

Service Manual

ROBOT 160, 170, 180T

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Sample of manual. Download All 308 pages at:

<https://www.arepairmanual.com/downloads/jcb-robot-160170180t-skid-steer-loader-service-repair-manual/>

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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 all the 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.

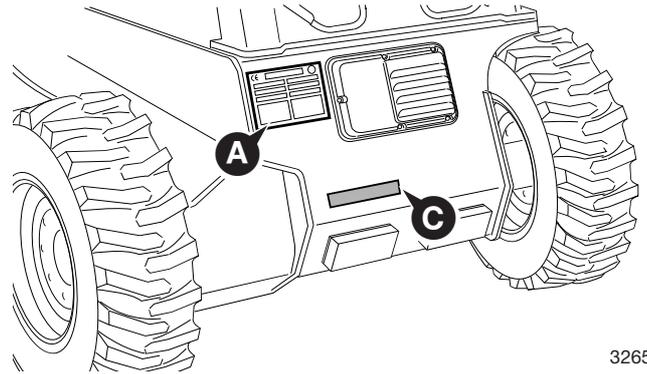
Where a torque setting is given as a single figure it may be varied by plus or minus 3%. Torque figures indicated are for dry threads, hence for lubricated threads may be reduced by one third.

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

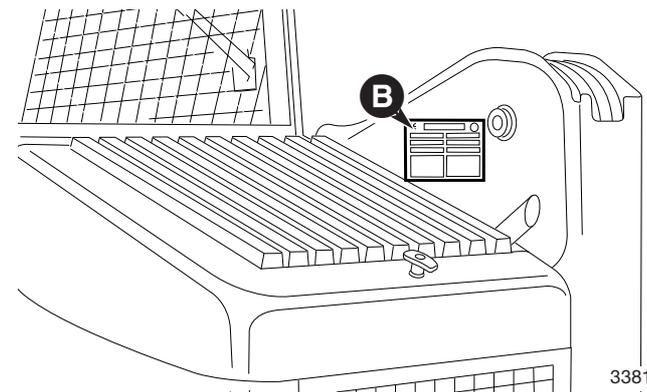
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Machine Identification Plate

On early machines the machine identification plate is located as shown at **A**, on later machines the plate is located as shown at **B**. The plate is stamped with the serial numbers of the major individual units.



326580



338180

Typical Vehicle Identification Number (VIN)

SLP 165 S B V E 677001
 ① ② ③ ④ ⑤ ⑥ ⑦

- ① World Manufacturer Identification
- ② Machine Model
- ③ Machine Type (S = Standard, H = High-flow)
- ④ Build Type (A = Canopy, B = Cab)
- ⑤ Year of Manufacture:
 W = 1998 2 = 2002
 X = 1999 3 = 2003
 Y = 2000 4 = 2004
 1 = 2001 5 = 2005
- ⑥ Manufacturer Location (E = England)
- ⑦ Product Identification Number (PIN)

Unit Identification

The chassis serial number is stamped on the front face of the chassis as shown at **C**.

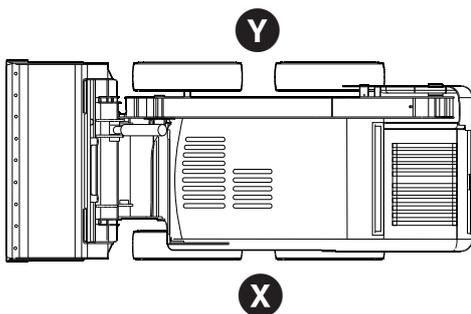
The engine serial number is stamped on a label **D** on the left side of the cylinder block.

The hydraulic pump unit serial number is stamped on a plate on the bottom face of the pump.

If any of the major units are replaced with new ones, the relevant serial number on the Machine Identification Plate will be superseded. Either stamp the plate with the new number or stamp out the old number.

Left Side, Right Side

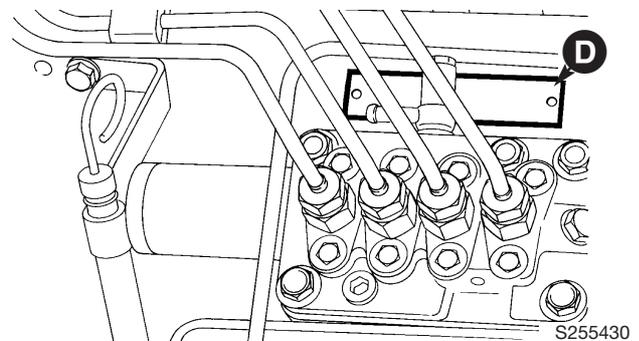
In this manual, 'left' **X** and 'right' **Y** mean your left and right when you are seated correctly in the machine.



323860

		JCB COMPACT PRODUCTS LIMITED HAREWOOD ESTATE, LEEK ROAD, CHEADLE, STOKE ON TRENT, UNITED KINGDOM ST10 2JU			
CONSTRUCTOR		MADE IN UK			
Vehicle Identification No.			Product Identification No.		
ENGINE SERIAL No.			WEIGHT		
PUMP SERIAL No.			YEAR OF MANUFACTURE		
MODEL	80/1269/EEC		MODEL	80/1269/EEC	
	POWER KW	R.P.M.		POWER KW	R.P.M.
160	35.7	2600	190	59.7	2200
170	37.3	2800	190 HF	59.7	2200
170 HF	37.3	2800	1110	68.6	2200
160 HF	35.7	2600	1110 HF	68.6	2200
1CX	37.3	2800	1CX HF	37.3	2800
180	44.7	2800	180 HF	44.7	2800

817/19702



S255430

Use only where no torque setting is specified in the text. Values are for dry threads and may be within three per cent of the figures stated. For lubricated threads the values should be REDUCED by one third.

UNF Grade 'S' Bolts

Bolt Size in	(mm)	Hexagon (A/F) in	Torque Settings		
			Nm	kgf m	lbf ft
1/4	(6.3)	7/16	14	1.4	10
5/16	(7.9)	1/2	28	2.8	20
3/8	(9.5)	9/16	49	5.0	36
7/16	(11.1)	5/8	78	8.0	58
1/2	(12.7)	3/4	117	12.0	87
9/16	(14.3)	13/16	170	17.3	125
5/8	(15.9)	15/16	238	24.3	175
3/4	(19.0)	1 1/8	407	41.5	300
7/8	(22.2)	1 5/16	650	66.3	480
1	(25.4)	1 1/2	970	99.0	715
1 1/4	(31.7)	1 7/8	1940	198.0	1430
1 1/2	(38.1)	2 1/4	3390	345.0	2500

Metric Grade 8.8 Bolts

Bolt Size in	(mm)	Hexagon (A/F) in	Torque Settings		
			Nm	kgf m	lbf ft
M5	(5)	8	7	0.7	5
M6	(6)	10	12	1.2	9
M8	(8)	13	28	3.0	21
M10	(10)	17	56	5.7	42
M12	(12)	19	98	10	72
M16	(16)	24	244	25	180
M20	(20)	30	476	48	352
M24	(24)	36	822	84	607
M30	(30)	46	1633	166	1205
M36	(36)	55	2854	291	2105

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

BSP Adapters with Bonded Washers.

