

Operation Manual
TCD 2015





- This engine is built exclusively for purpose according to the scope of delivery - defined by the equipment manufacturer (use for the intended purpose). Any use above and beyond this is considered improper use. The manufacturer will not be liable 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 instructions specified by the manufacturer. The engine may only be used, maintained and repaired by persons who are familiar with it and instructed in the dangers. 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 / hot parts
 - in engines with external ignition (high electrical voltage), avoid touching at all costs!
- Unauthorised modifications to the engine exclude manufacturer liability for resulting damages.
- Equally, manipulations to the injection and control system can affect the engine's performance and the exhaust characteristics. Compliance with legal environmental regulations will no longer be guaranteed in this case.
- Do not modify, obstruct the cooling air flow area to the fan, unhindered cooling air supply must be guaranteed. The manufacturer will accept no liability for damages resulting from this.
- Only DEUTZ original parts may be used when carrying out maintenance/repair work on the engine. These have been designed especially for your engine and ensure a trouble-free operation. Failure to observe this will void 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 systems are switched off (remove ignition key). The specifications for accident prevention with electrical systems (e.g. -VDE-0100/-0101/-0104/-0105 Electrical measures against dangerous touch voltages) must be observed.

Cover all electrical components tightly when cleaning with liquids.

- Do not work on the fuel system when the engine is running - **Danger to life**. Wait for the pressure to drop after the engine comes 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. In case of leaks danger due to high pressure - **Danger to life**.
 - Go to the workshop immediately in case of leaks.
 - Make sure the engine is not started accidentally during repairs when working on the fuel system - **Danger to life**.

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. Also pass on the safety instructions to your operating personnel. Furthermore, the legislation for "general regulations for safety and the prevention of accidents" must be observed.

Caution



This symbol indicates a danger to the component / engine. The appropriate instructions must be followed otherwise the component / engine may be destroyed.

Foreword

Dear customer,

Congratulations on your purchase of this DEUTZ engine. The DEUTZ air/liquid-cooled engines are developed for a broad spectrum of applications. A wide range of variants ensures that the respective requirements are met.

The engine is equipped according to the installation case you have specified, i.e. not all the parts described in this instruction manual are installed in your engine.


We have done our best to highlight the differences so that you can easily find the operating and maintenance instructions relevant to your engine.

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

We will be glad to answer any inquiries you may have.

Your
DEUTZ AG.

Engine number

Please enter the engine number here.  6
This will simplify the handling of customer service, repair and spare parts queries.

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Note

Illustrations and data in this instruction manual are subject to technical changes in the course of further development of the engine. Reprinting and reproduction of any kind, even in part, require our express permission.

Order number

0312 3412 en

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DEUTZ diesel engines

are the product of years of research and development. The profound expertise gained through this, in combination with high demands on quality, attests to the fact that our engines possess all the qualities of long life, high reliability and low fuel consumption. Naturally the high requirements for protection of the environment are also met.

Safety precautions when the engine is running

Only carry out maintenance work or repairs with the engine switched off. Ensure that the engine cannot be started unintentionally - danger of accidents!

Re-install any removed protective equipment upon completion of the work.

Observe industrial safety regulations when operating the engine in enclosed spaces or underground.

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

Only re-fuel with the engine switched off.

Maintenance and care

are decisive for whether the engine satisfactorily meets the set demands. Compliance with the prescribed maintenance times and the careful execution of maintenance and care work are therefore essential.

Difficult operating conditions deviating from normal operation must be observed especially.

Original DEUTZ parts

are subject to the same strict quality requirements as the DEUTZ engines. Further developments for the improvement of the engines

are also introduced for the original DEUTZ parts of course. Only the use of original DEUTZ parts manufactured according to the latest state of knowledge will guarantee perfect functioning and high reliability.

DEUTZ Xchange components

DEUTZ Xchange components are a low-cost alternative. The same high quality standards as for new parts apply here of course. DEUTZ Xchange components are equivalent to the original DEUTZ parts in function and reliability.

Asbestos

Gaskets used in this engine are asbestos-free. Please use the appropriate spare 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. Therefore we are represented by a network of service branches world-wide.

The name DEUTZ stands not only for an engine which is the result of sophisticated development work, DEUTZ Parts catalogue also stands for a complete service package which guarantees the optimum operation of our engines and for a customer service on which you can rely.

