

Service Manual

Fastrac

3170, 3170 Plus 3190, 3190 Plus 3200, 3200 Plus 3220, 3220 Plus 3230, 3230 Plus

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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 = Optional Equipment
- 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.

Page cross references are generally made by presenting the subject title printed in bold, followed by the title of the section containing the subject. For example:

"24 If the axle is still on the machine, fit the brake calipers (see Brake Caliper Removal and Replacement, Section G)."

Note: If only the subject title in bold is given, i.e. no section title, the cross reference is to another part of the same section.

Use the contents list at the beginning of each section to find the exact page number.

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.

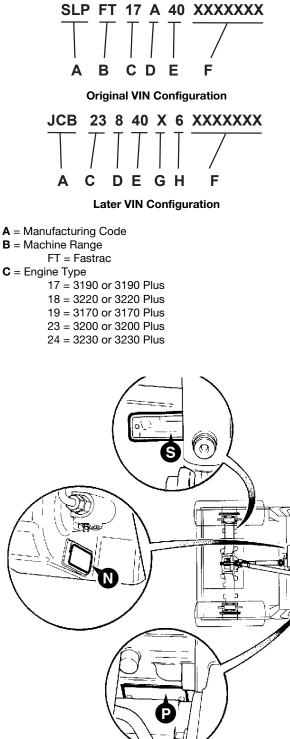
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Serial Number Plate

Each machine has a serial number plate located at \mathbf{X} . The 17 digit Vehicle Identification Number (VIN), and the serial numbers of the engine and transmission are stamped on the plate.

* Typical Vehicle Identification No. (VIN)



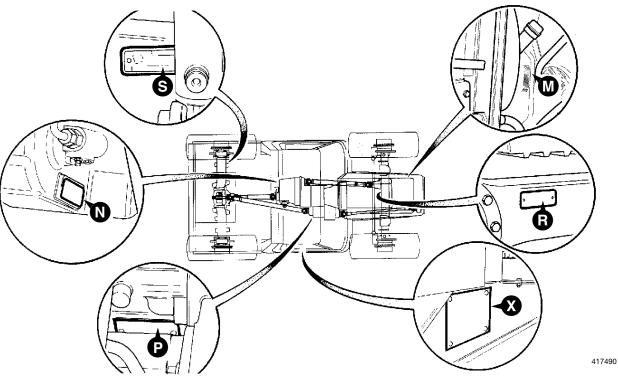
* **D** = Transmission Type (Gearbox and axle combination) 3170, 3170 Plus All other machines 8 = Standard (40, 50 or 65 km/h) A = 75 km/hB = 65 km/h9 = High Speed (75 km/h) D = 50 km/hE = 40 km/hE = Vehicle Max. Speed 40 = 40 km/h50 = 50 km/h65 = 65 km/h 75 = 75 km/h F = Serial Number * G = Authenticity Code

* **H** = year Code (e.g. 6 = 2006)

Unit Identification

The serial number of each major unit is also stamped on the unit itself as shown below. If a major unit is replaced by a new one, the serial number on the plate will be wrong. Either stamp the new number of the unit on the identification plate, or simply stamp out the old number. This will prevent the wrong unit number being quoted when replacement parts are ordered.

Engine	Μ
Gearbox Assembly (assembly of all three gearboxes)	Ν
Speed Gearbox	Ρ
Front Axle	R
Rear Axle	S



Torque Settings

2 - 1

Introduction - Zinc Plated Fasteners and Dacromet Fasteners

Some external fasteners on Fastrac machines are assembled using an improved type of corrosion resistant finish. This type of finish is called Dacromet and replaces the original Zinc and Yellow plating used on earlier machines.

The two types of fasteners can be readily identified by colour and part number suffix as follows:

Fastener Type	Colour	Part Number
Zinc and Yellow	Golden finish	'Z' (e.g. 1315/3712Z)
Dacromet	Mottled silver finish	'D' (e.g. 1315/3712D)

Note: As the Dacromet fasteners have a lower torque setting than the Zinc and Yellow fasteners, the torque figures used must be relevant to the type of fasteners.

Note: A Dacromet bolt should not be used in conjunction with a Zinc and Yellow plated nut, as this could change the torque characteristics of the torque settings further. For the same reason, a Dacromet nut should not be used in conjunction with a Zinc and Yellow plated bolt.

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

Note: Dacromet bolts, due to their high corrosion resistance are used areas where rust could occur. Dacromet bolts are only used for external applications. They are not used in application such as gearbox and engine joint seams or internal applications.

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Torque Settings

2 - 2

Zinc Plated Fasteners (golden finish)

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.

