

# Service Manual

**JS330**  
from machine no. 712501

**JS450**  
from machine no. 714501

**JS460**  
from machine no. 714550

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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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\*

### JS330/JS450/460 and Variants

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.

#### Tightening Torque Table

No	Tightening Point	Bolt Diameter	Wrench mm	Tightening Torque		
				Nm	kgf m	lbf ft
				JS330/JS450-460	JS330/JS450-460	JS330/JS450-460
1†	Travel Motor	M24	36	900~1051	92~107	663~775
2†	Drive Sprocket	M20/M24	30/36	521~608/900~1051	53~62/92~107	384~448/663~775
3†	Take-up Roller	M16	24	267~312	27~32	197~230
4†	Upper (Carrier) Roller (Standard)	M16	24	267~312	27~32	197~230
	(Heavy Duty)	M18	27	371~432	38~44	273~318
5†	Lower (Track) Roller	M20/24	30/36	521~608/900~1051	53~62/92~107	384~448/603~775
6†	Track Guard	M20/24	30/36	521~608/900~1051	53~62/92~107	384~448/603~775
7	Shoe Bolt (Standard)	M20	30	755~931	77~95	557~687
	(Heavy Duty)	M22	32	980~1180	100~120	723~871
8	Counter weight	M27/M42	41/65	1335~1540/1470	136~158/150	985~1136/1084
9†	Turntable Bearing (Lower Frame)	M24	36	900~1050	92~107	664~775
10†	Turntable Bearing (Slew Frame)	M24	36	900~1050	92~107	664~775
11†	Slew Equipment	M24	36	900~1050	92~107	664~775
12†	Engine (Engine Mount)	M20	30	289~337	30~34	213~248
13†	Engine Bracket	M12&M14	19&22	108~127/176~196	11~13/18~20	79~93/130~144
14	Radiator	M16	24	127~147	13~15	93~108
15†	Hydraulic Pump	M12	19	63~73	6.4~7.4	46~54
16†	Oil Tank	M16	24	196	20	144
17†	Fuel Tank	M16	24	245	25	180
18†	Control Valve	M16/M20	24/30	196/343	20/35	144/253
19†	Rotating Joint	M12&M16	19&24	65~95/245~290	7~10/25~30	48~70/180~214
20	Cab	M16	24	128~142	13~15	94~105
21	Battery	M10	17	20~29	2~3	14.7~21.4

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

The tightening torques for the bolts and nuts not listed above are as follows:

Bolt Diameter (size)			M6	M8	M10	M12	M14	M16	M18	M20
Hex. bolt	Wrench	mm	10	13	17	19	22	24	27	30
	Tightening Torque	Nm	6.9	15.7	32.3	58.8	98.0	137.2	196.0	274.4
		kgf m	.69	1.7	3.3	5.9	9.9	13.9	20	28
		lbf ft	5	12	24	43	72	101	145	203
Hex. socket head bolt	Wrench	mm	5	6	8	10	12	14	14	17
	Tightening Torque	Nm	8.8	21.6	42.1	78.4	117.6	176.4	245.0	343.0
		kgf m	.89	2.2	4.3	8.0	12	17.9	24.9	34.9
		lbf ft	6.5	16	31	58	87	130	180	253

## Torque Settings

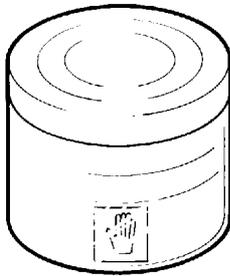
**Note 1:** The figures quoted are for non-plated fasteners and are to be used only when there is no torque setting specified in the relevant procedure in this service manual.

**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			12.9		
	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
<b>M3</b>	0.39	0.04	0.28	-	-	-	-	-	-	-	-	-
<b>M4</b>	0.78	0.08	0.57	-	-	-	-	-	-	-	-	-
<b>M5</b>	1.67	0.17	1.2	-	-	-	-	-	-	-	-	-
<b>M6</b>	2.84	0.29	2.1	8.04	0.82	5.9	11.3	1.15	8.3	-	-	-
<b>M8</b>	7.06	0.72	5.2	19.6	2.00	14.5	27.7	2.82	20.4	48	4.90	35.4
<b>M10</b>	14.0	1.43	10.3	39.1	3.99	28.8	55.0	5.61	40.6	94	9.2	66.4
<b>M12</b>	24.6	2.51	18.1	68.5	6.98	50.5	96.2	9.81	71	166	16.9	122
<b>M16</b>	61.9	6.31	45.7	173	17.6	127.6	242	24.7	178.5	400	40.8	295
<b>M20</b>	122	12.4	90	337	34.4	249	475	48.4	350	-	-	-
<b>M22</b>	167	17.0	123	464	47.3	342	652	66.5	481	-	-	-
<b>M24</b>	210	21.4	155	584	59.5	431	821	83.7	606	-	-	-
<b>M27</b>	311	31.7	229	864	88.1	637	1220	124	900	-	-	-
<b>M30</b>	420	42.8	310	1170	119	863	1650	168	1217	-	-	-
<b>M33</b>	576	58.7	425	1600	163	1180	2260	230	1667	-	-	-
<b>M36</b>	736	75.1	543	2050	209	1512	2880	294	2124	-	-	-
<b>M39</b>	961	98.0	709	2680	273	1977	3760	383	2773	-	-	-
<b>M42</b>	1190	121	878	3300	336	2434	4640	473	3422	-	-	-
<b>M45</b>	1490	152	1099	4140	422	3054	5820	593	4293	-	-	-
<b>M48</b>	1780	182	1312	4960	506	3659	6970	711	5141	-	-	-

