

Maintenance schedule

TCG 2020

1500 min⁻¹ , Gas group 1

0299 9177 EN, 10/2006



Engine number:

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Please enter the engine serial number here. This will simplify the handling of customer service, repair and spare parts queries.

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

This documentation is intended for the following engine

- Engine type:
- Type of application:
- System name:
- Power: kW
- Speed: min⁻¹
- Commissioned on:

Please enter data. This will make it a lot easier for us to process after-sales support, repair work and spare parts orders.

The documentation should be presented to the responsible service partner for every service assignment.

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Printed in Germany

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Publication date:

© 10/2006

Ordering No:

0299 9177

Contents

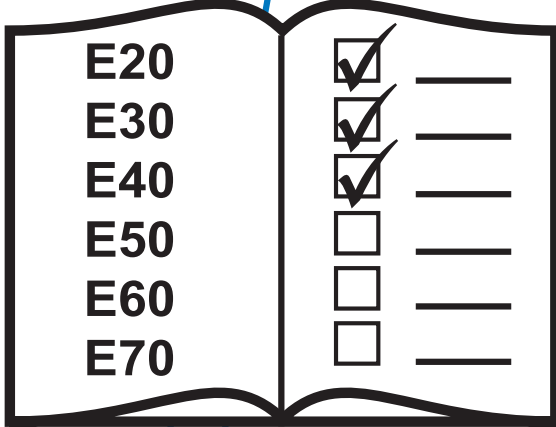
5 Maintenance

General	5-3
Maintenance and service schedules.....	5-3
Selection and installation	5-4
Definition of tasks in the maintenance schedule.....	5-5
Gas groups	5-6
Silicon content	5-6
Maintenance schedule.....	5-7
Maintenance measures	5-7
Average life of wearable parts	5-11
Proof of maintenance performed	5-13
Operation inspection log	5-15

Service

DEUTZ POWER SYSTEMS

Contents
TCG 2020

A1						
						
B1						



Maintenance



Please note that the following maintenance schedule is a **standard maintenance schedule**.

A fixed definition of the maintenance intervals for all applications is not possible due to the various relations between ambient conditions, operating mode and quality of the fuels.

Under difficult operating conditions it may be necessary to shorten the prescribed intervals. The standard maintenance schedule must then be generally revised. Generally the locally prevailing operating conditions are defined already in the configuration phase.

Critical operating conditions are for example:

- contamination of the combustion gases by wear promoting constituents such as silicon, sulphur, chlorine, ...
- frequent cold starts
- increased dust load in the intake air

Talk to your service partner if in doubt.

General

This engine is built exclusively for the purpose set out in the scope of supply - defined by the equipment manufacturer (use for the intended purpose). Depending on the purpose, the engine is identified by a performance code or a type of gas code which is embossed on the rating plate. The rating plate is described in detail in chapter 2.

The maintenance schedule lists the measures for maintaining the nominal condition and thus operational safety of the engine with the corresponding intervals.

When the specified interval or operating hours have been reached, or if necessary, the work specified in the maintenance schedule must be carried out.

The activities are described on job cards. The job cards are listed in chapter 9. The operating manual contains the job cards up to the Deutz maintenance and service schedule E40. The workshop manual lists the job cards up to the Deutz maintenance and service schedule E70.

- The intervals specified in the maintenance schedule are maximum values and assume that installation, intended purpose and operating conditions comply with the specifications. It must be ensured that all running materials such as combustion gas, lube oil and coolant are of the prescribed quality.



It must be ensured especially that the gas quality meets the minimum requirements according to TR 0199 - 99 - 3017 to avoid operating malfunctions and/or premature engine wear.

- The maintenance schedule only applies to the engine itself and the parts mounted on the engine. System parts must be serviced according to the times and instructions specified by the manufacturer. The appropriate information can be found in the **manufacturer documents** supplied.
- The measures described must be carried out by technically skilled personnel or authorized specialists. The competencies are listed in the Deutz maintenance and service schedule table.

Maintenance and service schedules

The operating hour-dependent maintenance measures are divided into maintenance and service schedules. All the listed measures are to be carried out carefully according to the



maintenance schedule specifically defined for the engine.

Please note that Deutz maintenance and service schedules may be added or omitted depending on the speed and gas group.

Maintenance and service schedules	Carried out by
E10 Due once after commissioning and after E60 and E70 respectively	Technically skilled personnel
E20 Daily inspection round	
E30 Periodic maintenance (small scope)	
E40 Periodic maintenance (medium scope)	
E50 Periodic maintenance (extended scope)	Authorised specialists
E60 Intermediate overhaul	
E70 General overhaul	

Selection and installation

A suitable maintenance schedule is allocated for the engine, depending on the speed and gas group.

The maintenance plan consists of several sections:

- Maintenance measures
- Information on the average service life of non-repairable items.
- Copy form for proof of execution.

Plan in plenty of time when the the maintenance and service schedules are due in accordance with the engine's number of operating hours.

Arrange in advance the anticipated date with your service partner. When making the appointment, inform him of any irregularities in the engine.