Adapter Size in	Spanner size mm	Torque Settings		
		Nm	kgf m	lbf ft
1/8	11	20	2.0	15
1/4	19	34	3.5	25
3/8	22	75	7.6	55
1/2	27	102	10.4	75
5/8	30	122	12.4	90
3/4	32	183	18.7	135
1	38	203	20.7	150
1 1/4		305	31.1	225
1 1/2		305	31.1	225

SAE Adapters with 'O' rings.

Adapter Size in	Nm	Torque Settings	
		kgf m	lbf ft
7/16	20	2.0	15
9/16	35	3.6	26
3/4	81	8.3	60
7/8	108	11.0	80
1 1/16	183	18.7	135
1 5/16	298	30.4	220
1 5/8	380	38.8	280

Hydraulic Coned BSP Hoses.

Hose Size in	Spanner size mm	Torque Settings		
		Nm	kgf m	lbf ft
1/8	14	14	1.4	10
1/4	19	27	2.7	20
3/8	22	40	4.0	29
1/2	27	55	5.6	40
5/8	30	65	6.6	48
3/4	32	95	9.7	70
1	38	120	12.2	88
1 1/4		189	19.3	139
1 1/2		244	24.9	180

'O' Ring Face Seal System

Adaptors screwed into valve blocks

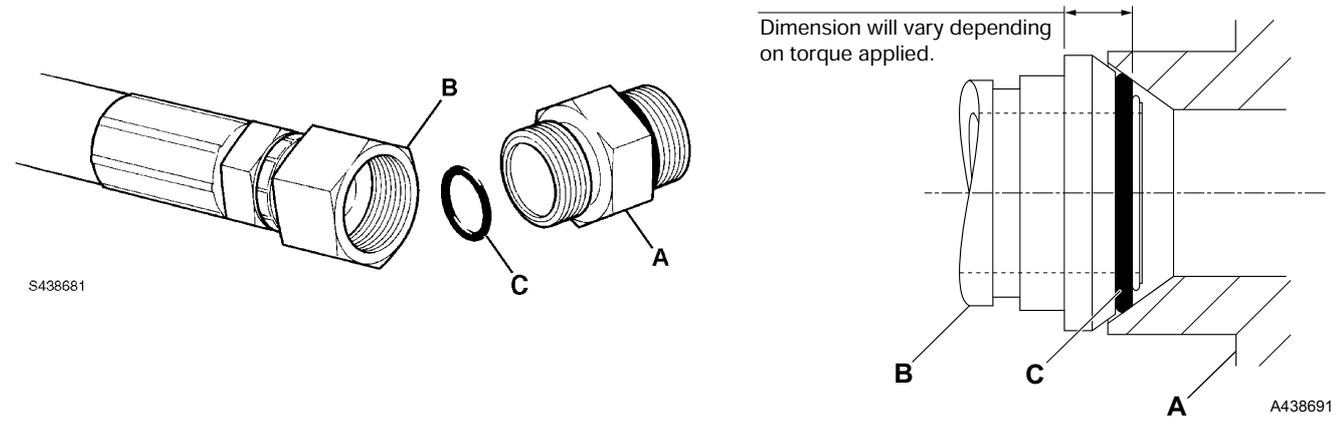
Adaptors screwed into valve blocks, etc. seal onto an 'O' ring which is compressed into a 45° seat machined in the face of the tapped port.

Adaptor Size	Common Spanner Size (A/F)		Tightening Torque	
	mm	in.	Nm	lbf ft
1/4" BSP	19	0.75	18	13
3/8" BSP	22	0.875	31	23
1/2" BSP	27	1	49	36
5/8" BSP	30		60	44
3/4" BSP	32	1.25	81	60
1" BSP	38	1.5	129	95
1 1/4" BSP			206	152

SAE Tube Size	SAE Port Thread Size	Common Spanner Size (A/F)		Tightening Torque	
		mm	in.	Nm	lbf ft
4	7/16 - 20	15.9	0.625	20 - 28	16.5 - 18.5
6	9/16 - 18	19.1	0.750	46 - 54	34 - 40
8	3/4 - 16	22.2	0.875	95 - 105	69 - 77
10	7/8 - 14	27.0	1.063	130 - 140	96 - 104
12	1.1/16 - 12	31.8	1.250	190 - 210	141 - 155
16	1.5/16 - 12	38.1	1.500	290 - 310	216 - 230
20	1.5/8 - 12	47.6	1.875	280 - 380	210 - 280

Hoses Screwed onto Adaptors

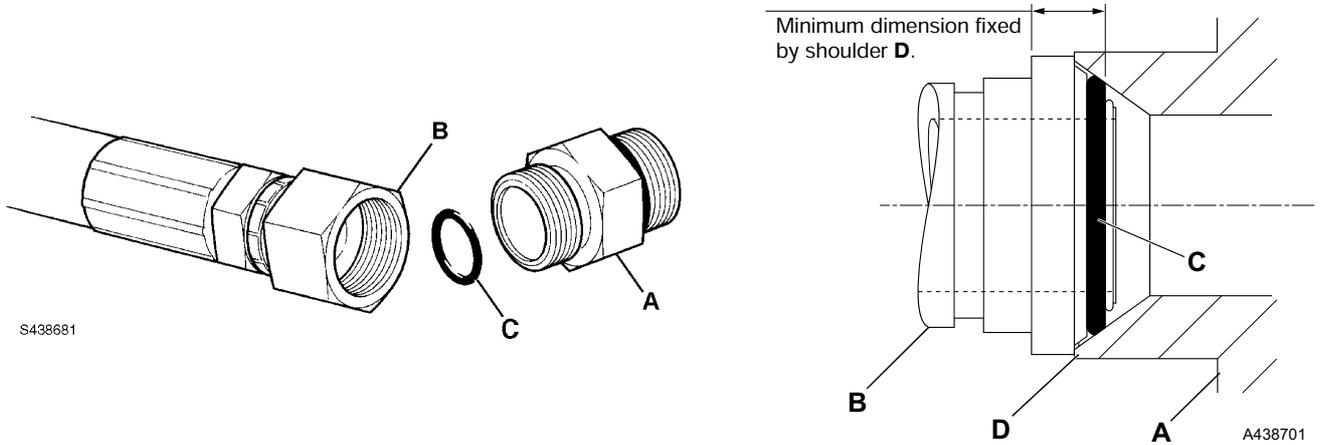
Hoses **B** screwed onto adaptors **A** etc. seal onto an 'O' ring **C** which is compressed into a 45° seat machined in the face of the adaptor port.



