

Service Manual

JS70

from machine no. 695501

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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 JCB Technical Training Department.

These personnel should have a sound knowledge of workshop practice, safety procedures, and general techniques associated with the maintenance and repair of hydraulic earthmoving equipment.

Renewal of oil seals, gaskets, etc., and any component showing obvious signs of wear or damage is expected as a matter of course. It is expected that components will be cleaned and lubricated where appropriate, and that any opened hose or pipe connections will be blanked to prevent excessive loss of hydraulic fluid and ingress of dirt. Finally, please remember above all else **SAFETY MUST COME FIRST!**

The manual is compiled in sections, the first three are numbered and contain information as follows:

- 1 = General Information** - includes torque settings and service tools.
- 2 = Care & Safety** - includes warnings and cautions pertinent to aspects of workshop procedures etc.
- 3 = Routine Maintenance** - includes service schedules and recommended lubricants for the whole machine.

The remaining sections are alphabetically coded and deal with Dismantling, Overhaul etc. of specific components, for example:

- A = Attachments**
- B = Body & Framework** ...etc

The page numbering in each alphabetically coded section is not continuous. This allows for the insertion of new items in later issues of the manual.

Section contents, technical data, circuit descriptions, operation descriptions etc. are inserted at the beginning of each alphabetically coded section.

All sections are listed on the front cover; tabbed divider cards align directly with individual sections on the front cover for rapid reference.

Where a torque setting is given as a single figure it may be varied by plus or minus 3%. Torque figures indicated are for dry threads, hence for lubricated threads may be reduced by one third.

'Left Hand' and 'Right Hand' are as viewed from the rear of the machine facing forwards.

Note: In this manual the term 'swing' may sometimes be used in place of 'slew' and the term 'arm' may sometimes be used in place of 'dipper'.

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Bolt and Nut Torque Specifications

Tighten the bolts and nuts according to the table. Before and after daily work, check the bolts and nuts for looseness and for those missing. Tighten if loose and renew if missing.

Tighten the bolts and nuts after the first 50 hours of the running-in stage and every 250 hours thereafter.

Torque Tightening Table

No	Tightening Point	Bolt Diameter	Wrench	Tightening Torque		
				Nm	kgf m	lbf ft
			mm			
1†	Travel Motor	M16	24	268~312	27.2~31.8	197~230
2†	Drive Sprocket	M14	22	173~202	17.6~20.6	128~149
3†	Idler Wheel	M10	17	63~73	6.9~7.4	46~54
4†	Upper (Carrier) Roller	M16	24	267~312	27.2~31.8	197~230
5†	Lower (Track) Roller	M12	19	109~127	11~13	80~94
6†	Grease Cylinder	M12	19	109~127	11~13	80~94
7†	Track Guard	M12	19	109~127	11~13	80~94
8	Shoe Bolt	U1/2 - 38	19	196~235	20~24	145~173
9†	Counterweight	M24	36	660~770	67.3~78.5	487~568
10†	Turntable Bearing (Undercarriage)	M16	24	252~283	25.7~28.9	186~209
11†	Turntable Bearing (Slew Frame)	M16	24	252~283	25.7~28.9	186~209
12†	Slew Equipment	M16	24	273~318	27.8~32.4	201~235
13†	Engine (Engine Mount)	M16	24	167~216	17~22	123~159
14†	Engine Bracket	M10/M16	17/24	65~75/167~216	6.6~7.7/17~22	48~55/123~159
15	Radiator	M10	17	30~35	3.1~3.6	22~26
16†	Hydraulic Pump	M10/M12	17/19	63~73/109~127	6.4~7.4/11~13	46~54/80~94
17†	Hydraulic Oil Tank	M16	24	160~172	16.3~17.5	118~127
18†	Fuel Tank	M16	24	160~172	16.3~17.5	118~127
19†	Control Valve	M12	19	53~65	5.4~6.6	39~48
20†	Rotary Coupling	M10	17	63~73	6.4~7.4	46~54
21	Cab	M16	24	79~88	8~9	58~65
22	Battery	M10	17	20~30	2~3	15~22

Note: Use JCB Threadlocker and Sealer (High Strength) on those marked † and tighten to the torque listed in the above table.

General Torque Settings

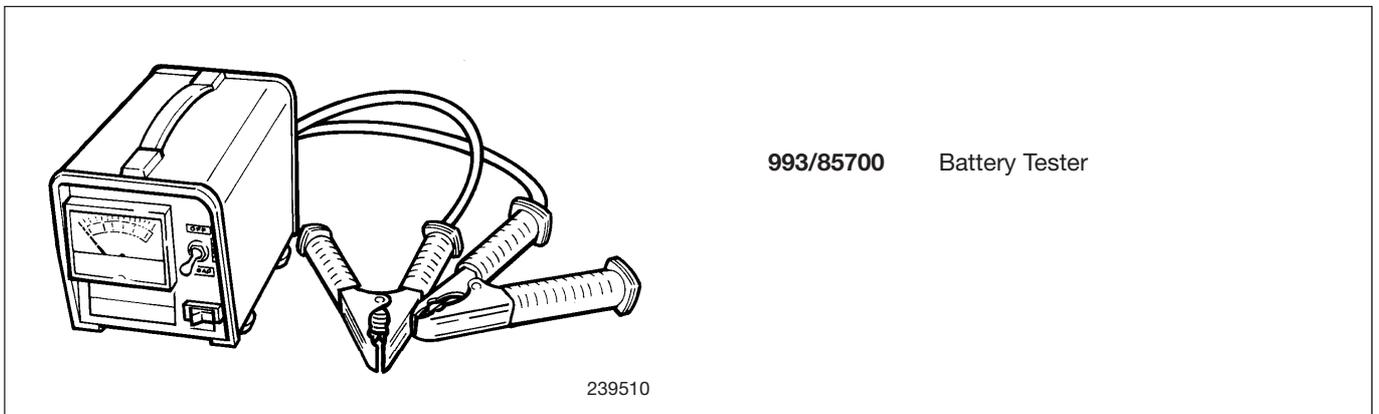
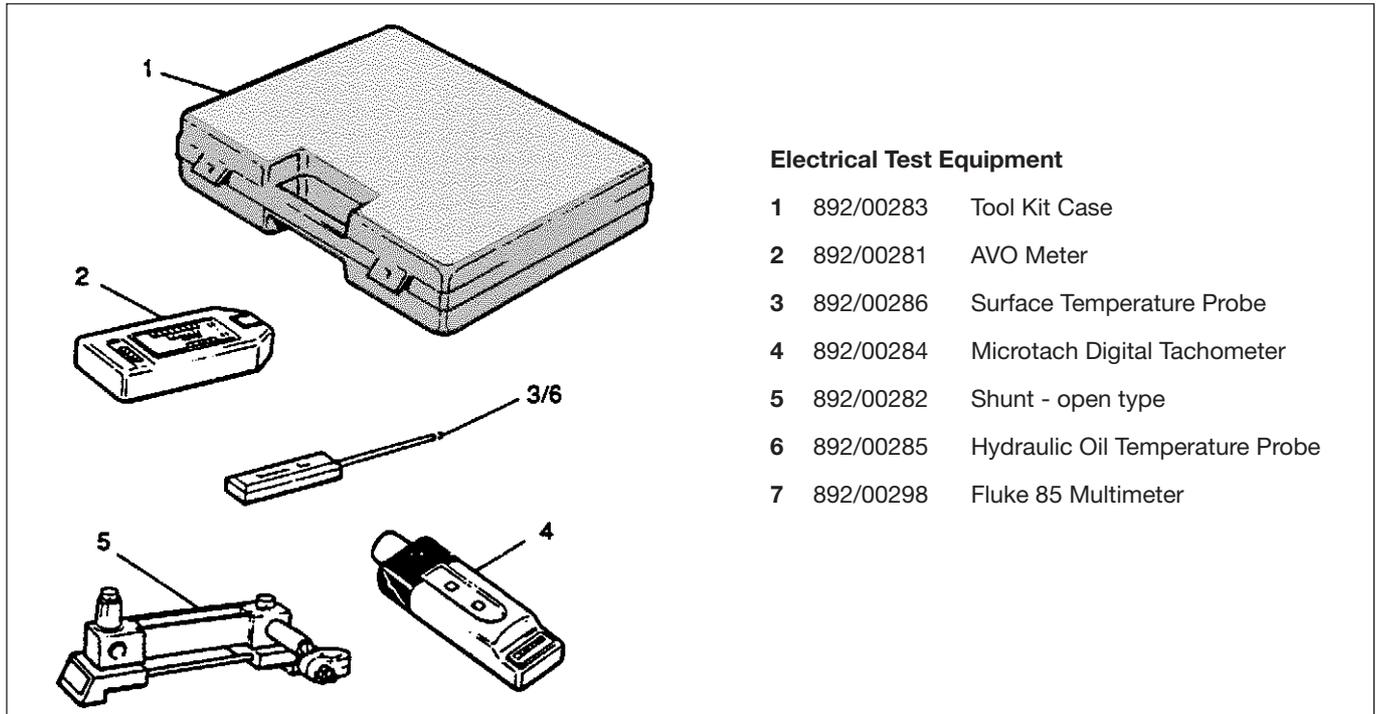
Note 1: The figures quoted are for non-plated fasteners and are to be used only when there is no torque setting specified in the relevant procedure in this service manual.

