

# 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.

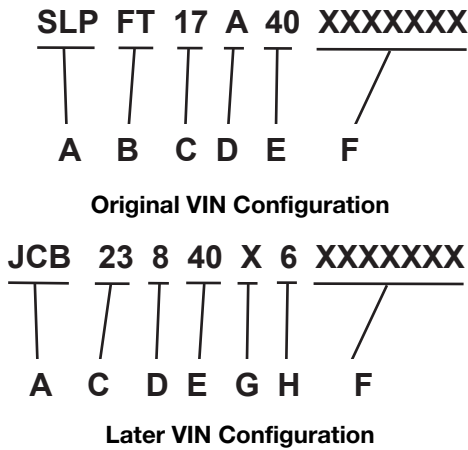
‘Left Hand’ and ‘Right Hand’ are as viewed from the rear of the machine facing forwards.

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**Serial Number Plate**

Each machine has a serial number plate located at **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)**



**A** = Manufacturing Code

**B** = Machine Range  
FT = Fastrac

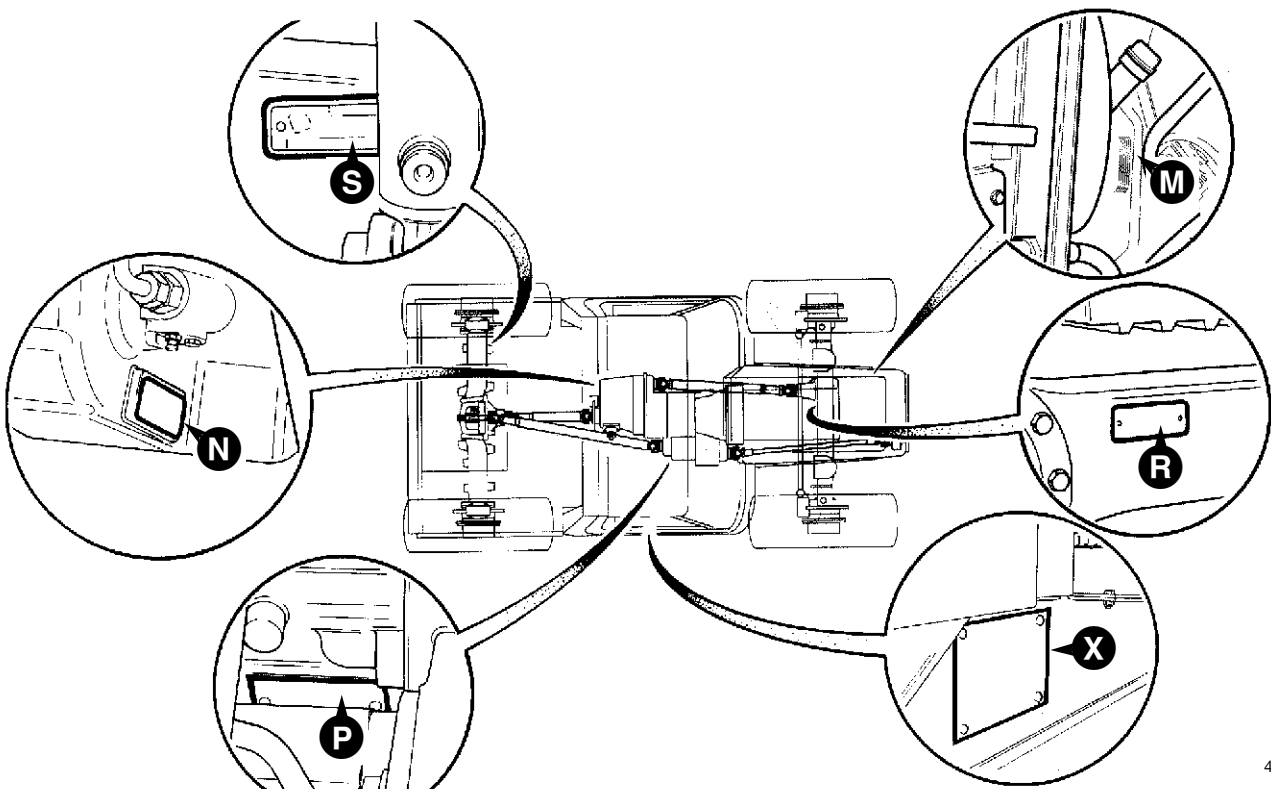
- \* C** = Engine Type
- 17 = 3190 or 3190 Plus
  - 18 = 3220 or 3220 Plus
  - 19 = 3170 or 3170 Plus
  - 23 = 3200 or 3200 Plus
  - 24 = 3230 or 3230 Plus

- \* D** = Transmission Type (Gearbox and axle combination)
- |                        |                                  |
|------------------------|----------------------------------|
| <b>3170, 3170 Plus</b> | <b>All other machines</b>        |
| A = 75 km/h            | 8 = Standard (40, 50 or 65 km/h) |
| B = 65 km/h            | 9 = High Speed (75 km/h)         |
| D = 50 km/h            |                                  |
| E = 40 km/h            |                                  |
- E** = Vehicle Max. Speed
- 40 = 40 km/h
  - 50 = 50 km/h
  - 65 = 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   | <b>M</b> |
| Gearbox Assembly (assembly of all three gearboxes) | <b>N</b> |
| Speed Gearbox                                      | <b>P</b> |
| Front Axle   | <b>R</b> |
| Rear Axle  | <b>S</b> |



417490

## 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:

<b>Fastener Type</b>	<b>Colour</b>	<b>Part Number</b>
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.