Hose Size	Common Spanner Size (A/F)		Tightening Torque	
	mm	in.	Nm	lbf ft
1/8" BSP	14		14	10
1/4" BSP	19	0.75	24	18
3/8" BSP	22	0.875	33	24
1/2" BSP	27	1	44	33
5/8" BSP	30		58	43
3/4" BSP	32	1.25	84	62
1" BSP	38	1.5	115	85
1 1/4" BSP			189	140
1 1/2" BSP			244	180

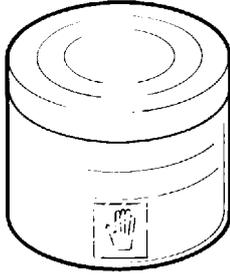
'Torque Stop' Hose System

'Torque Stop' Hoses **B** screwed onto adaptors **A** etc. seal onto an 'O' ring **C** which is compressed into a 45° seat machined in the face of the adaptor port. To prevent the 'O' ring being damaged as a result of over tightening, 'Torque Stop' Hoses have an additional shoulder, which acts as a physical stop.



Hose Size	Common Spanner Size (A/F)		Tightening Torque	
	mm	in.	Nm	lbf ft
1/8" BSP	14		14	10
1/4" BSP	19	0.75	27	20
3/8" BSP	22	0.875	40	30
1/2" BSP	27	1	55	40
5/8" BSP	30		65	48
3/4" BSP	32	1.25	95	70
1" BSP	38	1.5	120	89
1 1/4" BSP			189	140
1 1/2" BSP			244	180

* Section B - Body and Framework



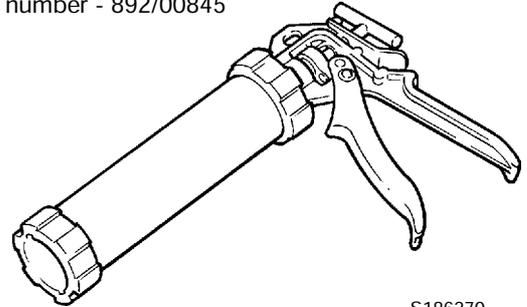
Hand Cleaner - special blend for the removal of polyurethane adhesives.

JCB part number - 4104/1310
(454g; 1 lb tub)

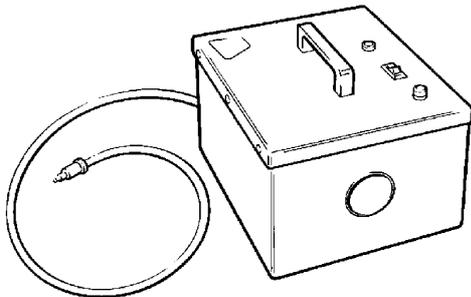
S186240

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

JCB part number - 892/00845



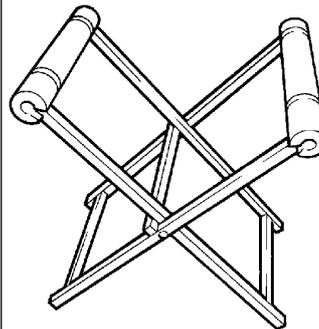
S186270



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).

JCB part number - 992/12300

S186250



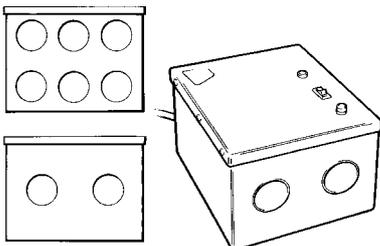
Folding Stand for Holding Glass - essential for preparing new glass prior to installation.

JCB part number - 892/00843

S186280

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.

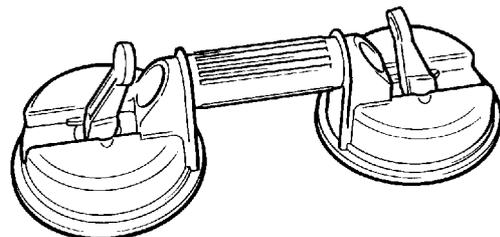
JCB part number:
992/12400 - 2 Cartridge x 240V
992/12600 - 6 Cartridge x 240V



S186260

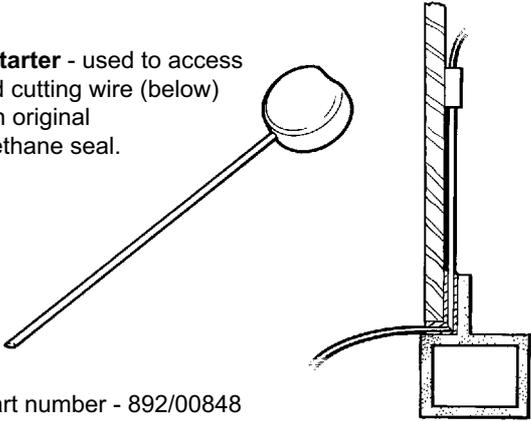
Glass Lifter - minimum 2 off - essential for glass installation, 2 required to handle large panes of glass. Ensure suction cups are protected from damage during storage.

JCB part number - 892/00842



S186300

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

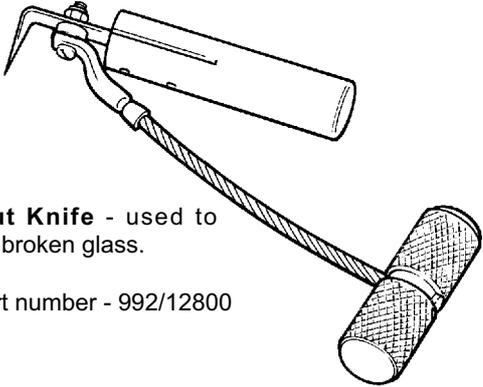


JCB part number - 892/00848

S186310

Cut-Out Knife - used to remove broken glass.

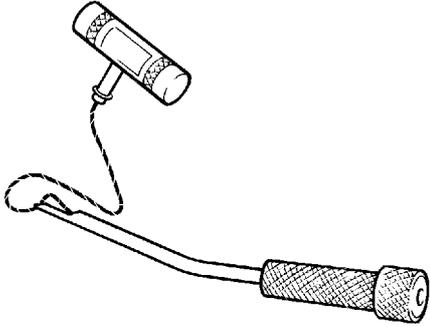
JCB part number - 992/12800



S186340

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

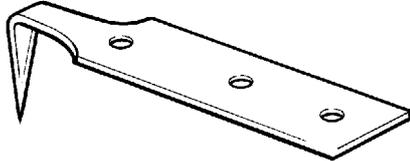
JCB part number - 892/00846



S186320

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

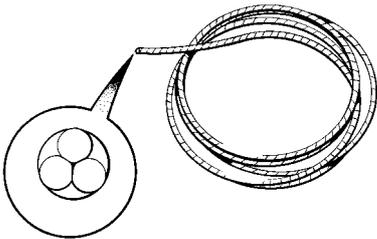
JCB part number - 992/12801 (unit quantity = 5 off)



S186350

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

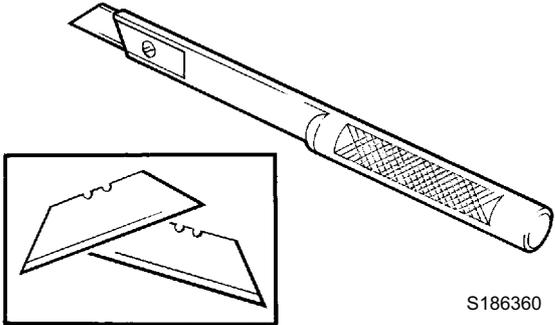
JCB part number - 892/00849
(approx 25 m length)



