission in neutral. Raise the loader arms so that there is enough clearance to remove the safety strut **A** from the ram piston. Stop the engine when the loader arms have been raised.
- 2 Release screw **B** and remove the strut from the ram piston. Secure the strut in its stowage position.





**SERVICE SCHEDULES**

\* EVERY 10 OPERATING HOURS OR DAILY  
whichever occurs first

**CLEAN**

- 1 Machine generally
- 2 Engine air filter pre-cleaner

**CHECK (Engine Stopped)**

- 3 Generally for damage
- 4 Engine coolant level and condition
- 5 Engine oil level and condition
- 6 Engine generally for leaks
- 7 Hydraulic fluid level
- 8 Hydraulic system for leaks
- 9 Tyre pressures and condition
- 10 Tightness of wheel nuts
- 11 ROPS/FOPS structure
- 12 Operation of warning lights and audible alarm
- 13 Windscreen washer level
- 14 Seat belt condition and security

**CHECK (Engine Running)**

- 15 Transmission oil level
- 16 Instrument readings, warning lights and audible alarm
- 17 Operation of all electrical equipment
- 18 Service brake operation
- 19 Steering operation
- 20 Operation of all hydraulic services
- 21 Optional Attachments (as needed)
- 22 Exhaust for excessive smoke
- 23 Parking brake operation

\* EVERY 50 OPERATING HOURS OR WEEKLY  
whichever occurs first

Do the Daily jobs plus:

**CHECK (Engine Stopped)**

- 1 Hydraulic oil cooler connections
- 2 Transmission oil cooler connections
- 3 Radiator and hoses condition
- 4 Fan/Air cond. compressor belt tension and condition
- 5 Optional attachments (as needed)

**GREASE**

- 6 Bucket pivot pins

**OIL**

- 7 All linkage points
- 8 All cables
- 9 All hinges

**SERVICE SCHEDULES (continued)****INITIAL 100 HOUR SERVICE (new machines only)**

Do the Daily jobs through to 50 hours plus:

**CLEAN**

- 1 Fuel lift pump gauze
- 2 Cab heater filter
- 3 Fuel sediment trap

**CHECK (Engine Stopped)**

- 4 Pivot pin grease seals
- 5 Valve tip clearances
- 6 Rear axle pivot end float
- 7 Axle oil levels
- 8 Axle mounting bolts for tightness
- 9 Engine mounting bolts for tightness
- 10 Transmission mounting bolts for tightness
- 11 Propshaft security
- 12 Battery electrolyte level and condition
- 13 Battery terminal condition and tightness
- 14 Wiring harnesses for chafing
- 15 Exhaust system security
- 16 Engine air inlet system security

**CHECK (Engine Running)**

- 17 MRV pressure
- 18 ARV pressure
- 19 Priority valve pressure
- 20 Steering MRV
- 21 Servo pressure
- 22 Servo accumulator pressure
- 23 Brake accumulator pressure
- 24 Idling speed
- \*25 Engine max. no load speed (flight speed)
- 26 Engine pulled down speed
- 27 Torque converter stall speed
- 28 Torque converter main line pressure
- 29 Clutch pressure
- 30 Operation of clutch cut-off
- 31 Operation of servo controls
- 32 Operation of Engine and Transmission controls

**CHANGE**

- 33 Engine oil
- 34 Engine oil filter canister
- 35 Fuel filter element
- 36 Hydraulic filter element
- 37 Transmission oil filter canister
- 38 Hydraulic servo supply filter

**GREASE**

- 39 Articulation and steer pivot pins
- 40 Loader pivot pins

**EVERY 100 OPERATING HOURS OR TWO WEEKS  
whichever occurs first**

Do the Daily jobs through to 50 hours plus:

**CLEAN**

- 1 Fuel sediment trap

**GREASE**

- 2 Loader pivot pins
- 3 Steer ram pivot pins
- 4 Lower centre pivot
- 5 Rear axle cradle pivots

**DRAIN**

- 6 Fuel filters
- 7 Fuel sediment trap

**EVERY 250 OPERATING HOURS OR MONTHLY  
whichever occurs first**

Do the Daily jobs through to 100 hours plus:

**CLEAN**

- 1 Cab heater filter (or weekly under very dusty conditions)

**CHECK (Engine Stopped)**

- 2 Front and rear axle oil level
- 3 Front and rear axle hubs oil level
- 4 All pivot pin grease seals
- 5 Hoses and pipework for chafing and damage
- 6 Fuel system for leaks and contamination
- 7 Air cleaner hose security
- 8 Battery electrolyte level and condition
- 9 Wiring harness for chafing
- 10 Condition of ram piston rods

