Service Manual

700 Series

Printed in England

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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).

Contents

*** This Service Manual covers the following machines:-**

712 from machine no. 612001
712 from machine no. 612250 (HR build)
716 from machine no. 614001

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.

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⚠ 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

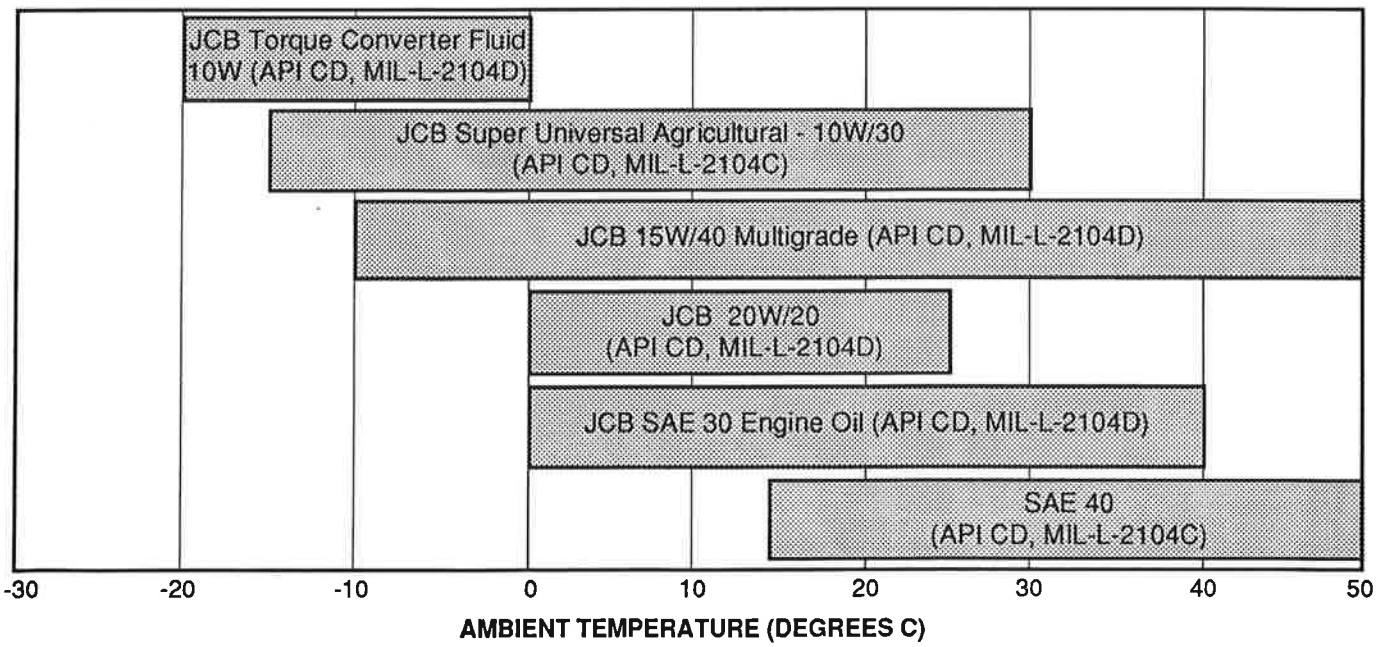
LUBRICANTS AND CAPACITIES

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 of operation and the engine filled with the recommended grade shown in the engine lubrication chart. JCB 10W/30 should be used also for the first 100 hours operation whenever a new or reconditioned engine is installed in a machine. Alternatively, when a new or reconditioned engine requires protection against corrosion during prolonged storage, Mobilarma 524 may be used during the storage period, and during the first 100 hours. 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 Chart below		14.8	3.2	3.8
TRANSMISSION	JCB Torque Converter Fluid (SAE 10W)		18.0	4.0	4.8
* JCB DRIVE AXLES	JCB Special Gear Oil		28.0	6.25	7.5
* ZF DRIVE AXLES					
Differential	JCB LS Gear Oil		13.5	2.90	3.6
Hubs (each)	JCB LS Gear Oil		3.5	0.77	0.9
HYDRAULIC TANK			82.0	18.0	21.7
Below 38 deg. C	JCB Special Hydraulic Fluid	**Note:** The capacity quoted does not include the system.			
Above 38 deg. C	JCB High Performance Hydraulic Fluid	This will vary with the attachments fitted.			
BRAKE SYSTEM	(see Hydraulic Tank)				
GREASE POINTS	JCB Special MPL Grease (see Note)				
COOLING SYSTEM	See Page 5/5-1 for Anti-freeze recommendations		28.0	6.25	7.5
FUEL TANK			227.0	50.0	60.0
ELECTRICAL CONNECTIONS:	As a corrosion and moisture inhibitor all exposed connections should be coated liberally with petroleum jelly.				

