

# Service Manual

JCB SERVICE © ROCESTER, STAFFORDSHIRE, ST14 5LS, ENGLAND. TEL. ROCESTER (01889) 590312

Publication No. 9803/4200 Issue 11

Published by the Technical Publications Dept. of JCB Service, Rocester, Staffordshire, England.

This Service Manual covers the following machines:

406

407

408

409

\* 409 Telemaster

407 and 409 Machines commence from Serial Number 632700.

Unless otherwise stated, information for 406 also applies to 407 and information for 408 also applies to 409 and the 409 Telemaster.

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

#### 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 - 3.

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

# **A** WARNING

#### Fluoroelastomeric Materials

Certain seals and gaskets (e.g. crankshaft oil seal) on JCB machines contain fluoroelastomeric materials such as Viton, Fluorel and Technoflon. Fluoroelastomeric materials subjected to high temperatures can produce highly corrosive hydrofluoric acid. THIS ACID CAN SEVERELY BURN.

New fluoroelastomeric components at ambient temperature require no special safety precautions.

Used fluoroelastomeric components whose temperatures have not exceeded 300°C require no special safety precautions. If evidence of decomposition (e.g. charring) is found, refer to the next paragraph for safety instructions DO NOT TOUCH COMPONENT OR SURROUNDING AREA.

Used fluoroelastomeric components subjected to temperatures greater than 300°C (e.g. engine fire) must be treated using the following safety procedure. Make sure that heavy duty gloves and special safety glasses are worn:

- 1 Ensure that components have cooled then remove and place material into plastic bags.
- 2 Thoroughly wash contaminated area with 10% calcium hydroxide or other suitable alkali solution, if necessary use wire wool to remove burnt remains.
- 3 Thoroughly wash contaminated area with detergent and water.
- 4 Contain all removed material, gloves etc. used in this operation in sealed plastic bags and dispose of in accordance with Local Authority Regulations.

DO NOT BURN FLUOROELASTOMERIC MATERIALS.

If contamination of skin or eyes occurs, wash the affected area with a continuous supply of clean water or with calcium hydroxide solution for 15-60 minutes. Get medical attention immediately.

INT-3-3-5/1



#### **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.
- 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

Contents	Page No.
Fluids, Lubricants, Capacities & Specifications	
- 406/408	1 - 1
- 407/409	1 - 2
* - 409 Telemaster	1 - 3
* - Torque Settings	1 - 10
Service Schedules	2 - 1
Greasing	
- Shovel Pivot Pins	3 - 1
- Loader End	3 - 2
- Central Pivot and Steering Ram	3 - 3
- Intermediate Propshaft	3 - 3
- Propshafts (except Intermediate)	3 - 4
Greasing (409 Telemaster)	
- Boom Wear Pad Runways	4 - 1
- Boom Pivot Pins	4 - 2

1-1 1-1

**Note:** New engines DO NOT require a running-in period. The engine/machine should be used in a normal work cycle immediately; glazing of the piston cylinder bores, resulting in excessive oil consumption, could occur if the engine is gently runin. Under no circumstances should the engine be allowed to idle for extended periods; (e.g. warming up without load). 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 appropriate recommended grade as shown in the 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. After the first 100 hours operation, it is essential that the 10W/30 oil is replaced by the lubricant recommended below.

ITEM	CAPACITY	FLUID/LUBRICANT	SPECIFICATION
Engine Oil -18 to 0° C -10 to 50° C	<b>406</b> 7.2 litres (1.6 UK gal) <b>408</b> 10.7 litres (2.4 UK gal)	JCB Torque Converter Fluid JCB 15W/40 Multigrade	API CD MIL-L-2104C
Gearbox	Syncro Shuttle †19 litres (4.2 UK gal) Powershift †19 litres (4.2 UK gal)	JCB Special Transmission Fluid JCB Special Transmission Fluid	Ford ESN-M2C 33G Ford ESN-M2C 33G
Transfer box	1.3 litres (0.3 UK gal)	JCB HD 90 Gear Oil	API-GL-5, MIL-L-2105C
Axles - Hurth (406) Differential Housing Hubs (Individual)	5.0 litres (1.1 UK gal) 0.2 litres (0.04 UK gal)	JCB Special Gear Oil JCB Special Gear Oil	Ford ESE-M2C 86B Ford ESE-M2C 86B
Axles - JCB	<b>406</b> 5.0 litres (1.1 UK gal) <b>408</b> 16 litres (3.6 UK gal)	JCB Special Gear Oil JCB Special Gear Oil	Ford ESE-M2C 86B Ford ESE-M2C 86B
Hydraulic System Up to 38° C Above 38°C	<b>406</b> 59 litres (13.2 UK gal) <b>408</b> 63 litres (14.1 UK gal)	JCB Special Hydraulic Fluid JCB High Performance Hydraulic Fluid	ISO 32 ISO 46
Brake System	1.2 litres (0.27 UK gal)	JCB Light Hydraulic Fluid	ISO 15
		CAUTION: DO NOT USE ORDINARY BE	RAKE FLUID
Cooling System	<b>406</b> 12.5 litres (2.8 UK gal) <b>408</b> 15.5 litres (3.5 UK gal)	Water/Anti-freeze (see Coolant mixture)	ASTM D3306-74
Fuel System	<b>406</b> 65 litres (14.5 UK gal) <b>408</b> 90 litres (20.2 UK gal)	Diesel Oil (see Types of Fuel)	ASTM D975-66T Nos. 1D, 2D.
Grease Points		JCB Special MPL Grease	Lithium based, No. 2 consistency

