

JS200W - Wheeled Excavators - Tier 2 and Tier 4i Engines

[Section 1 - General Information](#)

[Section 2 - Operator's Manual](#)

[Section B - Body & Framework](#)

[Section C - Electrics](#)

[Section D - Controls](#)

[Section E - Hydraulics](#)

[Section F - Transmission](#)

[Section K - Engine](#)



Publication No.
9813/4050-01



Copyright © 2004 JCB SERVICE. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any other means, electronic, mechanical, photocopying or otherwise, without prior permission from JCB SERVICE.

Issued by JCB Technical Publications, JCB Aftermarket Training, Woodseat, Rocester, Staffordshire, ST14 5BW, England. Tel +44 1889 591300 Fax +44 1889 591400

World Class
Customer Support

General Information

Service Manual - JS200W - Wheeled Excavators - Tier 2 and Tier 4i Engines

[Section 1 - General Information](#)

[Section 2 - Operator's Manual](#)

[Section B - Body & Framework](#)

[Section C - Electrics](#)

[Section D - Controls](#)

[Section E - Hydraulics](#)

[Section F - Transmission](#)

[Section K - Engine](#)



Publication No.
9813/4050-01



Copyright © 2004 JCB SERVICE. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any other means, electronic, mechanical, photocopying or otherwise, without prior permission from JCB SERVICE.

Issued by JCB Technical Publications, JCB Aftermarket Training, Woodseat, Rocester, Staffordshire, ST14 5BW, England. Tel +44 1889 591300 Fax +44 1889 591400

World Class
Customer Support



Section 1 - General Information

Contents	Page No.
Introduction	
Identifying Your Machine	1-1
Safety	
Introduction	1-3
Use	
Introduction	1-5
Scope	1-6
Personnel	1-6
Applications	1-6
Newest Data	1-6
Format	1-7
Left Side, Right Side	1-8
Hydraulic Schematic Codes	1-9
Colour Codes	1-9
Routine Maintenance	
Maintenance Schedules	1-11
General Procedures	
Introduction	1-13
Parking the Machine and Making it Safe	1-14
Venting the Hydraulic Pressure	1-15
Connecting/Disconnecting Hydraulic Hoses	1-16
Battery Disconnection/Connection	1-17
Removing and Replacing Components	1-18
Preparation	1-18
Original Components	1-18
New Components	1-18
Torques and Fixings	1-18
Battery Charging System Precautions	1-19
Gas Hydraulic Bladder Accumulators	1-20
Replacement	1-20
Charging	1-20
Service Consumables	
Introduction	1-23
Sealing and Retaining Compounds	1-24
Torque Settings	
Introduction	1-25
Zinc Plated Fasteners and Dacromet Fasteners	1-26
Introduction	1-26
Bolts and Screws	1-26
Hydraulic Connections	1-30
'O' Ring Face Seal System	1-30
'Torque Stop' Hose System	1-36
'Positional Type' Hydraulic Adaptors	1-37
Fitting Procedure	1-37
Service Tools	
Numerical List	1-39



Contents	Page No.
Tool Detail Reference	1-42
Section B - Body and Framework	1-42
Section C - Electrics	1-46
Section E - Hydraulics	1-47
Section H - Steering	1-59

Introduction

Identifying Your Machine

For information about identifying your machine and its main components, refer to ***Section 2, About the Machine, Machine and Component Identification.***



Section 1 - General Information

Introduction

Identifying Your Machine

Page left intentionally blank

Safety

Introduction

In this manual and on the machine there are safety notices.

The safety notices have different signal words as follows:

- DANGER
- WARNING
- CAUTION
- Notice

For an explanation of the safety notice signal words, refer to **Section 2, Introduction, Safety**.

For general safety notices, refer to **Section 2, Introduction, Safety**.

For maintenance safety notices, refer to **Section 2, Maintenance, Maintenance Safety**.

For safety notices specific to maintenance procedures, refer to the relevant procedure.

If you do not fully understand a safety notice ask your employer to explain it.



Page left intentionally blank

Use

Introduction

This topic contains information about the structure of the manual and how to use the manual.

⇒ [Scope \(□ 1-6\)](#)

⇒ [Personnel \(□ 1-6\)](#)

⇒ [Applications \(□ 1-6\)](#)

⇒ [Newest Data \(□ 1-6\)](#)

⇒ [Format \(□ 1-7\)](#)

⇒ [Left Side, Right Side \(□ 1-8\)](#)

⇒ [Hydraulic Schematic Codes \(□ 1-9\)](#)

⇒ [Colour Codes \(□ 1-9\)](#)

Scope

Personnel

This manual 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. Finally, please remember above all else SAFETY MUST COME FIRST!

Applications

This manual contains data relevant to a range of machines. Make sure you reference the data for the correct machine.

Newest Data

From time to time new machines, systems or devices require the manual to be re-issued. Make sure you have the newest issue.

Always check the on-line JCB data system for relevant technical information.

Format

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

- 1 **General Information** - The section includes general information such as torque settings and service tools.
- 2 **Operator Manual** - The section contains a copy of the applicable machine Operator Manual. Refer to this section when necessary for information about the main machine components and controls. Refer also to the safety and daily / weekly maintenance information.

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

- A **Attachments**
- B **Body and Framework...etc.**

Each section contains data such as technical data, descriptions, fault finding and test procedures.

Some sections contain **procedures and specifications for different variants**. This happens because of market requirements, or when the machine specification changes after a period of time. Where applicable, a table contains information to help you identify the correct data and procedures.

Left Side, Right Side

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

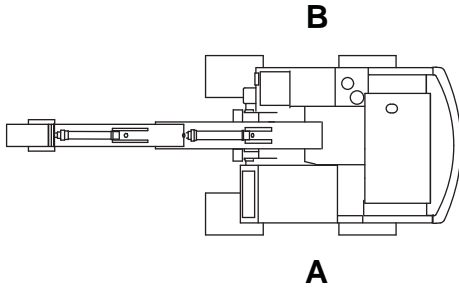









Fig 1.

T017280-1

Hydraulic Schematic Codes

Colour Codes

The following colour coding, used on illustrations to denote various conditions of oil pressure and flow, is standardised throughout JCB Service Publications.

	Red	Full Pressure: Pressure generated from operation of a service. Depending on application this may be anything between neutral circuit pressure and LSRV operating pressure.
	Pink	Pressure: Pressure that is above neutral circuit pressure but lower than that denoted by Red.
	Orange	Pilot: Oil pressure used in controlling a device (Pilot).
	Blue	Neural: Neutral circuit pressure.
	Green	Exhaust:
	Light Green	Cavitation: Oil subjected to a partial vacuum due to a drop in pressure (cavitation).
	Yellow	Lock Up: Oil trapped within a chamber or line, preventing movement of components (lock up).



Page left intentionally blank

Routine Maintenance

Maintenance Schedules

This publication contains procedures for carrying out the routine maintenance tasks listed on the maintenance schedules. Refer to **Section 2, Maintenance Schedules**.

The procedures for the daily and weekly (10 and 50 hour) tasks are given in **Section 2, Maintenance**.

The procedures for the 100 hour and above tasks are given in the related sections of this publication. For example the procedures for engine related tasks are given in Section K.



Section 1 - General Information

Routine Maintenance

Maintenance Schedules

Page left intentionally blank

General Procedures

Introduction

When work is done on the machine it is important that the correct care is taken. This will help to prevent personal injury and reduce the risk of component failure.

