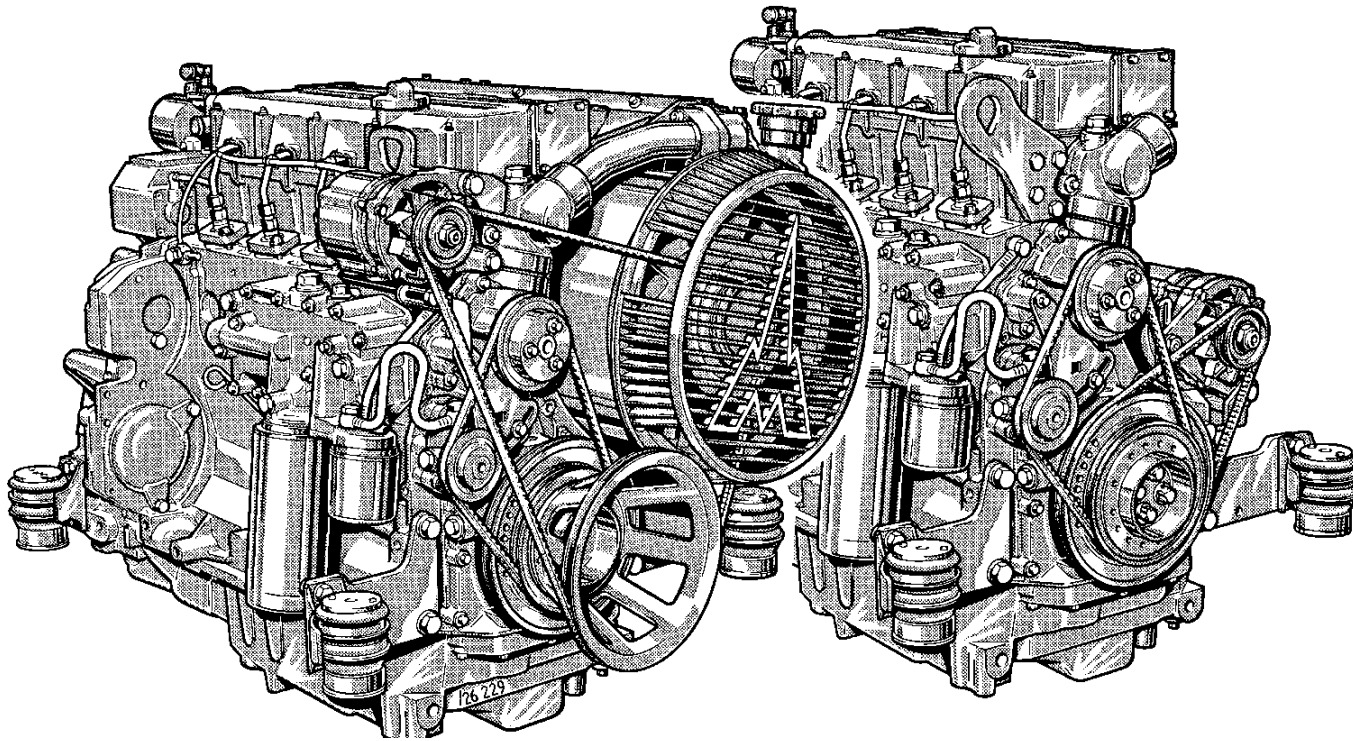


Operation Manual

1012

1013





- Please read and observe the information given in this Operation Manual. This will enable you to avoid accidents, preserve the manufacturer's warranty and maintain the engine in peak operating condition.
- This engine has been built exclusively for the application specified in the scope of supply, as described by the equipment manufacturer and is to be used only for the intended purpose. Any use exceeding that scope is considered to be contrary to the intended purpose. The manufacturer will not assume responsibility for any damage resulting therefrom. The risks involved are to be borne solely by the user.
- Use in accordance with the intended purpose also implies compliance with the conditions laid down by the manufacturer for operation, maintenance and servicing. The engine should only be operated by personnel trained in its use and the hazards involved.
- The relevant accident prevention guidelines and other generally accepted safety and industrial hygiene regulations must be observed.
- When the engine is running, there is a risk of injury through:
 - turning/hot components
 - engines with positive ignition
 - ignition systems (high electrical voltage)You must avoid contact at all times!
- Unauthorized engine modifications will invalidate any liability claims against the manufacturer for resultant damage. Manipulations of the injection and regulating system may also influence the performance of the engine, and its emissions. Adherence to legislation on pollution cannot be guaranteed under such conditions.
- Do not change, convert or adjust the cooling air intake area to the blower. The manufacturer shall not be held responsible for any damage which results from such work.
- When carrying out maintenance/repair operations on the engine, the use of DEUTZ original parts is prescribed. These are specially designed for your engine and guarantee perfect operation. Non-compliance results in the expiry of the warranty!
- Maintenance and cleaning of the engine should only be carried out when the engine is switched off and has cooled down. You must ensure that the electrical systems have been switched off and the ignition key has been removed. Accident prevention guidelines concerning electrical systems (e.g. VDE-0100/-0101/-0104/-0105 Electrical protective measures against dangerous touch voltage) are to be observed. When cleaning with fluids, all electrical components are to be covered impermeably.

