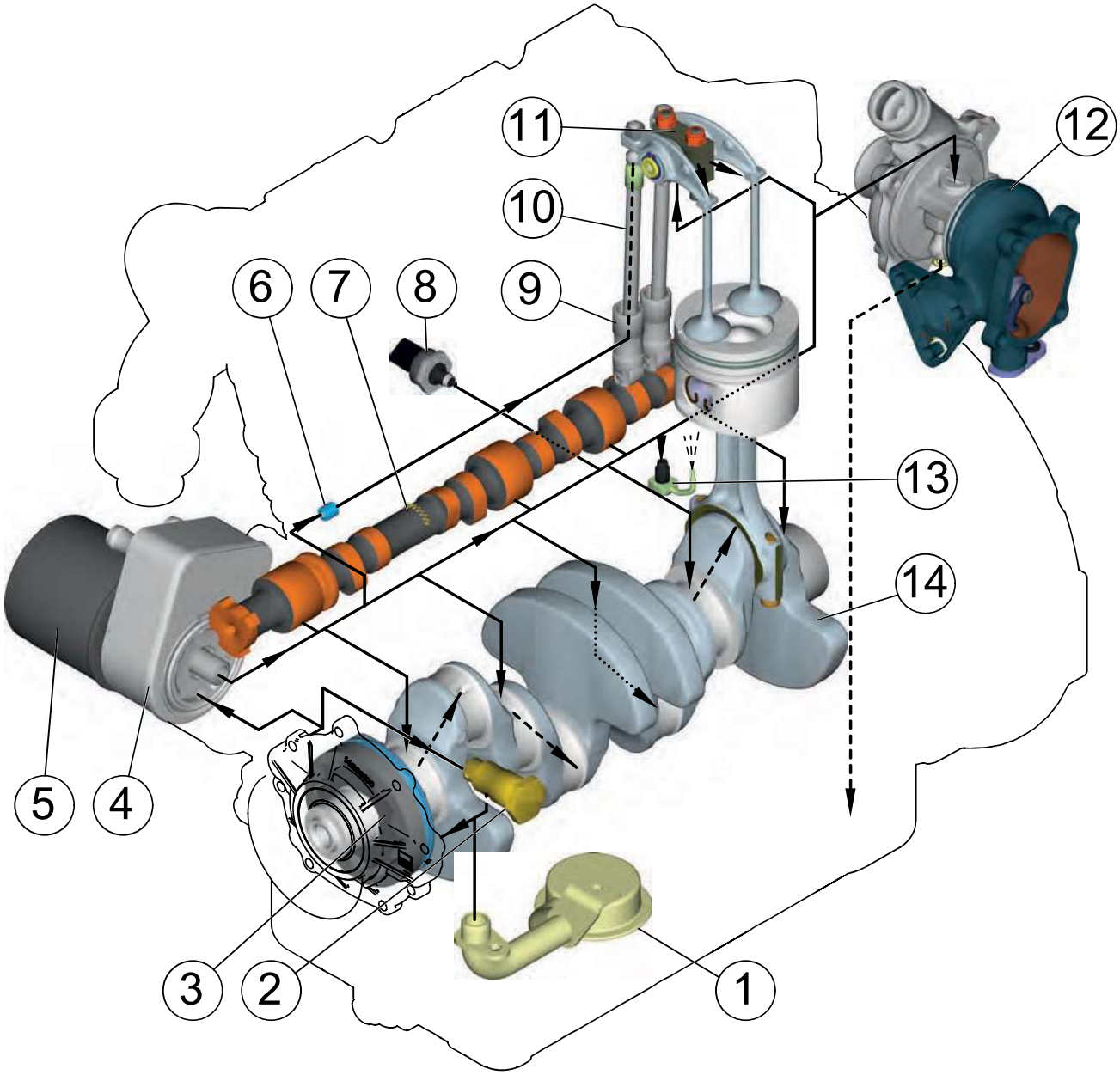
Workshop Manual

4 H50 TIC

439 002 00 - 07.2015e Printed in Germany

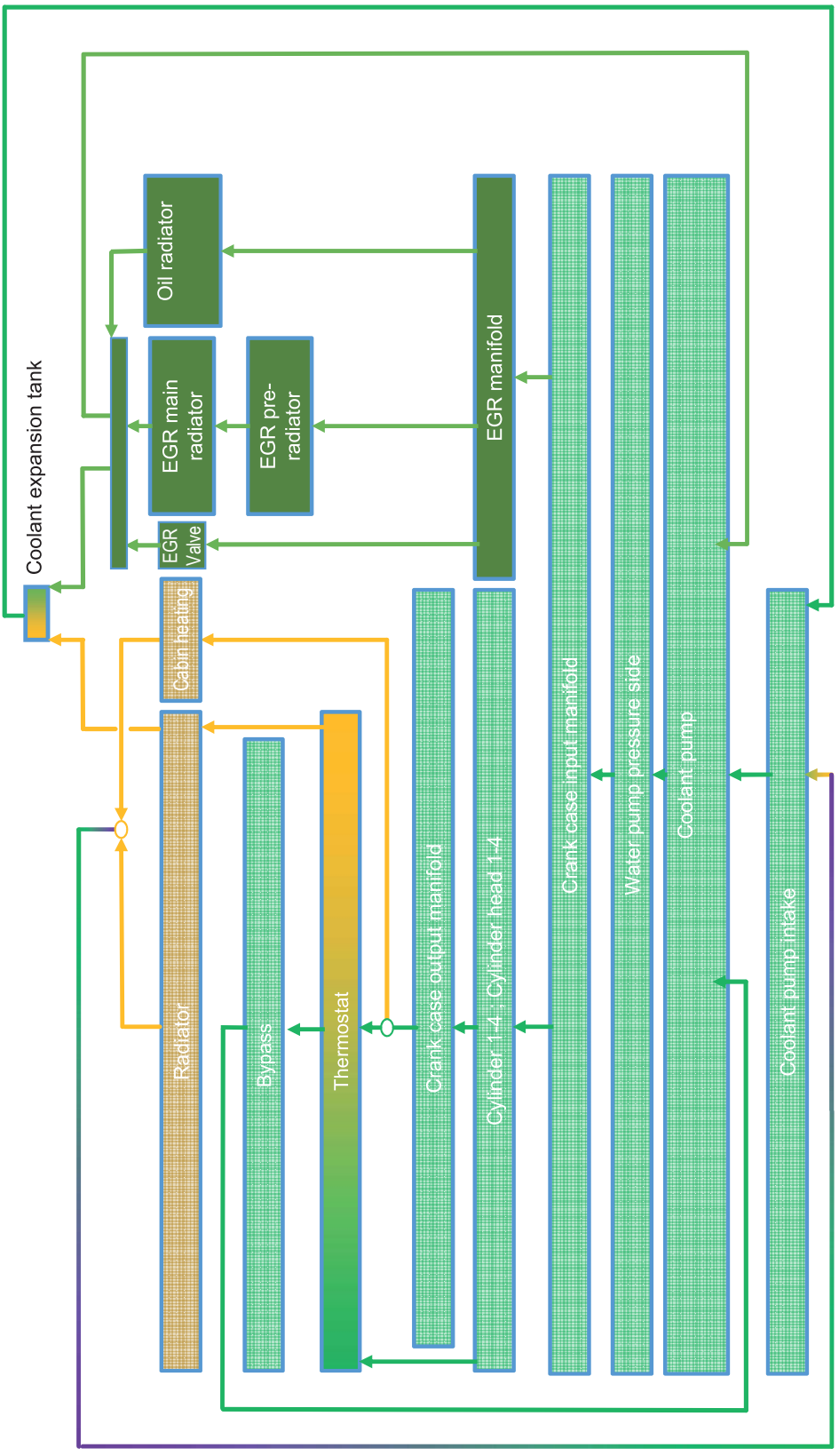
1. General

Lubricating oil circuit

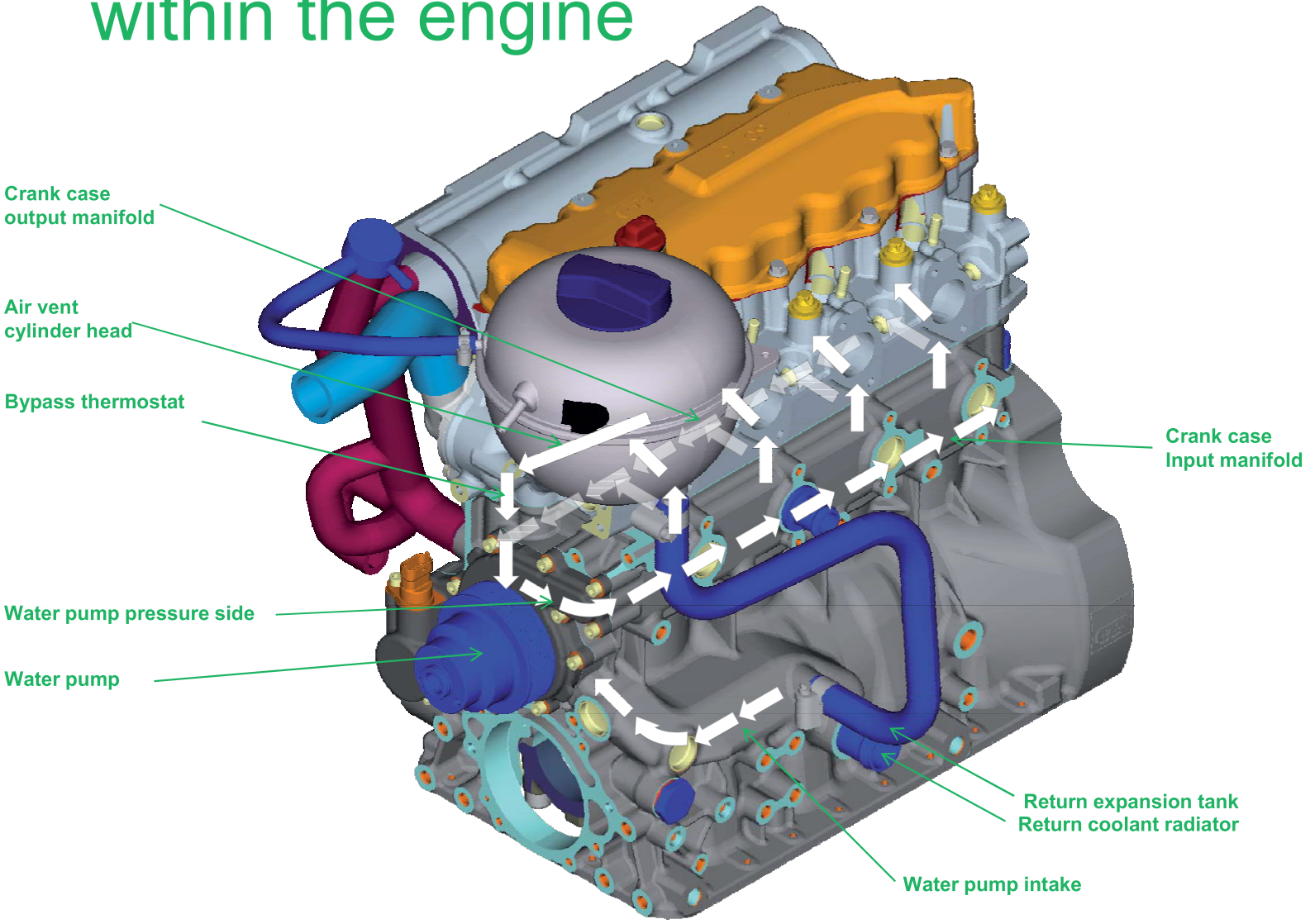


1 Oil intake pipe
2 Oil pressure relief valve
3 Oil pump
4 Oil cooler
5 Oil filter
6 Check valve
7 Camshaft
8 Oil pressure sensor
9 Roller tappet with HVA element
10 Push rod
11 Rocker arm bearing block with injection nozzles
12 Turbocharger
13 Piston cooling
14 Crankshaft

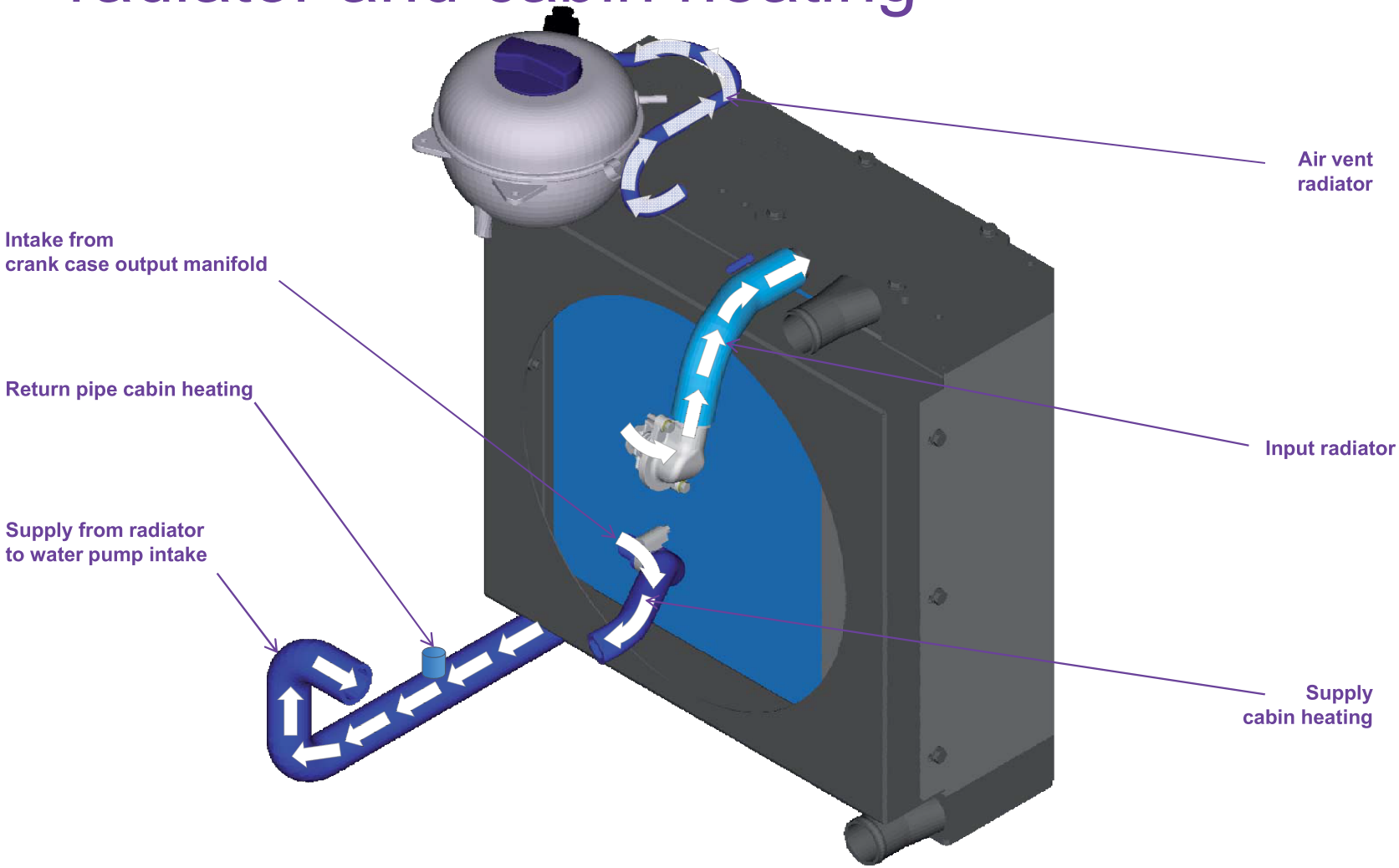
Cooling circuit diagram 4H50TIC/TICD



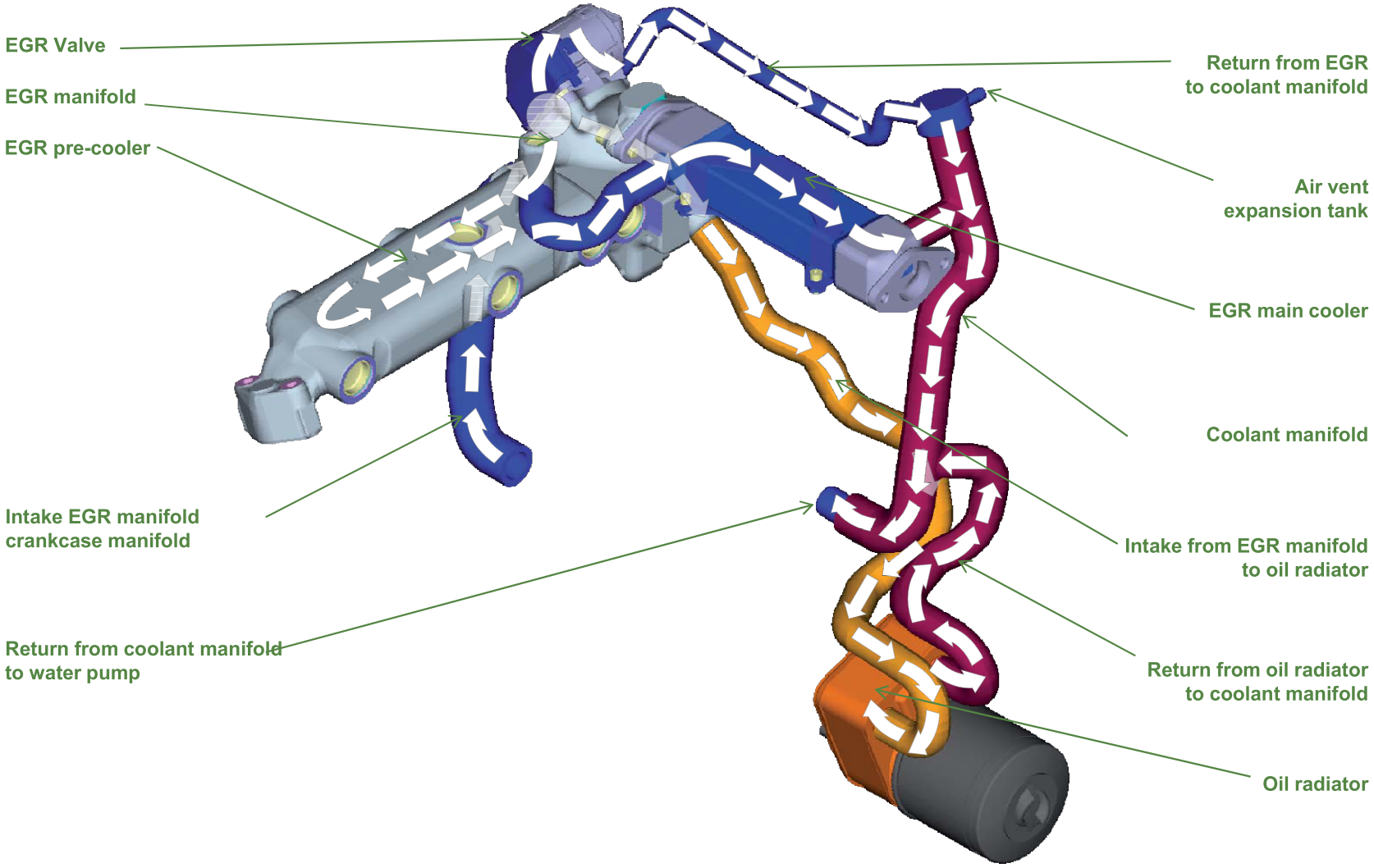
Cooling circuit diagram 4H50 – within the engine



Cooling circuit diagram 4H50 – radiator and cabin heating



Cooling circuit diagram 4H50 – exhaust gas recirculation and oil radiator



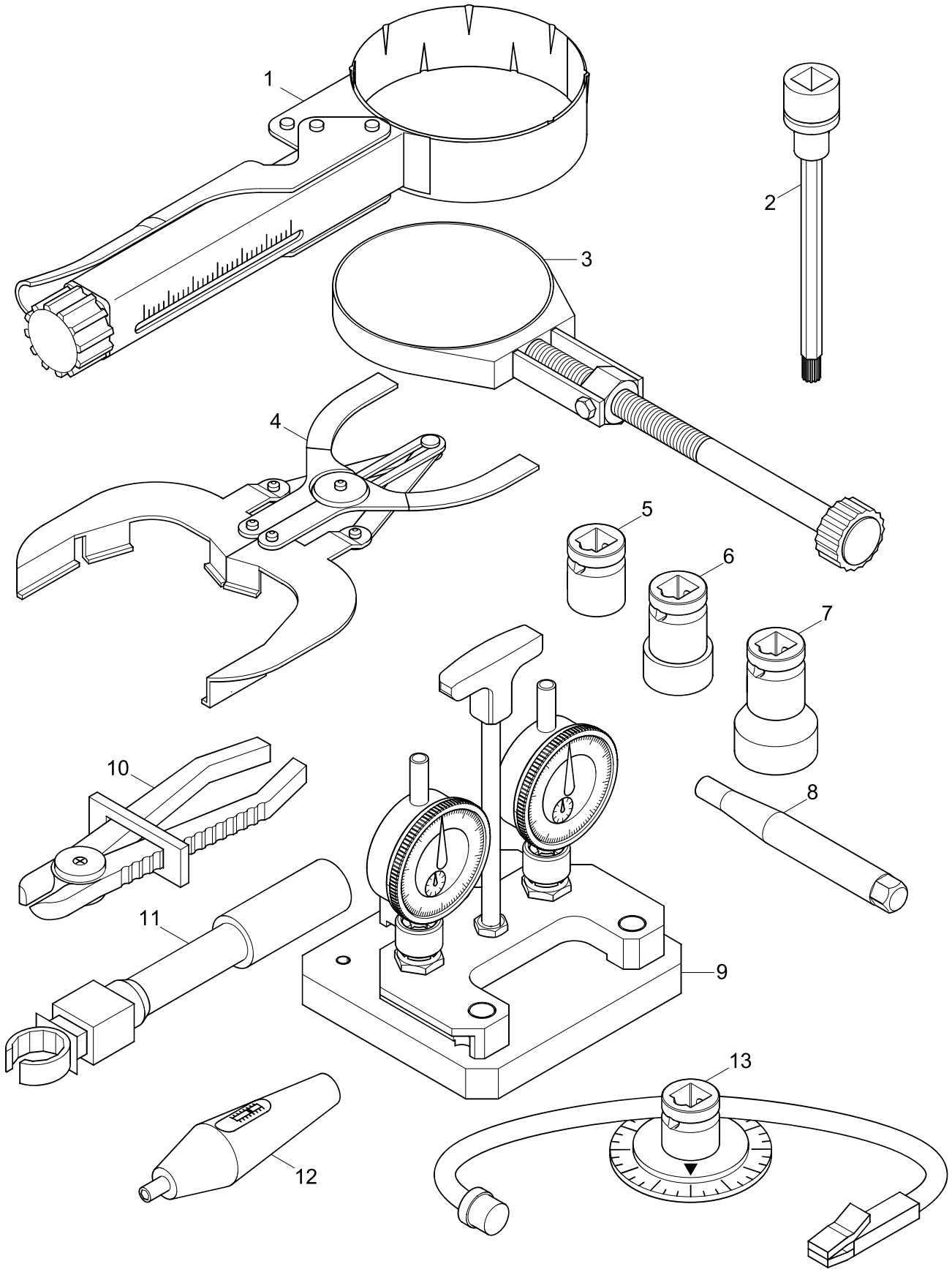
Sealants and adhesives

Application of sealant and adhesive material:
Identification letters in the drawings provide indications, which are decoded below. This is the same listing that is used in our spare parts list.

A	= 502 230 01	Loctite Activator	500 ml
B	= 502 231 01	Loctite 574	50 ml
C	= 502 232 00	Loctite 601	50 ml
D	= 700 189 18	Loctite 243	50 ml
E	= 502 234 00	Loctite 648	10 ml
F	= 502 238 00	Technicoll 8058	750 g
	+ 502 239 00	Technicoll 8367	750 g
G	= 502 565 01	Loctite IS 407	20 g
H	= 502 825 01	Silicon	30 ml
J	= 502 830 02	high-temperature paste	1000 g
K	= 503 426 00	high-temperature grease	100 g
L	= 502 566 00	silicone	100 g
M	= 504 851 00	grinding paste K 240	80 ml

Assembly/disassembly cylinder head + exterior area

No.	Ident no.	Designation
1	626 383 00	Piston ring collet chuck ø 70 - 100mm
2	612 099 00	Multi-tooth wrench socket M8
3	620 307 01	Strap wrench
4	612 090 01	Piston ring expander
5	700 217 64	Socket wrench for cyl.K E14 1/2"
6	700 106 34	Socket wrench SW 27 for oil pressure sensor
7	700 106 76	Socket wrench SW 36 for oil filter adapter
8	653 368 00	Centering bolts for engine mount
9	653 474 00	Measurement device for gap
10	700 113 94	Hose clamping tongs
11	702 534 99	Kink torque wrench
12	702 534 97	Screwdriver torque
13	702 534 98	Rotation angle measurement device (Gedore)


1
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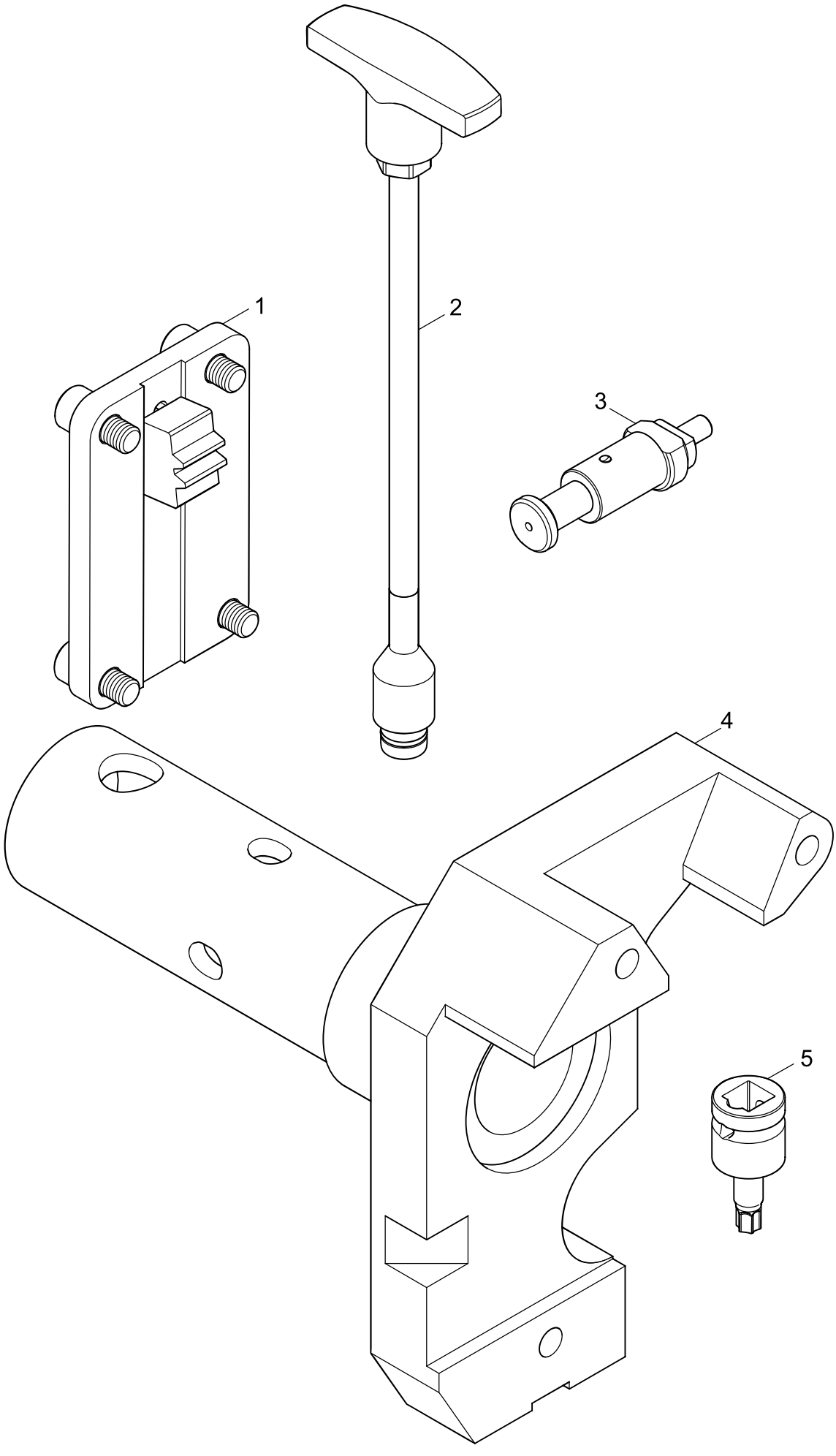
Assembly/disassembly - engine

No.	Ident no.	Designation
1	653 480 00	Counterholder for flywheel
2	653 466 00	Assembly pin for roller tappet
3	653 464 00	Magnet holder for roller tappet guide
4	653 517 00	Turning device for engine benches
5	702 517 89	Socket wrench for conrod T50 1/2"