As part of the procedures in this manual you will need to do some general procedures. Two examples of these general procedures are; parking the machine and making it safe, and venting hydraulic pressure.

These procedures are given here as an alternative to again and again in the manual. Where applicable you will see a cross reference to this section so that you can refer to the detailed procedures.

[⇒ *Parking the Machine and Making it Safe* \(□ 1-14\)](#)

[⇒ *Venting the Hydraulic Pressure* \(□ 1-15\)](#)

[⇒ *Connecting/Disconnecting Hydraulic Hoses* \(□ 1-16\)](#)

[⇒ *Battery Disconnection/Connection* \(□ 1-17\)](#)

[⇒ *Removing and Replacing Components* \(□ 1-18\)](#)

[⇒ *Battery Charging System Precautions* \(□ 1-19\)](#)

[⇒ *Gas Hydraulic Bladder Accumulators* \(□ 1-20\)](#)



Parking the Machine and Making it Safe

For the correct procedures to park and make the machine safe, refer to **Section 2, Maintenance, Maintenance Positions.**

Venting the Hydraulic Pressure

WARNING

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses or couplings, vent the pressure trapped in the hoses in accordance with the instructions given in this publication.

HYD-1-5

For the correct procedures to vent the hydraulic pressure, refer to **Section 2, Maintenance, Hydraulic System, General, Discharge.**

Connecting/Disconnecting Hydraulic Hoses

WARNING

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses or couplings, vent the pressure trapped in the hoses in accordance with the instructions given in this publication.

HYD-1-5

For the correct procedures to connect/disconnect hydraulic hoses, refer to **Section 2, Attachments, Connecting/Disconnecting Hydraulic Hoses.**



Battery Disconnection/Connection

For the correct procedures to disconnect/connect the battery, refer to **Section 2, Maintenance, Electrical System, Battery**.

Removing and Replacing Components

Preparation

Before removing and replacing components do the following:

- To prevent contamination of the machine systems, clean the machines in the area of the applicable components. Refer to **Section 2, Preservation and Storage, Cleaning the Machine**.
- Make sure that the correct maintenance procedures are available.
- Make sure that the correct tools and equipment are available.
- Make sure that the correct replacement parts, consumables, fluids and lubricants are available.

Original Components

Always Install new oil seals, gaskets, etc.

Components showing obvious signs of wear or damage should be replaced with new ones.

Before re-installing original components do the following:

- Clean components using the applicable cleaning materials.
- Inspect components for signs of excessive wear or defects.
- Check the component specifications such as wear limits where applicable.

New Components

Make sure that the correct new components are installed. Do not substitute components from another machine. Components may look the same but may not be interchangeable. Refer to the JCB parts systems.

Torques and Fixings

When replacing components always tighten the applicable fixings to the correct torque. For the torque setting to be effective do the following before installing the fixings:

- Make sure that all the applicable component assemblies are correct.
- Make sure that the applicable fixings are to the correct specification. If necessary discard the original fixings and replace them with new ones. The relevant procedures indicate when this is necessary.
- Make sure that the applicable fixings and threaded holes are free from contamination. This includes; dirt, debris, old sealants and compounds, fluids and lubricants.

This manual provides reference to the correct torque settings as follows:

- Where no torque setting is given in the applicable procedure, use the standard torque setting. To obtain the correct standard torque setting refer to **Torque Settings** in this section.
- Where torque settings are given in the applicable procedure use the settings given. These settings may be different to the standard torque settings in the case of special fixings for example.

Battery Charging System Precautions

Obey the procedures below to prevent damage to the alternator and battery.

- Ensure that the battery negative terminal is connected to the earthing cable.
- Never make or break connections to the battery or alternator, or any part of the charging circuit whilst the engine is running. Disregarding this instruction will result in damage to the regulator or rectifying diodes.
- Main output cables are 'live' even when the engine is not running. Take care not to earth connectors in the moulded plug if it is removed from the alternator.
- When arc welding on the machine, protect the alternator by removing the moulded plug (or if separate output cables fitted, remove the cables).
- Follow the correct procedures when jump starting the engine. Refer to **Section 2, Operation, Moving a Disabled Machine.**

Gas Hydraulic Bladder Accumulators

Some hydraulic circuits and valve blocks are fitted with gas hydraulic bladder type accumulators.

Before removing accumulators make sure hydraulic pressure is vented. ⇒ [Venting the Hydraulic Pressure \(□ 1-15\)](#)

Even when the hydraulic pressure is vented the accumulator still contains pressurised nitrogen gas. DO NOT attempt to discharge the gas pressure.

DO NOT transport accumulators charged with pressurised gas by air freight.

Replacement

Replacement accumulators are generally supplied in a discharged state with no nitrogen gas. A label attached to the accumulator indicates the gas charge state.

Charging

⇒ [Fig 1. \(□ 1-20\)](#)

Important: The following charging procedure is only applicable to accumulators supplied in a discharged state.

To carry out the charging procedure the following is required:

- Pressurised bottle of nitrogen gas with a suitable pressure reducing valve (3).
- Correct gas bottle adaptor depending on territory.
- Charging kit 892/00239. Refer to **Section 1**.

Operating charge pressures; accumulators are charged to different operating pressures depending on the application. For the correct charge pressure refer to the applicable system specifications.

Before fitting a replacement accumulator charge it with nitrogen gas as follows:

WARNING

Use only nitrogen gas to charge accumulators. The use of any other gas can cause the accumulators to explode. Remember that although nitrogen is not poisonous you can be killed by suffocation if it displaces the air in your workplace. Do not allow excessive quantities of nitrogen to be discharged into the atmosphere.

B-3-1-6

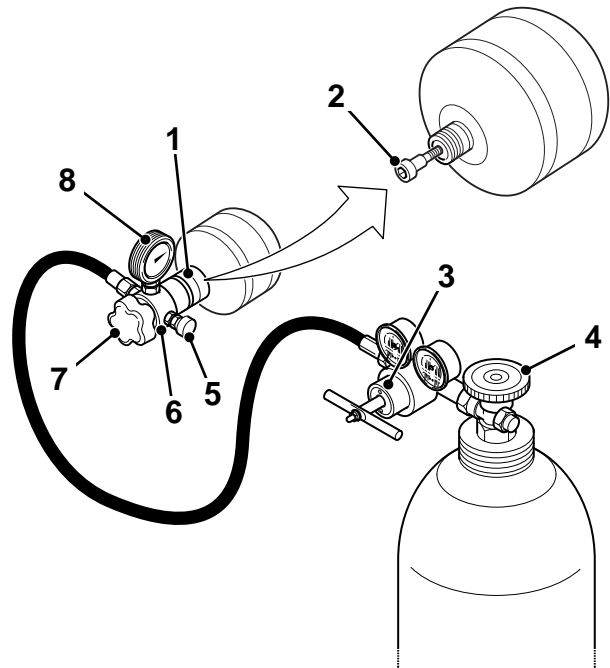


Fig 1.

- 1 Hold the accumulator upright and remove the plastic cap from the top of the accumulator.

Note: Some accumulators are supplied with a measured quantity of oil inside the gas chamber. Take care to prevent oil loss.

- 2 Using a suitable allen key, slowly remove the filler plug 2.

Lightly oil the sealing washer beneath. Replace the washer and plug. Loosen the plug by 1/8 of a turn.

- 3 Connect the accumulator adaptor **1** (from kit 892/00239) to the accumulator. Connect the charging unit **6** to the accumulator adaptor.