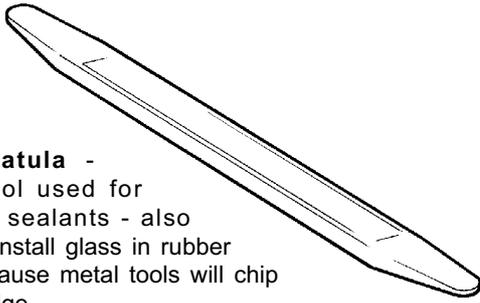
S186330

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

JCB part number - 892/00844



S186360



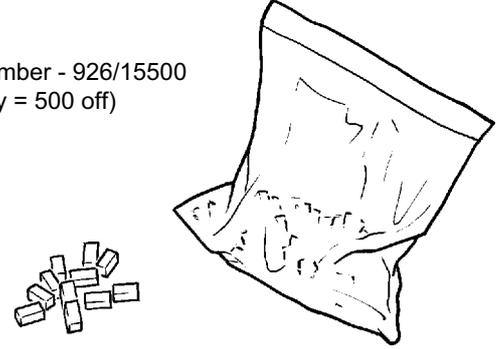
Nylon Spatula -
general tool used for
smoothing sealants - also
used to re-install glass in rubber
glazing because metal tools will chip
the glass edge.

JCB part number - 892/00847

S186470

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

JCB part number - 926/15500
(unit quantity = 500 off)

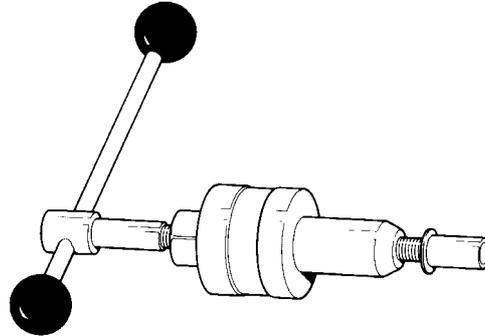


S186550

Rivet Nuts

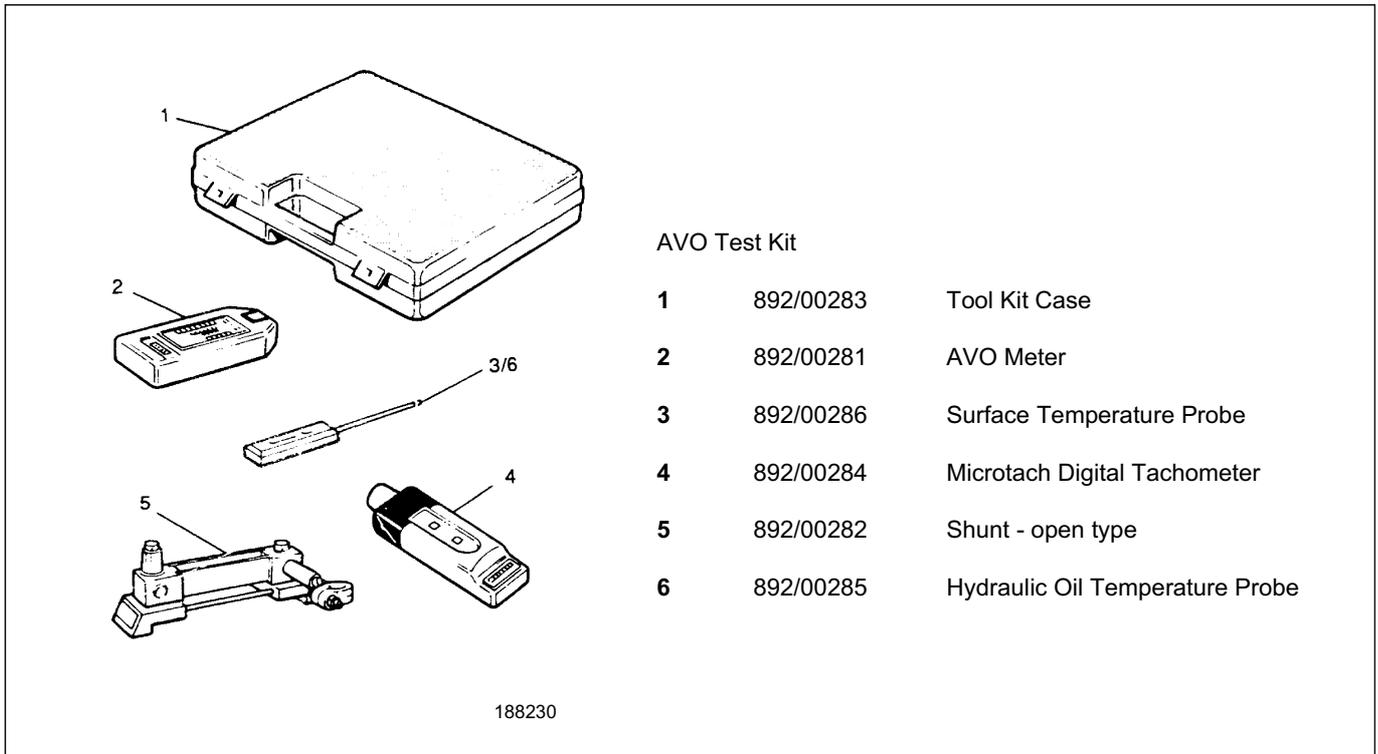
826/01099 M6 x 16mm Rivet Nut
826/01101 M6 x 19mm Rivet Nut
826/01103 M8 x 18mm Rivet Nut
826/01102 M8 x 21mm Rivet Nut
826/01104 M10 x 23mm Rivet Nut
826/01105 M10 x 26mm Rivet Nut

Installation Tool Available from:
Bollhoff Fastenings Ltd.
Midacre
The Willenhall Estate
Rose Hill
Willenhall
West Midlands, WV13 2JW

