

Product: 2002 Deutz 914 Engine Service Repair Workshop Manual
Full Download: <https://www.arepairmanual.com/downloads/2002-deutz-914-engine-service-repair-workshop-manual/>

Workshop Manual

914

0312 0441 en

In view of continuous design improvements or changes, the technical specifications and the illustrations shown in this operation manual are subject to alteration. Reprinting and reproduction, in part or in whole, are subject to our written approval.

Sample of manual. Download All 333 pages at:

<https://www.arepairmanual.com/downloads/2002-deutz-914-engine-service-repair-workshop-manual/>



Product: 2002 Deutz 914 Engine Service Repair Workshop Manual
Full Download: <https://www.arepairmanual.com/downloads/2002-deutz-914-engine-service-repair-workshop-manual/>

DEUTZ AG
Instandhaltungstechnik Motoren
Deutz-Mülheimer Straße 147-149
D - 51063 Köln
Tel.: + 49 (0) 2 21-8 22-0
Fax: + 49 (0) 2 21-8 22-53 58
<http://www.deutz.de>

Printed in Germany
All rights reserved
1st edition, 10/2002
Order no. 0312 0441

Sample of manual. Download All 333 pages at:
<https://www.arepairmanual.com/downloads/2002-deutz-914-engine-service-repair-workshop-manual/>

- Please read carefully and observe the instructions given in this documentation. Thus you avoid accidents, preserve the manufacturer's warranty and ensure that your engine always functions properly and reliably.
- This engine is constructed solely for the use - as defined by the equipment manufacturer (intended use) - designated in the scope of supply. Any use beyond this is contrary to the intended purpose. The manufacturer is not responsible for any damage incurred on this account. That risk is borne solely by the user.
- Intended use also includes compliance with the operating, maintenance and repair instructions issued by the manufacturer. The engine may only be used, maintained and repaired by those who are familiar with it and have received instruction about the hazards.
- Make sure that this documentation is readily available for all those carrying out operating, maintenance and repair work and that the contents are well understood.
- Non-compliance with this documentation may result in malfunction and engine damage as well as personal injuries for which the manufacturer shall not accept any liability.
- A prerequisite for successful maintenance and repair work is that all required equipment, hand and special tools are available and in perfect working order.
- Engine components such as springs, clamps, snap rings, etc. may cause injury if not handled with care.
- Accident prevention regulations and all other generally recognized regulations on safety and occupational medicine are to be observed.
- Optimal operation economy, reliability and durability of the engine can only be ensured when genuine parts of DEUTZ AG are used.
- Engine repairs must be carried out in accordance with intended use. For conversions, only parts approved by DEUTZ AG for a specific purpose should be used. Unauthorised changes made to the engine invalidate all liability on the part of the manufacturer for damage incurred as a result. Non-compliance with this rule nullifies the warranty!

1

DEUTZ engines have been developed for a broad range of applications. The extensive range of models available ensures that each particular requirement can be fulfilled.

The engine is equipped for the specific installation conditions, that means that not all parts and components described in this documentation are actually built onto your engine.

We have tried to point out these differences so that can easily find the operating, maintenance and repair specifications relevant to your engine.

Should you have any further questions, please do not hesitate to contact us.

Yours

DEUTZ AG

DEUTZ Engines

are the product of many years research and development work. Our broad-based expertise acquired over the years, together with stringent quality requirements, ensures that the engines we produce have a long service life, and are very reliable and economic in fuel consumption. It goes without saying that they also fulfil the high requirements placed on environmental protection.

Servicing and maintenance work

is a major factor in ensuring that the engine performs in the way intended. It is therefore essential that the stipulated maintenance schedules are observed and that maintenance and servicing work is performed carefully. Particular attention needs to be paid to this in demanding operating environments beyond normal working conditions.

DEUTZ AG

In case of operating defects or inquiries for spare parts, please get in touch with one of our representative service centres. Our trained personnel are able to repair any damage incurred promptly and professionally using original parts.