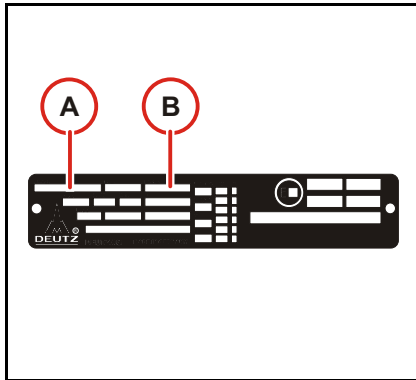
Contact one of our responsible service representatives in case of operation malfunctions and spare parts inquiries. Our trained specialist personnel ensures fast, professional repairs using original parts in the event of damage.

The DEUTZ homepage with references to product responsibilities and services always gives you an up-to-date overview of the DEUTZ partners in your area. Or use the fast, comfortable route via the Internet under www.deutz-shop.de. With the DEUTZ P@rts OnlineParts-Catalogue you have direct contact to the nearest local DEUTZ Service Station.

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Deutz-Mülheimer Str. 147-149
D-51057 Köln

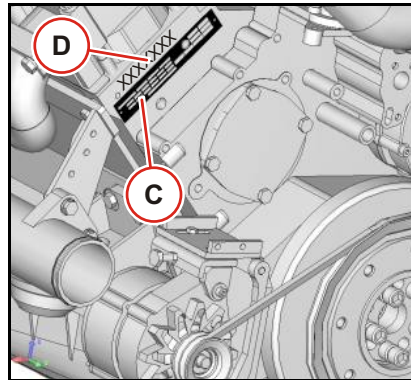
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<http://www.deutz.com>

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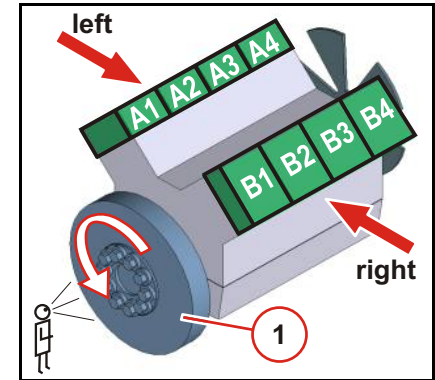
Company plate

The type **A**, the engine number **B** and the performance data are stamped on the company plate. The engine type and number must be stated when purchasing spare parts.



Position of the company plate and engine number

The company plate **C** and engine number **D** are fixed or stamped on the crankcase.



General definitions

Cylinder arrangement, engine sides and direction of rotation

Cylinder arrangement

The cylinders are counted consecutively, starting from the flywheel¹.

Direction of rotation

Looking onto drive side

- left-hand rotation: counter-clockwise (see example)

Engine sides

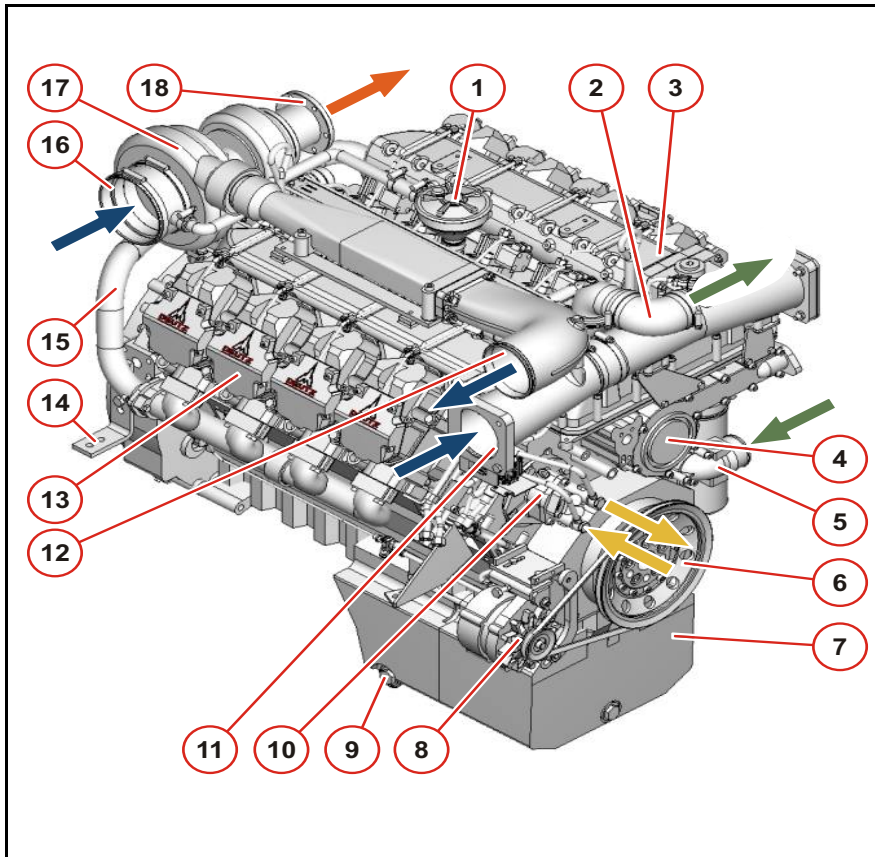
Looking at the power transmission side.