### 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

Dia.	Bolt size		Torque Settings		
	(mm)	Hexagon (A/F) mm	Nm	kgf m	lbf ft
M5	(5)	8	7	0.7	5
M6	(6)	10	12	1.2	9
M8	(8)	13	28	3.0	21
M10	(10)	17	56	5.7	42
M12	(12)	19	98	10	72
M16	(16)	24	244	25	180
M18	(18)	27	350	36	258
M20	(20)	30	476	48	352
M24	(24)	36	822	84	607
M30	(30)	46	1633	166	1205
M36	(36)	55	2854	291	2105

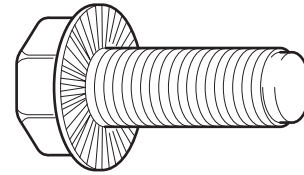
#### Metric - All Internal Hexagon Headed Cap Screws

Diameter mm	Torque		
	Nm	kgf m	lbf ft
M3	2	0.2	1.5
M4	6	0.6	4.5
M5	11	1.1	8
M6	19	1.9	14
M8	46	4.7	34
M10	91	9.3	67
M12	159	16.2	117
M16	395	40	292
M18	550	56	406
M20	770	79	568
M24	1332	136	983

#### Metric Grade 10.9 Bolts

Dia.	Bolt size		Torque Settings		
	(mm)	Hexagon (A/F) mm	Nm	kgf m	lbf 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



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

BSP Size (inches)	Torque Settings		
	Nm	kgf m	lbf ft
1/8	14	1.4	10
1/4	24	2.5	18
3/8	33	3.3	24
1/2	44	4.8	35
5/8	58	6.0	43
3/4	84	8.6	62
1	115	11.8	85
1 1/2	244	24.9	180

#### Hydraulic Adapter into Component Connections with bonded washers

BSP Size (inches)	Torque Settings		
	Nm	kgf m	lbf ft
1/8	20	2.1	15
1/4	34	3.4	25
3/8	75	7.6	55
1/2	102	10.3	75
5/8	122	12.4	90
3/4	183	18.7	135
1	203	20.7	150
1 1/2	305	31	225

**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 Dia.	Torque Settings		
	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 Dia.	Torque Settings		
	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

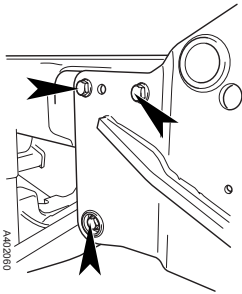
**Metric Grade 12.9 Bolts**

Bolt size Dia.	Torque Settings		
	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

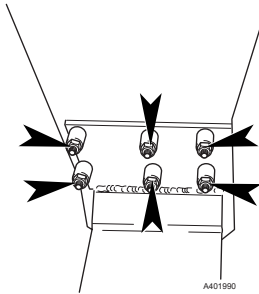
**Dacromet Fasteners (mottled silver finish) - List of Torque Settings**

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

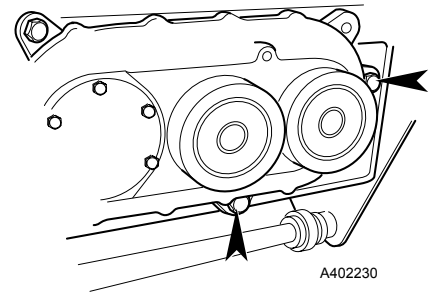
**Location:** Front Wrapper  
(top/bottom)  
**Nm:** 392    **kgf m:** 40    **lbf ft:** 289



**Location:** Front Lower Crossmember  
**Nm:** 115    **kgf m:** 12    **lbf ft:** 85

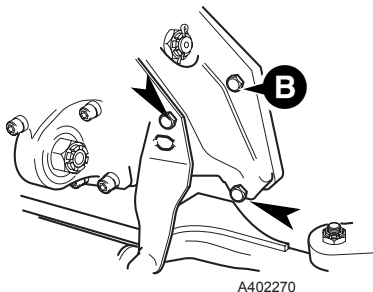


**Location:** Front P.T.O. Box  
**Nm:** 200    **kgf m:** 20    **lbf ft:** 148

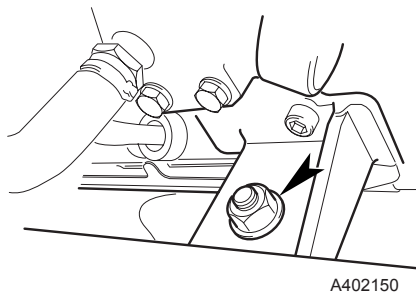


\* **Location:** Front Axle Upper Arm  
Mounting Bracket  
**8.8 grade bolts:**  
**Nm:** 200    **kgf m:** 20    **lbf ft:** 148

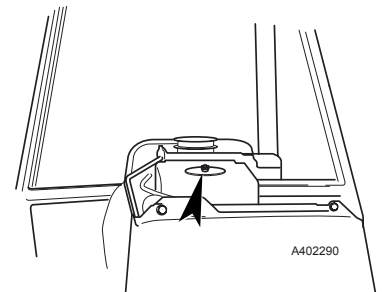
**10.9 grade bolts (all bolts with JCB  
Threadlocker and Sealer and with  
spacer fitted at bolt B):**  
**Nm:** 300    **kgf m:** 30    **lbf ft:** 220



