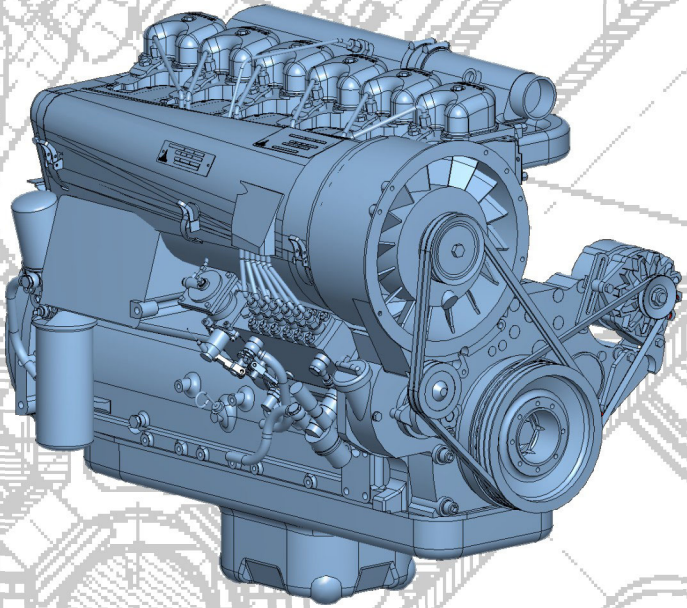
Operation Manual

D/TCD 914



DEUTZ®

Notes

Notes

- This engine is defined exclusively for purpose according to the scope of delivery and built by the equipment manufacturer (use for the intended purpose). Any other use above and beyond this will be considered as misuse. The manufacturer will not accept any liability for damages resulting from this. The user bears the sole risk.
- Use for the intended purpose also includes observance of the operating, maintenance and repair conditions specified by the manufacturer. The engine should only be operated, serviced and repaired by personnel trained in its use and the hazards involved.

  The pertinent rules for the prevention of accidents and other generally recognised safety and industrial medicine rules must be observed.
- When the engine is running there is a danger of injury caused by:
  - rotating and hot components
  - on motors with external ignition (high electrical voltage). Contact must be avoided!
- Unauthorised engine modifications will invalidate any liability claims against the manufacturer for resultant damage.
- Equally, manipulations to the injection and control system can affect the engine's performance and the exhaust characteristics. Adherence to legislation on pollution can no longer be guaranteed under such conditions.
- Do not change the cooling air feed area to the blower of fan. An unobstructed cooling air supply must be guaranteed.

  The manufacturer will accept no liability for damage resulting from this.
- When carrying out maintenance work 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/cleaning work on the engine may only be carried out when the engine is not running and has cooled down.

  When doing this, make sure that the electrical system is switched off (remove ignition key).

  The specifications for accident prevention with electrical systems (e.g. VDE-0100/-0101/-0104/-0105 Electrical protective measures against dangerous contact voltages) must be observed.

  Cover all electrical components tightly when cleaning with liquids.
- Do not work on the fuel system while the engine is running - **Danger to life!**

  Wait for the pressure to drop after the engine has come to a standstill (in engines with DEUTZ Common Rail about 5 minutes, otherwise 1 minute) because the system is under high pressure **- Danger to life!**

  During the first trial run do not stand in the danger area of the engine.

  Danger due to high pressure in case of leaks - **Danger to life!**
  - In case of leaks immediately contact workshop.
  - When working on the fuel system, make sure that the engine is not started inadvertently during repairs - **Danger to life!**

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Dear customer,

Congratulations on the purchase of your DEUTZ engine.

DEUTZ air/liquid-cooled engines are developed for a broad spectrum of applications. Consequently, a wide range of variants is offered to meet the requirements of specific cases.

The engine is equipped accordingly for the particular installation situation, i.e. not all the components described in the operating manual are installed in your engine.

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

Please make sure that this operating manual is available to everyone involved in the operation, maintenance and repair of the engine and that they have understood the contents.

If you have any queries, please contact us, we'll be happy to advise you.

Sincerely,

DEUTZ AG

Engine serial number

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

Notes

We reserve the right to make technical changes to the descriptions and data in this operating manual in the interest of further development of the engines.

This document may only be reprinted and reproduced, even in part, with our express permission.

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DEUTZ diesel engines

DEUTZ diesel engines are the product of years of research and development. Profound know-how combined with high quality requirements are the guarantee for the production of engines with a long life, high reliability levels and low fuel consumption. Obviously the high requirements for the protection of the environment are also met.

Safety precautions when the engine is running

Maintenance work or repairs may only be performed on the shut-down engine. Make sure that the engine cannot be started inadvertently - **Danger of accident!**

After repair work: Check that all guards have been replaced and that all tools have been removed from the engine.

Observe industrial safety regulations when running the engine in an enclosed space or underground.

When working on the running engine, work clothing must be close fitting.

Never fill the fuel tank while the engine is running.

Service and Maintenance

Service and maintenance are also decisive for whether the engine satisfactorily meets the set demands. Recommended service intervals must therefore be observed and service and maintenance work must be carried out conscientiously.

Special care should be taken under abnormally demanding operating conditions.

Original DEUTZ parts

Original DEUTZ parts are subject to the same strict quality demands as the DEUTZ engines. Further developments for improving the engines are also introduced in the original DEUTZ parts of course. Only the use of original DEUTZ parts manufactured according to the state-of-the-art can guarantee perfect functioning and high reliability.

DEUTZ Xchange components

DEUTZ replacement parts are a low-cost alternative. Of course, the quality standards here are just as high as for new parts. DEUTZ replacement parts are equal to the original DEUTZ parts in function and reliability.

Asbestos

The gaskets used in this engine contain no asbestos. Please use the appropriate original DEUTZ parts for maintenance and repair work.

Service

We want to preserve the high performance of our engines, and with it the confidence and satisfaction of our customers. We are therefore represented worldwide by a network of service branches.

The DEUTZ name does not merely stand for engines that are the products of extensive development work, DEUTZ also stands for complete service packages that ensure optimum operation of our engines, and for customer services operations that you can count on.

Please contact your DEUTZ-partner in case of malfunctions and sare parts inquiries. Our specially trained personnel will ensure fast, professional repairs using original DEUTZ spare parts in case of damage.

The DEUTZ home page gives you a continuously up-to-date overview of the service partners in your vicinity with notes on product responsibilities and services. Or you can use another fast, convenient way via the Internet under www.deutzshop.de. The DEUTZ P@rts Online parts catalogue gives you a direct contact to your nearest local service partner.

California
Proposition 65 Warning
Diesel engines and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

Masthead

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Danger



This symbol is used for all safety instructions which, if not observed, present a direct danger to life and limb for the person involved. Observe these carefully. The attention of operating personnel should be drawn to these safety instructions. Furthermore, the legislation for "general regulations for safety and the prevention of accidents" must be observed.

Caution



This symbol indicates a danger to the part and engine. The relevant instructions must be observed, failure to do so can lead to destruction of the part and the engine.

Notes



This symbol accompanies notes of a general kind.

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Engine type designation

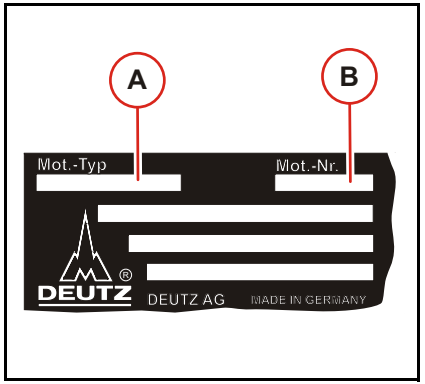
This manual covers the following engine types

D 914 L06 TCD 914 L06
D 914 L05
D 914 L04
D 914 L03

TCD	
T	Exhaust gas turbocharger
C	Charge air cooler
D	Diesel

914	
914	Series

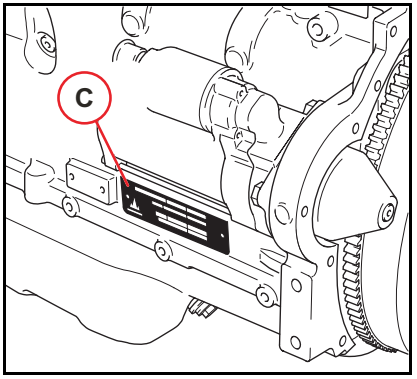
L03/L04/L05/L06	
L	in series
03	No. of cylinders
04	No. of cylinders
05	No. of cylinders
06	No. of cylinders



Rating plate

The type (A), engine number (B) and performance data are stamped on the rating plate.

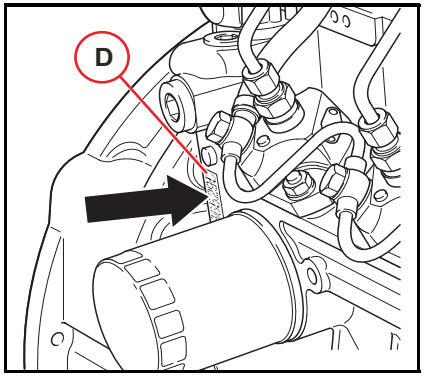
The engine type and number must be stated when purchasing spare parts.



Location of the rating plate

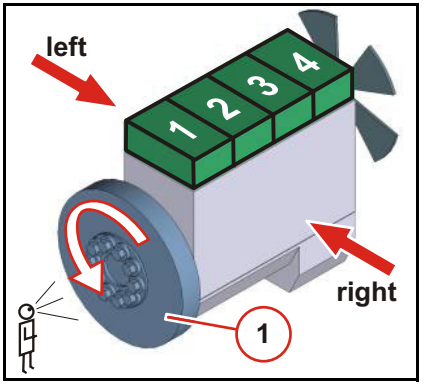
The rating plate (C) is fixed to the cylinder head cover or the crankcase.

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Engine serial number

The engine number (D) is stamped onto the crankcase (arrow) and onto the rating plate.



Cylinder numbering

Cylinder arrangement

The cylinders are counted consecutively starting from flywheel (1).

Direction of rotation

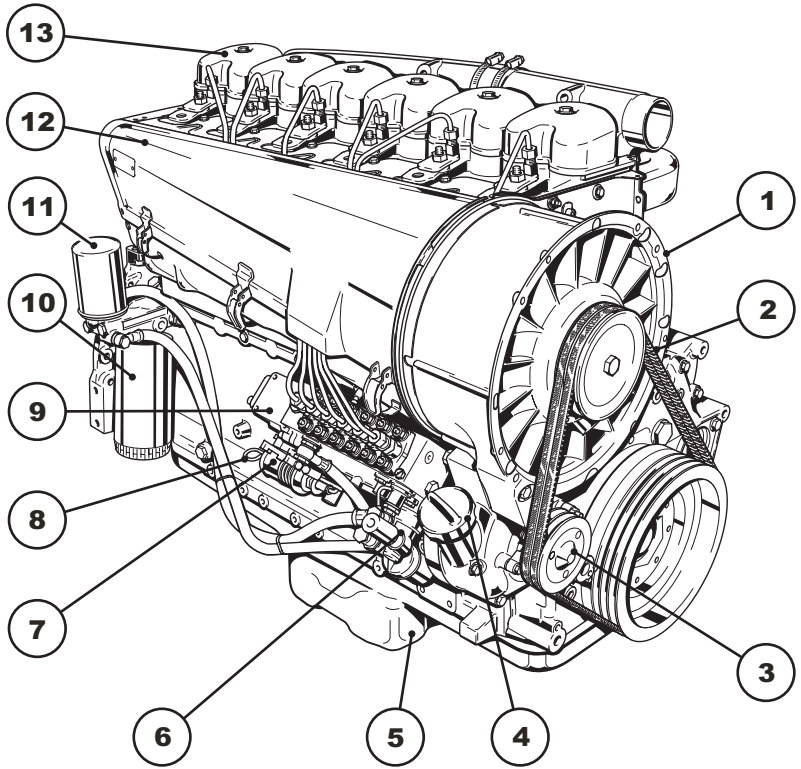
Looking onto the flywheel.

rotating to the left: counter-clockwise.

Engine sides

Looking onto the flywheel.