- left,
- right.

2.2 Engine diagram

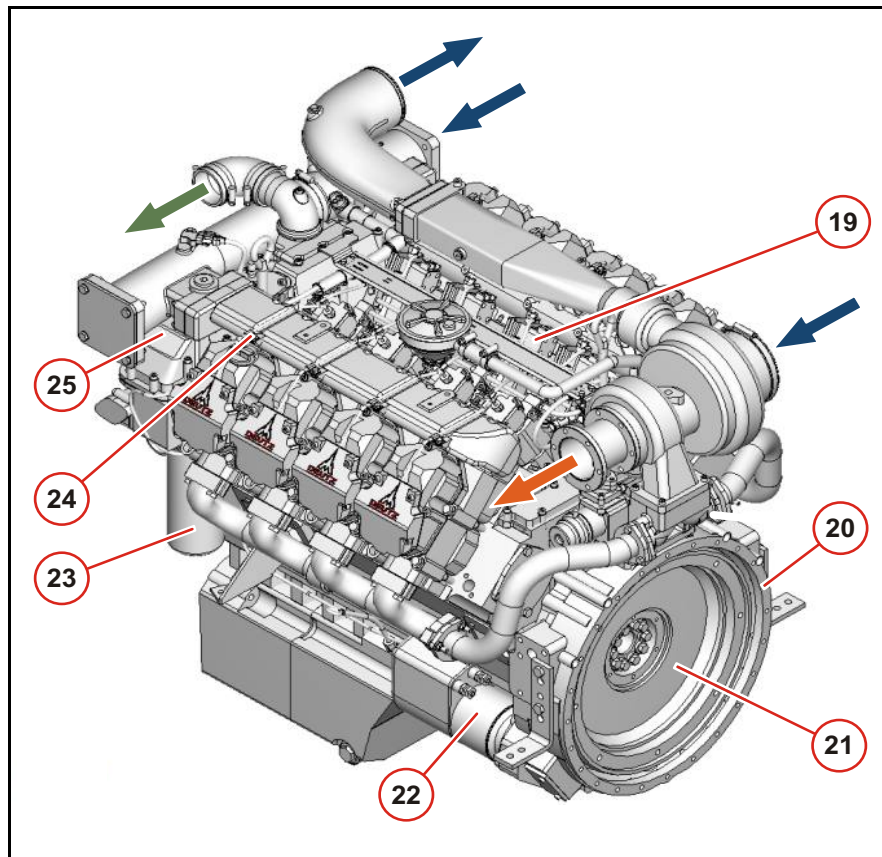
Engine description

2



Example: TCD2015 V08 standard, industrial and vehicle engine, right side

2



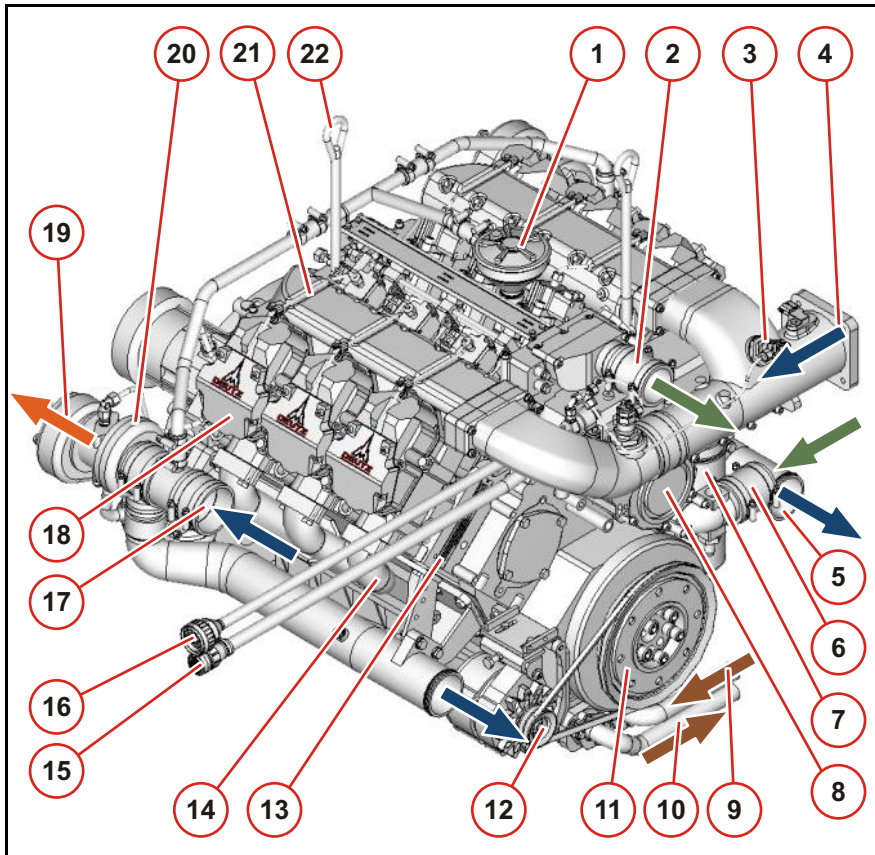
- 19. Injection pump (plug-in pump)
- 20. Gear connection (SAE)
- 21. Flywheel
- 22. Starter