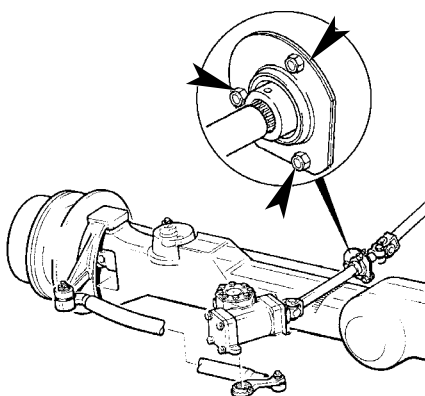
**Location:** Front Engine Mounting  
**Nm:** 200    **kgf m:** 20    **lbf ft:** 148



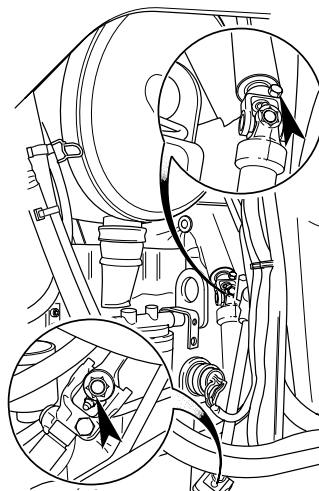
**Location:** Header Tank Clamp Plate  
**Nm:** 30    **kgf m:** 3    **lbf ft:** 22



**Location:** Steershaft Bearing  
**Nm:** 28    **kgf m:** 2.9    **lbf ft:** 21



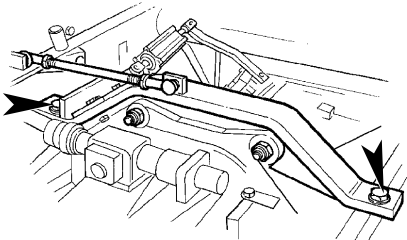
**Location:** Steershaft upper UJ  
**Nm:** 38    **kgf m:** 3.9    **lbf ft:** 28



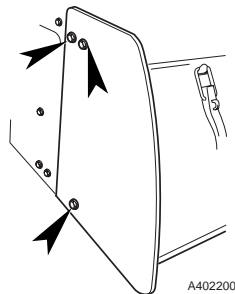


**Dacromet Fasteners (mottled silver finish) - List of Torque Settings (continued)**

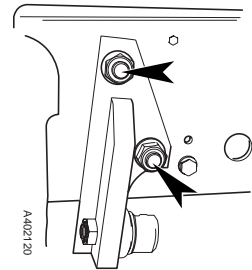
**Location:** Gearbox Crossmember  
**Nm:** 200    **kgf m:** 20    **lbf ft:** 148



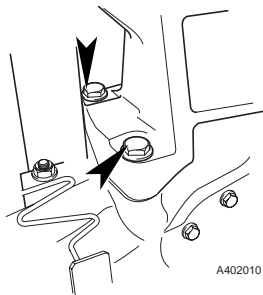
**Location:** Left Hand Pannier Step  
**Nm:** 47.5    **kgf m:** 4.8    **lbf ft:** 35



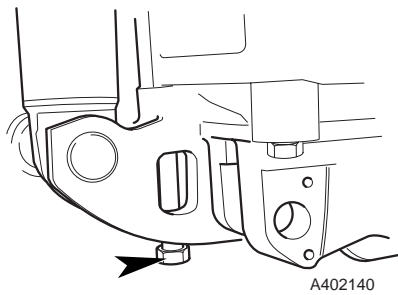
**Location:** Rear Anti-Roll bar mounting bracket  
**Nm:** 392    **kgf m:** 40    **lbf ft:** 289



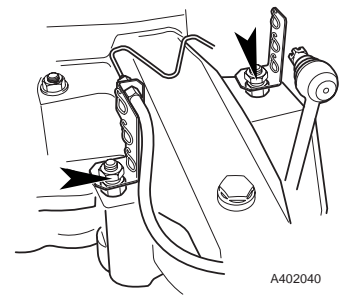
**Location:** Tower Casting to Axle  
**Nm:** 392    **kgf m:** 40    **lbf ft:** 289



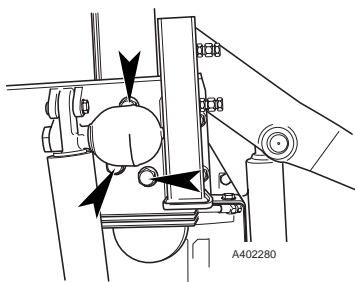
**Location:** Lower Link Capscrew  
**Nm:** 654    **kgf m:** 67    **lbf ft:** 482



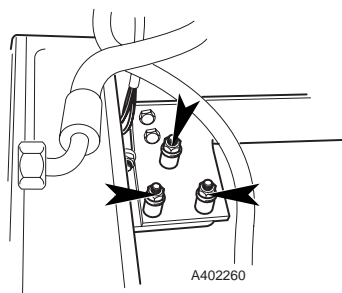
**Location:** Lower Link Bolt (Hex Head)  
**Nm:** 392    **kgf m:** 40    **lbf ft:** 289