## Service Tools

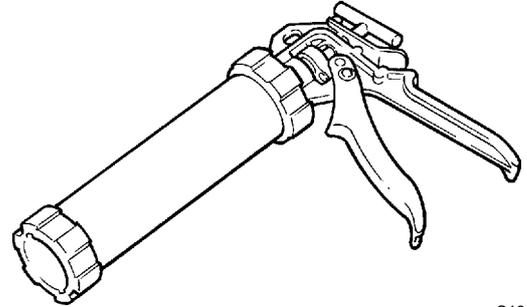
### Body and Framework (Section B)



S186240

**Hand Cleaner** - special blend for the removal of polyurethane adhesives.

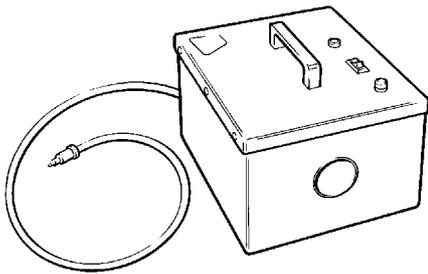
4104/1310 (454g; 1lb tub)



S186270

**Cartridge Gun** - hand operated - essential for the application of sealants, polyurethane materials etc.

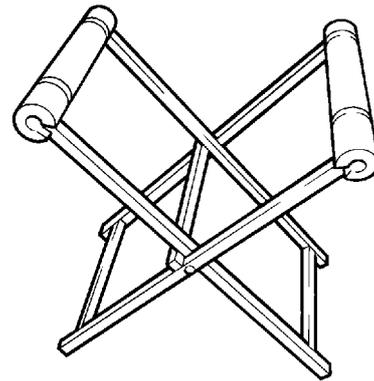
892/00845



S186250

**12V Mobile Oven** - 1 cartridge capacity - required to pre-heat adhesive prior to use. It is fitted with a male plug (703/23201) which fits into a female socket (715/04300).

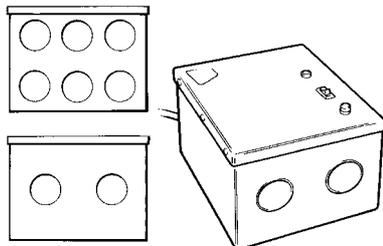
992/12300



S186280

**Folding Stand for Holding Glass** - essential for preparing new glass prior to installation.

892/00843

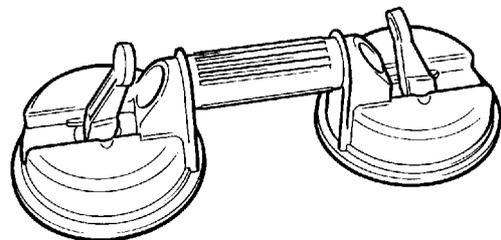


S186260

**240V Static Oven** - available with 2 or 6 cartridge capacity - required to pre-heat adhesive prior to use. No plug supplied. Note: 110V models available upon request - contact JCB Technical Service

992/12400 - 2 cartridge x 240V

992/12600 - 6 cartridge x 240V



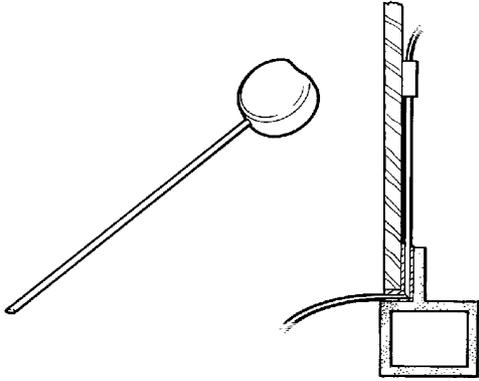
S186300

**Glass Lifter** - minimum 2 off - essential for glass installation, 2 required to handle large panes of glass. Ensure suction cups are protected from damage during storage.

892/00842

**Service Tools (cont'd)**

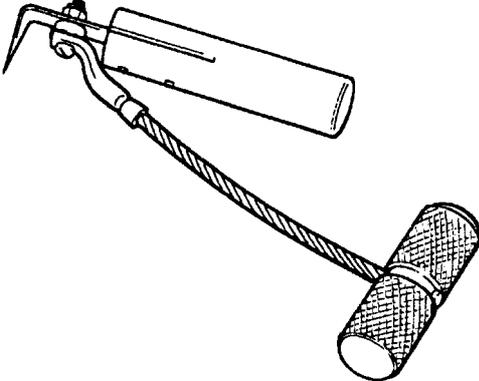
**Body and Framework (Section B) (cont'd)**