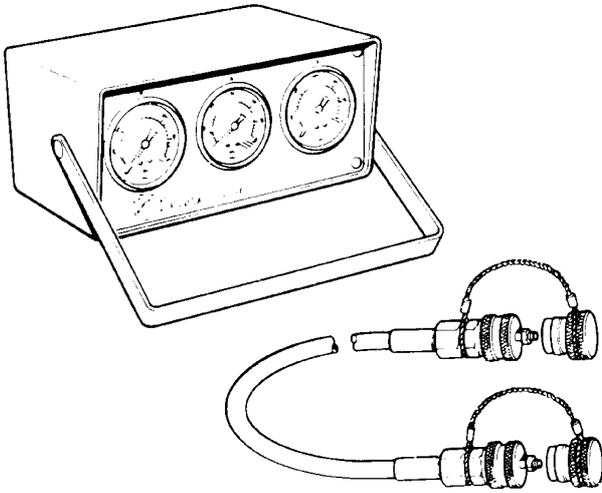


S261210

Section C - Electrics



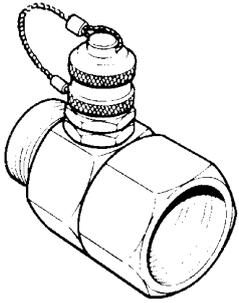
Section E - Hydraulics



188120

Hydraulic Circuit Pressure Test Kit

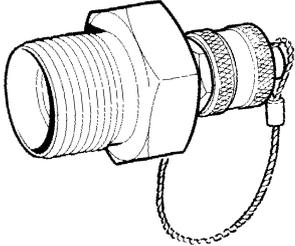
- 892/00253 Pressure Test Kit
- 892/00201 Replacement Gauge 0-20 bar (0-300 lbf/in²)
- 892/00202 Replacement Gauge 0-40 bar (0-600 lbf/in²)
- 892/00203 Replacement Gauge 0-400 bar (0-6000 lbf/in²)
- 892/00254 Replacement Hose



188130

Pressure Test 'T' Adapters

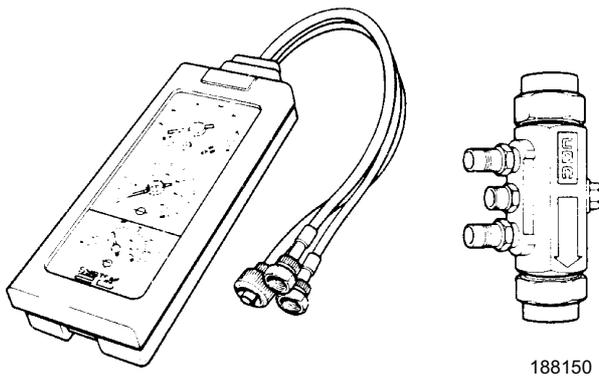
- 892/00262 1/4 in M BSP x 1/4 in F BSP x Test Point
- 816/55038 3/8 in M BSP x 3/8 in F BSP x Test Point
- 816/55040 1/2 in M BSP x 1/2 in F BSP x Test Point
- 892/00263 5/8 in M BSP x 5/8 in F BSP x Test Point
- 892/00264 3/4 in M BSP x 3/4 in F BSP x Test Point
- 892/00265 1 in M BSP x 1 in F BSPP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



200140

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

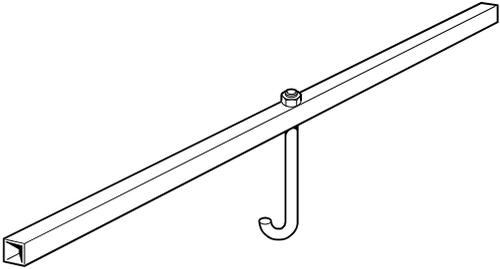


188150

Flow Test Equipment

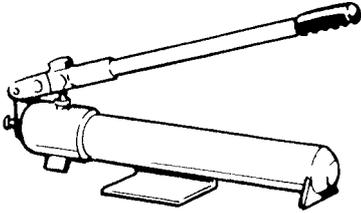
- 892/00268 Flow Monitoring Unit
- 892/00269 Sensor Head 0 - 100 l/min (0 - 22 UK gal/min)
- 892/00270 Load Valve
- 1406/0021 Bonded Washer
- 1604/0006 Adapter 3/4 in M x 3/4 in M BSP
- 1612/0006 Adapter 3/4 in F x 3/4 in M BSP
- 892/00271 Adapter 3/4 in F x 5/8 in M BSP
- 892/00272 Adapter 5/8 in F x 3/4 in M BSP
- 816/20008 Adapter 3/4 in F x 1/2 in M BSP
- 892/00275 Adapter 1/2 in F x 3/4 in M BSP
- 892/00276 Adapter 3/4 in F x 3/8 in M BSP
- 892/00277 Adapter 3/8 in F x 3/4 in M BSP

Section E - Hydraulics



A215880

892/00858 Pump support bracket - for engine removal.



193850

Hand Pump Equipment

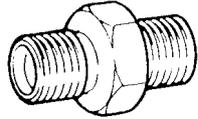
- 892/00223 Hand Pump
- 892/00137 Micro-bore Hose 1/4 in BSP x 5 metres
- 892/00274 Adapter 1/4 in M BSP x 3/8 in M BSP Taper
- 892/00262 1/4 in M BSP x 1/4 in F BSP x Test Point
- 892/00706 Test Probe
- 892/00278 Gauge 0 - 40 bar (0 - 600 lbf/in²)
- 892/00279 Gauge 0 - 400 bar (0 - 6000 lbf/in²)



188140

Bonded Washers

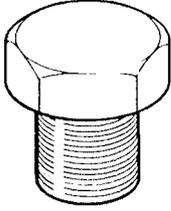
- 1406/0011 1/4 in BSP
- 1406/0018 1/2 in BSP
- 1406/0021 3/4 in BSP
- 1406/0029 1.1/4 in BSP



193860

Male Adapters - BSP x BSP

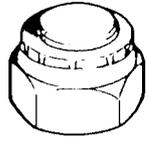
- 1606/0003 3/8 in x 1/4 in
- 1604/0003 3/8 in x 3/8 in
- 1606/0004 1/2 in x 1/4 in
- 1606/0007 1/2 in x 3/8 in
- 1604/0004 1/2 in x 1/2 in
- 1606/0008 3/4 in x 3/8 in
- 1606/0009 3/4 in x 1/2 in
- 1604/0006 3/4 in x 3/4 in



193870

Female Cone Blanking Plug

- 892/00055 1/4 in BSP
- 892/00056 3/8 in BSP
- 892/00057 1/2 in BSP
- 892/00059 3/4 in BSP
- 892/00060 1 in BSP'T'

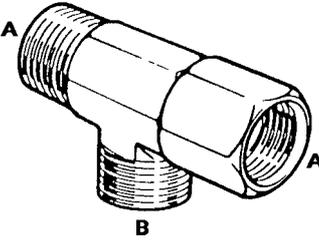


193880

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

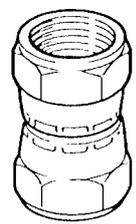
Section E - Hydraulics



193890

'T' Adapters

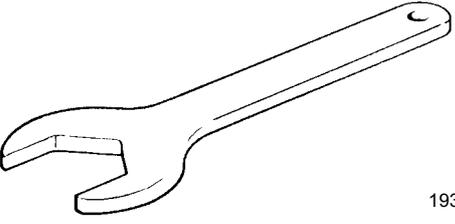
892/00047	3/8 in BSP (A) x 1/4 in BSP (B)
892/00048	1/2 in BSP (A) x 1/4 in BSP (B)
816/50043	3/4 in BSP (A) x 1/4 in BSP (B)
816/60096	3/4 in BSP (A) x 3/4 in BSP (B)