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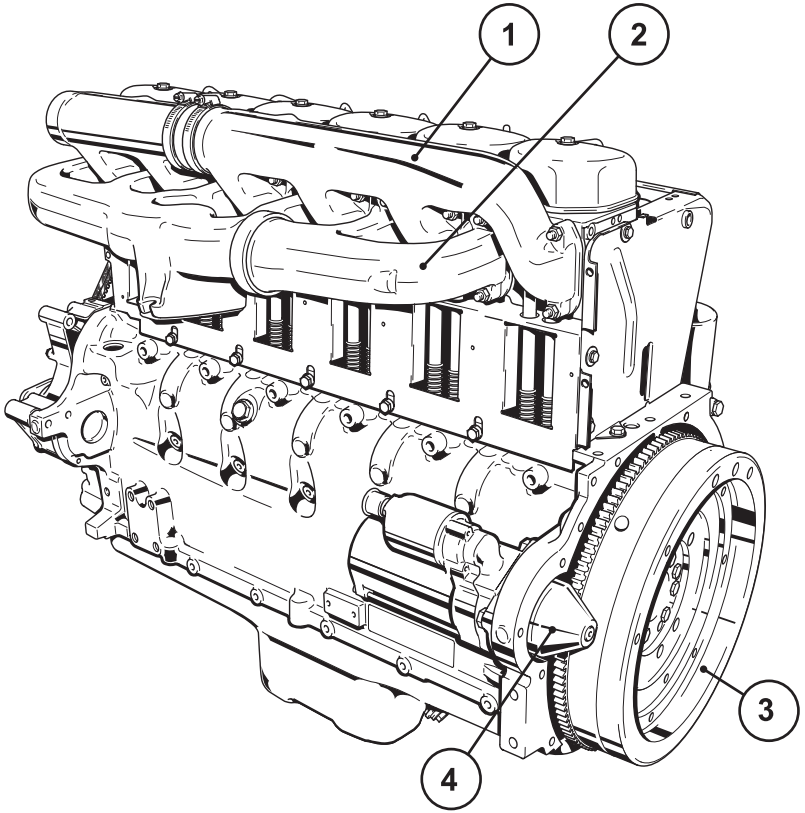


D 914 L06

View from right (example)

1 Cooling fan
2 V-belt (fan)
3 Tension pulley
4 Lubricating oil filling
5 Lubricating oil sump
6 Fuel supply pump with integrated screen filter
7 Stop magnet
8 Lubricating oil dipstick
9 Injection pump
10 Lube oil replacement filter
11 Exchangeable fuel filter
12 Air guide hood
13 Cylinder head cover

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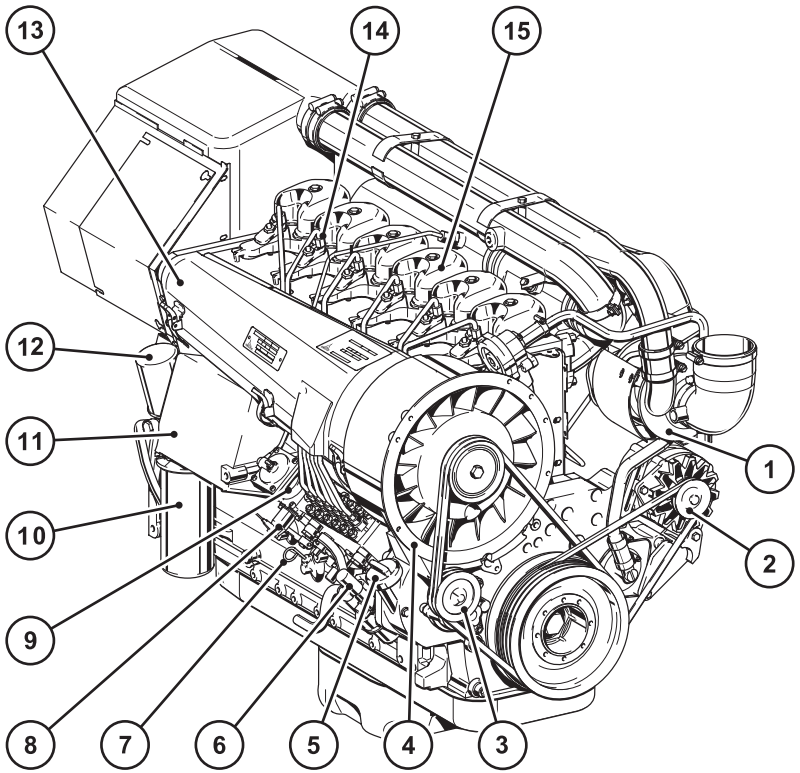


D 914 L06

View from left (example)

1 Air intake pipe
2 Exhaust manifold line
3 Flywheel
4 Starter

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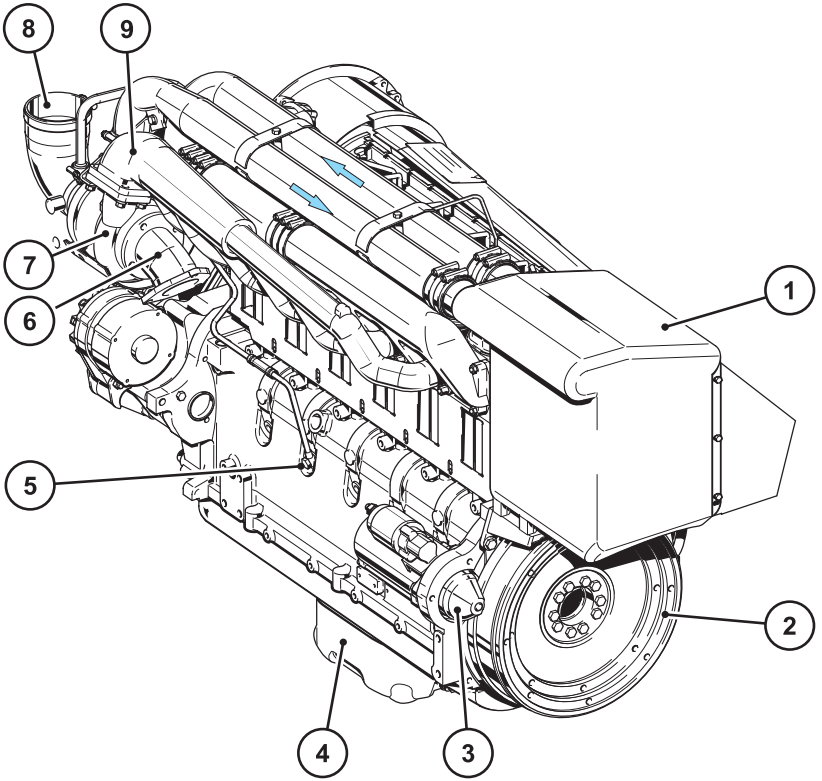


TCD 914 L06

View from right (example)

1 Turbocharger
2 Generator
3 Tension pulley
4 Cooling fan
5 Lubricating oil filling
6 Fuel supply pump with integrated screen filter
7 Lubricating oil dipstick
8 Stop magnet
9 Injection pump
10 Lube oil replacement filter
11 Lube oil cooler
12 Exchangeable fuel filter
13 Air guide hood
14 Injection valve
15 Cylinder head cover

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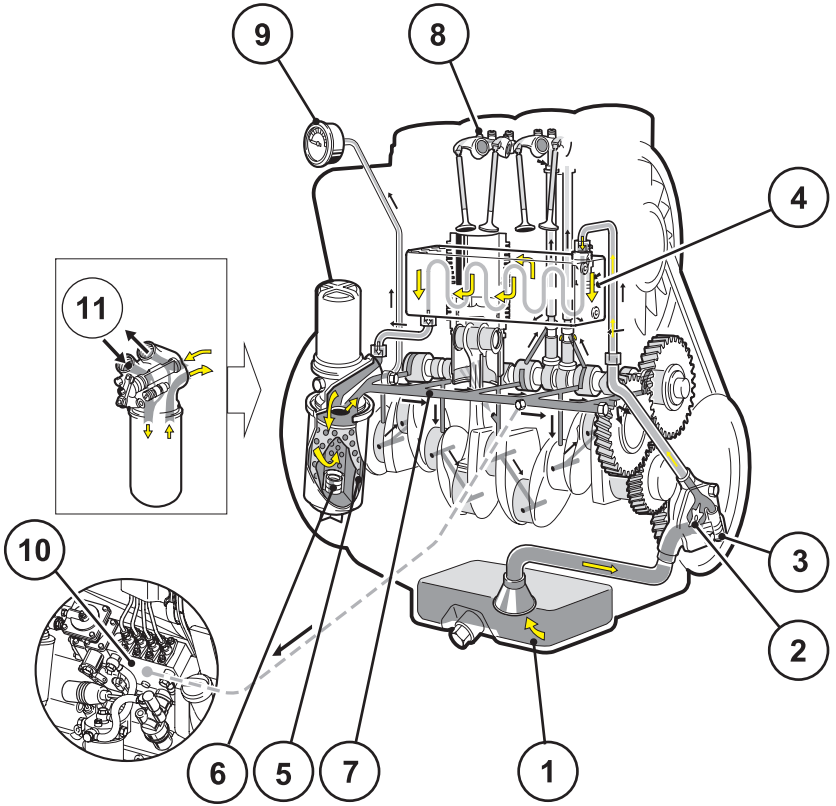


TCD 914 L06

View from left (example)

1 Charge air cooler
2 Flywheel
3 Starter
4 Lubricating oil sump
5 Lubricating oil pipe to the turbocharger
6 Exhaust outlet
7 Turbocharger
8 Combustion air inlet
9 Exhaust manifold line

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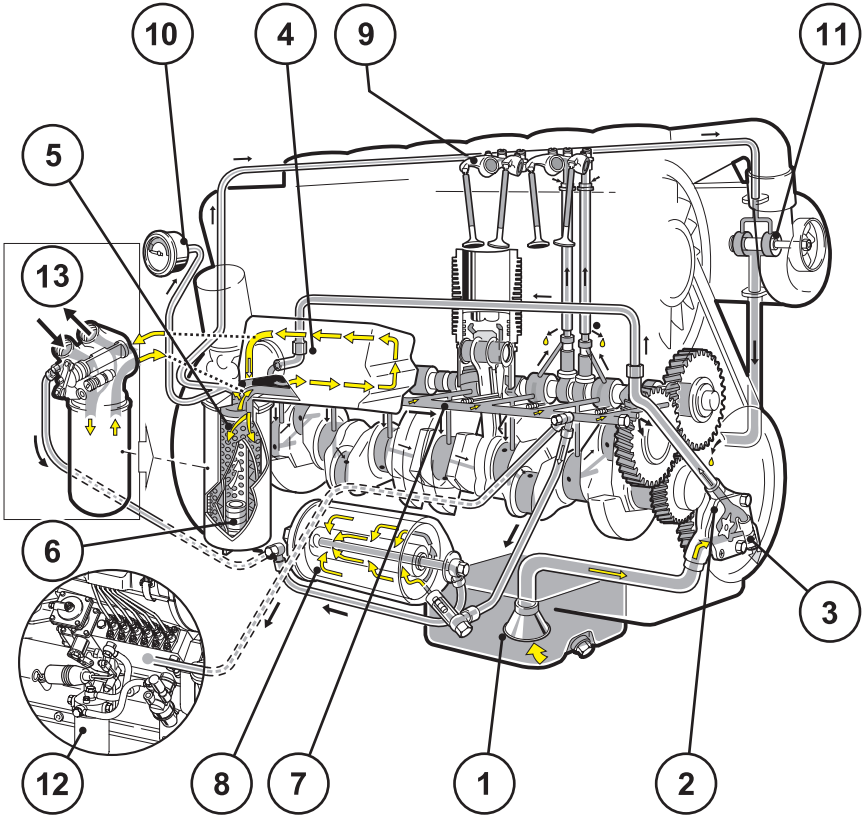


D 914

(example)

1 Lubricating oil sump
2 Lubricating oil pump
3 Pressure holding valve
4 Lube oil cooler
5 Lubricating oil filter
6 Overpressure valve
7 Main lube oil channel
8 Rocker arm
9 Lubricating oil pressure indicator
10 Injection pump
11 Connection possibility for cab heating
Retrofitting by authorised specialists only

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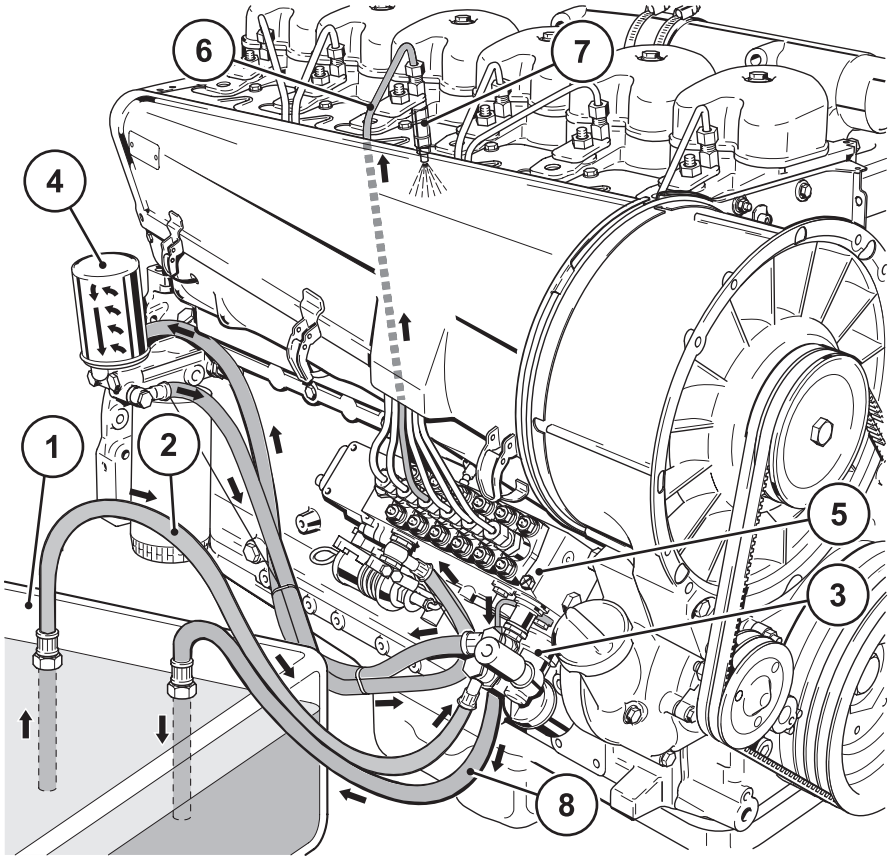