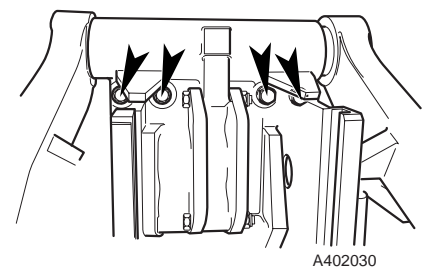
**Location:** Rear Crossmember  
**Nm:** 392    **kgf m:** 40    **lbf ft:** 289



**Location:** Rear Lower Crossmember  
**Nm:** 200    **kgf m:** 20    **lbf ft:** 148



**Location:** Rockinger Hitch Bolt  
**Nm:** 392    **kgf m:** 40    **lbf ft:** 289



## 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 Tools Numerical List

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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**

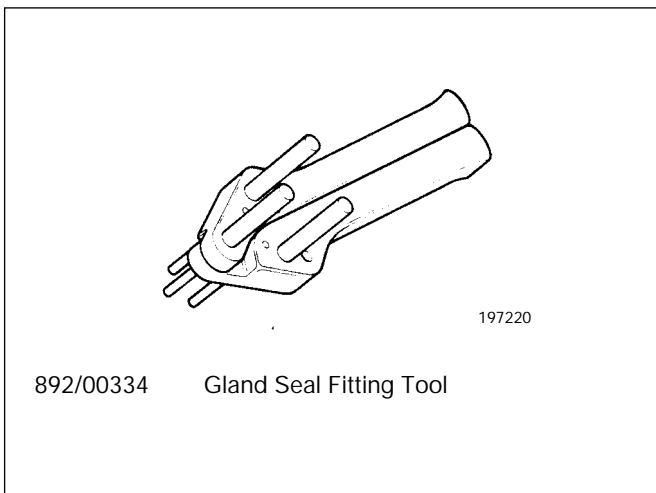
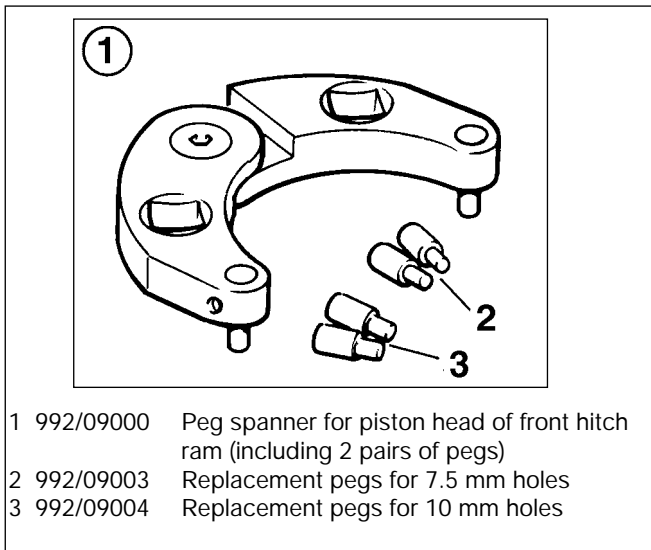
892/00201	Gauge 0 - 20 bar	7 - 1
892/00202	Gauge 0 - 40 bar	7 - 1
892/00203	Gauge 0 - 400 bar	7 - 1
892/00254	Hose	7 - 1

**\* Replacement parts for kit no. 892/01092**

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
445/12303	Washer	8 - 5
892/00891	Dolly	8 - 5
917/02800	Bearing	8 - 5
998/10606	Bearing Fitting Tube	8 - 5
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

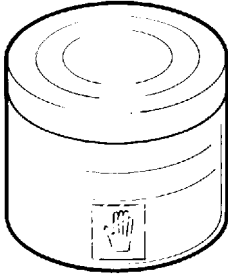
## Service Tools

### Section A - Optional Equipment



**Service Tools**

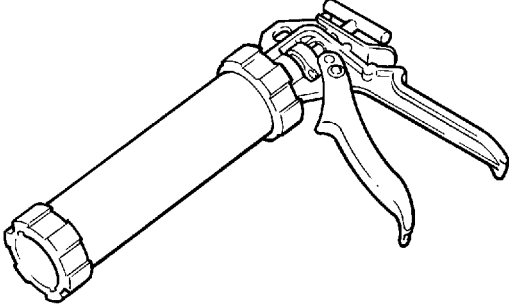
**Section B - Body and Framework**



S186240

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

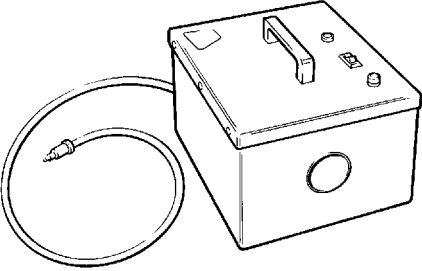
JCB part number - 4104/1310 (454g; 1lb tub)



S186270

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

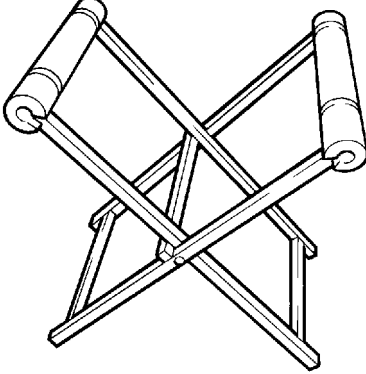
JCB part number - 892/00845



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).