Note 2: The 4T grade settings DO NOT APPLY to fasteners used on the engine. If any 4T specification fasteners are found on the engine, these must be tightened to the figure quoted in the relevant engine manual.

Bolt Size	Strength Grade of Bolt or Stud								
	4T			8.8			10.9		
	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M3	0.39	0.04	0.28	-	-	-	-	-	-
M4	0.78	0.08	0.57	-	-	-	-	-	-
M5	1.67	0.17	1.2	-	-	-	-	-	-
M6	2.84	0.29	2.1	8.04	0.82	5.9	11.3	1.15	8.3
M8	7.06	0.72	5.2	19.6	2.00	14.5	27.7	2.82	20.4
M10	14.0	1.43	10.3	39.1	3.99	28.8	55.0	5.61	40.6
M12	24.6	2.51	18.1	68.5	6.98	50.5	96.2	9.81	71
M16	61.9	6.31	45.7	173	17.6	127.6	242	24.7	178.5
M20	122	12.4	90	337	34.4	249	475	48.4	350
M22	167	17.0	123	464	47.3	342	652	66.5	481
M24	210	21.4	155	584	59.5	431	821	83.7	606
M27	311	31.7	229	864	88.1	637	1220	124	900
M30	420	42.8	310	1170	119	863	1650	168	1217
M33	576	58.7	425	1600	163	1180	2260	230	1667
M36	736	75.1	543	2050	209	1512	2880	294	2124
M39	961	98.0	709	2680	273	1977	3760	383	2773
M42	1190	121	878	3300	336	2434	4640	473	3422
M45	1490	152	1099	4140	422	3054	5820	593	4293
M48	1780	182	1312	4960	506	3659	6970	711	5141

Service Tools

SECTION C - ELECTRICS

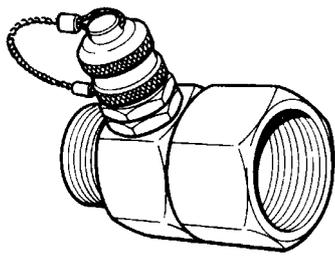
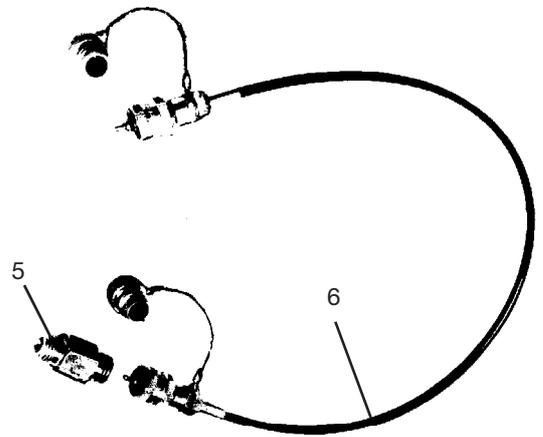
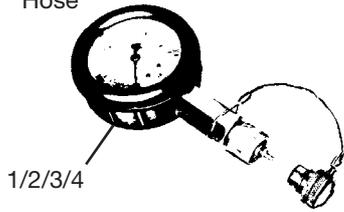


Service Tools (continued)

SECTION E - HYDRAULICS

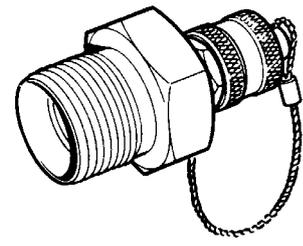
Hydraulic Pressure Test Gauges and Connections

- 1 892/00346 Pressure Gauge 0-70 bar (0-1000 lbf/in²)
- 2 892/00898 Pressure Gauge 0-100 bar (0-1500 lbf/in²)
- 3 892/00279 Pressure Gauge 0-400 bar (0-6000 lbf/in²)
- 4 892/00280 Pressure Gauge 0-600 bar (0-8500 lbf/in²)
- 5 892/00347 Connector
- 6 892/00254 Hose



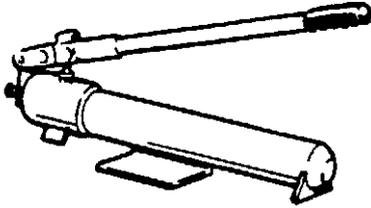
Pressure Test 'T' Adapters

- 892/00262 1/4 in BSP x 1/4 in F BSP x Test Point
- 816/55038 3/8 in BSP x 3/8 in F BSP x Test Point
- 816/55040 1/2 in BSP x 1/2 in F BSP x Test Point
- 892/00263 5/8 in BSP x 5/8 in F BSP x Test Point
- 892/00264 3/4 in BSP x 3/4 in F BSP x Test Point
- 892/00265 1 in M BSP x 1 in F BSP x Test Point
- 892/00266 1,1/4 in M BSP x 1,1/4 in F BSP x Test Point
- 892/00267 1,1/2 in M BSP x 1,1/2 in F BSP x Test Point

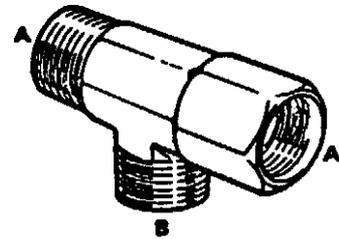


Pressure Test Adapters

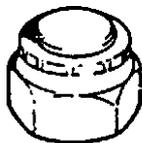
- 892/00255 1/4 in BSP x Test Point
- 892/00256 3/8 in BSP x Test Point
- 892/00257 1/2 in BSP x Test Point
- 892/00258 5/8 in BSP x Test Point
- 816/15118 3/4 in BSP x Test Point
- 892/00259 1 in BSP x Test Point
- 892/00260 1,1/4 in BSP x Test Point
- 892/00261 5/8 in UNF x Test Point

