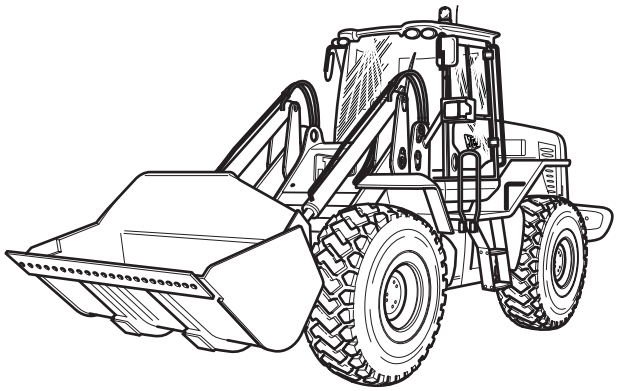
# Service Manual

# Wheeled Loading Shovel - 412S, 414S, 416S






Publication No.

**9803/4170-14**


World Class
Customer Support

**Page left intentionally blank**

**Contents** **Page No.**

Contents Page No.

# Introduction

## About this Publication

This publication is designed for the benefit of JCB Distributor Service Engineers who are receiving, or have received, training by JCB Technical Training Department.

These personnel should have a sound knowledge of workshop practice, safety procedures, and general techniques associated with the maintenance and repair of hydraulic earthmoving equipment.

Renewal of oil seals, gaskets, etc., and any component showing obvious signs of wear or damage is expected as a matter of course. It is expected that components will be cleaned and lubricated where appropriate, and that any opened hose or pipe connections will be blanked to prevent excessive loss of hydraulic fluid and ingress of dirt. Finally, please remember above all else SAFETY MUST COME FIRST!

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

**1** General Information - includes torque settings and service tools.

**2** Care & Safety - includes warnings and cautions pertinent to aspects of workshop procedures etc.

**3** Routine Maintenance - includes service schedules and recommended lubricants for all the machine.

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

**A** Attachments

**B** Body & Framework...etc.

The page numbering in each alphabetically coded section is not continuous. This allows for the insertion of new items in later issues of the manual.

Section contents, technical data, circuit descriptions, operation descriptions etc. are inserted at the beginning of each alphabetically coded section.

All sections are listed on the front cover; tabbed divider cards align directly with individual sections on the front cover for rapid reference.

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

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

This Service Manual covers the following machines:

412S Wheeled Loading Shovel from machine serial number 535000

414S Wheeled Loading Shovel from machine serial number 537000

416S Wheeled Loading Shovel from machine serial number 543000

The information provided in this manual for the 414S machine also applies to the 416S machine except where speciified.

Smoothshift Transmission introduced from the following serial numbers:

412S Wheeled Loading Shovel from machine serial number 535500

414S Wheeled Loading Shovel from machine serial number 537300

416S Wheeled Loading Shovel from machine serial number 543100

JCB 444 Series engine added to 412S Wheeled Loading Shovel from machine serial number 1242000.

# Identifying your Machine

## Identification Plates

### Identification Plate

Your machine has an identification plate **1X** mounted on the left hand side of the machine on the loader arm pillar. The serial numbers of the machine and its major units are stamped on the plate.

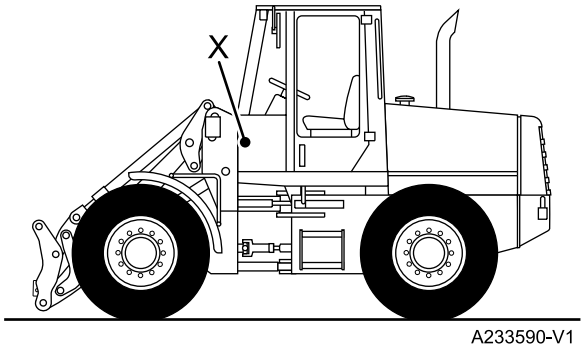



**Fig 1.**

### Explanation of Vehicle Identification Number (VIN)

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| SLP | 412S0 | S | E | 0527001 |