Note: JCB Special MPL Grease is a lithium based No.2 consistency grease.

ENGINE LUBRICATION CHART



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

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

SERVICE SCHEDULES

EVERY 10 HOURS OR DAILY whichever occurs first

Clean

1 Machine generally
* 2 Air fliter pre-cleaner

Grease

* 1 Steer rams
* 2 Tip-up rams and body pivots

Check and adjust as necessary (Engine stopped)

1 Generally for damage
2 Engine coolant level and condition
3 Fuel system for leaks and contamination
4 Hydraulic fluid level
5 Hydraulic system for leaks
6 Transmission oil level
7 Engine oil level and condition
8 Engine generally for leaks
9 Tyre pressures and condition
10 Tightness of wheel nuts
11 Windscreen washer level
12 Seat belt condition and security
13 ROPS/FOPS structure

Check and adjust as necessary (Engine running)

1 Instrument readings, warning lights and buzzer
2 Operation of all electrical equipment
3 Exhaust for excessive smoke
4 Footbrake operation
5 Transmission operation
6 Steering operation
7 Operation of body tip service
8 Parking brake operation

EVERY 50 HOURS OR WEEKLY whichever occurs first

Do the daily jobs plus:-

Drain

1 Fuel filter
2 Fuel sediment trap

Grease

1 Propshafts - universal and sliding joints
* 2 Steer pivots

***Oil**

1 All linkage points

Check and adjust as necessary (Engine stopped)

1 Front and rear axle oil levels
2 Oil cooler connections
3 Radiator hoses and condition
4 Fan belt tension
* 5 Condition of ram piston rods
* 6 Hoses and pipework for chafing and damage
* 7 Air cleaner hose security
* 8 Wiring for chafing

SERVICE SCHEDULES (cont'd)

INITIAL 100 HOUR SERVICE (new machines only)

Clean

1 Fuel lift pump gauze
2 Air filter precleaner

Drain

1 Fuel sediment trap

Check and adjust as necessary (Engine stopped)

1 Coolant level/Antifreeze strength
2 Exhaust system security
3 Air inlet system security
4 All mounting bolts for tightness
5 Battery electrolyte level and condition
6 Battery terminals condition/tightness
7 Wiring for chafing
8 Fan belt tension/condition
9 Axle oil levels
10 Axle breather operation
11 Propshaft security
12 Wheel nut security
13 Tyre pressures
14 Oscillating ring bolt tightness
15 Hydraulic fluid level
16 Hoses and pipes for leaks/damage
17 Rams for damage/leaks
18 Doors and hinges
19 Cab glazing
20 Locks
21 Seat and seat belt
22 Windscreen washer bottle
23 General condition of machine

Check and adjust as necessary (Engine running)

1 M.R.V. pressure
2 Body lift operation
3 Steering relief valve pressure
4 Brake accumulator pressure
5 Operation of foot/parking brakes
6 Operation of brake warning lights
7 Idling speed
8 Maximum governed speed
9 Pulled down speed
10 Exhaust smoke
11 Clutch oil pressures
12 Fuel system for leaks
13 Cooling system for leaks
14 Operation of throttle and stop controls
15 Transmission oil level
16 Operation of neutral start
17 Forward/reverse/ratio selection
18 Operation of reverse alarm
19 Oil cooler for leaks/operation
20 Operation of all lights and instruments
21 Operation of alternator and starter
22 Operation of all electrical equipment
23 Operation of air conditioning (if fitted)

Change

1 Engine oil and filter
2 Fuel filter element
3 Hydraulic oil filter element
4 Transmission oil filter
* 5 Brake system filter element (from machine no. 612250)

Grease

1 Steer rams
2 Tip-up rams and body pivots
3 Steer pivots
4 Oscillating ring

SERVICE SCHEDULES (cont'd)

EVERY 250 HOURS OR MONTHLY whichever occurs first

Do the Daily to 50 hour jobs plus:-

Change

1 Engine oil
2 Engine oil filter

Check and adjust as necessary (Engine stopped)