Connect the charging hose to the pressure regulator **3** using the correct adaptor.

Set the pressure regulator **3** to the minimum pressure.

- 4 Via the charging tool knob **7**, open the filler plug **2** by three turns.

- 5 Open the discharge valve **5** on the charging unit.

Carefully open the nitrogen gas bottle valve **4** and confirm that the nitrogen gas flows freely.

Shut the gas bottle valve and the discharge valve **5**.

- 6 Carefully open the gas bottle valve. Slowly increase the pressure using the gas bottle pressure regulator and watching the gauge **8** on the charging unit, allow nitrogen to flow until the pressure reading reaches 4 bar (72.5 psi) ABOVE the operating charge pressure.

Important: DO NOT exceed the maximum working pressure of the accumulator. The maximum working pressure is marked on the accumulator body.

Close the gas bottle valve.

- 7 Wait 10 minutes to dissipate the heat generated during charging.

- 8 Reduce the pressure in the accumulator to the specified operating charge pressure by carefully opening and closing the discharge valve **5**. Turn the knob **7** to shut the filler plug **2** and tighten to a torque of 20 Nm (15 lb ft).

- 9 Release the pressure from the charging hose by opening the discharge valve **5**.

Disconnect the charging unit and adaptor from the accumulator.

- 10 Check the gas-tightness of filler plug **2** by pouring some oil around it.

- 11 Replace the plastic cap.

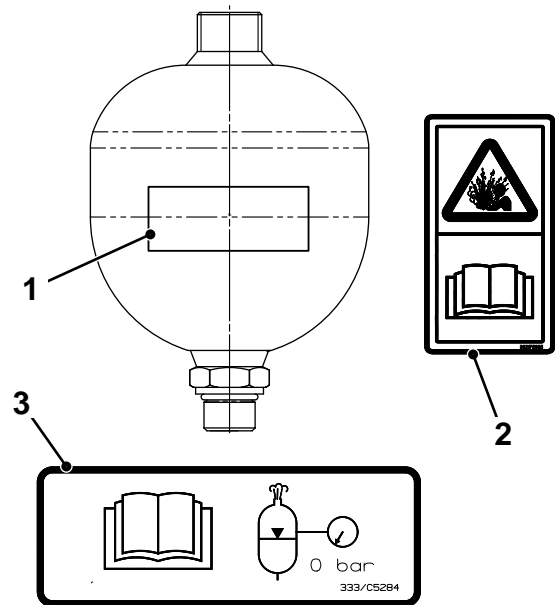


Fig 2.

C110550

- 12 ⇒ Fig 2. (□ 1-21) Remove the discharged state label **3** and attach the pressurised warning label **2** at position **1** on the accumulator.

Install the accumulator and make sure the pressurised warning label is clearly visible.



Section 1 - General Information

General Procedures

Gas Hydraulic Bladder Accumulators

Page left intentionally blank

Service Consumables

Introduction

Consumables such as sealing and retaining compounds are necessary to complete some procedures. Before you start work make sure that the consumables show in the tables are available.

[⇒ Sealing and Retaining Compounds \(□ 1-24\)](#)



Section 1 - General Information Service Consumables

Sealing and Retaining Compounds

Sealing and Retaining Compounds

T11-001_4

Table 1.

Type	Description	Part No.	Quantity
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	50 ml
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	50 ml
JCB Retainer (High Strength)	For all retaining parts which are unlikely to be dismantled.	4101/0601	10 ml
		4101/0651	50 ml
JCB Threadlocker and 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.	4101/0250	10 ml
		4101/0251	50 ml
JCB Threadlocker and Sealer (High Strength)	A high strength locking fluid for sealing and retaining nuts, bolts, and screws up to 50 mm diameter, and for hydraulic fittings up to 25 mm diameter.	4101/0550	10 ml
		4101/0552	200 ml
JCB Threadseal	A medium strength thread sealing compound.	4102/1951	50 ml
JCB Activator	A cleaning primer which speeds the curing rate of anaerobic products.	4104/0251	200 ml (Aerosol)
		4104/0253	1 ltr (Bottle)
JCB Cleaner/Degreaser	For degreasing components prior to use of anaerobic adhesives and sealants.	4104/1557	400 ml (Aerosol)
Direct Glazing Kit	For one pane of glass; comprises of: <ul style="list-style-type: none"> - 1 x Ultra Fast Adhesive (310 ml) - 1 x Active Wipe 205 (30 ml) - 1 x Black Primer 206J (30 ml) - plus applicator nozzle etc. 	993/55700	
Ultra Fast Adhesive	For direct glazing.	4103/2109	310 ml
Active Wipe 205	For direct glazing.	4104/1203	250 ml
Black Primer 206J	For direct glazing.	4201/4906	30 ml
Clear Silicone Sealant	To seal butt jointed glass.	4102/0901	
Plastic to Metal Bonder	To seal plastic to metal joints.	4103/0956	50 g
Black Polyurethane Sealant	To finish exposed edges of laminated glass.	4102/2309	310 ml

Torque Settings

Introduction

This topic contains information about torques. Torque values are given for types and sizes of bolts and hydraulic connectors and adaptors.

Where a torque is given as a single figure it may be varied by plus or minus 3%. Torque figures are given for fasteners with different surface treatments. Make sure you use the correct torque figures.

Where torques are given in topics within the other sections always use these values.

⇒ [Zinc Plated Fasteners and Dacromet Fasteners \(1-26\)](#)

⇒ [Introduction \(1-26\)](#)

⇒ [Bolts and Screws \(1-26\)](#)

⇒ [Hydraulic Connections \(1-30\)](#)

⇒ ['O' Ring Face Seal System \(1-30\)](#)

⇒ ['Torque Stop' Hose System \(1-36\)](#)

⇒ ['Positional Type' Hydraulic Adaptors \(1-37\)](#)

⇒ [Fitting Procedure \(1-37\)](#)

Zinc Plated Fasteners and Dacromet Fasteners

T11-002

Introduction

Some external fasteners on JCB machines are manufactured 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. → [Table 1. Fastener Types \(1-26\)](#).

Table 1. Fastener Types

Fastener Type	Colour	Part No. Suffix
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 fastener.

Note: A Dacromet bolt should not be used in conjunction with a Zinc or Yellow plated nut, as this could change the torque characteristics of the torque setting further. For the same reason, a Dacromet nut should not be used with a Zinc or 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 in areas where rust could occur. Dacromet bolts are only used for external applications. They are not used in applications such as gearbox or engine joint seams or internal applications.

Bolts and Screws

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

Note: Dacromet fasteners are lubricated as part of the plating process, do not lubricate.

Torque settings are given for the following conditions:

Condition 1

- Un-lubricated fasteners
- Zinc fasteners
- Yellow plated fasteners

Condition 2

- Zinc flake (Dacromet) fasteners
- Lubricated zinc and yellow plated fasteners
- Where there is a natural lubrication. For example, cast iron components

Verbus Ripp Bolts

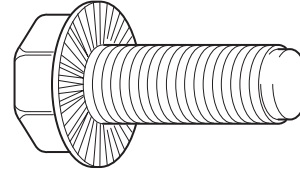


Fig 1.