- 23. Lubricating oil filter cartridge
- 24. High pressure pipe
- 25. Lubricating oil cooler

Example: TCD2015 V08 standard, industrial and vehicle engine, left side

2.2 Engine diagram

Engine description

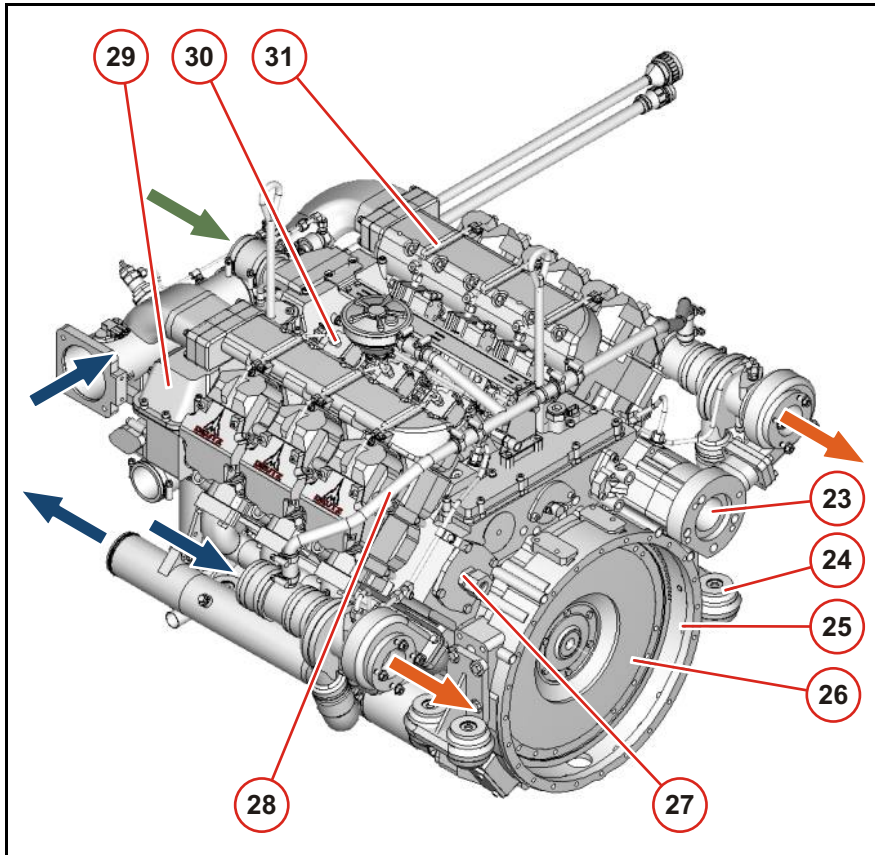
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Example: TCD2015 V06 railway engine, right side