1 Fuel system for leaks/contamination
2 Battery electrolyte level

Grease

1 Oscillating ring

Clean

1 Air cleaner dust valve
2 Battery terminals

EVERY 500 HOURS OR 6 MONTHS whichever occurs first

Do the Daily to 250 hour jobs plus:-

Clean

1 Fuel lift pump gauze

Change

1 Fuel filter element
2 Hydraulic fluid filter element
3 Transmission oil filter
4 Brake system filter element (from machine no. 612250)

Check and adjust as necessary (Engine stopped)

1 Exhaust system security
2 All mounting bolts for tightness
* 3 Thickness of brake pads (716 only)

Check and adjust as necessary (Engine running)

1 Idling speed
2 Pulled down speed
3 M.R.V. pressure
4 Steering relief valve pressure
5 Brake accumulator pressure
6 Transmission clutch oil pressure
7 Torque converter main line pressure

EVERY 1000 HOURS OR YEARLY whichever occurs first

Do the Daily to 500 hour jobs plus:-

Change

1 Air cleaner outer element
2 Transmission oil (clean strainer)
3 Axles - oil

Check and adjust as necessary (Engine stopped)

1 Engine compression

EVERY 2000 HOURS OR 2 YEARS whichever occurs first

Do the Daily to 1000 hour jobs plus:-

Clean

1 Engine injectors (and test)

Change

1 Air cleaner inner element
2 Hydraulic fluid (clean suction strainer)
3 Engine coolant

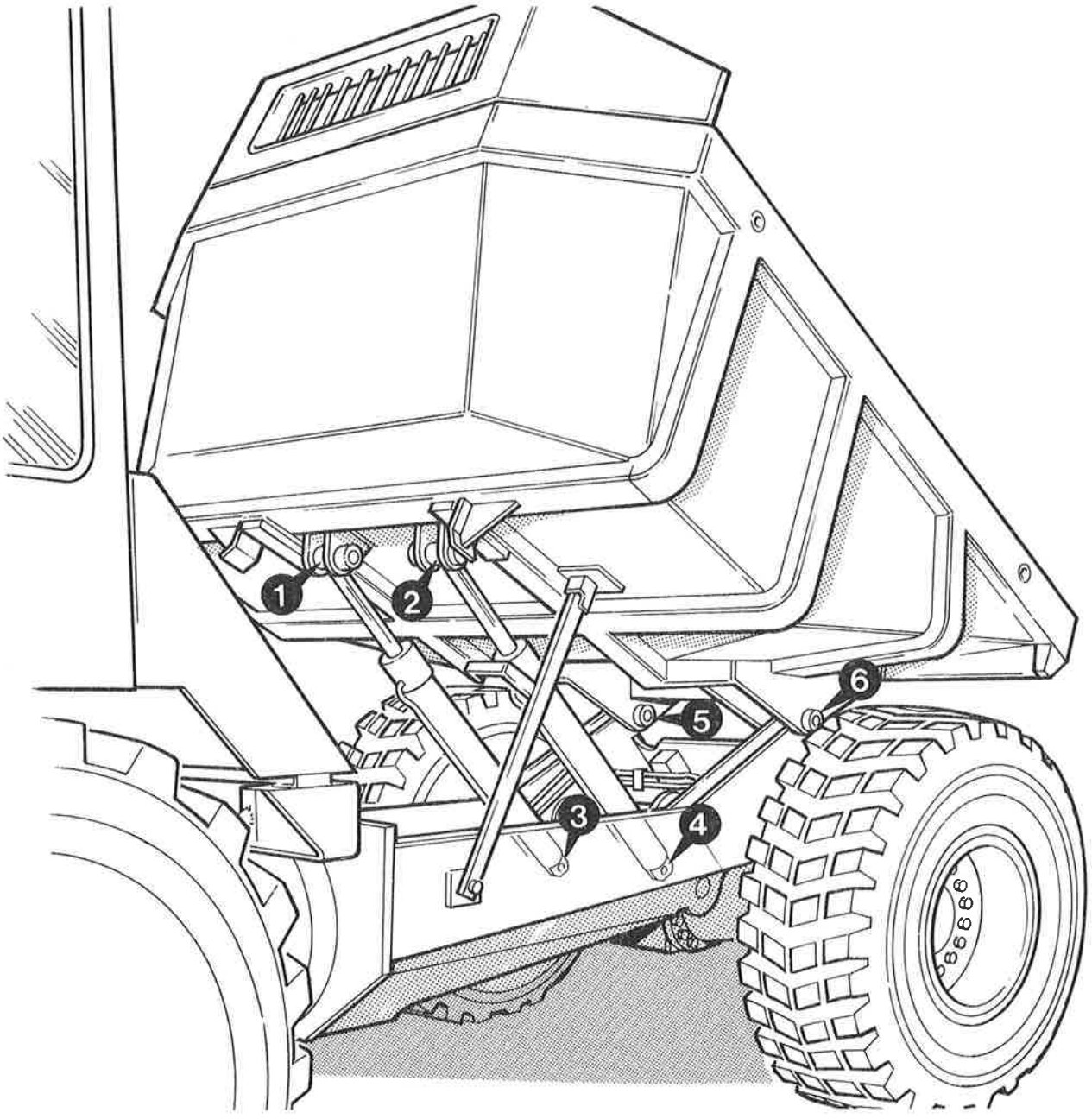
Check and adjust as necessary (Engine stopped)