Service Tools (continued)**SECTION E - HYDRAULICS****Hand Pump Equipment**

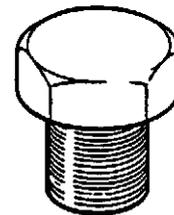
892/00223	Hand Pump
892/00137	Micro-bore Hose 1/4 in BSP x 5 metres
892/00274	Adapter 1/4 in M BSP x 3/8 in M BSP Taper
892/00262	1/4 in M BSP x 1/4 in F BSP x Test Point
892/00706	Test Probe
892/00278	Gauge 0 - 40 bar (0 - 600 lb/in ²)
892/00279	Gauge 0 - 400 bar (0 - 6000 lb/in ²)
892/00280	Gauge 0 - 600 bar (0 - 8500 lb/in ²)



816/50005	1/2 in BSP (A) x 1/2 in BSP (B)
816/60096	3/4 in BSP (A) x 3/4 in BSP (B)
816/00018	1 in BSP (A) x 1 in BSP (B)

**Female Cone Blanking Plug**

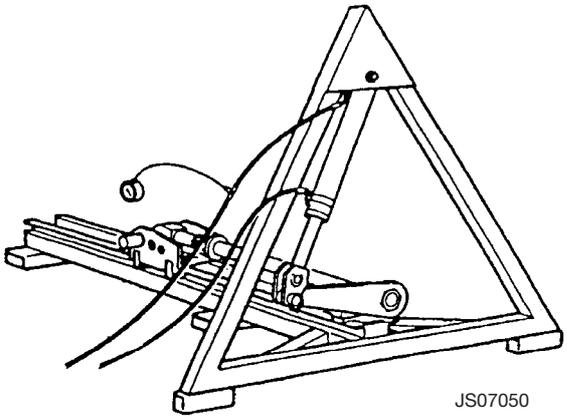
892/00055	1/4 in BSP
892/00056	3/8 in BSP
892/00057	1/2 in BSP
892/00058	5/8 in BSP
892/00059	3/4 in BSP
892/00060	1 in BSP

**Male Cone Blanking Plug**

816/00294	1/4 in BSP
816/00189	3/8 in BSP
816/00190	1/2 in BSP
816/00197	5/8 in BSP
816/00196	3/4 in BSP
816/00193	1 in BSP

Service Tools (continued)

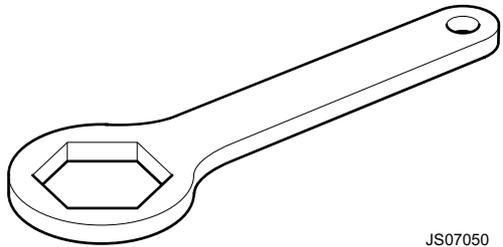
SECTION E - HYDRAULICS



JS07050

Ram Piston Nut Removal/Fitting Rig

993/99525	Rig assembly (not including spanners and ram)
993/99522	Anchor Side Plate (supplied loose unwelded)
993/99523	Anchor cross Member (supplied loose unwelded)
993/99524	Ram Eye End Modification Plate Assembly
556/43400	Lift Ram
545/18000	Lynch Pin
811/50232	1,1/4 in. Pivot Pin

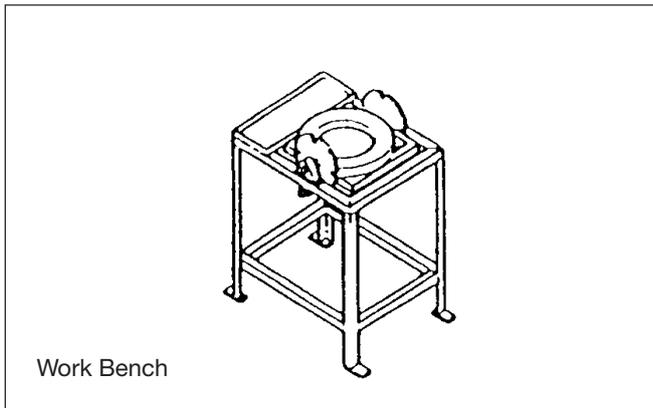


JS07050
JS07050

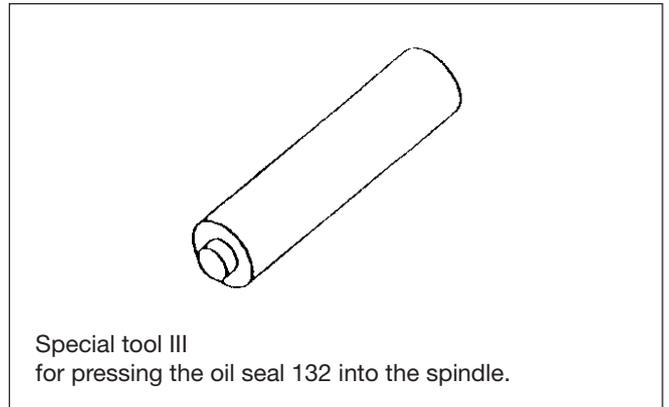
Ram Piston Nut Removal/Fitting Spanner

993/99512	Spanner 55mm A/F
993/99513	Spanner 60mm A/F
993/99514	Spanner 65mm A/F
993/99515	Spanner 70mm A/F
993/99516	Spanner 75mm A/F
993/99517	Spanner 85mm A/F
993/99518	Spanner 90mm A/F
993/99519	Spanner 100mm A/F
993/99520	Spanner 110mm A/F
993/99521	Spanner 115mm A/F
SSP0046	Spanner 80mm A/F
SSP0047	Spanner 95mm A/F

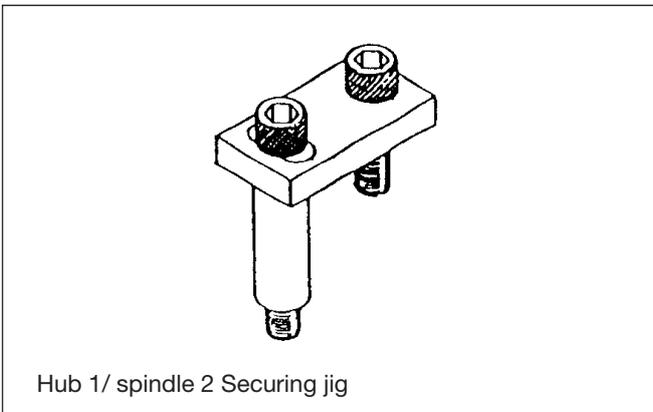
Service Tools (continued)
SECTION F - TRANSMISSIONS



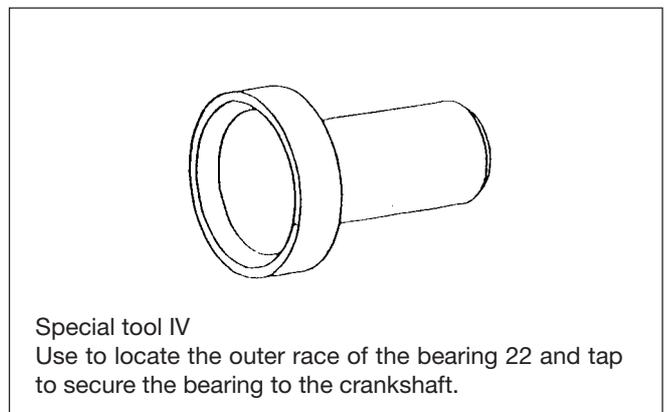
Work Bench



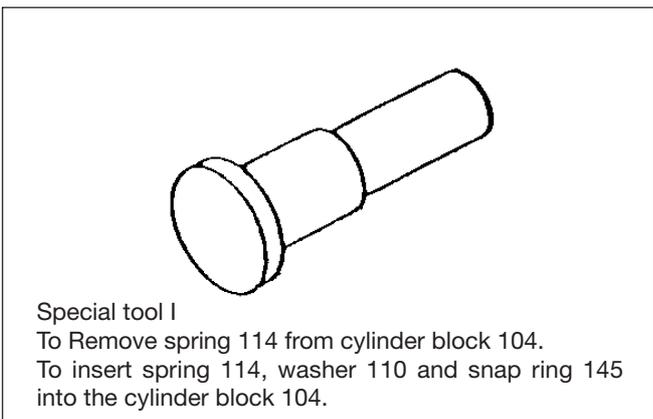
Special tool III
 for pressing the oil seal 132 into the spindle.