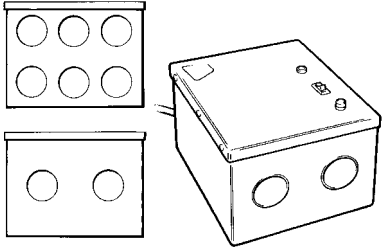
JCB part number - 992/12300



S186280

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

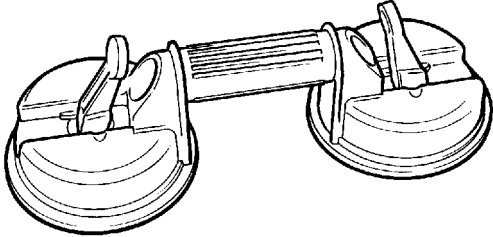
JCB part number - 892/00843



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

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



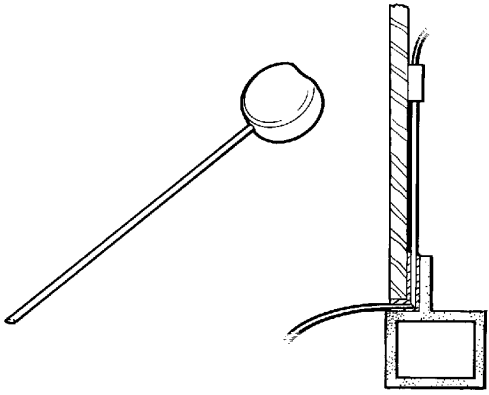
S186300

**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.

JCB part number - 892/00842

**Service Tools (continued)**

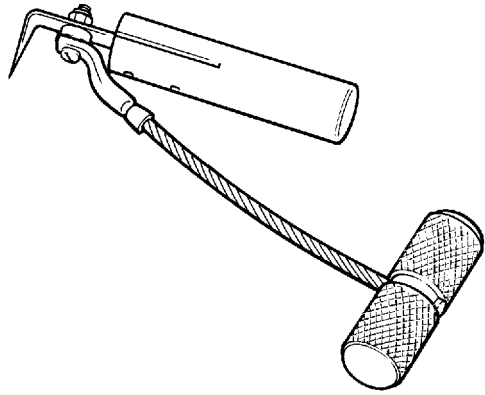
**Section B - Body and Framework (continued)**



S186310

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

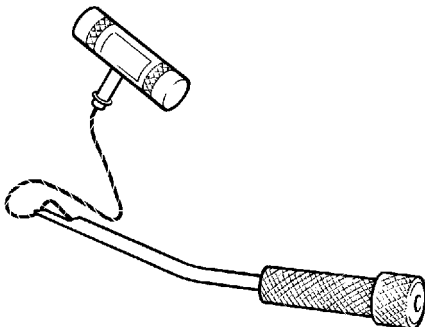
JCB part number - 892/00848



S186340

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

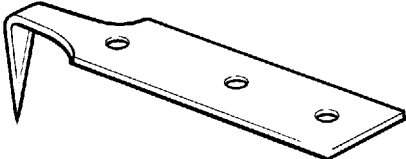
JCB part number - 992/12800



S186320

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

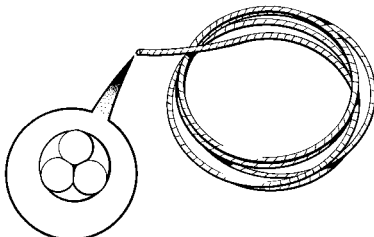
JCB part number - 892/00846



S186350

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

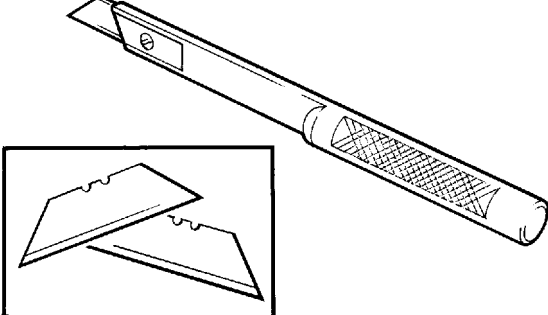
JCB part number - 992/12801 (unit quantity = 5 off)



S186330

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

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



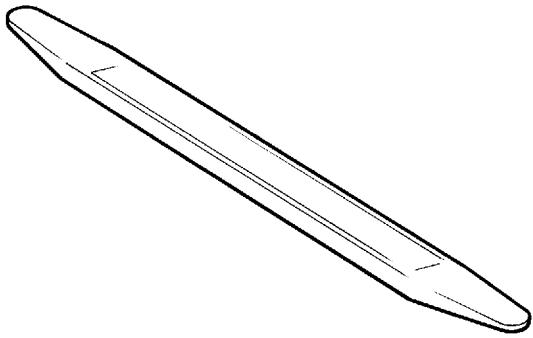
S186360

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

JCB part number - 892/00844

**Service Tools (continued)**

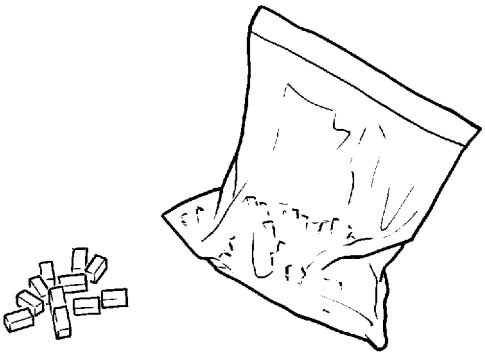
**Section B - Body and Framework (continued)**