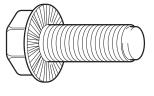
Metric Grade 8.8 Bolts

	Bolt size		То	rque Se	ttings	Diameter		Torque	
Dia.	(mm)	Hexagon (A/F) mm	Nm	kgf m	lbf ft	mm	Nm	kgf m	lbf ft
M5	(5)	8	7	0.7	5	M3	2	0.2	1.5
M6	(6)	10	12	1.2	9	M4	6	0.6	4.5
M8	(8)	13	28	3.0	21	M5	11	1.1	8
M10	(10)	17	56	5.7	42	M6	19	1.9	14
M12	(12)	19	98	10	72	M8	46	4.7	34
M16	(16)	24	244	25	180	M10	91	9.3	67
M18	(18)	27	350	36	258	M12	159	16.2	117
M20	(20)	30	476	48	352	M16	395	40	292
M24	(24)	36	822	84	607	M18	550	56	406
M30	(30)	46	1633	166	1205	M20	770	79	568
M36	(36)	55	2854	291	2105	M24	1332	136	983

Metric Grade 10.9 Bolts

Dia.	Bolt size Dia. (mm)		To Nm	rque Set kgf m	tings Ibf ft
M6	(6)	8	16	1.6	12
M8	(8)	13	39	4	29
M10	(10)	17	78	8	57
M12	(12)	19	137	14	101
M16	(16)	24	343	35	253
M20	(20)	30	657	67	485
M24	(24)	36	1157	118	853

Verbus Ripp Bolts



Metric - All Internal Hexagon Headed Cap Screws

A343780

Torque settings for these bolts are determined by the application. Refer to the relevant procedure for the required settings.

Hydraulic Hose to Adapter Connections

Hydraulic Adapter into Component Connections with bonded washers

Torque Settings					То	rque Settin	gs
BSP Size (inches)	Nm	kgf m	lbf ft	BSP Size (inches)	Nm	kgf m	lbf ft
1/8	14	1.4	10	1/8	20	2.1	15
1/4	24	2.5	18	1/4	34	3.4	25
3/8	33	3.3	24	3/8	75	7.6	55
1/2	44	4.8	35	1/2	102	10.3	75
5/8	58	6.0	43	5/8	122	12.4	90
3/4	84	8.6	62	3/4	183	18.7	135
1	115	11.8	85	1	203	20.7	150
11/2	244	24.9	180	11/2	305	31	225

Torque Settings

Dacromet Fasteners (mottled silver finish)

Use only where no torque setting is specified in the text.

NOTE: DACROMET FASTENERS ARE LUBRICATED AS PART OF THE PLATING PROCESS: DO NOT LUBRICATE.

Metric Grade 8.8 Bolts

Bolt size	Torque Settings			
Dia.	Nm	kgf m	lbf ft	
M6 x 1.0	9	0.9	7	
M8 x 1.25	22.5	2.3	17	
M10 x 1.5	47.5	4.8	35	
M12 x 1.75	80	8.2	59	
M14 x 2	133	13.6	98	
M16 x 2	200	20.4	148	
M18 x 2.5	278	28.4	205	
M20 x 2.5	392	40	289	
M24 x 3	675	69	498	
M30 x 3.5	1348	138	994	

Metric Grade 10.9 Bolts

Bolt size	Torque Settings			
Dia.	Nm	kgf m	lbf ft	
M6 x 1.0	13.5	1.4	10	
M8 x 1.25	35	3.6	26	
M10 x 1.5	62.5	6.4	46	
M12 x 1.75	115	11.7	85	
M14 x 2	175	17.9	129	
M16 x 2	300	30.6	221	
M18 x 2.5	395	40	291	
M20 x 2.5	559	57	412	
M24 x 3	962	98	710	
M30 x 3.5	1920	196	1416	