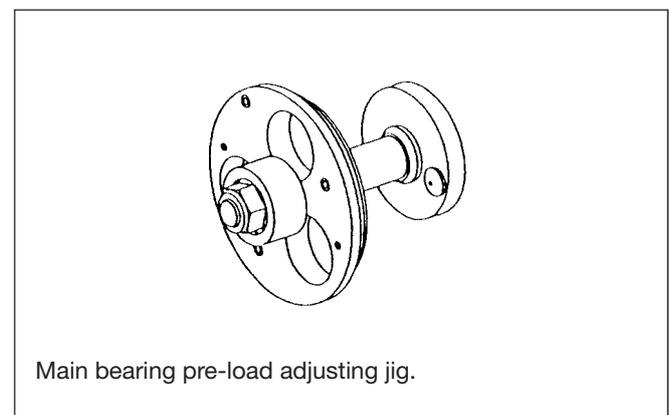
Hub 1/ spindle 2 Securing jig



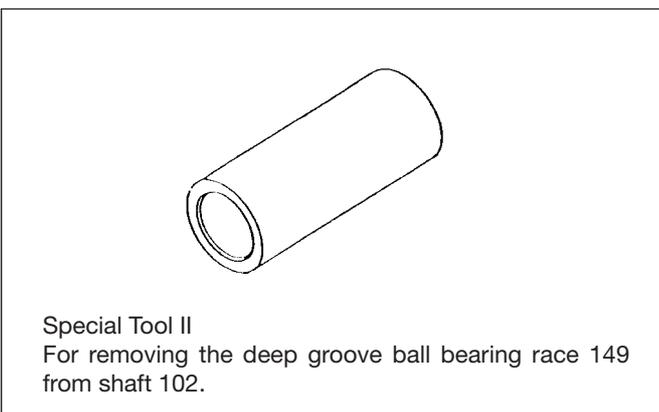
Special tool IV
 Use to locate the outer race of the bearing 22 and tap to secure the bearing to the crankshaft.



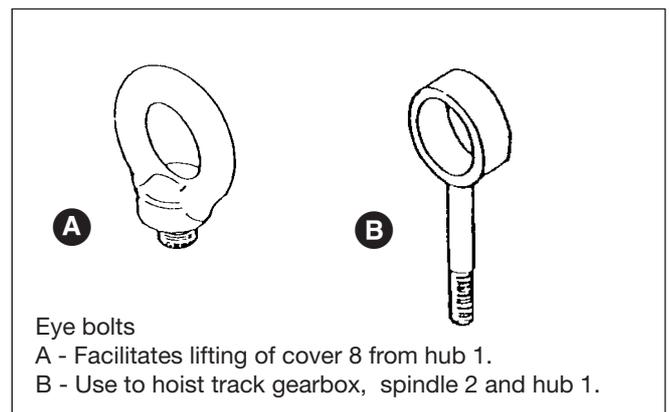
Special tool I
 To Remove spring 114 from cylinder block 104.
 To insert spring 114, washer 110 and snap ring 145 into the cylinder block 104.



Main bearing pre-load adjusting jig.



Special Tool II
 For removing the deep groove ball bearing race 149 from shaft 102.



Eye bolts
 A - Facilitates lifting of cover 8 from hub 1.
 B - Use to hoist track gearbox, spindle 2 and hub 1.

Sealing and Retaining Compounds

JCB Multigasket	A medium strength sealant suitable for all sizes of gasket flanges and for hydraulic fittings of 25-65 mm diameter.	4102/1212	
JCB High Strength Threadlocker	A high strength locking fluid for use with threaded components. Gasketing for all sizes of flange where the strength of the joint is important.	4102/0551	
JCB Retainer (High Strength)	For all retaining parts which are unlikely to be dismantled.	4101/0651	
JCB Threadlocker & Sealer	A medium strength locking fluid for sealing and retaining nuts bolts and screws up to 50mm diameter, and for hydraulic fittings up to 25mm diameter.	4101/0251	
JCB Threadlocker	For threads of 50 mm diameter upwards, e.g. suction strainer.	4101/0451	50 ml
JCB Threadlocker & Sealer (High Strength)	A medium to high strength locking fluid.	4101/0552	
JCB Threadseal	Medium strength thread sealant (for patch bolts that are re-used).	4102/1951	50 ml
JCB Activator	A cleaning primer which speeds the curing rate of anaerobic products.	4104/0251 4104/0253	Aerosol Bottle
JCB Cleaner/Degreaser	For degreasing components prior to use of anaerobic adhesives and sealants.	4104/1557	Aerosol
Direct Glazing Kit	For one pane of glass, comprises items marked † below plus applicator nozzle etc.	993/55700	
† Ultra Fast Adhesive	For direct glazing	4103/2109	310 ml
† Active Wipe 205	For direct glazing	4104/1203	250 g
† Black Primer 206J	For direct glazing	4201/4906	30 ml
Clear Silicone Sealant	To seal butt jointed glass. Also to seal hub planet gear carrier when no 'O' ring is fitted	4102/0901	
Black Polyurethane Sealant	To finish exposed edges of laminated glass	4102/2309	310 ml

Contents	Page No.
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In this publication and on the machine, there are safety notices. Each notice starts with a signal word. The signal word meanings are given below.

 **DANGER**

Denotes an extreme hazard exists. If proper precautions are not taken, it is highly probable that the operator (or others) could be killed or seriously injured.

INT-1-2-1

 **WARNING**

Denotes a hazard exists. If proper precautions are not taken, the operator (or others) could be killed or seriously injured.

INT-1-2-3

 **CAUTION**

Denotes a reminder of safety practices. Failure to follow these safety practices could result in injury to the operator (or others) and possible damage to the machine.

INT-1-2-3

All construction and agricultural equipment can be hazardous. When a JCB Excavator 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 the following pages, specific warnings are given throughout the book. This section is designed to give a safety code for use of the machine generally and for operation and maintenance practices.

General Safety



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 that lifting equipment is strong enough for the job.

INT-1-3-7



WARNING

Clothing

You can be injured if you do not wear the 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 Equipment

Raised equipment can fall and injure you. Do not walk or work under raised equipment unless safely supported.

13-1-1-6



DANGER

Before removing the boom from the machine, ensure that the counterweight is adequately supported as in certain ground conditions the machine could tip backwards. Never travel or transport the machine with the boom removed.

BF6-3

Operating Safety

WARNING

Engine

The engine has rotating parts. Do not open the engine cover while the engine is running. Do not use the machine with the cover open.

INT-2-1-6

WARNING

Entering/Leaving

Always face the machine when entering and leaving the cab. Use the step(s) and handrails. Make sure the step(s), handrails and your boot soles are clean and dry. Do not jump from the machine. Do not use the machine controls as handholds, use the handrails.

INT-2-1-7

WARNING

Controls

You or others can be killed or seriously injured if you operate the control levers from outside the cab. Operate the control levers only when you are correctly seated inside the cab.

INT-2-1-3

WARNING

Visibility

Accidents can be caused by working in poor visibility. Keep windows clean and use your lights to improve visibility. Do not operate the machine if you cannot see properly.

INT-2-1-11

WARNING

Machine Limits

Operating the machine beyond its design limits can damage the machine, it can also be dangerous. Do not operate the machine outside its limits. Do not try to upgrade the machine performance with unapproved modifications.