If appropriate, draw up a maintenance contract with your service partner. All due maintenance measures, and any repair measures depending on the agreement, will then be planned and carried out properly by the service partner conformant as set out in the contract. Your local service partner will provide the details.

Definition of tasks in the maintenance schedule

Settings

Setting torques, dimensions, pressures etc.; extra work may be necessary to renew components.

Draining

draining condensation for example.

Replacing

Replacement of components, function blocks and liquids.

Reworking

Material acceptance within the permissible tolerances to maintain a nominal condition.

Checks

Checks according to criteria in the job card. If all criteria are not satisfied, the cause must be determined and the nominal condition reinstated.

Cleaning

Cleaning by hand or machine (automatic), replacement of cleaning components (e.g. air filter) may be necessary.

Visual inspection

Visual inspection according to criteria in the job card. If all criteria are not satisfied, the cause must be determined and the nominal condition reinstated.

Overhauling

Checking of function blocks; rework or renewal of components.

Maintenance

Maintenance according to job card. Checking functions; reworking or renewal of components may be necessary.

Changing

Changing lube oil for example

Gas groups

The maintenance intervals also depend on the quality of the combustion gases.

The combustion gases are divided into two groups depending on their wear properties for which different standard maintenance schedules apply, see also Technical Circular 0199 - 99 - 3017.

Gas group 1

Natural gas

Marsh gas

Liquid gas - propane, butane, LNG (liquid natural gas)

Crude oil gas

Gases with a hydrogen content $H_2 > 30 \text{ vol\%}$, e.g. coke oven gas

Gas group 2 (bio-gases)

Sewage gas

Landfill gas

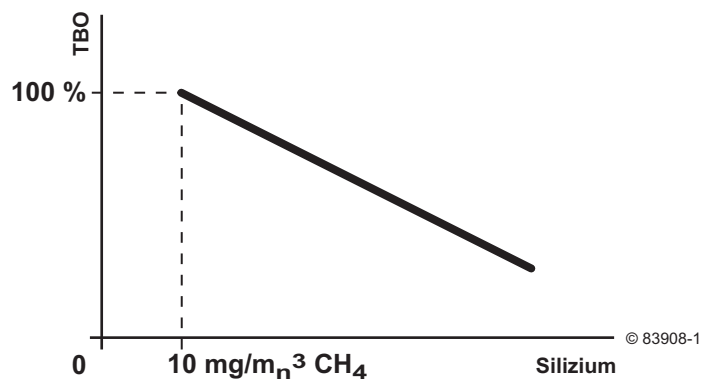
Wood gas

Other bio-gases

Silicon content



When using combustion gases with a silicon content of $> 10 \text{ mg/m}_n^3 \text{ CH}_4$ the time between overhauls (TBO) absolutely must be reduced because of the strong abrasive effect of silicon.



A 5-1

So as to ensure the necessary service lives the silicon content must be checked at regular intervals as part of a comprehensive gas analysis.

If necessary the maintenance intervals must be reduced accordingly.

Maintenance schedule

Valid for:	Engine type:	V12, V16 and V20 engine
	Speed:	n = 1,500 rpm
	Combustion gas :	Gas group 1
	Performance abbreviations	ICN
	Type of application:	Current generators

Maintenance measures

Oh - independent	E10	E20	E30	E40	E45	E50	E55	E60	E70	Description
	1x after 50 Oh	every 24 hours (daily)	after every 2,000 Oh	every 4,000 oh	every 12,000 oh	every 16,000 oh	every 24,000 oh	every 32,000 oh	every 64,000 oh	
										In accordance with Technical Bulletin 0199 - 99 - 2105 Gas engines - lubricating oil Lube oil analysis, lube oil change, etc.
										In accordance with Technical Bulletin 0199 - 99 - 2091 Engine coolant Engine coolant analysis, engine coolant change, etc.
										In accordance with Technical Bulletin 0199 - 99 - 2116 Engine corrosion protection Engine corrosion protection, removal of engine corrosion protection etc.
x										as required - Clean engine - Renew or overhaul starter
x										Monthly - Test run if the engine has not been operated in stand-by mode within a month
x										Monthly - Maintain the battery if the engine has not been used while being on standby operation within one month
x										every 4 months - Carry out gas analysis in accordance with Technical Bulletin 0199 - 99 - 3017
x										every 6 months - Check anti-corrosion or anti-freeze content in the coolant - Check pressure drop in gas filter
x										every 12 months - Check control devices, pressure setting and seal of the gas control system - Replace gas filter insert
x										Renew intake air cleaner - If underpressure limit value is reached (observe service gauge) or there is damage (leaks)
x										Run in engine - After maintenance work, e.g. replacement of piston, cylinder liner