1
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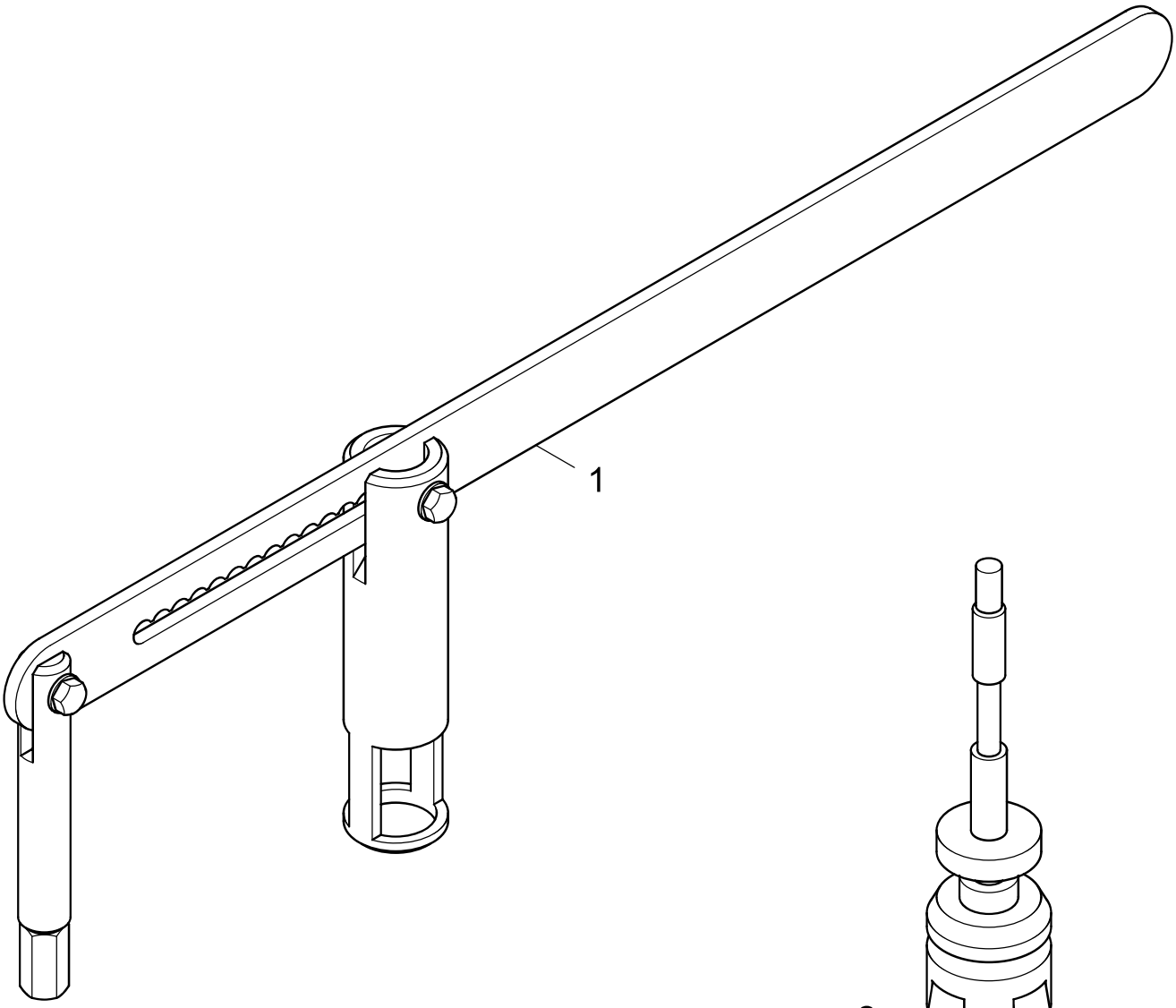
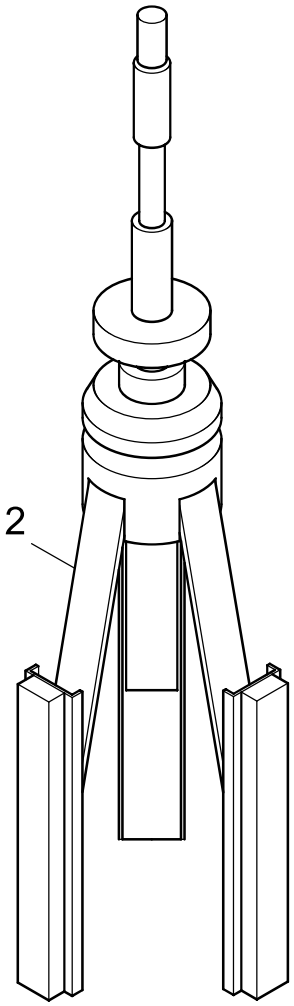
5

Component servicing

No.	Ident no.	Designation
1	629 223 01	Valve lifting tool
2	634 142 00	Honing tools 50-175
3	634 143 00	Replacement stones for honing tools


1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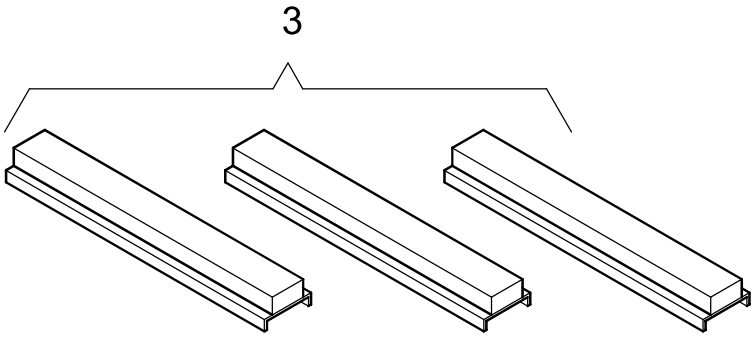
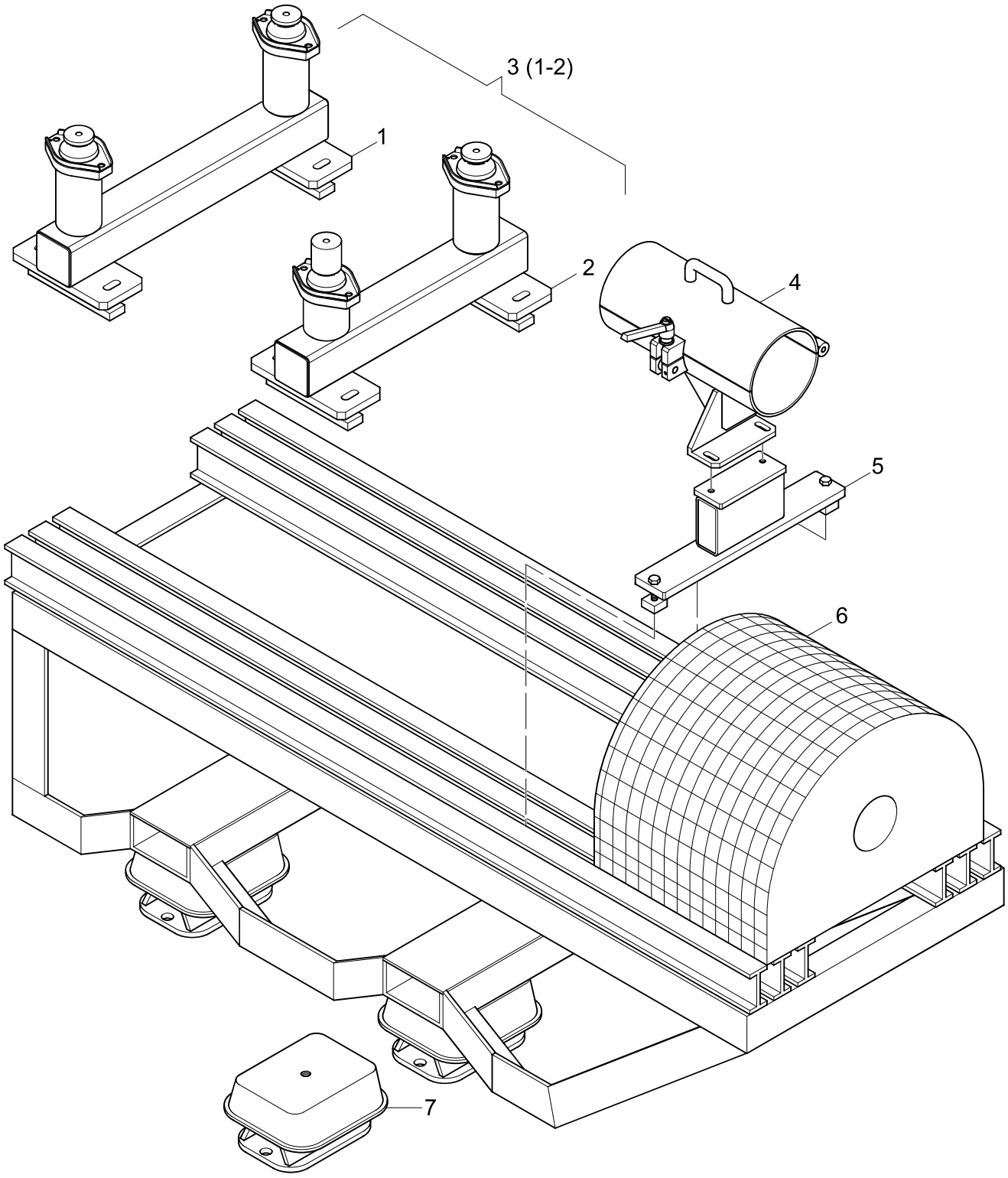

3

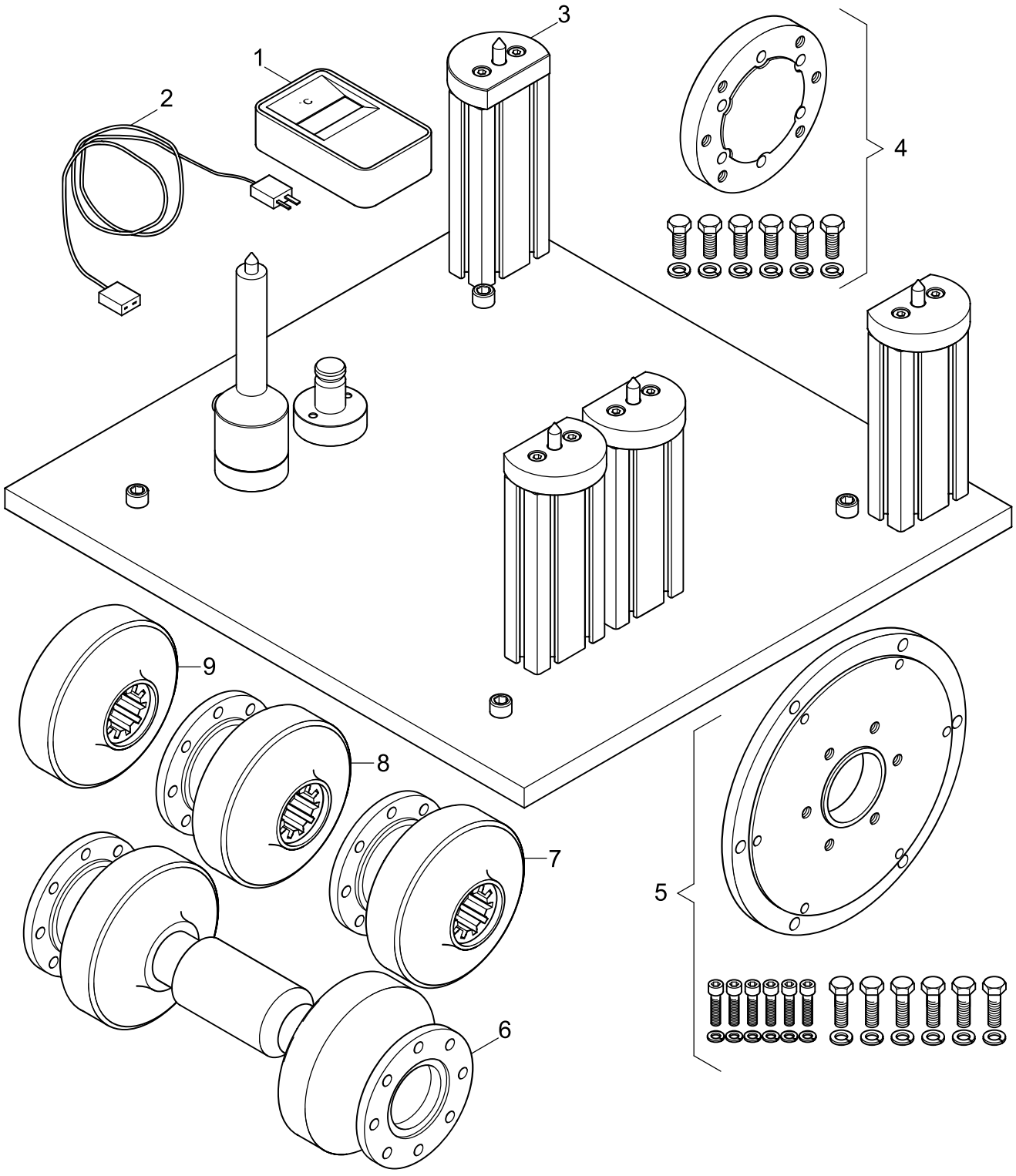
Test bench set-up

No.	Ident no.	Designation
1	- - - - - - - -	Part cannot be ordered individually, please order group
2	- - - - - - - -	Part cannot be ordered individually, please order group
3	652 948 00	Axle height adjustment
4	647 639 00	Guard tube
5	629 242 00	Adapter for guard device
6	612 963 01	Base frame "large"
7	618 996 00	Machine bearing "replacement"


3 (1-2)
1
2
4
5
6
7

Test bench set-up

No.	Ident no.	Designation
1	624 851 01	Temperature measurement device
2	624 861 01	Sensor extension cable
3	653 290 00	Assembly table
4	635 303 90	Adapter flange 6-8-hole
5	631 147 90	Driven flange
6	630 705 00	Drive shaft 8-hole
7	630 706 00	Rod end 8-hole "new"
8	634 287 00	Rod end 8-hole "replacement"
9	634 286 00	Joint insert 8-hole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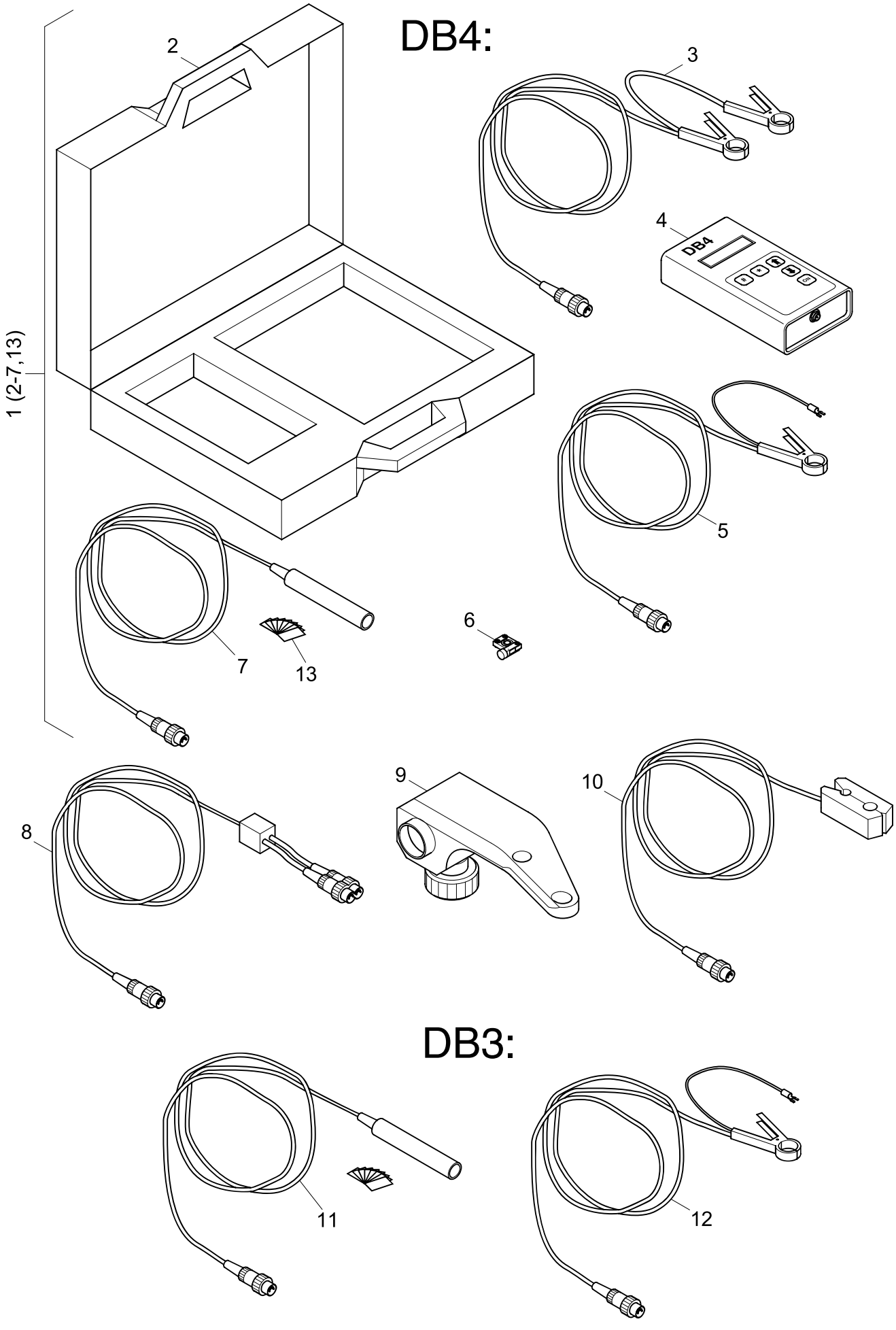
9

Adjustment and diagnostic equipment

No.	Ident no.	Designation
1	624 838 92	Revolution counter for fuel pressure pipe
2	- - - - - - - - -	Part cannot be ordered individually, please order group
3	638 342 00	Charging cable with 12V pole clamps
4	- - - - - - - - -	Part cannot be ordered individually, please order group
5	638 340 00	Cable for Piezo sensor
6	631 965 00	Piezo sensor 6mm
7	638 341 00	Photo sensor with cable
8	641 236 00	Speed differential adapter
9	639 123 00	Holder for photo sensor 1B
10	638 343 00	Speed sensor for ignition cable
11	635 776 00	Photo sensor with cable
12	634 268 00	Cable for Piezo sensor
13	702 503 97	Reflex marks (1 sheet = 35 pieces)


DB4:
1 (2-7,13)
2
3
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DB4
5
6
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13
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9
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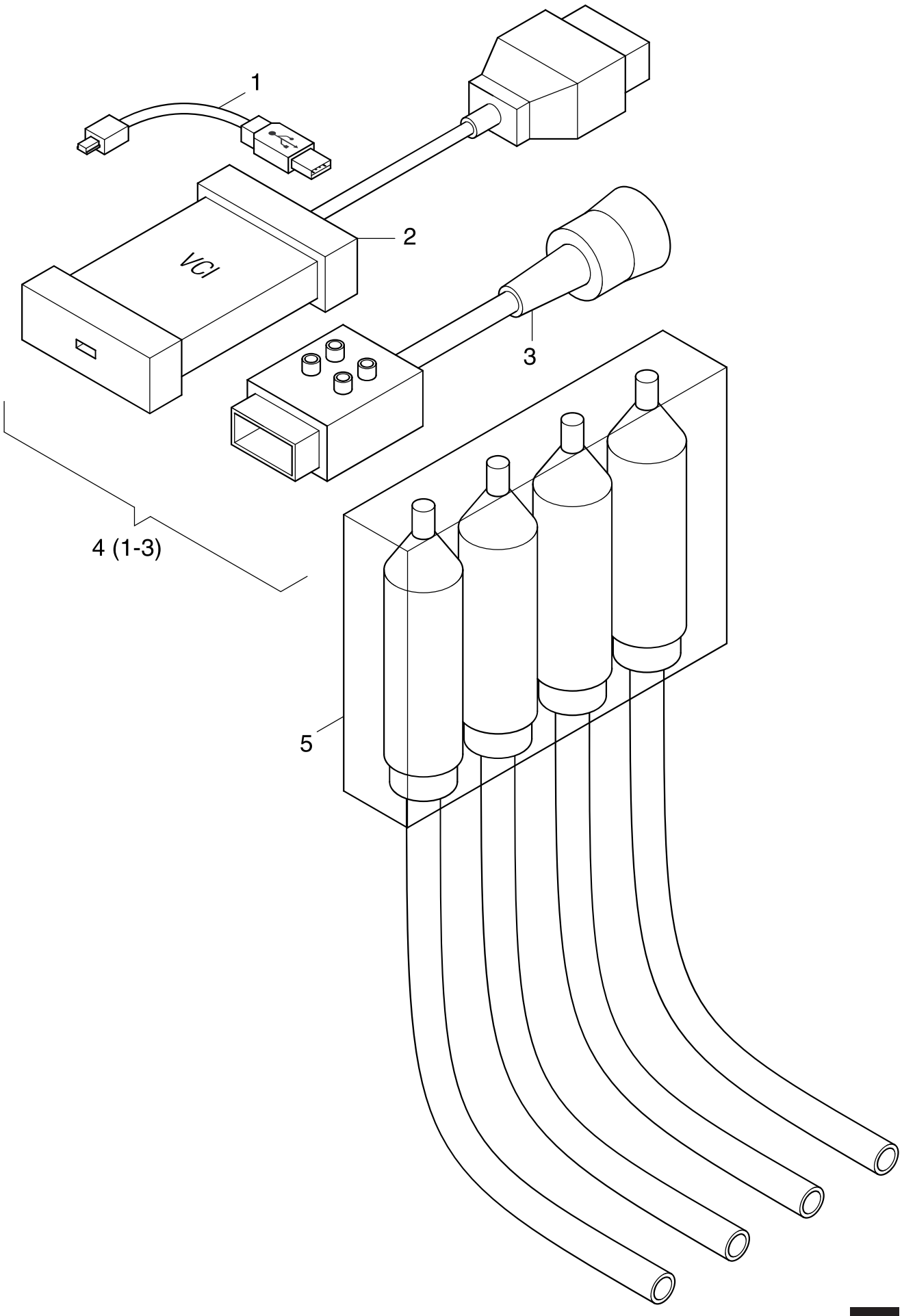
DB3:
11
12

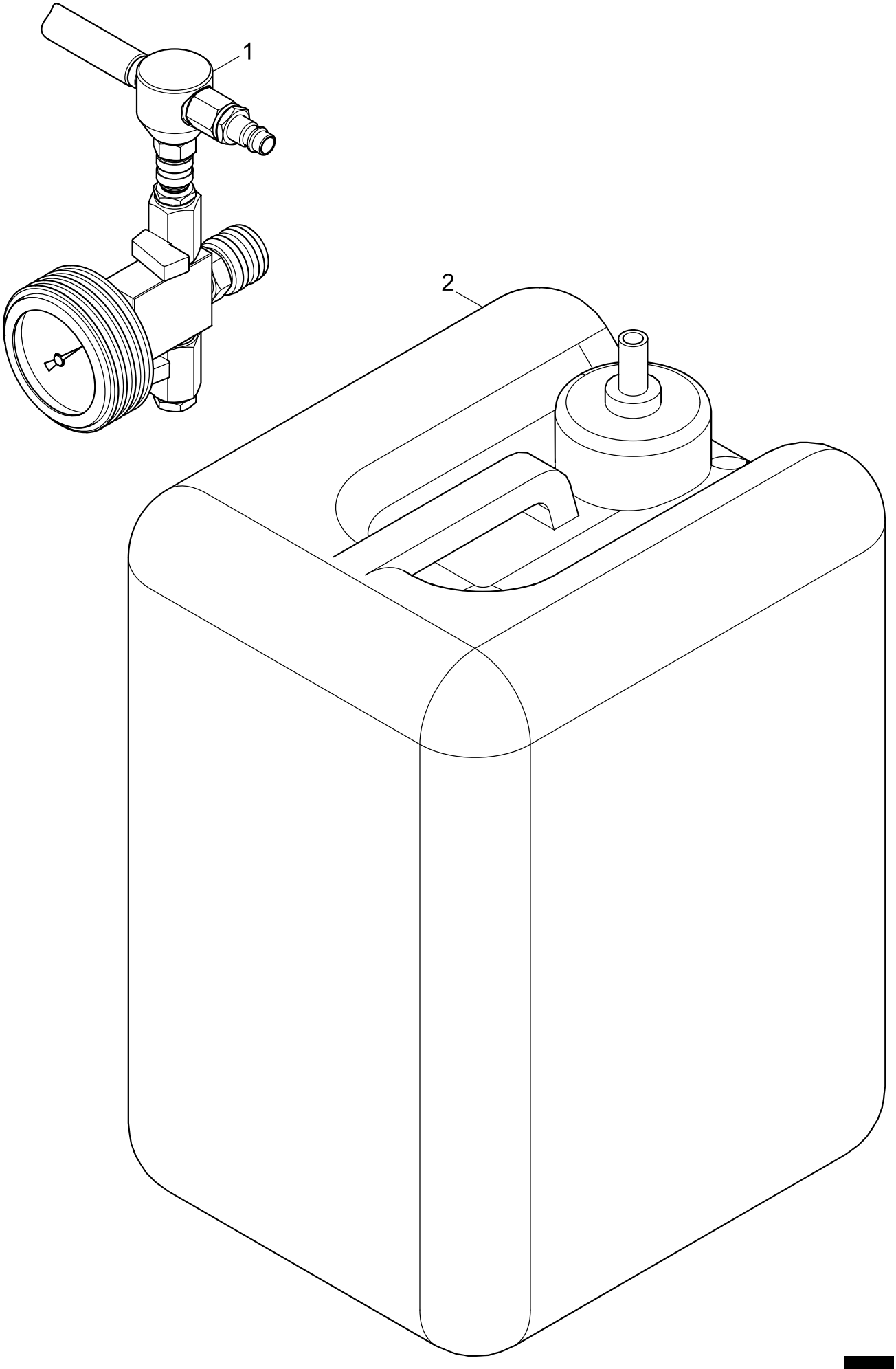
Adjustment and diagnostic equipment

No.	Ident no.	Designation
1	- - - - - - - - -	Part cannot be ordered individually, please order group
2	- - - - - - - - -	Part cannot be ordered individually, please order group
3	- - - - - - - - -	Diagnostic tool (Bosch) VCI
4	653 772 00	BG diagnostic tool VCI
5	702 536 30	Return flow quantities measurement device


1
2
VCI
3
4 (1-3)
5

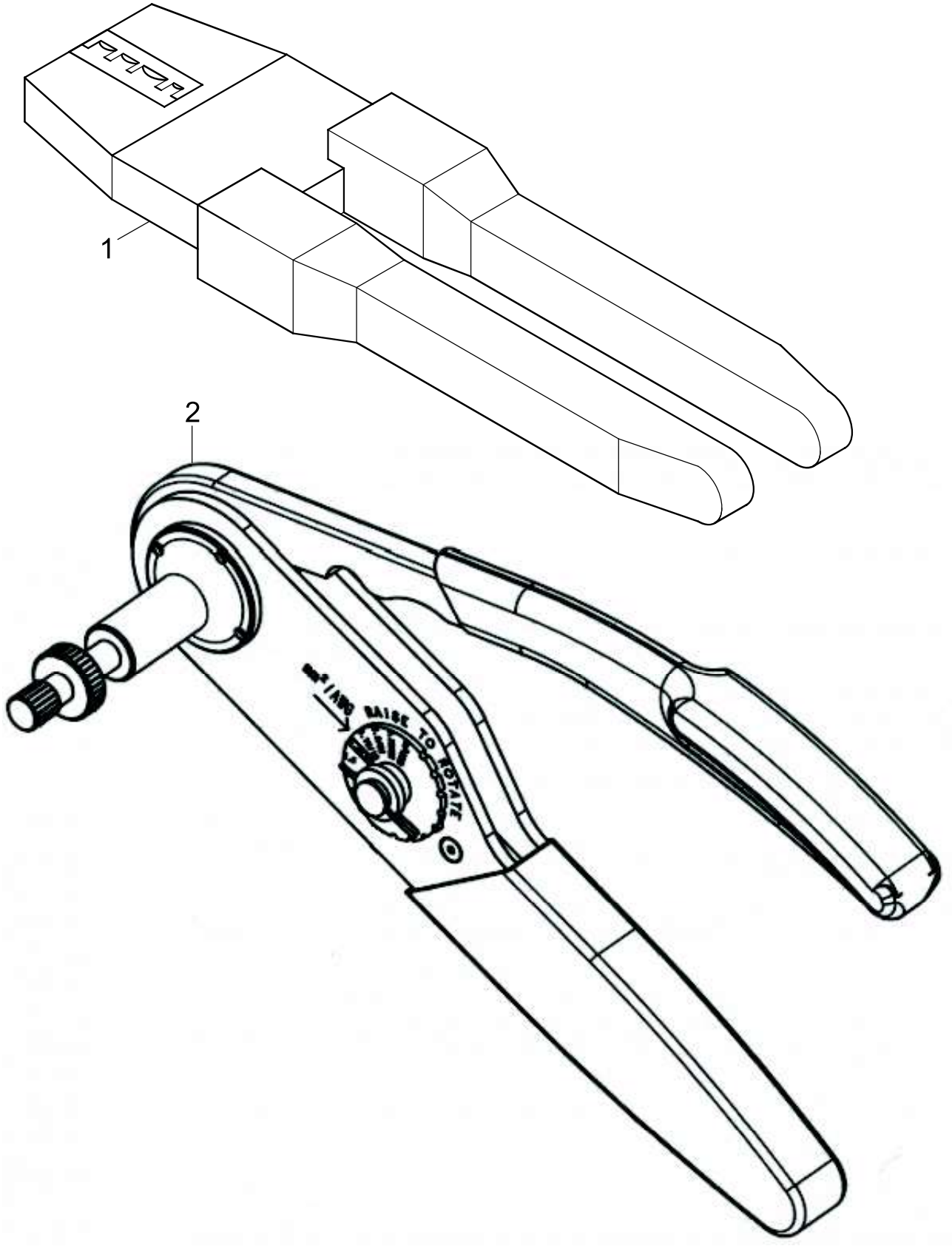
Cooling system

No.	Ident no.	Designation
1	702 530 56	Radiator vacuum filling device
2	702 530 57	Tank for filling device