193900

Female Connectors

892/00074	3/8 in BSP x 3/8 in BSP
892/00075	1/2 in BSP x 1/2 in BSP
892/00077	3/4 in BSP x 3/4 in BSP



193930

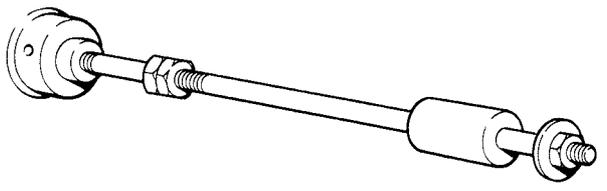
Hexagon Spanners for Ram Pistons and End Caps

992/09300	55 mm A/F
992/09400	65 mm A/F
992/09500	75 mm A/F
992/09600	85 mm A/F



193920

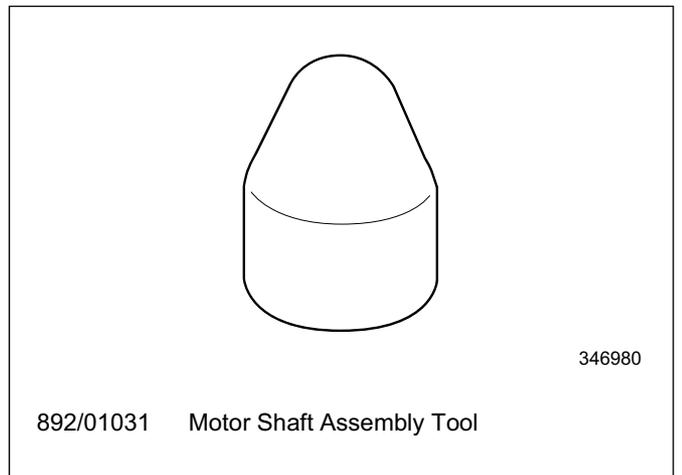
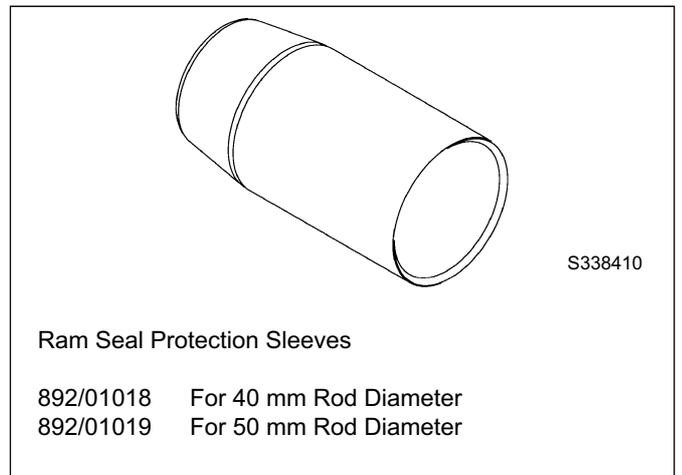
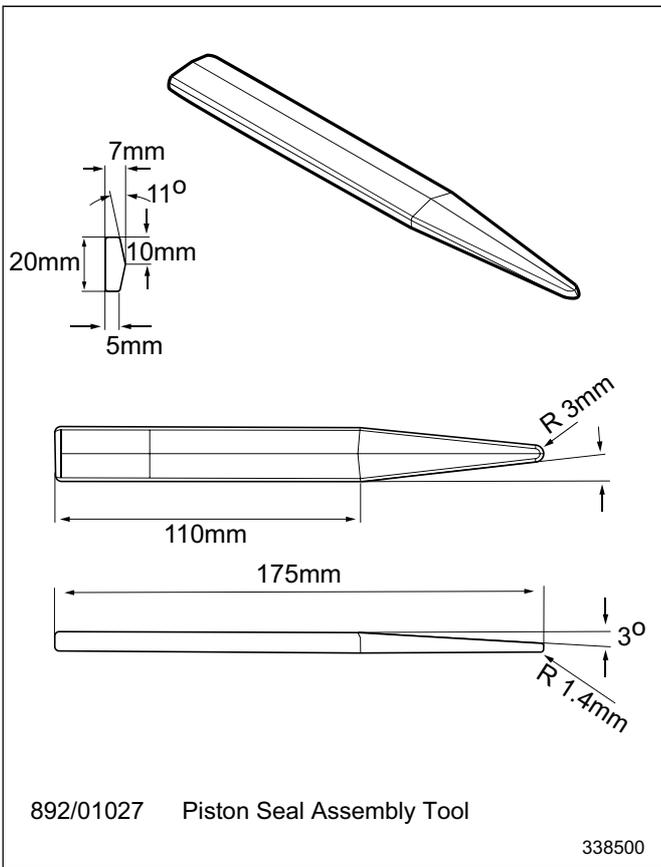
993/99510 Half Moon Spanner



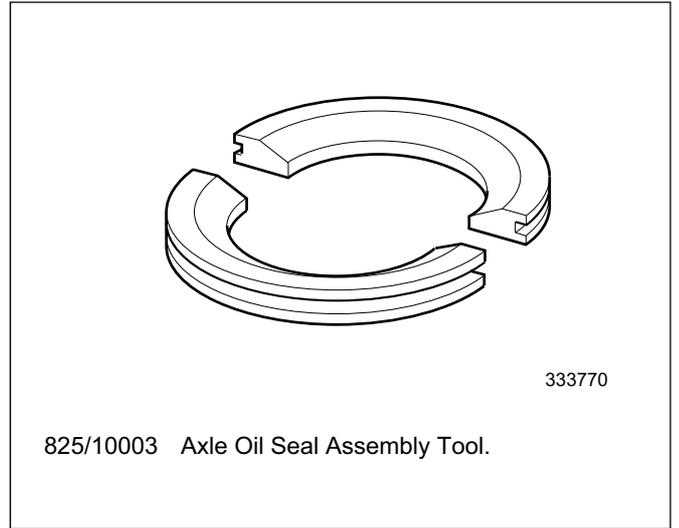
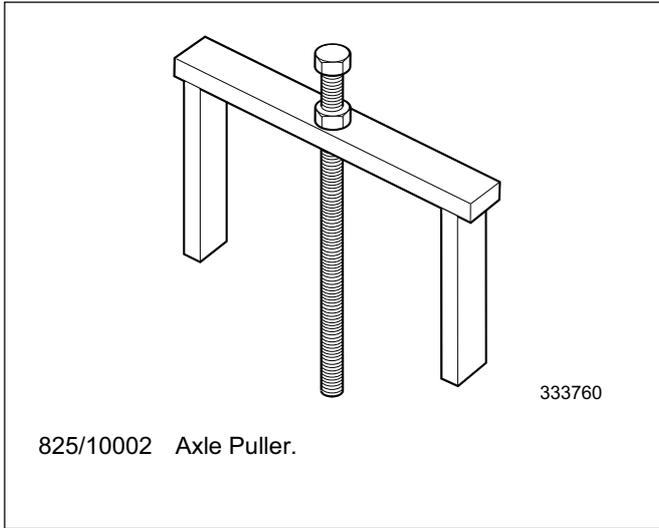
193910