INT-2-1-4

WARNING

Exhaust Gases

Breathing the machine exhaust gases can harm and possibly kill you. Do not operate the machine in closed spaces without making sure there is good ventilation. If possible, fit an exhaust extension. If you begin to feel drowsy, stop the machine at once. Get out of the cab into fresh air.

INT-2-1-10

WARNING

Hazardous Atmospheres

This machine is designed for use in normal outdoor atmospheric conditions. It should not be used in an enclosed area without adequate ventilation. Do not use the machine in a potentially explosive atmosphere, i.e. combustible vapours, gas or dust, without first consulting your JCB Distributor.

INT-2-1-14

WARNING

Ramps and Trailers

Water, mud, ice, grease and oil on ramps or trailers can cause serious accidents. Make sure ramps and trailers are clean before driving onto them. Use extreme caution when driving onto ramps and trailers.

INT-2-2-6

WARNING

Communications

Bad communications can cause accidents. Keep people around you informed of what you will be doing. If you will be working with other people, make sure any hand signals that may be used are understood by everybody. Work sites can be noisy, do not rely on spoken commands.

INT-2-2-3

DANGER

Sparks

Explosions and fire can be caused by sparks from the exhaust or the electrical system. Do not use the machine in closed areas where there is flammable material, vapour or dust.

INT-2-2-10

WARNING

Controls

Keep the machine controls clean and dry. Your hands and feet could slide off slippery controls. If that happens, you will lose control of the machine.

2-2-3-6

Maintenance Safety

WARNING

Soft Ground

A machine can sink into soft ground. Never work under a machine on soft ground.

INT-3-2-4

WARNING

Metal Splinters

You can be injured by flying metal splinters when driving metal pins in or out. Use a soft faced hammer or drift to remove and fit metal pins. Always wear safety glasses.

INT-3-1-3

WARNING

Communications

Bad communications can cause accidents. If two or more people are working on the machine, make sure each is aware of what the others are doing. Before starting the engine, make sure the others are clear of the danger areas; examples of danger areas are: the rotating blades and belt on the engine, the attachments and linkages, and anywhere beneath or behind the machine. People can be killed or injured if these precautions are not taken.

INT-3-1-5

WARNING

Diesel Fuel

Diesel fuel is flammable; keep naked flames away from the machine. Do not smoke while refuelling the machine or working on the engine. Do not refuel with the engine running. There could be a fire and injury if you do not follow these precautions.

INT-3-2-2

WARNING

Petrol

Do not use petrol in this machine. Do not mix petrol with the diesel fuel; in storage tanks the petrol will rise to the top and form flammable vapours.

INT-3-1-6

WARNING

Oil

Oil is toxic. If you swallow any oil, do not induce vomiting, seek medical advice. Used engine oil contains harmful contaminants which can cause skin cancer. Do not handle used engine oil more than necessary. Always use barrier cream or wear gloves to prevent skin contact. Wash skin contaminated with oil thoroughly in warm soapy water. Do not use petrol, diesel fuel or paraffin to clean your skin.

INT-3-2-3

WARNING

Fires

If your machine is equipped with a fire extinguisher, make sure it is checked regularly. Keep it in the operator's cab until you need to use it.

Do not use water to put out a machine fire, you could spread an oil fire or get a shock from an electrical fire. Use carbondioxide, dry chemical or foam extinguishers. Contact your nearest fire department as quickly as possible. Fire fighters should use self-contained breathing apparatus.

INT-3-2-7/1

WARNING

Battery

A battery with frozen electrolyte can explode if it is used or charged. Do not use a machine with a frozen battery. To help prevent the battery from freezing, keep the battery fully charged.

INT-3-1-7

WARNING

Battery Gases

Batteries give off explosive gases. Keep flames and sparks away from the battery. Do not smoke close to the battery. Make sure there is good ventilation in closed areas where batteries are being used or charged. Do not check the battery charge by shorting the terminals with metal; use a hydrometer or voltmeter.

INT-3-1-8

WARNING

Battery Terminals

The machine is negatively earthed. Always connect the negative pole of the battery to earth.

When connecting the battery, connect the earth (-) lead last.

When disconnecting the battery, disconnect the earth (-) lead first.

INT-3-1-9

WARNING

Electrical Circuits

Understand the electrical circuit before connecting or disconnecting an electrical component. A wrong connection can cause injury and/or damage.

INT-3-1-4

CAUTION

Do not disconnect the alternator, the battery, or any part of the charging circuit with the engine running.

8-3-4-1

Maintenance Safety (cont'd)**⚠ CAUTION**

Never use water or steam to clean inside the cab. The use of water or steam could damage the on-board computer and render the machine inoperable. Remove dirt using a brush or damp cloth.

8-3-4-8

⚠ CAUTION
Arc Welding

Before carrying out any arc welding on the machine, completely remove the Control Computer to avoid damage to the circuits; also disconnect the alternator plug and battery leads.

When welding items to the mainframe make sure that the earth clamp is positioned on the mainframe and when welding to the undercarriage make sure that the earth clamp is positioned on the undercarriage. If you earth one and weld the other, you may cause severe damage to the slew ring.

Always connect the earth clamp to any other component being welded, i.e. boom or dipper, to avoid damage to pivot pins and bushes.

8-1-2-6/1

⚠ WARNING
Hydraulic Hoses

Damaged hoses can cause fatal accidents. Inspect the hoses regularly for:

- Damaged end fittings
- Chafed outer covers
- Ballooned outer covers
- Kinked or crushed hoses
- Embedded armouring in outer covers
- Displaced end fittings.

INT-3-3-2

⚠ WARNING

DO NOT remove the hydraulic tank filler cap or cover plate when the engine is running. The hydraulic system is under pressure. You or others could be injured. First stop the engine and then release the pressure.

8-3-4-4/1

⚠ WARNING
Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, stop the engine and operate the controls to release pressure trapped in the hoses. Make sure the engine cannot be started while the hoses are open.

INT-3-1-11/1

⚠ WARNING**Hydraulic Fluid**

Fine jets of hydraulic fluid at high pressure can penetrate the skin. Do not use your fingers to check for hydraulic fluid leaks. Do not put your face close to suspected leaks. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of hydraulic fluid. If hydraulic fluid penetrates your skin, get medical help immediately.

INT-3-1-10/1

⚠ CAUTION**Rams**

The efficiency of the rams will be affected if they are not kept free of solidified dirt. Clean dirt from around the rams regularly. When leaving or parking the machine, close all rams if possible to reduce the risk of weather corrosion.

INT-3-2-10

⚠ CAUTION**Cleaning**

Cleaning metal parts with incorrect solvents can cause corrosion. Use only recommended cleaning agents and solvents.

INT-3-2-11

⚠ CAUTION**'O'-rings, Seals and Gaskets**

Badly fitted, damaged or rotted 'O'-rings, seals and gaskets can cause leakages and possible accidents. Renew whenever disturbed unless otherwise instructed. Do not use Trichloroethane or paint thinners near 'O' rings and seals.

INT-3-2-12

⚠ WARNING**Hot Coolant**

The cooling system is pressurised when the engine is hot. Hot coolant can spray out when you remove the radiator cap. Let the system cool before removing the radiator cap. To remove the cap; turn it to the first notch and let the system pressure escape, then remove the cap.

INT-3-2-9

⚠ CAUTION

If the machine is operated at full load, before its initial run-in procedure is complete, it may cause scuffing and seizing which can adversely effect the service life of the machine.

8-3-1-5

⚠ WARNING**Compressed Air**

When using compressed air, wear safety glasses and gloves. Do not direct compressed air at your skin.