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



Section 1 - General Information Torque Settings

Zinc Plated Fasteners and Dacromet Fasteners

Table 2. Torque Settings - UNF Grade 'S' Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
in.	mm	in.	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
1/4	6.3	7/16	11.2	1.1	8.3	10.0	1.0	7.4
5/16	7.9	1/2	22.3	2.3	16.4	20.0	2.0	14.7
3/8	9.5	9/16	40.0	4.1	29.5	36.0	3.7	26.5
7/16	11.1	5/8	64.0	6.5	47.2	57.0	5.8	42.0
1/2	12.7	3/4	98.0	10.0	72.3	88.0	9.0	64.9
9/16	14.3	13/16	140.0	14.3	103.2	126.0	12.8	92.9
5/8	15.9	15/16	196.0	20.0	144.6	177.0	18.0	130.5
3/4	19.0	1 1/8	343.0	35.0	253.0	309.0	31.5	227.9
7/8	22.2	1 15/16	547.0	55.8	403.4	492.0	50.2	362.9
1	25.4	1 1/2	814.0	83.0	600.4	732.0	74.6	539.9
1 1/8	31.7	1 7/8	1181.0	120.4	871.1	1063.0	108.4	784.0
1 1/4	38.1	2 1/4	1646.0	167.8	1214.0	1481.0	151.0	1092.3

Table 3. Torque Settings - Metric Grade 8.8 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	5.8	0.6	4.3	5.2	0.5	3.8
M6	6	10	9.9	1.0	7.3	9.0	0.9	6.6
M8	8	13	24.0	2.4	17.7	22.0	2.2	16.2
M10	10	17	47.0	4.8	34.7	43.0	4.4	31.7
M12	12	19	83.0	8.5	61.2	74.0	7.5	54.6
M16	16	24	205.0	20.9	151.2	184.0	18.8	135.7
M20	20	30	400.0	40.8	295.0	360.0	36.7	265.5
M24	24	36	690.0	70.4	508.9	621.0	63.3	458.0
M30	30	46	1372.0	139.9	1011.9	1235.0	125.9	910.9
M36	36	55	2399.0	244.6	1769.4	2159.0	220.0	1592.4



Section 1 - General Information Torque Settings

Zinc Plated Fasteners and Dacromet Fasteners

Table 4. Metric Grade 10.9 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	8.1	0.8	6.0	7.3	0.7	5.4
M6	6	10	13.9	1.4	10.2	12.5	1.3	9.2
M8	8	13	34.0	3.5	25.0	30.0	3.0	22.1
M10	10	17	67.0	6.8	49.4	60.0	6.1	44.2
M12	12	19	116.0	11.8	85.5	104.0	10.6	76.7
M16	16	24	288.0	29.4	212.4	259.0	26.4	191.0
M20	20	30	562.0	57.3	414.5	506.0	51.6	373.2
M24	24	36	971.0	99.0	716.9	874.0	89.1	644.6
M30	30	46	1930.0	196.8	1423.5	1737.0	177.1	1281.1
M36	36	55	3374.0	344.0	2488.5	3036.0	309.6	2239.2

Table 5. Metric Grade 12.9 Fasteners

Bolt Size		Hexagon (A/F)	Condition 1			Condition 2		
ISO Metric Thread	mm	mm	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M5	5	8	9.8	1.0	7.2	8.8	0.9	6.5
M6	6	10	16.6	1.7	12.2	15.0	1.5	11.1
M8	8	13	40.0	4.1	29.5	36.0	3.7	26.5
M10	10	17	80.0	8.1	59.0	72.0	7.3	53.1
M12	12	19	139.0	14.2	102.5	125.0	12.7	92.2
M16	16	24	345.0	35.2	254.4	311.0	31.7	229.4
M20	20	30	674.0	68.7	497.1	607.0	61.9	447.7
M24	24	36	1165.0	118.8	859.2	1048.0	106.9	773.0
M30	30	46	2316.0	236.2	1708.2	2084.0	212.5	1537.1
M36	36	55	4049.0	412.9	2986.4	3644.0	371.6	2687.7



Section 1 - General Information Torque Settings

Zinc Plated Fasteners and Dacromet Fasteners

Table 6. Torque Settings - Rivet Nut Bolts/Screws

Bolt Size		Nm	kgf m	lbf ft
ISO Metric Thread	mm			
M3	3	1.2	0.1	0.9
M4	4	3.0	0.3	2.0
M5	5	6.0	0.6	4.5
M6	6	10.0	1.0	7.5
M8	8	24.0	2.5	18.0
M10	10	48.0	4.9	35.5
M12	12	82.0	8.4	60.5

Table 7. Torque Settings - Internal Hexagon Headed Cap Screws (Zinc)

Bolt Size		Nm	kgf m	lbf ft
ISO Metric Thread				
M3		2.0	0.2	1.5
M4		6.0	0.6	4.5
M5		11.0	1.1	8.0
M6		19.0	1.9	14.0
M8		46.0	4.7	34.0
M10		91.0	9.3	67.0
M12		159.0	16.2	117.0
M16		395.0	40.0	292.0
M18		550.0	56.0	406.0
M20		770.0	79.0	568.0
M24		1332.0	136.0	983.0

Hydraulic Connections

'O' Ring Face Seal System

Adaptors Screwed into Valve Blocks

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

Table 8. Torque Settings - BSP Adaptors

BSP Adaptor Size	Hexagon (A/F)	Nm	kgf m	lbf ft
	in.			
1/4	19.0	18.0	1.8	13.0
3/8	22.0	31.0	3.2	23.0
1/2	27.0	49.0	5.0	36.0
5/8	30.0	60.0	6.1	44.0
3/4	32.0	81.0	8.2	60.0
1	38.0	129.0	13.1	95.0
1 1/4	50.0	206.0	21.0	152.0

Table 9. Torque Settings - SAE Connections

SAE Tube Size	SAE Port Thread Size	Hexagon (A/F)	Nm	kgf m	lbf ft
		mm			
4	7/16 - 20	15.9	20.0 - 28.0	2.0 - 2.8	16.5 - 18.5
6	9/16 - 18	19.1	46.0 - 54.0	4.7 - 5.5	34.0 - 40.0
8	3/4 - 16	22.2	95.0 - 105.0	9.7 - 10.7	69.0 - 77.0
10	7/8 - 14	27.0	130.0 - 140.0	13.2 - 14.3	96.0 - 104.0
12	1 1/16 - 12	31.8	190.0 - 210.0	19.4 - 21.4	141.0 - 155.0
16	1 5/16 - 12	38.1	290.0 - 310.0	29.6 - 31.6	216.0 - 230.0
20	1 5/8	47.6	280.0 - 380.0	28.5 - 38.7	210.0 - 280.0

Hoses Screwed into Adaptors

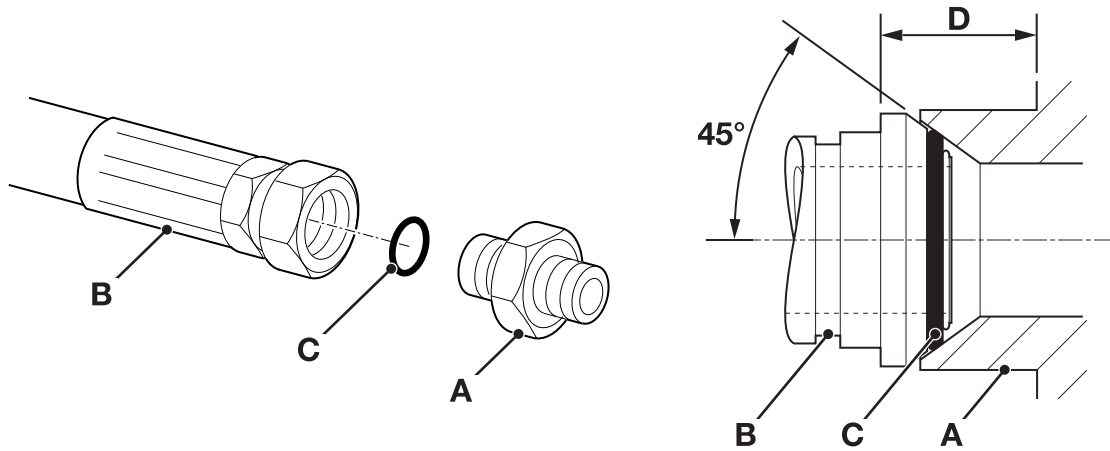


Fig 2.