Operation Manual

1012

1013

0297 9682 en

**Engine serial
number:**

--	--	--	--	--	--	--

Please enter the engine serial number here. This number should be quoted when enquiring about customer service, repairs or spare parts (see Section 2.1).

Technical modifications required to improve our engines are reserved with regard to specification data and other technical information contained in this Operation Manual. No parts of this Manual may be reproduced in any form or by any means without our written approval.



Foreword

Dear Customer,

Liquid-cooled Deutz engines are designed for a large number of applications. Consequently, a wide range of variants are offered to meet the requirements of specific cases.

Your engine is appropriately equipped for the installation concerned, which means that not all of the components described in this Operation Manual are necessarily mounted on your engine.

We have endeavoured to highlight any differences so that you will be able to locate the operating and maintenance instructions relevant to your engine quickly and easily.

Please read this Manual before starting your engine, and always observe the operating and maintenance instructions.

We are available to help with any additional enquiries

Sincerely,

DEUTZ AG

Contents

1. General

2. Engine Description

- 2.1 Model
 - 2.1.1 Rating Plate
 - 2.1.2 Position of the Rating Plate
 - 2.1.3 Engine Serial Number
 - 2.1.4 Cylinder numbering
- 2.2 Engine Illustrations
 - 2.2.1 Operation side 1012
 - 2.2.2 Starter side 1012
 - 2.2.3 Operation side 1012 E
 - 2.2.4 Starter side 1012 E
 - 2.2.5 Operation side 1013
 - 2.2.6 Starter side 1013
 - 2.2.7 Operation side 1013 E
 - 2.2.8 Starter side 1013 E
 - 2.2.9 Starter side
Unit Engine BF4M 1013 EC
 - 2.2.10 Operation side
Unit Engine BF4M 1013 EC
 - 2.2.11 Starter side
Unit Engine BF6M 1013 EC
 - 2.2.12 Operation side
Unit Engine BF6M 1013 EC
- 2.3 Lube Oil Circuit Schematic
 - 2.3.1 Lube Oil Circuit 1012 / 1012 E
 - 2.3.2 Lube Oil Circuit 1013 / 1013 E
- 2.4 Fuel System
 - 2.4.1 Fuel System Plan

2.5 Engine cooling

- 2.5.1 Cooling System Schematic 1012
- 2.5.2 Cooling System Schematic 1012 E
- 2.5.3 Cooling System Schematic 1013
- 2.5.4 Cooling System Schematic 1013 E/
1013 E

3. Engine Operation

- 3.1 Commissioning
 - 3.1.1 Pour in Engine Oil
 - 3.1.2 Filling Oil Bath Air Cleaner
 - 3.1.3 Pour in Fuel
 - 3.1.4 Filling / Venting the Cooling System
 - 3.1.5 Other Preparations
- 3.2 Starting
 - 3.2.1 Starting
- 3.3 Monitoring Operation
 - 3.3.1 Engine Oil Pressure
 - 3.3.2 Coolant temperature
 - 3.3.3 Coolant Level / Coolant Level
Gauge
- 3.4 Shutting off
 - 3.4.1 Mechanical shut-off
 - 3.4.2 Electrical shut-off
- 3.5 Operating conditions
 - 3.5.1 Winter Operation
 - 3.5.2 High Ambient Temperature, High
Altitude

4 Operating Media

- 4.1 Lube Oil
 - 4.1.1 Quality
 - 4.1.2 Viscosity
- 4.2 Fuel
 - 4.2.1 Quality Grade
 - 4.2.2 Winter-Grade Fuel
- 4.3 Coolant
 - 4.3.1 Water Quality for Coolant
Preparation
 - 4.3.2 Coolant Preparation
 - 4.3.3 Cooling System Protective Liquid