**Note:** The total hydraulic system capacity depends on the equipment being used. Fill the system with all rams closed and watch the level indicator.

† The figure quoted is TOTAL system capacity. Use the 'MAX' and 'MIN' marks on the dipstick when refilling the system.

1 - 2

## FLUIDS, CAPACITIES AND LUBRICANTS

**Note:** New engines DO NOT require a running-in period. The engine/machine should be used in a normal work cycle immediately; glazing of the piston cylinder bores, resulting in excessive oil consumption, could occur if the engine is gently runin. Under no circumstances should the engine be allowed to idle for extended periods; (e.g. warming up without load). 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 appropriate recommended grade as shown in the 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. After the first 100 hours operation, it is essential that the 10W/30 oil is replaced by the lubricant recommended below.

ITEM	CAPACITY	FLUID/LUBRICANT	SPECIFICATION
Engine Oil -18 to 0° C -10 to 50° C	10.7 litres (2.4 UK gal)	JCB Torque Converter Fluid JCB 15W/40 Multigrade	API CD MIL-L-2104C
Gearbox	Syncro Shuttle †19 litres (4.2 UK gal) Powershift	JCB Special Transmission Fluid	Ford ESN-M2C 33G
	†13 litres (2.9 UK gal)	JCB Special Transmission Fluid	Ford ESN-M2C 33G
Transfer box	1.3 litres (0.3 UK gal)	JCB HD 90 Gear Oil	API-GL-5, MIL-L-2105C
Axles	<b>407</b> 5.0 litres (1.1 UK gal) <b>409</b>	JCB Special Gear Oil	Ford ESE-M2C 86B
	16 litres (3.6 UK gal)	JCB Special Gear Oil	Ford ESE-M2C 86B
Hydraulic System Up to 38° C Above 38°C	63 litres (14.1 UK gal)	JCB Special Hydraulic Fluid JCB High Performance Hydraulic Fluid	ISO 32 ISO 46
Brake System	1.2 litres (0.27 UK gal)	JCB Light Hydraulic Fluid	ISO 15
		CAUTION: DO NOT USE ORDINARY BE	RAKE FLUID
Cooling System	15.5 litres (3.5 UK gal)	Water/Anti-freeze (see Coolant mixture)	ASTM D3306-74
Fuel System	90 litres (20.2 UK gal)	Diesel Oil (see Types of Fuel)	ASTM D975-66T Nos. 1D, 2D.
Grease Points		JCB Special MPL Grease	Lithium based, No. 2 consistency

**Note:** The total hydraulic system capacity depends on the equipment being used. Fill the system with all rams closed and watch the level indicator.

<sup>†</sup> The figure quoted is TOTAL system capacity. Use the 'MAX' and 'MIN' marks on the dipstick when refilling the system.

1 - 3

## FLUIDS, CAPACITIES AND LUBRICANTS

**Note:** New engines DO NOT require a running-in period. The engine/machine should be used in a normal work cycle immediately; glazing of the piston cylinder bores, resulting in excessive oil consumption, could occur if the engine is gently runin. Under no circumstances should the engine be allowed to idle for extended periods; (e.g. warming up without load). 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 appropriate recommended grade as shown in the 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. After the first 100 hours operation, it is essential that the 10W/30 oil is replaced by the lubricant recommended below.