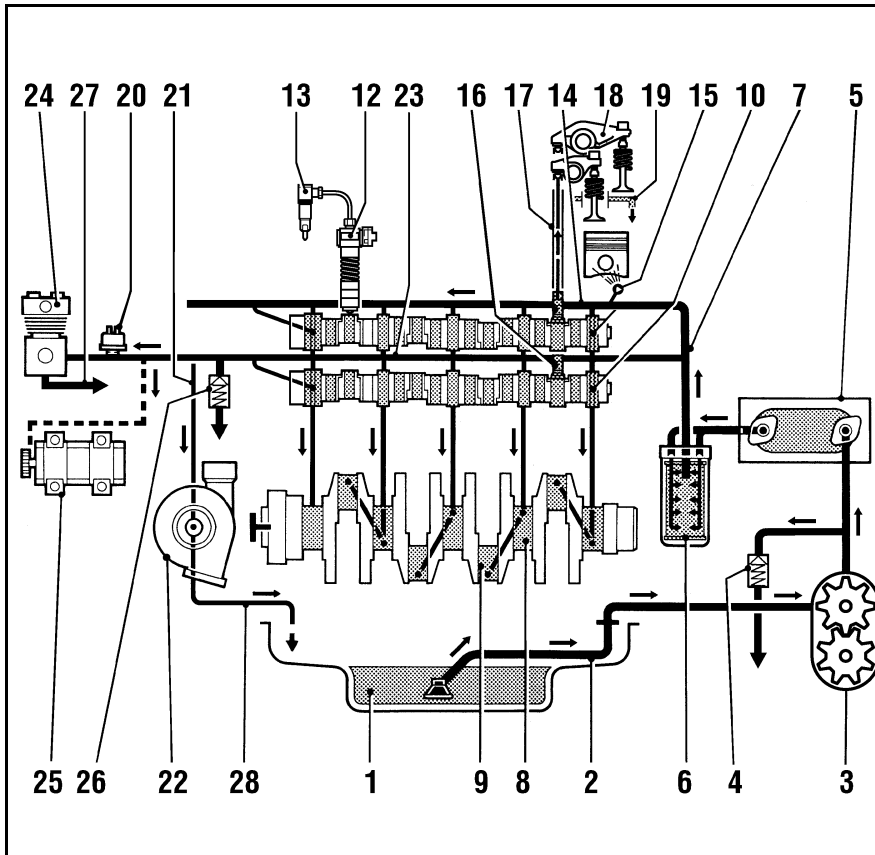
1. Crankcase venting
2. Connection to coolant heat exchanger
3. Spark plug
4. Connection from the charge air cooler
5. Connection to charge air cooler
6. Connection from coolant heat exchanger
7. Lubricating oil filter cartridge
8. Coolant pump
9. Connection of separate lubricating oil tank
10. Connection to separate lubricating oil tank
11. Vibration damper / V-belt pulley
12. Generator
13. Engine rating plate (company plate)
14. Exhaust manifold
15. Connection to the EMR3 system
16. Connection to the MVS system
17. Connection from air filter
18. Cylinder head cover
19. Connection to exhaust silencer
20. Turbocharger
21. Charge air suction pipe
22. Transport device

2



- 23. Auxiliary drive
- 24. Engine mounting
- 25. Gear connection (SAE)
- 26. Flywheel
- 27. Free auxiliary drive
- 28. Crankcase vent pipe
- 29. Lubricating oil cooler
- 30. Injection pump (plug-in pump)
- 31. High pressure pipe