Hoses **2-B** screwed into adaptors **2-A** seal onto an 'O' ring **2-C** which is compressed into a 45° seat machined into the face of the adaptor port.

Note: Dimension **2-D** will vary depending upon the torque applied.

Table 10. BSP Hose - Torque Settings

BSP Hose Size	Hexagon (A/F)	Nm	kgf m	lbf ft
	in.			
1/8	14.0	14.0 - 16.00	1.4 - 1.6	10.3 - 11.8
1/4	19.0	24.0 - 27.0	2.4 - 2.7	17.7 - 19.9
3/8	22.0	33.0 - 40.0	3.4 - 4.1	24.3 - 29.5
1/2	27.0	44.0 - 50.0	4.5 - 5.1	32.4 - 36.9
5/8	30.0	58.0 - 65.0	5.9 - 6.6	42.8 - 47.9
3/4	32.0	84.0 - 92.0	8.6 - 9.4	61.9 - 67.8
1	38.0	115.0 - 126.0	11.7 - 12.8	84.8 - 92.9
1 1/4	50.0	189.0 - 200.0	19.3 - 20.4	139.4 - 147.5
1 1/2	55.0	244.0 - 260.0	24.9 - 26.5	180.0 - 191.8



Section 1 - General Information Torque Settings

Hydraulic Connections

Adaptors into Component Connections with Bonded Washers

Table 11. BSP Adaptors with Bonded Washers - Torque Settings

BSP Size			
in.	Nm	kgf m	lbf ft
1/8	20.0	2.1	15.0
1/4	34.0	3.4	25.0
3/8	75.0	7.6	55.0
1/2	102.0	10.3	75.0
5/8	122.0	12.4	90.0
3/4	183.0	18.7	135.0
1	203.0	20.7	150.0
1 1/4	305.0	31.0	225.0
1 1/2	305.0	31.0	225.0

Procedure

Torque all of the O-Ring face seal fittings. Always make sure that the correct torque is used to tighten the specific fitting size. ⇒ [Table 12.](#) (□ 1-34).

To prevent damage to the O-Ring during the assembly procedure its important to use the double-spanner method of tightening. ⇒ [Fig 3.](#) (□ 1-33).

- Torque spanner 1.
- Open ended/comboination spanner.2.

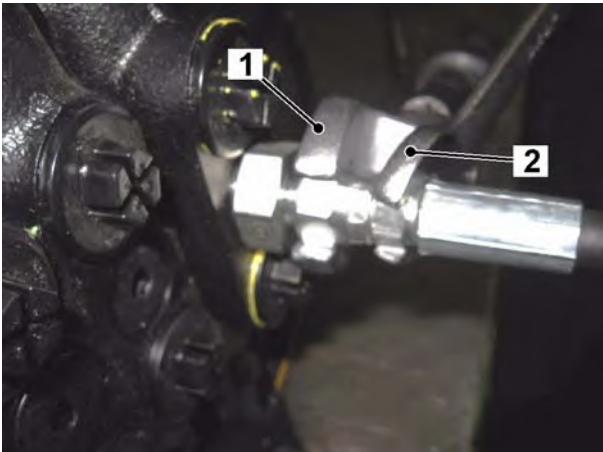


Fig 3.

T044470

- The swivel-nut is hand-tight 4.
- The swivel-nut is tightened to the correct torque setting 5.

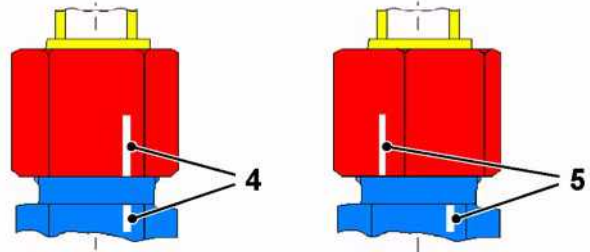


Fig 5.

T044490

Key Points

A rubber trapezoid O-Ring seal 3 is pre-installed in the Captive O-Ring Groove (CORG). This groove is the half-dovetail type and has very secure retention properties as the seal is below the lip of the groove. ⇒ [Fig 4.](#) (□ 1-33).



Fig 4.

T044480

Swivel-nut line marking, the broken-line method. ⇒ [Fig 5.](#) (□ 1-33).



Section 1 - General Information Torque Settings

Hydraulic Connections

Table 12.

Assembly Torques for UNF Threads on the ORFS Fittings						
Product		Thread size		Series		
		T		Assembly torque		
Series	Port dash size	ISO 11296		Non-adjustable end	Adjustable end	
		Inch			Nm	Nm
Port connections males stud and swivel fittings	-4	7/16-20	UNF	35	35	
	-5	1/2-20	UNF	40	40	
	-6	9/16-18	UNF	46	46	
	-8	3/4-16	UNF	80	80	
	-10	7/8-14	UNF	135	135	
	-12	1.1/16-12	UNF	185	185	
	-16	1.5/16-12	UNF	270	270	
	-20	1.5/8-12	UNF	340	340	
-24	1.7/8-12	UNF	415	415		
	Dash size of tube or hose ends	UNF thread size		Flats from wrench resistance	Swivel nut torque Nm (Ref)	
Hose ends ORFS female swivel	-4	9/16-18	UNF	1/2 to 3/4	26	
	-6	11/16-16	UNF	1/2 to 3/4	42	
	-8	13/16-16	UNF	1/2 to 3/4	57	
	-10	1-14	UNF	1/2 to 3/4	85	
	-12	1. 3/16-12	UNF	1/3 to 1/2	122	
	-16	1.7/16-12	UNF	1/3 to 1/2	156	
	-20	1.11/16-12	UNF	1/3 to 1/2	200	
	-24	2-12	UNF	1/3 to 1/2	256	
-32	2.1/2-12	UNF				

General

If there is a leak from the hydraulic system:

- Before the hose is disconnected to examine the O-ring, examine the hose swivel-nut for the broken-line white marker. If there is no visible white marker, photograph the hose and adaptor. → [Fig 5.](#) ([□ 1-33](#)).
- Open a Tech Web call. Attach the photographs and make a report of the hose and adaptor part numbers, and the effected service. Always check the torque of the hose before its disassembled. If the hose or the adaptor is loose, you must specify which component is the cause of the leak.

For example if the hose is tight and the adaptor turns in the valve block, record this information in the Tech Web call.

- Examine the O-rings, adaptor thread, hose swaging and hose damage in the usual method. If the hose leaks because of chaffing, photograph the chafe point and attach the photographs to the Tech Web call.
- When a warranty claim is submitted, refer the claim to the Tech Web call.
- A failure to supply the relevant information could delay the warranty claim process and possibly cause the warranty claim to be declined.