1
2

Electrical equipment

No.	Ident no.	Designation
1	700 318 32	Crimping pliers "Garant F28/95"
2	700 348 26	Mounting pliers "Deutsch HDT 48-00"

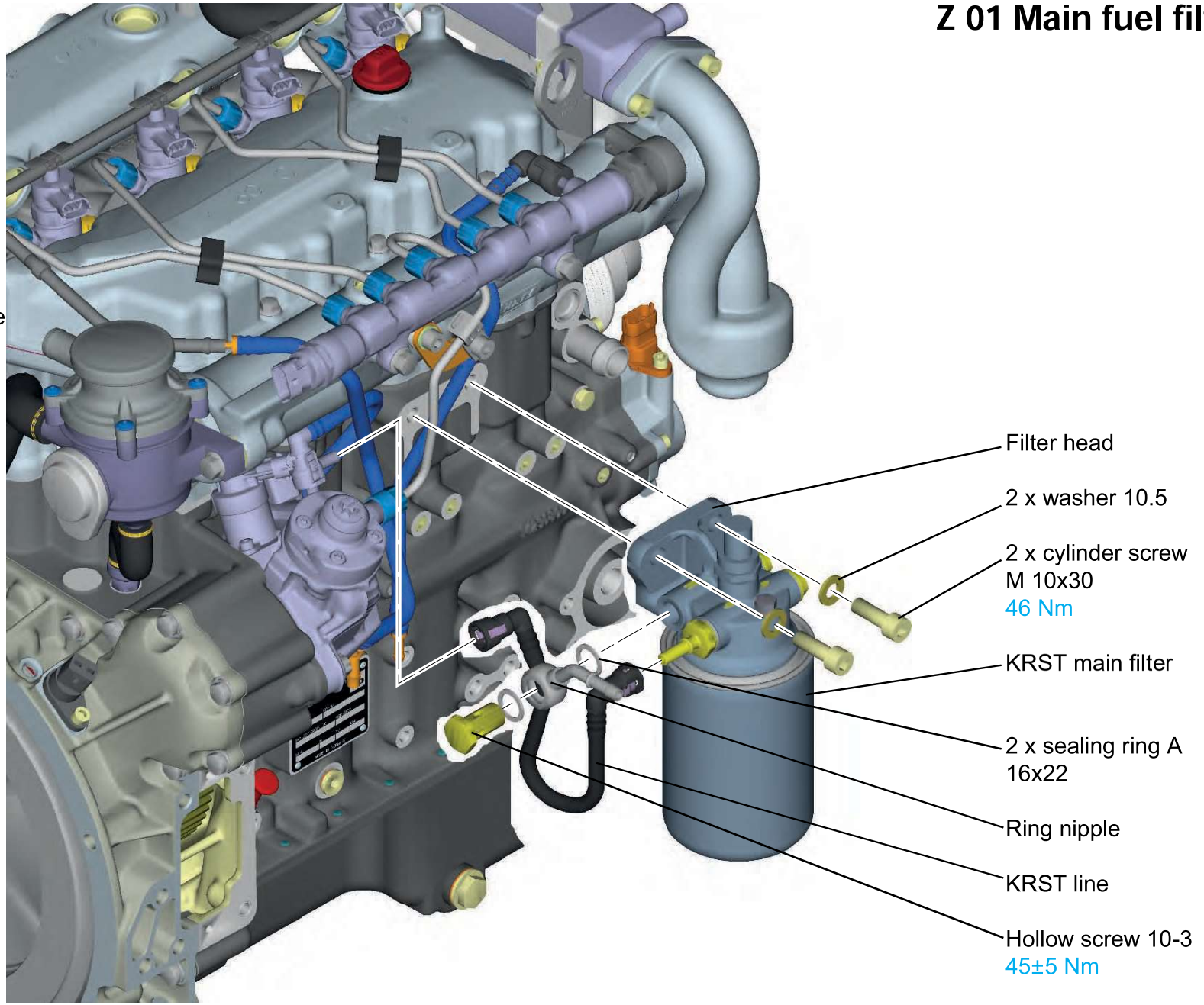

1
2
RAISE TO ROTATE

2. Additional equipment

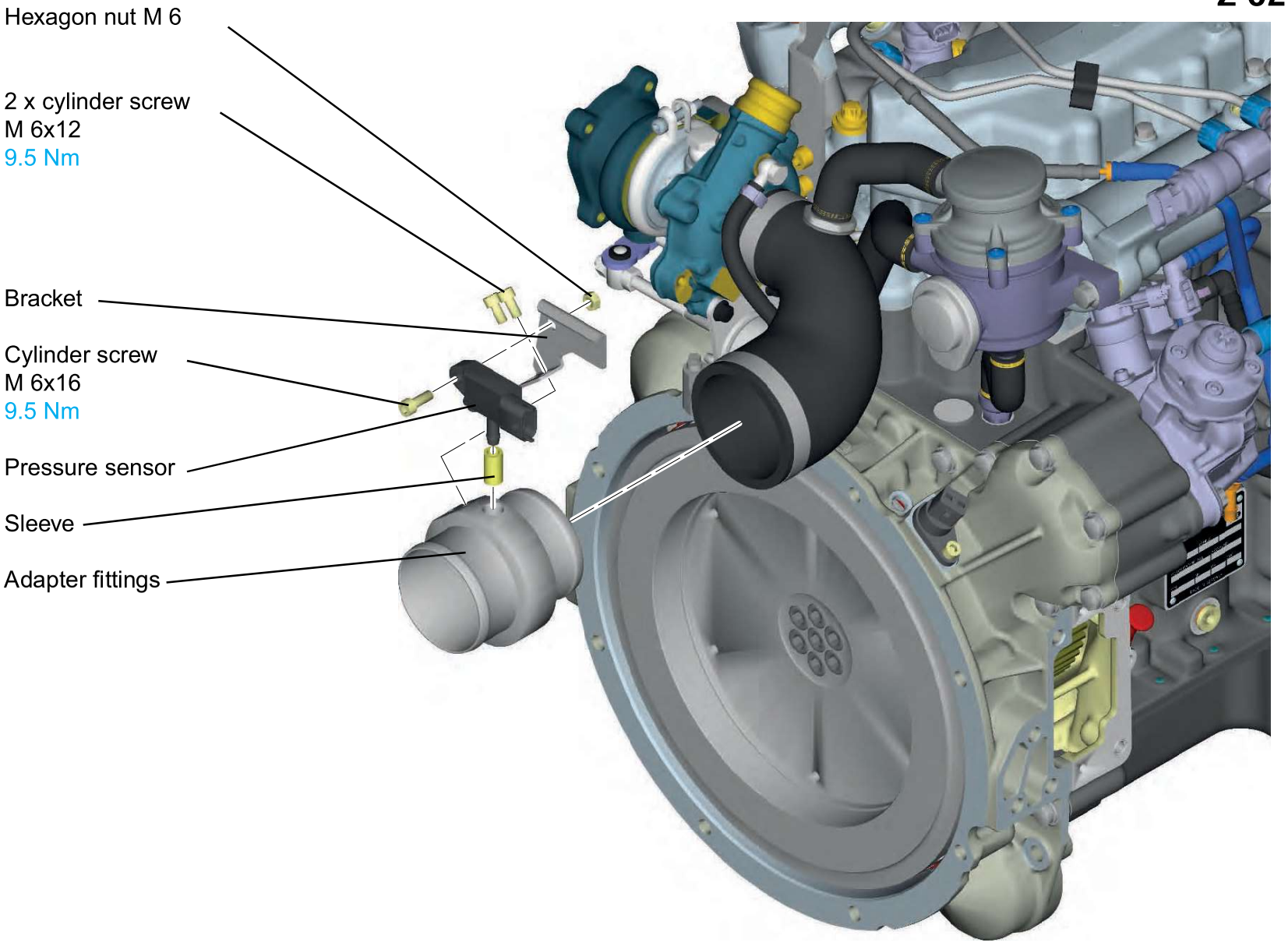
Z 01 Main fuel filter

Absolute cleanliness!

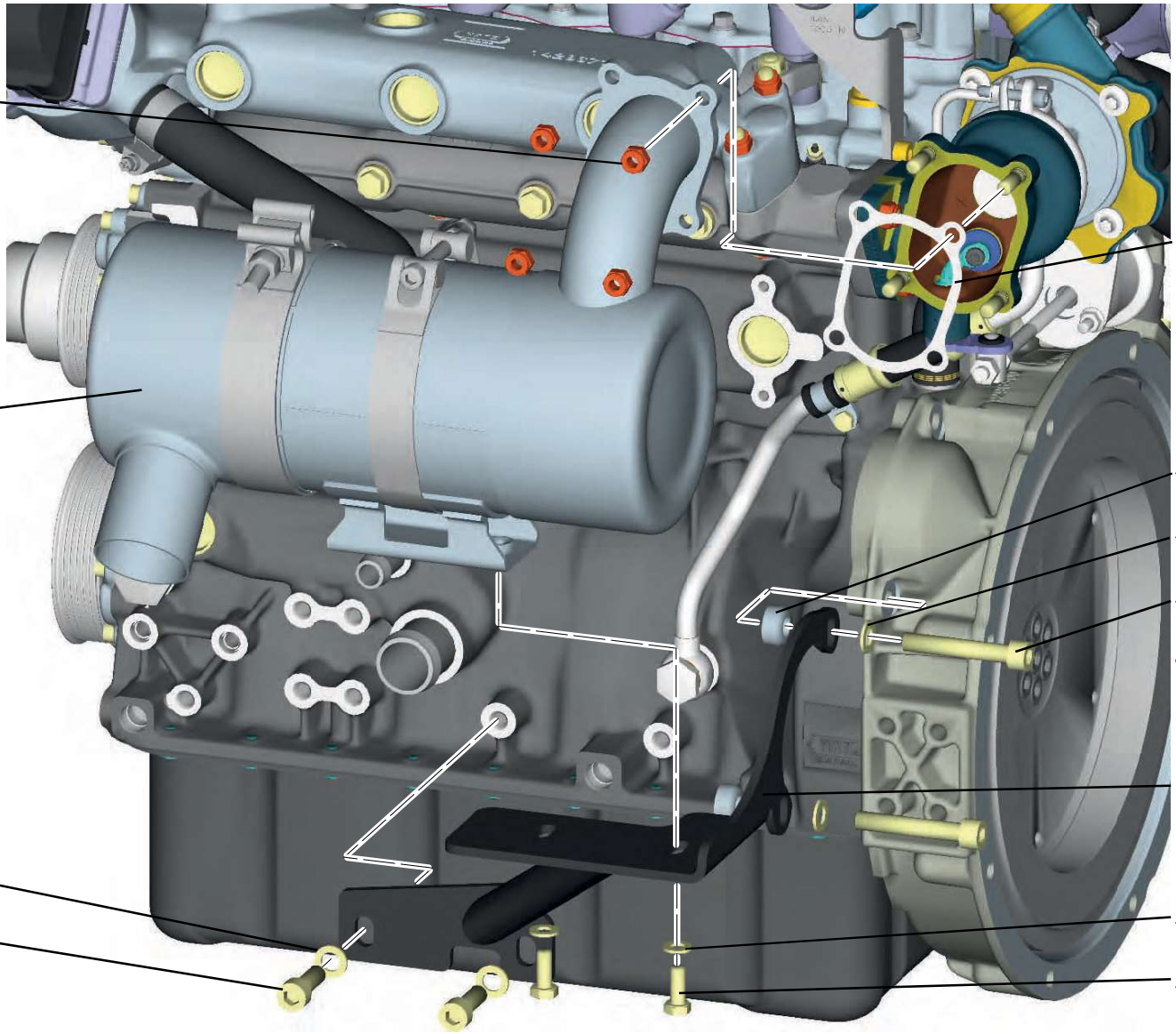
Protective caps may only be removed from the parts directly before mounting!



Z 02 Suction hose



Z 03 Oxidation catalytic converter



4 x hexagon nut
VM 8
23 Nm

Oxidation catalytic converter
(incl. piping, flange and support)

2 x washer 10.5

2 x cylinder screw
M 10x30
Secure with Loctite 243
46 Nm

Gasket

2 x spacers

2 x washer 10.5

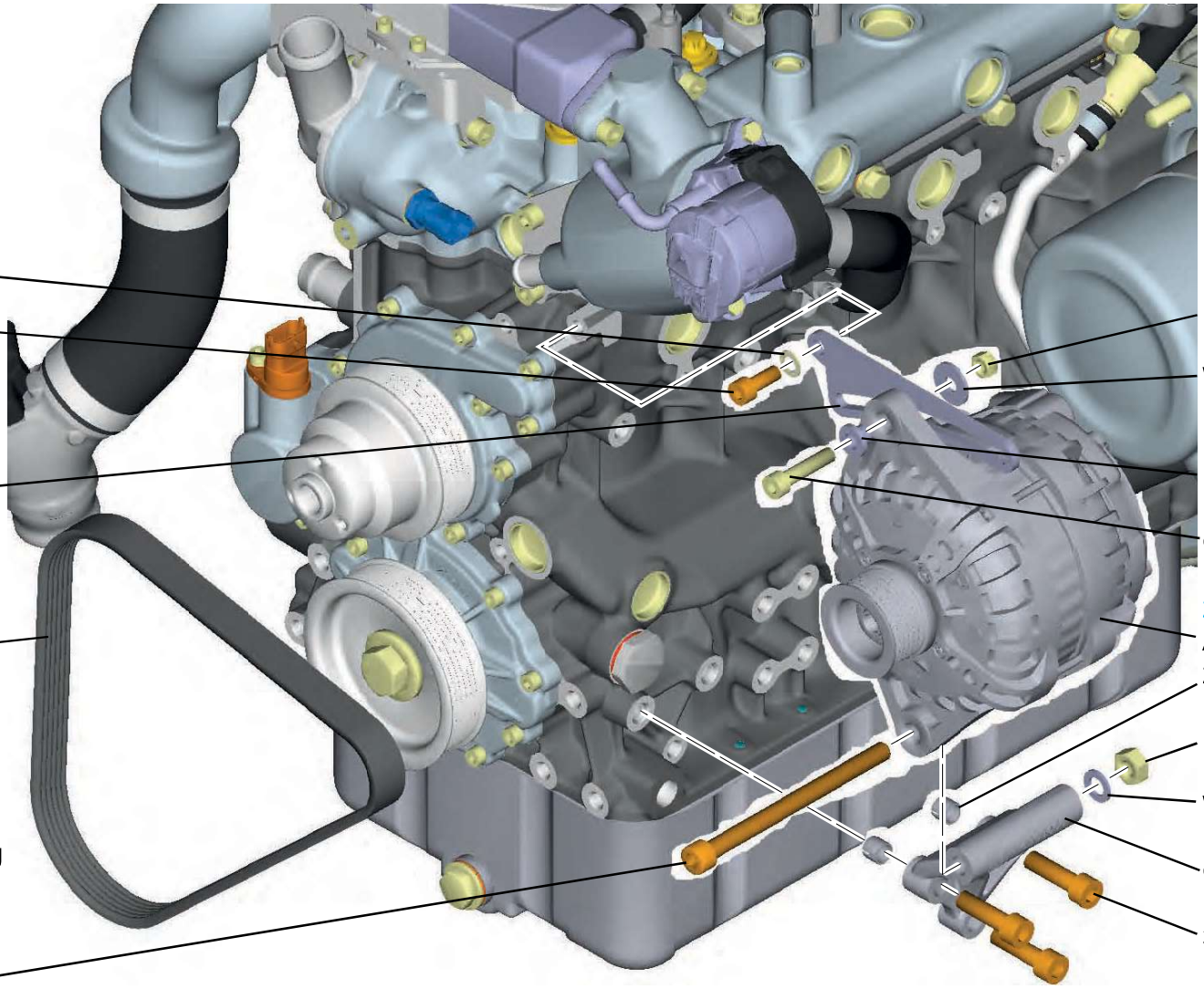
2 x cylinder screw
M 10x60
46 Nm

Fastening

2 x washer A 8.4

2 x hexagon bolt
M 8x20
Secure with Loctite 243
23 Nm

Z 05 Alternator



Washer 8.4

Cylinder screw
M 8x20
23 Nm

Tensioning arm

Poly v belt
6PK 768
Pretensioning of new belt: 480 + 50 N
Pretensioning after service: 250 + 30 N
Minimum pretensioning force: 170 N

Cylinder screw
M 10x130
46 Nm

Hexagon nut M 8

Washer B 8.4

Flange sleeve

Cylinder screw
M 8x35
23Nm

Alternator 14V/110A

2 x spring pin 12x10

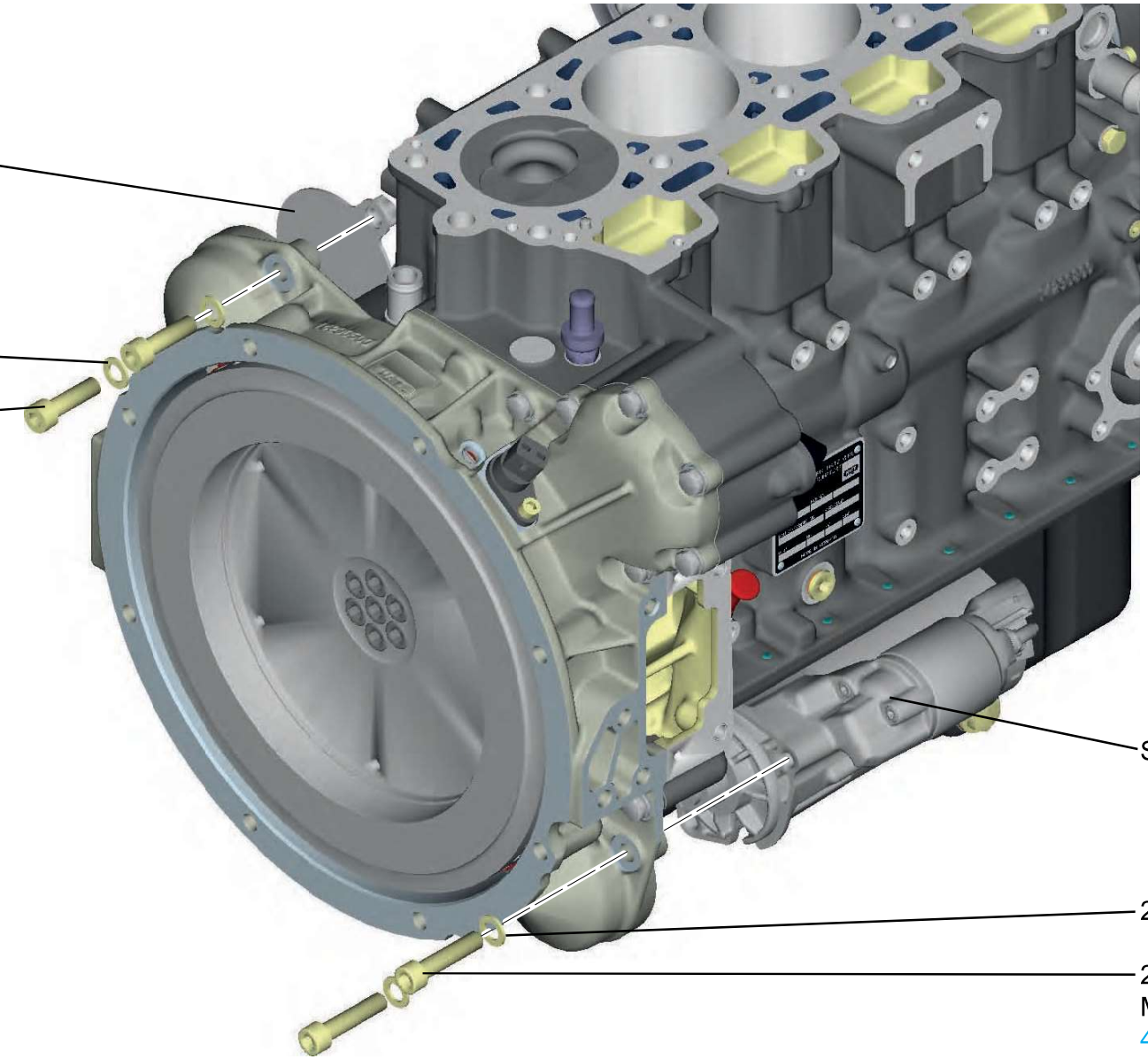
Hexagon nut M 10

Washer 10.5

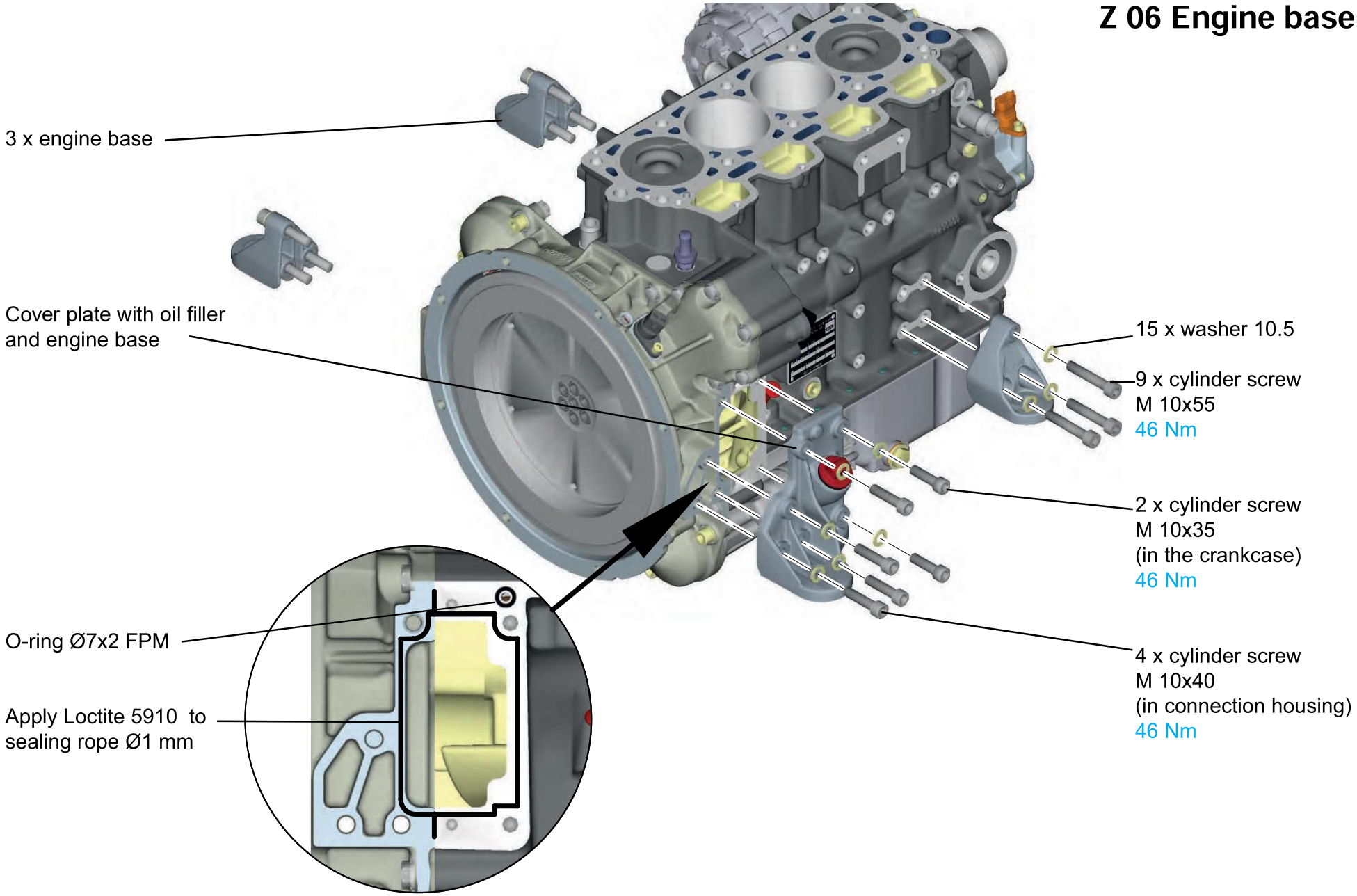
Console

3 x cylinder screw
M 10x35
46 Nm

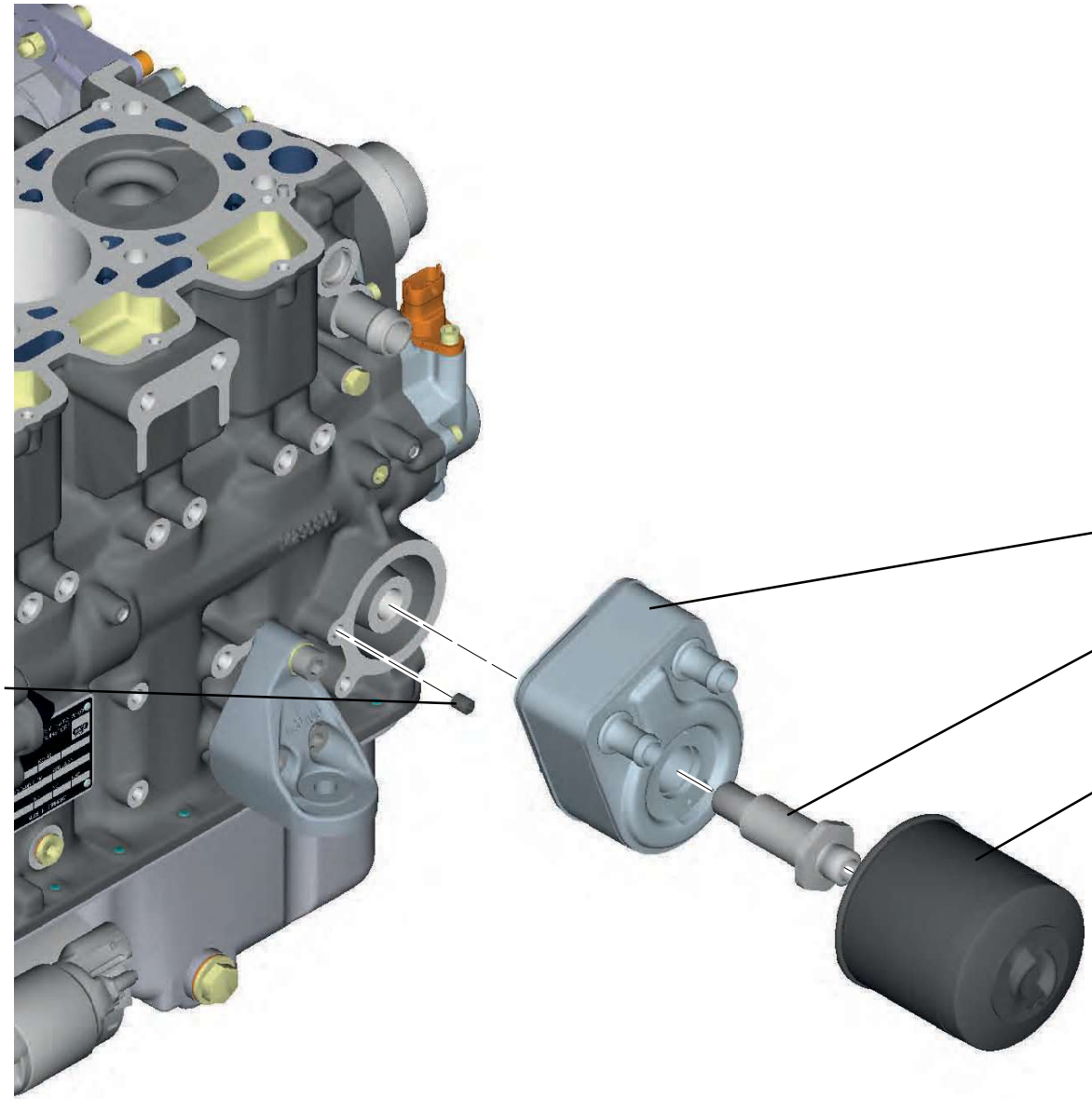
Z 05 Starter


Starter bracket cover
2 x washer 10.4
2 x cylinder screw
M 10x35
46 Nm
Starter 12V 2.2 kW
2 x washer 10.4
2 x cylinder screw
M 10x45
46 Nm