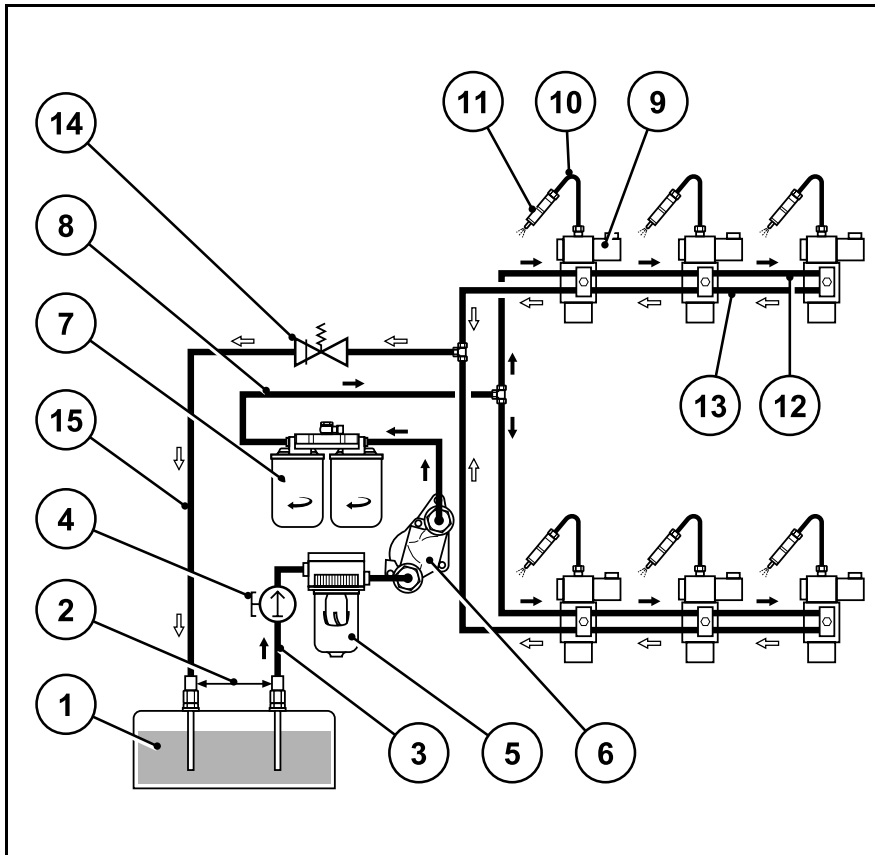
Example: TCD2015 V06 railway engine, left side



Example: Lubricating oil diagram

1. Lubricating oil tray
2. Lubricating oil suction intake pipe
3. Lubricating oil pump
4. Pressure relief valve
5. Lubricating oil cooler
6. Lubricating oil filter
7. Main oil lines
8. Crankshaft bearing
9. Big end bearing
10. Camshaft bearing
11. Oil supply to the individual injection pumps
12. Injection pump with injector
13. Camshaft lubrication
14. Line to injection nozzle
15. Injection nozzle with pressurestat for piston cooling
16. Tappet with pulse lubrication of the rocker arm
17. Tappet rod, oil supply for rocker arm lubrication
18. Rocker arm
19. Oil return bore in the cylinder head to the crankcase
20. Oil pressure sensor / oil pressure switch
21. Oil line to the turbocharger
22. Turbocharger
23. Oil line to the crankshaft and camshaft, compressor / hydraulic pump
24. Compressor (optional)
25. Hydraulic pump (optional)
26. Pressurestat (adjustable)
27. Return line from the compressor / hydraulic pump to the crankcase
28. Return line from the turbocharger