**1** World Manufacturer Identification, SLP = JCB

**2** Machine Model, 412S0 = 412S

**3** Year of Manufacture S, (P = 1993, R = 1994, S = 1995, T = 1996, V = 1997, W = 1998, X = 1999, Y = 2000, 1 = 2001, 2 = 2002, 3 = 2003, 4 = 2004)

**4** Manufacturing Location (E = England)

**5** Machine Serial Number (0527001)

The serial number of each major unit is also stamped on the unit itself. If a major unit is replaced by a new one, the serial number on the identification 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.

The machine and engine serial numbers can help identify exactly the type of equipment you have.

### Unit Identification

The engine serial number is stamped on a plate **2Y** or **3Y** which is fastened to the right side of the cylinder block, near the fuel filter.

***Note:*** *For machines with the JCB 444 Series engine, see* ***Section K, Technical Data.***

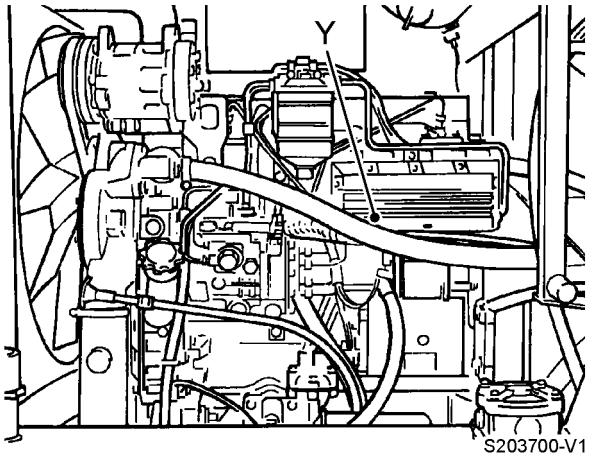



**Fig 2. 412S Machines**

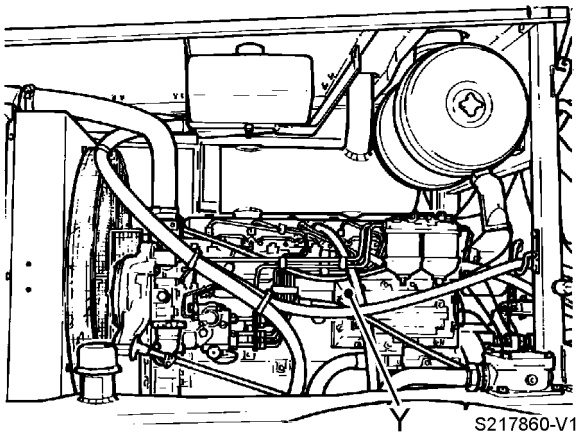



**Fig 3. 414S Machines**

## Typical Engine Identification Number

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| AA | 50261 | U | 500405 | P |

**1** Engine Type,

- **a** AA = 4 cylinder naturally aspirated
- **b** AB = 4 cylinder turbo

**2** Build Number

**3** Country of Origin

**4** Engine Sequence Number

**5** Year of Manufacture

## Transmission Identification

The Transmission serial number is stamped on plate **4Z** or **5Z** as shown.

