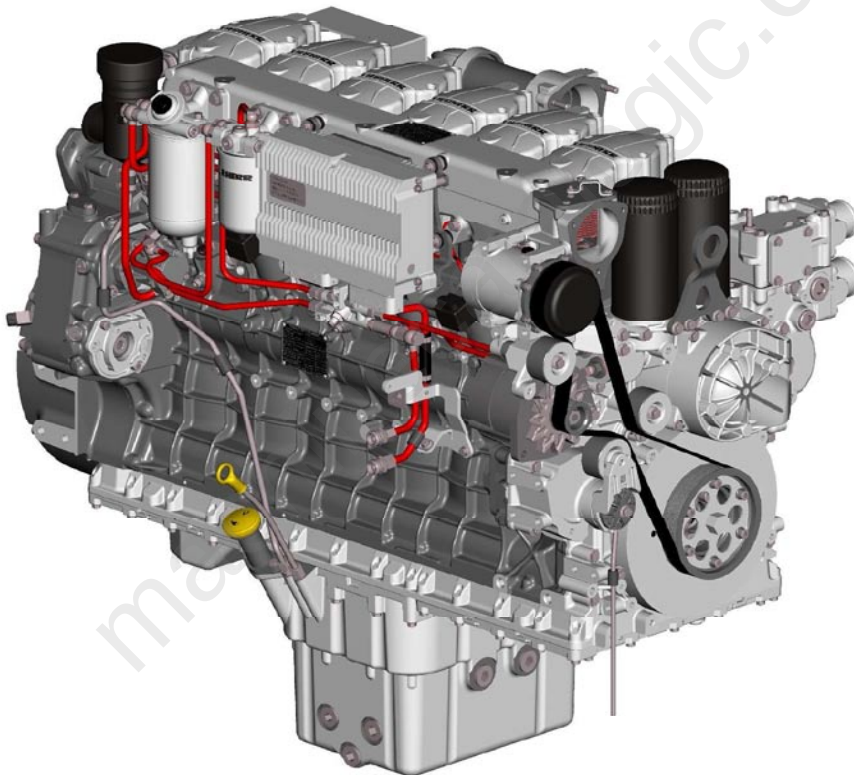


SERVICE MANUAL

LIEBHERR

**Diesel engine
D934 / D936**



Uwe Wolf 2007

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1.6 Tightening specifications

Cylinder head bolts	Pretightening with torque 1 stage = 30Nm 2 stage = 120Nm 3 stage = 200Nm	Subsequent tightening with angular degree 1 stage = 45° 2 stage = 90° 3 stage = 90° Overall = 225°	
Screws for rocker arm support	65Nm		
Connecting rod bolt	Torque 1 stage = 30Nm, 2 stage = 110Nm	Subsequent tightening with angular degree 1 stage = 45° 2 stage = 45° Overall = 90°	
Main bearing screws	Torque 1 stage = 30Nm 2 stage = 110Nm	Subsequent tightening with angular degree 1 stage = 45° 2 stage = 45° 3 stage = 45° Overall = 135°	
Flywheel screws	Torque 1 stage = 30Nm 2 stage = 90Nm	Subsequent tightening with angular degree for screw length of 147mm 1 stage = 90° 2 stage = 90° 3 stage = 90° Overall = 270° Subsequent tightening with angular degree for screw length of 72mm 1 stage = 90° 2 stage = 90° Overall = 180°	
Vibration damper screws	Torque 1 stage = 30Nm 2 stage = 90Nm	Subsequent tightening with angular degree 1 stage = 90° 2 stage = 90° Overall = 180°	
Flywheel housing screws	Pretensioning 45Nm Tightening 125Nm		
Screws for the end of the crankshaft on the same side as the fan	Torque 1 stage = 80Nm 2 stage = 180Nm 3 stage = 260Nm overall = 260Nm	Pre-tightening 1 stage = 20Nm 2 stage = 80Nm 3 stage = angle 30° + 30° = 60° Overall = 60°	
Screw for idler power take-off	Torque 87 Nm		
Screw for idler mass compensation	Torque 27 Nm		
Screws for camshaft sprocket front	Torque 1 stage = 50Nm 2 stage = 125Nm 3 stage = 200Nm Overall = 200°	Pre-tightening 1 stage = 20Nm 2 stage = 50Nm 3 stage = 35° Overall = 35°	
Screws for camshaft sprocket rear	Torque 1 stage = 50Nm 2 stage = 125Nm 3 stage = 200Nm Overall = 200°	Pre-tightening 1 stage = 20Nm 2 stage = 50Nm 3 stage = 40° Overall = 40°	
Pressure pipe tube	50Nm		
Injection valve mounting bracket	50Nm		
Injection lines	On same side as pump 25 to 40Nm On same side as nozzle 25 to 40Nm		