S186310

**Wire Starter** - used to access braided cutting wire (below) through original polyurethane seal.

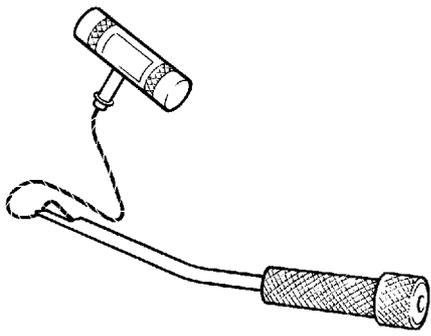
892/00848



S186340

**Cut-out Knife** - used to remove broken glass.

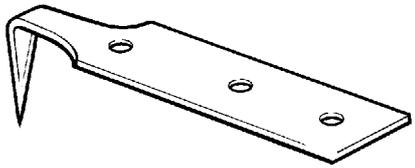
992/12800



S186320

**Glass Extractor (Handles)** - used with braided cutting wire (below) to cut out broken glass.

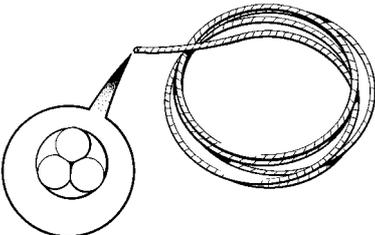
892/00846



S186350

**'L' Blades** - 25mm (1in.) cut - replacement blades for cut-out knife (above).

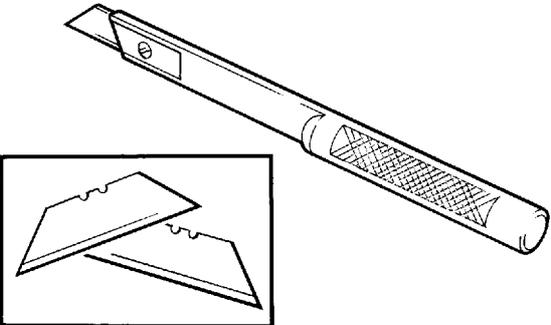
992/12801 (unit quantity = 5 off)



S186330

**Braided Cutting Wire** - consumable heavy duty cut-out wire used with the glass extraction tool (above).

892/00849 (approx 25m length)



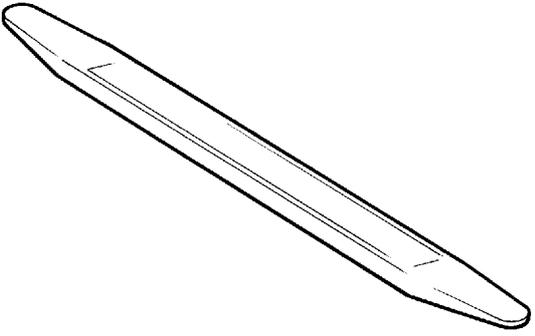
S186360

**Long Knife** - used to give extended reach for normally inaccessible areas.

892/00844

**Service Tools (cont'd)**

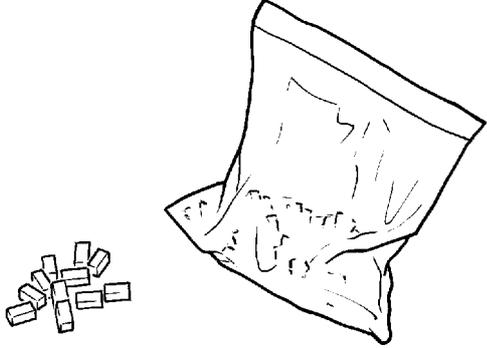
**Body and Framework (Section B) (cont'd)**



S186470

**Nylon Spatula** - general tool used for smoothing sealants - also used to re-install glass in rubber glazing because metal tools will chip the glass edge.