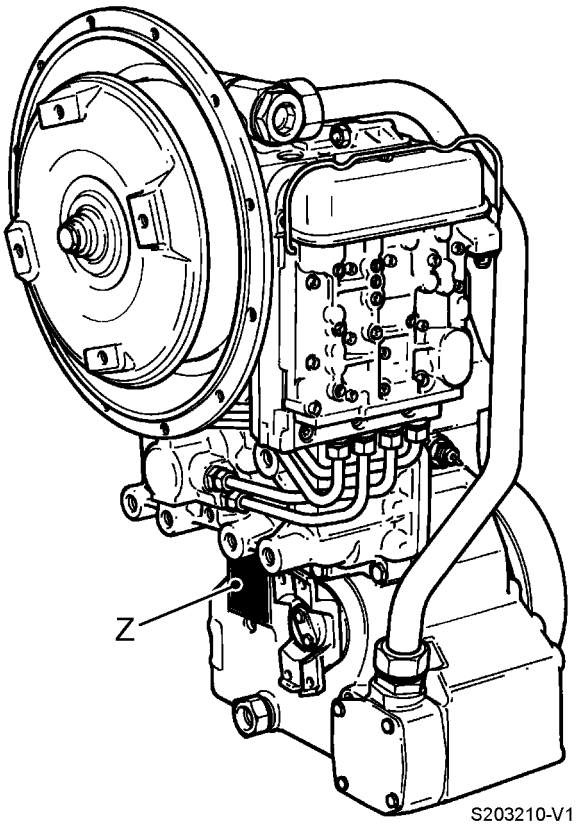



**Fig 4. 412S Machines**

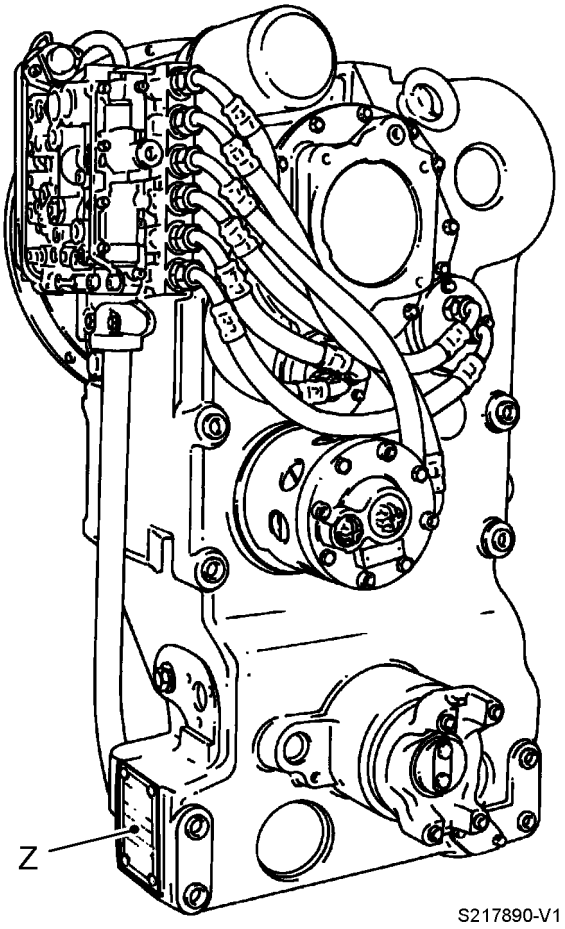



**Fig 5. 414S Machines**

# Torque Settings

## 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.

### UNF Grade `S' Bolts

| Bolt size | | | Torque Settings | | |
|---|---|---|---|---|---|
| Dia. | (mm) | Hexagon (A/F) mm | Nm | kgf m | lbf ft |
| 1/4 | 6.3 | 7/16 | 14 | 1.4 | 10 |
| 5/16 | 7.9 | 1/2 | 28 | 2.8 | 20 |
| 3/8 | 9.5 | 9/16 | 49 | 5.0 | 36 |
| 7/16 | 11.1 | 5/8 | 78 | 8.0 | 58 |
| 1/2 | 12.7 | 3/4 | 117 | 12.0 | 87 |
| 9/16 | 14.3 | 13/16 | 170 | 17.3 | 125 |
| 5/8 | 15.9 | 15/16 | 238 | 24.3 | 175 |
| 3/4 | 19 | 1 1/8 | 407 | 41.5 | 300 |
| 7/8 | 22.2 | 1 5/16 | 650 | 66.3 | 480 |
| 1 | 25.4 | 1 1/2 | 970 | 99.0 | 715 |
| 1 1/4 | 31.7 | 1 7/8 | 1940 | 198.0 | 1430 |
| 1 1/2 | 38.1 | 2 1/4 | 3390 | 345.0 | 2500 |