**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

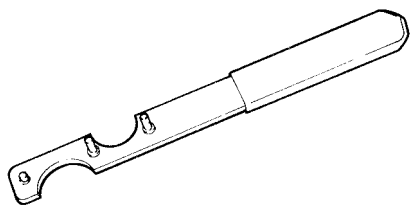
S186470



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

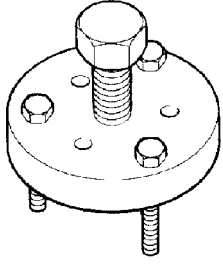
JCB part number - 926/15500  
(unit quantity = 500 off)

S186550



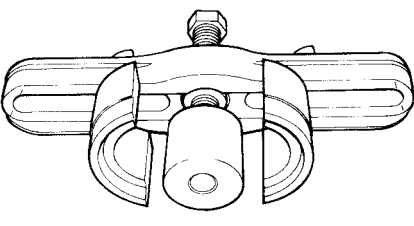
**892/00801 Clutch spanner for air conditioning compressor**

S200940




**892/00807 Front plate puller for air conditioning compressor**

S200970



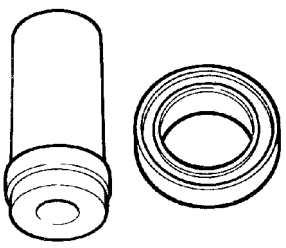
**892/00802 Rotor puller set for air conditioning compressor**

S200950



**892/00808 Shaft protector for air conditioning compressor**

S200980



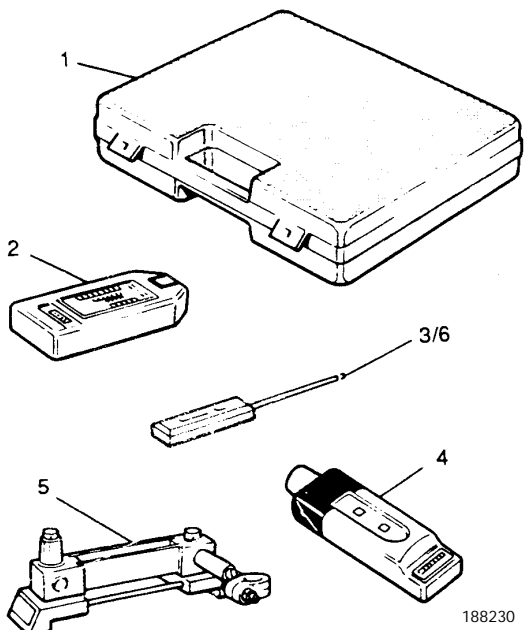
**892/00803 Rotor installer set for air conditioning compressor**

S200960



Service Tools

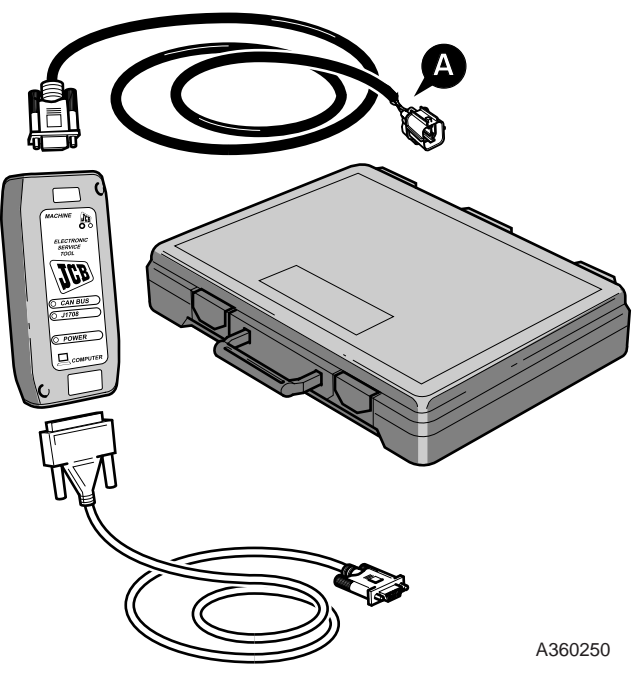
Section C - Electrics



**Electrical Test Equipment**

- 1 892/00283 Tool Kit Case
- 2 892/00281 AVO Meter
- 3 892/00286 Surface Temperature Probe
- 4 892/00284 Microtach Digital Tachometer
- 5 892/00282 100 Amp Shunt - open type
- 6 892/00285 Hydraulic Oil Temperature Probe
- 7 892/00298 Fluke 85 Multimeter

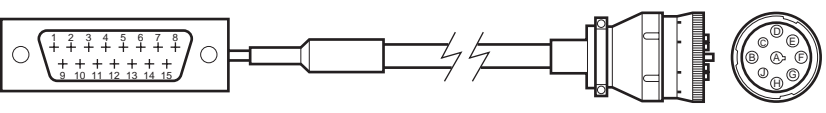
188230



892/01033 Data Link Adapter Kit - ABS

**Note:** Item A of the Data Link Adapter Kit is unsuitable for use with the Fastrac and must be replaced by the 'Harness - Diagnostic (J1939)' shown below.