892/00847



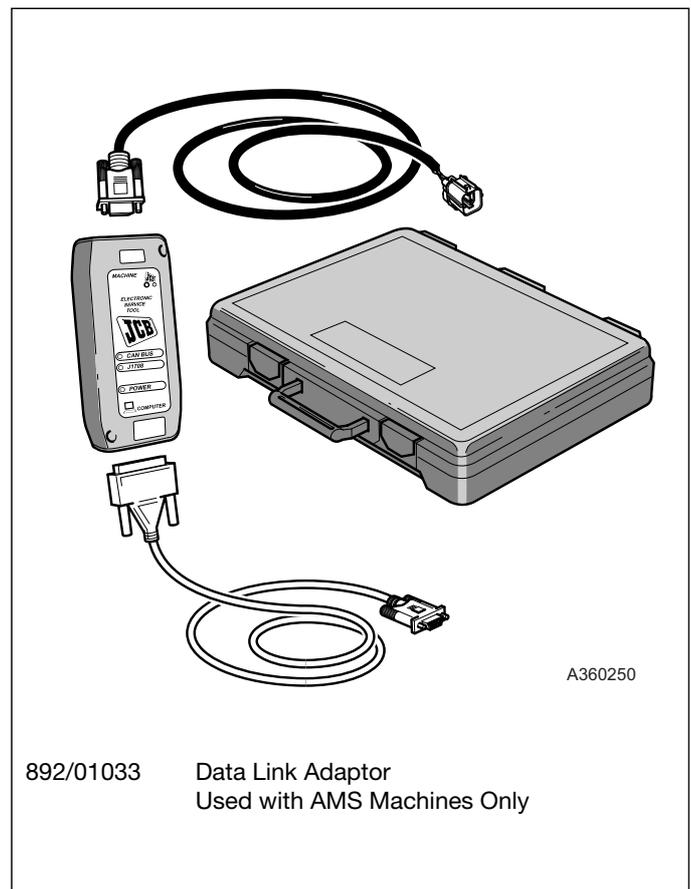
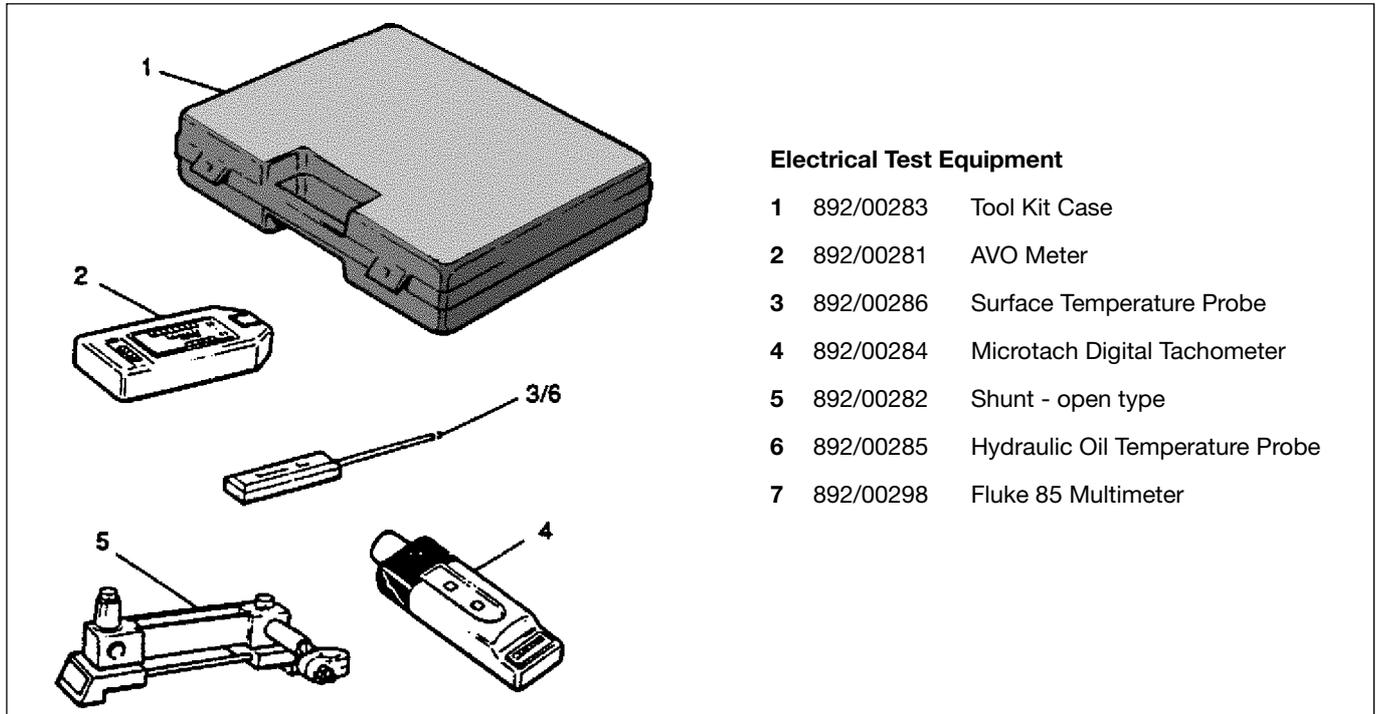
S186550

**Rubber Spacer Blocks** - used to provide the correct set clearance between glass edge and cab frame.

926/15500  
(unit quantity = 500 off)

## Service Tools

## SECTION C - ELECTRICS

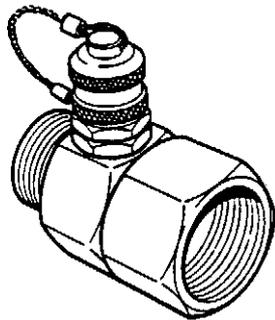
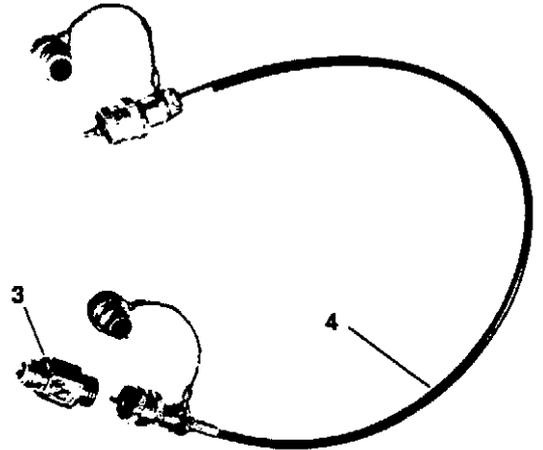
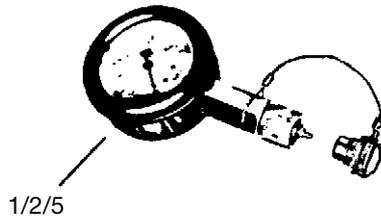


**Service Tools (continued)**

**SECTION E - HYDRAULICS**

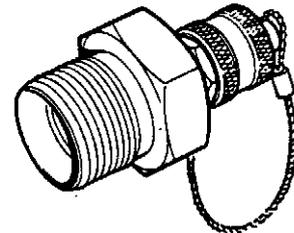
**Hydraulic Pressure Test Gauges and Connections**