### Metric Grade 8.8 Bolts

| Bolt size | | | Torque Settings | | |
|---|---|---|---|---|---|
| Dia. | (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 |

### Rivet Nut Bolts/Screws

| Bolt size | | Torque Settings (for steel rivet nuts) | | |
|---|---|---|---|---|
| Dia. | (mm) | Nm | kgf m | lbf ft |
| M3 | (3) | 1.2 | 0.12 | 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 |

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

# JCB Standard Torque Settings B.S.P. Port Connection (Colour Coded)

***Note:*** *All adapters, elbows and hoses should be tightened to JCB standard torque settings unless stated otherwise.*


**Fig 1.**

# JCB Standard Torque Settings for Hose Ends and Flanged Fittings (Colour Coded)

***Note:*** *All adapters, elbows and hoses should be tightened to JCB standard torque settings unless stated otherwise.*

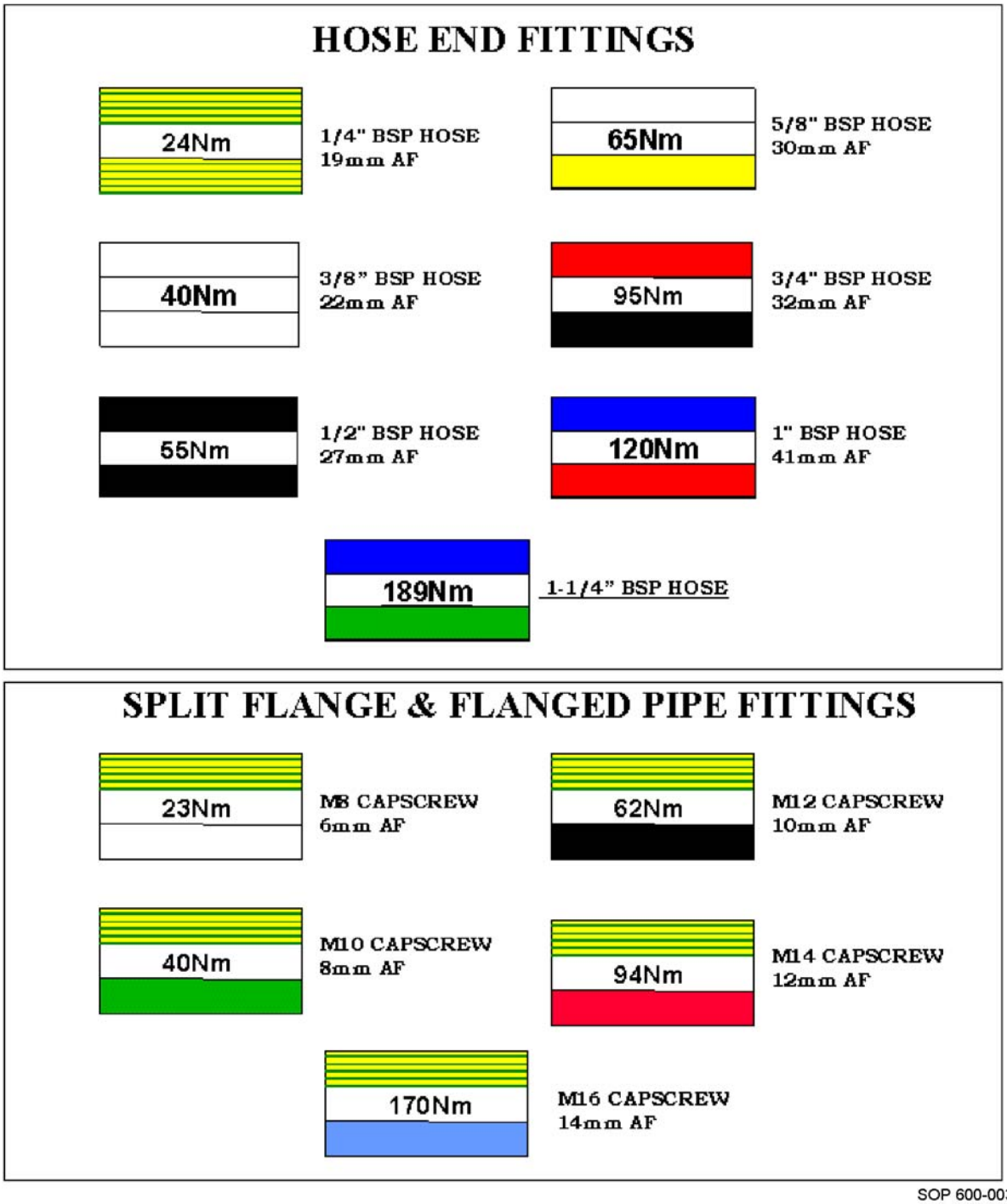



**Fig 2.**

# Service Tools

## Numerical List Section B - Body and Framework

The tools listed in the table are special tools required for removal and replacement of Body and Framework parts. These tools are available from JCB Service.

***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 | Tool Detail Reference |
|---|---|---|