TCD 914 L06

(example)

1 Lubricating oil sump
2 Lubricating oil pump
3 Pressure holding valve
4 Lube oil cooler
5 Lubricating oil filter
6 Overpressure valve
7 Main lube oil channel
8 Sub-stream lubricating oil filter
9 Rocker arm
10 Lubricating oil pressure indicator
11 Turbocharger
12 Injection pump
13 Connection possibility for cab heating
Retrofitting by authorised specialists only

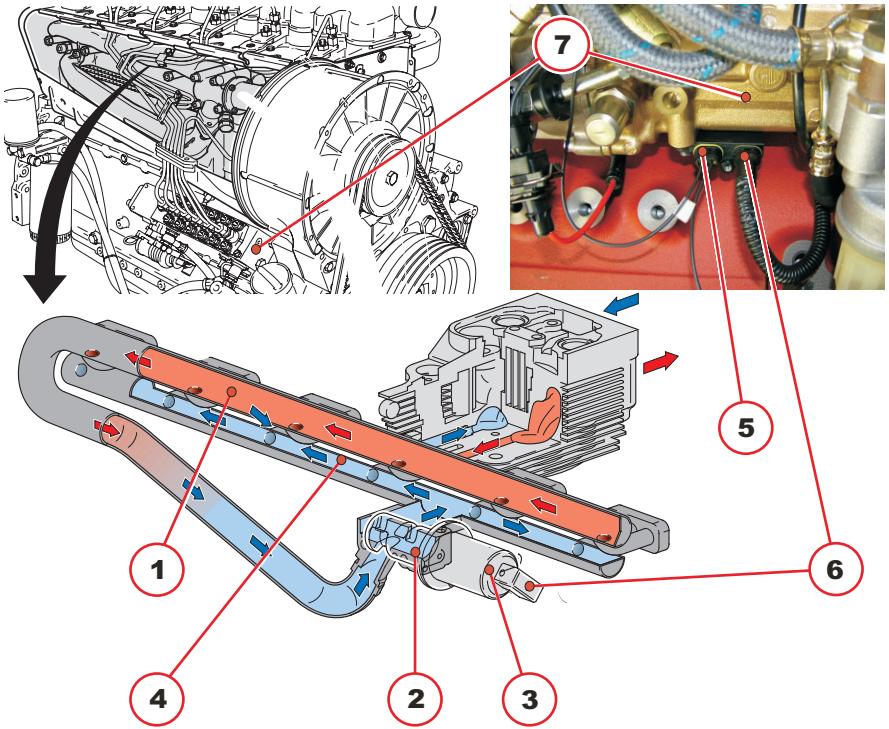
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Fuel schematic (example)

1 Fuel tank
2 Fuel line from tank to fuel pump
3 Fuel supply pump with integrated screen filter
4 Exchangeable fuel filter
5 Injection pump
6 Injection line to injection valve
7 Injection valve
8 Fuel return to fuel tank

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External exhaust gas recirculation

D 914 L03 > 37 kW

D 914 L04

D 914 L05

D 914 L06

TCD 914 L06 Optional

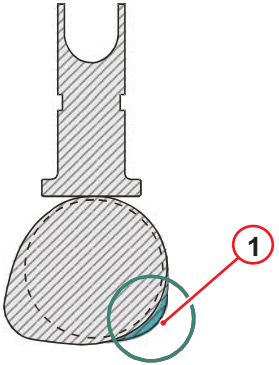
(example)

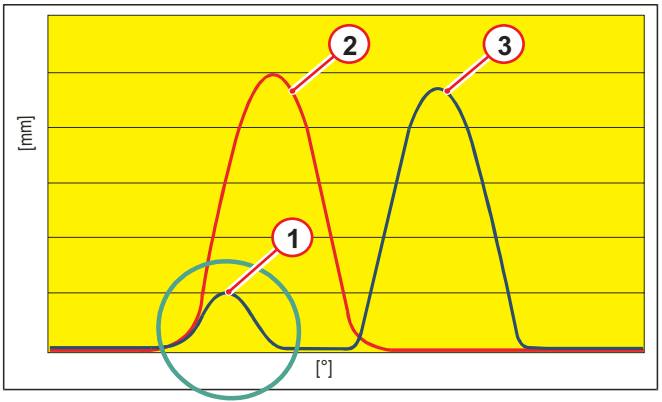
1 Exhaust gas partial flow (not connected)
2 Valve housing
3 Actuator (electrically actuated)
4 Distributor pipe
5 Electrical connection
6 Switch
The switch is connected internally with the control linkage. The voltage to the actuator is interrupted at load peaks.
7 Injection pump

The switch housing is designed to be safe from manipulation.

Only have work performed on the components by authorised qualified personnel.

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Internal exhaust gas recirculation

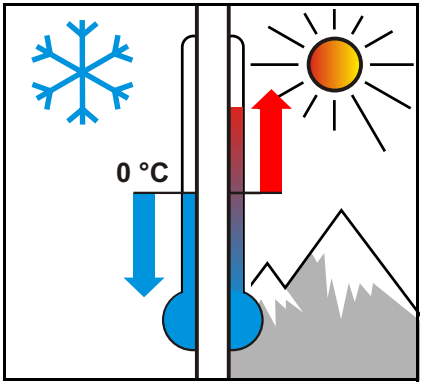
(example)

D 914 L03 < 37 kW

TCD 914 L06 Optional

1 Additional cams for exhaust gas recirculation
Inlet valve opens briefly during the outlet cycle and emits an exhaust gas partial flow to the suction system.
This partial volume is sucked back in in the next suction cycle.
2 Outlet valve
3 Inlet valve

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Low ambient temperatures

Lubricating oil

- Select the lubricating oil viscosity according to the ambient temperature.
- If cold starting occurs frequently cut the lube oil changing interval by half.

Fuel

- Use winter fuel below 0 °C (28).

Battery

- A good charging condition of the battery (48) is the prerequisite for starting the engine.
- Heating up the battery to approx. 20°C improves the starting behaviour of the engine. (Remove and store the battery in a warm room).

Cold start aid

- Depending on the type of engine, glow plugs, heating plugs, heating flange, flame glow system can be used as cold starting aids.(21)

High ambient temperatures, high altitude

This engine can be equipped optionally with an electronic DEUTZ control unit. Under the operating conditions listed below, the amount of fuel is reduced automatically, controlled by the electronic control unit.

Under the following application and operating conditions, the amount of fuel must be reduced.

- above 1000 m altitude
- above 30 °C ambient temperature

Reason: Air density decreases as altitude or ambient temperature increase. This reduces the amount of oxygen in the engine intake air and the fuel-air mixture would be too rich if the injected amount of fuel were not reduced.

- The results would be:
  - black smoke in the exhaust
  - high engine temperature
  - reduction in engine performance
  - possible impairment of starting behaviour

Consult your equipment supplier or DEUTZ partner if you have any other questions.

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Preparations for initial commissioning

(Maintenance schedule E 10)

- Remove engine corrosion protection
- Remove any transport devices.
- Check the battery and cable connections and mount if necessary.
- Check belt tension (43).
- Have the engine monitor or warning system checked by authorised personnel.
- Check the engine mounting.
- Check that all hose unions and clips fit properly.

The following additional work must be carried out on generally overhauled engines:

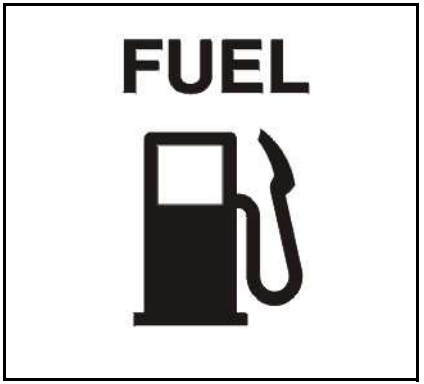
- Check the fuel pre-filter and main filter and change if necessary.
- Check the intake air cleaner (if available, maintain according to maintenance indicator).
- Drain lubricating oil and condensation water from the charge air cooler.
- Fill with engine lube oil.

Fill with engine lube oil

Low lubricating oil level and overfilling lead to engine damage.

The engines are generally supplied without lubricating oil filling.
Select lubricating oil quality and viscosity before filling.
Order DEUTZ lubricating oils from your DEUTZ partner

- Fill the engine with lubricating oil via the lubricating oil filler neck.
- Observe the lubricating oil filling level (58).



Pour in fuel

Only re-fuel when the engine is not running.
Ensure cleanliness.
Do not spill fuel.
Additional venting of the fuel system by a 5 minute trial run at idle speed or on low load is absolutely essential.

- The fuel low pressure system must be vented before the first start-up after filling with the manualy supply pump.

Only use clean commercially available brand diesel fuel. Observe fuel quality (28).

Use summer or winter-grade fuel, depending on the ambient temperature.

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Trial run



Additional venting of the fuel system by a 5 minute trial run at idle speed or on low load is absolutely essential.

Carry out a brief trial run up to operating temperature (approx. 90 °C) after preparations.

Do not load the engine if possible.

- Work with the engine not running:
  - Check engine for tightness.
  - Check lubricating oil level, if necessary top up.
- Work during the trial run:
  - Check engine for tightness.

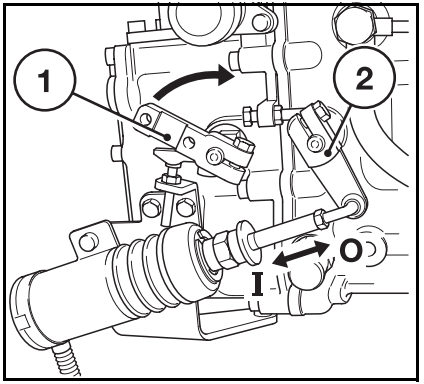
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Starting

Before starting, make sure that nobody is standing in the immediate vicinity of the engine or work machine.
Disconnect the engine by uncoupling devices to be driven where possible.
After repair work: Check that all guards have been replaced and that all tools have been removed from the engine.
When starting with the flame glow plug/ glow plug/heating flange system do not use any other starting aid (e.g. injection with start pilot). Risk of accident!
Do not actuate the starter for more than 20 seconds. If the engine does not start up, wait for one minute and then repeat the starting process.

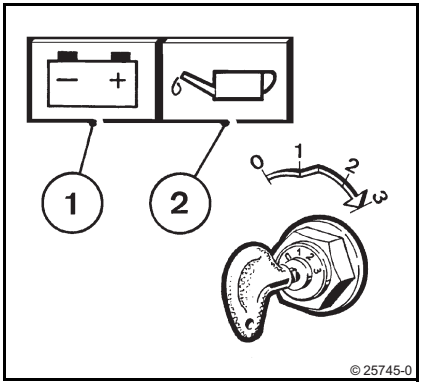
If the engine does not start up after two attempts, determine the cause as per fault table (50).
Do not run up the engine immediately to high idling speed / full load operation from cold.

Disconnect the engine by uncoupling devices to be driven where possible.



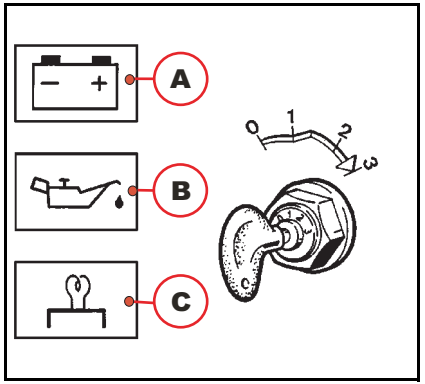
Starting

- Move speed adjustment lever (1) to slow idle.
- Turn shutdown lever (2) to position "I" and start.
- In electrical start with a lifting magnet the shutoff lever (2) is pulled in direction "I" and held when current is applied. The charging control lamp and lubricating oil pressure control lamp go out.