ITEM	CAPACITY	FLUID/LUBRICANT	SPECIFICATION
Engine Oil -18 to 0° C -10 to 50° C	10.7 litres (2.4 UK gal)	JCB Torque Converter Fluid JCB 15W/40 Multigrade	API CD MIL-L-2104C
Gearbox	Syncro Shuttle †19 litres (4.2 UK gal) Powershift 13 litres (2.9 UK gal)	JCB Special Transmission Fluid JCB Special Transmission Fluid	Ford ESN-M2C 33G Ford ESN-M2C 33G
Transfer box	1.3 litres (0.3 UK gal)	JCB HD 90 Gear Oil	API-GL-5, MIL-L-2105C
Axles	16 litres (3.6 UK gal)	JCB Special Gear Oil	Ford ESE-M2C 86B
Hydraulic System Up to 38° C Above 38°C	63 litres (14.1 UK gal)	JCB Special Hydraulic Fluid JCB High Performance Hydraulic Fluid	ISO 32 ISO 46
Cooling System	15.5 litres (3.5 UK gal)	Water/Anti-freeze (see Coolant mixture)	ASTM D3306-74
Fuel System	90 litres (20.2 UK gal)	Diesel Oil (see Types of Fuel)	ASTM D975-66T Nos. 1D, 2D.
Grease Points		JCB Special MPL Grease	Lithium based, No. 2 consistency
Wear Pad Runways		JCB Waxoyl	

**Note:** The total hydraulic system capacity depends on the equipment being used. Fill the system with all rams closed and watch the level indicator.

<sup>†</sup> The figure quoted is TOTAL system capacity. Use the 'MAX' and 'MIN' marks on the dipstick when refilling the system.

1 - 10 1 - 10

## **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 fl
1/4	(6.3)	7/16	14 1.4 10
<sup>5</sup> /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
<sup>9</sup> /16	(14.3)	1/16	170 17.3 125
5/8	(15.9)	15/16	238 24.3 175
3/4	(19.0)	11/8	407 41.5 300
7/8	(22.2)	<b>1</b> 5/16	650 66.3 480
1	(25.4)	1 <sup>1</sup> /2	970 99.0 715
<b>1</b> <sup>1</sup> /4	(31.7)	1 <sup>7</sup> /8	1940 198.0 1430
1 <sup>1</sup> /2	(38.1)	21/4	3390 345.0 2500

#### **Metric Grade 8.8 Bolts**

Bolt Size		Hexagon (A/F)		Torque Set	tings
	(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

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

2 - 1 2 - 1

A badly maintained machine is a danger to the operator and the people working around him. Make sure that the regular maintenance and lubrication jobs listed in the schedules are done to keep the machine in a safe and efficient working condition. A badly maintained machine is a danger to the operator and the people working around him. Make sure that the regular maintenance and lubrication jobs listed in the schedules are done to keep the machine in a safe and efficient working condition.

The schedules are based on machine running hours. Keep a regular check on the hourmeter readings. Do not use a machine which is due for a service. Make sure any defects found during the regular maintenance checks are rectified immediately.

Pre-start Cold Checks Service Points and Fluid Levels	Operation	10 Hr	50 Hr	First 100 Hr	500 Hr	1000 Hr	2000 Hr
ENGINE							
Generally for Leaks	- Check						
Oil level	- Check						
Oil and Filter	† - Change	_					
Fuel Filter	- Drain			-	_	-	_
Fuel Filter	† - Change		_				
Coolant Level and Antifreeze Strength	- Check						
Air Cleaner Dust Valve	- Clean	_		_	_		
Air Cleaner Outer Element	- Change						
Air Cleaner Inner Element	- Change					_	
Coolant	- Change						
Fuel Lift Pump	- Clean						
Fuel Sedimenter	- Drain				_	_	_
Fan Belt Tension/Condition	- Check						
Valve Clearances	- Check and Adjust		_	_	_		
Engine Mount Security	- Check						
Fuel System for Leaks and Contamination	- Check						
Tuel dystem for Leaks and Contamination	- Officer	•			_		_
TRANSMISSION AND AXLES							
Hub Oil Levels	- Check						
Hub Oil	†† - Change						
Oil Filter	- Change						
Drive Axle(s) Oil Level	- Check						
Drive Axle(s) Oil	†† - Change						
Transmission Oil Level	- Check						
Transmission Oil	- Change						
Transmission Strainer	- Clean						
Transfer Gearbox Oil Level	- Check						
Transfer Gearbox Oil	- Change						
Axle Breather(s)	- Clean						
Drive shaft/Prop. Shaft Security	- Check						
Drive Shaft/Prop. Shaft	- Lubricate						
Axle Mount Security	- Check						
Transmission Mount Security	- Check						
HYDRAULICS							
Oil Filter	- Change						
Oil	- Sample/Change			-	_	-	
Suction Strainer	- Clean						
Oil Level	- Check						_
Hoses - Damage or Leaks	- Check	_					
Rams - Condition	- Check		_				
Pipework - Damage or Leaks	- Check						
. Iponom Damago of Louid	OHOOK		_	_	_	_	_