2



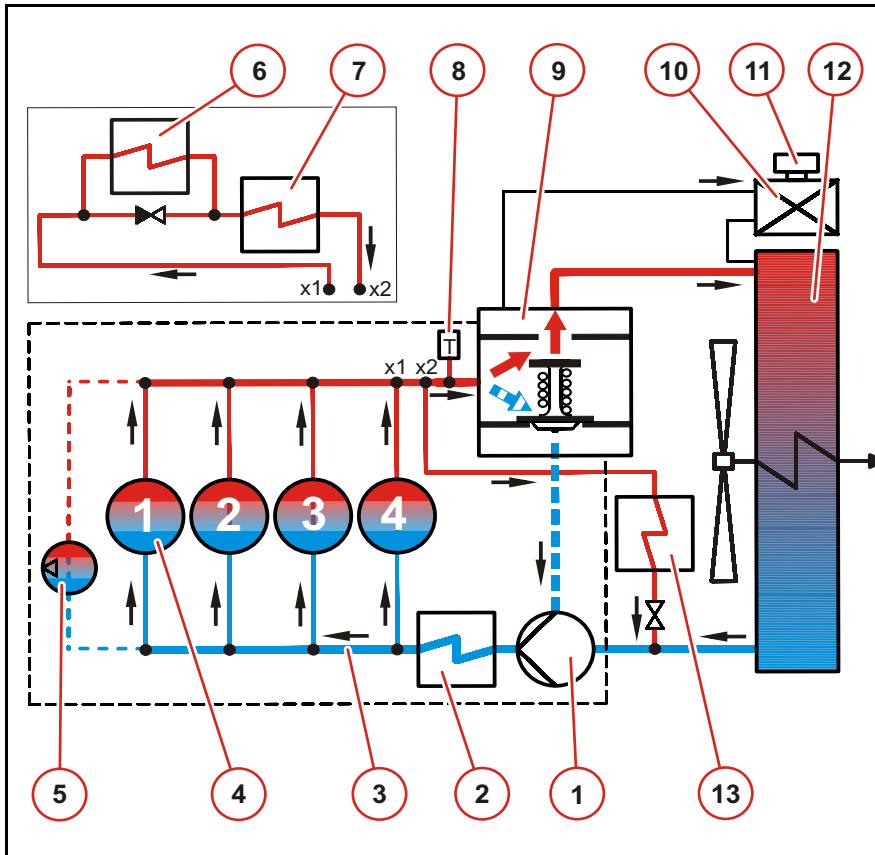
1. Fuel tank
2. min. distance 500 mm
3. Fuel supply line from tank
4. Hand pump for venting
5. Fuel prefilter (example)
6. Fuel supply pump
7. Fuel double filter
8. Fuel supply line to the injection pumps
9. Injection pump
10. High pressure pipe
11. Injector
12. Fuel supply to the injection pumps
13. Fuel return from the injection pumps
14. Pressurestat
15. Fuel return to the fuel tank

Example: Fuel diagram

2.5 Coolant circuit

Engine description

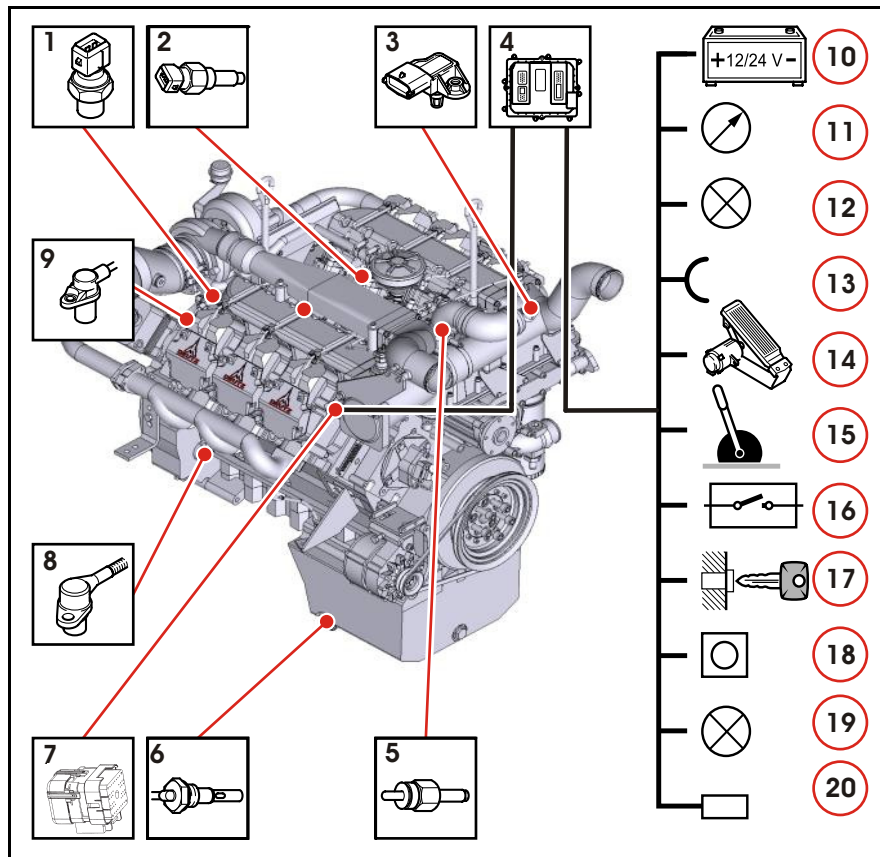
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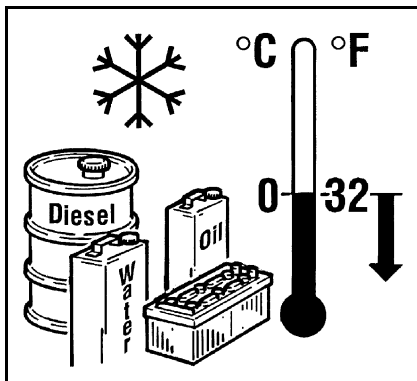
1. Coolant pump
2. Lubricating oil cooler
3. Coolant duct
4. Cylinder pipe /head cooling (number/arrangement of cylinders depends on series)
5. Compressor (optional)
6. Gear oil cooler (optional)
7. Auxiliary cooler (optional)
8. Temperature sensor
9. Thermostat
10. Compensation tank
11. Filler neck
12. Heat exchanger
13. Cab heating (optional)

