

411, 416 Wheeled Loading Shovel

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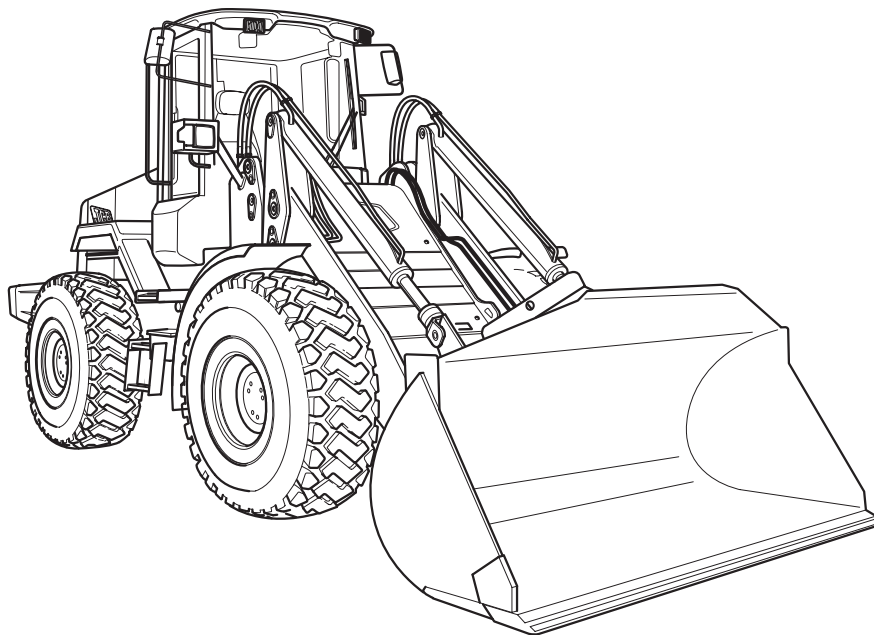
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Section 1 - General Information

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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:

411 Wheeled Loading Shovel from machine serial number 527000

416 Wheeled Loading Shovel from machine serial number 529000

411 Wheeled Loading Shovel from machine serial number M1241500

416 Wheeled Loading Shovel from machine serial number M1243000

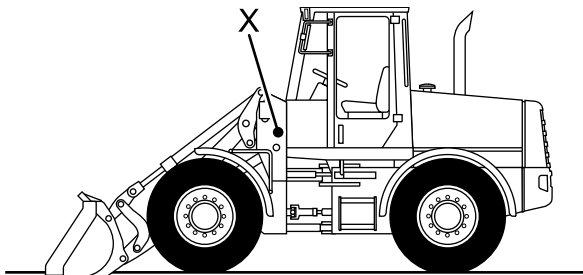
Note: Data and information for 412S Machines in this Service Manual may not be up to date. 412S and 414S Machines are now covered in Service Manual Part Number 9803/4170.

Identifying your Machine

Identification Plates

Identification Plate

Your machine has an identification plate **1-X** 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.



A203290-V2

Fig 1.

Explanation of Vehicle Identification Number (VIN)

1	2	3	4	5
SLP	41100	S	E	0527001

- 1 World Manufacturer Identification, SLP = JCB
- 2 Machine Model, 41100 = 411
- 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.

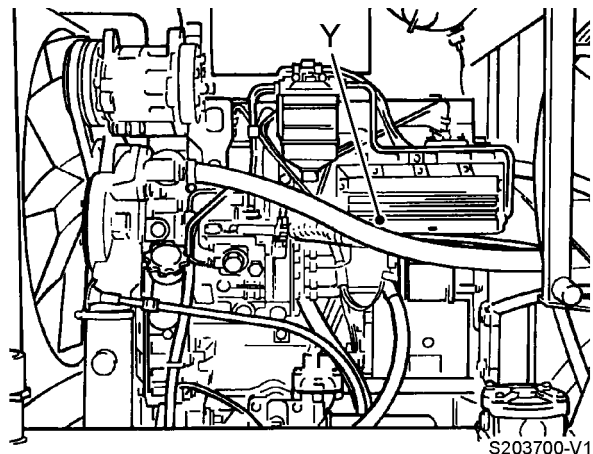
This will prevent the wrong unit number being quoted when replacement parts are ordered.

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 **2-Y** 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.**



S203700-V1

Fig 2.

Typical Engine Identification Number

1	2	3	4	5
AA	50261	U	500405	P

1 Engine Type,

A Series - **AA** = 4 cylinder naturally aspirated, **AB** = 4 cylinder turbo.

R Series - **RG** = 4 cylinder turbo, low emission stage 2, **RJ** = 4 cylinder air to air charge cooled, low emission, stage 2.