'Torque Stop' Hose System

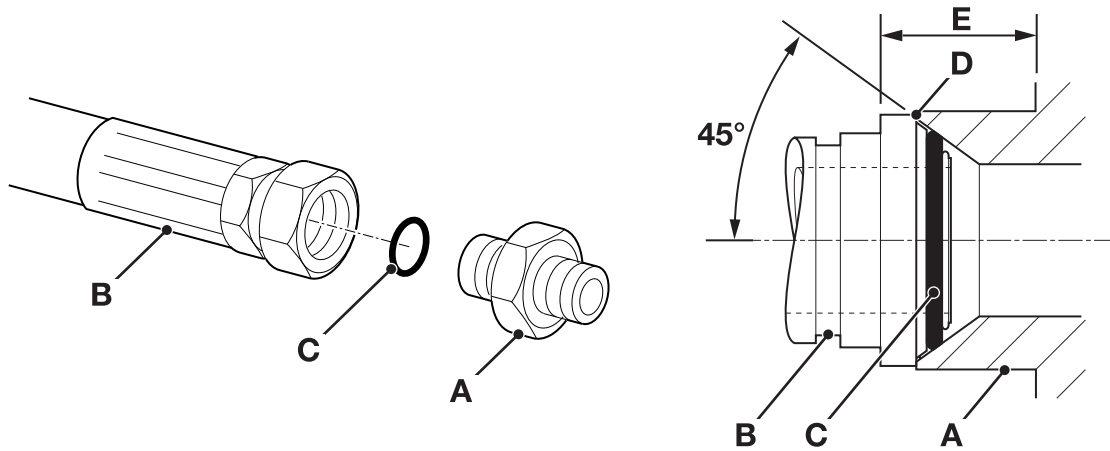


Fig 6.

'Torque Stop' Hoses **6-B** screwed into adaptors **6-A** seal onto an 'O' ring **6-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 **6-D**, which acts as a physical stop.

Note: Minimum dimension **6-E** fixed by shoulder **6-D**.

Table 13. BSP 'Torque Stop' Hose - Torque Settings

BSP Hose Size	Hexagon (A/F)	Nm	kgf m	lbf ft
	in.			
1/8		14.0	1.4	10.0
1/4		27.0	2.7	20.0
3/8		40.0	4.1	30.0
1/2		55.0	5.6	40.0
5/8		65.0	6.6	48.0
3/4		95.0	9.7	70.0
1		120.0	12.2	89.0
1 1/4		189.0	19.3	140.0
1 1/2		244.0	24.9	180.0

'Positional Type' Hydraulic Adaptors

Fitting Procedure

On a typical machine, some hydraulic components may utilise 'Positional Type' SAE Hydraulic Adaptors. When fitting 'Positional Type' Hydraulic Adaptors it is important to adopt the following procedure. If this procedure is not followed correctly, damage to the 'O' ring seal **7-A** can occur resulting in oil leaks.

- 1 Ensure the locknut **7-B** is screwed back onto the body of the adaptor as far as possible as shown.
- 2 Check the 'O' ring backing washer **7-C** is a tight fit on the adaptor. Note that the washer should not move freely, if the washer is slack do not use the adaptor.
- 3 Check the 'O' ring **7-A** is fitted and that it is free from damage or nicks. Before fitting the adaptor, smear the 'O' ring with clean hydraulic fluid.

Note: The dimensions and shore hardness of the 'O' ring is critical. Should it become necessary to replace the 'O' ring, ensure that only JCB Genuine Parts are used.

- 4 Screw the adaptor into the port of the hydraulic component as far as possible, so that ALL the threads engage and the 'O' ring is correctly seated against the sealing face.
- 5 Set the angular position of the adaptor as required, then secure by tightening the locknut **7-B**.

Note: When fitted correctly no more than one thread should be visible at **8-Z** as shown.

- 6 Torque tighten the locknut to 81 Nm (60 lbf ft).

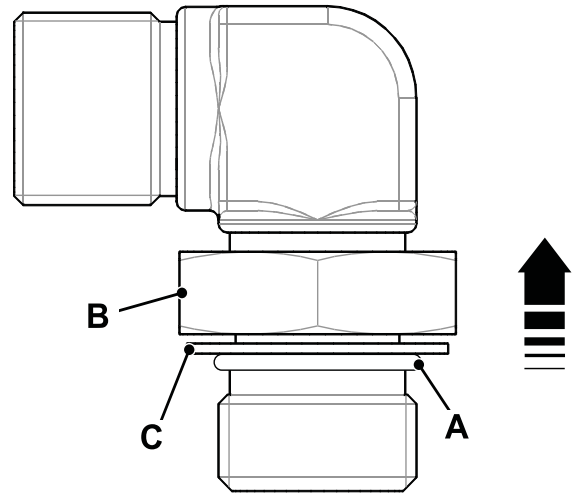


Fig 7.

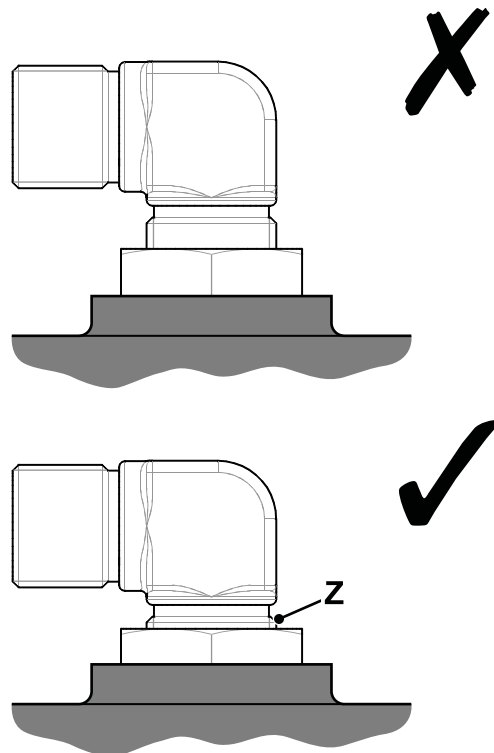


Fig 8.



Section 1 - General Information Torque Settings

'Positional Type' Hydraulic Adaptors

Page left intentionally blank

Service Tools

Numerical List

The tools listed in the table are special tools required for carrying out the procedures described in this manual. These tools are available from JCB Service.

Some tools are available as kits or sets, the part numbers for parts within such kits or sets are not listed here. For full

details of all tools, including the content of kits and sets, refer to **Tool Detail Reference, Section 1**.

Note: Tools other than those listed will be required. It is expected that such general tools will be available in any well equipped workshop or be available locally from any good tool supplier.