Original parts made by DEUTZ AG are always state-of-the-art.

You can find notes on our back-up service at the end of this documentation.

Caution when engine is running

Shut the engine down before performing maintenance and repair work. If any safety fixtures are removed, refit these after concluding the work. When working on a running engine, work clothes must be tightly fitting and may not hang loose.

**Safety**

All safety instructions are marked by this symbol. Observe these carefully. Also pass on safety instructions to your operating personnel. In addition, observe the "General Safety and Accident Prevention Regulations" applicable by law.

**Note**

Notes of a general nature are marked by this symbol. Observe these carefully.

**Asbestos**

The seals used with this engine do not contain asbestos. Please use corresponding spare parts when undertaking maintenance and repair work.



0 Introduction

Editorial, foreword, quick access, contents

1 User instructions

- 1.1 General
- 1.2 Regulations
- 1.3 Operating instructions and workshop manual
- 1.4 Work cards
- 1.5 Key to symbols

2 Technical Data

3 Work cards

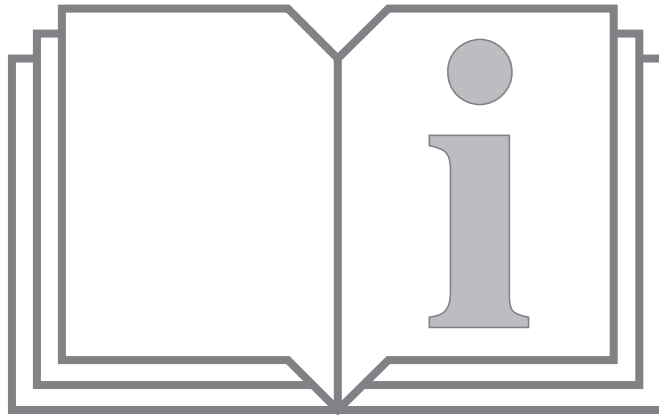
- 3.1 Overview work cards, alphabetical
- 3.2 Overview work cards, numerical

1

This page has been left blank on purpose.

1 User instructions

- 1.1 General
- 1.2 Regulations
- 1.3 Operating instructions and workshop manual
- 1.4 Work cards
- 1.5 Key to symbols



1 User instructions

1.1 General

The maintenance work prescribed in the operating instructions and the workshop manual must be performed to schedule and in the full scope.

Maintenance personnel must have the skills necessary to perform the work. Any safety fixtures and protective equipment needing to be dismantled during maintenance work must be refitted.



Caution

It is essential to observe the safety and accident prevention regulations during maintenance work.

In this context, also comply with the specific safety provisions for the different maintenance groups which are described in detail as work cards in the chapter on work cards (compare section 1.2).

Maintenance intervals are contained in the maintenance schedules. These also provide information on the work to be performed.

The work cards give technical advice on how to undertake the work.

1.2 Regulations

Safety and accident prevention regulations

Detailed safety instructions have been compiled for the different maintenance groups in the form of work cards, these precede the work cards of the respective maintenance groups.

Observe the accident prevention regulations laid down by law (available from trade associations or specialist outlets). These depend on the place of installation, the operating mode and the consumables and auxiliary aids used.

Special protective action dependent on the respective work is specified and marked in the description of the work.

In general, the following applies

- to personnel:
 - Only instructed personnel may operate or service the engine. No unauthorised persons are allowed in the machine room.
 - Wear tightly clothing and hearing protection in the machine room when the engine is operating.
 - Only deploy skilled personnel for maintenance or repair work.
- to the machine room:
 - Provide adequate ventilation (do not cover air vents).
 - Install first-aid boxes and suitable fire extinguishers. Check that these are filled and ready to use at regular intervals.
 - Do not store inflammable materials in the machine room unless these are required to operate the equipment.
 - Smoking and naked flames are forbidden in the machine room.