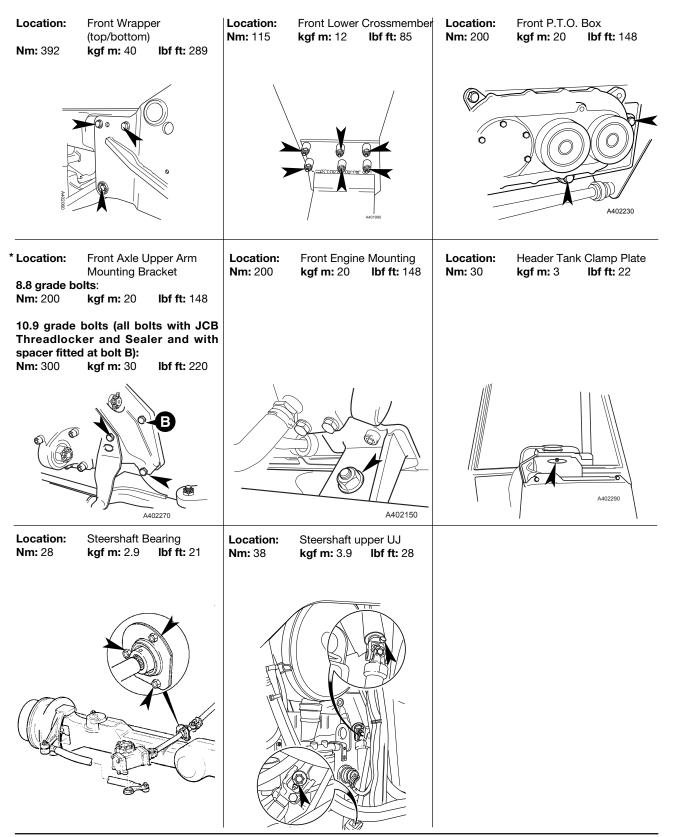
Metric Grade 12.9 Bolts

Bolt size	Torque Settings				
Dia.	Nm	kgf m	lbf ft		
M6 x 1.0	15	1.5	11		
M8 x 1.25	40	4.1	29		
M10 x 1.5	80	8.2	59		
M12 x 1.75	133	13.6	98		
M14 x 2	225	23	166		
M16 x 2	350	35.7	258		
M18 x 2.5	463	47	342		
M20 x 2.5	654	67	482		
M24 x 3	1125	115	830		
M30 x 3.5	2247	229	1657		

Torque Settings

Dacromet Fasteners (mottled silver finish) - List of Torque Settings

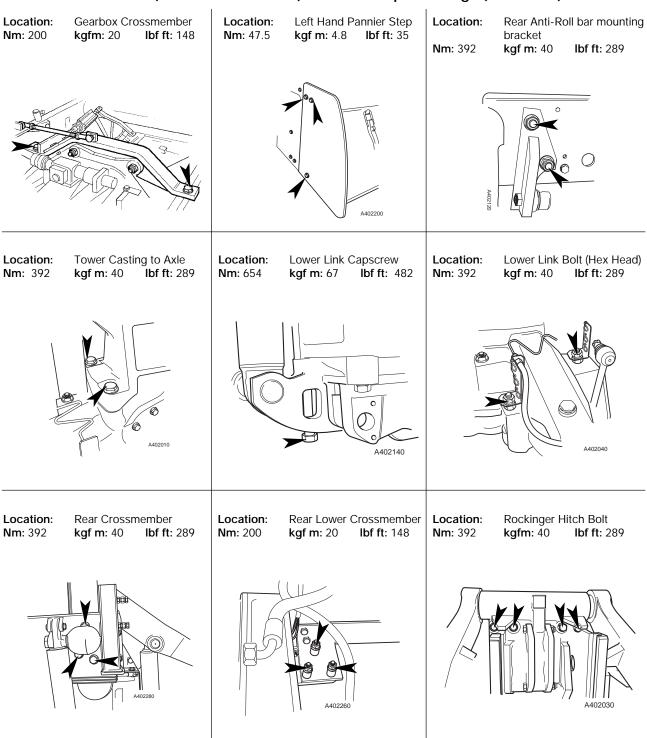
This list shows Dacromet fasteners that may not be shown in the other sections of the service manual.



Torque Settings

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Dacromet Fasteners (mottled silver finish) - List of Torque Settings (continued)



3 - 1

Sealing and Retaining Compounds

* Gasketing - Loctite 509	To seal the joint faces between the PTO/splitter gearbox, the speed gearbox and the range gearbox.	4102/3202 4102/3240	50ml 315 ml
JCB Multigasket	A medium strength sealant suitable for all sizes of gasket flanges, and for hydraulic fittings of 25-65 mm diameter.	4102/1212	
JCB High Strength Threadlocker	A high strength locking fluid for use with threaded components. Gasketing for all sizes of flange where the strength of the joint is important.	4102/0551	
JCB Retainer (High Strength)	For all retaining parts which are unlikely to be dismantled.	4101/0651	
JCB Threadlocker & Sealer	A medium strength locking fluid for sealing and retaining nuts, bolts, and screws up to 50 mm diameter, and for hydraulic fittings up to 25 mm diameter.	4101/0251	
JCB Threadlocker	For threads of suction strainer.	4101/0451	50ml
JCB Threadlocker & Sealer (High Strength)	A medium to high strength locking fluid.	4101/0552	
JCB Threadseal	Medium strength thread sealant (for patch bolts that are re-used).	4102/1951	50 ml
Clayton System Seal SC1251	A thread sealant used mainly on air brake system hose adapters.	4102/2210	2ml
JCB Activator	A cleaning primer which speeds the curing rate of anaerobic products.	4104/0251 4104/0253	Aerosol Bottle
JCB Cleaner/Degreaser	For degreasing components prior to use of anaerobic adhesives and sealants.	4104/1557	Aerosol
Direct Glazing Kit	For one pane of glass, comprises items marked † below plus		
	applicator nozzle etc.	993/55700	
† Ultra Fast Adhesive	For direct glazing	4103/2109	310 ml
† Active Wipe 205	For direct glazing	4104/1203 4104/1206	250 g 30 ml
† Black Primer 206J	For direct glazing	4201/4906	30 ml
JCB Clear Silicone Sealant	To seal butt jointed glass. Also to seal hub planet gear carrier when no 'O' ring is fitted	4102/0901	
Black Polyurethane Sealant	To finish exposed edges of laminated glass	4102/2309	310 ml