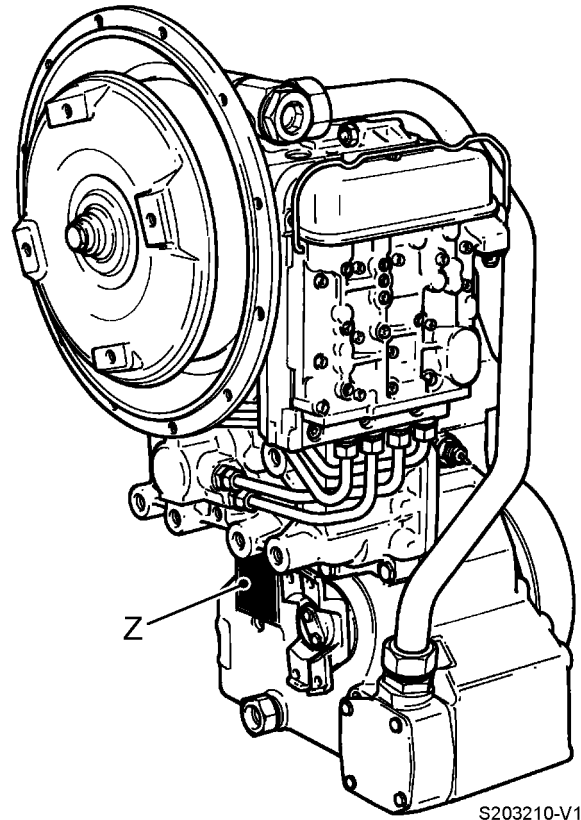
2 Build Number

3 Country of Origin

4 Engine Sequence Number

5 Year of Manufacture

The Transmission serial number is stamped on plate **3-Z** as shown.



S203210-V1

Fig 3.

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

Dia.	Bolt size		Torque Settings		
	(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

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

Rivet Nut Bolts/Screws

Dia.	Bolt size (mm)	Torque Settings (for steel rivet nuts)		
		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.

Service Tools

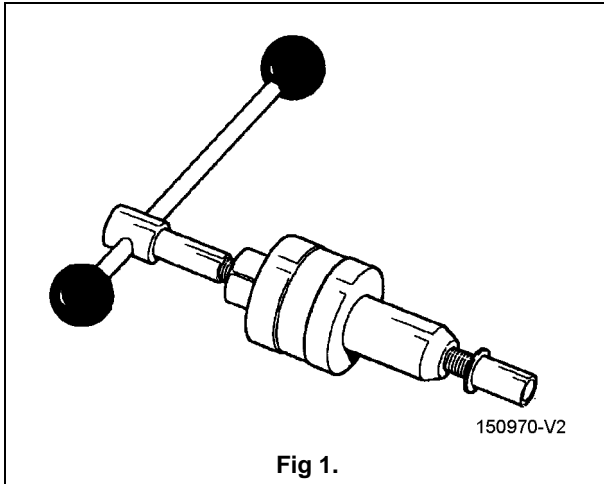
Numerical List Section B - Body and Framework

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

Tool Detail Reference Section B - Body and Framework



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

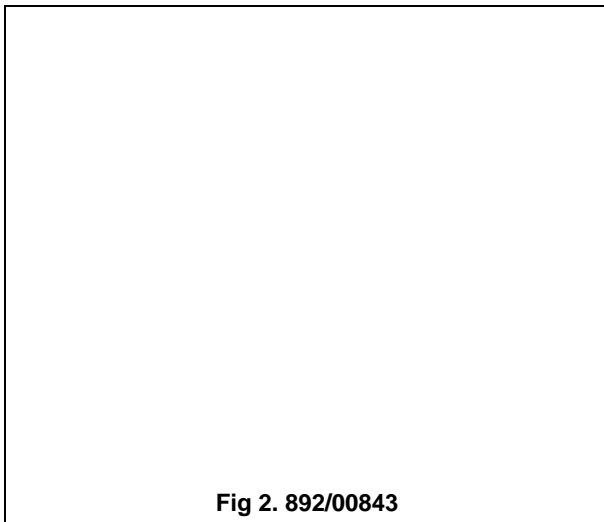




Fig 9. 992/12801

Note: - 25 mm (1 in) cut - replacement blades for cut-out knife (above), (unit quantity = 5 off)



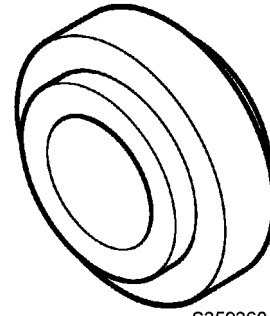
Fig 10. 892/00849

Note: - consumable heavy duty cut-out wire used with the glass extraction tool (above), (approx 25 m length)