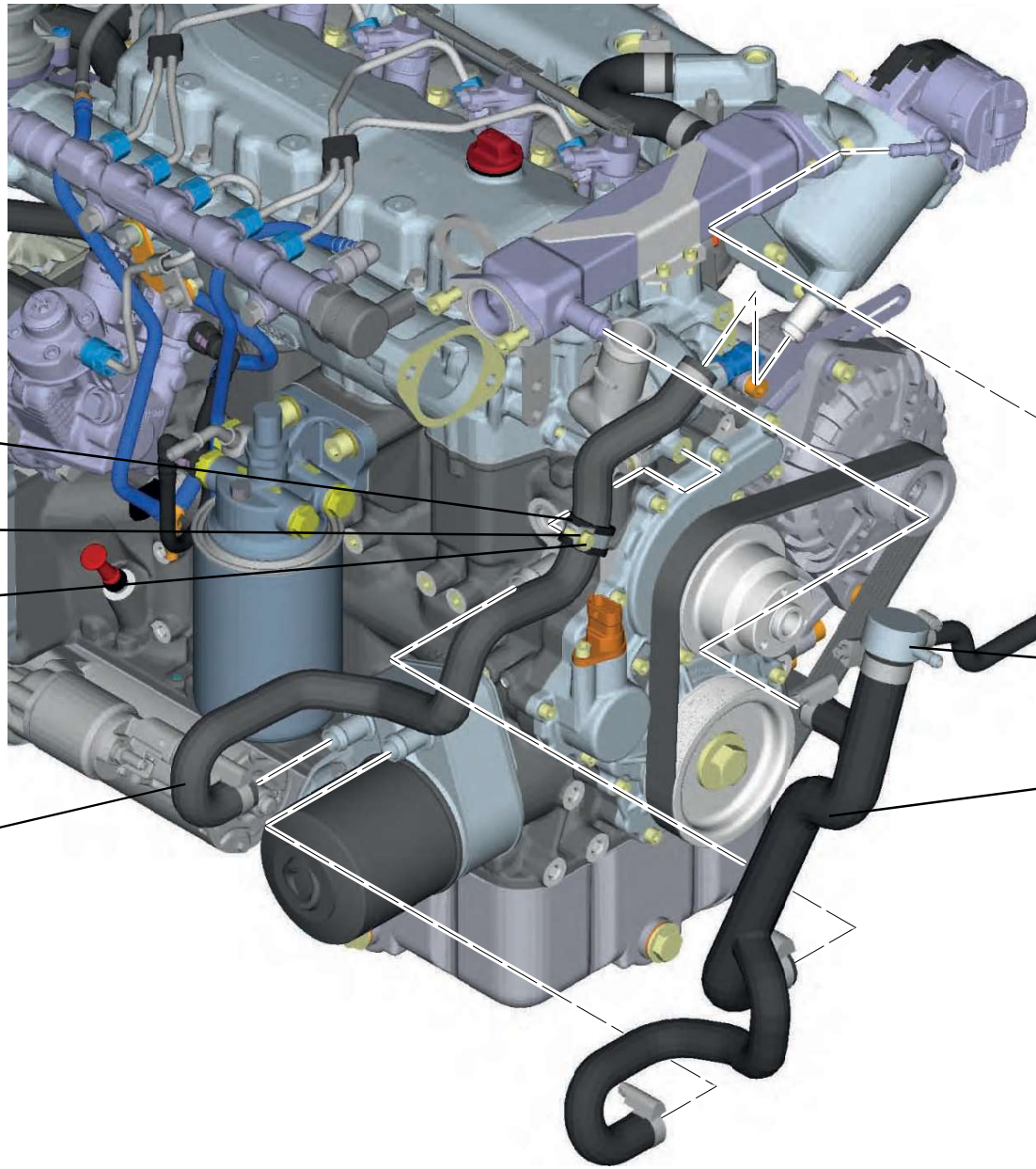
Z 06 Engine base



Z 07 Oil cooler



Z 07 Oil cooler



Pipe clamp
RSGU 1.25/15

Washer 6.4

Hexagon bolt
M 6x16
9.5 Nm

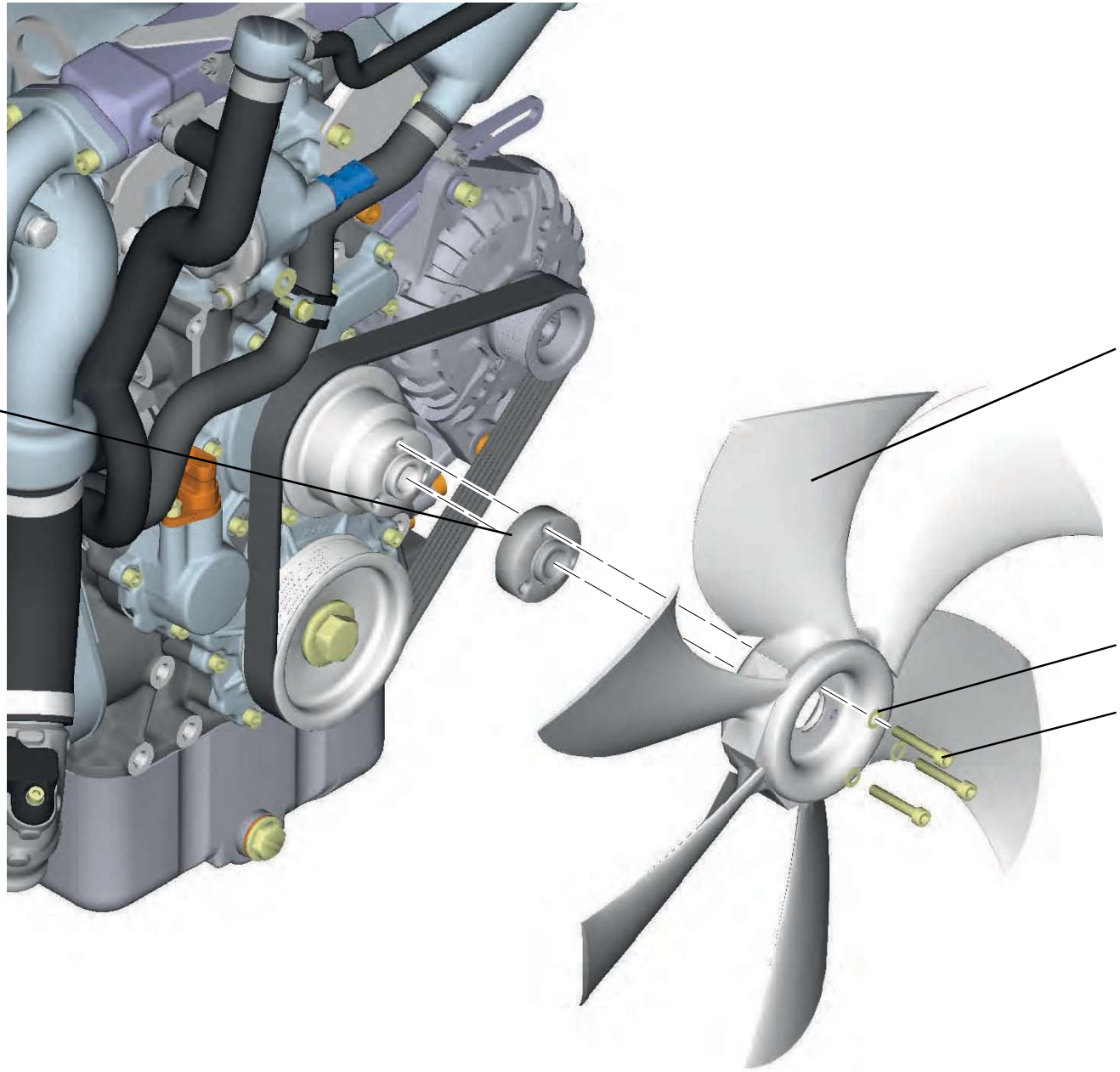
Shaped hose piece
16 x 4.5
fastened with
2 x hose clamp
DIN 3017-A 12-22x9
3 Nm

Shaped hose piece
8 x 3
fastened with
2 x hose clamp
DIN 3017-A 10-16x7.5
1.5 Nm

Distributor

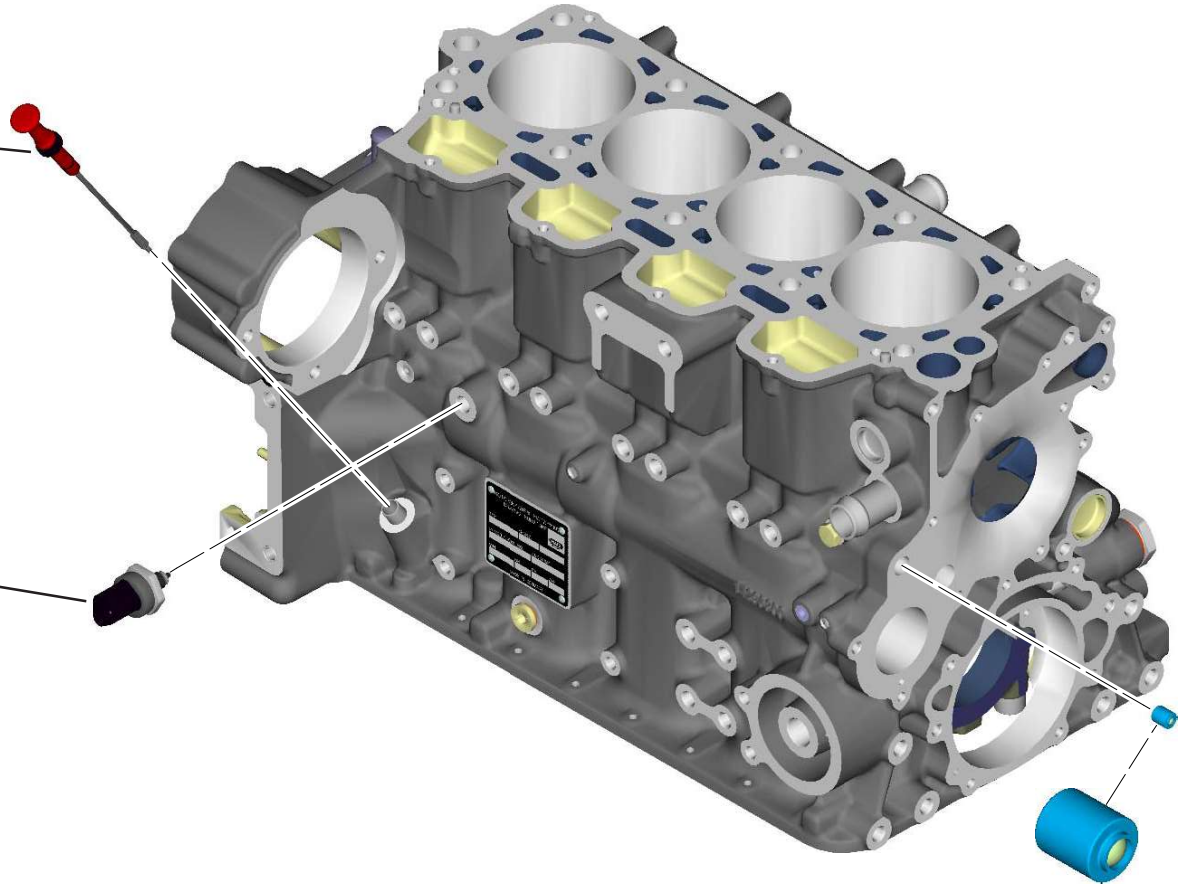
Shaped hose piece
fastened with
2 x hose clamp
DIN 3017-A 12-22x9
3 Nm
1 x hose clamp
DIN 3017-A 16-27x12
5 Nm
1 x hose clamp
DIN 3017-A 20-32x13
5 Nm

Z 30 Fan

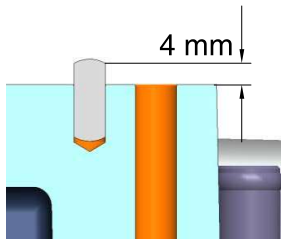

Spacer for fan
Exhaust fan
3 x spring washer A 6
3 x cylinder screw
M 6x35
9.5 Nm

3. Basic engine equipment

M 01 Cylinder crankcase



M 01 Cylinder crankcase



2 x cylinder pin 6 m6x12
press in to specified dimension

Secure tube connectors
with Loctite 648 and
press into cylinder block
up to the stop

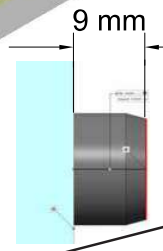
Secure check valve
(Provent) with
Loctite 243
12.5 ± 2.5 Nm

Oil overpressure valve:
Piston for oil overpres-
sure valve

Pressure spring

Sealing ring A 24x29

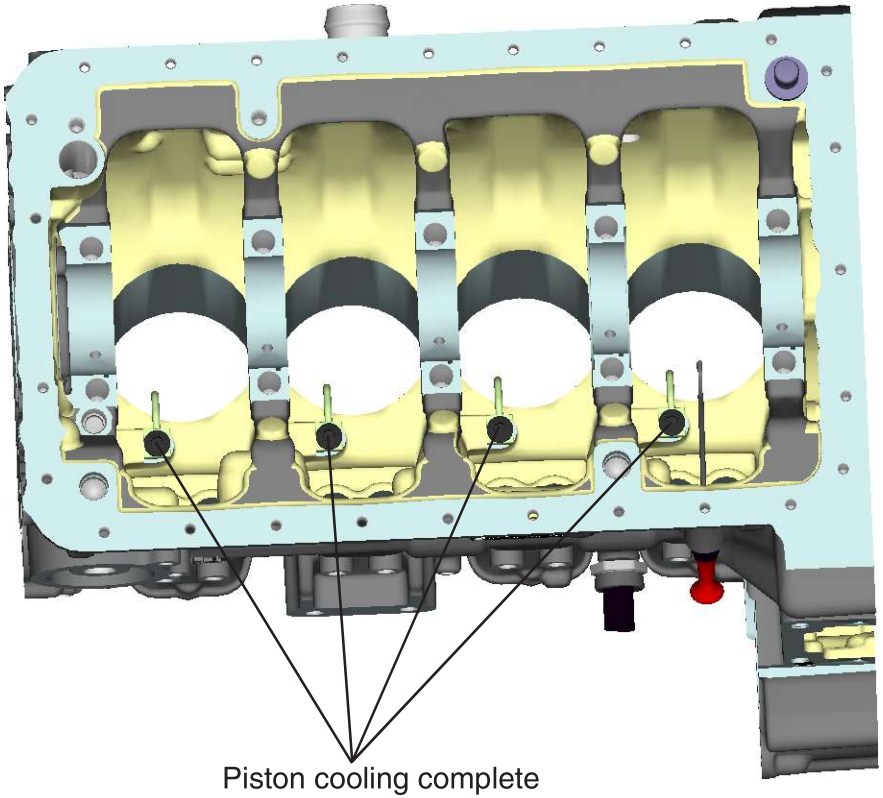
Screw plug
M 24x1.5
100 ± 10 Nm

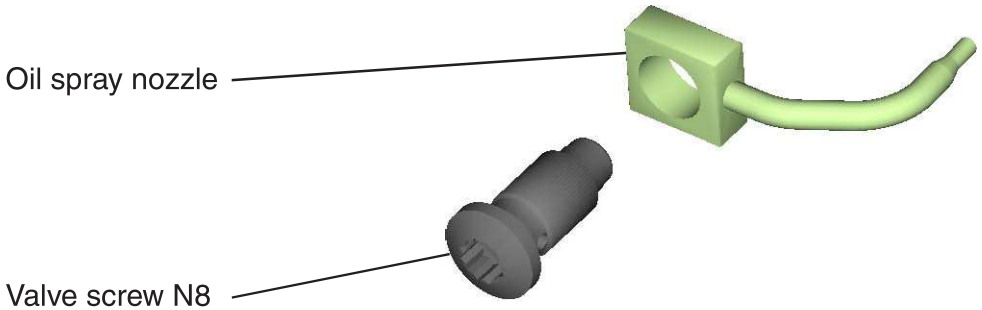


2 x cylinder pin
14 m6x28
press in to specified
dimension

Secure check valve
(oil pre-separator) with
Loctite 243
12.5 ± 2.5 Nm

M 01 Cylinder crankcase

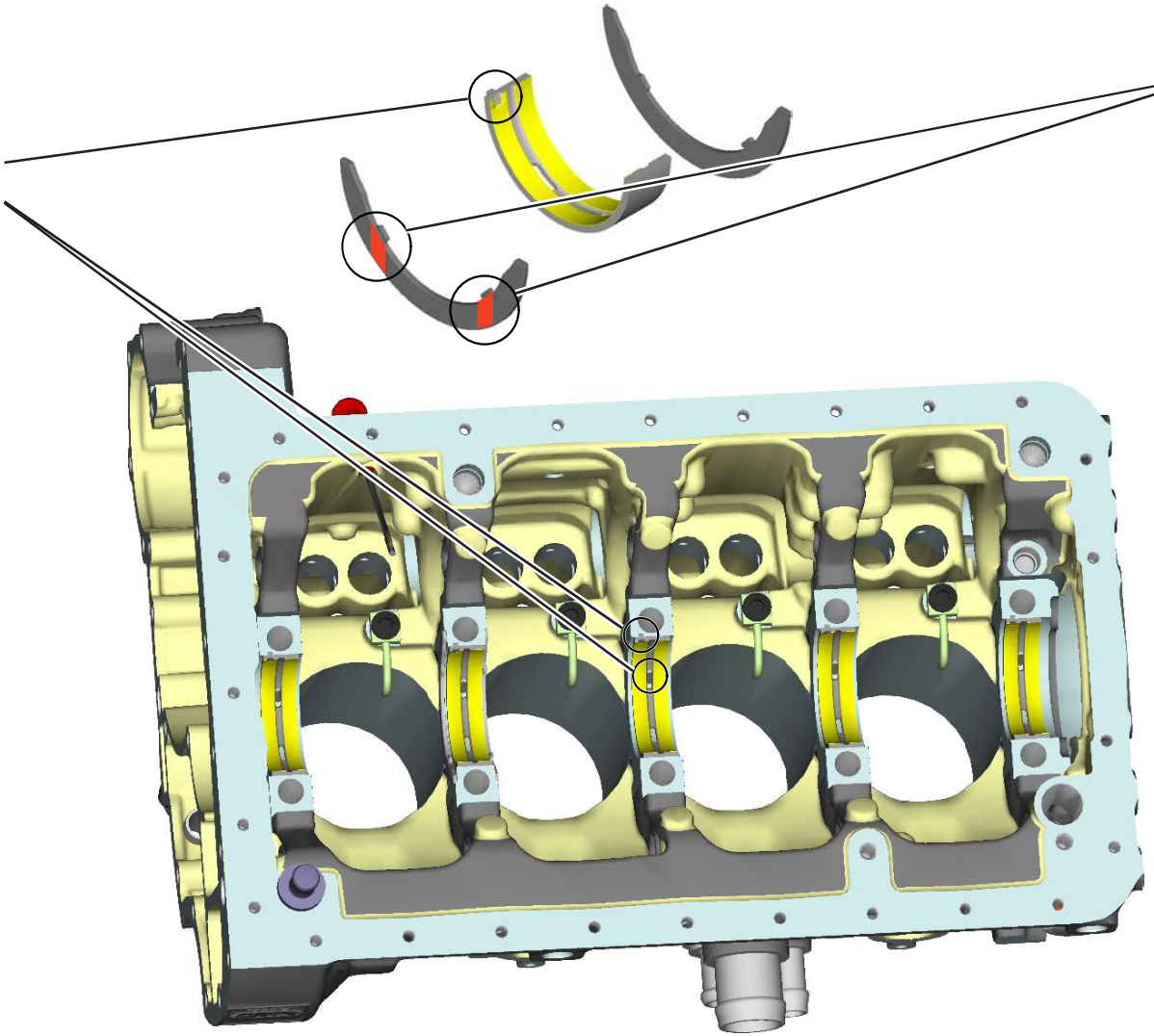




M 02 Crankshaft

Insert main bearing halves into cylinder block main bearing bracket and moisten with engine oil.

Heed the correct position of the oil holes and the position groove.



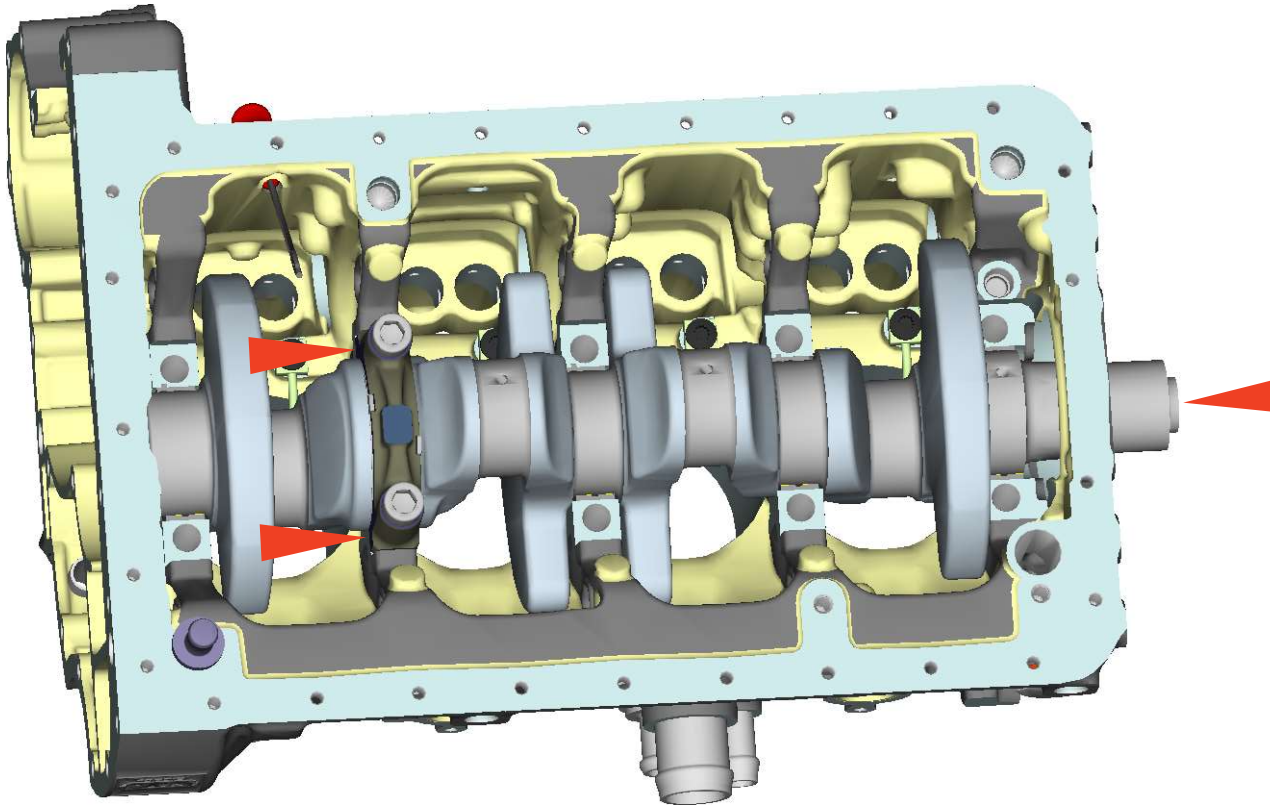
Insert thrust washer with grease.
Oil pockets point to the crankshaft sliding surfaces!

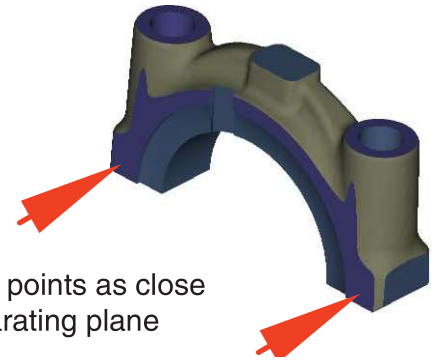
M 02 Crankshaft

Thread crankshaft into cylinder block.

Ensure axial play of the crankshaft through correct mounting of the main bearing bracket with thrust washers.

Before tightening the screws on the main bearing bracket, put the crankshaft and the main bearing bracket in the specified direction to the system.

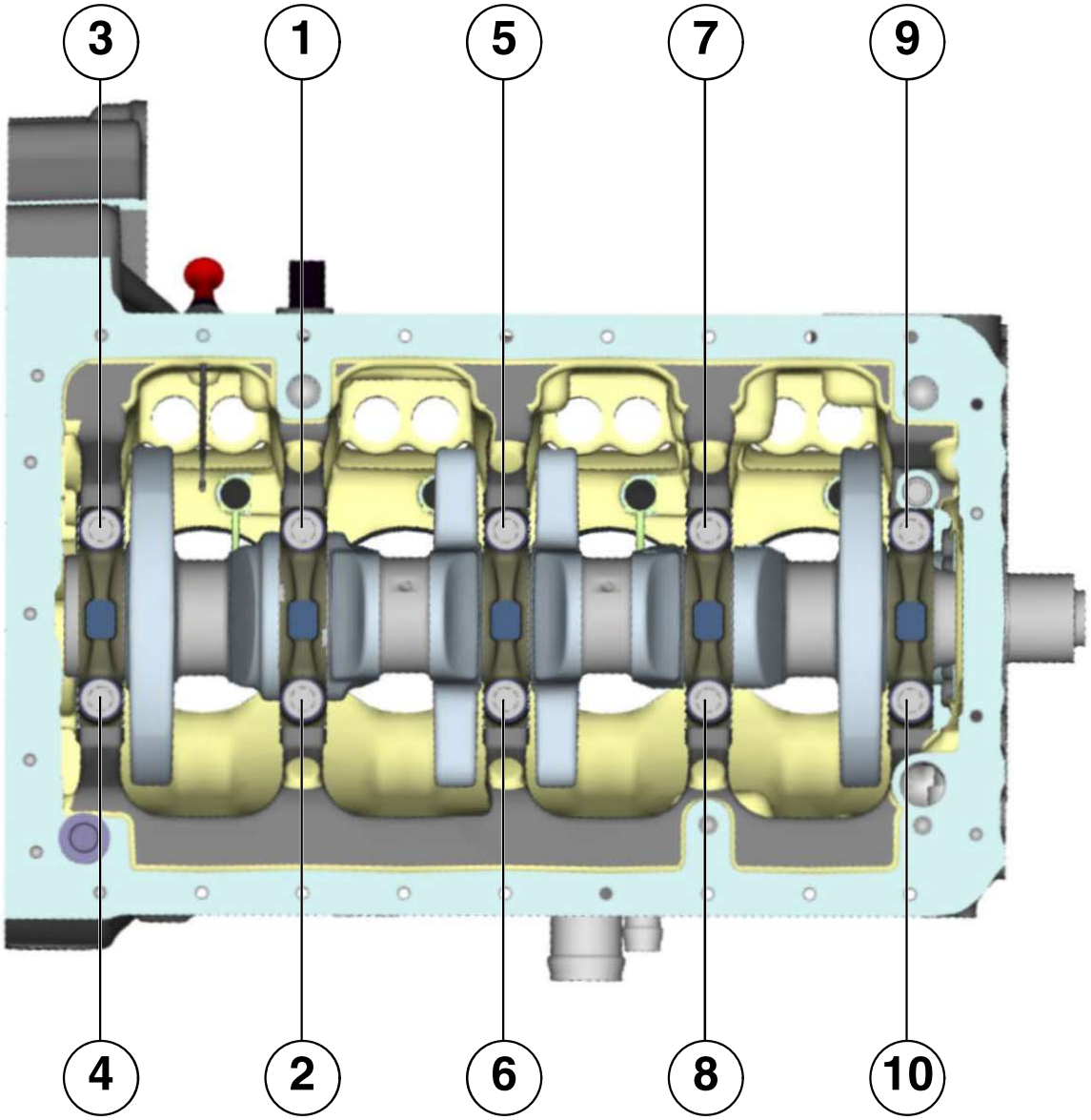




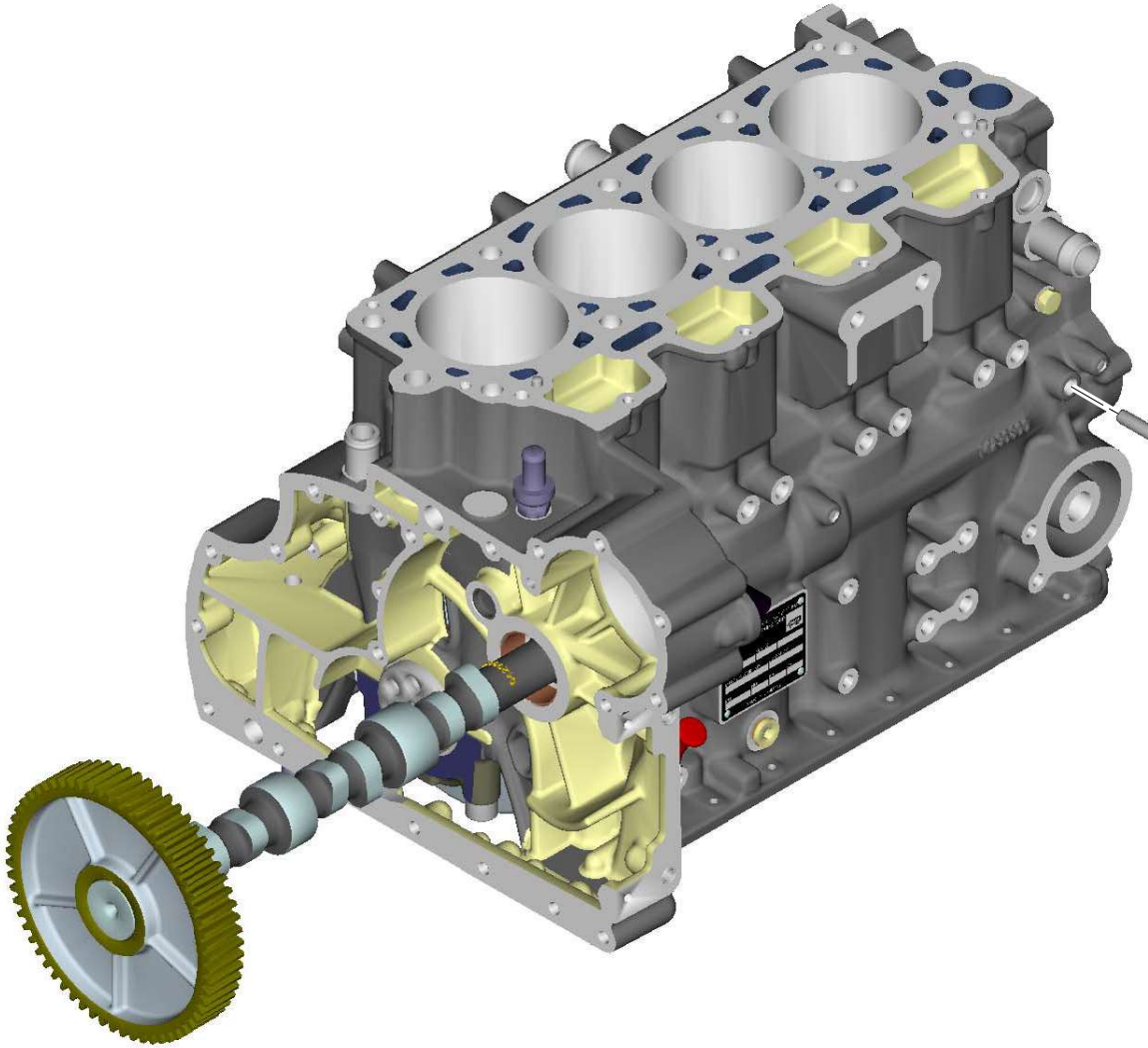
Force transmission points as close as possible to separating plane

Tighten main bearing bracket in the specified sequence.