Part Number	Description	See Section
-	Bonded Washers - see Tool Detail Reference (Section 1) for content	E
-	Female Cone Blanking Plugs - see Tool Detail Reference (Section 1) for content	E
-	Female Connectors - see Tool Detail Reference (Section 1) for content	E
-	Hydraulic Flow Test Equipment - see Tool Detail Reference (Section 1) for content	E
-	Hydraulic Hand Pump Equipment - see Tool Detail Reference (Section 1) for content	E
-	Male Adapters - BSP x BSP - see Tool Detail Reference (Section 1) for content	E
-	Male Adapters - BSP x NPT (USA only) - see Tool Detail Reference (Section 1) for content	E
-	Male Cone Blanking Caps - see Tool Detail Reference (Section 1) for content	E
-	Pressure Test Points - Adaptors - see Tool Detail Reference (Section 1) for content	E
-	Pressure Test Points - 'T' Adaptors - see Tool Detail Reference (Section 1) for content	E
-	Rivet Nut Tool - see Tool Detail Reference (Section 1) for content	B
331/22966	Pump Drive Alignment Tool	E
331/31069	Test Block for A.R.V.	E
4104/1310	Hand Cleaner	B
892/00039	Spool Clamp	E
892/00041	De-glazing Tool	K
892/00137	Micro-Bore Hose	E
892/00180	Seal Fitting Tool	H
892/00223	Hand Pump	E
892/00253	Hydraulic Circuit Pressure Test Kit - see Tool Detail Reference (Section 1) for content	E
892/00254	Hose	E
892/00271	Adapter	E
892/00272	Adapter	E
892/00273	Adapter	E
892/00274	Adapter	E



Section 1 - General Information Service Tools

Numerical List

Part Number	Description	See Section
892/00275	Adapter	E
892/00276	Adapter	E
892/00277	Adapter	E
892/00279	Gauge	E
892/00280	Gauge	E
892/00281	AVO Meter	C
892/00284	Digital Tachometer	C
892/00285	Hyd. Oil Temperature Probe	C
892/00298	Fluke Meter	C
892/00334	Ram Seal Fitting Tool	E
892/00346	Gauge	E
892/00347	Connector	E
892/00706	Test Probe	E
892/00842	Glass Lifter	B
892/00843	Folding Stand for Holding Glass	B
892/00845	Cartridge Gun	B
892/00846	Glass Extractor (Handles)	B
892/00847	Nylon Spatula	B
892/00848	Wire Starter	B
892/00849	Braided Cutting Wire	B
892/01016	Ram Protection Sleeve for 25 mm Rod Diameter	E
892/01017	Ram Protection Sleeve for 30 mm Rod Diameter	E
892/01018	Ram Protection Sleeve for 40 mm Rod Diameter	E
892/01019	Ram Protection Sleeve for 50 mm Rod Diameter	E
892/01020	Ram Protection Sleeve for 50 mm Rod Diameter (slew ram)	E
892/01021	Ram Protection Sleeve for 60 mm Rod Diameter	E
892/01022	Ram Protection Sleeve for 60 mm Rod Diameter (slew ram)	E
892/01023	Ram Protection Sleeve for 65 mm Rod Diameter	E
892/01024	Ram Protection Sleeve for 70 mm Rod Diameter	E
892/01025	Ram Protection Sleeve for 75 mm Rod Diameter	E
892/01026	Ram Protection Sleeve for 80 mm Rod Diameter	E
892/01027	Piston Seal Assembly Tool	E
926/15500	Rubber Spacer Blocks	B
992/02800	ARV Extractor	E
992/09300	Hexagon Spanner 55mm A/F	E
992/09400	Hexagon Spanner 65mm A/F	E
992/09500	Hexagon Spanner 75mm A/F	E



Section 1 - General Information Service Tools

Numerical List

Part Number	Description	See Section
992/09600	Hexagon Spanner 85mm A/F	E
992/09700	Hexagon Spanner 95mm A/F	E
992/09900	Hexagon Spanner 115mm A/F	E
992/10000	Hexagon Spanner 125mm A/F	E
992/10100	Spool Clamp	E
992/12300	12V Mobile Oven	B
992/12400	24V Static Oven (2 Cartridge)	B
992/12800	Cut-Out Knife	B
992/12801	'L' Blades	B
993/68100	Slide Hammer Kit - see <i>Tool Detail Reference (Section 1)</i> for content	B

Tool Detail Reference

Section B - Body and Framework

Note: Not all service tools are illustrated.

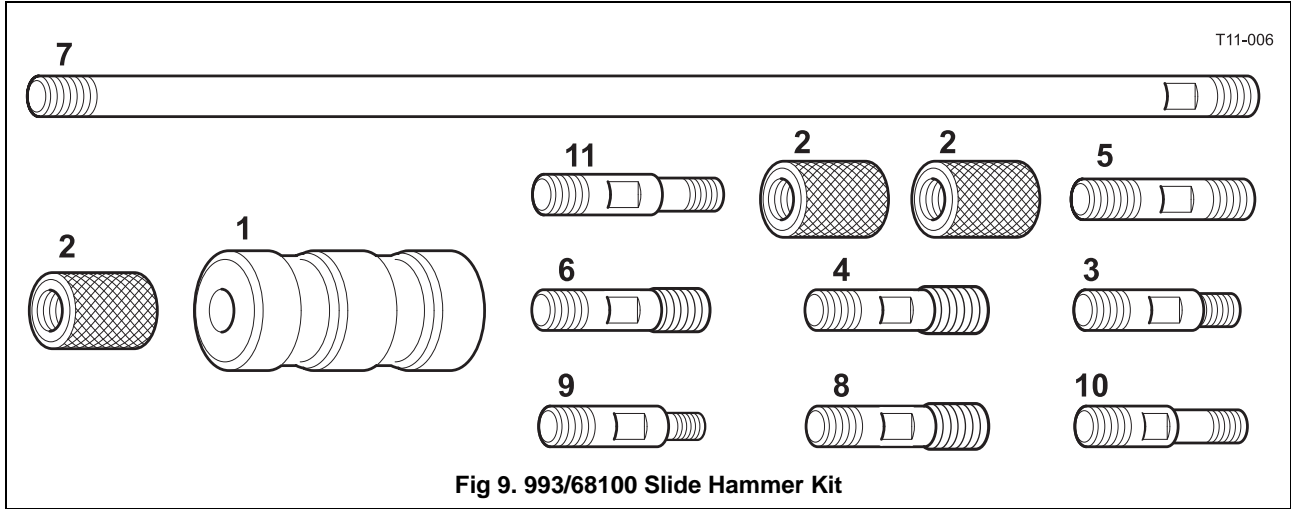


Fig 9. 993/68100 Slide Hammer Kit

1	993/68101	Slide Hammer	7	993/68107	Bar - M20 x M20 X 800 mm
2	993/68102	End Stops	8	993/68108	Adaptor - M20 x 7/8" UNF
3	993/68103	Adaptor - M20 x 5/8" UNF	9	993/68109	Adaptor - M20 x M12
4	993/68104	Adaptor - M20 x 1" UNF	10	993/68110	Adaptor - M20 x 5/8" UNF (Shoulder)
5	993/68105	Adaptor - M20 x M20	11	993/68111	Adaptor - M20 x 1/2" UNF
6	993/68106	Adaptor - M20 x M24			

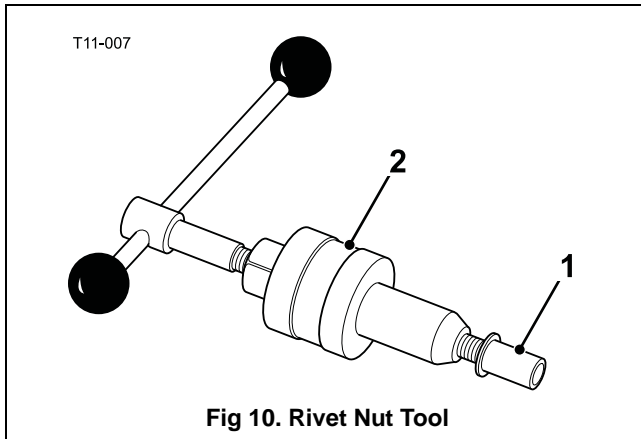


Fig 10. Rivet Nut Tool

1	826/01099	M6 x 16 mm Rivet Nut
	826/01101	M6 x 19 mm Rivet Nut
	826/01102	M8 x 18 mm Rivet Nut
	826/01103	M8 x 21 mm Rivet Nut
	826/01104	M10 x 23 mm Rivet Nut
	826/01105A	M10 x 26 mm Rivet Nut
2	-	Installation Tool available from: Bollhoff Fastenings Ltd (www.bollhoff.com)