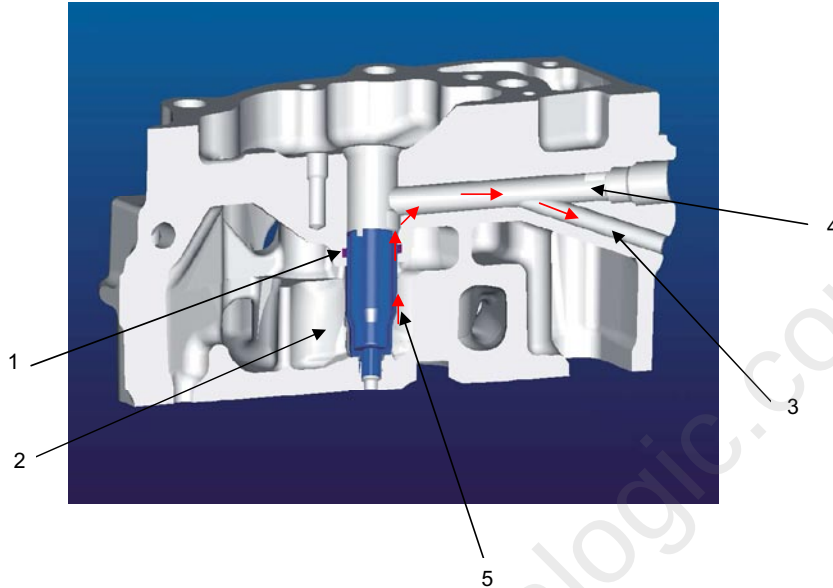
5.5 Cooling water in the fuel

Contaminated fuel.

Remedy:

Clean the fuel system completely. Replace the fuel filter and bleed the fuel system.

O-ring of the steel ferrules in the cylinder head leaking. (see diagram)



1. O-ring steel ferrule
2. Water channel
3. Fuel leakage channel
4. Channel pressure pipe tube
5. Leakage path for cooling water when the O-ring is faulty

! Remedy!

Dismantle the leak oil lines. Carry out a cooling water pressure test. If cooling water is leaking from one or more leak oil leakage boreholes, the cylinder head(s) is/are to be replaced by way of exchange. The steel ferrule may not be replaced as there is a danger that the cylinder head will start leaking.

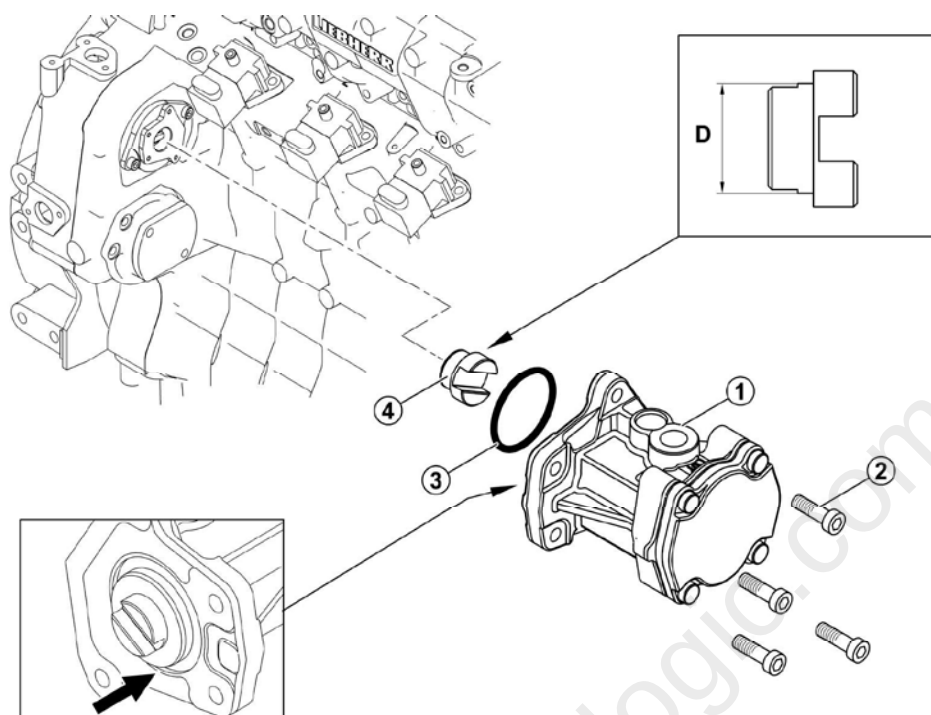
Dismantling the cylinder head, see chap. 3.3