- 1 892/00279 Pressure Gauge 0-400 bar (0-6000 lbf/in<sup>2</sup>)
- 2 892/00346 Pressure Gauge 0-70 bar (0-1000 lbf/in<sup>2</sup>)
- 3 892/00347 Connector
- 4 892/00254 Hose
- 5 892/00280 Pressure Gauge 0-600 bar (0-9000 lbf/in<sup>2</sup>)



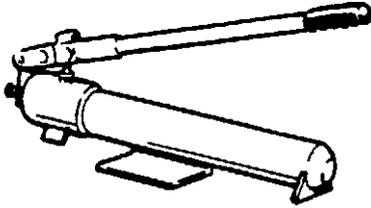
**Pressure Test 'T' Adapters**

- 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

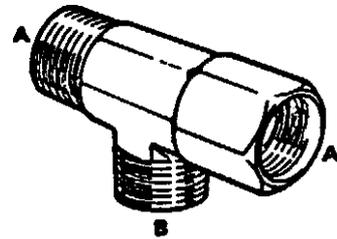


**Pressure Test Adapters**

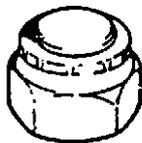
- 892/00255 1/4 in BSP x Test Point
- 892/00256 3/8 in BSP x Test Point
- 892/00257 1/2 in BSP x Test Point
- 892/00258 5/8 in BSP x Test Point
- 816/15118 3/4 in BSP x Test Point
- 892/00259 1 in BSP x Test Point
- 892/00260 1,1/4 in BSP x Test Point
- 892/00261 5/8 in UNF x Test Point

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

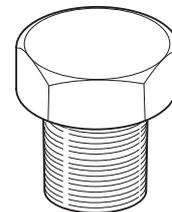
892/00223	Hand Pump
892/00137	Micro-bore Hose 1/4 in BSP x 5 metres
892/00274	Adapter 1/4 in M BSP x 3/8 in M BSP Taper
892/00262	1/4 in M BSP x 1/4 in F BSP x Test Point
892/00706	Test Probe
892/00278	Gauge 0 - 40 bar (0 - 600 lb/in <sup>2</sup> )
892/00279	Gauge 0 - 400 bar (0 - 6000 lb/in <sup>2</sup>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



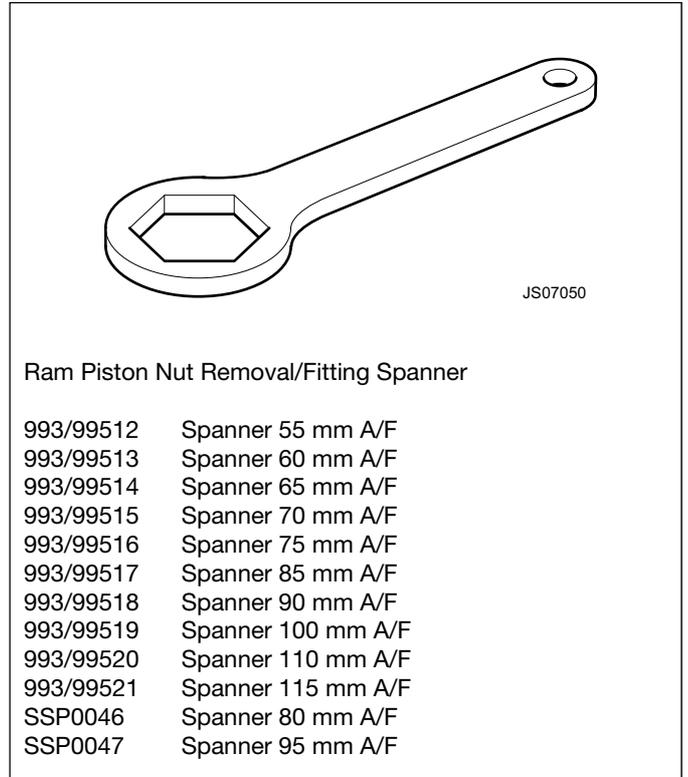
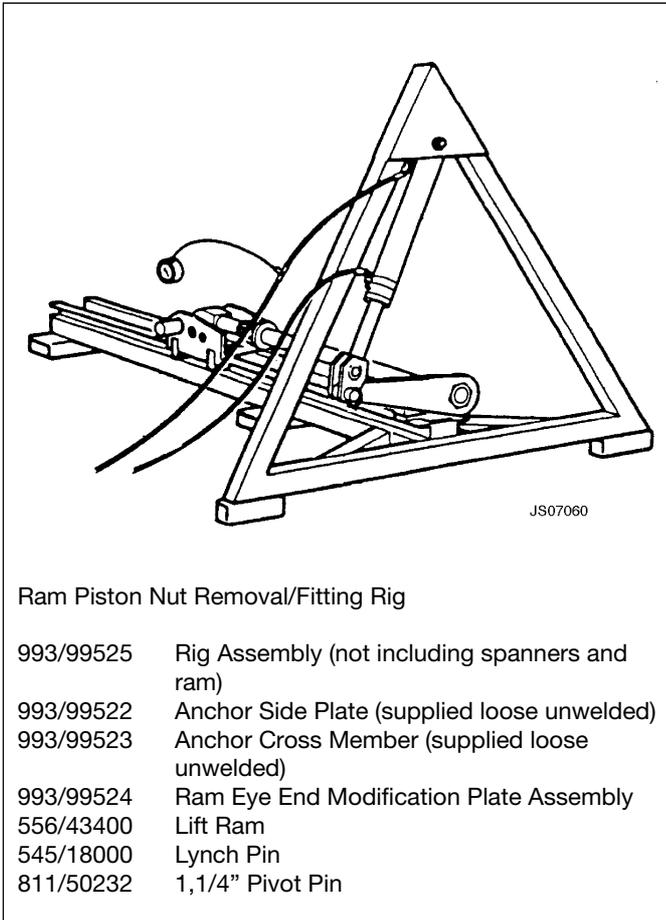
816/50005	1/2 in BSP (A) x 1/2 in BSP (B)
816/60096	3/4 in BSP (A) x 3/4 in BSP (B)
816/00018	1 in BSP (A) x 1 in BSP (B)