Without cold start aid

- Insert key.
- Turn key to the right.
  - Position 1 = operating voltage.
  - Pilot lamps (1) and (2) light up.
- Push the key in and turn further clockwise against spring pressure.
  - Level 2 = no function.
  - Level 3 = start.
- release the key as soon as the engine starts up.
  - The pilot lamps will go out.



with cold starting device

- Insert key.
  - Position 0 = no operating voltage.
- Turn key to the right.
  - Position 1 = operating voltage.
  - Pilot lamps (A), (B) and (C) light up.
- stage 2 = pre-heating
  - Preheat until the glow display goes out; an error has occurred if the preheating indicator flashes; e.g. the preheating relay is stuck, which can discharge the battery completely when at a standstill.
  - Engine is ready for operation.
- Push the key in and turn further clockwise against spring pressure.
  - Level 3 = start.
- release the key as soon as the engine starts up.
  - The pilot lamps will go out.

After starting, any exhaust gas turbidity in the runup phase can be reduced by holding the key at stage 2. (maximum 3 minutes)

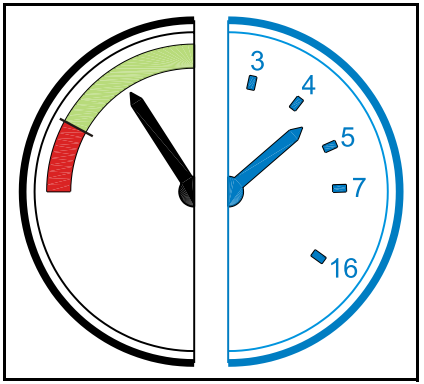
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Operation monitoring by EMR2

Optional

The EMR2 system monitors the engine condition as well as the engine electronics and displays these to the driver/operator with the error lamp:

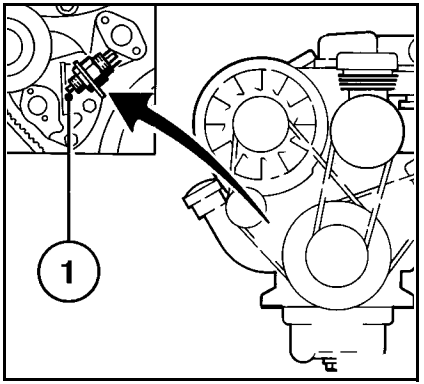
- Function test
  - Ignition on, error lamp lights up for approx. 2 seconds and then goes out.
- The lamp does not light
  - After the lamp test an extinguished lamp indicates an error-free and trouble-free operating state within the scope of the control possibility.
- Steady light
  - If a lamp lights steadily a monitored measuring variable (e.g. coolant temperature, lubricating oil pressure) has left the permissible value range.
- Flashing
  - Serious error in the system.



Display instrument

Possible displays:

- Colour scale
  - Display of operating state by coloured areas:
  - green = normal operating state
  - red = critical operatng state
    Take suitable action.
- Measured value scale
  - Actual value can be read off directly. The nominal value should be taken from the Technical Data (58).



V-belt monitoring

A warning device for tearing of the V-belt must be provided by the customer/device manufacturer.

- In the event of V-belt tear the pressure pin (1) of the electrical switch is actuated by the tensioning roller and an acoustic signal or light signal is initiated.
- Stop the engine immediately to avoid overheating.

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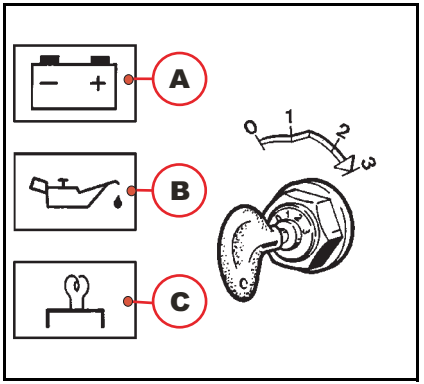
Instruments and symbols

Instruments/symbols	Designation	Possible display:	Measure
	Lubricating oil pressure display	Lubricating oil pressure below minimum	Switch off engine
	Lubricating oil pressure display	Lubricating oil pressure in the red area	Switch off engine
	Lubricating oil temperature display	The temperature display should always be in the green area and only be in the yellow-green area under exceptional circumstances If the pointer enters the orange sector, the engine is overheating.	Turn off and establish the cause from the Fault Table
	Lubricating oil pressure pilot lamp	If the pilot lamp lights up after starting the engine or while the engine is running, the lubricating oil pressure is too low	Switch off engine
	Lube oil level	If the pilot lamp lights up after starting the engine or while the engine is running, the lubricating oil level is too low	Check lubricating oil level / if necessary top up
	Operating hours counter	Indicates the previous operating time of the engine	Observe the maintenance intervals
	Horn	With acoustic signal	See Fault Table

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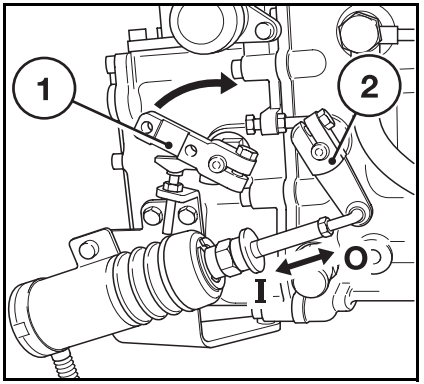
Shutting off

Avoid switching off from full load (coking/ blockage of the remaining lubricating oil in the turbocharger bearing housing). The lubricating oil supply of the turbocharger is then no longer guaranteed! This shortens the life of the turbocharger.
Run the engine in low idling speed for approximately one minute after relieving the load.
The control unit remains active for about another 40 seconds to save the system data (lag) and then switches off automatically.



Electrical shutdown (optional)

- Run engine up to idling speed.
- Move the key to position 0.
  Control lamps A+B+C go out.
  A = charge pilot light
  B = lube oil pressure pilot light
  C = pilot light for pre-heating system
  0 = gear position: switch off engine



Shutting off

- Run engine up to idling speed.
- Move the key to position 0.
  Control lamps A+B+C go out.
- In case of electrical shutdown or power failure the shutoff lever (2) is switched off by the lifting magnet up to engine standstill. The charging control lamp and lubricating oil pressure control lamp light up.

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General

Modern diesel engines place very high demands on the lubricating oil to be used. The specific engine performances which have increased constantly over the last few years lead to an increased thermal load on the lubricating oil. The lubricating oil is also more exposed to contamination due to reduced oil consumption and longer oil change intervals. For this reason it is necessary to observe the requirements and recommendations described in this operating manual in order not to shorten the life of the engine.

Lubricating oils always consist of a base oil and an additive package. The most important tasks of a lubricating oil (e.g. wear protection, corrosion protection, neutralisation of acids from combustion products, prevention of coke and soot deposits on the engine parts) are assumed by the additives. The properties of the base oil are also decisive for the quality of the product, e.g. with regard to thermal load capacity.

In principle, all engine oils of the same specification can be mixed. However, mixing of engine oils should be avoided because the worst properties of the mixture are always dominant.

The **lubricating oil quality** has a considerable influence on the life, performance and thus also on the costs-effectiveness of the engine. It basically applies that: The better the lubricating oil quality, the better these properties.

The **lubricating oil viscosity** describes the flow behaviour of the lubricating oil depending on the temperature. The lubricating oil viscosity has no influence and effect on the lubricating oil quality.

Synthetic lubricating oils are used increasingly and have advantages. These oils have a better temperature and oxidation stability as well as a relatively low cold viscosity. Since some processes relevant to the definition of the lube oil change intervals are not essentially dependent on the lube oil quality (such as the incorporation of soot and other contaminations), the lube oil change interval when using synthetic lube oils may not be increased in relation to the specifications of the lube oil change intervals.

Biodegradable lubricating oils may be used in DEUTZ engines if they meet the requirements of this operating manual.

Quality

Lubricating oils are classified by DEUTZ according to their efficiency and quality class (DQC: DEUTZ Quality Class). It basically applies that: with increasing quality class (DQC I, II, III, IV) the lubricating oils are more efficient and higher quality. The appended quality class designation (- 02 / - 05) indicates in which year the classification was made.

Lubricating oils according to other comparable specifications can be used as long as they meet DEUTZ requirements. In regions in which none of these qualities are available, please contact your responsible DEUTZ partner.

or see www.deutz.com

\SERVICE \Operating Media and Diagnosis**D**eutz **Q**uality **C**lass**DQC Release List**

The following lubricating oils are recommended for the engines in this operating manual:

Recommended quality class	
DEUTZ	**Others**
DQC II - 05	ACEA E3-96; E4-07; E5-02; E7-04 API CH-4/CG-4; CI-4,CI-4, CJ-4; DHD-1
DQC III - 05 DQC IV - 05	Please contact your DEUTZ partner or see www.deutz.com \SERVICE \Operating Media and Diagnosis**D**eutz **Q**uality **C**lass**DQC Release List**

DEUTZ lubricating oils DQC II-05 TLS - 15W40 D	
Container	**Order number:**
5 litre container	0101 6331
20 litre container	0101 6332
209 litre barrel	0101 6333

DEUTZ lubricating oils DQC III-05 TLX - 10W40 FE	
Container	**Order number:**
5 litre container	0101 6335
20 litre container	0101 6336
209 litre barrel	0101 6337

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DEUTZ lubricating oils DQC IV-05 synthetic	
Container	**Order number:**
20 litre container	0101 7849
209 litre barrel	0101 7850

Lubricating oil change intervals

- The intervals depend on:
  - lubricating oil quality
  - sulphur content in the fuel
  - type of application of engine
- The lubricating oil change interval must be halved if at least one of the following conditions applies:
  - Constant ambient temperature below -10 °C (14 °F) or lube oil temperature below 60 °C (84 °F).
  - Sulphur content in the diesel fuel of 0.5-1 %. In case of fuels containing more than 1% sulphur, contact your corresponding DEUTZ partner.
  - operation with bio-diesel fuel
- If the lubricating oil change intervals are not reached within a year, the oil should be changed at least once a year.

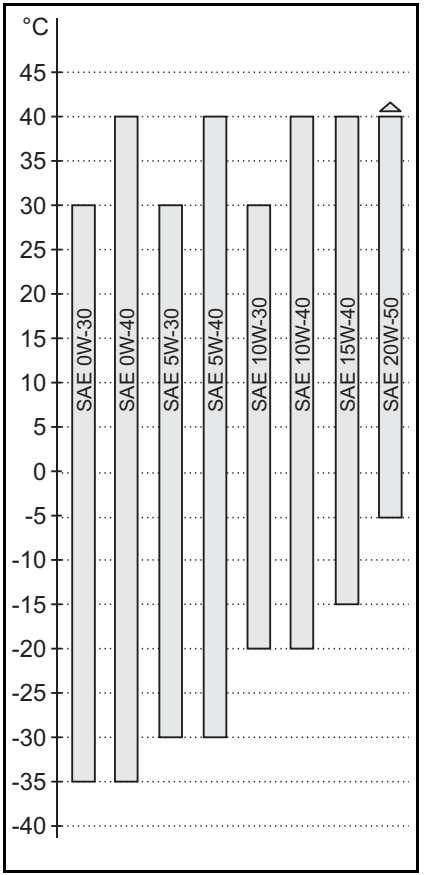
Viscosity

The ambient temperature at the installation site or in the application area of the engine is decisive for choosing the right viscosity class. Too high a viscosity can lead to starting difficulties, too low a viscosity can endanger the lubrication effect and cause a high lubricating oil consumption. At ambient temperatures below -40 °C, the lubricating oil must be pre-heated (e.g. by storing the vehicle or the machine in a hall).

The viscosity is classified according to SAE. Multi-purpose lubricating oils should be used basically. Single-purpose lubricating oils can also be used in enclosed, heated spaces at temperatures >5 ° C.

Depending on the ambient temperature we recommend the following common viscosity classes:

The prescribed lubricating oil quality must be observed when selecting the viscosity class!



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Permissible fuels

The following fuel specifications / standards are approved:

- Diesel fuels
  - EN 590
  - ASTM D 975 1-D
  - ASTM D 975 2-D
  - BS 2869 A1
  - BS 2869 A2
  - NATO F-54
  - NATO F-75
  - JIS K2204 Grade 1
  - JIS K2204 Grade 2
- Light heating oils
  - DIN 51603
  - ASTM D 396 Grade No. 1
  - ASTM D 396 Grade No. 2
  - BS 286 Class D
- Jet fuels
  - NATO F34
  - NATO F35
  - NATO F44
  - NATO F63
- Biodiesel fuel
  - EN 14214

Use commercially available fuels with a sulphur content below 0.5 %. The lubricating oil change intervals must be halved at a higher sulphur content.

If other fuels are used which do not meet the requirements of the operating manual, the warranty will be voided.

The certification measurements for compliance with the legal emission values are made with the test fuels specified in the laws. These correspond to the diesel fuels in accordance with EN 590 and ASTM D 975 described in the operation manual. No emission values are guaranteed with the other fuels described in this operation manual.

The respective fuels prescribed by law must be used to comply with the national emission regulations (e.g. sulphur content).