Service Too	ols Numerical List		892/00278	Gauge 0 - 40 bar	7 - 2
			892/00279	Gauge 0 - 400 bar	7 - 2
		Page No.	892/00281	Avo Meter	6 - 1
1370/0901Z	Nut M24	9 - 1	892/00282	Shunt	6 - 1
1406/0021	Bonded Washer	7 - 1	892/00283	Tool Kit Case	6 - 1
1604/0006	Adapter	7 - 1	892/00284	Digital Tachometer	6 - 1
1604/0008	Adapter	7 - 1	892/00285	Oil Temperature Probe	6 - 1
1606/0012	Adapter	7 - 1	892/00286	Surface Temperature Probe	6 - 1
1606/0015	Adapter	7 - 1	892/00293	Connector Pipe	7 - 1
1612/0006	Adapter	7 - 1	892/00294	Connector Pipe	7 - 1
4101/0251	JCB Threadlocker and Sealer	3 - 1	892/00298	Fluke Multimeter	6 - 1
4101/0451	JCB Threadlocker	3 - 1	892/00311	Brake Test Kit	8 - 4
4101/0552	JCB Threadlocker and Sealer		892/00312	Dummy End Plate	8 - 2
	(High Strength)	3 - 1	892/00314	Accumulator Adapter	9 - 1
4101/0651	JCB Retainer (High Strength)	3 - 1	892/00318	Hose and Adapter Kit	7 - 2
4102/0551	JCB High Strength Threadlocker	3 - 1	892/00333	Heavy Duty Socket, 19 mm A/F	8 - 2
4102/0901	JCB Clear Silicone Sealant	3 - 1	892/00334	Gland Seal Fitting Tool	7 - 2
4102/1212	JCB Multigasket	3 - 1	892/00706	Test Probe	7 - 2
4102/1951	JCB Threadseal	3 - 1	892/00801	Clutch spanner	5 - 3
4102/2210	Clayton System Seal SC1251	3 - 1	892/00802	Rotor puller set	5 - 3
4102/2309	Black Polyurethane Sealant	3 - 1	892/00803	Rotor installer set	5 - 3
4103/2109	Ultra Fast Adhesive	3 - 1	892/00807	Front plate puller	5 - 3
4104/0251	JCB Activator (Aerosol)	3 - 1	892/00808	Shaft protector	5 - 3
4104/0253	JCB Activator (Bottle)	3 - 1	892/00812	Drive Coupling Spanner	8 - 1
4104/1557	JCB Cleaner/Degreaser	3 - 1	892/00817	Heavy Duty Socket, 17 mm A/F	8 - 2
4104/1203	Active Wipe 205 (250 g)	3 - 1	892/00818	Heavy Duty Socket, 22mm A/F	8 - 2
4104/1205	Active Wipe 205 (250 g) Active Wipe 205 (30 ml)	3 - 1	892/00819	Heavy Duty Socket, 15 mm A/F	8 - 2
4104/1310	Hand Cleaner	5 - 1	892/00842	Glass Lifter	5 - 1
4201/4906	Black Primer	3 - 1	892/00843	Folding Stand	5 - 1
721/00664	Connecting Lead (Wingst)	3 - 1 6 - 2	892/00844	Long Knife	5 - 2
721/10885	Harness - ABS Diagnostic (J1939		892/00845	Cartridge Gun	5 - 1
		7 - 1	892/00846	Glass Extractor Handles	5 - 2
816/15118	Test Adapter	7 - 1 7 - 1	892/00847	Nylon Spatula	5 - 2 5 - 3
816/20008	Adapter		892/00848	Wire Starter	5 - 2
816/20013	Adapter	7 - 1	892/00848	Braided Cutting Wire	5 - 2 5 - 2