993/68100 Slide Hammer

Section E - Hydraulics



Section F - Transmission



8 - 1	Sealing and Retaining Compounds	8 - 1
JCB Multi-Gasket	A medium strength sealant suitable for all sizes of gasket flanges, and for hydraulic fittings of 25-65 mm diameter.	4102/1212 50ml
JCB Threadlocker (High Strength)	A high strength locking fluid for use with threaded components.	4102/0551 50ml
JCB Retainer (High Strength)	For retaining parts which are unlikely to be dismantled.	4101/0651 50ml
JCB Threadlocker & Sealer	A medium strength locking fluid for sealing and retaining nuts, bolts, and screws up to 50 mm dia., and for hydraulic fittings up to 25 mm dia.	4101/0250 10ml 4101/0251 50ml
JCB Threadlocker & Sealer (High Strength)	A medium to high strength locking fluid for retention and sealing of ram piston heads.	4101/0550 10ml 4101/0552 50ml
JCB Threadlocker	A locking fluid for use on threads larger than 50 mm dia.	4101/0451 50ml
JCB Threadseal	A medium strength thread sealing compound.	4102/1951 50ml
JCB Activator	A cleaning primer which speeds the curing rate of anaerobic products.	4104/0251 Aerosol (1ltr) 4104/0253 Bottle (200ml)
JCB Cleaner/Degreaser	For degreasing components prior to use of anaerobic adhesives and sealants.	4104/1557 Aerosol (400ml)
Direct Glazing Kit	For one pane of glass; comprises items marked † below plus applicator nozzle, etc.	
† Ultra Fast Adhesive	For direct glazing	4103/2109 310ml
† Active Wipe 205	For direct glazing	4104/1203 250g
† Black Primer 206J	For direct glazing	4201/4906 30ml
Clear Silicone Sealant	To seal butt jointed glass	4102/0901

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Safety Notices

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 machine 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

General Safety

WARNING

Decals

You can be injured if you do not obey the decal safety instructions. Keep decals clean. Replace unreadable or missing decals with new ones before operating the machine. Make sure replacement parts include warning decals where necessary.

INT-1-3-4

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

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

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

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

Raised Attachments

Raised attachments can fall and injure you. Do not walk or work under raised attachments unless they are safely blocked.

INT-1-3-8

Operating Safety

WARNING Entering/Leaving

When entering and leaving the cab, use the step and handrails. Make sure the step, handrails and your boot soles are clean and dry. Do not jump from the machine. Do not use the machine controls or Safety Restraint Bar as handholds, use only the handrails.
3-1-1-1

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 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 Passengers

Passengers in or on the machine can cause accidents. The JCB Skid Steer Loader is a one man machine. Do not carry passengers.
INT-2-2-2

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

CAUTION

Do not attempt to operate the machine immediately after starting in cold conditions. The machine may not respond properly to control movements. Allow at least 10 minutes warm up time with the engine at half throttle. Operate the arm and bucket services to warm the hydraulic oil.
3-1-1-5

WARNING ROPS/FOPS Structure

The machine is fitted with a Roll Over Protection Structure (ROPS) and a Falling Objects Protection Structure (FOPS). You could be killed or seriously injured if you operate the machine with a damaged or missing ROPS/FOPS. If the ROPS/FOPS has been in an accident, do not use the machine until the structure has been renewed. Modifications and repairs that are not approved by the manufacturer may be dangerous and will invalidate the ROPS/FOPS certification.
INT-2-1-9/3

WARNING Seat Belts

The ROPS/FOPS cab is designed to give you protection in an accident. If you do not wear your seat belt, you could be thrown around inside the cab or thrown out of the machine and crushed. You must wear a seat belt when using the machine. Fasten the seat belt before starting the engine.
2-2-1-9

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 Ramps and Trailers

Water, mud, ice, grease and oil on ramp 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. Always reverse up a ramp if unloaded, travel forwards if loaded.
3-1-1-3/1

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 Attachments

Use only JCB approved attachments. Non-approved attachments, modified to fit the Skid Steer Loader, could cause damage to the machine, and/or make it unsafe. The use of non-approved attachments could invalidate your warranty.
3-1-2-1

Maintenance Safety

WARNING

Repairs

Do not try to do repairs or any other type of maintenance work you do not understand. To avoid injury and/or damage get the work done by a specialist engineer.

GEN-1-5

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

Always wear safety glasses when dismantling assemblies containing components under pressure from springs. This will protect against eye injury from components accidentally flying out.

GEN-6-2

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

Soft Ground

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

INT-3-2-4

WARNING

Engine

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

INT-2-1-6/1

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

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 or injury if you do not follow these precautions.

INT-3-2-2

WARNING

Electrical Circuits

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

INT3-1-4

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

DANGER

Electrolyte

Battery electrolyte is toxic and corrosive. Do not breathe the gases given off by the battery. Keep the electrolyte away from your clothes, skin, mouth and eyes. Wear safety glasses. See Battery in MAINTENANCE section for First Aid treatment.

INT-3-2-1/2

Maintenance Safety (cont'd)**⚠ 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

⚠ WARNING**Hydraulic Pressure**

It is not possible to vent all residual pressure. Loosen the connection one full turn and allow the pressure to dissipate. Keep face and hands well clear of pressurised hydraulic oil and wear protective glasses.

HYD 4-3

⚠ 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

⚠ 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

⚠ 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**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 steam pressure escape, then remove the cap.

INT-3-2-9

⚠ WARNING**Tyres and Rims**

Over-inflated or over-heated tyres can explode. Follow the instructions in this manual for inflating the tyres. Do not weld or cut rims. Get a tyre/wheel specialist to do any repair work.

INT-3-2-6

⚠ 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. Firefighters should use self-contained breathing apparatus.

INT-3-2-7/1

⚠ 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

Safety Decals

WARNING

Decals on the machine warn you of particular hazards. Each decal is attached close to a part of the machine where there is a possible hazard. Read and make sure you understand the safety message before you work with or on that part of the machine.

Keep all decals clean and readable. Replace lost or damaged decals. The decals and their attachment points are shown on the following pages. Each decal has a part number printed on it, use this number to order a new decal from your JCB distributor.

INT-3-3-3

WARNING

If you need eye-glasses for reading, make sure you wear them when reading the safety decals. Decals are strategically placed around the machine to remind you of possible hazards. Do not over-stretch or place yourself in dangerous positions to read the decals.

INT-3-3-4

Safety Decals (cont'd)

ATTENTION !

A THE ENGINE WILL NOT START IF HIGH FLOW (IF FITTED) IS SWITCHED ON.

B THE AUXILIARY HYDRAULICS CAN STILL BE OPERATED WHEN THE DRIVE CONTROL AND LOADER CONTROL ARE ISOLATED UNLESS THE LATCH IS MANUALLY ENGAGED.