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Winter operation with diesel fuel

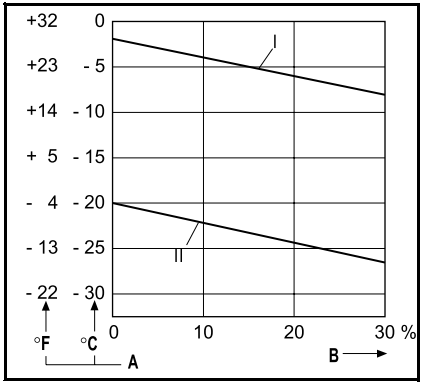
Only carry out mixing in the tank. Fill with the appropriate amount of paraffin first, then add the diesel fuel. Normal and high grade fuels may not be mixed.

At low ambient temperatures paraffin discharges can lead to blockages in the fuel system and cause operating faults. Below 0 °C ambient temperature use winter diesel (down to -20 °C) (filling stations provide this in good time before the cold season starts).

- Below -20 °C paraffin should be added. The relevant percentages are given in the adjacent diagram.
- Special diesel fuels can be used for arctic climates to -44 °C.

If it is necessary to use Summer diesel fuel below 0 °C, up to 30 % petroleum can be added according to the diagram opposite.

Usually a sufficient cold resistance can be achieved by adding a flow improver. Ask your DEUTZ partner.



I Summer-grade diesel fuel

II Winter-grade diesel fuel

A Outdoor temperature

B Percentage of paraffin to be added

Assignment of the DEUTZ maintenance and service schedules to maintenance intervals

Standard maintenance schedule D/TCD 914			
Stage	**Activity**	**To be carried out by**	**Maintenance interval every ..... operating hours (oh)**
E10	Initial commissioning	Authorised specialists	When commissioning new or overhauled engines
E20	Daily inspection	Operator	1x daily or every 10 operating hours in continuous operation
E30	Maintenance	Qualified personnel	D 1000 [1] / TCD 500 [1]
E40	Extended maintenance I		1000
E50	Extended maintenance II	Authorised specialists	1.500

[1] The lubricating oil load may be high depending on the application. The lubricating oil change interval must be halved here (27).

EPA-certified engines

The EPA (**E**nvironmental **P**rotection **A**gency) is a US Government organisation for the protection of the environment and human health.

Deviations from the standard maintenacne schedule for engines subject to EPA certification			
Stage	**Activity**	**To be carried out by**	**Maintenance interval every ..... operating hours (oh)**
E60	Intermediate overhaul	Authorised specialists	3.000

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Maintenance measures

Stage	Activity	Measure	Page
E10		The measures are listed in chapter 3.	19
E20	Check	Lubricating oil level (if necessary top up)	33
		Lubricating oil bath air filter	40
		Engine tightness (visual inspection for leaks)	
		Suction air filter/dry air filter (maintain in accordance with maintenance indicator)	39
		V-belts (retension or renew if necessary)	43
E30	Replace	Lubricating oil An lubricating oil application/change strategy adapted optimally to the individual engine application type can be created, for example, with the DEUTZ oil diagnosis. Ask your DEUTZ partner.	27/33
		Lubricating oil filter/insert (every time the lubricating oil is changed)	27
	Check	Battery and cable connectors	48
		Engine monitor, warning system Maintenance only to be carried out by authorised service personnel	
E40	Check	Cold starting device	18
		V-belts (retension or renew if necessary)	43
		Engine mounting (tighten, replace if damaged when necessary)	
		Fastenings, hose unions / clips (renew if damaged)	
	Settings	Valve clearance	46
	Replace	Sub-stream lubricating oil filter	35
		Fuel filter cartridge	37
	Clean	Fuel pre-cleaner / fuel pre-filter (change filter insert if necessary)	37
		Suction air filter/dry air filter (maintain in accordance with maintenance indicator)	39
E50	Check	Switching valve of exhaust return	16
		Injection valve	
E60	Replace	Injection valve	

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Stage	Activity	Measure	Page
	Replace	Switching valve of exhaust return	16
	Clean	Charge air cooler entry area (drain lube oil/condensate)	
		Turbocharger compressor outlet	
		Exhaust channels of exhaust return (cylinder head)	42
Every 2 years	Replace	V-belts	43
		Cold starting device	18
		Dry air filter	39

Maintenance work outside the DEUTZ maintenance and service schedules

*If the water level warning system (lamp/siren) responds, the fuel pre-filter must be emptied immediately.

Maintenance profile

A self-adhesive maintenance diagram is delivered with every engine. It should be stuck in a well visible location on the engine or equipment.

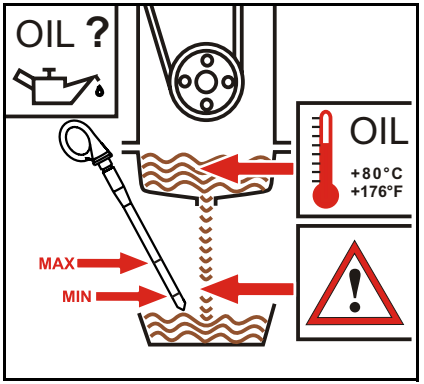
Order number: 0312 3144

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Regulations for working on the lubricating oil system

Do not work when the engine is running!
Smoking and naked lights prohibited!
Be careful of hot lubricating oil. Danger of scalding!

Pay attention to utmost cleanliness when working on the lubricating oil system. Clean the area around the components concerned carefully. Blow damp parts dry with compressed air.
Observe the safety regulations and national specifications for handling lube oils.
Dispose of leaking lubricating oil and filter elements properly. Do not allow used oil to seep away into the ground.
Perform a trial run after all work. Pay attention to tightness and lubricating oil pressure and then check the engine oil level.
In case of fuels containing more than 1% sulphur, contact your corresponding DEUTZ partner.



Checking the lubricating oil level

Low lubricating oil level and overfilling lead to engine damage.
The lubricating oil level may only be checked with the engine in a horizontal position and switched off.
If the engine is warm, switch off the engine and check the lubricating oil level after 5 minutes. If the engine is cold you can check it immediately.

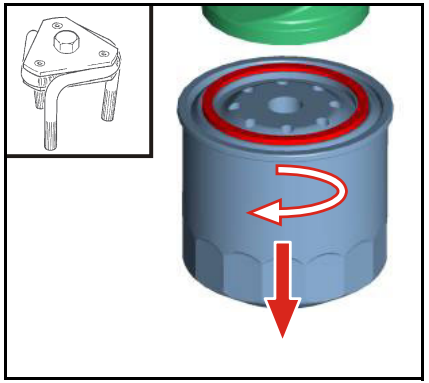
Be careful of hot lubricating oil. Danger of scalding!

- Pull out the lubricating oil dipstick and wipe off with a lint-free, clean cloth.
- Insert the lubricating oil dipstick as far as it will go.
- Extract the lubricating oil dipstick and read off the oil level.
- The oil level must always be between the MIN and MAX marks! Top up to the MAX mark if necessary.

Changing the lubricating oil

- Warm up the engine (lubricating oil temperature > 80 °C).
- Ensure that the engine or vehicle is in a level position.
- Switch off the engine.
- Place a collecting receptacle underneath the lube oil drain screw.
- Unscrew the lube oil drain screw, drain oil.
- Fit a new sealing ring to the lube oil drain screw, insert and tighten. (tightening torque 100 Nm).
- Pour in lube oil.
  - Quality/viscosity data (26).
  - Filling volume (58).
- Check lubricating oil level, if necessary top up.

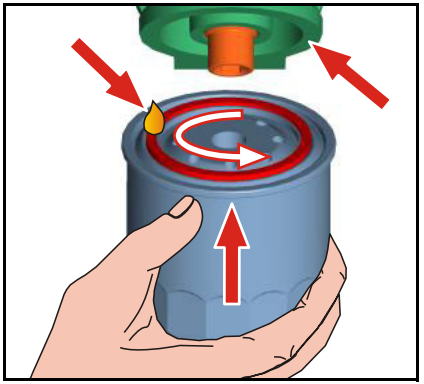
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Change lubricating oil filter

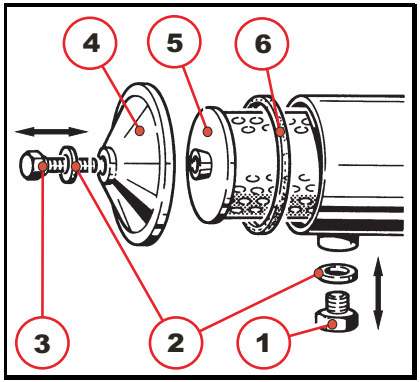
The filter cartridge should never be pre-filled. There is a danger of dirt contamination!

- Remove clamps when twist protection mounted (optional).
- Loosen and unscrew filter cartridge with tool **(order number: 170050)**.
- Collect draining lubricating oil
- Clean the sealing surface of the filter support with a lint-free, clean cloth.



- Oil the gasket of the new DEUTZ original filter cartridge lightly.
- Screw on new filter by hand until the gasket is touching and tighten with a torque of:
  15-17 Nm
- Fasten clamps of the twist protection (optional).

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Sub-stream lubricating oil filter

Change filter cartridge

1 Lubricating oil drain plug
2 Sealing ring
3 Screw
4 Cover
5 Filter cartridge
6 Gasket

- Place a collecting receptacle underneath the lube oil drain screw.
- Unscrew the lube oil drain screw, drain oil.
- Loosen screw.
- Remove cover.
- Unscrew soiled filter cartridge.
- Clean components.
- Insert new filter cartridge.
- Mount gasket (new gasket if necessary).
- Mount cover.
- Insert screws with new sealing rings.
- Check for leaks after starting the engine.

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Specifications when working on the fuel system



Engine must be switched off!
Smoking and naked lights prohibited!
No injection/high pressure pipes may be disconnected while the engine is running.
Caution when handling hot fuel!
Pay attention to utmost cleanliness when refuelling and working on the fuel system.
Clean the respective affected parts carefully. Blow damp areas dry with compressed air.
Observe the safety regulations and national specifications for handling fuels.
Dispose of leaking fuel and filter elements properly. Do not allow fuel to seep away into the ground.
After all work on the fuel system, the system should be vented, a trial run performed and the tightness checked.
It will be necessary to vent the fuel system when commissioning for the first time, after maintenance work or if the tank has been run dry.

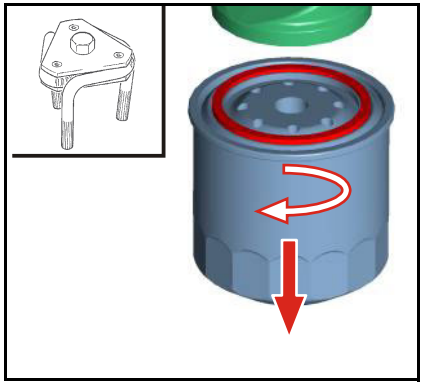


Additional venting of the fuel system by a 5 minute trial run at idle speed or on low load is absolutely essential.
Pay attention to utmost cleanliness due to the high production accuracy of the system!
The fuel system must be tight and closed.
Make a visual inspection for leaks/damage in the system.



Clean and dry the engine and engine compartment thoroughly before beginning work.
Areas of the engine compartment from which dirt could be loosened must be covered with a fresh, clean foil.
Work on the fuel system may only be carried out in an absolutely clean environment. Air contamination such as dirt, dust, moisture etc. must be avoided.

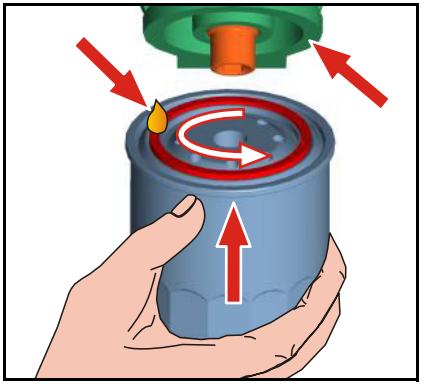
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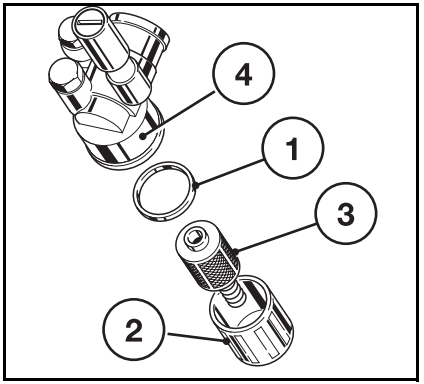
Change the fuel filter cartridge

The filter cartridge should never be pre-filled. There is a danger of dirt contamination!

- Remove clamps when twist protection mounted (optional).
- Loosen and unscrew filter cartridge with tool **(order number: 170050)**.
- Catch any escaping fuel.
- Clean the sealing surface of the filter support with a lint-free, clean cloth.



- Oil the gasket of the new DEUTZ original filter cartridge lightly.
- Screw on new filter by hand until the gasket is touching and tighten with a torque of:
  10-12 Nm
- Fasten clamps of the twist protection (optional).
- Vent the fuel system.