- to operating and maintaining the engine:
 - Do not start the engine unless all safety fixtures are installed. Ensure that no-one is loitering in the danger zone.
 - Shut the engine down and secure against re-starting before starting cleaning, maintenance and repair work.

Disposal regulations

The work described in the operating instructions and the workshop manual occasionally requires the renewal of parts and operating materials. These replacement parts / operating materials must be stored, transported and disposed of according to the regulations. The operator is responsible for this.

Disposal includes the recycling and scrapping of parts / operating materials, whereby recycling has priority.

Details on disposal its monitoring are regulated by regional, national and international laws and decrees. It is the responsibility of the plant operator to comply with these.

The servicing documentation has been sub-divided into operating instructions and workshop manual in order to structure the information in the best way for the users.

Among other things, the **operating instructions** contain a general description of and a guide to all maintenance work required

They contain the following chapters:

- 1 General, table of contents
- 2 Engine description
- 3 Operating
- 4 Operating materials
- 5 Maintenance
- 6 Servicing and maintenance work
- 7 Troubleshooting
- 8 Engine conservation
- 9 Technical specifications
- 10 Service

The **workshop manual** requires prior knowledge of the contents of the operating instructions, this applies in particular to the safety regulations. Simple repairs and emergency action on components are described which necessitate a larger scope of work and correspondingly skilled personnel.

1.3 Operating instructions and workshop manual

1

1.4 Work cards

The **work cards** are differentiated into those associated with the **workshop manual** e.g. W 4-5-1 and those with the **maintenance instructions I 4-5-1**.

- Please refer to Fig. 1 for an explanation on how the work cards are numbered.
- Fig. 2 shows the shows the layout of a work card.