| 825/99849 | Dummy Boss | ⇨ *Fig 12. (1-11)* |
| 825/99850 | Bearing Locator | ⇨ *Fig 12. (1-11)* |
| 826/01179 | M6 x 16mm Rivet Nut | ⇨ *Fig 1. (1-9)* |
| 826/01106 | M6 x 19mm Rivet Nut | ⇨ *Fig 1. (1-9)* |
| 826/01177 | M8 x 18mm Rivet Nut | ⇨ *Fig 1. (1-9)* |
| 826/01176 | M10 x 23mm Rivet Nut | ⇨ *Fig 1. (1-9)* |
| 826/01333 | M10 x 26mm Rivet Nut | ⇨ *Fig 1. (1-9)* |
| 892/00842 | Glass Lifter | ⇨ *Fig 3. (1-9)* |
| 892/00843 | Glass Stand | ⇨ *Fig 2. (1-9)* |
| 892/00844 | Long Knife | ⇨ *Fig 11. (1-11)* |
| 892/00846 | Glass Extractor (Handles) | ⇨ *Fig 8. (1-10)* |
| 892/00847 | Nylon Spatula | ⇨ *Fig 4. (1-9)* |
| 892/00848 | Wire Starter | ⇨ *Fig 6. (1-10)* |
| 892/00849 | Braided Cutting Wire | ⇨ *Fig 10. (1-11)* |
| 926/15500 | Rubber Spacer Blocks | ⇨ *Fig 5. (1-10)* |
| 992/12800 | Cut-Out Knife | ⇨ *Fig 7. (1-10)* |
| 992/12801 | 'L' Blades | ⇨ *Fig 9. (1-11)* |

# Tool Detail Reference Section B - Body and Framework

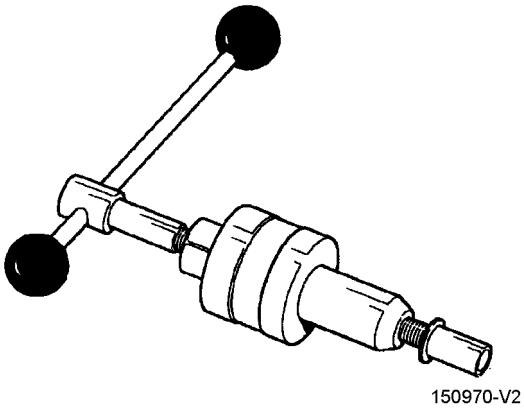



**Fig 1.**

***Note:*** *826/01179 M6 x 16mm Rivet Nut, 826/01106 M6 x 19mm Rivet Nut, 826/01177 M8 x 18mm Rivet Nut, 826/01176 M10 x 23mm Rivet Nut, 826/01333 M10 x 26mm Rivet Nut*

Installation Tool Available from:

Bollhoff Fastenings Ltd.