Oh - independent	E10	E20	E30	E40	E45	E50	E55	E60	E70	Description
	1x after 50 Oh	every 24 hours (daily)	after every 2,000 Oh	every 4,000 oh	every 12,000 oh	every 16,000 oh	every 24,000 oh	every 32,000 oh	every 64,000 oh	
		x	x	x		x		x	x	Visual inspection of the system
	x		x	x						Check and set inlet and exhaust valve clearance
	x		x	x						Check valve lag (cylinder head fitted)
	x					x		x	x	Clean or renew dirt trap starter compressed air line
			x	x		x		x	x	Check speed governor linkage
			x	x		x		x	x	Maintaining the battery
				x		x		x	x	Renew lube oil filter cartridge In accordance with Technical Bulletin 0199 - 99 - 2105
				x						Check combustion chambers with endoscope
				x		x		x	x	Replace spark plugs
				x		x		x	x	Check ignition time
				x		x				Service crankcase breather (model Dynapure)
								x	x	Overhaul crankcase breather (model Dynapure)
				x		x		x	x	Maintain crankcase breather (model UPF) - Renew the outer fine filter (hepa-filter) every 4,000 oh - Renew the inner prefilter every 8,000 oh
				x		x		x	x	Auxiliary units test by TEM system
					x					Check, clean turbocharger - Observe manufacturer's documentation
							x			Overhaul the exhaust gas turbocharger - Observe manufacturer's documentation
						x		x	x	Check engine mounting
						x		x	x	Check starter pinion and gear rim on the flywheel
						x		x	x	Check exhaust pipe
						x		x	x	Overhaul cylinder heads
						x				Clean combustion chambers
						x				Check cylinder liners, collar rest and water chambers
						x				Clean gas mixer
								x	x	Overhaul gas carburettor
						x				Check intercooler (endoscope) and clean if necessary
								x	x	Clean intercooler
								x	x	Check flame filter - Only V20 engine
								x	x	Renew cylinder liners
								x		Check rubber compensators
									x	Renew rubber compensators
								x	x	Check vibration dampers, hoses and flexible lines
								x	x	Check fittings and control units on engine side

Oh - independent	E10	E20	E30	E40	E45	E50	E55	E60	E70	Description
	1x after 50 Oh	every 24 hours (daily)	after every 2,000 Oh	every 4,000 oh	every 12,000 oh	every 16,000 oh	every 24,000 oh	every 32,000 oh	every 64,000 oh	
								x	x	Renew viscosity rotary vibration dampers
								x		Check crankshaft axial clearance
								x		Check camshaft axial clearance
								x		Check valve tappet
									x	Renew valve tappet
								x		Check small end bushings
								x	x	Renew big end bearing
								x		Check the piston
									x	Renew pistons (complete)
								x		Check piston bolt
								x		Renew piston rings
								x	x	Check camshaft
									x	Renew camshaft bearing
									x	Renew valve actuator
									x	Renew connecting rod
									x	Renew crankshaft sealing ring on the drive side
									x	Renew crankshaft sealing ring on the free side
									x	Measure crankshaft, check for fractures, clean
									x	Check, clean gear train
									x	Renew main bearing and axial bearing or stop rings
									x	Renew lubricating oil pump
									x	Renew lubricating oil pressure limiting valve
									x	Renew exhaust gas compensators
									x	Overhaul compressed air starter - Only V20 engine
									x	Renew ignition coil, ignition wiring

Average life of wearable parts

Intake air cleaner

Average life	16,000 oh
Requirement-oriented life	according to service gauge

The life depends among other things on:

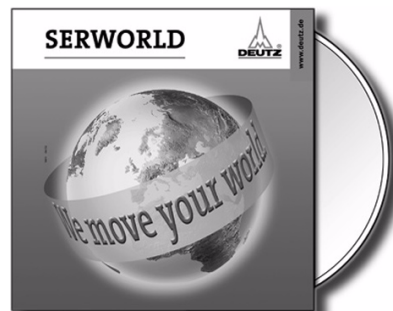
- Amount of dirt in the intake air
- Precleaning of the intake air

Service

Sales & Service Index

This Sales & Service Index offers you an overview of the DEUTZ Power Systems branches in your vicinity, including the products for which they are responsible and the range of services provided. Even when no direct product responsibility is mentioned, your local branch will be happy to help you with expert advice. The Index is constantly updated. Please ask your DEUTZ Power Systems service partner for the latest edition.

Order no.: 0312 0807 (CD-ROM)



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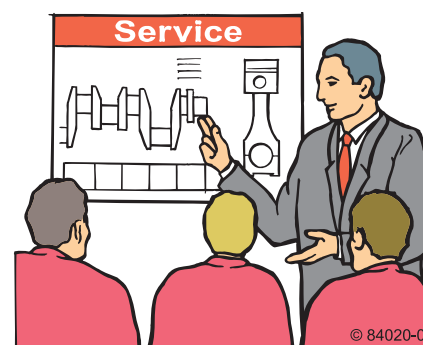
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The degree of availability, reliability and service life of equipment and drive assemblies are determined to a great extent by professional operation and service by qualified and experienced operators and service technicians. The DEUTZ AG Power Systems also offers service-related seminars for DEUTZ Power Systems products to the staff of customers and operators. Apart from the standard seminars, held in our Training Centre in Mannheim, it is also possible to arrange special seminars, either in the Training Centre or at another location requested by the customer. Information about the seminar program will be distributed in a circular. Please ask your DEUTZ Power Systems Service representative.



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