816/55038	Adapter/Test Point	7 - 1 7 - 1	892/00864	PD 90 Axle Locknut Spanner	3 - 2 8 - 3
816/55040	Adapter/Test Point	7 - 1 9 - 2	892/00871	Frame (Puller Adapter Assembly)	0 - 3 9 - 1
892/00041	Deglazing Tool	9 - 2 7 - 1	892/00874	Brace (Puller Adapter Assembly)	9 - 1 9 - 1
892/00078 892/00137	Connector Micro Bore Hose	7 - 1	892/00875	Bar M24 (Puller Adapter Assembly)	9 - 1
		7 - 2 8 - 2	892/00876	Block (Puller Adapter Assembly)	9 - 1 9 - 1
892/00174 892/00179	Measuring Cup	8 - 2 8 - 1	892/00892	Speed Gearbox Locking Tool	9 - 1 8 - 3
	Bearing Press	6 - 1 7 - 2	892/00916	Spring Compressor	8 - 3
892/00223	Hand Pump	7 - 2 8 - 2	892/00918	Setting Tool Kit	8 - 3
892/00224	Impulse Extractor		892/00945	Sleeve for M30 Pinion	8 - 3
892/00225	Adapter for Impulse Extractor	8 - 1	892/01033	Data Link Adapter Kit - ABS	6 - 1
892/00253	Pressure Test Kit	7 - 1	892/01033	Peg Socket - Wet Clutch	0 - 1 8 - 5
892/00255	Adapter/Test Point	7 - 1	892/01045	Mandrel - Wet Clutch	8 - 3 8 - 4
892/00256	Adapter/Test Point	7 - 1	892/01048		8 - 4 8 - 4
892/00257	Adapter/Test Point	7 - 1 7 - 1	892/01047	Jig - Wet Clutch Clutch Pack Retainer - Wet Clutch	0-4
892/00258	Adapter/Test Point	7 - 1	092/01040		8 - 4
892/00259	Adapter/Test Point	7 - 1	892/01049	(2 required)	0 - 4
892/00260	Adapter/Test Point	7 - 1	692/01049	Guide Rod - Wet Clutch	0 1
892/00261	Adapter/Test Point	7 - 1	892/01050	(2 required)	8 - 4
892/00262	•	1 & 7 - 2		Mandrel - Wet Clutch	8 - 4
892/00263	Adapter/Test Point	7 - 1	892/01051	Intermediate Gear Retaining Tool -	0 4
892/00264	Adapter/Test Point	7 - 1	000/01050	Wet Clutch Transmission	8 - 4
892/00265	Adapter/Test Point	7 - 1	892/01052	Locking Plate - Wet Clutch	0 1
892/00268	Flow Monitoring Unit	7 - 1	000/01050	(2 required)	8 - 4
892/00269	Sensor Head	7 - 1	892/01053	Adapter for impulse extractor	
892/00270	Load Valve	7 - 1		(PTO intermediate shaft,	0 0
892/00271	Adapter	7 - 1	000/0101	wet clutch transmission)	8 - 2
892/00272	Adapter	7 - 1	892/01066	Combination Lead	6 - 2
892/00273	Sensor Head	7 - 1	* 892/01092	Wheel Hub Service Kit	8 - 5
892/00274	Adapter	7 - 2	926/15500	Rubber Spacer Blocks	5 - 3
892/00275	Adapter	7 - 1	992/09000	Peg Spanner	5 - 0
892/00276	Adapter	7 - 1	992/12300	Mobile Oven	5 - 1
892/00277	Adapter	7 - 1	992/12400	Static Oven	5 - 1
0000/0000					1 4+