8-3-4-2

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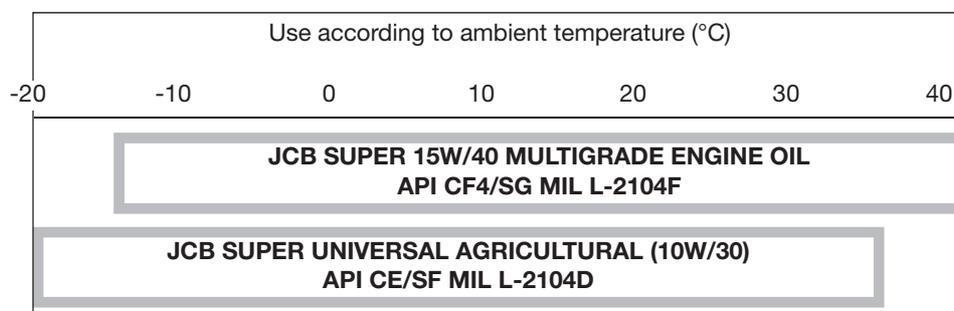
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CAPACITIES AND SPECIFICATIONS

Note: New engines DO NOT require a running-in period. The engine 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 run-in. Under no circumstances should the engine be allowed to idle for extended periods (e.g. warming-up without load).

Item	Fluid/Lubricant	International Specification	Capacity
ENGINE	See separate chart	-	6.8 litres (1.49 UK gal)
SLEW GEARBOX	JCB HP Grease	Lithium based, No. 2 consistency	0.2 kg (0.44 lb)
TRACK GEARBOXES	JCB Gear Oil HD90	API-GL-5, MIL-L-2105C	2 x 1.7 litres (0.37 UK gal)
TRACK ROLLERS AND IDLER WHEEL	Engine Oil (see separate chart)	-	-
HYDRAULIC SYSTEM	JCB Special Hydraulic Fluid HP46	Vickers 35VQ25/V104C: Sundstrand, Denison and FZG Approval Tests	92 litres (20.26 UK gal)
SLEW RING - BEARINGS - GEAR TEETH	JCB HP Grease JCB HP Grease	Lithium based, No. 2 consistency	- 3.2 kg (7.14 lb)
ALL OTHER GREASE POINTS	JCB HP Grease	Lithium based, No. 2 consistency	
COOLING SYSTEM	See Coolant Mixtures	ASTM D3306-74	10.1 litres (2.22 UK gal)
FUEL TANK	See Fuel System, Types of Fuel	ASTM D975-66T Nos 1D, 2D	140 litres (30.8 UK gal)

Engine Lubrication Chart



It is most important that you read and understand this information and the publications referred to. Make sure that all of your colleagues who are concerned with lubricants read it too.

First Aid - Oil

Swallowing

If oil is swallowed you should not induce vomiting. Get medical advice.

Skin

In the case of excessive skin contact you should wash with soap and water.

Eyes

In the case of eye contact, flush with water for 15 minutes. If irritation persists, get medical attention.

Fires

Extinguish with carbon dioxide, dry chemical or foam. Fire-fighters should use self contained breathing apparatus.

WARNING

Do not use water to put out an oil fire. This will only spread it because oil floats on water.

Extinguish oil and lubricant fires with carbon dioxide, dry chemical or foam. Fire fighters should use self contained breathing apparatus.

7-3-1-3/1

Hygiene

JCB lubricants are not a health risk when used properly for their intended purposes.

However, excessive or prolonged skin contact can remove the natural fats from your skin, causing dryness and irritation.

Low viscosity oils are more likely to do this, therefore particular care is necessary in handling used oils which can be diluted with fuel contamination.

Whenever you are handling oil products you should maintain good standards of care and personal and plant hygiene. For details of these precautions we advise you to read the relevant publications issued by your local health authority, and note the following:

Storage

Always keep lubricants out of the reach of children.

Never store lubricants in open or unlabelled containers.

Handling

New Oil

There are no special precautions needed for the handling or use of new oil, beside normal care and hygiene practices.

Used Oil

Used engine crankcase lubricants contain harmful contaminants. In laboratory tests it was shown that used engine oils can cause skin cancer.

Here are precautions to protect your health when handling used engine oil:

1. Avoid prolonged, excessive or repeated skin contact with used engine oils.
2. Apply a barrier cream to the skin before handling used engine oil.
3. Note the following when removing engine oil from skin:
 - a. Wash your skin thoroughly with soap and water.
 - b. Using a nail brush will help.
 - c. Use special hand cleansers to help clean dirty hands.
 - d. Never use petrol, diesel fuel or gas oil.
 - e. Avoid skin contact with oil soaked clothing.
 - f. Don't keep oily rags in pockets.
 - g. Wash dirty clothing before re-use.
 - h. Throw away oil-soaked shoes.

Waste Disposal

All waste products should be disposed of in accordance with all the relevant regulations.

The collection and disposal of used engine oil should be in accordance with any local regulations. Never pour used engine oil into sewers or drains.

Spillage

Absorb on sand or a locally approved brand of absorbent granules. Scrape up and remove to a chemical disposal area.

Service Intervals for Hydraulic Oil and Filters when using a Breaker

When using a breaker, contamination and degradation of the hydraulic oil occurs much more quickly than in normal excavating use. If the machine is used with increasingly degrading oil it can cause problems in the control valve, premature wear of the hydraulic pump and damage to the hydraulic system as a whole.

Servicing of the hydraulic oil and filters must be done more frequently according to the percentage of total operating hours involving use of the breaker. When a breaker is fitted, ensure that the oil and filters are changed at the intervals shown in the table below.

The hydraulic oil must be sampled and checked for contamination and degradation at the intervals shown.

Item	Time (hrs)	Use Frequency 100%			Use Frequency 40%			Use Frequency 20%			Use Frequency 10%		
		10	100	600	10	300	1500	10	600	3000	10	800	4000
Hydraulic Oil		○		●	○		●	○		●	○		●
Return Filter			●			●			●			●	
Suction Filter			1	●		1	●		1	●		1	●
Drain Filter			●			●			●			●	
Servo Filter			●			●			●			●	
Nephron Filter			●			●			●			●	
Breaker In-Line Filter			●			●			●			●	
Hydraulic Oil Sampling		Every 200 hrs			Every 300 hrs			Every 600 hrs			Every 800 hrs		

○ Check oil level and top up as required ● Change 1 Clean

Note: The filters must be changed whenever the period of breaker use exceeds 100hrs, regardless of the total number of hours the machine has worked.

Initial Precautions for New Machine Usage

CAUTION

If the machine is operated at full load, before its initial run-in procedure is complete it may cause scuffing and seizing which can adversely effect the life of the machine.

8-3-1-5

A new machine is only dispatched when it has completed all its inspection procedures, but operating it under severe conditions from new will affect its performance and shorten its service life.

- 1 Carry out the Daily inspection procedure
- 2 Always warm up the machine sufficiently
- 3 Hold the engine speed to 80% of the maximum
- 4 Check to see if the machine is running normally
- 5 Avoid running or swinging the machine rapidly
- 6 Avoid sudden shocks e.g. suddenly stopping the boom when lowering
- 7 Where applicable, grease the front pins daily
- 8 At 50 hrs carry out servicing

Every 10 Operating Hours or Daily Whichever occurs first

- 1 Clean**
 - a Machine generally.
- 2 Grease**
(If operating in very wet or severe conditions)
 - a Bucket/dipper pivot points.
- 3 Check (Engine Stopped)**
 - a Generally for damage.
 - b For oil and coolant leakage.
 - c Security of bolts and nuts ††.
 - d For disconnected or shorted wiring, loose terminals.
 - e Hydraulic fluid level.
 - f Engine oil level.
 - g Track tension.
 - h Windscreen washer fluid level.
 - j Fuel system for leaks.
 - k Fuel level.
 - l The auxiliary circuit hydraulic oil filter visual indicator (if using a rockbreaker)

†† Tapping with a hammer will identify any loose nuts and bolts which should then be tightened to the specified torque.