**CHECK (Engine Running)**

- 11 Air conditioning filter/drier sight glass for fluid (with Air conditioning system running)

**CHANGE**

- 12 Engine oil
- 13 Engine oil filter canister
- 14 Fuel filter element

**\* GREASE**

- 15 Intermediate propshaft universal joints

**SERVICE SCHEDULES (continued)****EVERY 500 OPERATING HOURS OR THREE MONTHS  
whichever occurs first**

Do the Daily jobs through to 250 hours plus:

**CLEAN**

- 1 Battery terminals (apply petroleum jelly)
- 2 Fuel lift pump gauze
- 3 Transmission strainer gauze

**CHECK (Engine Stopped)**

- 4 Exhaust system security
- 5 Engine mounting bolts for tightness
- 6 Brake and servo accumulator nitrogen pre-charge pressure

**CHECK (Engine Running)**

- 7 MRV pressure
- 8 ARV pressure
- 9 Steering relief valve pressure
- 10 Servo pressure
- 11 Clutch oil pressure
- 12 Torque converter main line pressure
- 13 Brake accumulator pressure (charging pressure)
- 14 Idling speed
- 15 Engine pulled down speed
- \*16 Engine max. no load speed (flight speed)
- 17 Operation of clutch cut-off

**CHANGE**

- 18 Transmission oil filter canister
- 19 Hydraulic servo supply filter
- 20 Hydraulic filter element

**GREASE**

- 21 Upper centre pivot

**EVERY 1000 OPERATING HOURS OR SIX MONTHS  
whichever occurs first**

Do the Daily jobs through to 500 hours plus:

**CLEAN**

- 1 Air filter dust valve

**CHECK (Engine Stopped)**

- 2 Engine compression

**CHANGE**

- 3 Air filter outer element
- 4 Axle oil
- 5 Transmission oil (clean strainer)

**\*GREASE**

- 6 Front and rear propshaft universal joints

**EVERY 2000 OPERATING HOURS OR YEARLY  
whichever occurs first**

Do the Daily jobs through to 1000 hours plus:

**CLEAN**

- 1 Clean engine injectors (and test)
- 2 Turbocharger impeller and compressor casings
- 3 Hydraulic tank breather filter
- 4 Emergency steer pump strainer (when fitted)

**CHECK (Engine Stopped)**

- 5 Valve tip clearances

**CHANGE**

- 6 Air filter inner element
- 7 Engine coolant (clean system)
- 8 Hydraulic fluid (clean suction strainer)