**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**

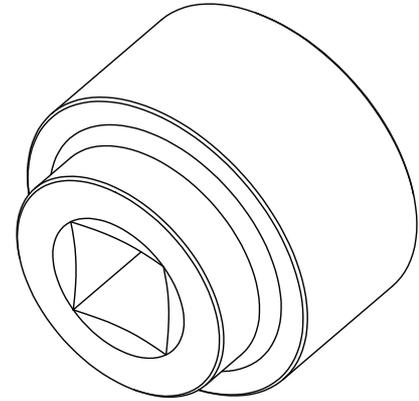
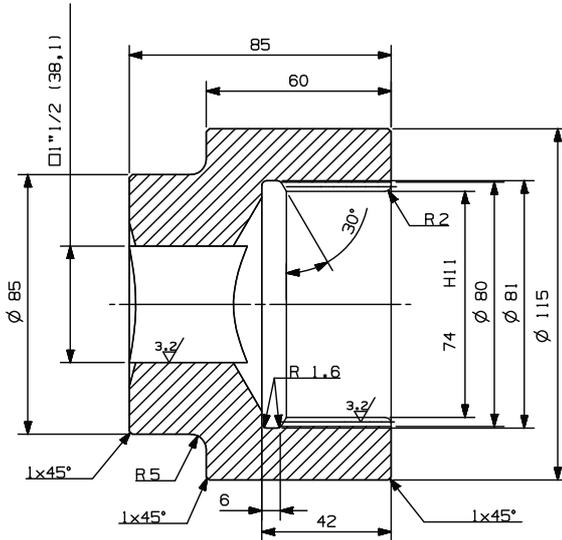
816/00294	1/4 in BSP
816/00189	3/8 in BSP
816/00190	1/2 in BSP
816/00197	5/8 in BSP
816/00196	3/4 in BSP
816/00193	1 in BSP

**Service Tools (continued)****SECTION E - HYDRAULICS**

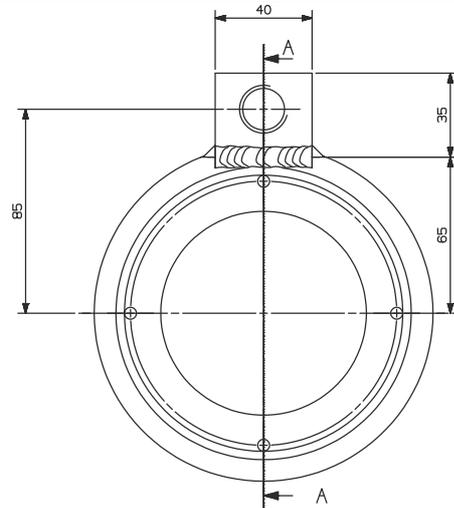
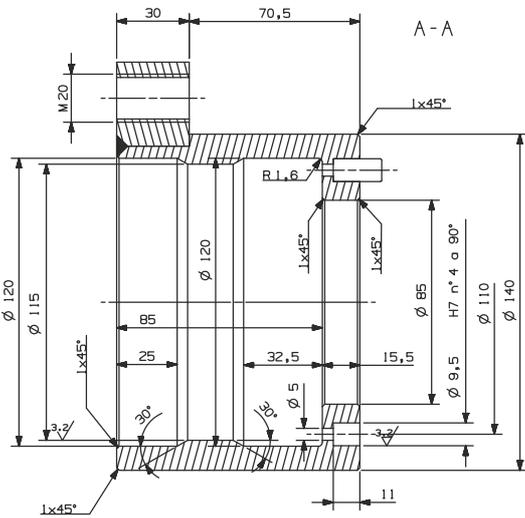
Service Tools (continued)

SECTION E - HYDRAULICS

Socket Box Wrench For disassembly and assembly of slew motor gearbox.

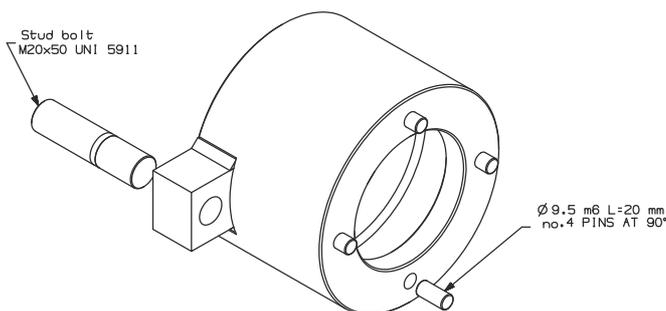


A408900



Nut Adapter

For disassembly and assembly of slew motor gearbox.