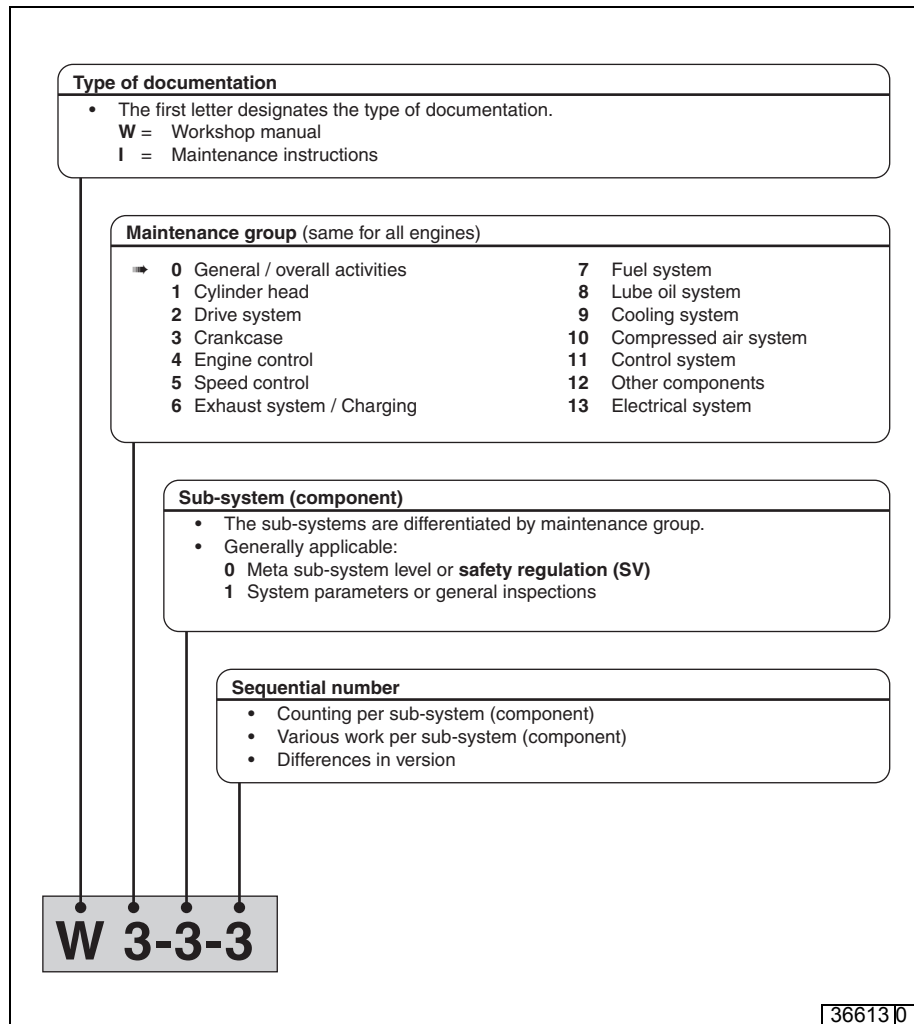


Fig. 1 Numbering of work cards

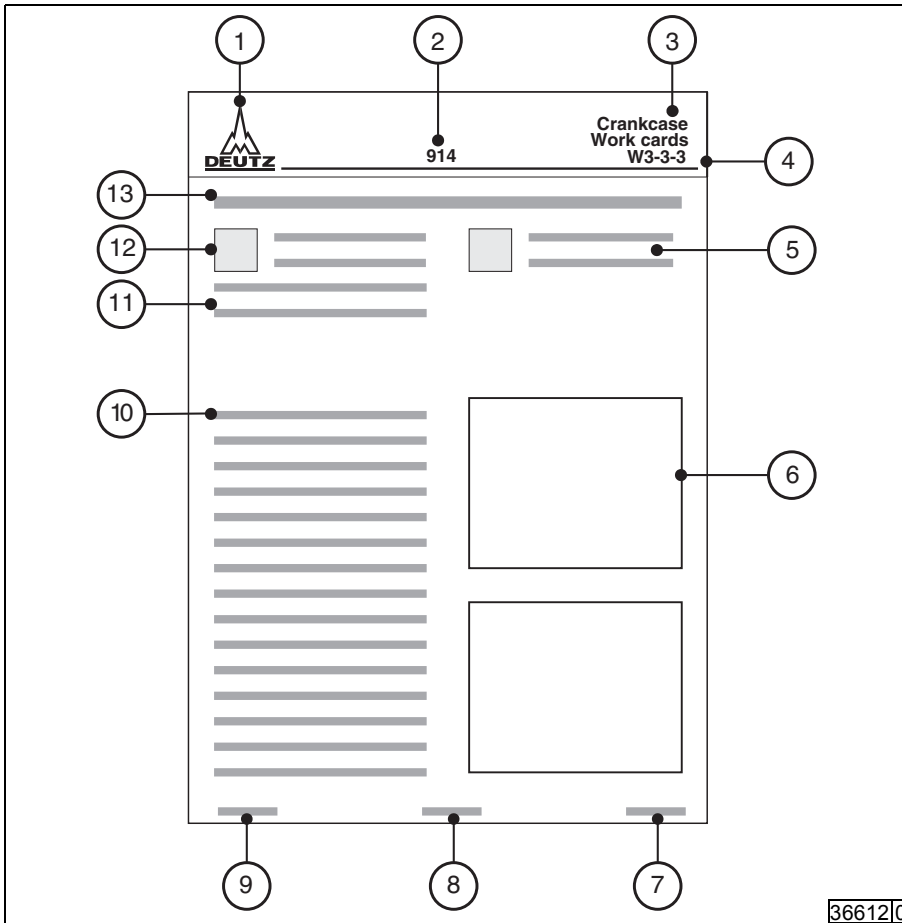


Fig. 2 Layout of work cards

- 1 DEUTZ, issuer of the servicing documentation
- 2 Engine type (e.g. 914)
- 3 Maintenance group
- 4 Work card number
- 5 Reference to other work cards, regulations etc.
- 6 Explanatory graphics
- 7 Page number
- 8 DEUTZ internal part number of the work card and technical categorisation number
- 9 Date the work card was issued
- 10 Sequence of work
- 11 Safety references and general notes
- 12 Tools, auxiliary aids and spare parts required
- 13 Title of the work card










Note

Should you have further questions on a work card, please always quote the engine type (2), the number of the work card (4), the page number (7), the date of issue (9) or alternatively the DEUTZ internal part number (8).