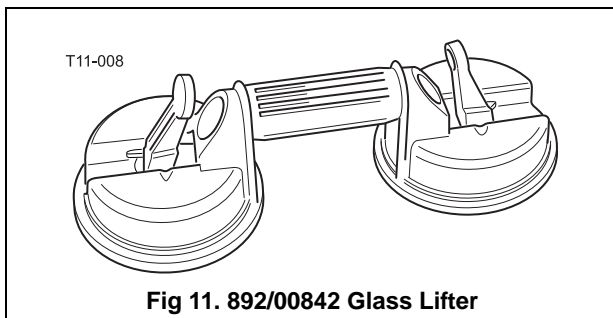


Fig 11. 892/00842 Glass Lifter

Minimum 2 off - Essential for glass installation, 2 required to handle large panes of glass. Ensure suction cups are protected from damage during storage.

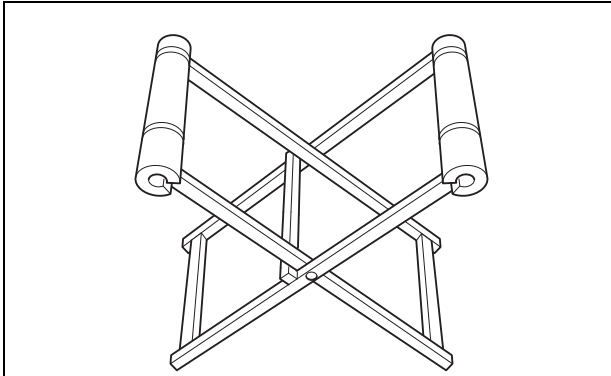
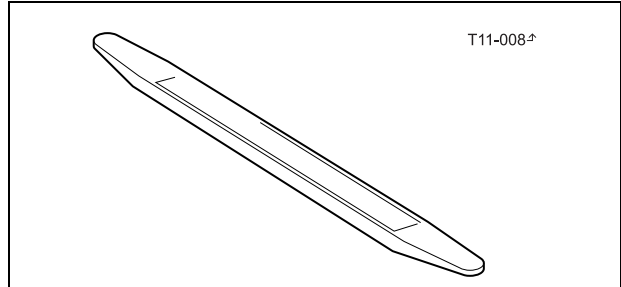


Fig 12. 892/00843 Folding Stand

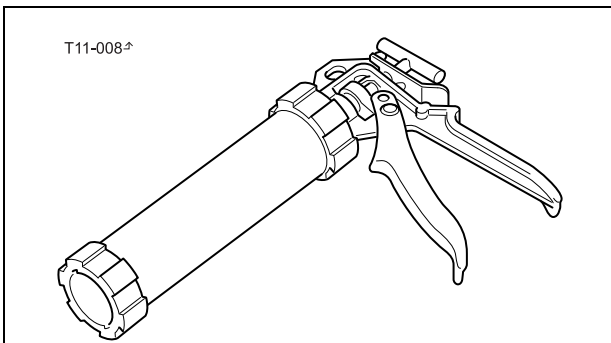
Essential for preparing new glass prior to installation.



T11-008[±]

Fig 15. 892/00847 Nylon Spatula

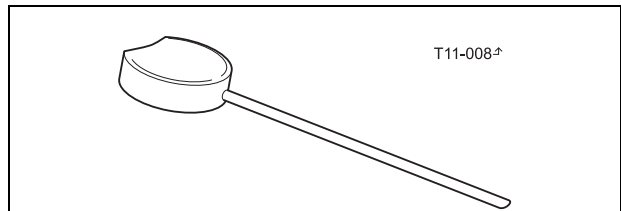
General tool used for smoothing sealants - also used to re-install glass in rubber glazing because metal tools will chip the glass edge.



T11-008[±]

Fig 13. 892/00845 Cartridge Gun

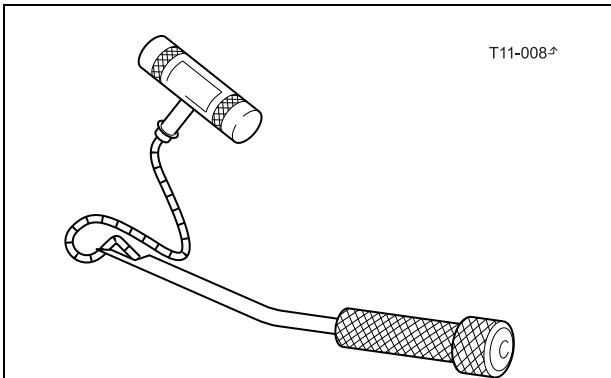
Hand operated. Essential for the application of sealants, polyurethane materials etc.



T11-008[±]

Fig 16. 892/00848 Wire Starter

Used to access braided cutting wire through original polyurethane seal. → [Fig 17. \(□ 1-44\)](#).



T11-008[±]

Fig 14. 892/00846 Glass Extractor (Handles)

Used with braided cutting wire to cut out broken glass. → [Fig 17. \(□ 1-44\)](#).

T11-008[±]

Fig 17. 892/00849 Braided Cutting Wire

Consumable heavy duty cut-out wire used with the glass extraction tool. ⇒ [Fig 14.](#) (□ 1-43). Approx 25 m length.

T11-008[±]

Fig 20. 992/12400 Static Oven 240V

Required to pre-heat adhesive prior to use. No plug supplied.

Note: 110V models available upon request - contact JCB Technical Service.

T11-008[±]

Fig 18. 926/15500 Rubber Spacer Blocks

Used to provide the correct set clearance between glass edge and cab frame. Unit quantity = 500 off.

T11-008[±]

Fig 21. 992/12800 Cut-Out Knife

Used to remove broken glass.

T11-008[±]

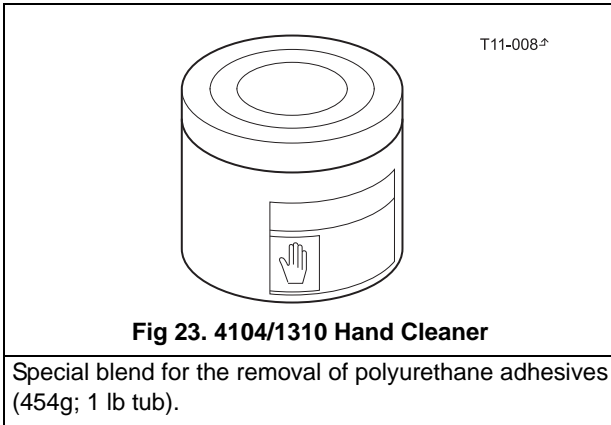
Fig 19. 992/12300 Mobile Oven 12V

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).

T11-008[±]

Fig 22. 992/12801 'L' Blades

25 mm (1 in.) cut. Replacement blades for cut-out knife. ⇒ [Fig 21.](#) (□ 1-44). Unit quantity = 5 off.



This as a preview PDF file from best-manuals.com



Download full PDF manual at best-manuals.com