Pre-start Cold Checks Service Points and Fluid Levels	Operation	10 Hr	50 Hr	First 100 Hr	500 Hr	1000 Hr	2000 Hr
BRAKES							
Parking Brake	- Check and Adjust						
Brake System Fluid Level	- Check						_
Brake System Fluid	- Change				_	_	
ELECTRICS							
Battery Electrolyte Level	- Check						
Wiring for Chaffing	- Check						
Battery Terminals for Condition and Tightness	- Check						
BODY AND FRAMEWORK							
All Articulation and Steer Pivots	- Grease						
All Loader Pivots	- Grease						
All Pivot Pins Windscreen Washer Fluid Level	- Check and Grease - Check						
ROPS/FOPS Structures	- Check	_			ם כ		
Boom Wear Pads	* - Check and Inspect				] []	_	
	·						
ATTACHMENTS Optional Equipment (as required)	- Check						
Optional Equipment (as required)	Official				•	_	_
Functional Test and Final Inspection	Operation	10 Hr	50 Hr	First 100 Hr	500 Hr	1000 Hr	2000 Hr
ENGINE							
Idle Speed	- Check and Adjust						
Maximum Governed speed	- Check and Adjust						
Torque Converter Stall Speed	- Check						
Exhaust Smoke	- Check						
Exhaust System Security	- Check						
Air Inlet System Security	- Check						
Coolant System for Leaks	- Check						
Throttle System and Control Cable	- Check						
Operation of Stop Control/E.S.O.S.	- Check						
TRANSMISSION AND AXLES							
Torque Converter Mainline Pressure	- Check						
Clutch Pack Pressures	Chaald						
Ciulcii i ack i lessules	- Check		1				
	- Check						
Tyre pressure and condition Wheel Nut Torque							
Tyre pressure and condition Wheel Nut Torque	- Check						
Tyre pressure and condition Wheel Nut Torque Steering Operation	- Check - Check						
Tyre pressure and condition Wheel Nut Torque Steering Operation Neutral Start Operation	- Check - Check - Check						
Tyre pressure and condition Wheel Nut Torque Steering Operation Neutral Start Operation Forward/Reverse Selection/Operation	- Check - Check - Check - Check						
Tyre pressure and condition Wheel Nut Torque Steering Operation Neutral Start Operation Forward/Reverse Selection/Operation Gear Change and Selection	- Check - Check - Check - Check - Check						
Tyre pressure and condition Wheel Nut Torque Steering Operation Neutral Start Operation Forward/Reverse Selection/Operation Gear Change and Selection Clutch Disconnect Reverse Alarm (if fitted)	- Check - Check - Check - Check - Check - Check						

2 - 3 2 - 3

Functional Test and Final Inspection	Operation	10 Hr	50 Hr	First 100 Hr	500 Hr	1000 Hr	2000 Hr
HYDRAULICS MRV Pressure All ARV's Auxiliary Circuit Steer Circuit MRV	<ul> <li>* - Check and Adjust</li> </ul>						
Operation of All Services Loader Valve and Controls	- Check - Check						
BRAKES Foot Brake Operation	- Check						
ELECTRICS All Electrics Starter Motor Alternator Warning Lights Lights and Instruments Wipers Heater Other (give details)	- Operate - Check						
PAINTWORK Condition	- Check						
CAB Glazing for Correct Fit Doors and Hinges Locks and Keys Seat/Seat Belts	- Check - Check - Check - Check						
ATTACHMENTS Attachment Circuit Pressures Operation	- Check - Check						
REGISTRATION/CERTIFICATION Form 2530 (F91) (UK Requirement) - Lift Form 2531 (F96/F97) (UK Requirement) SWL Stickers (UK)	- Check - Check - Renew as Required						

**Note:** Operation must be carried out at the end of each set period, ie. The 10 Hour operations must be carried out after **every** 10 Hours.

Note: The First 100 Hour Operations are carried out after the initial 100 hours only.

Note ††: When operating in regions where ambient temperatures exceed 32° C (90° F), change at 500 Hours.

Note †: When operating in extreme conditions, change at 250 Hours.