- 4 Check (Engine Running)**
 - a Operation of warning lights and audible alarm.
 - b Operation of other electrical equipment.
 - c Exhaust for excessive smoke.
 - d Excavator operation.
 - e Transmission operation.
 - f Operation of track and slew brakes.
 - g Operation of hour meter.

Every 50 Operating Hours or Weekly Whichever occurs first

- 1 Do the daily jobs plus:**
- 2 Clean**
 - a Drain water and sediment from fuel tank.
 - b Drain fuel water separator.
- 3 Grease**
 - a All pivot pins.

Every 100 Operating Hours or 2-Weekly Whichever occurs first

- 1 Do a 50 hour service plus:**
- 2 Clean**
 - a Battery terminals.
 - b Fuel lift pump strainer†.
- 3 Change**
 - a Engine oil main filter element †.
 - b Engine oil †.
 - c Servo oil filter element †.
 - d Engine oil filter by-pass element †.
 - e Return filter element†.
 - f Drain filter element †.
 - g Track gearbox oil†.
 - h Fuel filter element†.
- 4 Check (Engine Stopped)**
 - a Hoses and pipework for chafing or damage.
 - b Condition of ram piston rods.
 - c Bucket pivot pin grease seals†.
 - d Track plate condition.
 - e Track and running gear.
 - f Top and bottom track rollers for oil leaks †.
 - g Track idler wheels for oil leaks †.
 - h Security of major unit mounting bolts and nuts†. If loose, tighten to specified torque.
 - i Wiring for chafing.
 - j Fan belt adjustment†.
 - k Accumulator operation.
 - l Radiator for damage.
 - m Oil cooler for damage.
 - n Battery electrolyte level†.
 - p Exhaust system security†.
 - r Teeth and sidecutters†.
- 5 Check (Engine Running)**
 - a Operation of throttle system†.
 - b Operation of overload warning†.
 - c Operation of stop control†.

† These procedures are only to be carried out after the first 100 hours use of a new machine. Thereafter they are to be carried out as detailed in the following periodic checks.

Every 250 Operating Hours or Monthly**Whichever occurs first**

- 1 Do a 100 hour service plus:**
- 2 Clean**
 - a Drain water and deposits from hydraulic oil tank.
 - b Air cleaner dust valve.
- 3 Grease**
 - a Door and canopy hinges.
 - b Slew ring bearing.
- 4 Change**
 - a Engine oil.
 - b Engine oil full flow filter element.
- 5 Check (Engine Stopped)**
 - a Battery electrolyte level.
 - b Security of major unit mounting bolts and nuts. If loose, tighten to specified torque.
 - c Track gearbox oil level.
 - d Fan belt adjustment.
 - e Air inlet system security

Every 500 Operating Hours or 3-Monthly**Whichever occurs first**

- 1 Do a 250 hour service plus:**
- 2 Clean**
 - a Radiator, grille and oil cooler fins.
- 3 Grease**
 - a Slew ring teeth.
- 4 Change**
 - a Fuel filter element.
- 5 Check (Engine Stopped)**
 - a Exhaust system security.
 - b Top and bottom track rollers for oil leaks.
 - c Track idler wheels for oil leaks.
 - d Hydraulic oil (check the degradation and cleanliness by sampling).
 - e Seat belt condition and security.
 - f Teeth and sidecutters.
- 6 Check (Engine Running)**
 - a Operation of throttle system.
 - b Operation of overload warning.
 - c Operation of stop control.

Every 1000 Operating Hours or 6-Monthly**Whichever occurs first**

- 1 Do a 500 hour service plus:**
- 2 Clean**
 - a Fuel lift pump strainer.
 - b Hydraulic fluid suction strainer.
- 3 Change (Engine Stopped)**
 - a Engine air filter element (outer).
 - b Hydraulic tank air breather element.
 - c Track gearbox oil.
 - d Return filter element.†††
 - e Nephron filter.†††
 - f Servo oil filter element.†††
 - g Drain filter.†††
- 4 Check (Engine Stopped)**
 - a Track wear.

Every 2000 Operating Hours or Yearly**Whichever occurs first**

- 1 Do a 1000 hour service plus:**
- 2 Check (Engine Stopped)**
 - a Sample hydraulic oil and replace if necessary.
- 3 Grease**
 - a Slew gearbox
- 4 Change**
 - a Hydraulic fluid suction strainer.
 - b Engine air filter element (inner).

Every 4000 Operating Hours or 2 Years**Whichever occurs first**

- 1 Do a 2000 hour service plus:**
- 2 Change**
 - a Top and bottom track roller oil
 - b Long life coolant.
 - c Fuel hose (fuel tank - engine).
 - d Fuel hose (fuel filter - injection pump).
 - e Hydraulic pump exit hose (pump - operation valve).
 - f Boom ram line hose.
 - g Dipper ram line hose.
 - h Bucket ram line hose.

††† Refer to Service intervals for Hydraulic Oil and Filters when using a Breaker.

**Every 5000 Operating Hours or 2 Years
6 Months**

Whichever occurs first

1 Do a 1000 hour service plus:

2 Change

a Hydraulic oil.†††

b Hydraulic tank air breather element.

c Hydraulic fluid suction strainer.†††

††† Refer to Service intervals for Hydraulic Oil and Filters when using a Breaker.

You must grease the machine regularly to keep it working efficiently. Regular greasing will also lengthen the machine's working life.

Greasing should be done with a grease gun. Normally, two strokes of the gun should be enough. Stop greasing when fresh grease appears at the joint.

For the type of grease to use at each point, see *Fluids and Lubricants - Capacities and Specifications*.

Do not mix different types of grease. Keep them separate.

⚠ WARNING

You will be working close into the machine for these jobs. Lower the attachments if possible. Remove starter key and disconnect the battery. This will prevent the engine being started.

8-3-1-3

Slew Ring Teeth and Slew Pinion

Ensure slew ring is kept full of grease. Always grease whenever the machine has been steam-cleaned.

For location of the slew ring gear refer to *Component Location Diagrams* at the end of this section.

1 Make the Machine Safe

Stop the engine and remove the starter key.

2 Grease the Slew Ring

- a Remove cover **A** and discharge port plug **B**.
- b Apply grease to the slew ring via aperture **C**.

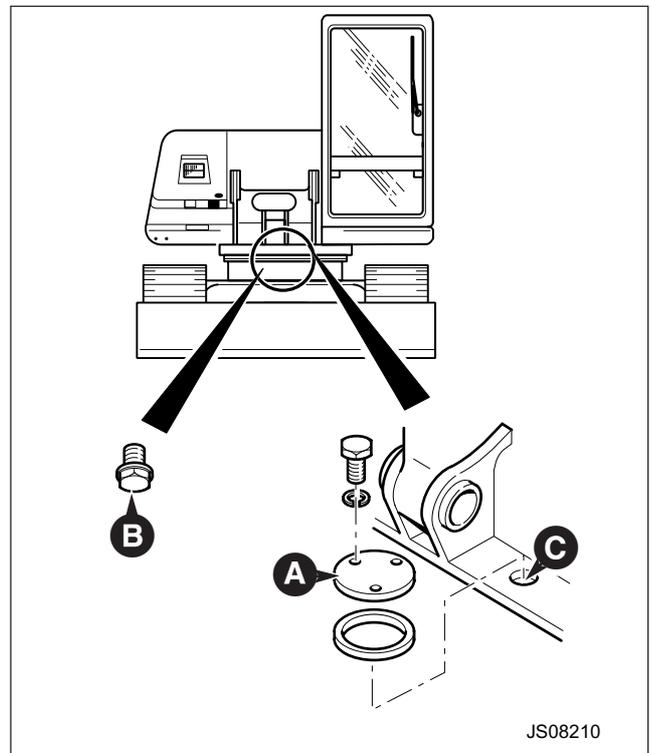
3 Slew the Machine

Start the engine and slew the machine a few degrees. Stop the engine, remove the starter key and apply grease again.