!Note!

Cleanliness:

Nowadays, components for the diesel injection are made of high-precision parts which are exposed to extreme stresses. Due to this high-precision technology, utmost cleanliness must be observed when working on the fuel system, as even dirt particles measuring only 0.02 mm can cause components to malfunction and thus lead to engine damage.

9.4 Fuel pump ZP 18.5



1	Delivery pump
2	Hexagon socket head screw M6x20-8.8
3	O-ring
4	Coupling

The fuel delivery pump is a gear-type pump encased in an aluminium housing. The fuel pump must feature underpressure on the suction side as it operates suction-throttled.

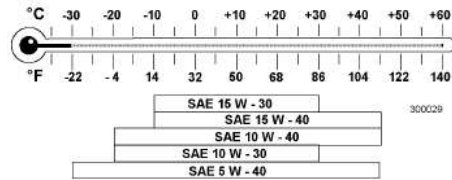
Installing and removing the fuel delivery pump

Preliminary tasks:

Fuel lines have been dismantled. Unscrew the hexagon socket head screws, pos. (2) and remove the fuel delivery pump, pos. (1). Replace the O-ring, pos. (3) and apply a light coating of oil. Ensure that the O-ring is seated correctly in the groove of the fuel delivery pump. (arrow). Insert the coupling, pos. (4) so that the side featuring the diameter $D = 20 \text{ mm}$ is pointing to the auxiliary drive

!Note!

Cleanliness: nowadays, components for the diesel injection are made of high-precision parts which are exposed to extreme stresses. Due to this high-precision technology, utmost cleanliness must be observed when working on the fuel system, as even dirt particles measuring only 0.002 mm can cause components to malfunction and thus lead to engine damage.



Temperature-dependent selection of the SAE classes.

The following diesel engine oil is recommended (for an ambient temperature of -20 °C / 4 °F to +45 °C / 113 °F).

Liebherr diesel engine oil:

Liebherr engine oil 10W-40 Specification ACEA E4

Liebherr engine oil low ash Specification ACEA E6

Lube-oil change intervals

Change intervals:

Oil filter change: see chapter, Maintenance and Inspection Chart

Oil change in accordance with climate, sulphur content in the fuel and quality in compliance with the following table.

If the prescribed operating hours (Bh) have not expired within one year, the diesel engine oil and filter must be replaced at least once a year.

Difficulty factors

Varying difficulty factors or complicated operating conditions directly influence the maintenance intervals.

Difficulty factors or complicated operating conditions may be for example:

- repetitive cold-starts
- sulphur content in the fuel exceeding 0.5 %.
- Application temperature below -10 °C.

If difficulty factors or complicated operating conditions arise, the oil change interval prescribed in the maintenance and inspection chart must be revised in accordance with the following table.