Service Tools Numerical List (continued)

		0
992/12600	Static Oven	5 - 1
992/12800	Cut-out Knife	5 - 2
992/12801	'L' Blades	5 - 2
993/45400	Torque Multiplier	8 - 1
993/55700	Direct Glazing Kit	3 - 1
993/59300	Pressure Test Adapter and Clamp	8 - 2
993/69800	Seal Kit	7 - 1
993/70111	Break-back Torque Wrench	8 - 3
997/11000	Drive Head Setting Bracket	8 - 3
997/11100	Adapter for M24 Pinion	8 - 3

The following parts are replacement items for kits and would normally be included in the relevant kit numbers.

Replacement items for kit no. 892/00253

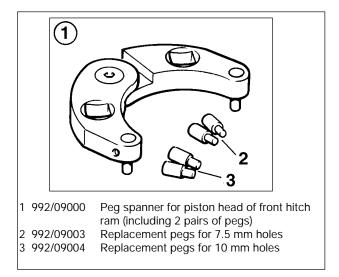
892/00201	Gauge 0 - 20 bar	7 - 1
892/00202	Gauge 0 - 40 bar	7 - 1
892/00203	Gauge 0 - 400 bar	7 - 1
892/00254	Hose	7 - 1

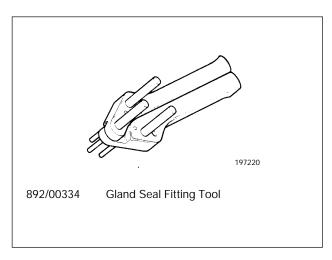
* Replacement parts for kit no. 892/01092

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1315/3414Z	Bolt M10x60	8 - 5
1315/3731Z	Bolt M16x220	8 - 5
1315/3835Z	Bolt M20x300	8 - 5
1370/0301Z	Nut M10	8 - 5
1370/0401Z	Nut M12	8 - 5
1370/0601Z	Nut M16	8 - 5
1370/0701Z	Nut M20	8 - 5
1420/0009Z	Washer M12	8 - 5
1420/0012Z	Washer M20	8 - 5
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892/00891	Dolly	8 - 5
917/02800	Bearing	8 - 5
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998/10607	Inner Bearing Plate	8 - 5
998/10608	Bearing Centre Puller	8 - 5
998/10610	Puller Rod	8 - 5
998/10614	Reaction Tube	8 - 5
998/10615	Wheel Bearing Carrier Puller	8 - 5
998/10616	Puller Handle Nut	8 - 5
998/10623	Puller Beam	8 - 5
998/10624	Modified Wheel Stud	8 - 5

Service Tools

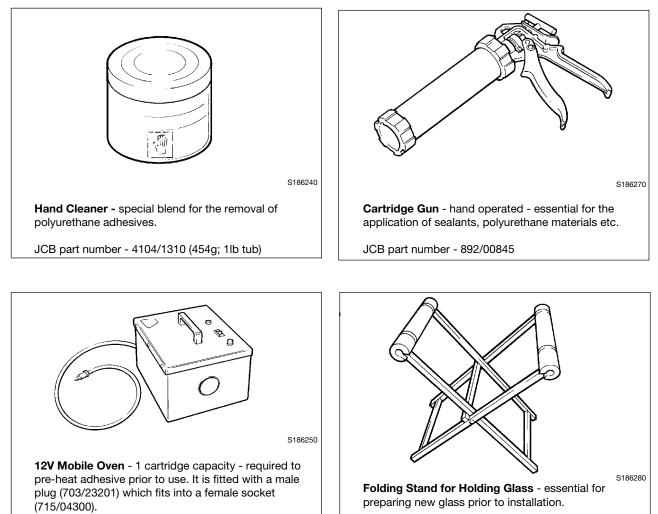
Section A - Optional Equipment



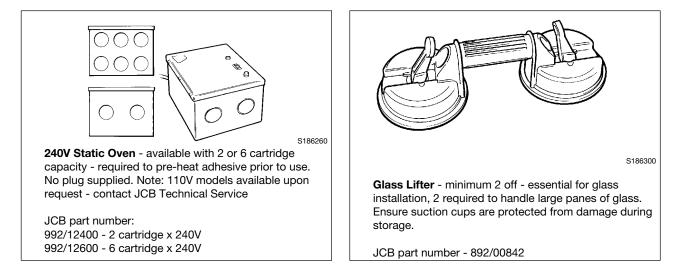


Service Tools

Section B - Body and Framework



JCB part number - 892/00843

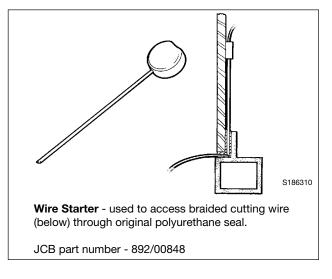


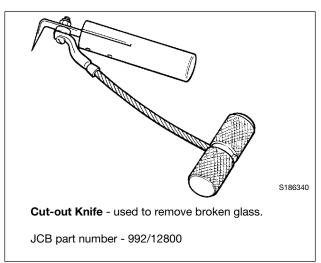
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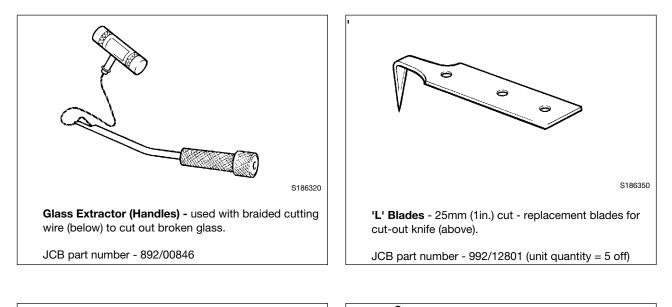
JCB part number - 992/12300