5. Routine Maintenance

- 5.1 Maintenance Schedule
- 5.2 Maintenance Chart
- 5.3 Maintenance Record

Contents

6. Service and Maintenance

6.1 Lubrication System

6.1.1 Oil Change Intervals

6.1.2 Checking Oil Level / Changing Engine Oil

6.1.3 Changing Oil Filter

6.1.4 Cleaning/Changing Oil filter (Cup)

6.2 Fuel System

6.2.1 Changing Fuel Filter

6.2.2 Replace fuel filter

6.2.3 Clean/Replace Fuel Pre-Filter, Filter Element

6.2.4 Venting the Fuel System with Preliminary Fuel Filter

6.2.5 Clean/Replace Fuel Pre-Filter, Filter Element

6.2.6 Vent Fuel System with Fuel Pre-Filter

6.2.7 Clean/Replace/Vent Fuel Pre-Filter, Filter Element

6.2.8 Clean / purge or change fuel pre-filter

6.2.9 Venting the Fuel System with Preliminary Fuel Filter

6.2.10 Changing Fuel Leakage Line

6.2.11 Changing Fuel Leakage Pipes

6.3 Cooling System

6.3.1 Cleaning Intervals

6.3.2 Cleaning Cooling System

6.3.3 Draining Cooling System 1012 / 1013

6.3.4 Filling / Venting Cooling System 1012 / 1013

6.3.5 Draining the Cooling System 1012 E / 1013 E

6.3.6 Filling/Venting the Cooling System 1012 E/1013 E

6.3.7 Draining the Cooling System Unit Engine

6.3.8 Filling/Venting the Cooling System Unit Engine

6.3.9 Draining the Charge-Air Cooler

6.4 Combustion Air Cleaner

6.4.1 Cleaning Intervals

6.4.2 Emptying Cyclone Type Precleaner

6.4.3 Cleaning Oil Bath Air Cleaner

6.4.4 Dry Type Air Cleaner

6.5 Belt Drives

6.5.1 Checking V-Belts

6.5.2 Tensioning Fan / Alternator Belts 1012

6.5.3 Changing Fan / Alternator Belts 1012