1

1.5 Key to symbols

	<p>Caution, important note</p>			<p>Note e.g. cylinder head has been dismantled</p>
	<p>Auxiliary aids e.g. lifting gear, adhesive</p>			<p>Always renew when reassembling e.g. gaskets</p>
	<p>Tools e.g. dial gauge 100 400</p>			<p>References e.g. work card nr. W x-y-z</p>
				<p>See technical specifications line reference, e.g. 67</p>

Technical Data

000	General engine data	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
001	Engine weight according to DIN 70020-A approx. kg	277	307	380	430	320	350	485/510
002	Total engine volume cm ³	3.236	4.314	5.393	6.472	3.236	4.314	6.472
003	Bore mm	102						
004	Stroke mm	132						
005	Direction of rotation	When facing flywheel counter-clockwise						
006	Rated speed max. min ⁻¹	2.500 to 2.800						
007	Minimum idle speed min ⁻¹	650 to 700						
008	Working cycle	Four-stroke diesel						
009	Combustion system	Direct injection						



2

010	General engine data	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
010	Compression ratio	20				18		
011	Compression pressure MPa (bar)	20 to 30 (20 to 30)						
012	Firing order	1-2-3	1-3-4-2	1-2-4- 5-3	1-5-3- 6-2-4	1-2-3	1-3-4-2	1-5-3- 6-2-4
020	Dimensions of engine including standard adapter housing (normal)							
021	Maximum length mm				1.012			1.012
022	Maximum width mm				739			739
023	Maximum height mm				1.176			1.176

040	General engine data	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
040	Lube oil pressure at low idling at 650 rpm ⁻¹ . without engine-oil heating. temperature approx. 120°C Oil SAE 15W/40m minimum MPa / (bar)	0.4				0.5		
041	Opening pressure of pressurestat MPa (bar) Lube oil pump: 40 + 60 liter / min. 70 + 80 liter / min.	5.5 to 6.5 (5.5 to 6.5) 5.0 to 6.0 (5.0 to 6.0)						
045	V-belt tension First-time assembly N	450 + 20						
046	V-belt tension Check after running 15 min under load N	300 + 20						
047	V-belt tension if re-used N	300 + 20						

2

100	Injection system	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
110	Injection pump	Motorpal						
111	Make type	PPM10Pi ...						
112	Minimum pressure which must be attained at approx. 5 KW revolutions MPa (bar)	300 (300)						
113	Test pressure for checking the tightness of pressure P-degree (dynamic) MPa (bar)	The pressure may drop from 150 to min. 140 after 1 min.						
120	Governor	Motorpal						
121	Make type	RV3M350/1150-3864						

130	Injection system	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
130	Injector	Bosch						
131	Injector type	DLLA 146 ...						
133	Injector opening pressure target value MPa (bar)	200 + 10 (200 + 10)						



2

140	Injection system	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
140	Commencement of delivery	2)						
141	Static. without injection timing mechanism	0%						
142	Static. with injection timing mechanism	6%						

2) Engine output, speed and commencement of delivery are stamped on the engine nameplate.