A360250

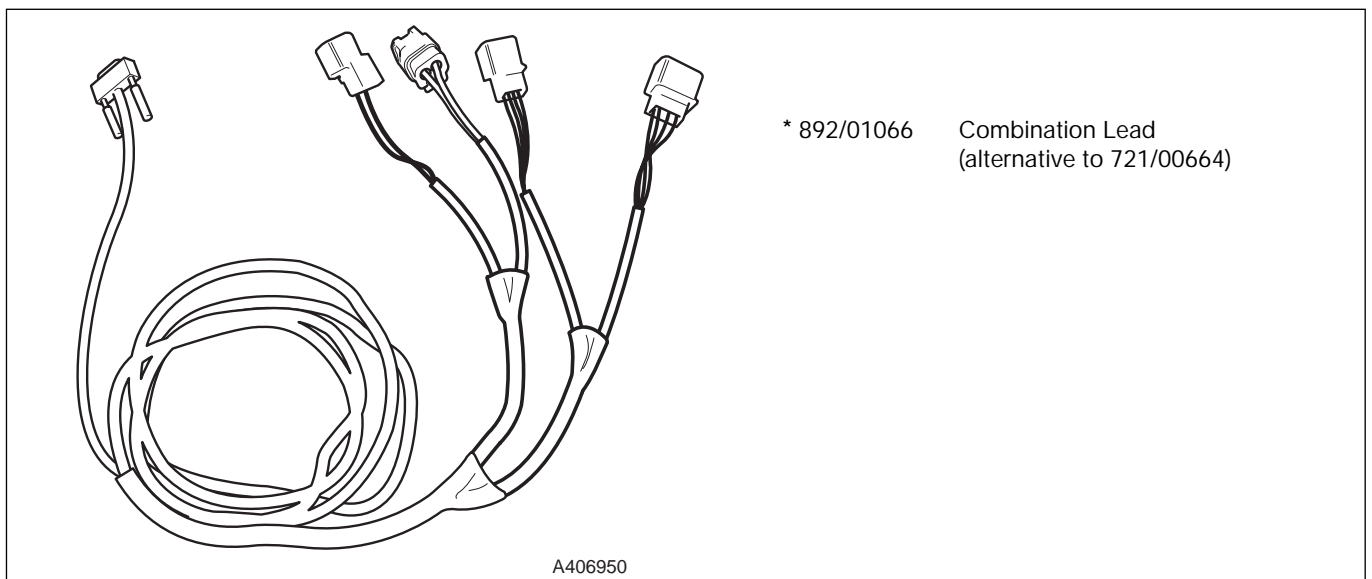
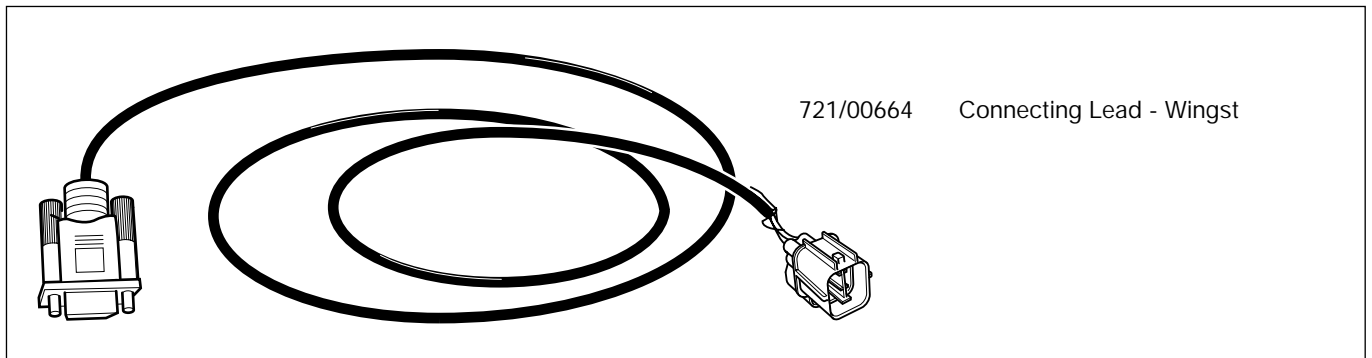


A386040

\* 721/10885 Harness - Diagnostic (J1939)

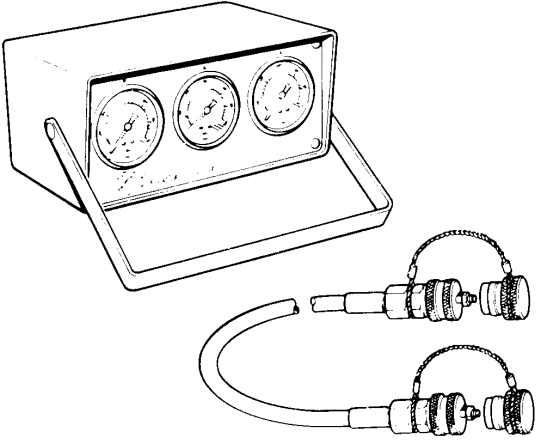
Service Tools (continued)

Section C - Electrics (continued)