Clean/change/vent the fuel pre-filter

Keep naked flames away when working on the fuel system! Do not smoke!

- Shut off the fuel supply to the engine (with high-level tank).
- Remove the filter hood (2) and pull out the filter element (3).
- Maintain the filter element (3) according to the interval in the maintenance schedule
- Catch any escaping fuel.
- Collect the sealing ring (1) and clean it, renew if damaged.
- Clean filter housing (4) with fuel.
- Screw on filter housing (4) with filter cover (2) and filter element (3).
- Open the fuel supply to the engine.
- Vent the fuel system.
- Check for leaks after starting the engine.

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Cleaning work



For all cleaning work, make sure that no parts are damaged (e.g. bent cooler mesh). Cover electrical/electronic parts and connections to clean the engine (e.g. control units, generator, solenoid valves etc.). Do not aim the water/steam jet directly at them. Allow engine to warm up.



Only carry out cleaning work on the engine when it is not running!
Remove the engine cover and cooling air cover if available and remount after cleaning.

General

The following causes of soiling make it necessary to clean the engine:

- High dust content in the air.
- Chaff and chopped straw in the area of the engine.
- Coolant leaks
- Lubricating oil leakage
- Fuel leaks

Because of the different application conditions, cleaning depends on the degree of dirt contamination.

Cleaning with compressed air

- Blow dirt off or out. Always blow out the cooler and cooling fins from the exhaust air side to the fresh air side.

Cleaning with cold cleaner

- Spray the engine with cold cleaner and leave it for about 10 minutes to take effect.
- Spray the engine clean with a high pressure water jet.
- Warm up the engine so that the water residues evaporate.

Cleaning with a high pressure cleaner

- Clean the engine with a steam jet (maximum spray pressure 60 bar, maximum steam temperature 90 °C, distance at least 1m).
- Warm up the engine so that the water residues evaporate.
- Always clean the cooler and cooling fins from the exhaust air side to the fresh air side.

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Regulations for working on the intake system

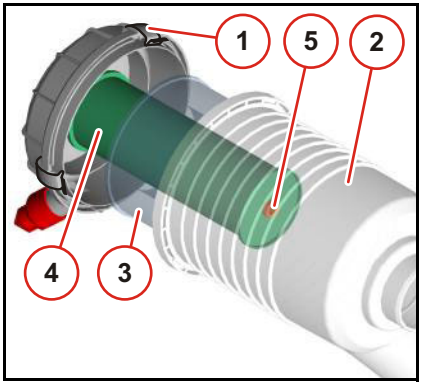
Do not work when the engine is running!

Pay attention to utmost cleanliness when working on the intake system, close intake openings if necessary.
Dispose of old filter elements properly.

Renewing the safety cartridge of the dry air filter

Never clean the safety cartridge (4).

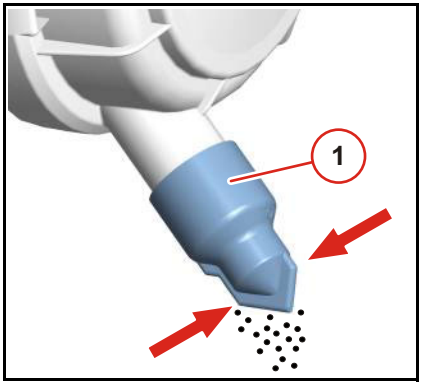
- Renew safety cartridge (4) according to the interval in the maintenance schedule
- To do this:
  - Unscrew hexagon nut (5), pull out safety cartridge (4).
  - Insert new safety cartridge, screw on hexagonal nut.
- Insert filter element (3), mount hood (2) and fix with clamping yoke (1).



Maintaining the dry air filter

Do not clean the filter element (3) with petrol or hot liquids!
Renew damaged filter elements.

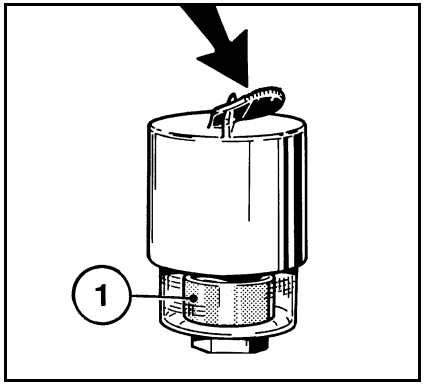
- Maintain the filter element (3) according to the interval in the maintenance schedule
- Lift up the clamping yoke (1).
- Remove the filter hood (2) and pull out the filter element (3).
- Filter element (3):
  - blow out with dry compressed air (max. 5 bar) from the inside to the outside if soiling is only slight,
  - renew if heavily soiled.



Clean the dust discharge valve of the dry air filter

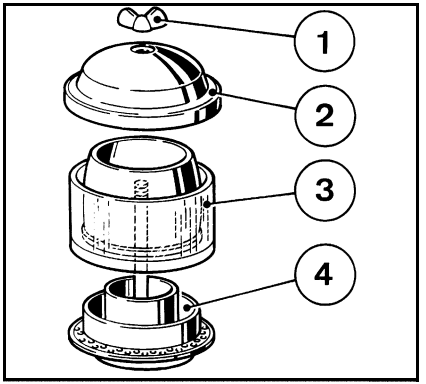
- Empty the dust discharge valve (1) by pressing together the discharge slit.
- Remove any caked dust by pressing together the upper section of the valve.
- Clean the discharge slit.

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Maintenance indicators for dry air filter

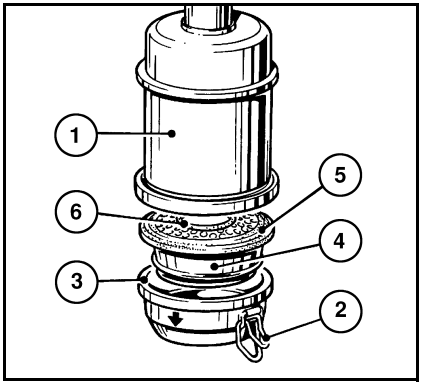
- The dry air filter is maintained according to a maintenance switch or maintenance indicator.
- Maintenance is necessary when:
  - the yellow warning light of the **maintenance switch** lights up when the engine is running.
  - the red field (1) of the **maintenance indicator** is fully visible.
- After carrying out maintenance work, reset the signal by pressing the button on the maintenance indicator. The maintenance indicator is now ready for operation again.



Emptying the cyclone precleaner

Never fill the dust container (3) with lubricating oil!

- Loosen wing nut (1) and lift off housing cover (2).
- Remove the dust container (3) from the base (4) and empty it. Clean the container using a brush and clean diesel fuel. Then dry.
- Place the dust container (3) on the base (4) and tighten the housing cover (2) with wing nut (1).



Cleaning oil bath air filter

Never clean the filter with petrol!

Dispose of the old lubricating oil in accordance with the regulations. Select the engine lubricating oil according to the requirements before filling the filter.

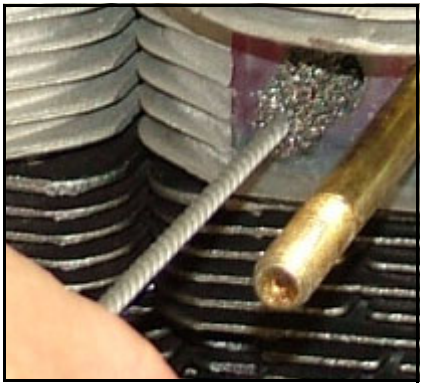
- Shut down engine and wait about 10 minutes until the lubricating oil has collected in the lubricating oil pan (3).
- Loosen the quick release clamps (2) and remove the lubricating oil pan (3) with filter insert (4).
- Collect draining lubricating oil
- Dispose of in an environmentally correct manner.
- Clean lubricating oil pan (3), filter cartridge (4) and filter housing (1) with a brush and clean die-

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sel fuel.

- Visually inspect the rubber gaskets (5), (6) and renew if damaged.
- Fill the lubricating oil pan (3) of the oil bath air filter with engine oil up to the mark (arrow).
- Mount the lubricating oil pan (3) with filter insert (4) on the filter housing (1) and close the quick release clamps (2).
- Check for leaks after starting the engine.

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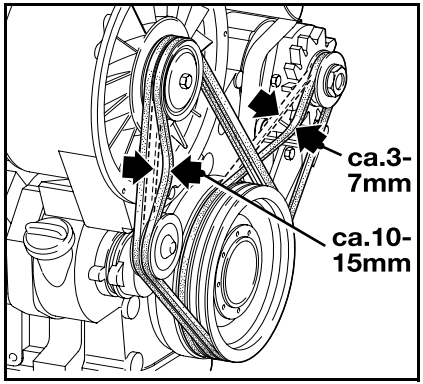


Clean cylinder head exhaust apertures

Carry out the work only when cold. Danger of burning!

- Remove air guide hood.
- Disassemble exhaust return system.
- Clean exhaust gas apertures on each cylinder using a wire brush **(order number: 8167)** (60).
- Suck off residue.
- Assemble exhaust gas return system.
- Tighten screws.
- Install air guide hood.

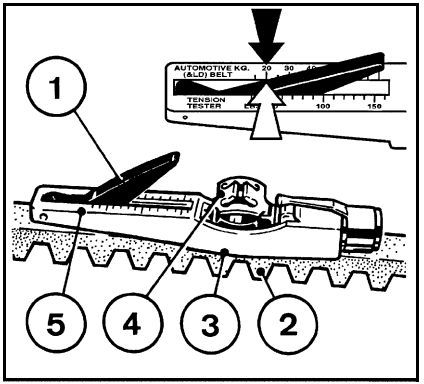
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Checking the belt drive

Only carry out work on the belt drive with the engine at a standstill!
Always change both belts in sets in case of wear on the double belts or damage to one V-belt.
After repair work: Check that all guards have been replaced and that all tools have been removed from the engine.

- Check the whole belt drive visually for damage.
- Renew damaged parts.
- Remount protective devices if necessary.
- Pay attention to correct fit of new belts, check the tension after running for 15 minutes.

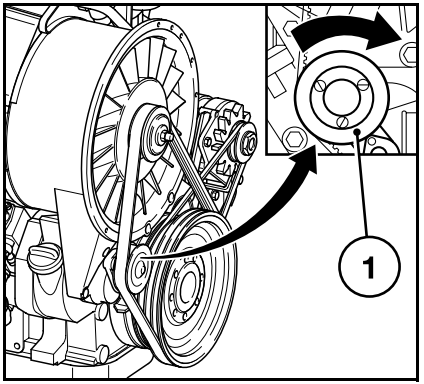


Checking the belt tension

- Lower indicator arm (1) into the measuring device.
- Place guide (3) between two belt pulleys on the V-belt (2). The stop have to be at the side.
- Press the button (4) at right angles to the V-belt (2) evenly until you hear or feel the spring snap in.
- Lift the measuring device carefully without altering the position of the indicator arm (1).
- Read the measured value at the point of intersection (arrow), scale (5) and indicator arm (1).
- If necessary, re-tension belt and measure again.

Tools

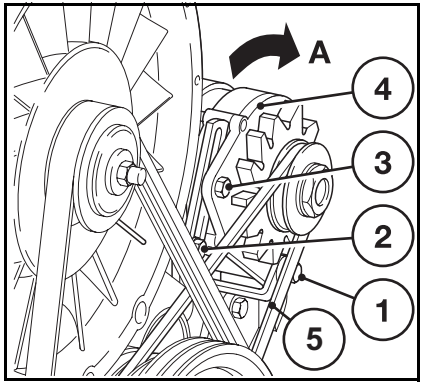
Belt tension measuring device **(order number: 8115)** can be obtained from your DEUTZ partner.



Change the belt

Fan

- Press clamping roller (1) in with conventional tool to change.
- Remove belt and fit new one.
- Checking the belt tension (43).



Tighten belt

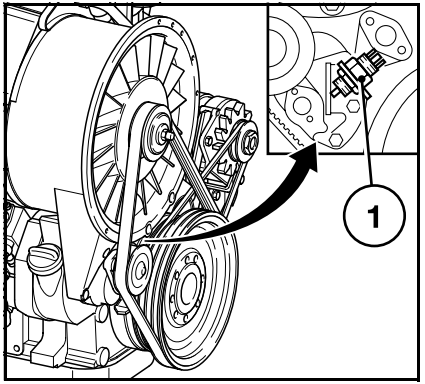
Generator

- Loosen screws (1), (2) and (3) slightly.
- Push the generator (4) outwards in the direction of the arrow until you get the correct V-belt tension.
- Retighten the screw (1), (2) and (3).

Change the belt

Generator

- Removing fan V-belt (43)
- Loosen screws (1), (2) and (3) slightly.
- Swing the generator (4) in in the opposite direction to the arrow.
- Remove the V-belt (5) and fit a new V-belt.
- Push the generator (4) outwards in the direction of the arrow until you get the correct V-belt tension.
- Retighten the screw (1), (2) and (3).
- Installing fan V-belt (58).
- Checking the belt tension (43).