Tightening torque:
1st level: 10 Nm
2nd level: 45 Nm
3rd level: 90 Nm



M 04 Camshaft



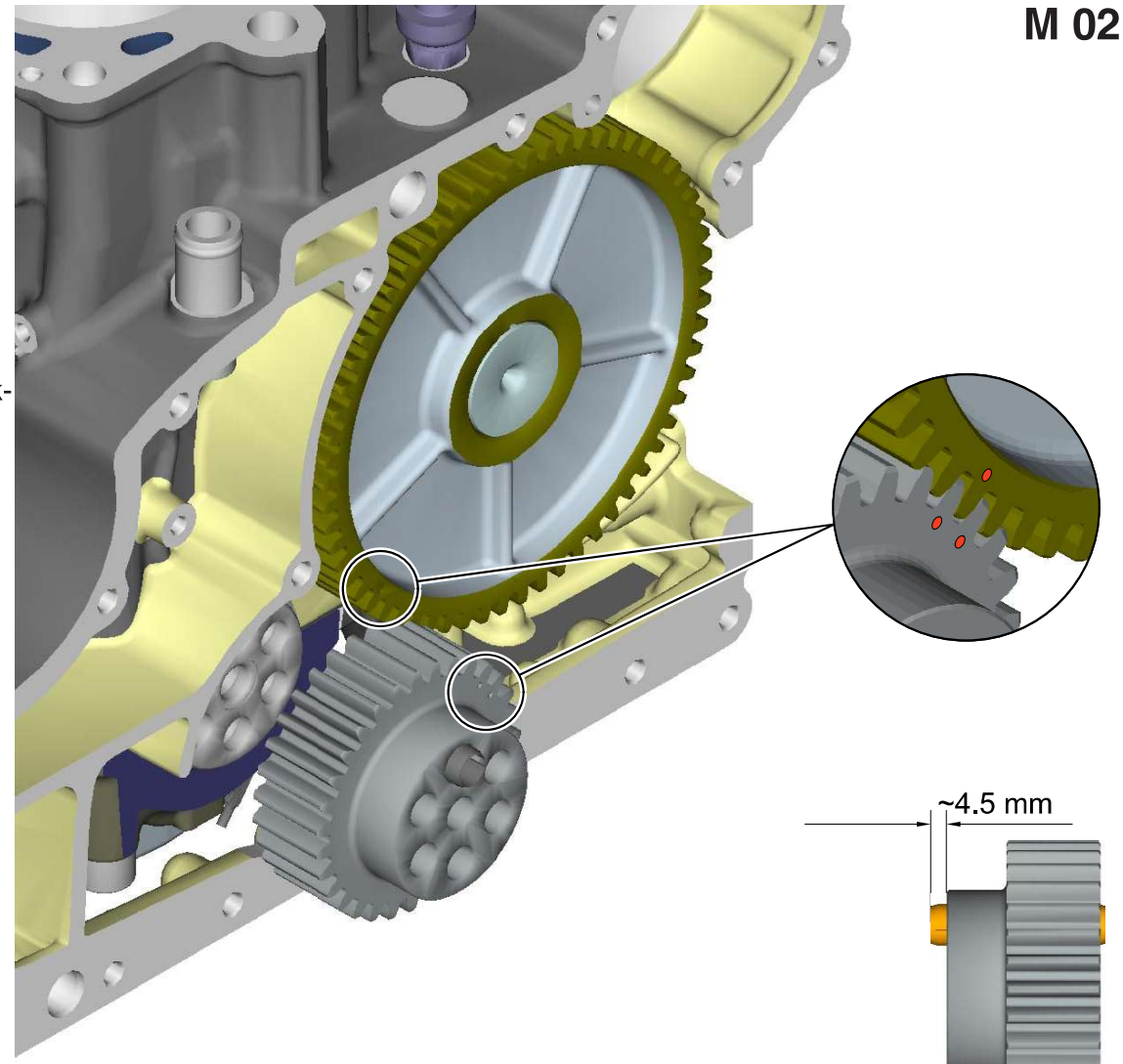
Grease camshaft bearing points with engine oil and insert camshaft into cylinder block.

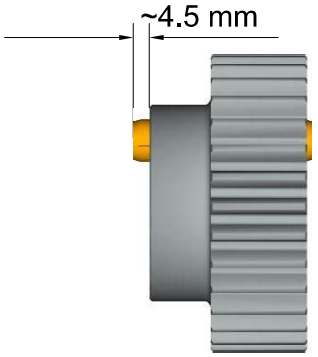
Cylinder pin 8 x 50

Threaded pin M10 x 10
Mount with Loctite 243
Tighten threaded pin up to stop
(max. 5 Nm),
then loosen half to three-quarters of a turn.

M 02 Crankshaft gear wheel

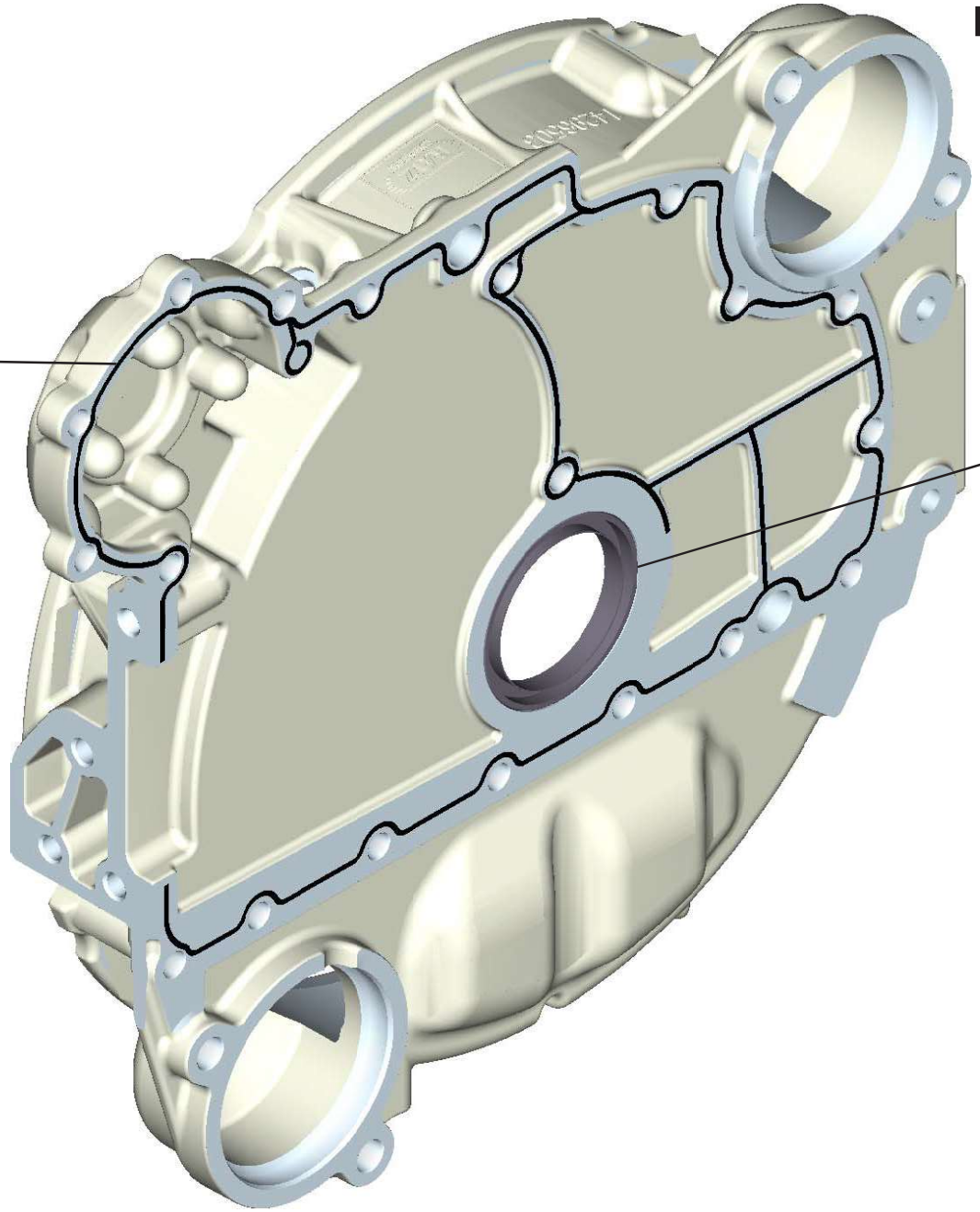
Place crankshaft gear wheel on crankshaft, heeding the correct positioning of the markings!





Press spring pin into crankshaft gear wheel to specified dimension.

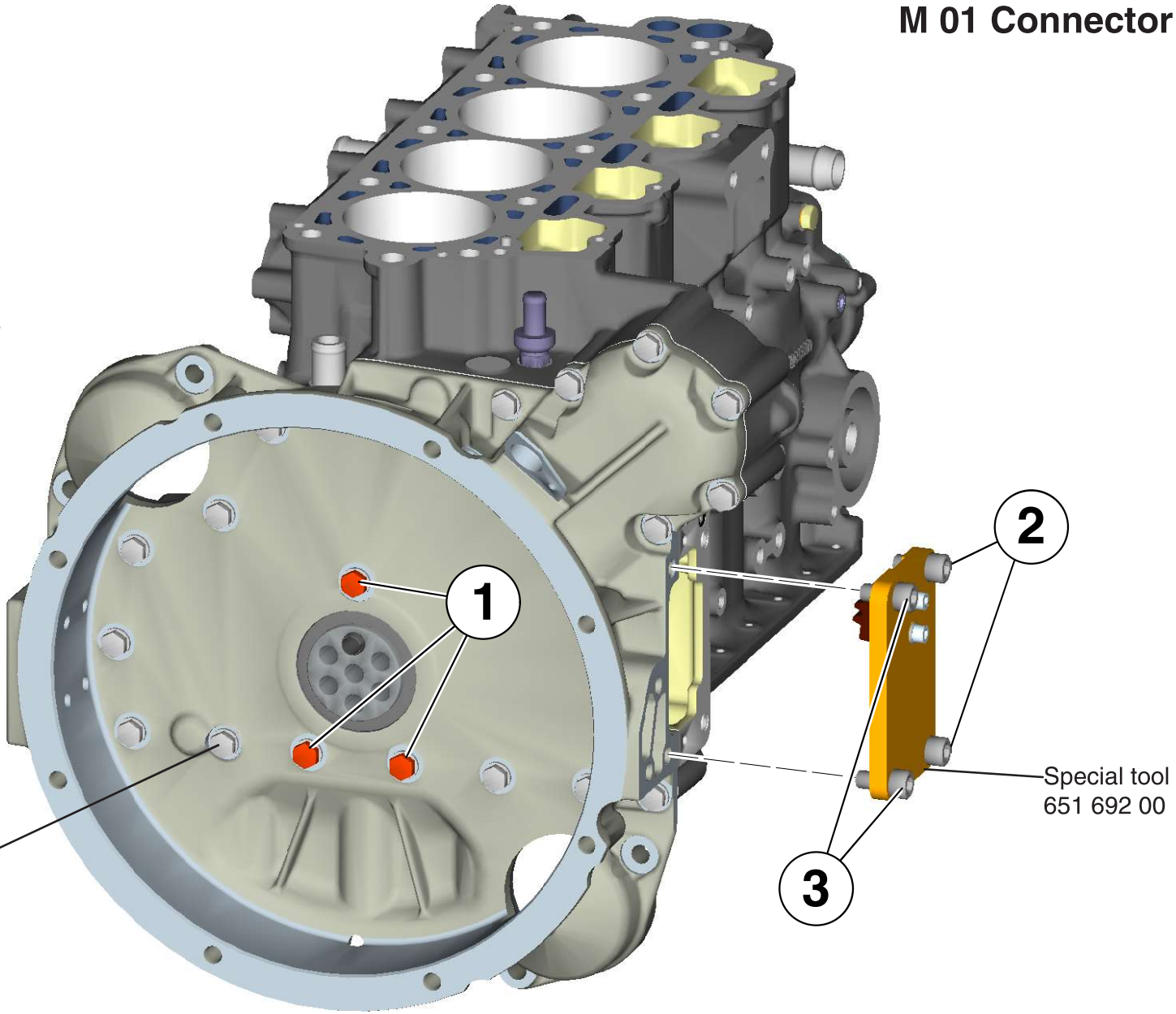
M 01 Connector housing



M 01 Connector housing

Place connector housing on cylinder block and tighten slightly by hand with the three screws **1.**
Screw special tool onto cylinder block **2** (23 Nm)
Screw special tool onto connector housing **3** (23 Nm);
this aligns the flange surface.
Tighten only the three screws **1** with 10-12 Nm.
Loosen screws **3** in order to avoid distortion, tighten all 19 combi screws (23 Nm).
Tighten special tool with screws **3** again (camshaft / crankshaft is blocked).

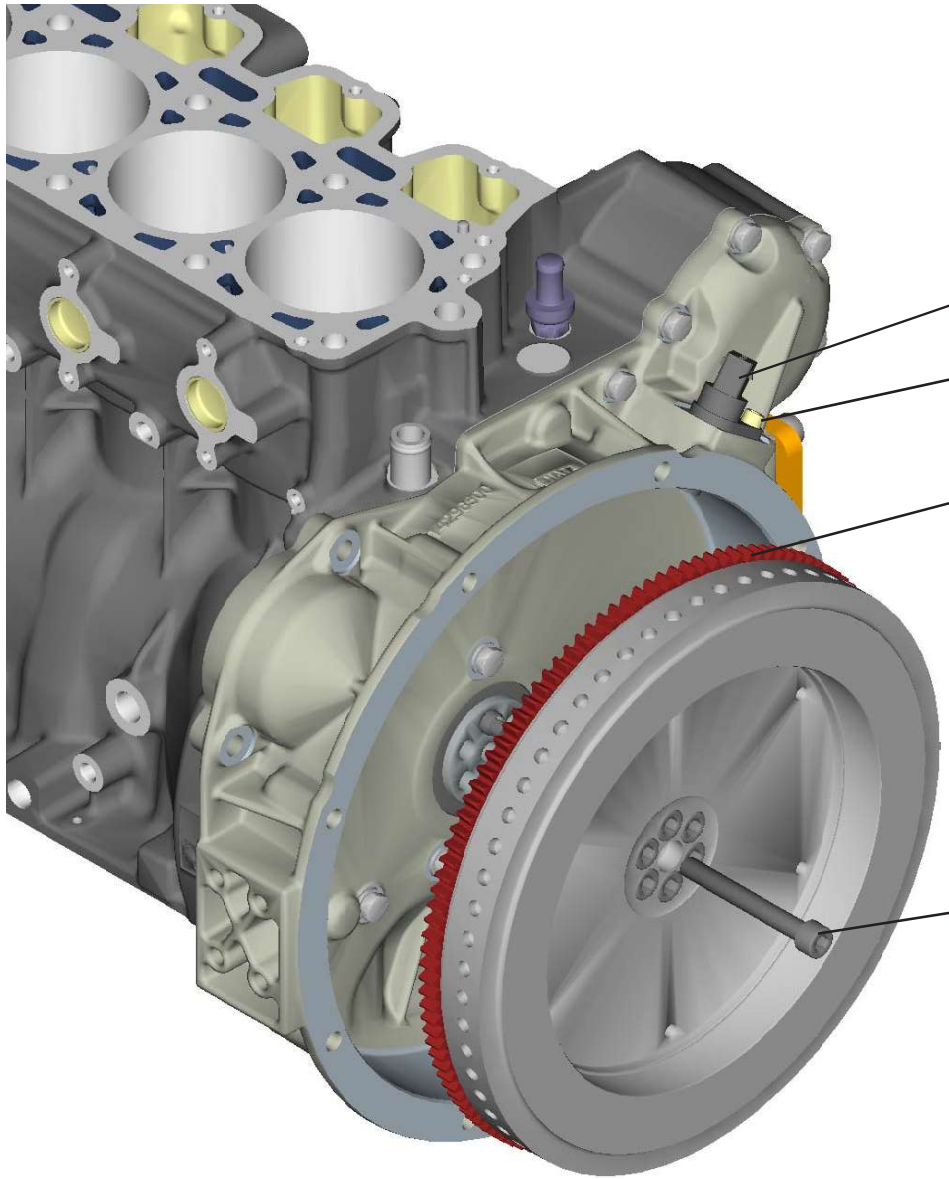
19x combi screw
ISO 10644 (ISO 4017 + 10673 N)
M 8x25 - 8.8 - A3B
23 Nm



M 17 Flywheel

Caution!

Remove speed sensor before dismounting the flywheel and only install after mounting the flywheel; otherwise it can be damaged by the sprocket.
Keep soiling to a minimum!
Front side is magnetic! Avoid contact with iron particles!



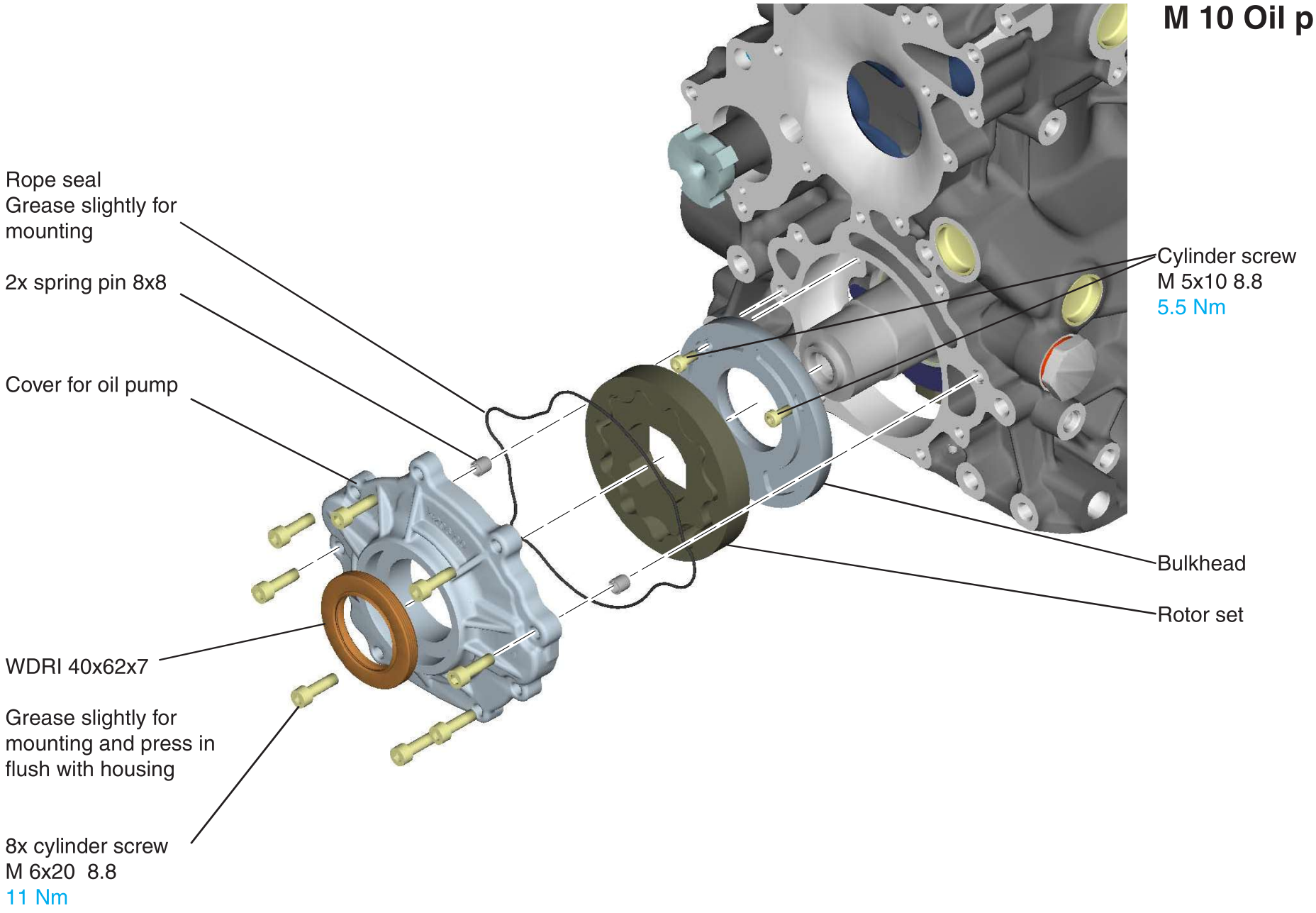
Speed sensor
DG6-S for flywheel

Cylinder screw M 6x20 8.8
9.5 Nm

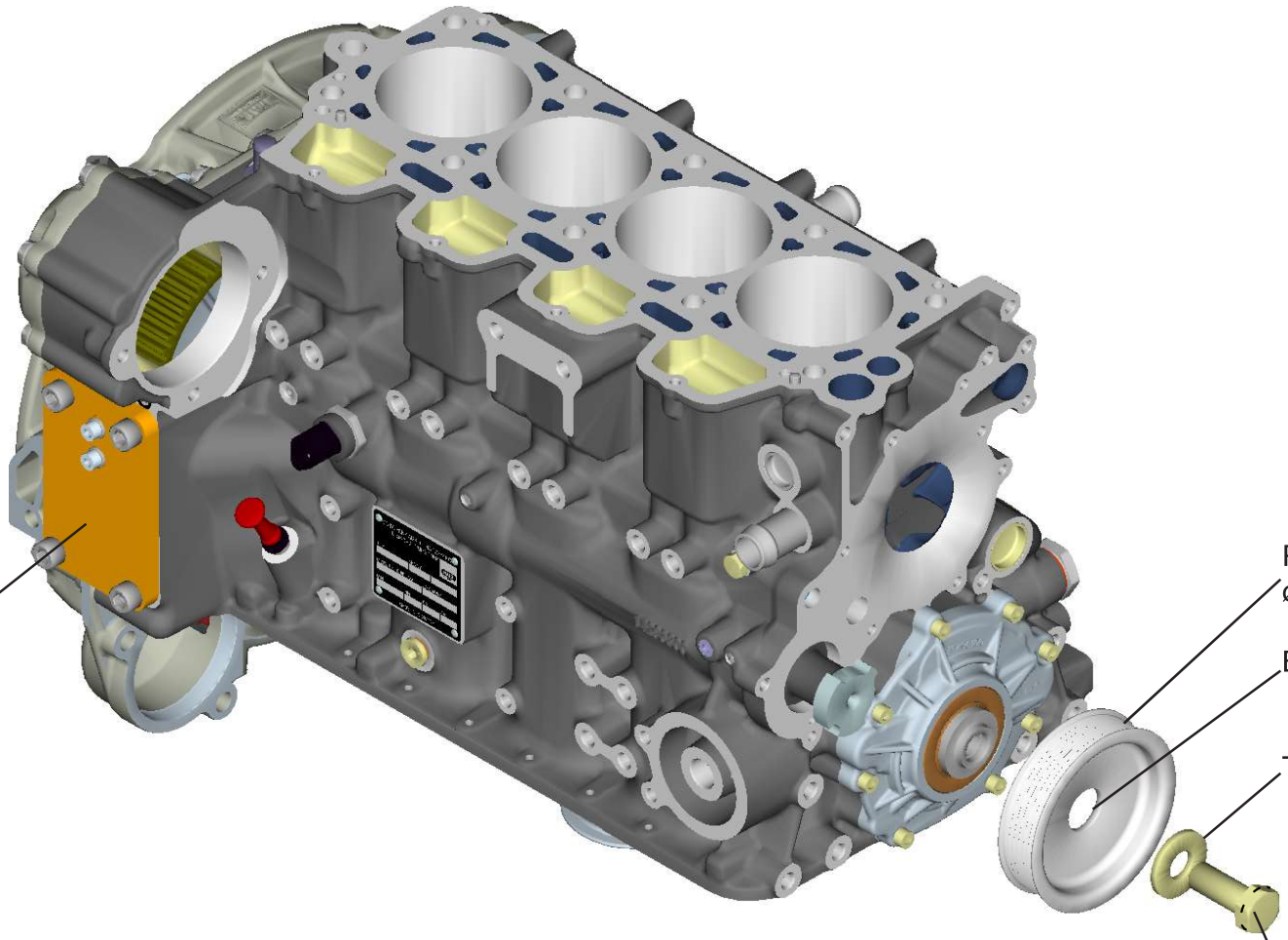
Sprocket
Mount in correct position at approx. 250°C (beveled side of the teeth must point in the direction of the starter)

7x cylinder screw
M 10x1x80 12.9
95 Nm

M 10 Oil pump


Rope seal
Grease slightly for mounting
2x spring pin 8x8
Cover for oil pump
WDRI 40x62x7
Grease slightly for mounting and press in flush with housing
8x cylinder screw
M 6x20 8.8
11 Nm
Cylinder screw
M 5x10 8.8
5.5 Nm
Bulkhead
Rotor set

Z 30 Pulley



Special tool
651 692 00
Remove after tighten-
ing the pulley.

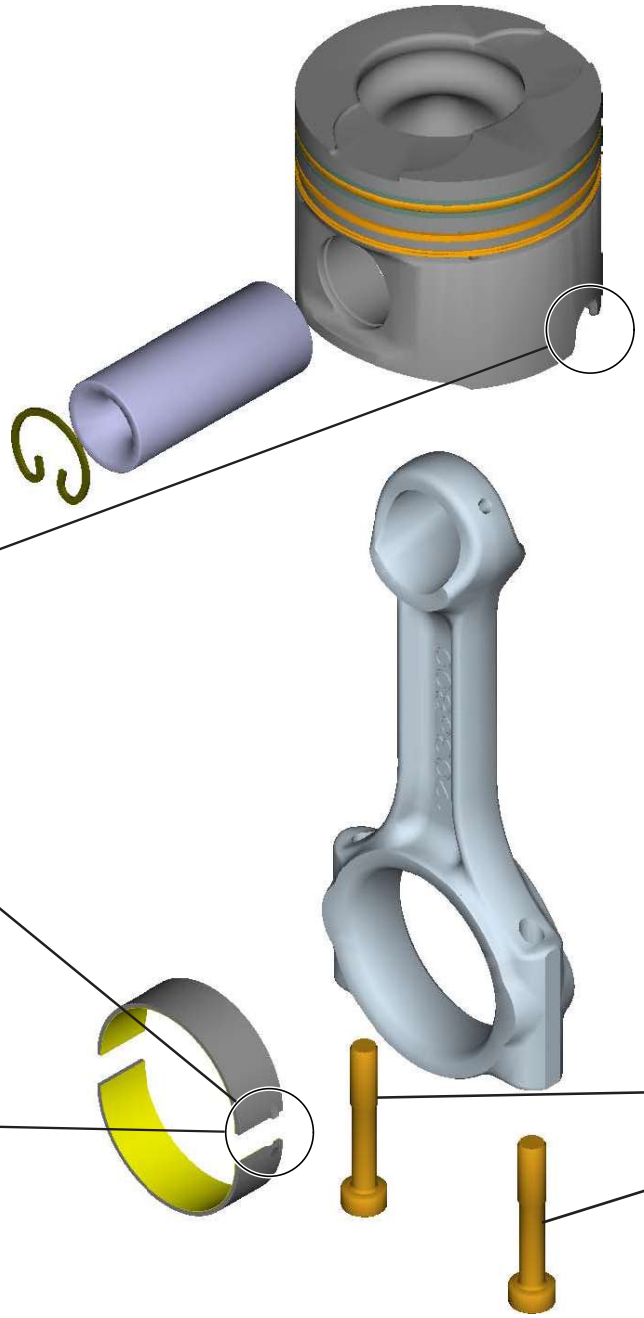
Pulley crankshaft
ø103 PK6

Bevel to the crankshaft

Tension washer 16

Cylinder screw
M 16x1,5x40 LH
Left thread!
200 Nm

M 05 Piston and conrod



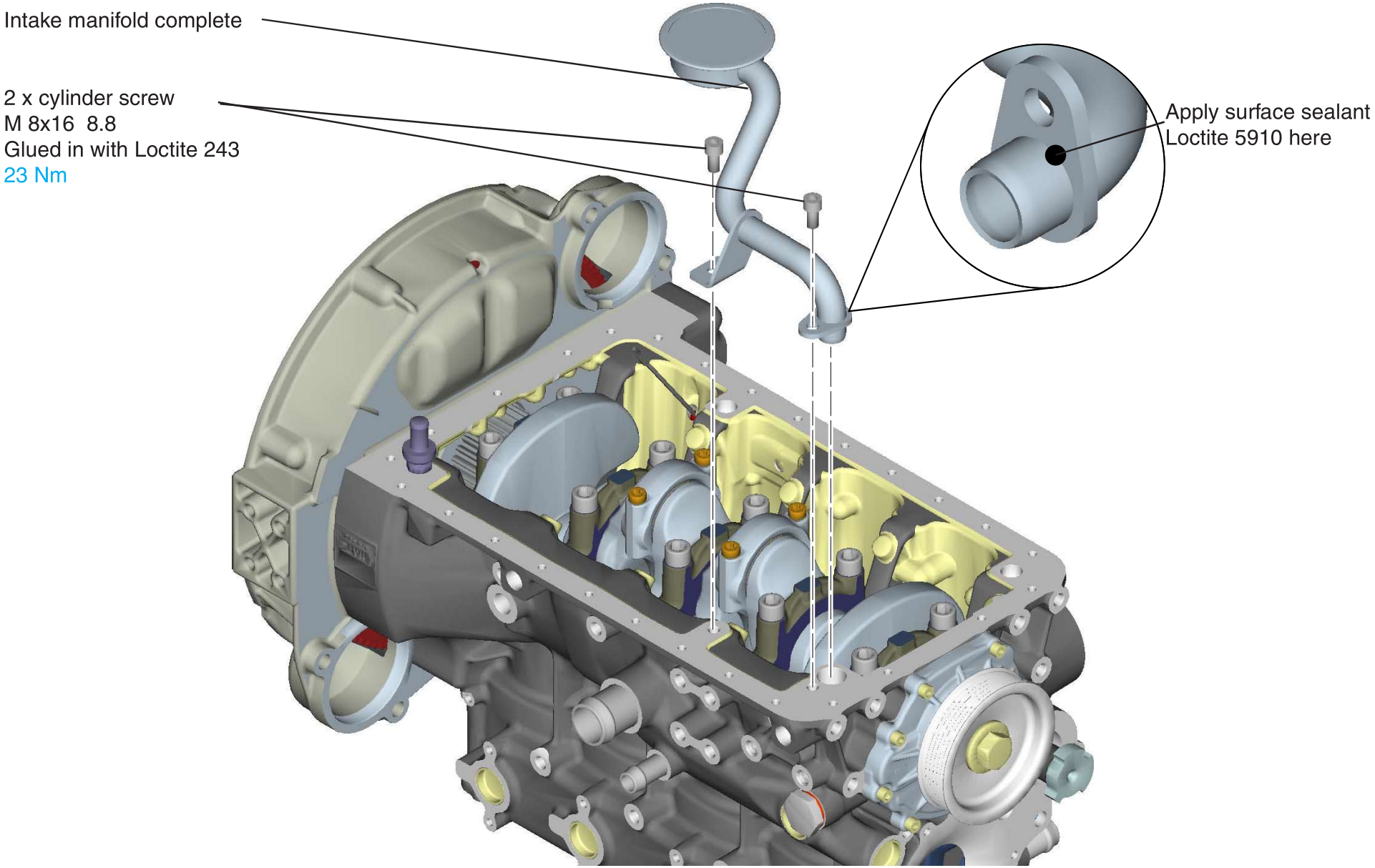
Mount piston in cylinder block with help of the piston ring collet chuck 626 383 00 (heed notch for oil spray nozzle).