Example: Coolant diagram

2



Example: Electrics



Low ambient temperatures

Lubricating oil

- Select lubricating oil according to ambient temperature (▮22) and consult DEUTZ partner if necessary.
- Halve the oil change times in case of frequent cold starts.

Fuel

- Below 0 °C use winter fuel (▮24).

Battery

- A well-charged battery (▮42) is a prerequisite for starting the engine.
- Heating the battery to about 20 °C improves the starting behaviour of the engine. (Remove and store the battery in a warm room).

Cold start aid

- Heating plugs, heating flange, spark plug system can be used as cold start aids, for example. (▮18).

Coolant

- Mixing ratio antifreeze/cooling water (▮26).

High ambient temperatures, high altitude



Under the following operating conditions, 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: When the altitude or ambient temperature increases, the air density decreases. 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
 - poss. impairment of the start behaviour

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

Preparations for initial commissioning (maintenance schedule E 10)

- Removing engine corrosion protection (▣49).
- Remove any transport devices.
- Check the battery and cable connections and mount if necessary. (▣42).
- Check the belt tension (▣39).
- Have the engine monitor or warning system checked by authorised personnel.
- Check the engine mounting.
- Check that all hose unions and clips are fit properly.

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

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

Fill engine oil

! Low oil and overfilling damage the engine.

☞ The engines are generally supplied without lubricating oil filling. Select engine oil quality and viscosity before filling (▣22). Order DEUTZ lubricating oils from your DEUTZ partner (▣22).

- Fill engine with lubricating oil (▣29) via lubricating oil filler neck.

- Oil filling volume (▣51).
- Check lubricating oil level, if necessary re-fill

Filling fuel

- The fuel low pressure system must be vented with the hand pump after filling before starting for the 1st time (▣32).



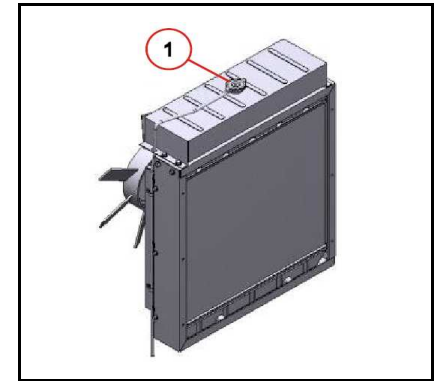
Only re-fuel when the engine is not running. Pay attention to cleanliness. Do not spill any fuel.



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

Only use clean, standard, branded diesel fuel. Note the fuel quality (▣24). Insert the fuel prefilter if necessary. In case of doubt, please ask your DEUTZ partner. Depending on the outdoor temperature, use either summer or winter diesel fuel.

3.2 Initial commissioning



Filling the coolant system



The coolant must have a prescribed cooling system corrosion protection (▣26) concentration. Never operate the engine without coolant, not even briefly!



Order cooling system correction protection agent (▣26) from your DEUTZ partner.

- Open the cooling system cap 1 carefully.
- Fill coolant up to the MAX mark on the compensation tank and close the cooling system cap 1.
- Switch on any heater and set to maximum so that the heating circuit is filled and vented.
- Observe the filling level in the cooling system (▣51).

Trial run



Venting of the fuel system by operating for 5 minutes at idle speed or low load is absolutely necessary.

After preparations, perform a short trial run up to operating temperature (approx. 90 °C). Do not apply load to the engine if possible.

- **Work with the engine not running:**
 - Check engine for tightness.
 - Check oil level, re-fill oil if necessary (▮29).
 - Check coolant level and refill coolant if necessary (▮34).
- **Work during the trial run:**
 - Check engine for tightness.