**Note:** We recommend that the services marked with an \* are carried out by a recognised JCB Distributor.

1 General 1

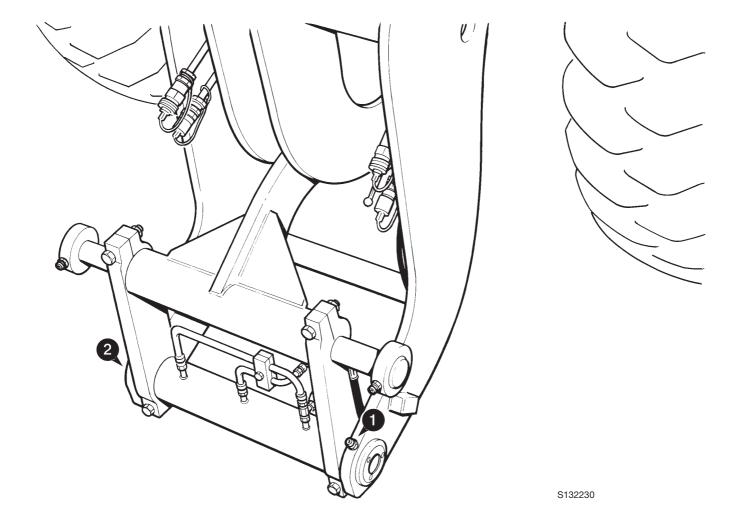
3 - 1 3 - 1

## **GREASING**

## **Shovel Pivot Pins**

Total of 2 grease points.

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

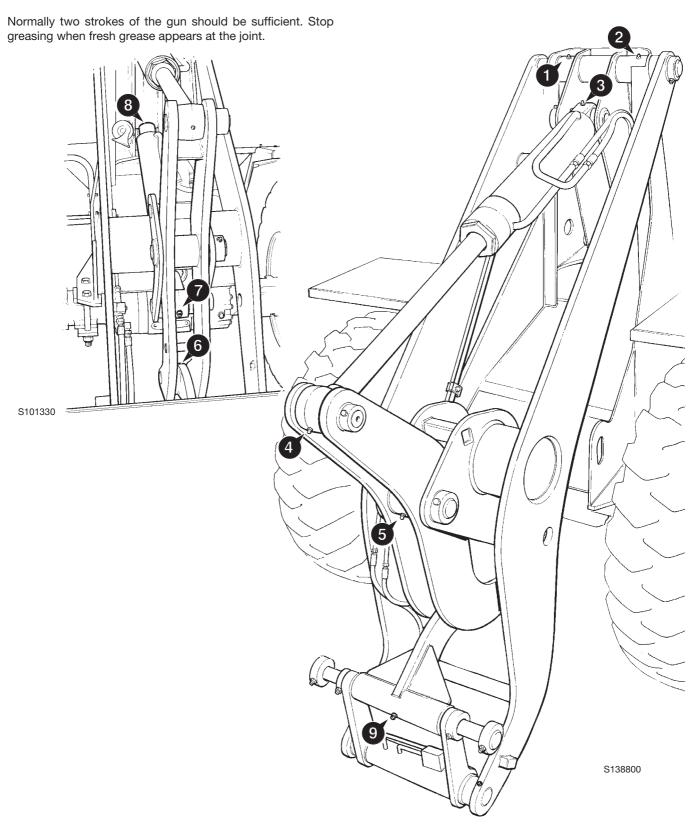


3 - 2

## **GREASING**

## **Loader End**

Total of 9 grease points.



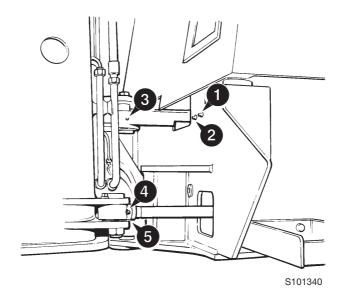
1 General 1

3 - 3

# **GREASING**

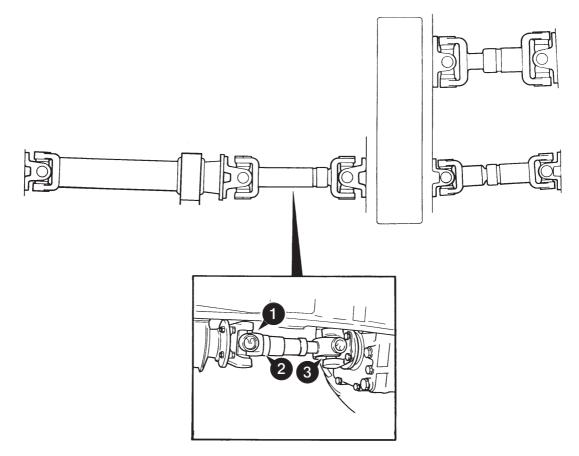
# **Centre Pivot and Steering Ram**

Total of 5 grease points.



# Intermediate Propshaft

Total of 3 grease points.



S132240



Our support email: ebooklibonline@outlook.com