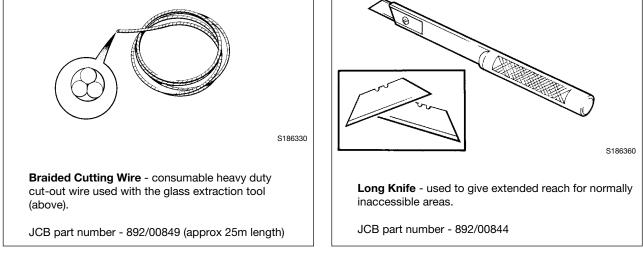
Service Tools (continued)

Section B - Body and Framework (continued)





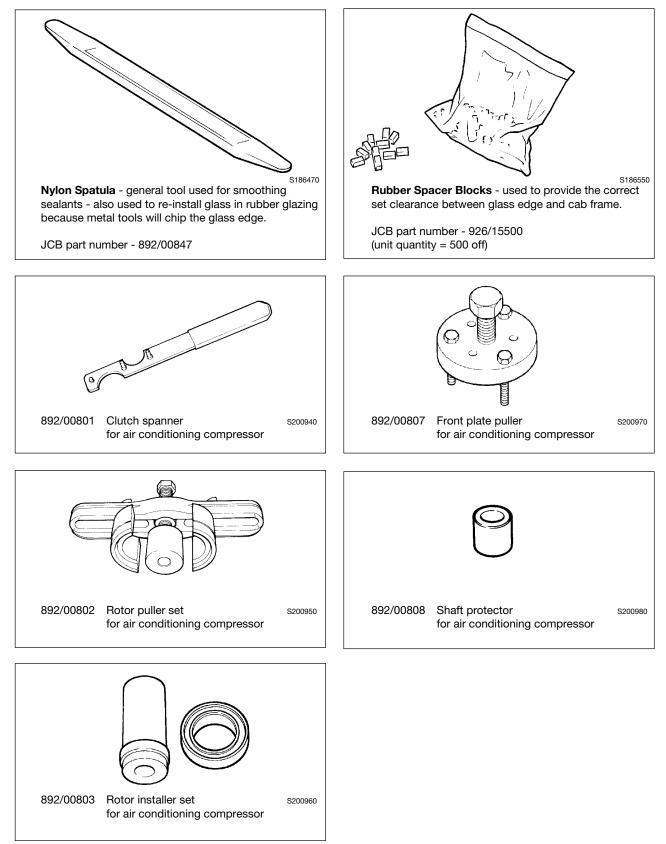




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Service Tools (continued)

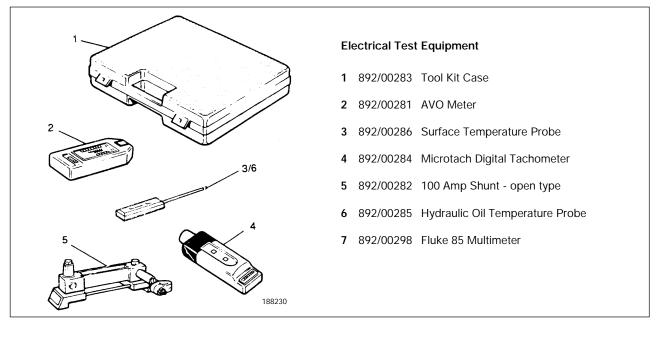


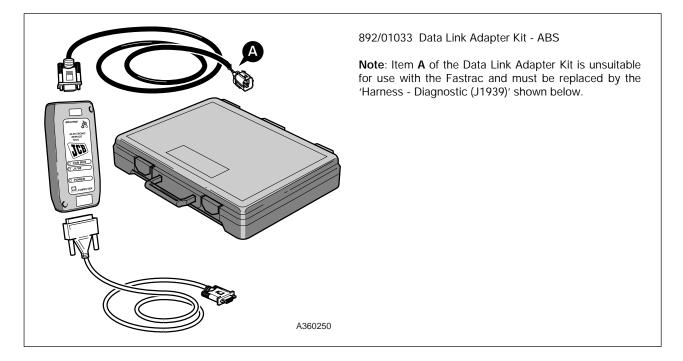


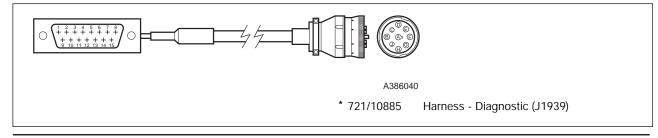
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Service Tools