Midacre

The Willenhall Estate

Rose Hill

Willenhall

West Midlands, WV13 2JW

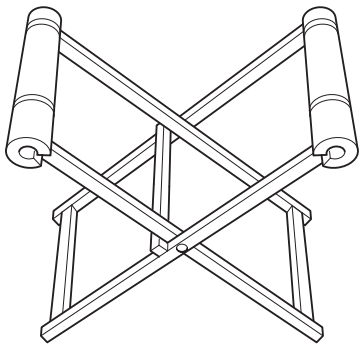


**Fig 2. 892/00843**

***Note:*** *essential for preparing new glass prior to installation.*

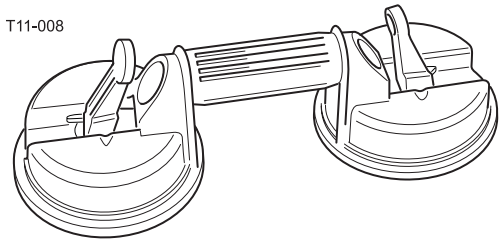



**Fig 3. 892/00842**

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

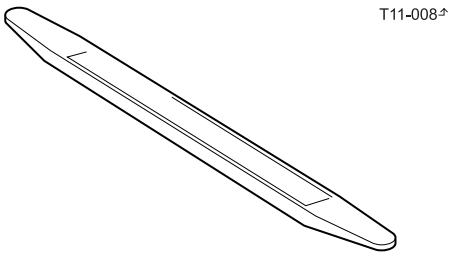



**Fig 4. 892/00847**

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


**Fig 5. 926/15500**

***Note:*** *- used to provide the correct set clearance between glass edge and cab frame. (unit quantity = 500 off)*

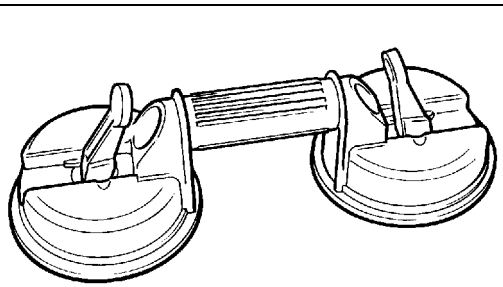


**Fig 6. 892/00848**

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

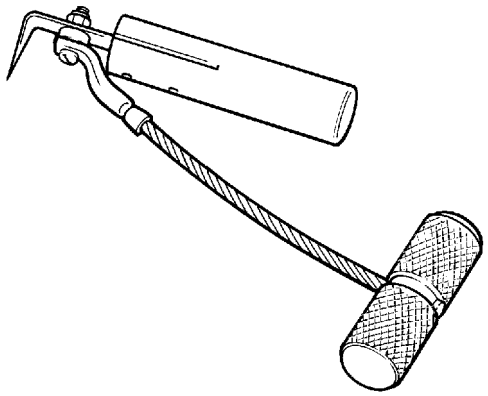


**Fig 7. 992/12800**

***Note:*** *- used to remove broken glass.*

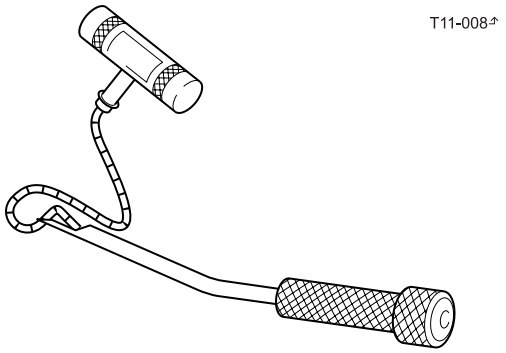



**Fig 8. 892/00846**

***Note:*** *- used with braided cutting wire (below) to cut out broken glass.*


Our support email:

ebooklibonline@outlook.com