Repeat until the whole ring is greased. Check that grease exudes around the entire circumference.

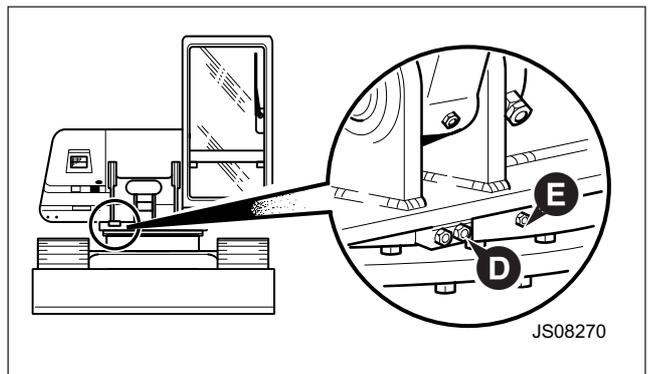
4 Refit the Cover

Refit discharge port plug **B** and cover **A**.



Slew Ring Bearing

Two remote nipples are mounted on plate **D**. A third nipple is at **E**.



Excavator End (Standard Boom) (50 hours)

Read general information about greasing at the beginning of this section.

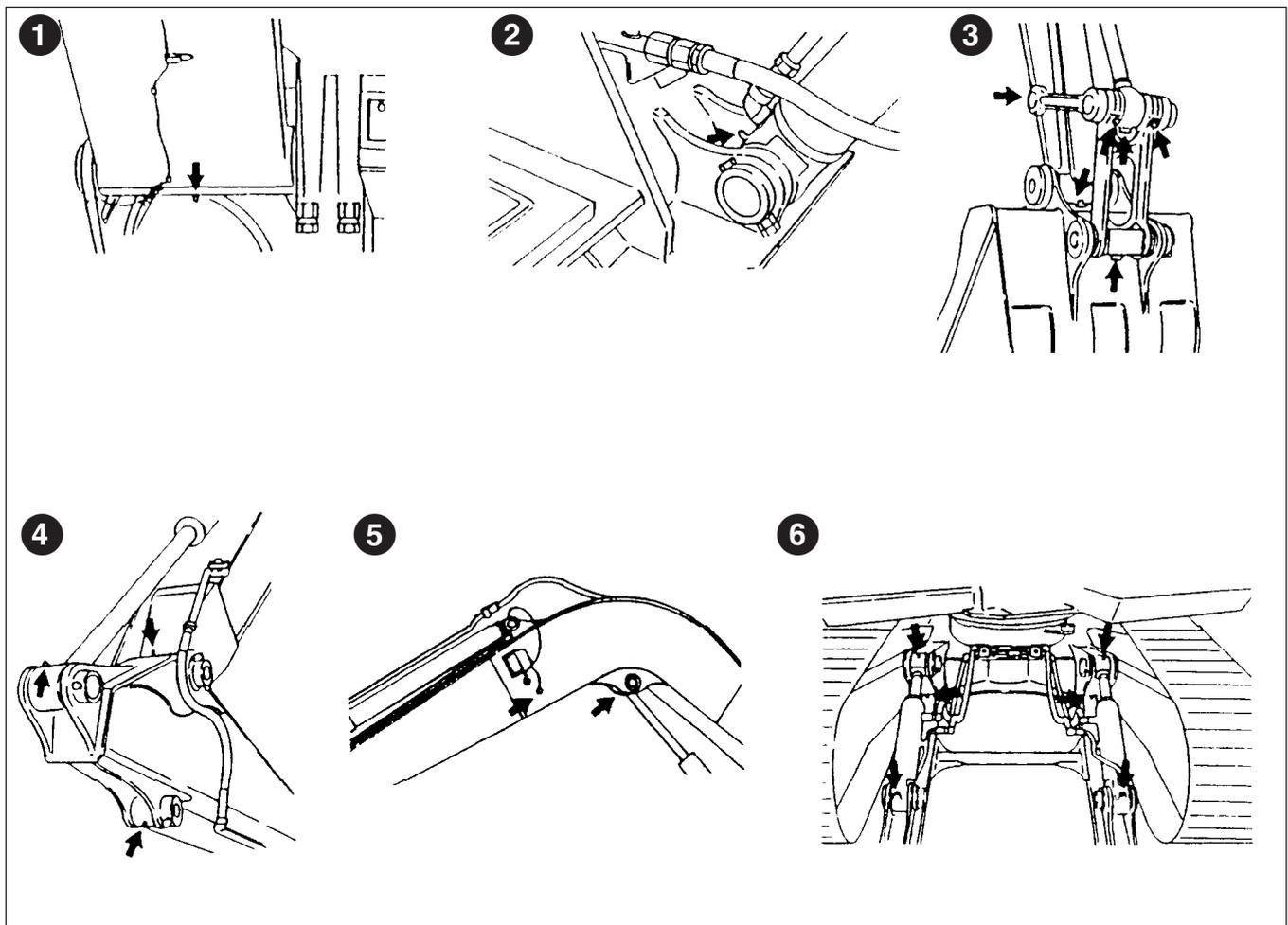
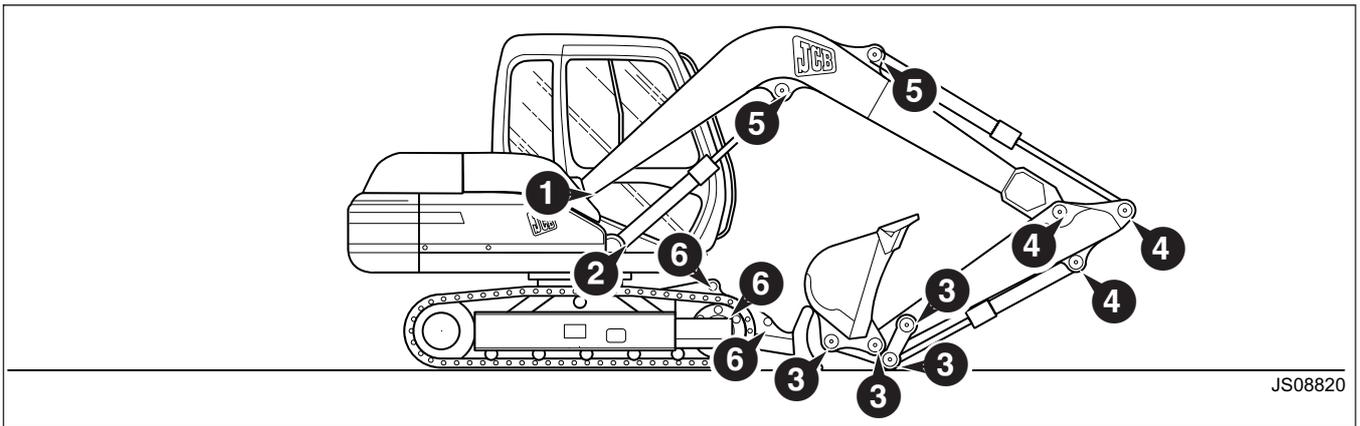
Each arrow highlights one grease point.

19 Grease points

⚠ WARNING

You will be working close into the machine for these jobs. Lower the attachments if possible. Remove the starter key and disconnect the battery. This will prevent the engine being started.

8-3-1-3



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