1 Valve clearances
2 Operation of alternator and starter

GREASING

Body and Lift Rams - Grease Daily

2 pivots, each with 1 grease point.
2 rams, each with 2 grease points.
- Total : 6 Grease Points



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GREASING

Steering Rams - Grease Daily

2 rams, each with 2 grease points.

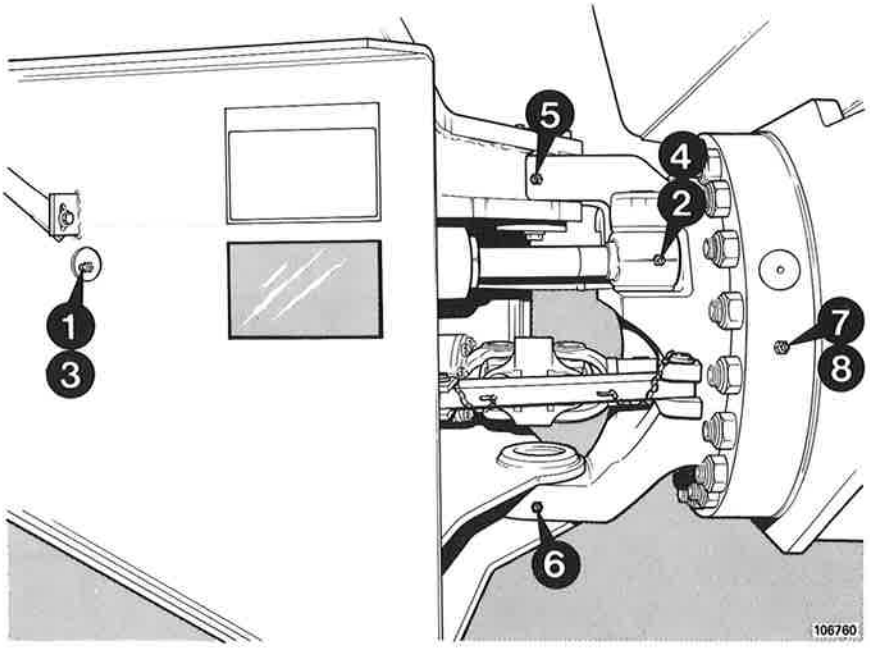
Centre Pivot - Grease Every 50 Hours

2 pivots, each with 1 grease point.

Oscillating Ring - Grease Every 250 Hours

1 grease point each side.