Section C - Electrics

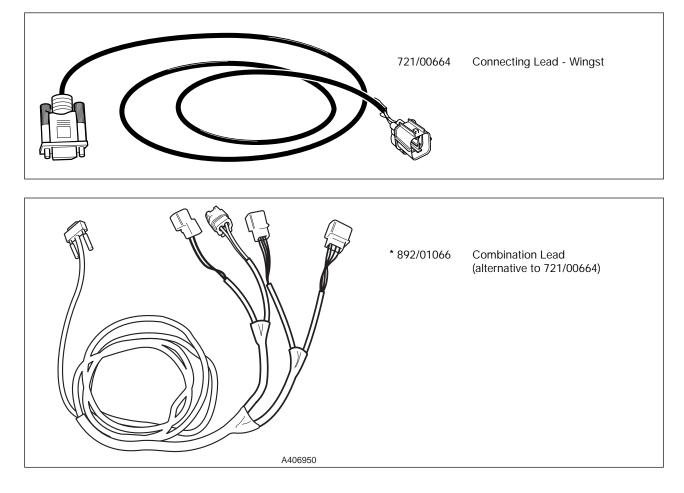






Service Tools (continued)

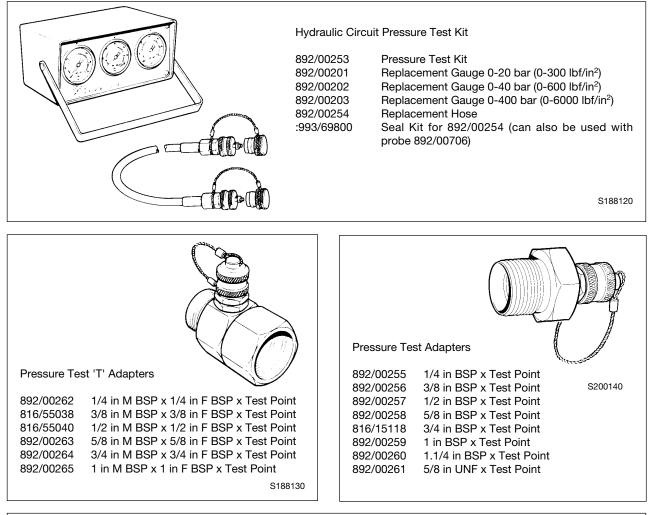
Section C - Electrics (continued)



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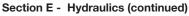
Service Tools

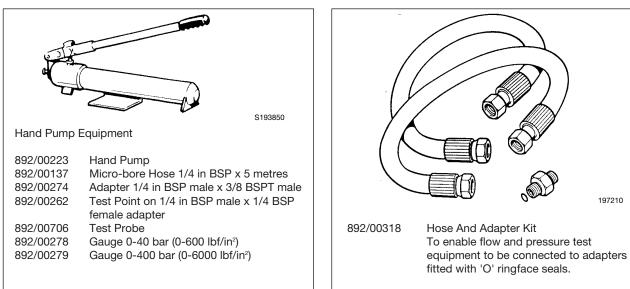
Section E - Hydraulics

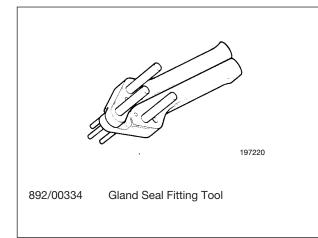


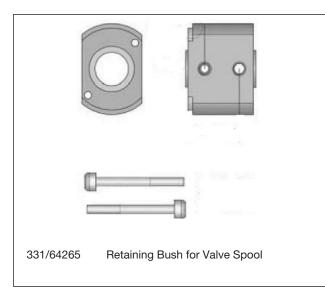
Flow Test Ec	quipment	
892/00268	Flow Monitoring Unit	
892/00269	Sensor Head 0 - 100 l/min (0 - 22 UK gal/min)	
892/00293	Connector Pipe	
892/00270	Load Valve	
1406/0021	Bonded Washer	
1604/0006	Adapter 3/4 in M x 3/4 in M BSP	
1612/0006	Adapter 3/4 in F x 3/4 in M BSP	
892/00271	Adapter 3/4 in F x 5/8 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	
892/00273	Sensor Head 0 - 380 l/min	
892/00294	Connector Pipe	
1606/0015	Adapter 1.1/4 in M BSP x 1 in M BSP	\sim
892/00078	Connector 1 in F x 1 in F BSP	
1604/0008	Adapter 1 in M x 1 in M BSP	S188150
1606/0012	Adapter 1 in M x 3/4 in M BSP	5188150
816/20013	Adapter 3/4 in F x 1 in M BSP	

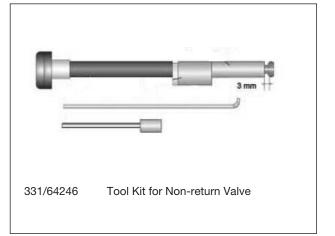
Service Tools (continued)











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