Fig 11. 892/00844

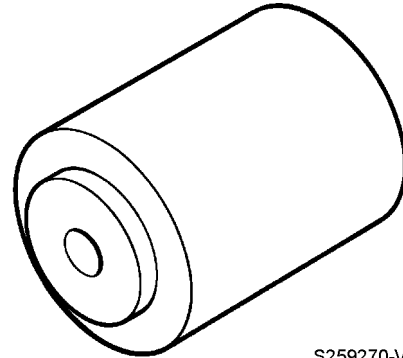
Note: - used to give extended reach for normally inaccessible areas.



S259260-V1

Fig 12. 825/99849

Note: - used with bearing locator to set up Upper Centre Pivot.



S259270-V1

Fig 13. 825/99850

Note: - used with dummy bush to set up Upper Centre Pivot.



Numerical List Section C - Electrics

The tools listed in the table are special tools required for testing electrics. 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
892/00282	Shunt	⇒ Fig 14. (□ 1-10)
892/00283	Tool Kit Case	⇒ Fig 14. (□ 1-10)
892/00284	Digital Tachometer	⇒ Fig 14. (□ 1-10)
892/00285	Hyd. Oil Temperature Probe	⇒ Fig 14. (□ 1-10)
892/00286	Surface Temperature Probe	⇒ Fig 14. (□ 1-10)
892/00298	Fluke Meter	⇒ Fig 14. (□ 1-10)
993/85700	Battery Tester	⇒ Fig 15. (□ 1-10)

Tool Detail Reference Section C - Electrics

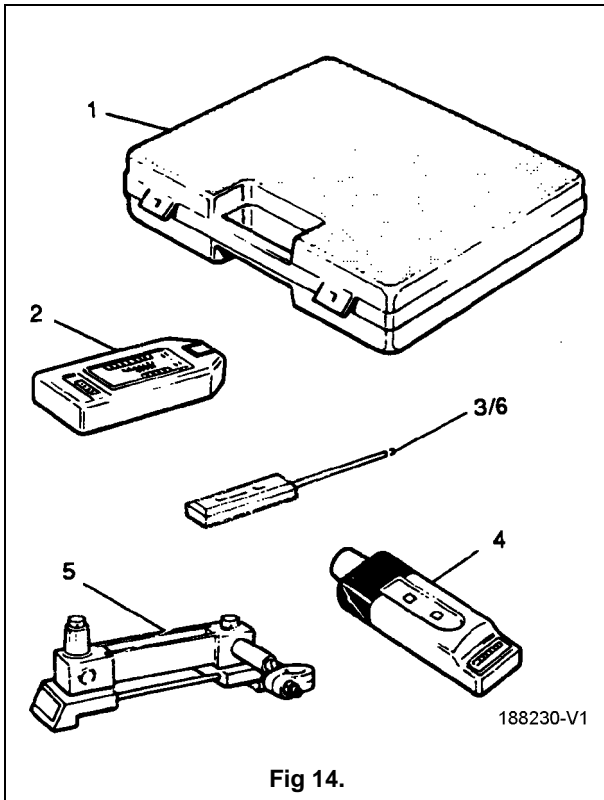


Fig 14.

1	892/00283 Tool Kit Case
2	892/00298 Fluke Meter
3	892/00286 Surface Temperature Probe
4	892/00284 Venture Microtach Digital Tachometer
5	892/00282 100 amp Shunt - open type
6	892/00285 Hydraulic Temperature Probe