A408860

Service Tools (continued)

SECTION E - HYDRAULICS

Seal Ring Tool for assembly and disassemble of slew motor gearbox seal

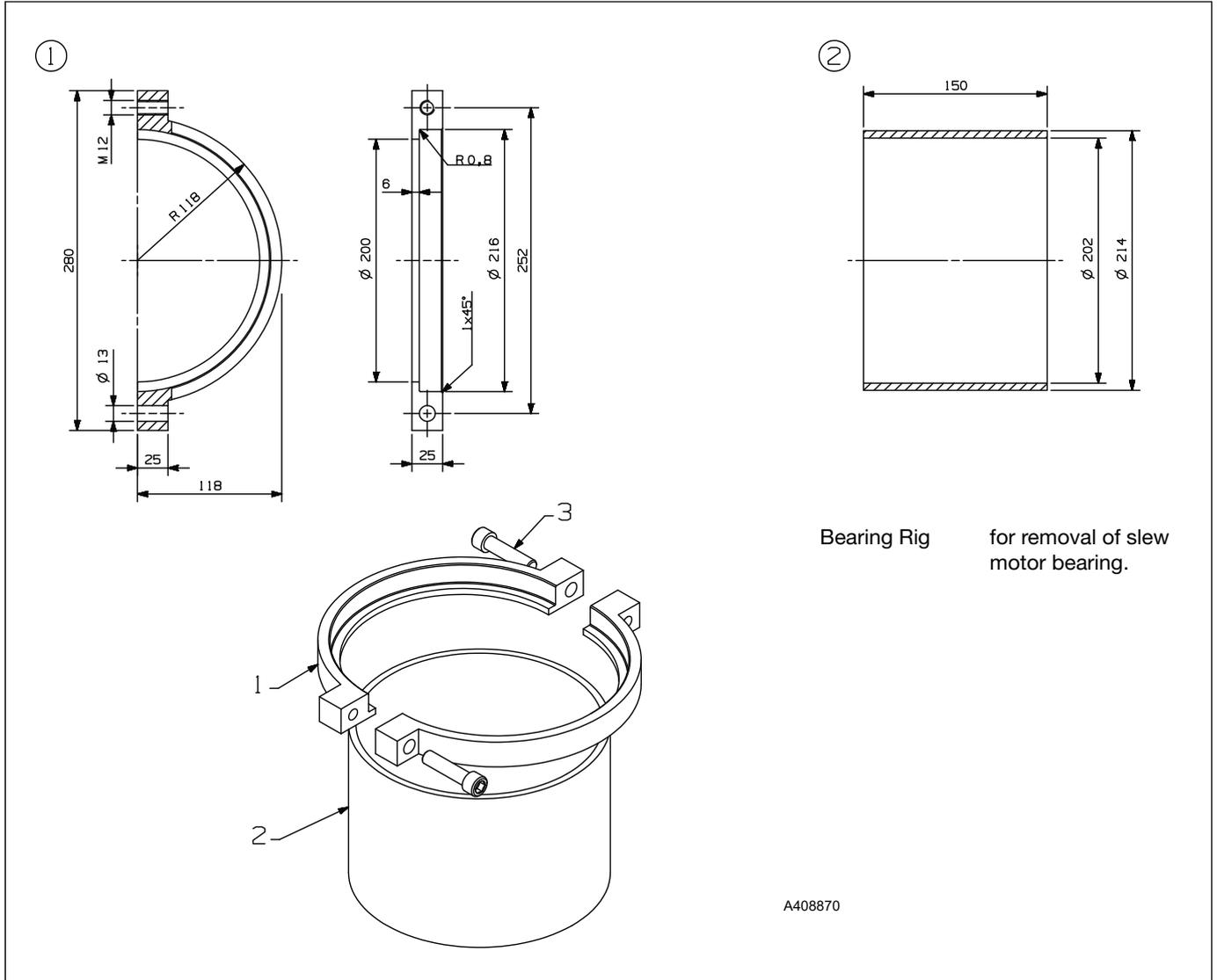
A408880

Stopper for assembly of slew motor gearbox.

A408890

Service Tools (continued)

SECTION E - HYDRAULICS



\* **Sealing and Retaining Compounds**

<b>JCB Multi-Gasket</b>	A medium strength sealant suitable for all sizes of gasket flanges, and for hydraulic fittings of 25-65 mm diameter.	4102/1212	50 ml
<b>JCB Threadlocker</b>	For threads of 50 mm diameter upwards, e.g. suction strainer.	4101/0451	50 ml
<b>JCB Threadlocker (High Strength)</b>	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	50 ml
<b>JCB Retainer (High Strength)</b>	For all retaining parts which are unlikely to be dismantled.	4101/0651	50 ml
<b>JCB Threadlocker and Sealer</b>	A medium strength locking fluid for sealing and retaining nuts, bolts, and screws up to 50 mm diameter, and for hydraulic fittings up to 25 mm diameter.	4101/0250 4101/0251	10 ml 50 ml
<b>JCB Threadlocker and Sealer (High Strength)</b>	A high strength locking fluid for sealing and retaining nuts, bolts, and screws up to 50 mm diameter, and for hydraulic fittings up to 25 mm diameter.	4101/0550 4101/0552	10 ml 200 ml
<b>JCB Threadseal</b>	A medium strength thread sealing compound.	4102/1951	50 ml
<b>JCB Activator</b>	A cleaning primer which speeds the curing rate of anaerobic products.	4104/0251 4104/0253	Aerosol (1 ltr) Bottle (200 ml)
<b>JCB Cleaner/Degreaser</b>	For degreasing components prior to use of anaerobic adhesives and sealants.	4104/1557	Aerosol (400 ml)
<b>Anti-Seize Paste</b>	A compound used for assembly and prevention of parts seizure.	4003/0211	
<b>Direct Glazing Kit</b>	For one pane of glass; comprises items marked † below plus applicator nozzle etc.		
† <b>Ultra Fast Adhesive</b>	For direct glazing	4103/2109	310 ml
† <b>Active Wipe 205</b>	For direct glazing	4104/1203	250 g
† <b>Black Primer 206J</b>	For direct glazing	4201/4906	30 ml
<b>Clear Silicone Sealant</b>	To seal butt jointed glass.	4102/0901	