Connect piston to con-rod, position grooves of the conrod bearing and notch for the oil spray nozzle on the piston are on the same side!

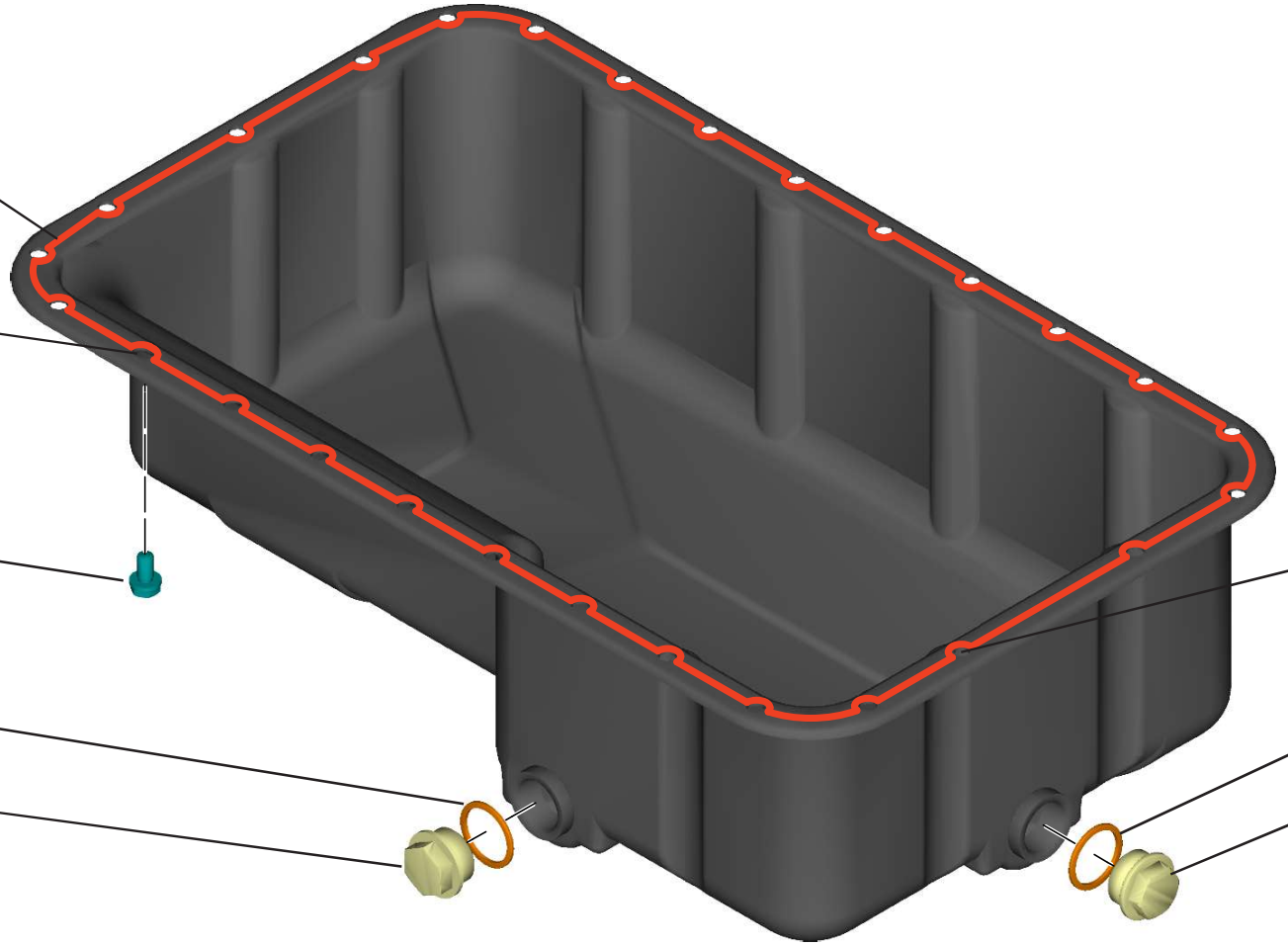
Mount bearing seats in conrod and oil (position grooves are on the same side)

Tighten conrod screws.
20 Nm + 65°

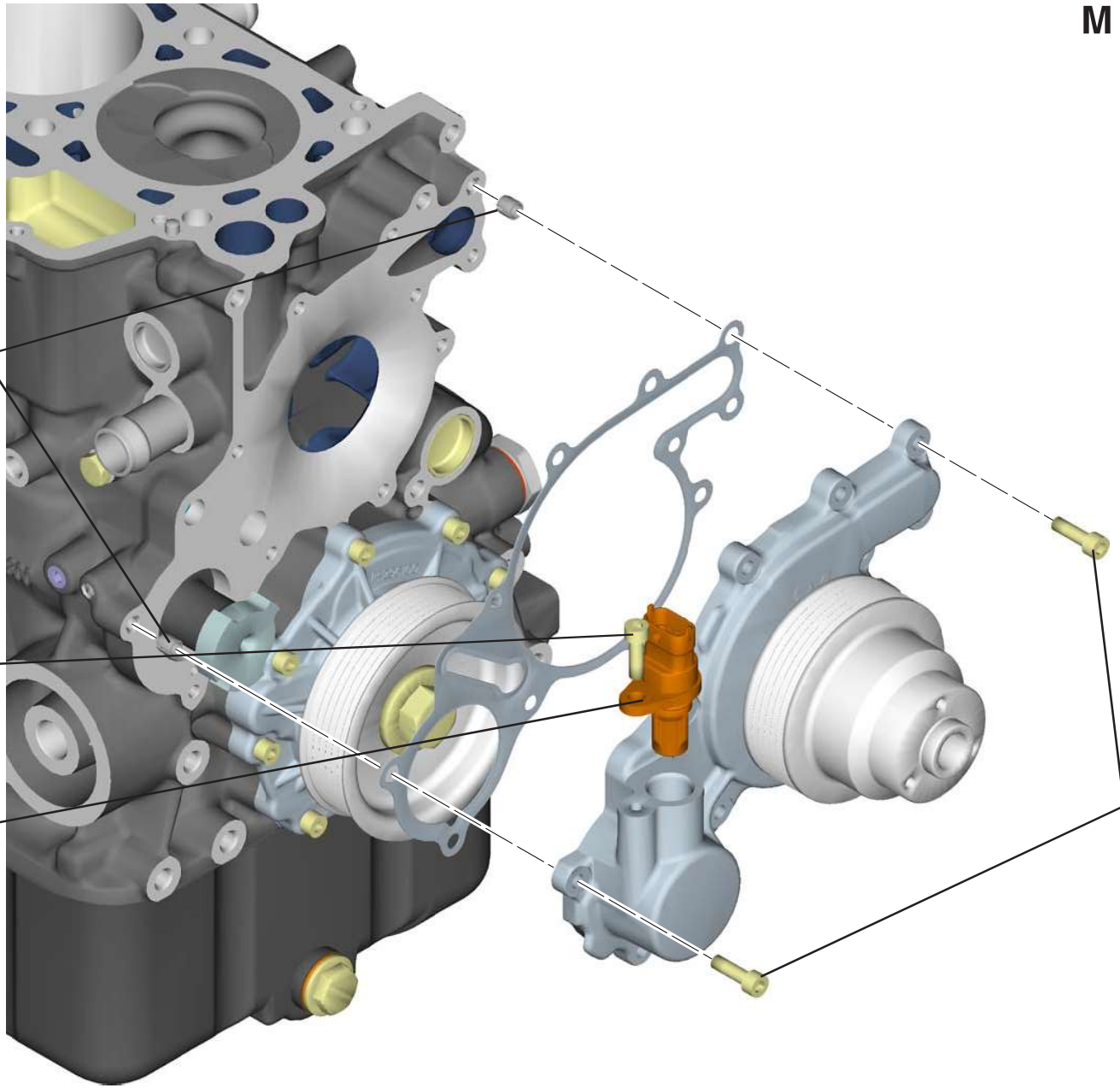
M 10 Intake manifold



M 01 Oil sump


Apply surface sealant
Loctite 5910 here ac-
cording to the red area
2nd screw connection
(long hole)
serves the alignment
Combi screw
M 6x13 8.8-A3D
9.5 Nm
Cu – sealing ring
Screw plug
AM 22x1.5
50 Nm
1st screw connection
(Ø6.2+0.1)
serves the positioning
Cu – sealing ring
Magnet screw plug
AM 22x1.5
50 Nm

M 36 Water pump



2 x spring pin 8x8
first mount in crank-shaft

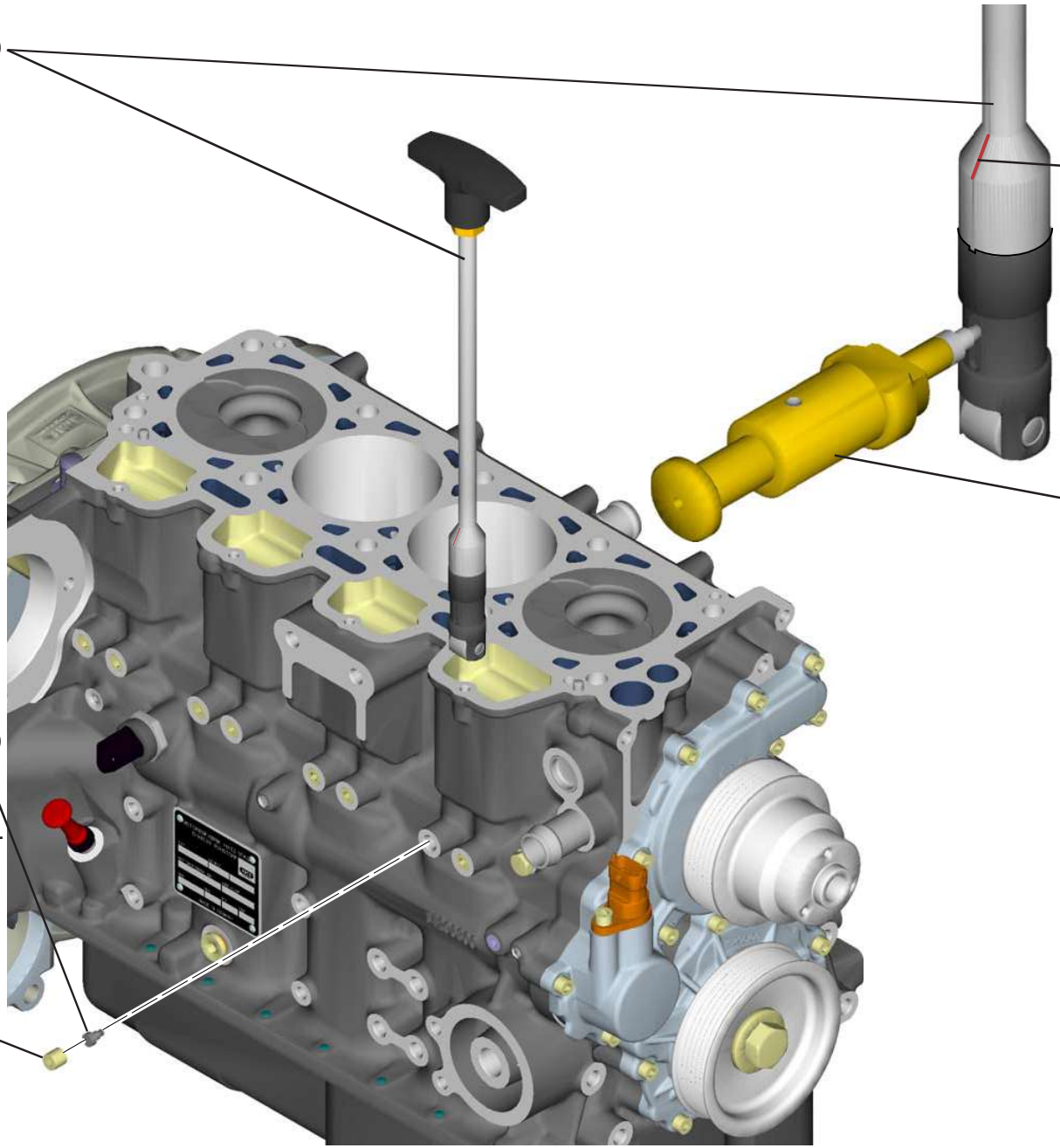
Cylinder screw
M 6x20
9.5 Nm

Phase encoder for cam shaft

11x cylinder screw
M 6x20
9.5 Nm

M 01 Roller tappet

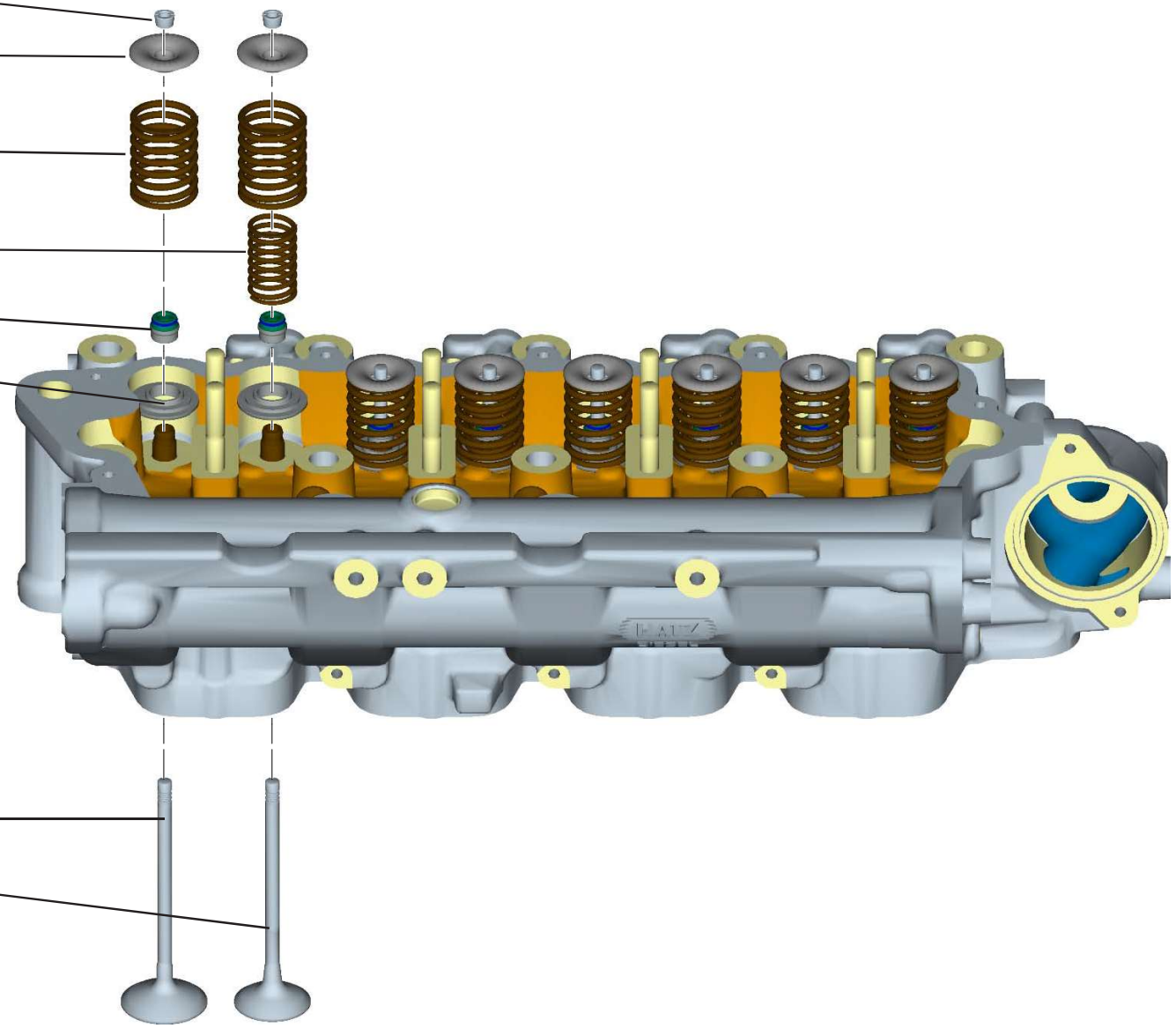
Place roller tappet on special tool 653 466 00 and insert into crankcase.



Insert guide pins with special tool 653 464 00 into crankcase. Ensure with a slight turning of the roller tappet that the guide pin is in the groove of the roller tappet.

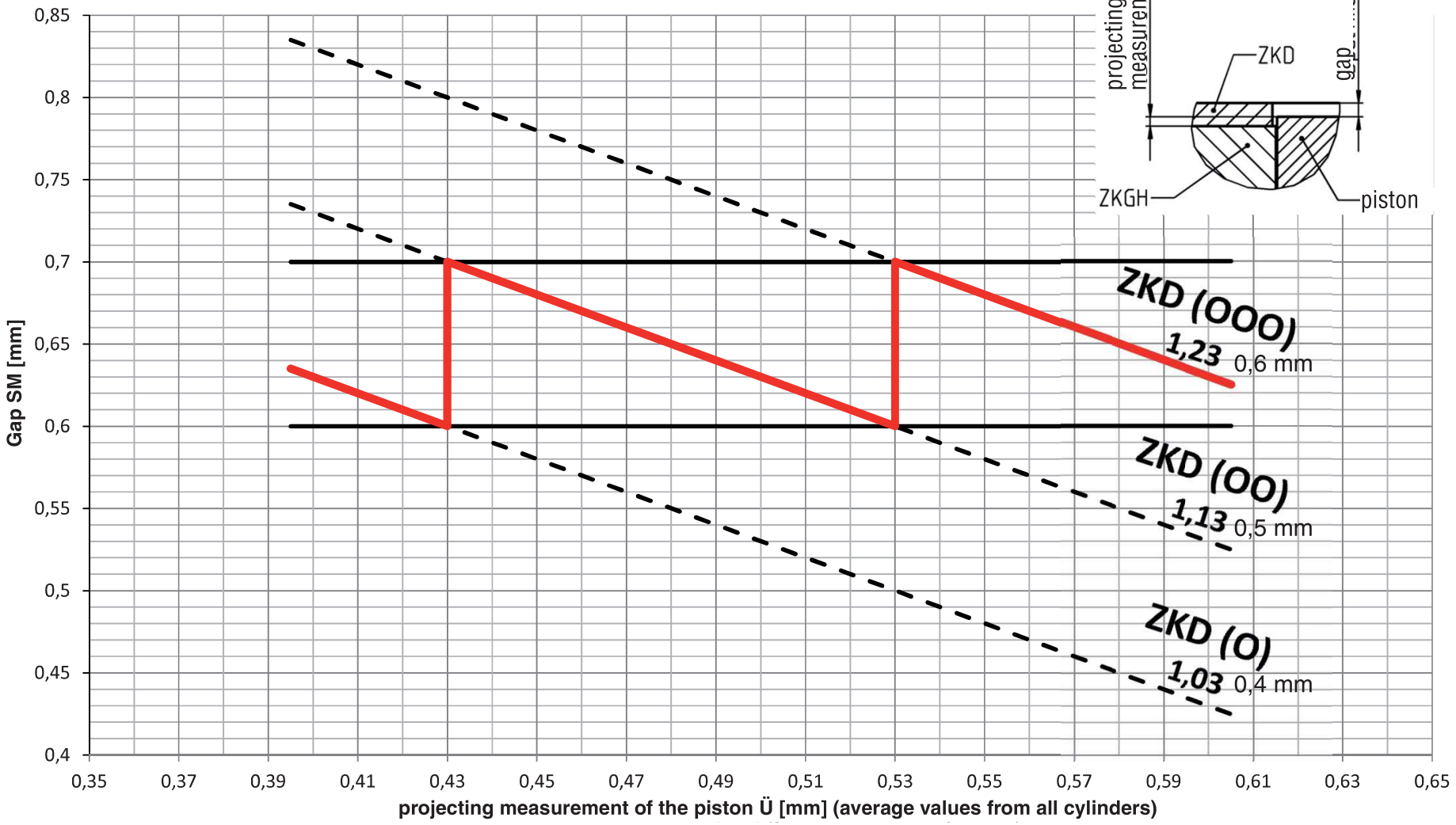
Threaded pin
M 10x10
Mount with Loctite 243
5 Nm

M 07 Cylinder head



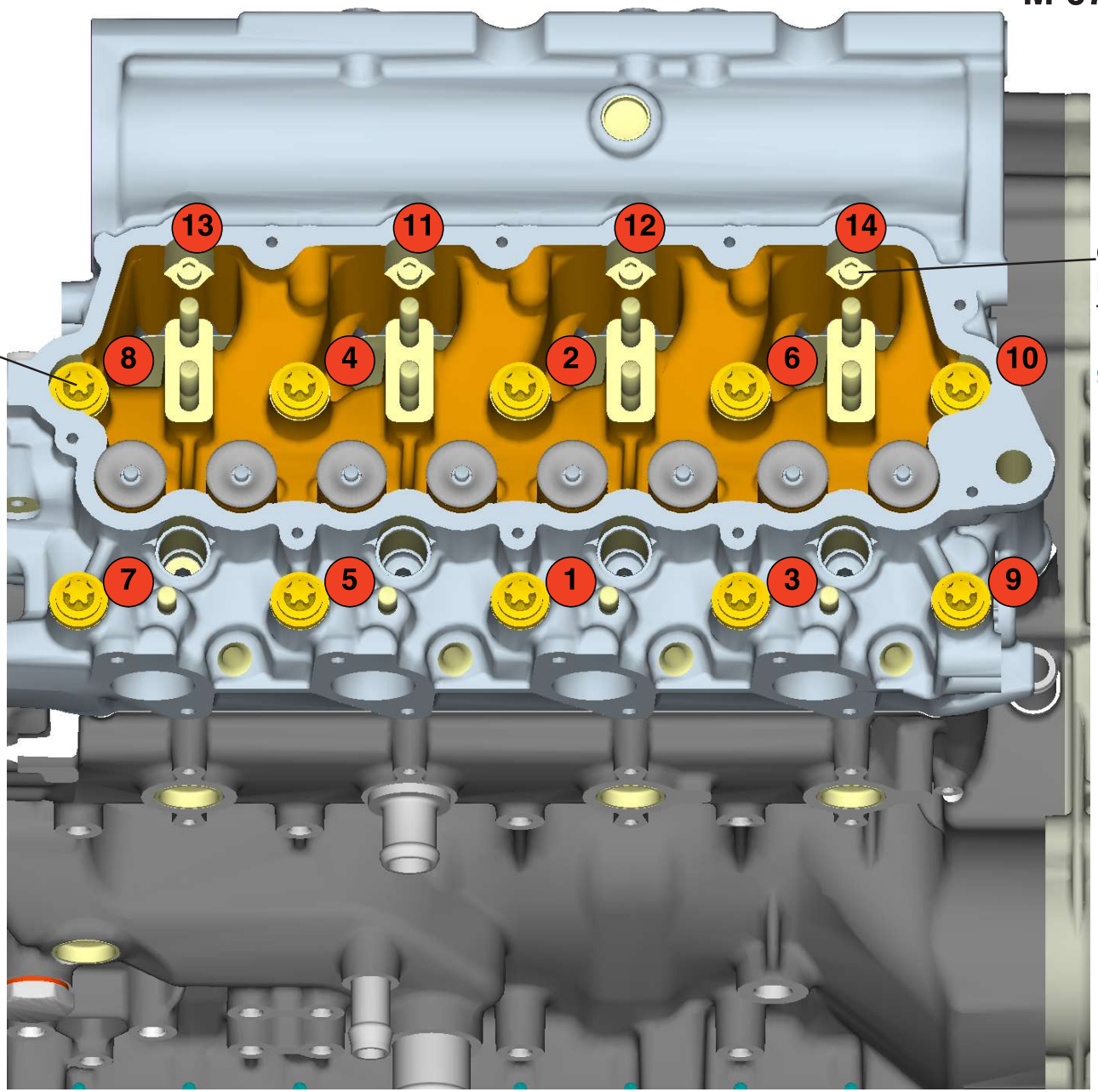
Insert and remove valves with special tool 629 223 01.

Choosing the right cylinder head seal engine H50
Gap 0.6...0.7



Determine piston protrusion with special tool 653 474 00 and select cylinder head seal according to table.