**Service Tools**

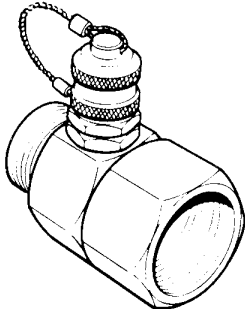
**Section E - Hydraulics**



Hydraulic Circuit Pressure Test Kit

892/00253	Pressure Test Kit
892/00201	Replacement Gauge 0-20 bar (0-300 lbf/in <sup>2</sup> )
892/00202	Replacement Gauge 0-40 bar (0-600 lbf/in <sup>2</sup> )
892/00203	Replacement Gauge 0-400 bar (0-6000 lbf/in <sup>2</sup> )
892/00254	Replacement Hose
:993/69800	Seal Kit for 892/00254 (can also be used with probe 892/00706)

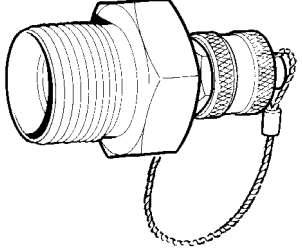
S188120



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 BSP x Test Point

S188130



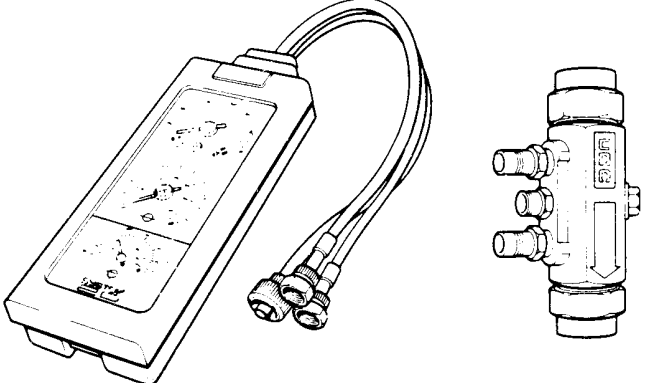
Pressure Test Adapters

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

S200140

Flow Test Equipment

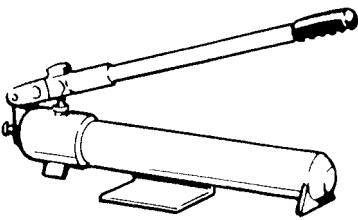
892/00268	Flow Monitoring Unit
892/00269	Sensor Head 0 - 100 l/min (0 - 22 UK gal/min)
892/00293	Connector Pipe
892/00270	Load Valve
1406/0021	Bonded Washer
1604/0006	Adapter 3/4 in M x 3/4 in M BSP
1612/0006	Adapter 3/4 in F x 3/4 in M BSP
892/00271	Adapter 3/4 in F x 5/8 in M BSP
892/00272	Adapter 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
892/00078	Connector 1 in F x 1 in F BSP
1604/0008	Adapter 1 in M x 1 in M BSP
1606/0012	Adapter 1 in M x 3/4 in M BSP
816/20013	Adapter 3/4 in F x 1 in M BSP



S188150

**Service Tools (continued)**

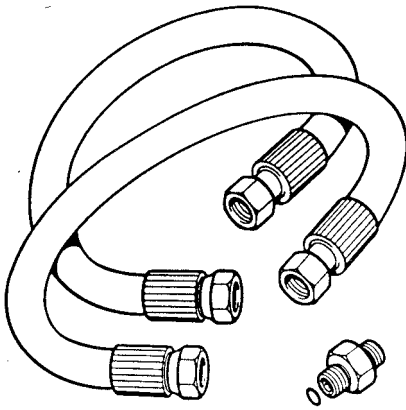
**Section E - Hydraulics (continued)**



S193850

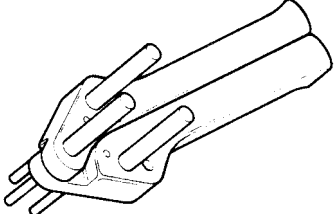
Hand Pump Equipment

- 892/00223 Hand Pump
- 892/00137 Micro-bore Hose 1/4 in BSP x 5 metres
- 892/00274 Adapter 1/4 in BSP male x 3/8 BSPT male
- 892/00262 Test Point on 1/4 in BSP male x 1/4 BSP female adapter
- 892/00706 Test Probe
- 892/00278 Gauge 0-40 bar (0-600 lbf/in<sup>2</sup>)
- 892/00279 Gauge 0-400 bar (0-6000 lbf/in<sup>2</sup>)




197210

892/00318 Hose And Adapter Kit  
To enable flow and pressure test equipment to be connected to adapters fitted with 'O' ringface seals.



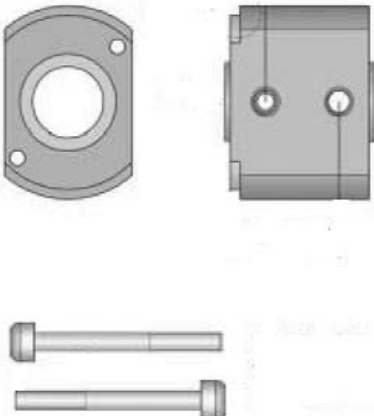
197220

892/00334 Gland Seal Fitting Tool



3 mm

331/64246 Tool Kit for Non-return Valve



331/64265 Retaining Bush for Valve Spool

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the Complete Manual  
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