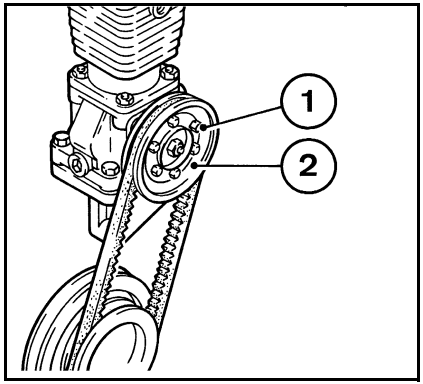


Function test pressure pin

A warning device for tearing of the V-belt must be provided by the customer/device manufacturer.

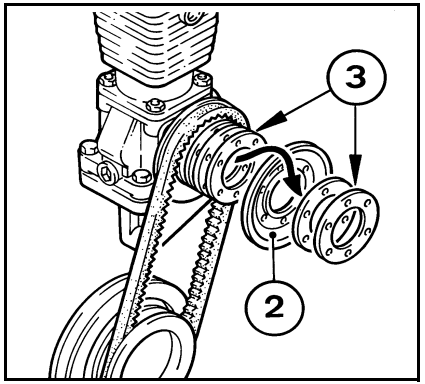
- In the event of V-belt tear the pressure pin (1) of the electrical switch is actuated by the tensioning roller and an acoustic signal or light signal is initiated.
- Check the function by pushing the pin (1) in.

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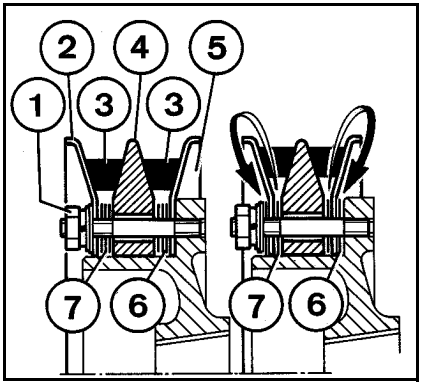
Tighten belt

- Loosen screw (1).
- Remove the outer half of the belt pulley (2).
- Remove belt and fit new one.
- Checking the belt tension (43).



Tighten belt

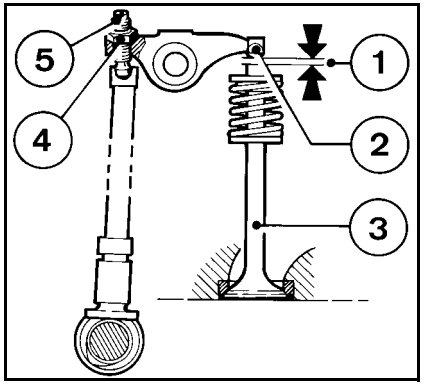
- In order to re-tension, remove one or more of the intermediate discs (3) on the inside. Place the removed discs on the removed belt pulley half (2) on the outside.
- Re-tighten screw (1). Turn the engine over whilst tightening to prevent trapping the V-belt.



Air compressor with double V-belt

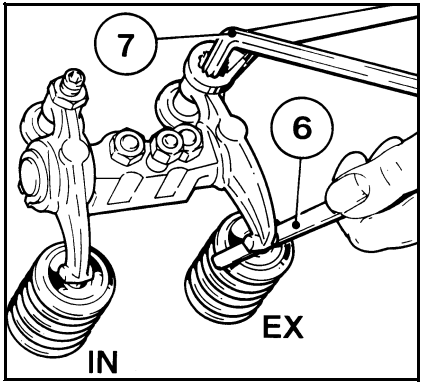
- Unscrew hex. nut (1), remove V-belt pulley half (2), V-belt (3) and intermediate pack of discs (7).
- Remove intermediate disc (4), rear V-belt (3), intermediate pack of discs (6) and the V-belt disc half (5).
- To re-tighten, remove one or more of the intermediate discs from the packs (6) and (7). Place the removed discs in front of, or behind, the V-belt pulley halves (2) to ensure that the belt alignment is maintained. Always remove the same number of intermediate discs from each pack.
- Installation in reverse order. Turn the engine over whilst tightening the nut (1) to prevent the V-belt from being trapped.

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Check valve clearance, adjust if necessary

- Let the engine cool down for at least 30 minutes before setting the valve clearance: Lubricating oil temperature below 80 °C.
- Remove the cylinder head hood.
- Place turning gear over fastening screws of the belt pulleys.
- Turn the crankcase until reaching valve overlap.
  Outlet valve is not yet closed, inlet valve begins to open.
  The cylinders to be set can be seen in the setting schematic.
- Check the valve clearance (1) between the rocker arm lugs (2) and the valve (3) with a feeler gauge (6).
- The feeler gauge (6) must slide in with little resistance.
- For permissible valve clearance, see (58)
- Adjust valve clearance if necessary:



- Engage hexagon socket head wrench (7) and insert and loosen the lock nut (4).
- Adjust the valve clearance setting screw (5) with the hexagon socket head wrench (7) so that the correct valve clerarance (1) is reached after tightening the lock nut (4).
- Perform the setting procedure on every cylinder.
- Reinstall cylinder head cover, with new gasket.

Valve clearance setting schematic

Valve overlap: Exhaust valve is not yet closed, inlet valve begins to open.

D 914 L03

Valve overlap	Turn crankshaft 360°	Settings
1	One turn	1
2	One turn	2
3	One turn	3

D 914 L04

Valve overlap	Settings
1	4
2	3
3	2
4	1

D 914 L05

Valve overlap	Turn crankshaft 360°	Settings
1	One turn	1
2	One turn	2
3	One turn	3
4	One turn	4
5	One turn	5

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D 914 L06

Valve overlap	Settings
1	6
5	2
3	4
6	1
2	5
4	3

TCD 914 L06

Valve overlap	Turn crankshaft 360°	Settings
1	One turn	1
2	One turn	2
3	One turn	3
4	One turn	4
5	One turn	5
6	One turn	6

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Regulations for working on the electrical system

Do not touch the voltage conducting parts, faulty warning lamps should be immediately replaced.

Pay attention to correct polarity of the connections.
Cover electrical/electronic parts and connections to clean the engine (e.g. control units, generator, solenoid valves etc.). Do not aim the water/steam jet directly at them. Allow engine to warm up.
Touching a lead against the frame to check whether it is live must not, under any circumstances, be carried out.
For electrical welding work, the ground terminal of the welding gear must be clamped directly to the part being welded.
Three-phase current generator: Never disconnect the cables between battery, generator and regulator while the engine is running.

Battery

Electronically stored data could be lost if the battery is disconnected.
Keep battery clean and dry.
Make sure the battery is fitted correctly and securely.
Dispose of old batteries in an environmentally friendly way.

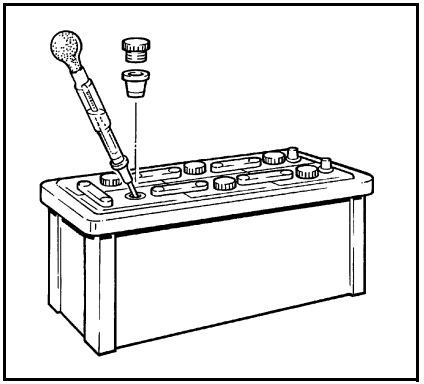
Danger of explosion! The gases emitted by the battery are explosive!
Fire, sparks, smoking and naked lights are prohibited!
Danger of acid burns! Wear protective gloves and glasses! Avoid contact with skin and clothing!
Danger of short circuit! Do not rest tools on the battery!

Checking the voltage

- Check the battery voltage with a conventional voltmeter. The voltage indicates the charging state. It should be between 12 and 14.4 Volt depending per battery.

Check acid level

- Unscrew caps.
- Note the manufacturer's specifications concerning the liquid level.
  The liquid should normally be 10-15 mm above the top edge of the plate or reach up to any available control device.
- Only use distilled water to top up the battery.
- Screw in caps.



Check acid density

- Unscrew caps.
- Measure the electrolyte density of individual cells with a commercial hydrometer. Hydrometer reading indicates battery's state of charge. The acid temperature when measuring should be 20 °C if possible.
- Check the acid level before recharging.
- Screw in caps.

Acid density [kg/ l]		Charge status	Measure
Normal	Tropical		
1,28	1,23	good	none
1,20	1,12	half	charge
1,12	1,08	empty	charge

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Removing the battery

- Always disconnect the minus pole first when removing the battery. Otherwise there is a danger of short-circuit!
- Remove the fastenings and take out the battery.

Charging the battery

- Unscrew caps.
- Charge the battery with a conventional battery charger. Observe the manufacturer specifications!
- Screw in caps.

Installing the battery

- Insert new or charged battery and attach the fastenings.
- Clean the terminals and battery poles with fine emery paper.
- Connect the plus pole first and then the minus pole. Otherwise there is a danger of short-circuit! Make sure the terminals have good contact. Tighten clamp bolts hand-tight.
- Grease the assembled terminals with an acid-free, acid-resistant grease.

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Faults and remedies

Faults	Causes	Measures
Engine does not start or is difficult to start	Not disconnected (if possible)	Check coupling
	Engine stop lever still in stop position	Check/replace
	Below starting limit temperature	Check
	Fuel tank empty	Vent fuel system
	Fuel suction pipe blocked	Check
	Fuel quality does not comply with operating manual	Change the fuel
	Fuel filter contaminated	Check/replace
	Air in fuel system	Vent fuel system
	Cold starting device	Check/replace
	Injection line leaks	Check injection line
	Injection valve defective	Check fuel injector / change if necessary
	Wrong SAE viscosity class of the engine lubricating oil	Change the lubricating oil
	Battery defective or discharged	Check battery
	Cable connection to starter loose or oxidized	Check cable connections
	Starter defective or pinion does not engage	Check starter
	Incorrect valve clearance	Check valve clearance and set if necessary
	Air filter clogged / turbocharger defective	Check/replace
	Compression pressure too low	Check compression pressure

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Faults	Causes	Measures
Engine starts, but runs irregularly or fails	Incorrect valve clearance	Check valve clearance and set if necessary
	Cold starting device	Check/replace
	Lube oil level too high	Check lube oil level, if necessary drain off.
	Compression pressure too low	Check compression pressure
	Air in fuel system	Vent
	Fuel filter/fuel pre-cleaner contaminated (lamp/siren faulty)	Empty/clean/change
	Fuel quality does not comply with operating manual	Change the fuel
	Injection valve defective	Check fuel injector / change if necessary
	Air filter clogged / turbocharger defective	Check/replace
	Air filter maintenance switch / maintenance indicator defective	Check/replace
	Charge air line leaking	Check charge air line
	Charge air cooler soiled	Check/clean
Engine becomes excessively hot. Temperature warning system activates	Injection valve defective	Check/replace
	Wrong SAE viscosity class of the engine lubricating oil	Change the lubricating oil
	Lubricating oil cooler fins soiled	Clean
	Lube oil cooler defective	Check/replace
	Lube oil filter contaminated on the air or lube oil side	Change
	Lube oil level too high	Check lube oil level, if necessary drain off.
	Lubricating oil level too low	Fill up lube oil
	Lube oil filter contaminated on the air or lube oil side	Check
	Incorrect valve clearance	Check valve clearance and set if necessary
	Cooling fan or exhaust thermostat defective, V-belt torn or loose	Check/replace/tension
	Cooling air guide plates loose, cracked or missing	Check
	Resistance in cooling system is too high / flow volume too low	Check the cooling system
	Heat short-circuit in the cooling air guidance	Check the cooling system
	Charge air line leaking	Check charge air line
	Charge air cooler soiled	Check/clean

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Faults	Causes	Measures
Engine output is deficient	Lube oil level too high	Check lube oil level, if necessary drain off.
	Lubricating oil level too low	Fill up lube oil
	Lubricating oil cooler fins soiled	Clean
	Engine stop lever still in stop position	Stop magnet defective (release circuit)
	Fuel suction temperature too high	Check the system
	Fuel quality does not comply with operating manual	Change the fuel
	Air filter clogged / turbocharger defective	Check/replace
	Air filter maintenance switch / maintenance indicator defective	Check/replace
	Fan defective/V-rib belt torn or loose	Check fan/V-belt, change if necessary
	Charge air line leaking	Check charge air line
	Charge air cooler soiled	Clean
	Heat short-circuit in the cooling air guidance	Check the cooling system
	Resistance in cooling system is too high / flow volume too low	Check the cooling system
	Injection line leaks	Check injection line
	Injection valve defective	Check fuel injector
	Engine stop lever still in stop position	Check/replace
Engine does not run on all cylinders	Injection line leaks	Check injection line
	Injection valve defective	Check fuel injector / change if necessary
	Incorrect valve clearance	Settings
	Compression pressure too low	Check the system
	Fuel filter/fuel pre-cleaner contaminated (lamp/siren faulty)	Empty/clean/change
	Air in fuel system	Vent fuel system