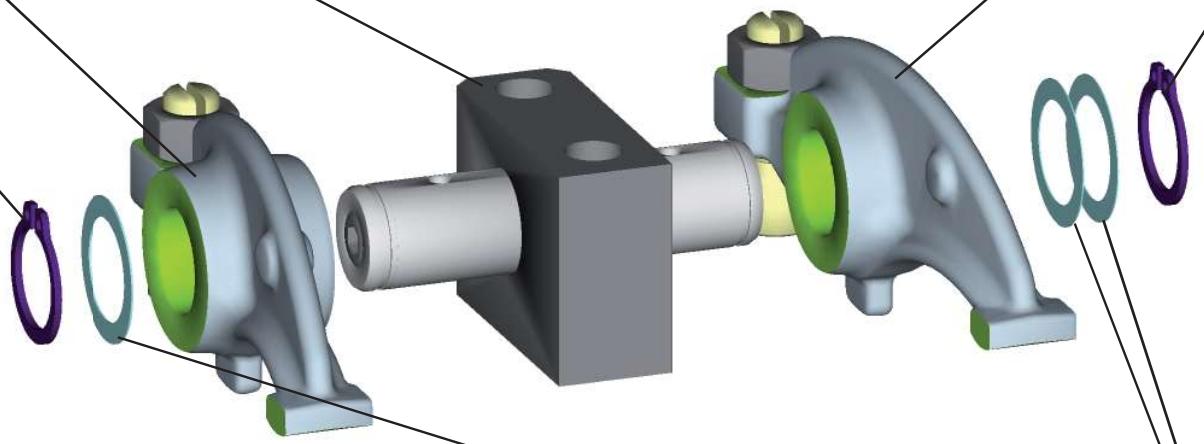
M 07 Cylinder head



Combi screw
M 12x130
Tightening process
1 - 10
1st stage: 20+2 Nm
2ndstage: 75°+5°
3rdstage: 75°+5°

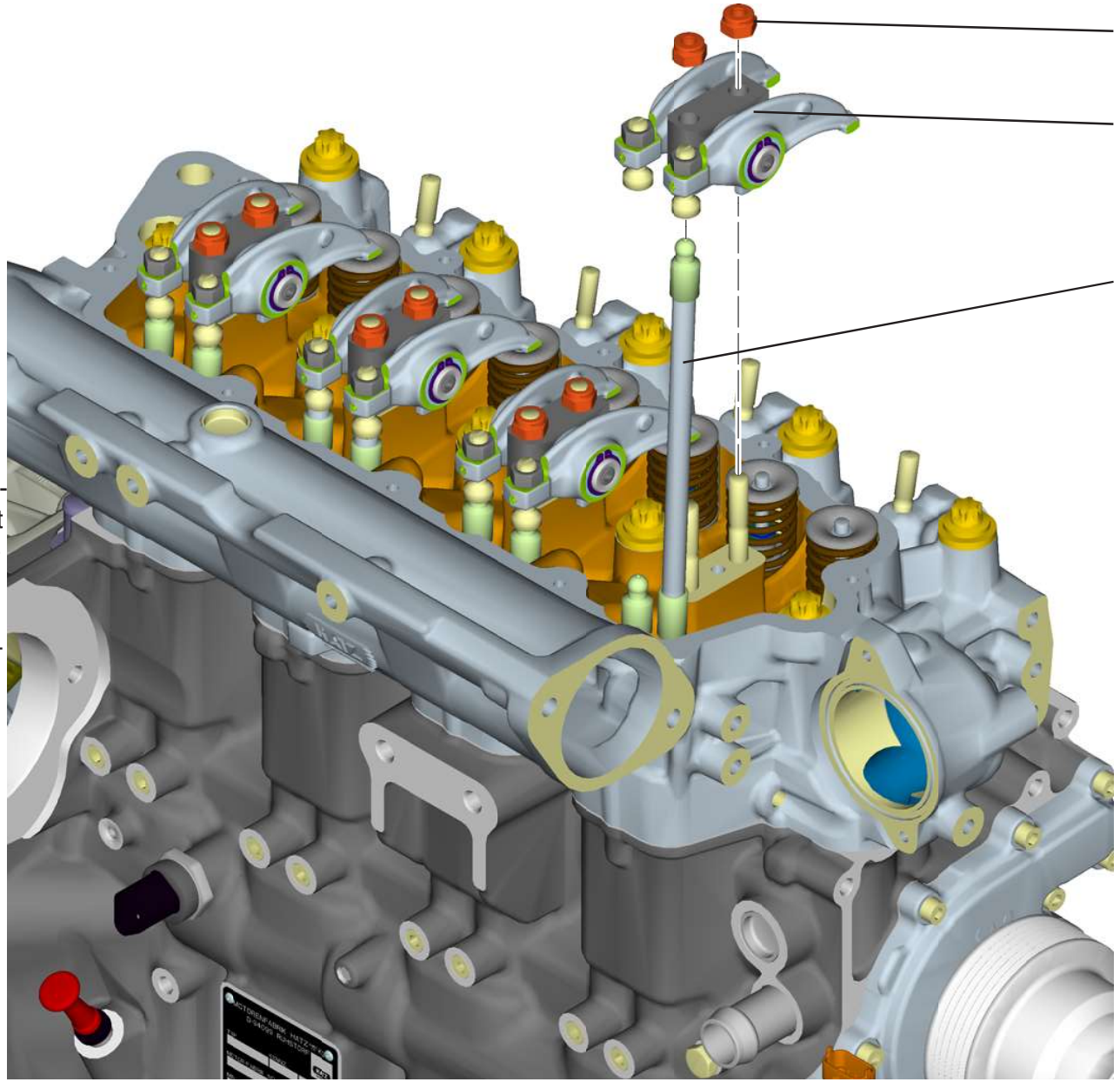
Cylinder screw
M 6x80
Tightening process
11 - 14
9.5 Nm

M 07 Rocker arm



M 07 Rocker arm

Basic setting tappet clearance:
Turn the cylinder to be adjusted in the working cycle.
Loosen the lock nut and turn adjusting screw in until the calotte of the adjusting screw lies against the spherical head of the push rod.
From this position, turn the adjusting screw 1 1/4 turns in and secure with lock nut.

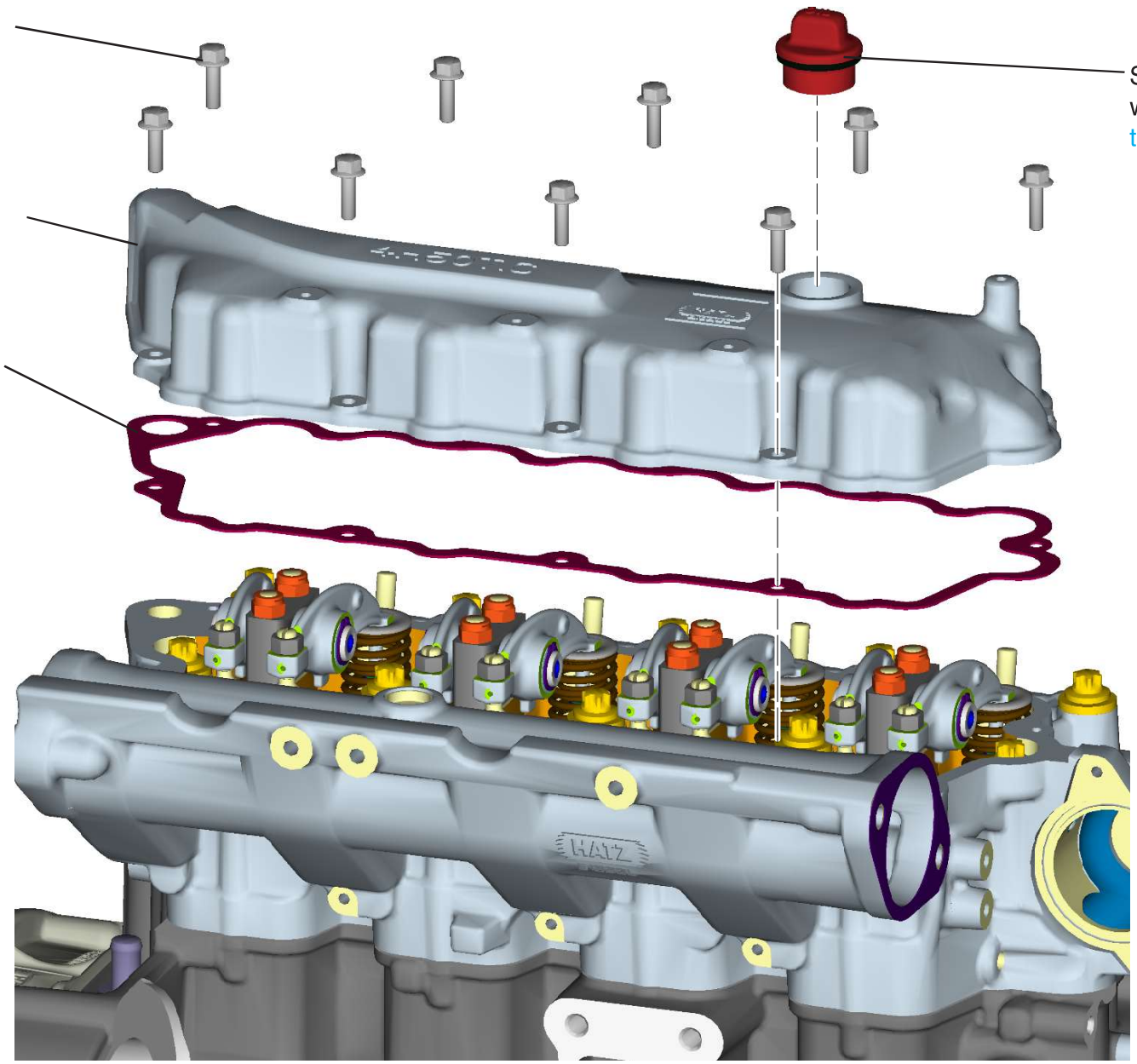


M 08 Cylinder head cover

Hexagon bolt
M 6x20 -F- A3B
9.5 Nm

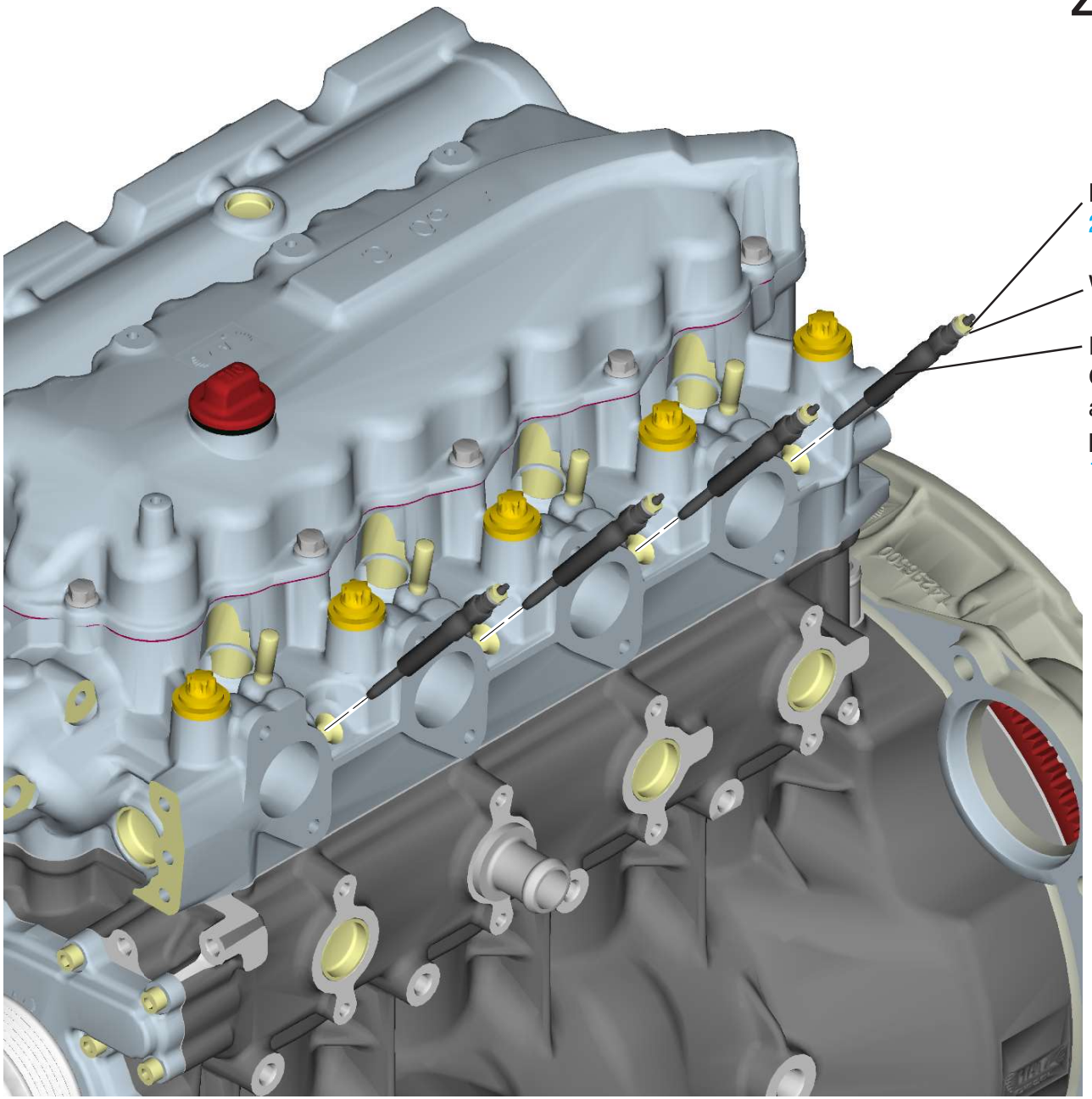
Cylinder head cover

Paper seal for the
cylinder head cover

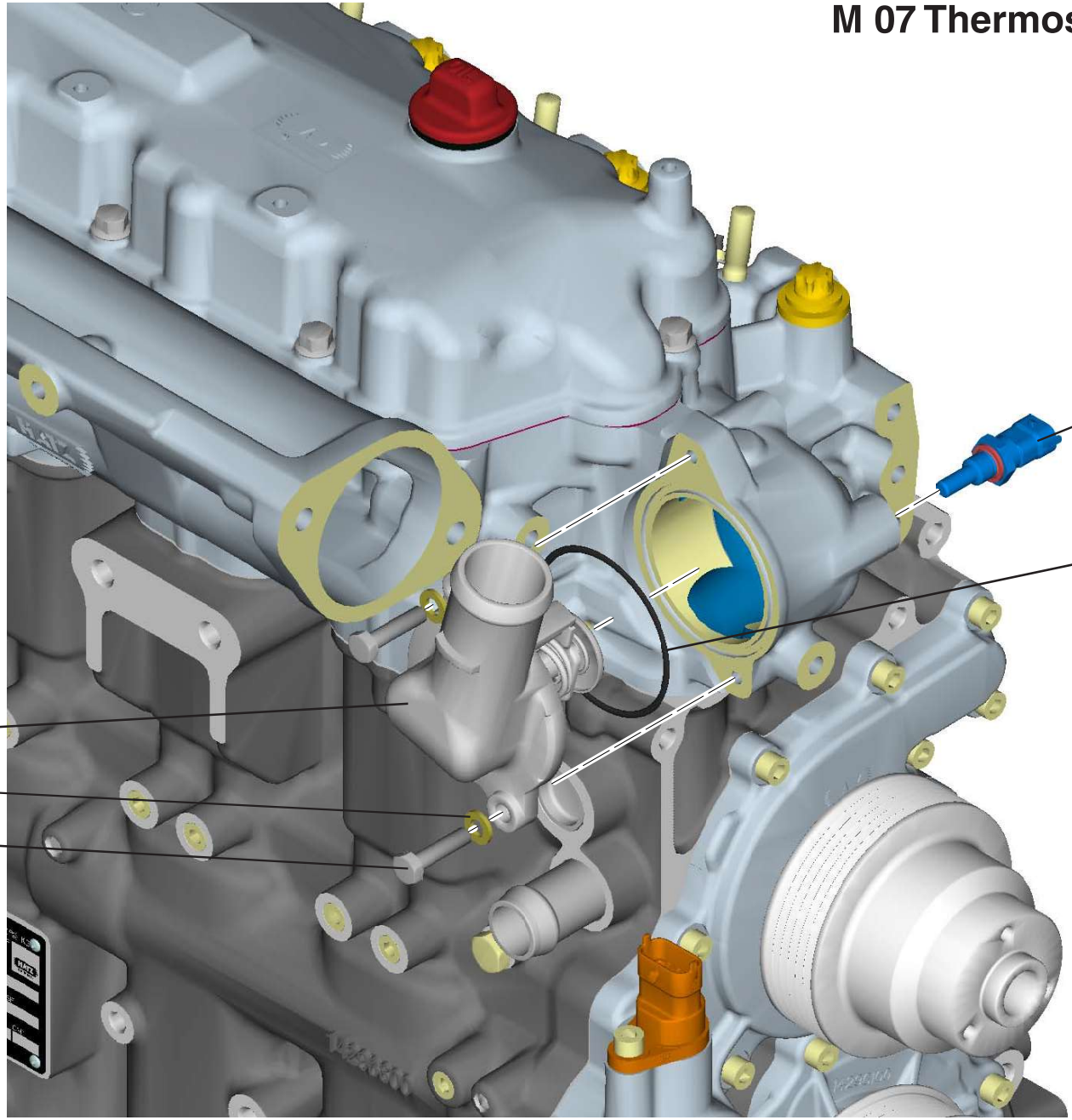


Screw plug for oil filler
with RK ring 26x35x3
tighten hand-tight

Z 05 Glow plugs



M 07 Thermostat, temp. sensor



Temperature sensor
TS cooling water
max. 25 Nm

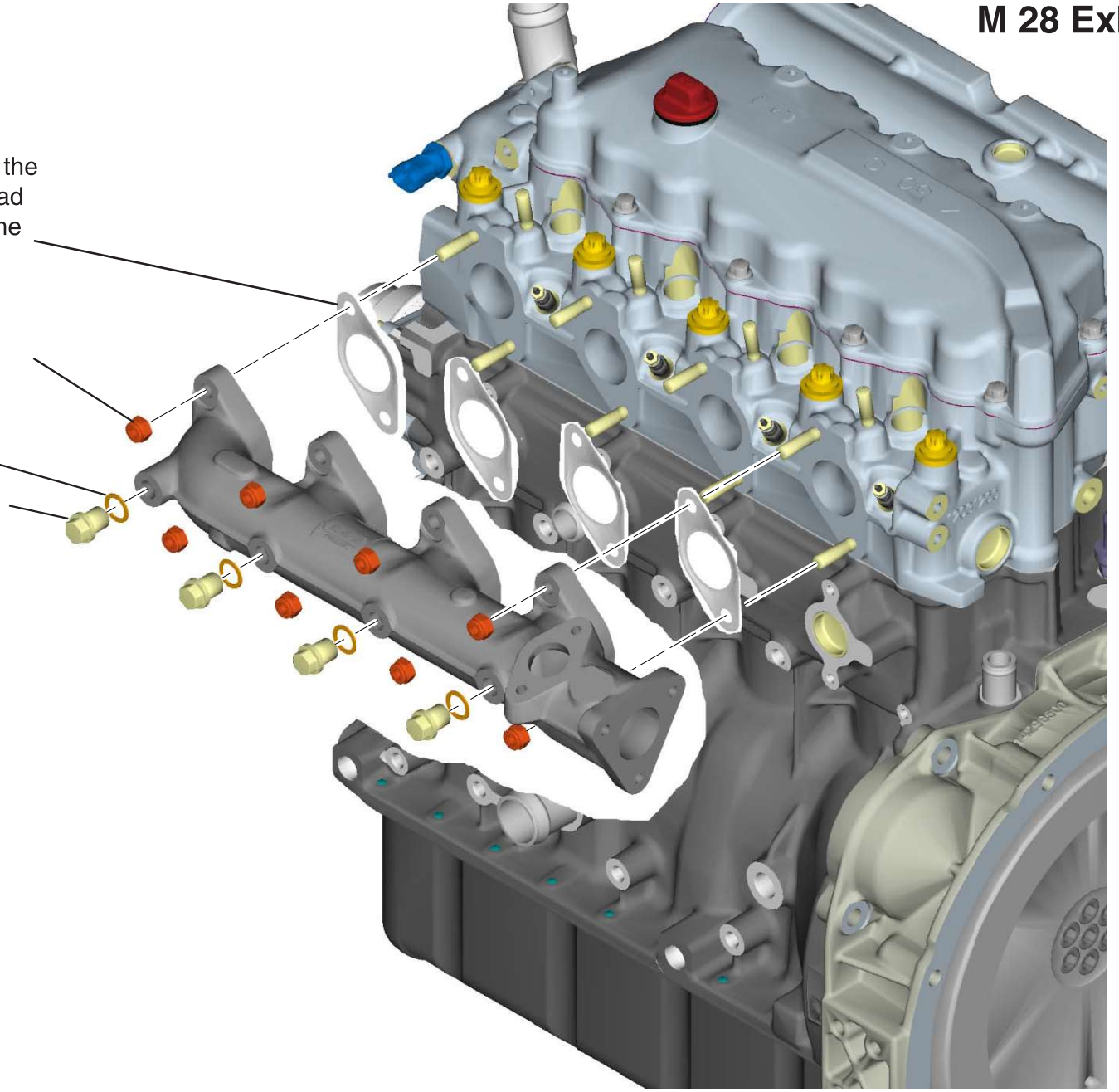
O-ring 58x2

Housing thermostat

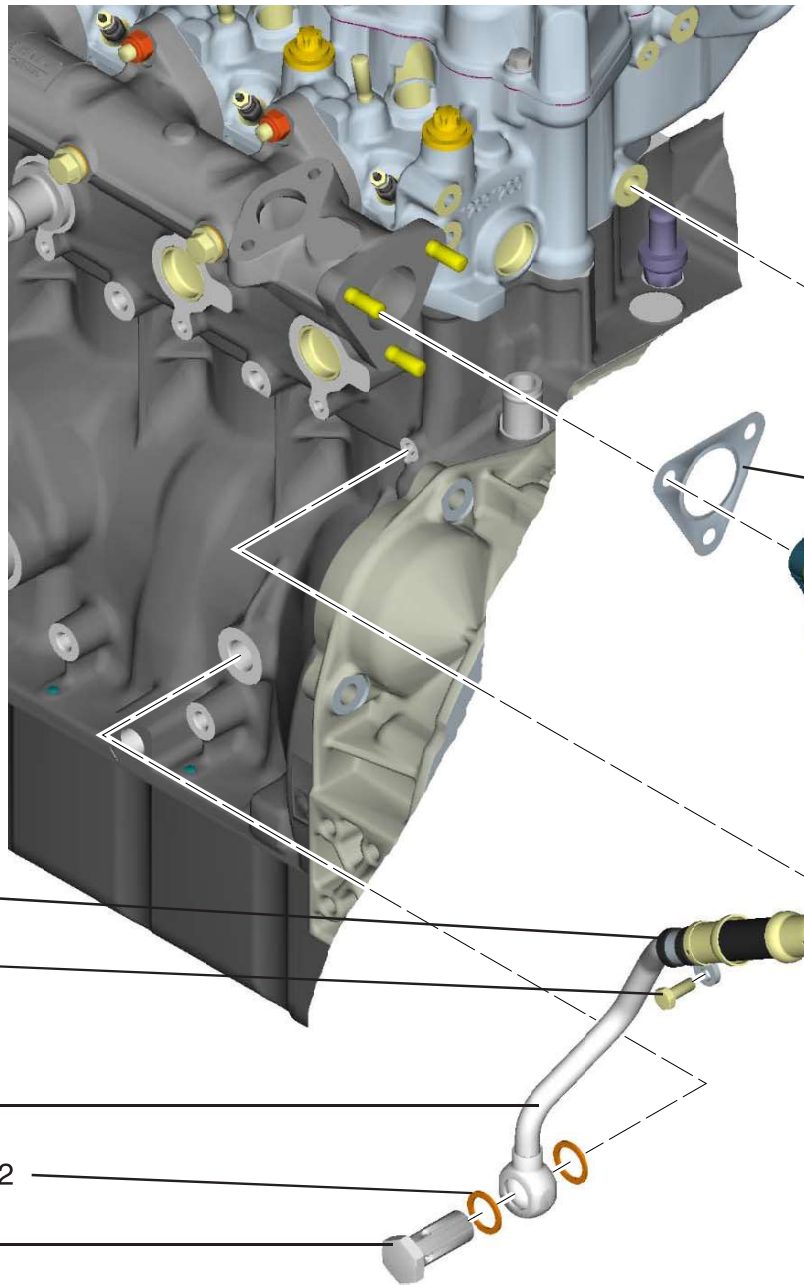
Washer 6.4

Hexagon bolt
M 6x25
11 Nm

M 28 Exhaust manifold



M 28 Turbocharger



Hollow screw 6 S
20 Nm

2 x sealing ring A 10x13.5

2 x sealing ring A 12x15.5

Hollow screw M 12x1.5
30 Nm

Pressure oil line

Turbocharger

Gasket for the turbo-charger
(position for the crimping at will)

3 x hex nut VM8
25 Nm

Gasket

2 x washer
A 6.4 DIN125

2 x hexagon bolt
M 6x16
9.5 Nm

Clamp

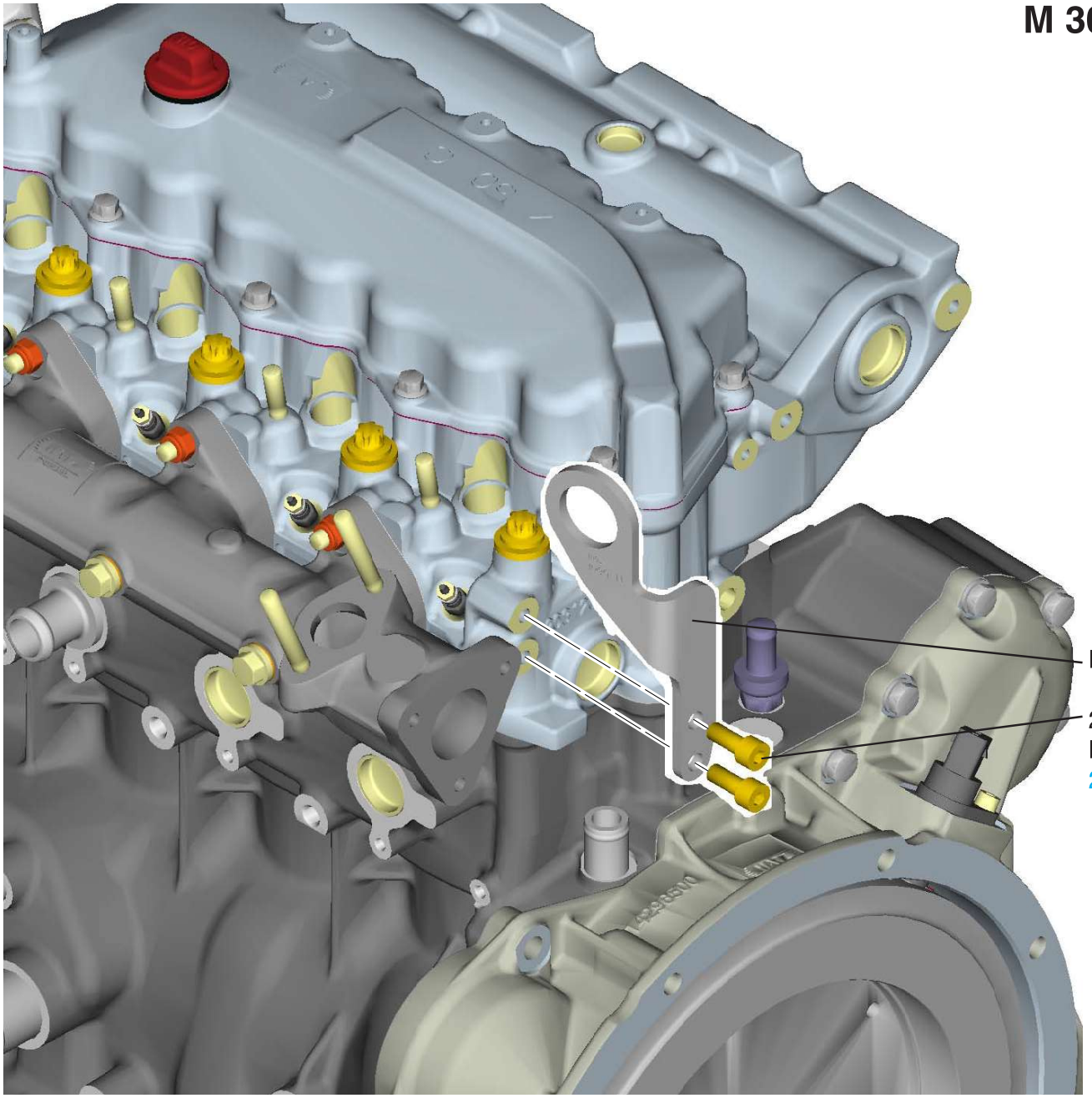
Hexagon bolt
M 6x16
9.5 Nm

Oil return line

2 x sealing ring A 16x22

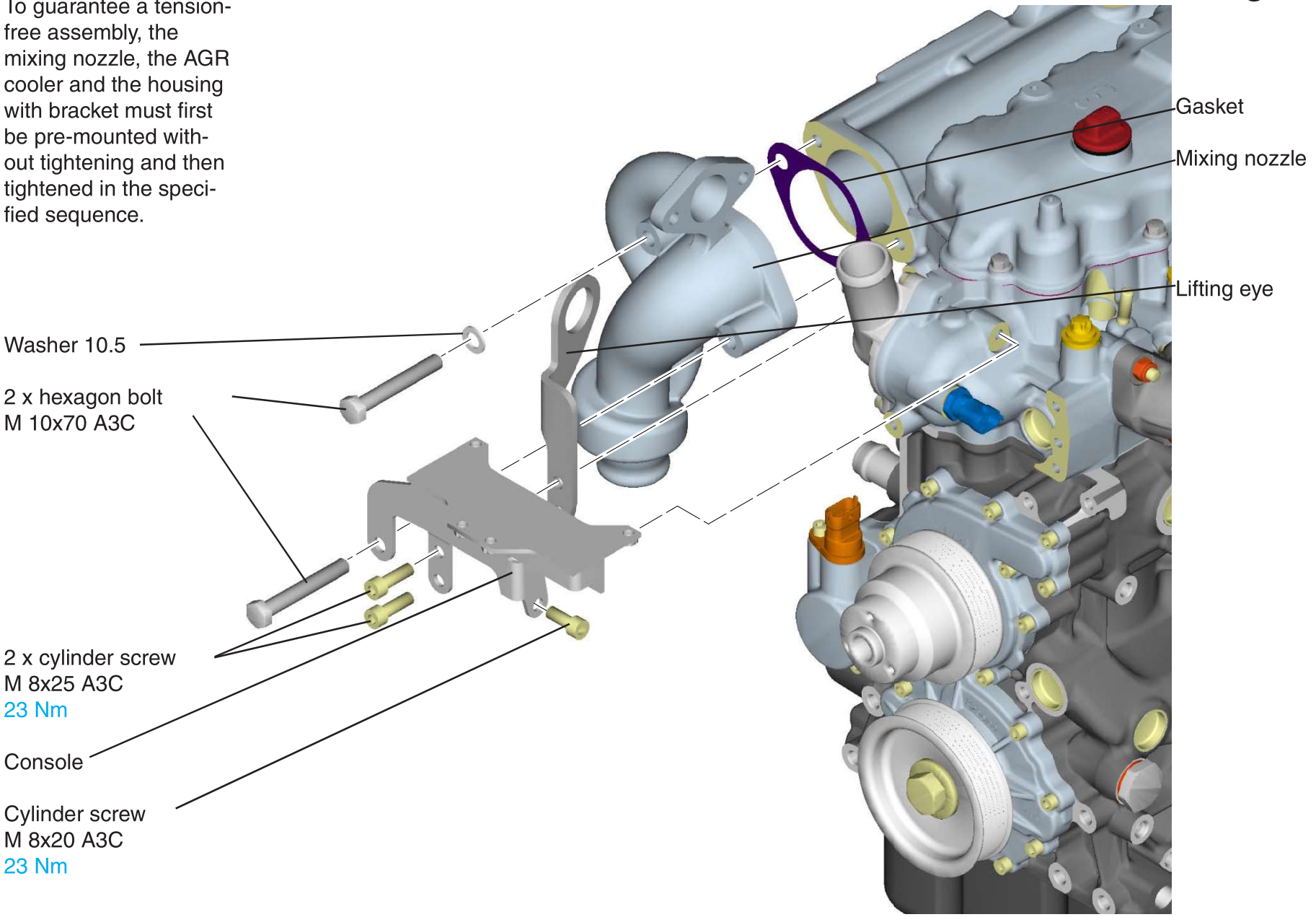
Hollow screw 10-3
55 Nm

M 30 Lifting device

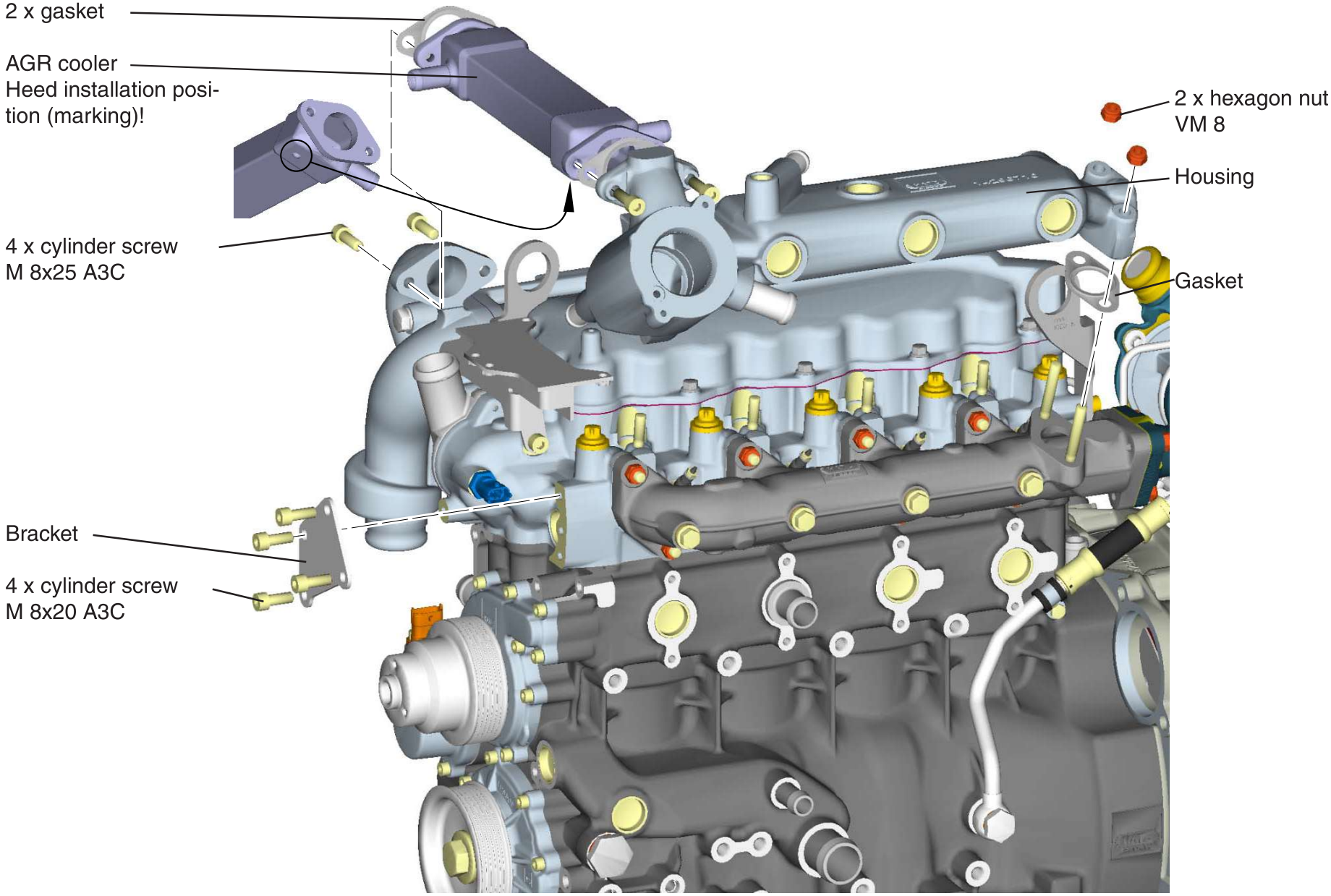


M 37 Exhaust gas return

Note:
To guarantee a tension-free assembly, the mixing nozzle, the AGR cooler and the housing with bracket must first be pre-mounted without tightening and then tightened in the specified sequence.