**GREASING**

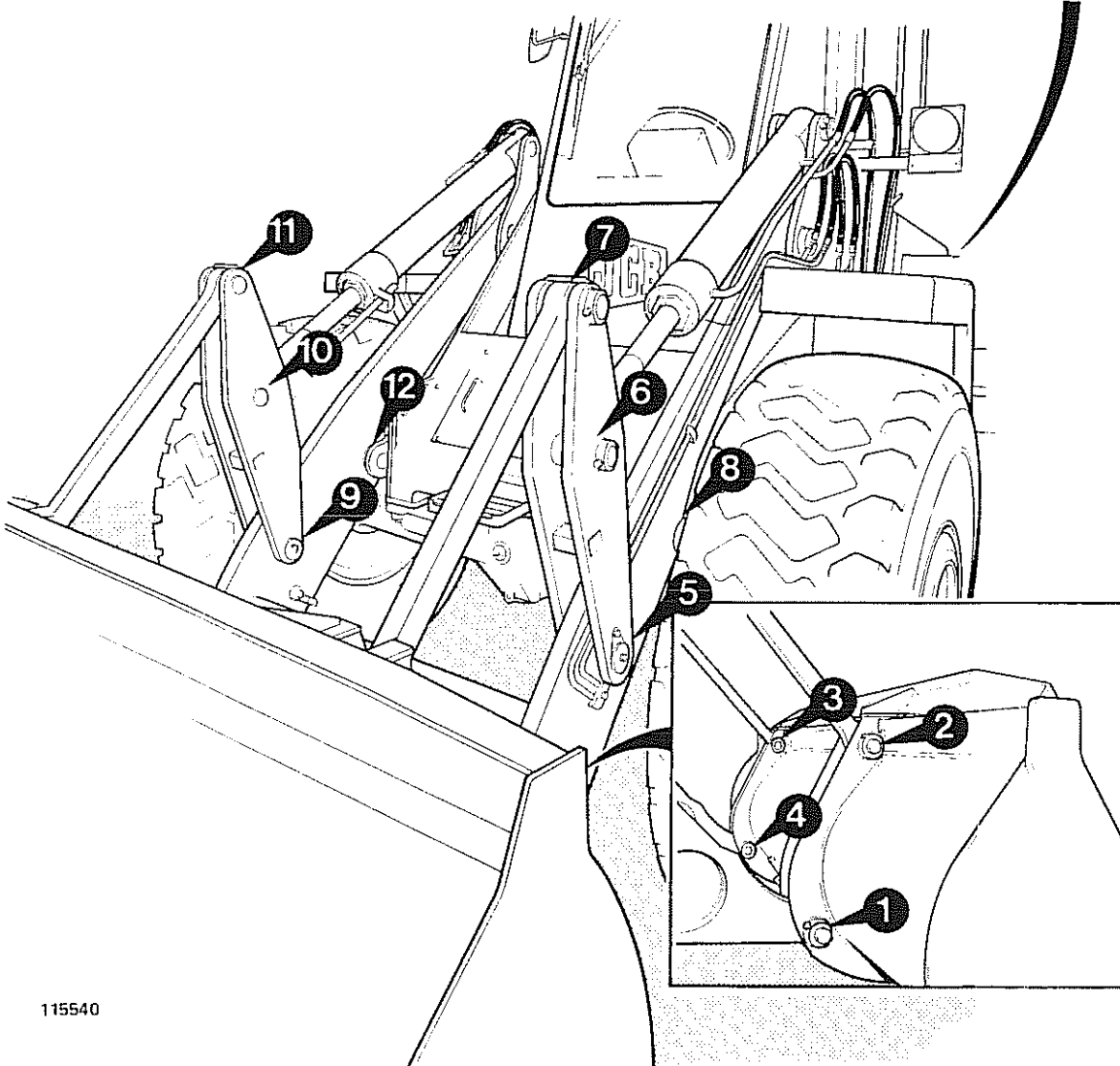
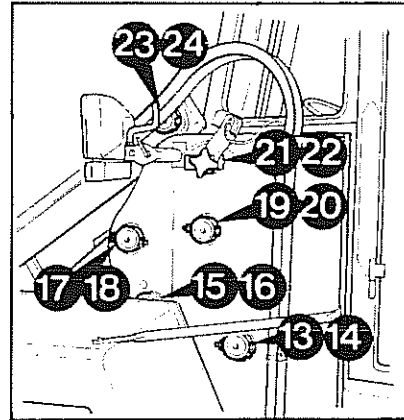
**Loader Arms - for interval see Service Schedule**

For each grease point identified, there is another on the other side of the machine.

12 grease points each side -  
Total 24 grease points.

Normally two strokes of the grease gun should be sufficient.  
Stop greasing when fresh grease appears at the joint.

**CAUTION:** If the loader arms need to be raised for greasing,  
then fit the loader arm safety strut.



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**GREASING**

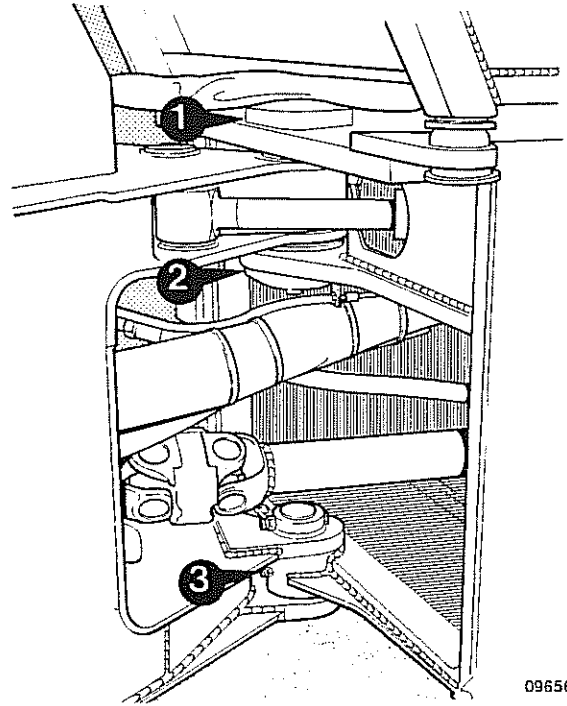
Centre Pivot (upper and lower) - for interval see Service Schedule

Total of 3 grease points

**WARNING**

Make sure the articulation lock is fitted before greasing the centre pivot.