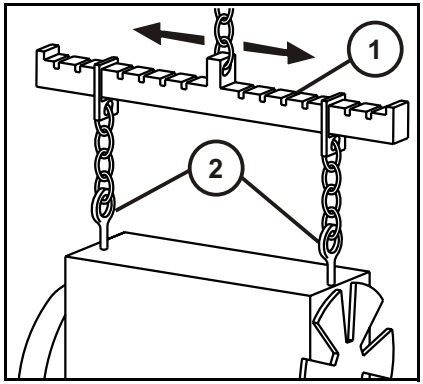
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Faults	Causes	Measures
Engine lubricating oil pressure is non-existant or excessively low	Lubricating oil level too low	Fill up lube oil
	Excessive inclination of engine	Check engine mounting / reduce inclination
	Wrong SAE viscosity class of the engine lubricating oil	Change the lubricating oil
	Injection line leaks	Check injection line
	Injection valve defective	Check fuel injector / change if necessary
	Lube oil cooler defective	Check/replace
	Compression pressure too low	Check the system
	Air in fuel system	Vent fuel system
Engine lubricating oil consumption excessive	Lube oil level too high	Check lube oil level, if necessary drain off.
	Excessive inclination of engine	Check engine mounting / reduce inclination
	Air filter clogged / turbocharger defective	Check/replace
Lubricating oil in the exhaust system	Engine operated continuously with too low a load (< 20-30%)	Check load factor
Engine producing blue smoke	Lube oil level too high	Check lube oil level, if necessary drain off.
	Excessive inclination of engine	Check engine mounting / reduce inclination
Engine producing white smoke	Below starting limit temperature	Check
	Lube oil level too high	Check lube oil level, if necessary drain off.
	Incorrect valve clearance	Check valve clearance and set if necessary
	Fuel quality does not comply with operating manual	Change the fuel
	Compression pressure too low	Check the system
	Cold starting device	Check/replace
	Injection valve defective	Check fuel injector / change if necessary

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Faults	Causes	Measures
Engine producing black smoke	Air filter clogged / turbocharger defective	Check/replace
	Air filter maintenance switch / maintenance indicator defective	Check/replace
	Charge air line leaking	Check charge air line
	Charge air cooler soiled	Check/clean
	Incorrect valve clearance	Check valve clearance and set if necessary
	Compression pressure too low	Check the system
	Injection valve defective	Check fuel injector / change if necessary

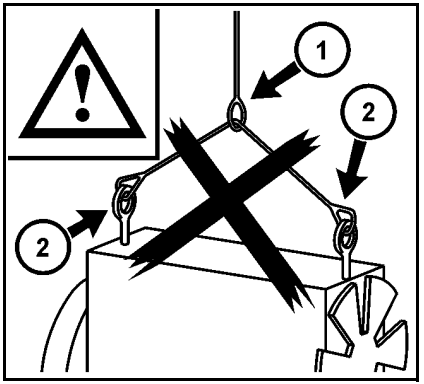
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Suspension equipment

The transport devices mounted on this engine are adapted to the engine weight. If the engine is transported with add-on components, the transport devices must be designed accordingly.

- Always use proper suspension equipment when transporting the engine.
- The suspension device (1) must be adjustable for the engine's centre of gravity.
- After transportation and before commissioning of engine: remove attachment eyes (2).



Danger to life!
The engine may tip over or fall down if suspended incorrectly!

- The fastening attachment cannot be fixed securely above the centre of gravity (1).
- The fastening attachment can slip, the engine swings backwards and forwards (1).
- Too short a fastening attachment causes bending torques in the transport device (2) and can damage it.

General

Engines contain the following types of corrosion protection:

- Interior corrosion protection
- Exterior corrosion protection

Your DEUTZ partner has the right corrosion protection agent for your needs.

The following measures for corrosion protection **after taking the engine out of operation** meet the requirements for 12 months corrosion protection.

The following corrosion protection work may only be carried out by persons familiar with it and instructed in the potential dangers.

If these measures are deviated from by exposing the corrosion-protected engines or parts to unfavourable conditions (installation outdoors or storage in damp, badly aired places) or damage to the corrosion protection layer, a shorter corrosion protection duration is to be expected.

The engine corrosion protection should be checked about every 3 months by opening the covers. If corrosion is detected, the corrosion protection should be renewed.

At the end of the corrosion protection work the crank drive may no longer be turned so that the corrosion protection agent in the bearings, bearing liners and cylinder liners is not scraped off.

Before operating a corrosion protected engine, the corrosion protection must be removed.

Interior corrosion protection

- Interior corrosion protection is always provided by wetting of the walls with the implemented corrosion protection agent in a corrosion protection run of the engine.
- The corrosion protection run can be performed once to protect the different systems:

Fuel system

Close the fuel/tank/supply line to the engine so that the system is protected against dirt and dust. Protect the electronics against moisture and corrosion.

- Fill the fuel tank with a mixture of:
  - 90 % distilled fuel
  - 10 % corrosion protection oil.
- Perform a corrosion protection run with no load for at least 5 minutes.

Lubricating oil system

- Drain lubricating oil from warm engine.
- Thoroughly clean lube oil tray, cylinder head with rocker arms, valves, valve springs with diesel fuel or cleaning agent.
- Fill the engine with corrosion protection oil up to the MAX mark and perform a corrosion protection run for at least 5 minutes so that all the components of the lubricating oil system are wetted or wet all accessible parts with corrosion protection oil and pump corrosion protection oil through the engine with a separate pump until all bearings and bearing liners are wetted.

Air compressor

- If a compressor is installed, a corrosion protection agent must be sprayed into the compressor suction system after shutting down the engine until it emerges visibly from the pressure nozzle.

Cooling system

- Depending on the series the engines are equipped with cooling air, cooling oil or cooling fluid system (cooling water with cooling system protection agent).
- Cooling air system, see the Exterior corrosion protection section.
- In engines of the oil-cooled series the circulating lubricating oil serves simultaneously for cooling. The cooling chambers are protected automatically against corrosion with the lube oil system.

Air intake pipes

- After the corrosion protection run, remove the cylinder head cover and deinstall injectors. The respective piston must be set to LT.
- The accessible part of the cylinder liner should be coated with corrosion protection oil with a spray lance through the opening.
- Spray corrosion protection lubricating oil into the suction intake pipe.

Exterior corrosion protection

- The engine must be cleaned thoroughly with a cleaning agent before exterior corrosion protection. Any signs of corrosion and damage to the paintwork must be removed.

Cooling air system in air-cooled engines

- The air guidance compartment of the engines is unpainted and must be sprayed with a corrosion protection agent.

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Bare exterior surfaces and parts

- Coat or spray all bare exterior parts and surfaces (e.g. flywheel, flange faces) with corrosion protection agent.

Rubber parts

- Rubber parts (e.g. muffs) which are not painted over must be rubbed down with talcum powder.

Belt drive

- Remove V-belts and V-rib belts and store packed.
- Spray V-belt pulleys and tension rollers with corrosion protection agent.

Engine openings

- All engine openings must be fitted with air-tight, water-tight covers to delay the vapourisation process of the corrosion protection agents.
- With installed air compressor, the suction and pressure connection must be sealed by a cap.
- Air should be excluded to avoid ventilation of the engine (chimney effect) for the suction from an air supply pipe.

Storage and packaging

- After being protected against corrosion, the engine must be stored in a dry, ventilated hall and suitably covered.
- The cover must be placed loosely over the engine so that the air can circulate around it to prevent condensation from forming. Use a desiccant if necessary.

Removal of corrosion protection

- The corrosion protection must be removed from the corrosion protected engine before starting.
- The packaging and all covers over the closed openings must be removed.
- Any corrosion deposits and paint damage should be remedied.

Fuel system

If there is a mixture of diesel fuel/corrosion protection oil in the fuel tank, drain it.

- Connect fuel/tank/supply line to the engine. Pay attention to cleanliness.
- Fill the fuel tank and fuel system with the proper fuel.

Lubricating oil system

- Unscrew the lube oil drain screw, drain oil.
- Fill the engine with lubricating oil via the lubricating oil filler neck.

Removal of exterior corrosion protection

- All areas and components coated with corrosion protection agent must be washed off with distilled fuel or a suitable cleaning agent.
- Wash out grooves of V-belt pulleys if necessary.
- Mount V-belts or V-rib belts as specified.
- Fill with coolant.

Corrosion protection agent / cleaning agent

Please ask your DEUTZ partner for reference products for the corrosion protection agents/cleaning agents to be used which meet DEUTZ requirements.

or see www.deutz.com

\SERVICE \Operating Media and Diagnosis

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General technical data

Engine type	Dimension	D 914 L03		D 914 L04	D 914 L05	D 914 L06	TCD 914 L06	
Working principle		Four-stroke diesel engine						
Charging		Suction motor					Four-stroke turbocharged diesel engine	
Type of cooling		air-cooled						
Cylinder arrangement		in series						
No. of cylinders		3		4	5	6	6	
Bore/stroke	[mm]	102/132						
Total displacement	[cm^3]	3236		4314	5393	6472	6472	
Combustion process		Direct injection						
Injection system		Row injection pump						
Exhaust gas recirculation		< 37 kW internal	> 37 kW external	external	external	external	internal	external
Valves per cylinder		2						
Valve clearance: Inlet/outlet	[mm]	$0,15^{+0,15}$ / $0,15^{+0,15}$						
Firing order of the engine		1-2-3		1-3-4-2	1-2-4-5-3	1-5-3-6-2-4	1-5-3-6-2-4	
Direction of rotation looking onto the flywheel		left						
Engine power rating according to ISO 3046	[kW]	see engine rating plate						
Speed (nominal revolutions)	[rpm]	see engine rating plate						
Injection timing	[°BTDC]	see engine rating plate						
Lubricating oil change volume (with filter)	≈ [l]	11 *		14 *	15,5 *	18 *	19,5 *	
Lube oil temperature in the lube oil tray, maximum	[°C]	135						
Lubricating oil pressure minimum (low idle, engine warm)	[kPa/bar]	50/0,5						
V-belt tension		Pre-tensioning/Re-tensioning						
V-belt AVX 10	[N]	450±50/300±50						
Weight without cooling system according to DIN 70020-A	≈ [kg]	277		307	380	430	510	

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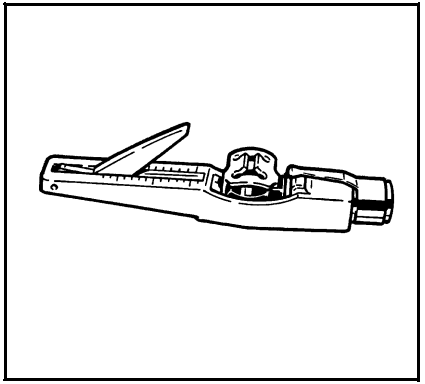
Engine type	Dimension	D 914 L03	D 914 L04	D 914 L05	D 914 L06	TCD 914 L06
*specified lubricating oil filling volumes apply for standard versions. In engines which deviate from the standard, for example different lubricating oil pans/dipstick variants and/or special inclined versions, the lubricating oil volume may vary. **The lubricating oil dipstick mark is always decisive.**						

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Tool ordering

The special tools described in this chapter can be ordered from:

WILBÄR - Wilhelm Bäcker GmbH & Co. KG
Taubenstrasse 5
42857 Remscheid
Germany
Phone: +49 (0) 2191 9339-0
Fax: +49 (0) 2191 9339-200
E-mail: info@wilbaer.de
www.deutz-tools.com

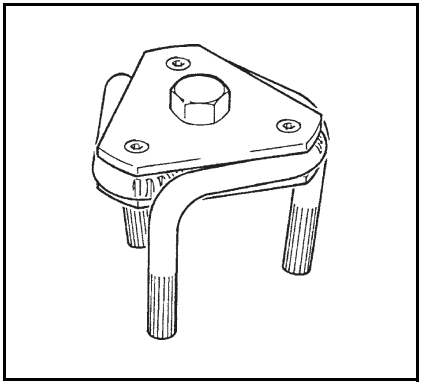


V-belt tension measuring instrument

Order number:

8115

Measuring instrument for checking the specified V-belt tensions.



Special wrench for loosening exchangeable filters

Order number:

170050

For loosening changeable filters.

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DEUTZ Oil



DEUTZ Oil DQC II-05
ACEA E5-02 / E3-96 / B3-04
API CG-4

TLS-15W40D (DQC II-05)	
5 L	0101 6331
20 L	0101 6332
209 L	0101 6333



DEUTZ Oil DQC III-05
ACEA E7-04 / E5-02 / E3-96 / B4-04 / A3-04
API CI-4 / SL GLOBAL DHD-1

TLX-10W40FE (DQC III-05)	
5 L	0101 6335
20 L	0101 6336
209 L	0101 6337



DEUTZ Oil DQC IV-05 (Synthetic)
ACEA E7-04 / E5-02 / E4-99

DEUTZ Oel DQC IV-5W30 (DQC IV-05)	
5 L	-
20 L	0101 7849
209 L	0101 7850



The engine company.

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