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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-1-2-2

 **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**

#### **Alcohol and Drugs**

It is extremely dangerous to operate machinery when under the influence of alcohol or drugs. Do not consume alcoholic drinks or take drugs before or whilst operating the machine or attachments. Be aware of medicines which can cause drowsiness.

INT-1-3-9



### **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 carbon dioxide, 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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**CAPACITIES AND SPECIFICATIONS**

Item	Lubricant	International Specification	Capacity	
			JS330	JS450/JS460
ENGINE	See separate chart		34 litres (7.5 UK gal)	34 litres (7.5 UK gal)
TRACK GEARBOX	JCB HD90 Gear Oil	API-GL-5, MIL-L-2105	2 x 8.5 litres (2 x 1.9 UK gal)	2 x 7.0 litres (2 x 1.5 UK gal)
SLEW GEARBOX	JCB HD90 Gear Oil	API-GL-5, MIL-L-2105	14.5 litres (3.2 UK gal)	18 litres (4 UK gal)
TRACK ROLLERS IDLER WHEEL	JCB HD 90 Gear Oil	API-GL-5, MIL-L-2105	-	-
RECOIL SPRING CYLINDER	JCB Special HP Grease	Lithium based, No. 2 consistency	-	-
HYDRAULIC SYSTEM	JCB Hydraulic Fluid 46	ISO VG46	320 litres (70.5 UK gal)	450 litres (99 UK gal)
SLEW RING - BEARING  - GEAR TEETH	JCB Special HP Grease  JCB Special HP Grease	Lithium based No. 2 consistency  Lithium based No. 2 consistency	-  17kg (37.48lb)	-  17kg (37.48lb)
ALL OTHER GREASE POINTS	JCB Special HP Grease	Lithium based No. 2 consistency	-	-
COOLING SYSTEM	see <b>Coolant Mixtures</b>	-	38 litres (8.4 UK gal)	43 litres (9.5 UK gal)
FUEL TANK	see <b>Type of Fuel</b>	-	580 litres (128 gal)	650 litres (143 gal)

**ENGINE LUBRICATION CHART**

Use according to ambient temperature (°C)						
-20	-10	0	10	20	30	40
<div style="border: 2px solid black; padding: 5px; margin: 5px auto; width: 80%;"> <b>JCB 15W/40 MULTIGRADE ENGINE OIL</b>  <b>API CD MIL L-2104C</b> </div> <div style="border: 2px solid black; padding: 5px; margin: 5px auto; width: 70%;"> <b>JCB SUPER UNIVERSAL AGRICULTURAL (10W/30)</b>  <b>API CD/SF</b> </div>						

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. Firefighters 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 need 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 or Crusher

When using a breaker or crusher, 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 or crusher. When a breaker or crusher 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			◆	●		◆	●		◆	●		◆	●
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   ◆ Clean

**Note:** The filters must be changed whenever the period of breaker/crusher 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. Boom/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 (not JS450 or 460).
  - b. Bucket pivot pins (JS450 and 460).

### 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 and slew gearbox oil level †.
  - h. Fuel filter element†.
4. **Check (Engine Stopped)**
  - a. Hoses and pipework for chafing or damage.
  - b. Condition of ram piston.
  - c. Bucket pivot pin grease seals†.
  - d. Track plate condition and bolt torque.
  - 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.
  - c. Pre-cleaner
3. Grease
  - a. Door and canopy hinges.
  - b. Slew ring bearing.
4. Check (Engine Stopped)
  - a. Battery electrolyte level.
  - b. Security of major unit mounting bolts and nuts.  
If loose, tighten to specified torque.
  - c. Track and slew 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. Engine oil.
  - b. Engine oil full flow filter element.
  - c. Fuel filter element.
  - d. Engine oil filter by-pass 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.
  - g. Engine oil (check the degradation and cleanliness by sampling).
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. Grease
  - a. Pivot pins (JS450 and JS460 only).
4. Change (Engine Stopped)
  - a. Engine air filter element (outer).
  - b. Hydraulic tank air breather element.
  - c. Track and slew gearbox oil.
  - d. Return filter element.†††
  - e. Nephron filter.†††
  - f. Servo oil filter element.†††
  - g. Drain filter.†††
5. 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. Change
  - a. Hydraulic fluid suction strainer.
  - b. Engine air filter element (inner).
  - c. Hydraulic Oil (for machines with biodegradable oil).

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

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

†††If using a breaker, crusher or pulverizer, see page 2-1 for revised servicing schedules.