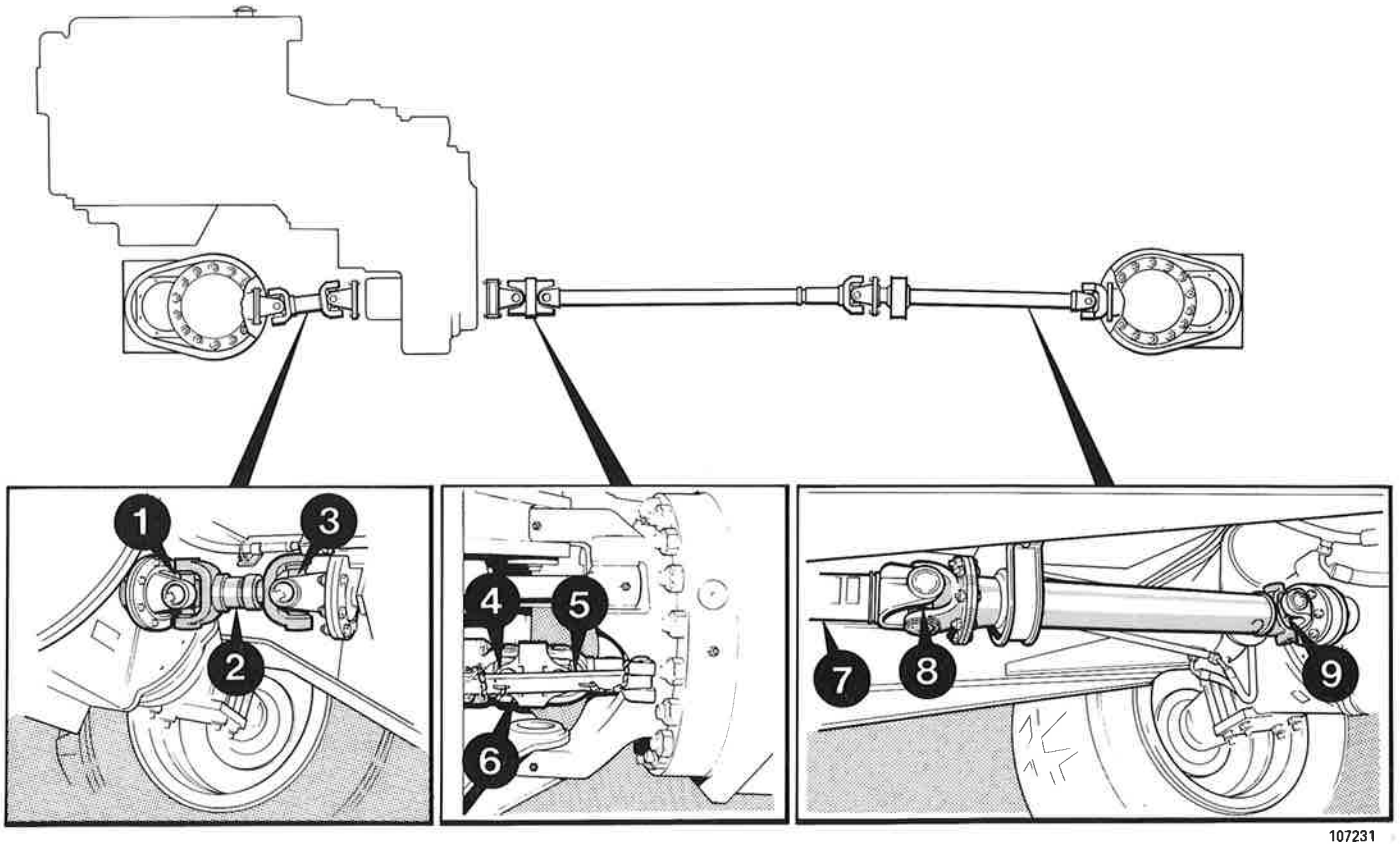
- Total : 8 Grease Points.



Propshafts - Grease Every 50 Hours

Front propshaft, 3 grease points.
* Rear propshaft, 6 grease points.
- Total : 9 Grease Points.

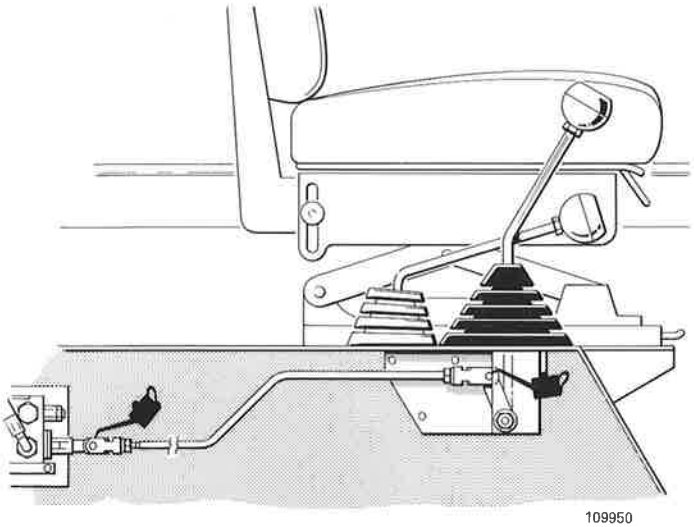
* **Note:** It will be necessary to fully articulate the machine to gain access to grease nipple 6.



OILING

Every 50 Hours apply oil to the following points;

Body Control Lever Linkage.