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Steer Ram Pins - for interval see Service Schedule

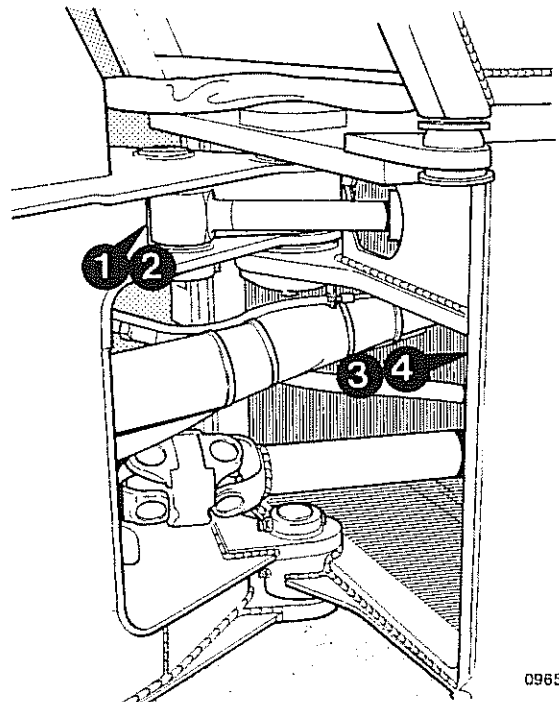
For each grease point identified, there is another on the other side of the machine.

2 grease points each side -  
Total 4 grease points.

**WARNING**

Make sure the articulation lock is fitted before greasing the steer ram pins.

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Propshafts - *For interval see Service Schedule*

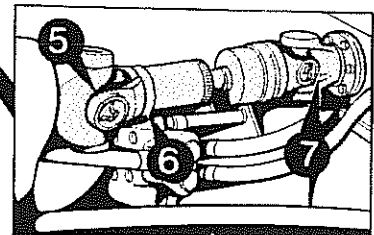
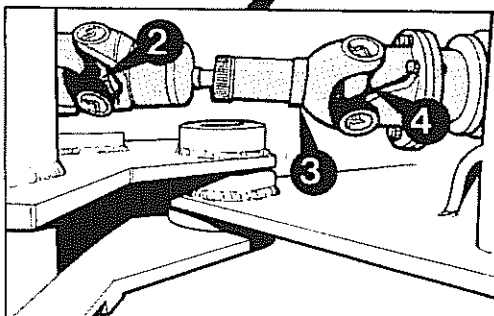
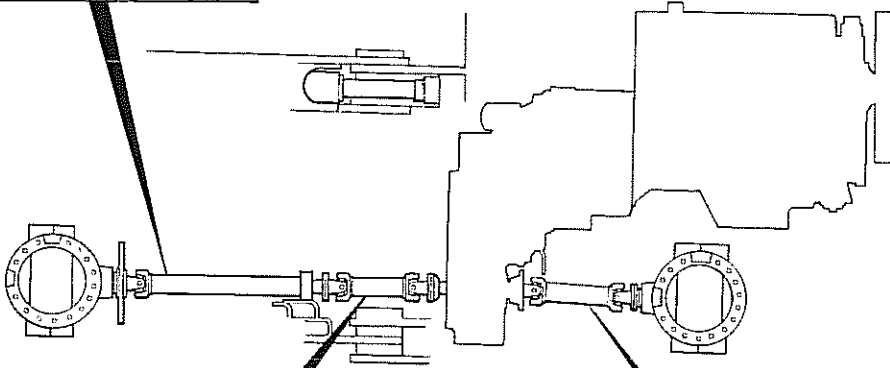
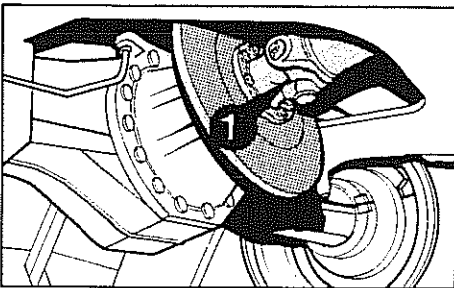
Total 7 grease points

**WARNING**

Make the machine safe before working underneath it. Park the machine on level ground, lower the arms. Apply the parking brake, put the transmission in neutral and stop the engine. Chock both sides of all four wheels.

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

GEN 1 - 2



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