unit or replace control unit

3011	ErrOperating2	Operating error2	
0	Type of error: EEPROM-access Cause: Internal engine control unit error Reaction: Engine will not start or engine cut-out Measure: Switch ignition off and on again; if the error can not be remedied, replace the engine control unit		
1	Type of error: Faulty parameter checksum Cause: Internal engine control unit error Reaction: Engine will not start or engine cut-out Measure: Switch ignition off and on again; if the error can not be remedied, replace the engine control unit		
2	Type of error: EEPROM invalid Cause: Internal engine control unit error Reaction: Engine will not start or engine cut-out Measure: Switch ignition off and on again; if the error can not be remedied, replace the engine control unit		
3	Type of error: ECU-page checksum error Cause: Internal engine control unit error Reaction: None Measure: Switch ignition off and on again; if the error can not be remedied, replace the engine control unit		
4	Type of error: NMI-checksum error Cause: Internal engine control unit error Reaction: None Measure: Switch ignition off and on again; if the error can not be remedied, replace the engine control unit		
5	Type of error: WorkData-page checksum error Cause: Internal engine control unit error Reaction: None Measure: Switch ignition off and on again; if the error can not be remedied, replace the engine control unit		
6	Type of error: Load collective-page checksum error Cause: Internal engine control unit error Reaction: None Measure: Switch ignition off and on again; if the error can not be remedied, replace the engine control unit		
7	Type of error: Structure size of load collective has changed Cause: Internal engine control unit error Reaction: None Measure: Switch ignition off and on again; if the error can not be remedied, replace the engine control unit		
8	Type of error: Load collective memory full Cause: Internal engine control unit error Reaction: None Measure: Switch ignition off and on again; if the error can not be remedied, replace the engine control unit		
9	Type of error: Permanent data checksum error		

2	Type of error:	Short circuit to earth of the sensor supply voltage
	Cause:	Short circuit following earth of supply line
	Reaction:	Sensor replacement value is used. Error disappears if measured values are once again located in the area defined
	Measure:	Check cabling of the engine control unit/sensor (short circuit following earth)
3	Type of error:	Short circuit against battery voltage of sensor supply voltage
	Cause:	Short circuit following supply voltage of the supply line
	Reaction:	Sensor replacement value is used. Error disappears if measured values are once again located in the area defined
	Measure:	Check cabling of the engine control unit/sensor (short circuit following battery voltage)
4	Type of error:	Warning threshold1 exceeded
	Cause:	Monitoring threshold 1 exceeded or fallen short of. Medium (air, fuel or oil) no longer in normal operating condition
	Reaction:	Depending on configuration and sensor, engine cut-out, output reduction or no reaction
	Measure:	Check medium for deficiency within the operating area. Remedy any mechanical problems.
5	Type of error:	Warning threshold2 exceeded
	Cause:	Monitoring threshold 2 exceeded or fallen short of. Medium (air, fuel or oil) no longer in normal operating condition
	Reaction:	Depending on configuration and sensor, engine cut-out, output reduction or no reaction
	Measure:	Check medium for deficiency within the operating area. Remedy any mechanical problems.

3083	ErrAirFilterPress2	Air filter pressure2
0	Type of error:	Short circuit following earth or cable break
	Cause:	Short circuit following earth or cable break in signal line
	Reaction:	Sensor replacement value is used. Error disappears if measured values are once again located in the area defined
	Measure:	Check cabling of the engine control unit/sensor (short circuit following earth or cable break)
1	Type of error:	Short circuit following battery voltage
	Cause:	Short circuit following supply voltage of the signal line
	Reaction:	Sensor replacement value is used. Error disappears if measured values are once again located in the area defined
	Measure:	Check cabling of the engine control unit/sensor (short circuit following battery voltage)
2	Type of error:	Short circuit to earth of the sensor supply voltage
	Cause:	Short circuit following earth of supply line
	Reaction:	Sensor replacement value is used. Error disappears if measured values are once again located in the area defined
	Measure:	Check cabling of the engine control unit/sensor (short circuit following earth)
3	Type of error:	Short circuit against battery voltage of sensor supply voltage
	Cause:	Short circuit following supply voltage of the supply line
	Reaction:	Sensor replacement value is used. Error disappears if measured values are once again located in the area defined
	Measure:	Check cabling of the engine control unit/sensor (short circuit following battery voltage)
4	Type of error:	Warning threshold1 exceeded
	Cause:	Monitoring threshold 1 exceeded or fallen short of. Medium (air, fuel or oil) no longer in normal operating condition
	Reaction:	Depending on configuration and sensor, engine cut-out, output reduction or no reaction
	Measure:	Check medium for deficiency within the operating area. Remedy any mechanical problems.

Full Version Available

Liebherr D 934 and D 936 Engine Service Manual

Liebherr D 934, D 936 engine service manual with repair procedures, fault lists and system descriptions. Searchable 179-page PDF. Instant PDF download.

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