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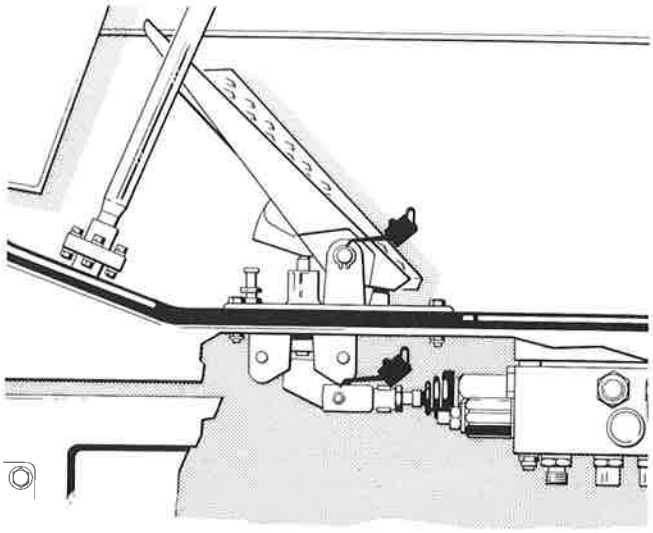
Footbrake Pedal Linkage.



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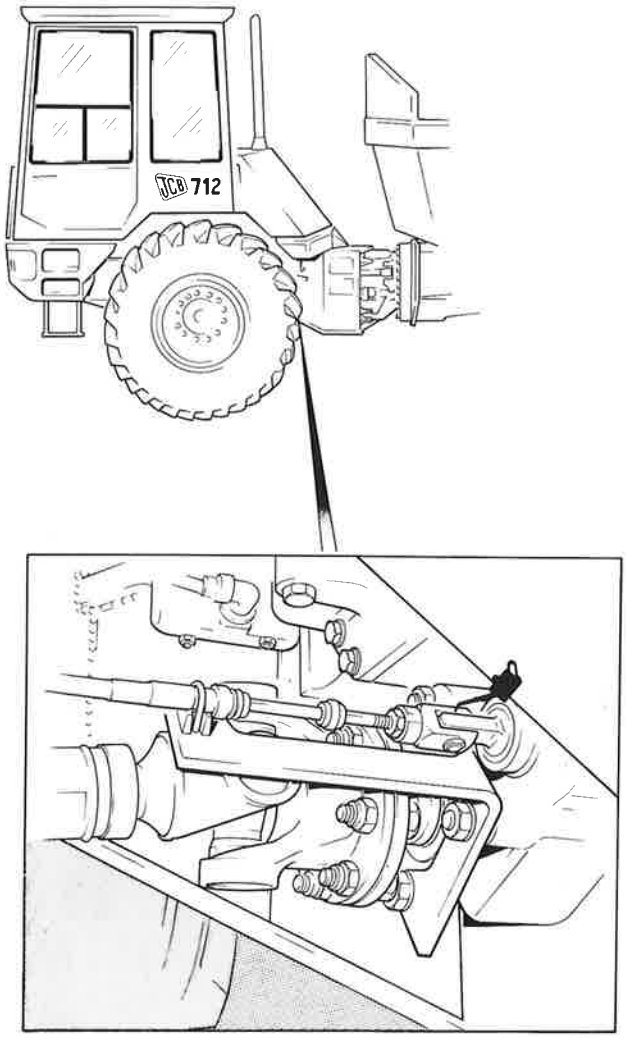
* 4 Wheel Drive Control Cable Clevis (712 machines only).