6.5.4 Tensioning Coolant / Fuel Pump Belts 1012

6.5.5 Changing Coolant / Fuel Pump Belts 1012

6.5.6 Tensioning Coolant / Fuel Pump Belts 1012 E

6.5.7 Changing Coolant / Fuel Pump Belts 1012 E

6.5.8 Tensioning Alternator Belt 1012 E

6.5.9 Changing Alternator Belt 1012 E

6.5.10 Tensioning / Changing Fan Belt 1013

6.5.11 Tensioning Coolant / Fuel Pump belts 1013

6.5.12 Changing Coolant / Fuel Pump Belts 1013

6.5.13 Tensioning / Changing Alternator Belt 1013

6.5.14 Tensioning Coolant / Fuel Pump Belts 1013 E

6.5.15 Changing Coolant / Fuel Pump Belts 1013 E

6.5.16 Tensioning / Changing Compressor Belt

6.6 Adjustments

6.6.1 Checking / Adjusting Valve Clearances

6.7 Accessories

6.7.1 Battery

6.7.1.1 Checking Battery and Cable Connectors

6.7.1.2 Checking Electrolyte Level

6.7.1.3 Checking Specific Gravity of Electrolyte

6.7.2 Three-Phase Alternator

6.7.3 Lifting Tackle

7. Faults, Causes and Remedies

7.1 Fault Table

8. Engine Preservation

8.1 Preservation

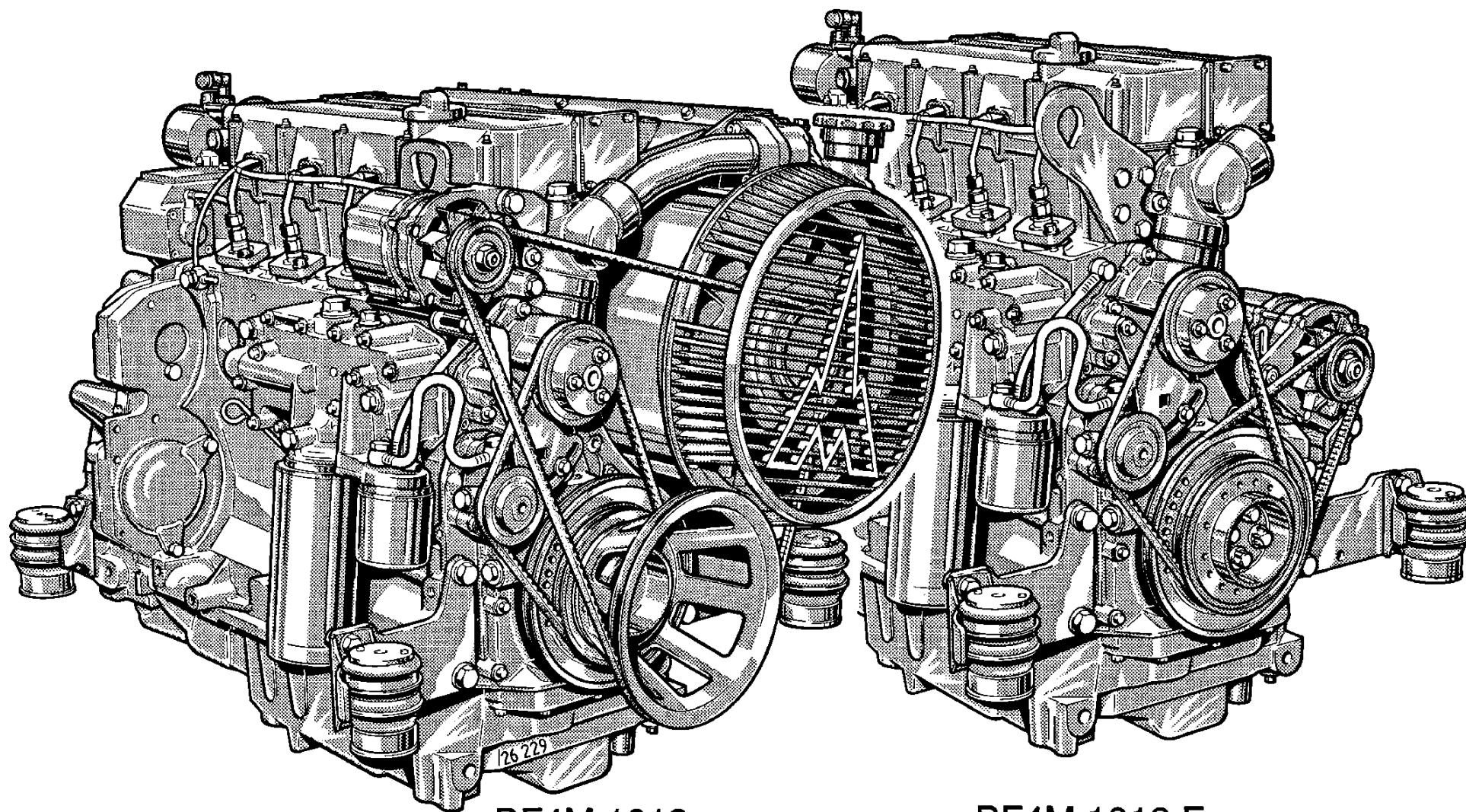
9. Technical Specification

9.1 Engine Specifications and Settings

9.2 Screw Tightening Torques

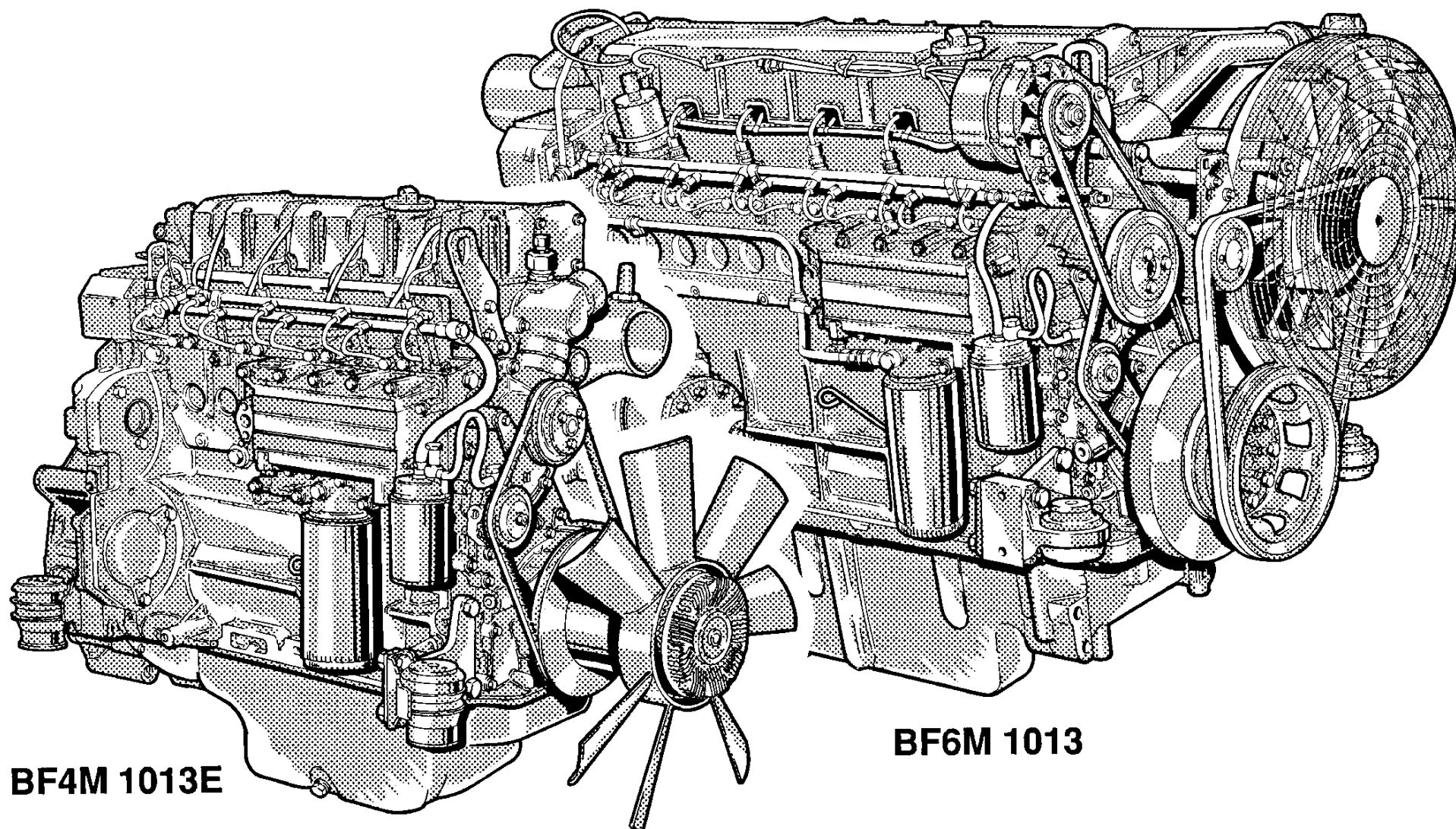
9.3 Tools

10. Service



BF4M 1012

BF4M 1012 E



BF4M 1013E

BF6M 1013

DEUTZ Diesel Engines

are the product of many years of research and development. The resulting know-how, coupled with stringent quality standards, guarantee their long service life, high reliability and low fuel consumption.

It goes without saying that DEUTZ Diesel Engines meet the highest standards for environmental protection.

Beware of Running Engine

Shut the engine down before carrying out maintenance or repair work. Ensure that the engine cannot be accidentally started. Risk of accidents.

When the work is complete, be sure to refit any panels and guards that may have been removed. Never fill the fuel tank while the engine is running. Observe industrial safety regulations when running the engine in an enclosed space or underground.

Care and Maintenance

Sound care and maintenance practices will ensure that the engine continues to meet the requirements placed on it. Recommended service intervals must be observed and service and maintenance work carried out conscientiously.

Special care should be taken under abnormally demanding operating conditions.

Safety



This symbol is used for all safety warnings. Please follow them carefully. The attention of operating personnel should be drawn to these safety instructions. General safety and accident prevention regulations laid down by law must also be observed.

Asbestos



DEUTZ original parts are asbestos-free.

Service

Please contact one of our authorized service representatives in the event of breakdowns or for spare parts inquiries. Our trained specialists will carry out repairs quickly and professionally, using only genuine spare parts.

Original parts from DEUTZ AG are always produced in accordance with state-of-the-art technology. Please turn to the end of this manual for further service information.

California Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.