150	Injection system	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
150	Injection timing mechanism							
151	Adjustment range Degree KW	6° to 12° (see 141. 142)						
152	Adjustment start min ⁻¹	1.200						
153	Adjustment end min ⁻¹	2.800						



2

200	Cylinder head	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
200	Cylinder head							
210	Valve guide							
211	Valve guide Outer diameter mm	15 ^{+0.056} _{+0.045}						
212	Valve guide bore in cylinder head mm	15 ^{+0.011}						
213	Valve guide (pressed in) inner diameter mm	8 ^{+0.015}						
220	Valve seat insert							
221	Valve seat insert Outer diameter Inlet mm	45.66 _{-0.02}						
222	Valve seat insert Outer diameter Exhaust mm	40.16 _{-0.02}						

223	Cylinder head	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
223	Valve seat insert Inlet bore mm	45.5 ^{+0.025}						
224	Valve seat insert Exhaust bore mm	40.0 ^{+0.025}						
230	Valve							
231	Valve stem Diameter Inlet mm	7.945 to 7.960						
232	Valve stem Diameter Exhaust mm	7.920 to 7.940						
233	Valve stem clearance Inlet normal mm	0.045 to 0.075						
234	Valve stem clearance Inlet Wear limit mm	0.15						
235	Valve stem clearance Exhaust normal mm	0.065 to 0.100						





2

236	Cylinder head	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
236	Valve stem clearance Exhaust Wear limit mm	0.20						
237	Valve disc diameter Inlet mm	42.9 to 43.10						
238	Valve disc diameter Exhaust mm	36.90 to 37.10						
239	Valve seat width Inlet mm	3.00						
240	Valve seat width Exhaust mm	2.50						
241	Valve seat angle Inlet Degree	30						
242	Valve seat angle Exhaust Degree	45						
243	Valve edge thickness Inlet normal mm	1.80						
244	Valve edge thickness Exhaust normal mm	1.50						

245	Cylinder head	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
245	Valve edge thickness Inlet Wear limit mm	1.30						
246	Valve edge thickness Exhaust Wear limit mm	1.00						
250	Valve spring							
251	Number per valve	1						
252	Total windings	7						
253	Length untensioned normal mm	59 ± 1.9						
254	Length untensioned Wear limit mm	56.00						

2

	Cylinder head	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
260	Valve clearance							
261	Inlet with cold engine mm	0.15 ^{+0.05}						
262	Exhaust with cold engine mm	0.15 ^{+0.05}						
270	Distances to be checked							
271	Valve recess distance normal mm							
272	Wear limit mm	5.50						
273	Recess of cylinder head bottom relative to cylinder head sealing surface normal mm	5.30 ^{+0.08}						
274	Wear limit mm	4.80						

280	Cylinderhead	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
280	Cylinder head bolts	4						
281	Length normal mm	217 ± 0.5						
282	Length limit value mm	218.50						



2

300	Crankcase	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
300	Cylinder							
301	Bore normal mm	102.0 ^{+0.05} _{+0.01}						
302	Bore Wear limit mm	0.1						
303	Number of oversizes	1						
304	Limit value for oversize mm	0.5						

400	Drive system	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
400	Piston							
401	Diameter normal mm	102				101.89 ^{-0.11}		
402	Number of oversizes	1						
403	Limit value for oversize mm	0.5						
404	Piston clearance to cylinderhead mm	Suction engine < 1800 min ⁻¹ 0.8 to 0.9				0.9 to 1.0		1.00 to 1.10
		Suction engine > 1800 min ⁻¹ 0.9 to 1.0						
405	Bore for piston pin mm	40 ^{+0.009} _{+0.003}						
406	Piston pin diameter mm	40 ^{-0.006}						

2

410	Drive system	F3L 914	F4L 914	F5L 914	F6L 914	BF3L 914/T	BF4L 914/T	BF6L 914 C/T
410	Piston ring groove diameter mm	(1.) 92.5 (2.) 92.5 (3.) 93.3						
411	1st ring groove Double trapezoid groove mm	3 ^{+0.03} 1)						
412	2nd ring groove Double trapezoid groove mm	3 ^{+0.03} 1)						
413	3rd ring groove Rectangular groove mm	3 ^{+0.05} _{+0.03}						
420	Piston rings	3 pieces						
421	Axial end float normal 1st ring Double trapezoid ring mm	0.06						
422	Wear limit mm	0.15						

1) Double-sided trapezoid ring. Check with groove gauge.