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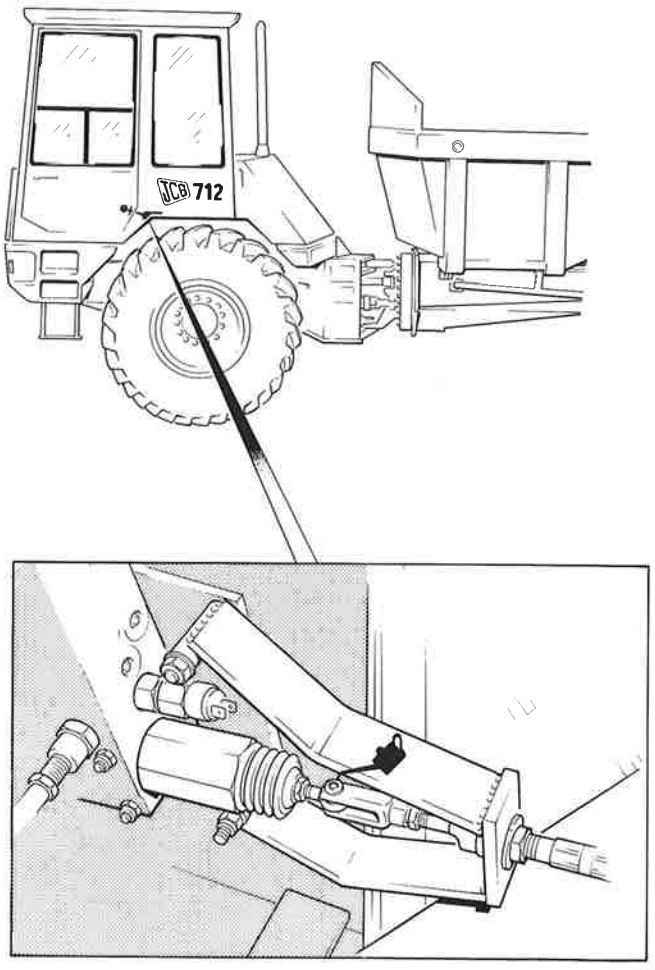
Parking Brake Cable Clevis (early machines only).



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FITTING THE ARTICULATION SAFETY LOCK

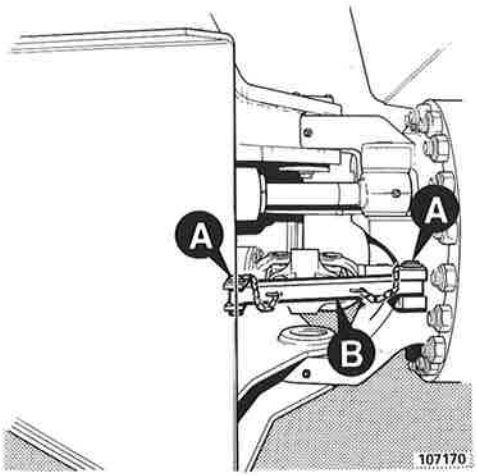
WARNING : The articulation safety lock must be fitted before any maintenance is done on the machine or if the machine is to be transported. Make sure the engine is switched off before fitting the articulation lock or you might get crushed between the two parts of the chassis.

Fit the articulation lock as follows:

1 Align the machine straight ahead and stop the engine.

2 Remove pins **A** and move the lock from the stowed position into the lock position as shown at **B**.

3 Fit pins **A** to lock the machine rigid.



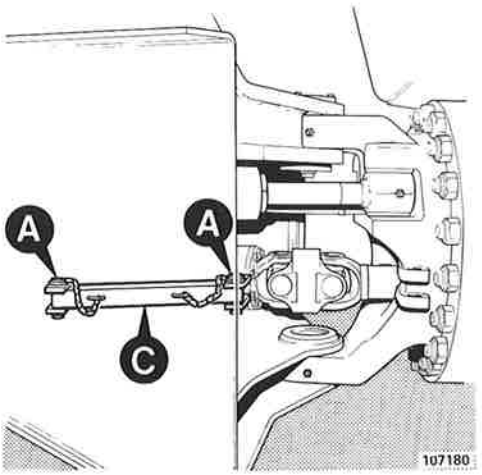
Note: If the machine is slightly out of alignment it will not be possible to fit both pins. Under these circumstances continue as follows:

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 pin to drop into position.

6 Switch the engine off and check that the pin has located properly.

To stow the articulation lock remove pins **A** and return the lock to the stowed position as shown at **C**. Use the pins to secure the lock.



FITTING THE BODY SAFETY STRUT

⚠ WARNING

The body safety strut is used to make sure the body cannot come down and must be fitted before any work is carried out on the rear chassis. Fitting the strut is a two man operation. Do not attempt to fit the strut by yourself.
GEN 5-1

Make sure the body is completely empty then fit the strut as follows:

1 Operate the body control lever to raise the body until the strut is clear to swing up into position.

2 Lift the safety strut and hold it in position, keeping hands well clear of the top.

3 Slowly lower the body until the strut is located in the pocket as shown at **A**.

⚠ WARNING

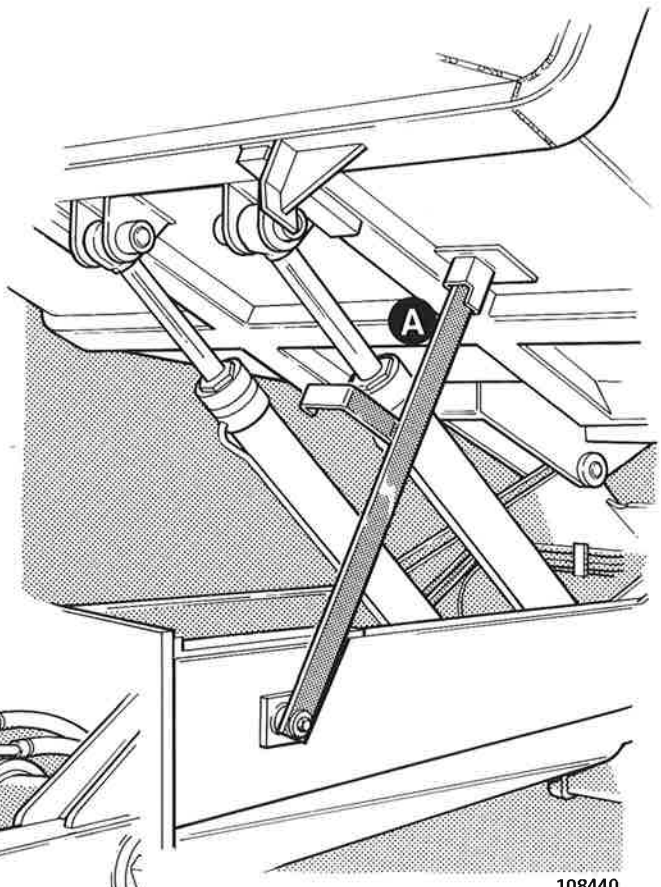
Do not power the body down onto the strut. This will break the strut and could kill or injure someone.
GEN 5-2

* 4 Switch the engine off. Make sure that the person who fitted the strut is well clear then, on 712 machines prior to serial no. 612250, push the control lever down into the *Float* position. On 712 machines from serial no. 612250 onwards and 716 machines, return the control lever to the neutral position.

To stow the safety strut reverse the fitting procedure, lowering the strut to the stowed position as shown at **B**. Make sure that the person who has stowed the strut is well clear before lowering the body. When the body reaches the fully down position, do the following:

* On 712 machines prior to serial no. 612250, push the control lever down to the *Float* position.

* On 712 machines from serial no. 612250 onwards and 716 machines, return the control lever to the neutral position.



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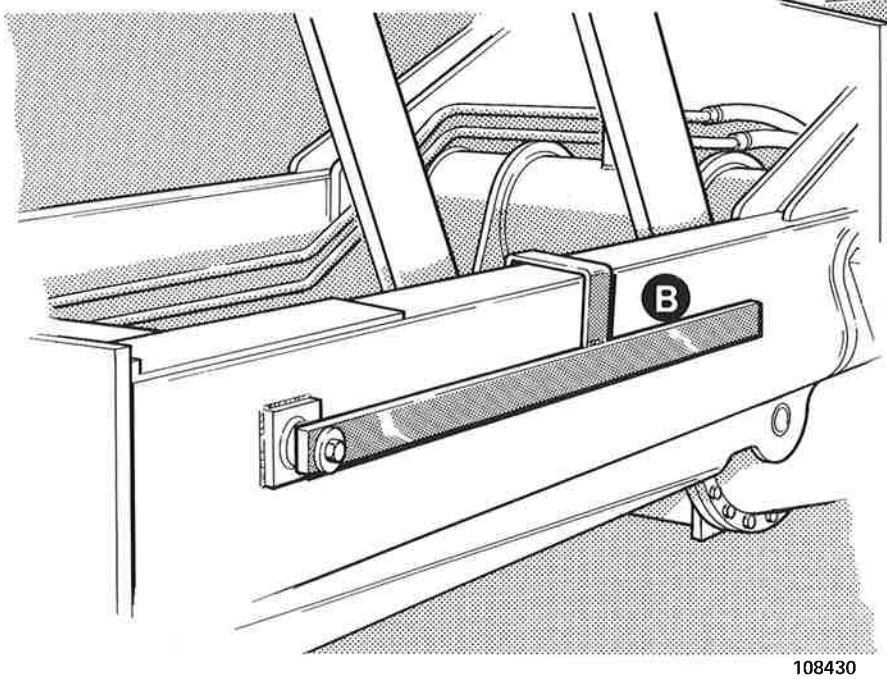

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