817/16642-2

DANGER

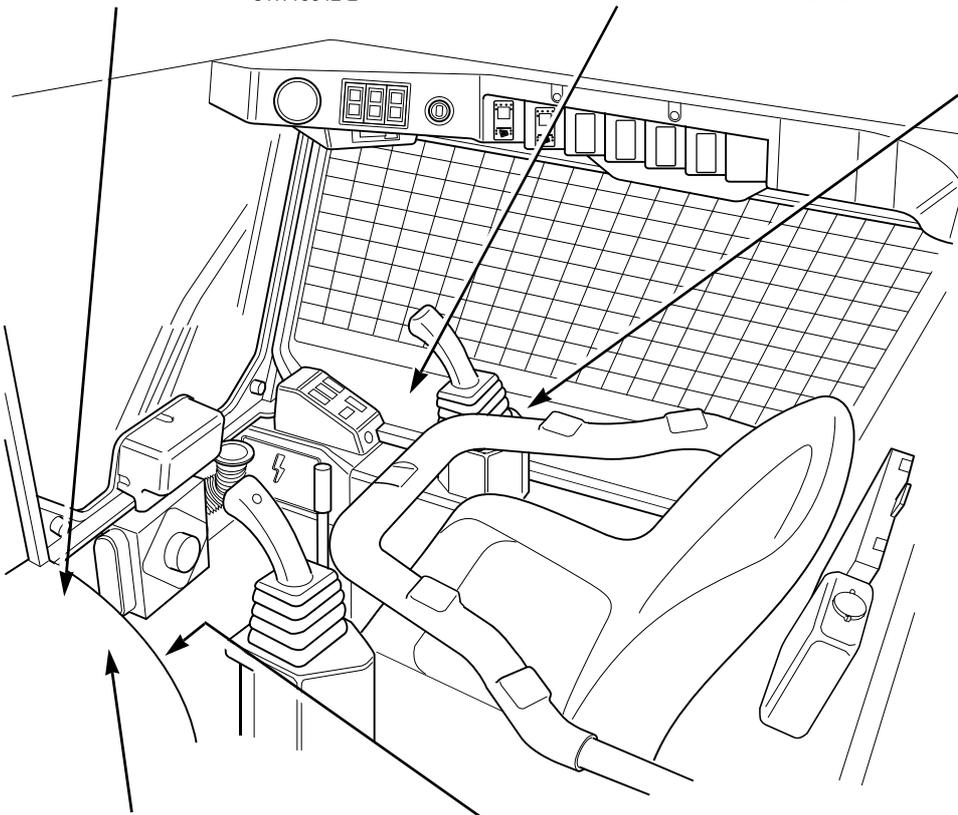
DO NOT STAND UNDER LOADER ARM OR EXIT THROUGH THE FRONT OF THE MACHINE EXCEPT IN AN EMERGENCY.

817/03149

DANGER

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

817/04330



WARNING

BEWARE OF FAN SWITCH OFF ENGINE

817/03150

PARK BRAKE

THE PARK BRAKE IS APPLIED AUTOMATICALLY WHEN THE DRIVER RESTRAINT IS RAISED UPWARDS

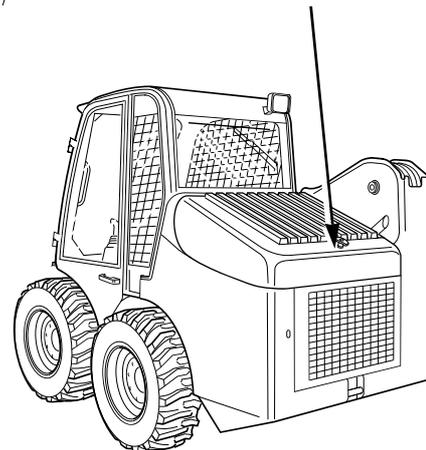
THE PARK BRAKE WILL NORMALLY AUTOMATICALLY RELEASE WHEN THE RESTRAINT IS LOWERED. IF IT HAS NOT RELEASED DRIVE THE MACHINE SLIGHTLY BACKWARDS AND FORWARDS SLOWLY

817/16643

WARNING

DO NOT OPERATE OR WORK ON THIS MACHINE UNLESS YOU HAVE READ AND UNDERSTAND THE INSTRUCTIONS AND WARNINGS IN THE OPERATION AND MAINTENANCE MANUAL. FAILURE TO FOLLOW THE INSTRUCTIONS OR HEED THE WARNINGS COULD RESULT IN INJURY OR DEATH. CONTACT ANY J.C.B. DEALER FOR REPLACEMENT COPIES. PROPER CARE IS YOUR RESPONSIBILITY.

817/01639



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Fluids, Capacities and Lubricants - except North America

ITEM	CAPACITY	FLUID/LUBRICANT	SPECIFICATION
Engine Oil To machine no. 681290: * From machine no. 681291:	8.2 litres (1.80 UK gal) 8.4 litres (1.85 UK gal)	JCB High Performance 15W/40	ACEA E2:B2:A2, API CF4/SG
Hydraulic System	26 litres (5.7 UK gal)	JCB High Performance 10W/30 JCB High Performance 15W/40 (top up only)	ACEA E2:B2:A2, API CF4/SG ACEA E2:B2:A2, API CF4/SG
Cooling System Total Coolant Antifreeze	8 litres (1.8 UK gal) 4 litres (0.9 UK gal)	JCB Four Seasons Antifreeze & Summer Coolant/water (see <i>Coolant Mixtures</i>)	ASTM D3306, BS6580
Fuel System	80 litres (17.6 UK gal)	Diesel oil (see <i>Types of Fuel</i>)	ASTM D975-66T Nos. 1D, 2D
Grease Points		JCB Special HP Grease or JCB Special MPL-EP Grease	Lithium complex NLGI No. 2 consistency including extreme pressure additives Lithium based NLGI No. 2 consistency including extreme pressure additives
Chain Case	27 litres (5.9 UK gal)	Engine Oil	

Fluids, Capacities and Lubricants - North America

ITEM	CAPACITY	FLUID/LUBRICANT	SPECIFICATION
Engine Oil To machine # 681290 * From machine # 681291	2.16 US gal (8.2 liters) 2.2 US gal (8.4 liters)	JCB Genuine Engine Oil 15W/40	CH-4/SJ, SAE 15W 40
Hydraulic System	6.8 US gal (26 liters)	JCB Genuine Engine Oil 10W/30 JCB Genuine Engine Oil 15W/40 (top up only)	CH-4/SJ, SAE 10W 30 CH-4/SJ, SAE 15W 40
Cooling System Total Coolant Antifreeze	2.2 US gal (8 liters) 1.0 US gal (4 liters)	Permanent Antifreeze	ASTM D3306-74
Fuel System	21.1 US gal (80 liters)	Diesel oil (see <i>Types of Fuel</i>)	ASTM D975-66T Nos. 1D, 2D
Grease Points		JCB Moly EP #2 Grease	Lithium complex NLGI # 2 consistency including extreme pressure additives
Chain Case	7.0 US gal (27 liters)	Engine Oil	

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.

Lubricants - Health and Safety

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.

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, drains or on the ground.

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 paraffin for washing.
- 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.

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.

Spillage

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

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