Numerical List Section E - Hydraulics

The tools listed in the table are special tools required for testing, removing and replacing hydraulics. 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
1406/0011	Bonded Washer	⇒ Fig 18. (1-14)
1406/0014	Bonded Washer	⇒ Fig 18. (1-14)
1406/0018	Bonded Washer	⇒ Fig 18. (1-14)
1406/0021	Bonded Washer	⇒ Fig 18. (1-14)
1406/0029	Bonded Washer	⇒ Fig 18. (1-14)
1604/0006	Adapter	⇒ Fig 19. (1-14)
1612/0006	Adapter	⇒ Fig 19. (1-14)
816/00189	Blanking Cap	⇒ Fig 21. (1-15)
816/00190	Blanking Cap	⇒ Fig 21. (1-15)
816/00193	Blanking Cap	⇒ Fig 21. (1-15)
816/00196	Blanking Cap	⇒ Fig 21. (1-15)
816/00197	Blanking Cap	⇒ Fig 21. (1-15)
816/00294	Blanking Cap	⇒ Fig 21. (1-15)
816/15118	Pressure Test Adapter	⇒ Fig 22. (1-15)
816/20008	Adapter	⇒ Fig 19. (1-14)
816/55038	Pressure Test Adapter	⇒ Fig 17. (1-14)
816/55040	Pressure Test Adapter	⇒ Fig 17. (1-14)
892/00039	Spool Clamp	⇒ Fig 25. (1-16)
892/00055	Blanking Plug	⇒ Fig 20. (1-15)
892/00056	Blanking Plug	⇒ Fig 20. (1-15)
892/00057	Blanking Plug	⇒ Fig 20. (1-15)
892/00058	Blanking Plug	⇒ Fig 20. (1-15)
892/00059	Blanking Plug	⇒ Fig 20. (1-15)
892/00060	Blanking Plug	⇒ Fig 20. (1-15)
892/00074	Female Connector	⇒ Fig 23. (1-15)
892/00075	Female Connector	⇒ Fig 23. (1-15)
892/00076	Female Connector	⇒ Fig 23. (1-15)
892/00077	Female Connector	⇒ Fig 23. (1-15)
892/00137	Micro-Bore Hose	⇒ Fig 26. (1-16)
892/00223	Hand Pump	⇒ Fig 26. (1-16)
892/00239	Charging Tool	⇒ Fig 27. (1-16)

Part Number	Description	Tool Detail Reference
892/00253	Pressure Test Kit	⇒ Fig 16. (1-14)
892/00255	Pressure Test Adaptor	⇒ Fig 22. (1-15)
892/00256	Pressure Test Adaptor	⇒ Fig 22. (1-15)
892/00257	Pressure Test Adaptor	⇒ Fig 22. (1-15)
892/00258	Pressure Test Adaptor	⇒ Fig 22. (1-15)
892/00259	Pressure Test Adaptor	⇒ Fig 22. (1-15)
892/00260	Pressure Test Adaptor	⇒ Fig 22. (1-15)
892/00261	Pressure Test Adaptor	⇒ Fig 22. (1-15)
892/00262	Pressure Test Adaptor	⇒ Fig 26. (1-16)
892/00263	Pressure Test Adaptor	⇒ Fig 17. (1-14)
892/00264	Pressure Test Adaptor	⇒ Fig 17. (1-14)
892/00265	Pressure Test Adaptor	⇒ Fig 17. (1-14)
892/00268	Flow Monitoring Unit	⇒ Fig 19. (1-14)
892/00269	Sensor Head	⇒ Fig 19. (1-14)
892/00270	Load Valve	⇒ Fig 19. (1-14)
892/00274	Adapter	⇒ Fig 26. (1-16)
892/00275	Adapter	⇒ Fig 19. (1-14)
892/00279	Gauge	⇒ Fig 26. (1-16)
892/00309	A.R.V. Pressure Test Kit	⇒ Fig 28. (1-17)
892/00335	A.R.V. Cartridge Removal Tool	⇒ Fig 28. (1-17)
892/00340	Test Block Body	⇒ Fig 28. (1-17)
892/00341	Setting Body	⇒ Fig 28. (1-17)
892/00343	Spanner	⇒ Fig 28. (1-17)
892/00345	Anti-cavitation Lock Out Bung	⇒ Fig 28. (1-17)
892/00706	Test Probe	⇒ Fig 26. (1-16)
892/00948	Charging Tool	⇒ Fig 27. (1-16)
892/01042	Charging Tool	⇒ Fig 27. (1-16)
892/01043	Adapter	⇒ Fig 27. (1-16)
992/09300	Spanner	⇒ Fig 24. (1-16)
992/09400	Spanner	⇒ Fig 24. (1-16)
992/09500	Spanner	⇒ Fig 24. (1-16)
992/09600	Spanner	⇒ Fig 24. (1-16)
992/09700	Spanner	⇒ Fig 24. (1-16)
992/10000	Spanner	⇒ Fig 24. (1-16)
992/10100	Spool Clamp	⇒ Fig 25. (1-16)
993/68300	Adjusting Pin	⇒ Fig 28. (1-17)



Section 1 - General Information Service Tools

Numerical List Section E - Hydraulics

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

Replacement items for kit no. 892/00253

Part Number	Description	Tool Detail Reference
892/00201	Replacement Gauge	⇒ Fig 16. (□ 1-14)
892/00202	Replacement Gauge	⇒ Fig 16. (□ 1-14)
892/00203	Replacement Gauge	⇒ Fig 16. (□ 1-14)
892/00254	Replacement Hose	⇒ Fig 16. (□ 1-14)

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