M 37 Exhaust gas return



M 37 Exhaust gas return

Tightening sequence:

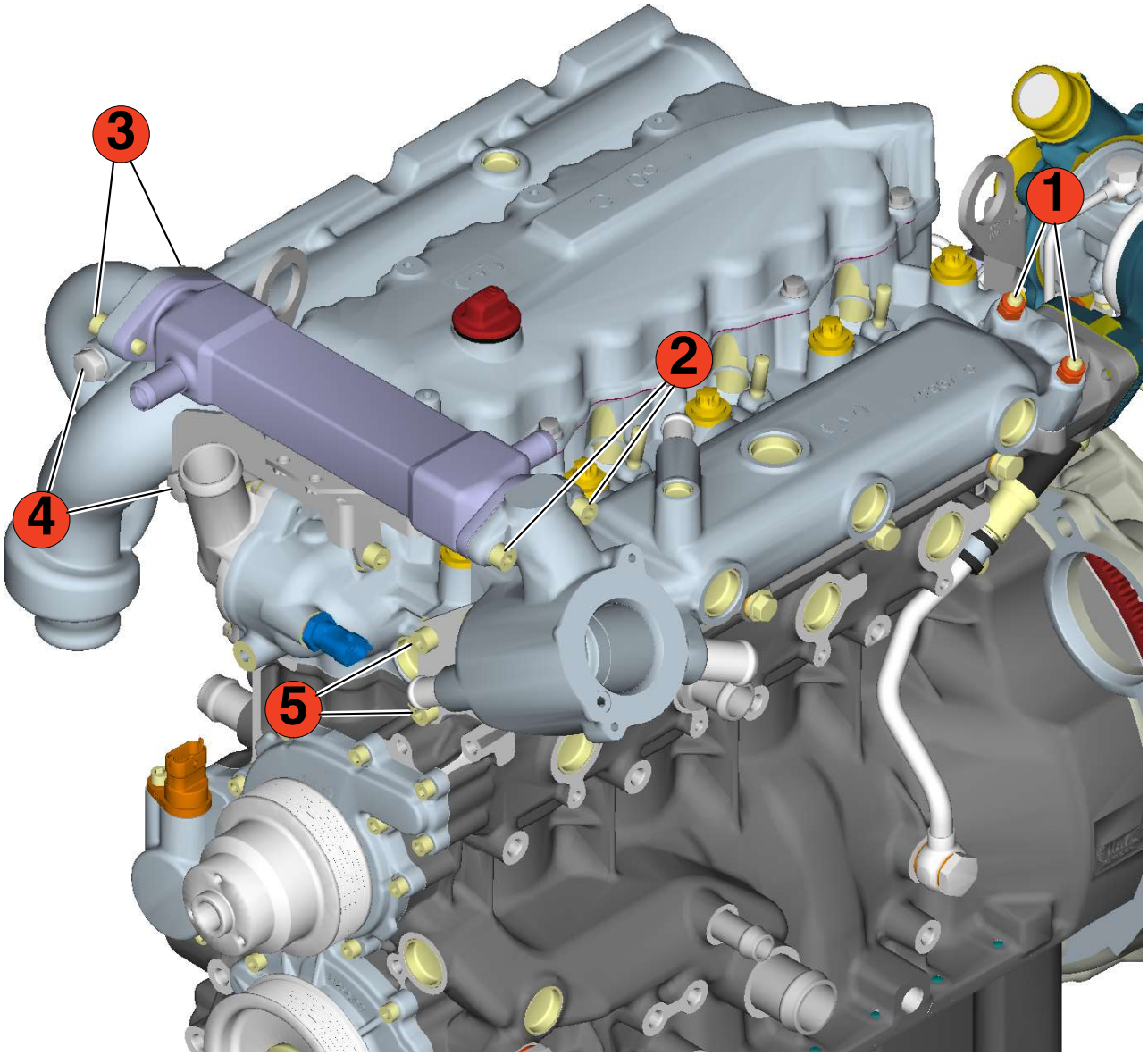
Position 1:
2 x hexagon nut
VM 8
23 Nm

Position 2:
2 x cylinder screw
M 8x25
23 Nm

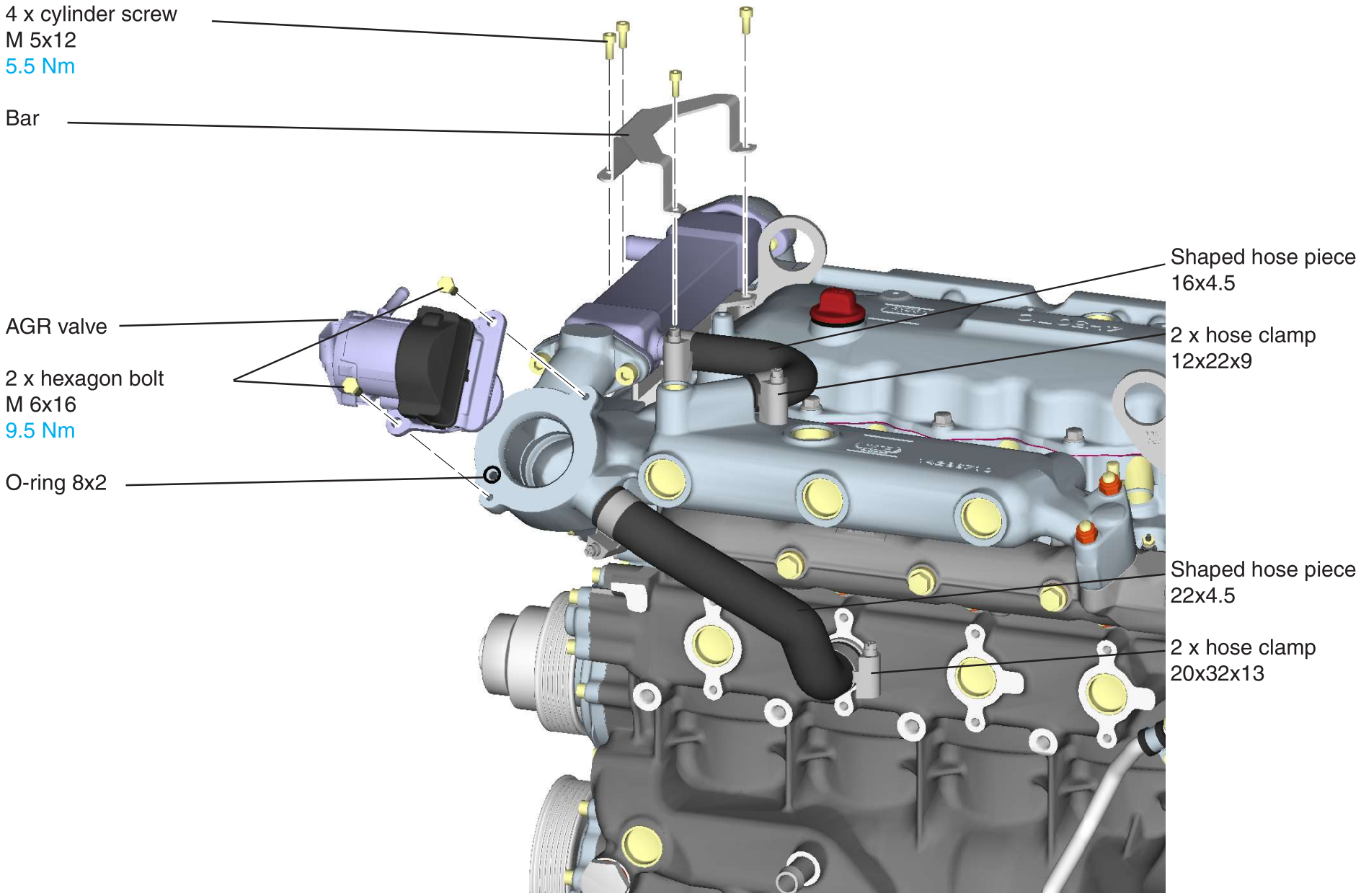
Position 3:
2 x cylinder screw
M 8x25
23 Nm

Position 4:
2 x hexagon bolt
M 10x70
46 Nm

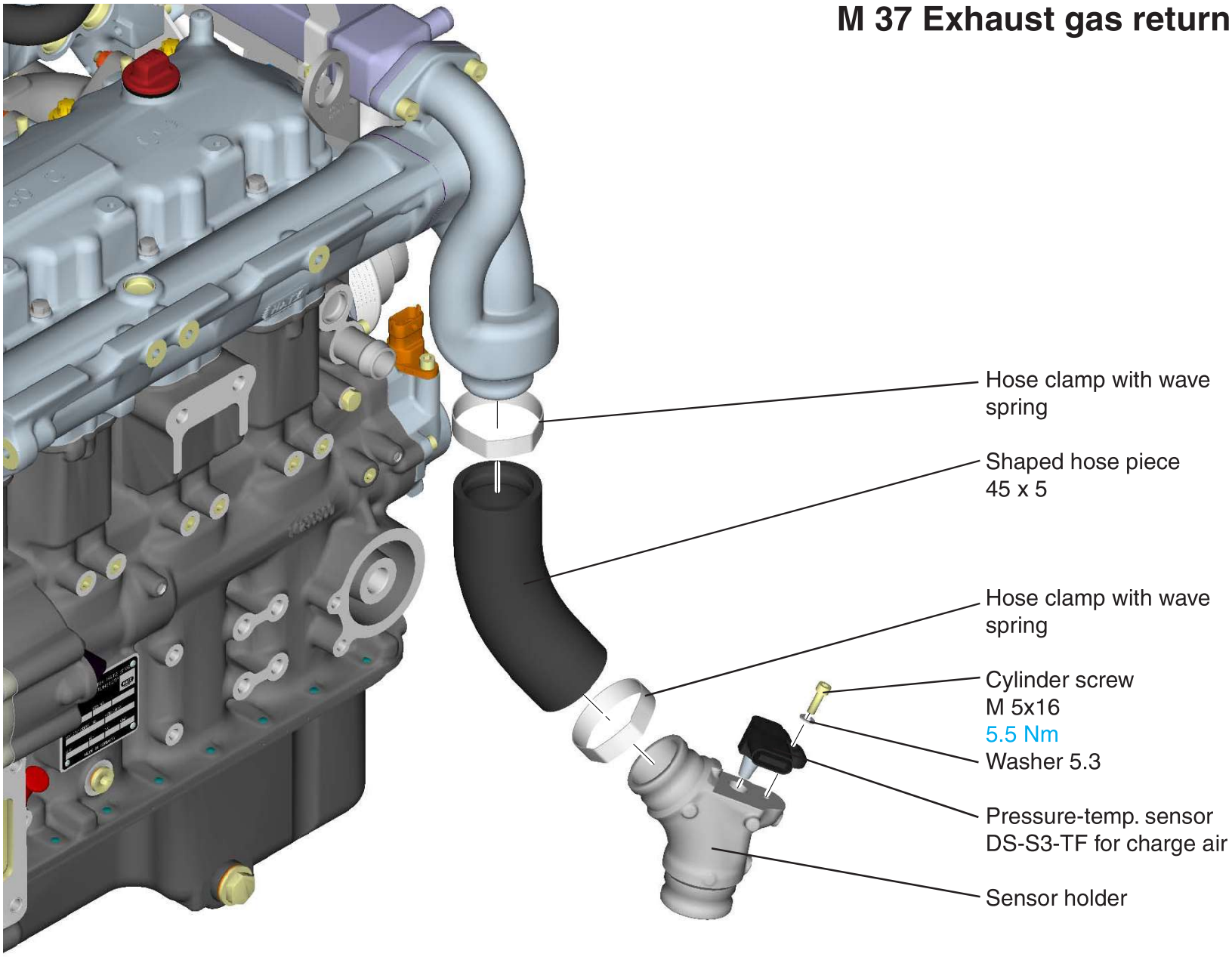
Position 5:
4 x cylinder screw
M 8x20
23 Nm



M 37 Exhaust gas return



M 37 Exhaust gas return



General instructions:

All work on the injection system may only be done in the voltage and pressure-free state (disconnect battery).
During all work on the injection system, cleanliness must be heeded in order to avoid the entry of particles into the injection system or the engine.
After every loosening of a pressure tube, it must be replaced!

Mounting of injectors on the engine

Remove the protective caps only right before mounting. Make sure that the nozzle cap and thus the injection holes are not damaged. Moisten exterior gaskets (O-rings) with installation oil, engine oil or diesel. Lubricants and glide agents that contain water are not permissible.
Before mounting, it may be necessary to check the correct position of the copper sealing disk on the nozzle clamping nut.
Attention must be paid that the injector is inserted into the cylinder head bore without damage. A transmission of force to the return connection or the plastic overmold must be avoided.
All plug connectors must be snapped in securely and locked during mounting.
The cap nut of the high-pressure line must be fastened properly before start-up.
If necessary, injector-specific data such as the IMA code must be transferred to the control unit. These serve the correct activation of the injectors and thus the intended operation.
The injector does not have to be ventilated before initial start-up.

Dismounting of injectors on the engine

The dismounting of the injectors must be done analogously to the mounting. Open connections must be sealed with protective caps.
To loosen the high-pressure screw connection, hold the hexagon of the inlet connector tight. With a loosened inlet connector, the high-pressure seal of the injector is no longer guaranteed.

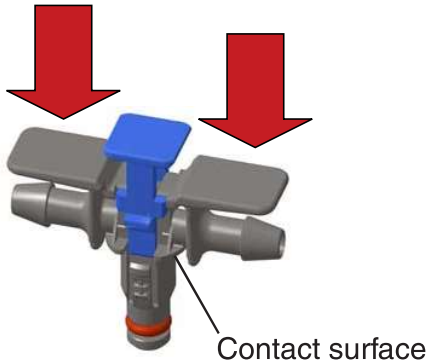
Remounting of injectors on the engine

After each loosening of an injector, the old copper sealing ring must be removed and a new one used.
In order to get cylinder-specific correction data for the engine controller, the injectors should be inserted on the original cylinder when re-using. In principle, the installation on other cylinders is also possible, however only if the IMA correction values are read into the control unit again.
Injectors can be cleaned before re-installation below the high-pressure connection in vertical position in the ultrasound bath.
Mechanical cleaning of the nozzle shaft with brushes is impermissible in order to prevent damage to the injection holes.

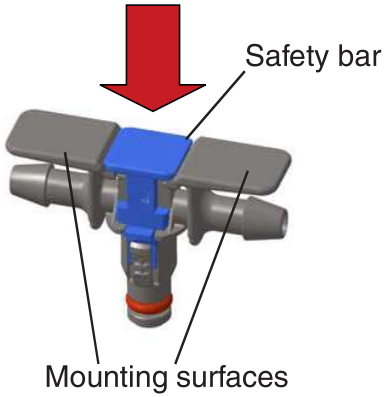
Fuel return line:
max. number of plug assembly/removal (plugging in; locking; unlocking; removing the plug from the counter piece): **10x**
If during the removal of the plug connectors the O-ring on them is damaged, then the entire return line must be replaced.
Before re-mounting of the plug connectors, it must be ensured that the counter pieces are not soiled or corroded.
Hose-nozzle connections may not be loosened. The mounting of the fuel return line on the vehicle low-pressure circuit and on the injector must be done dry (without mounting aids).The mounting of the return line on the engine is done by hand.

Mounting:
Plug return plug on injector return connection (until contact of the contact surface is on the injector (picture 1).
Then close the locking bar (bar must snap into the closed position and be even with mounting surfaces)(picture 2).
In order to guarantee the function, the return plugs must be mounted according to the mounting instructions above.
Otherwise fuel can escape!

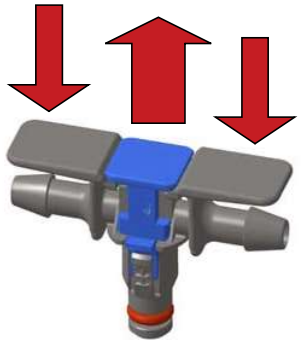
Dismounting:
Dismounting must be done by hand.
Open safety bar. Meanwhile, press on mounting surface in plug direction (safety bar must snap into open position (picture 3). Then remove return plug from injector return connection (picture 4).

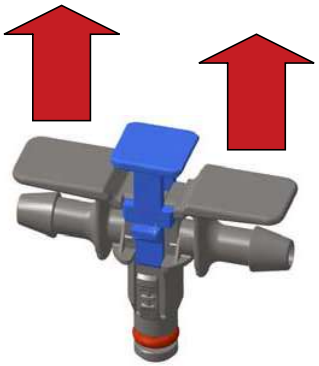


Picture 1



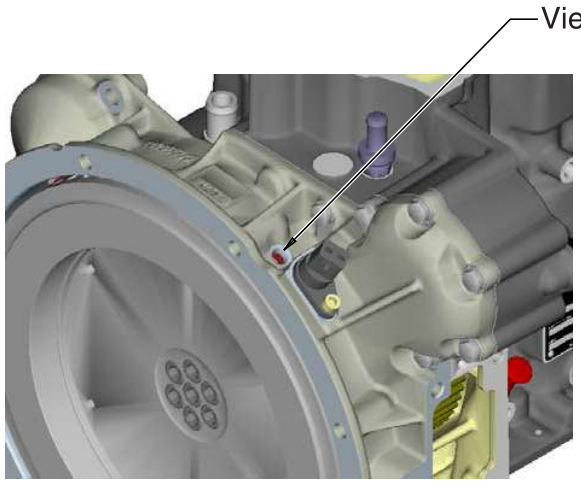
picture 2

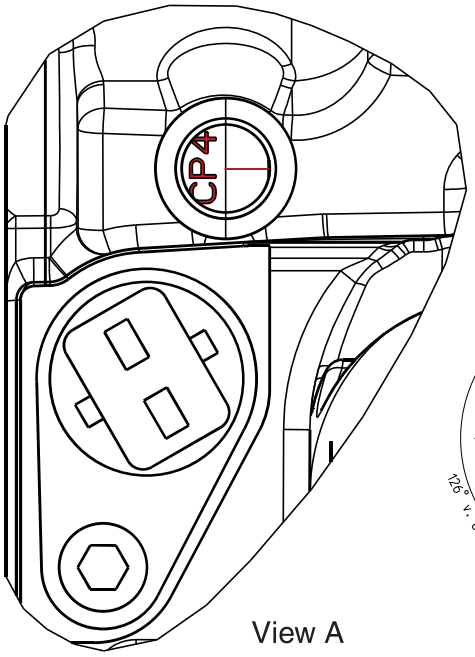

picture 3


picture 4

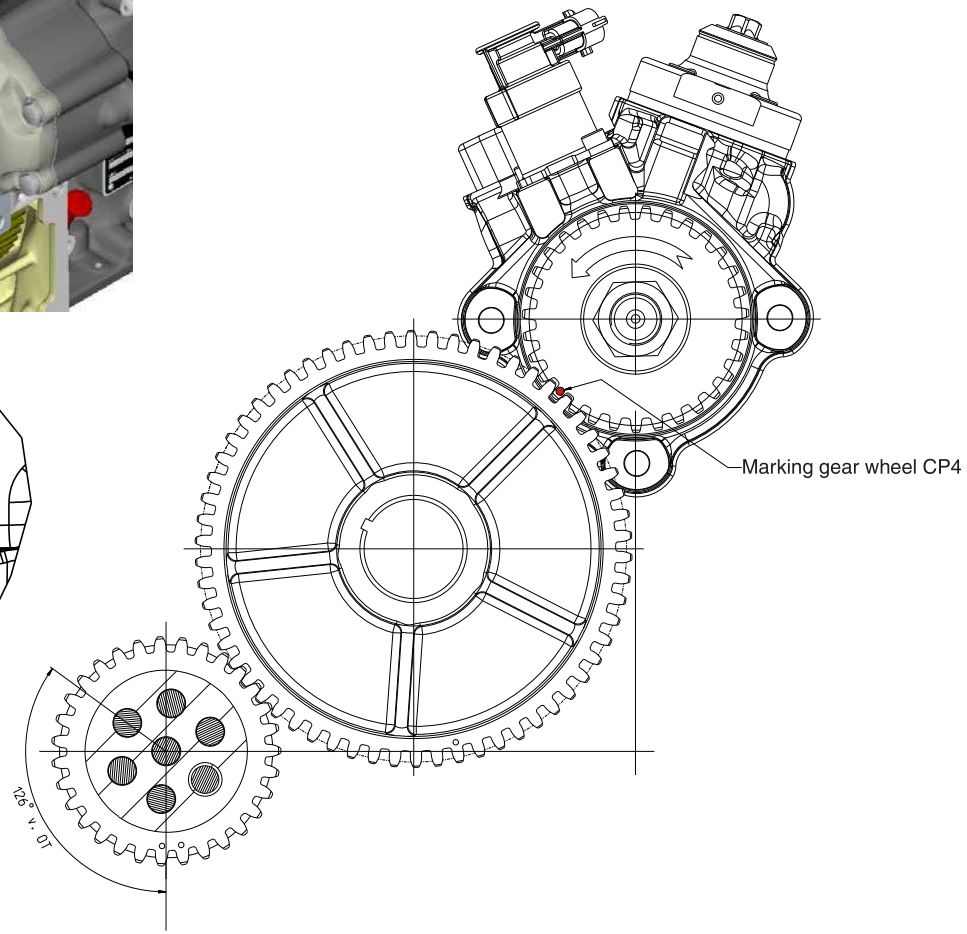
M 14 Injection system

Before the installation or removal of the high-pressure pump, the crankshaft must be turned into the position "CP4" (marking visible through inspection hole in the connection housing).
The marking on the high-pressure pump is now in the position shown.
This is the basic position for the mounting of the high-pressure pump.
Mounting precision:
± 1 tooth.
For mounting, grease the O-ring slightly (silicone grease)

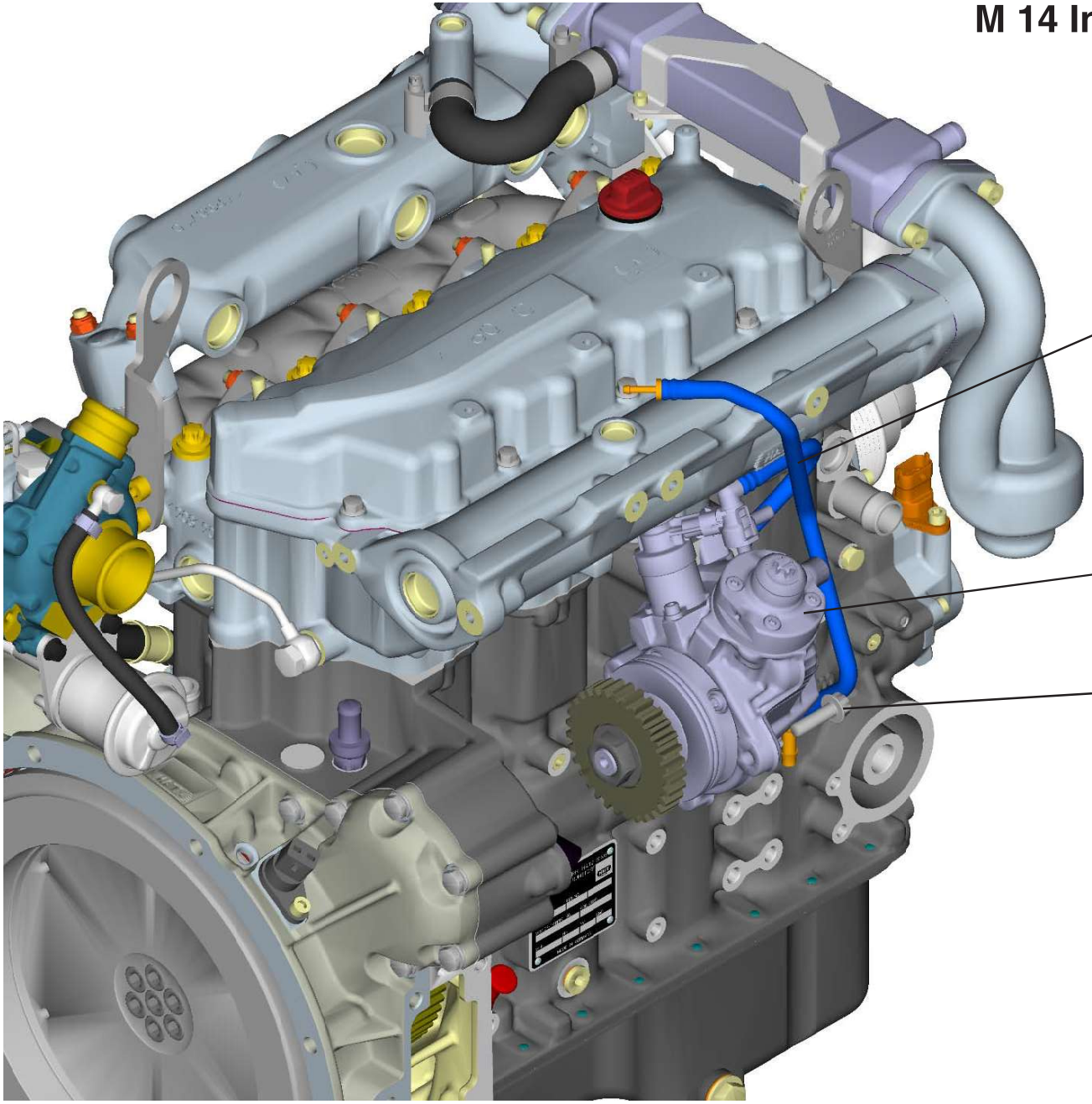




View A



M 14 Injection system

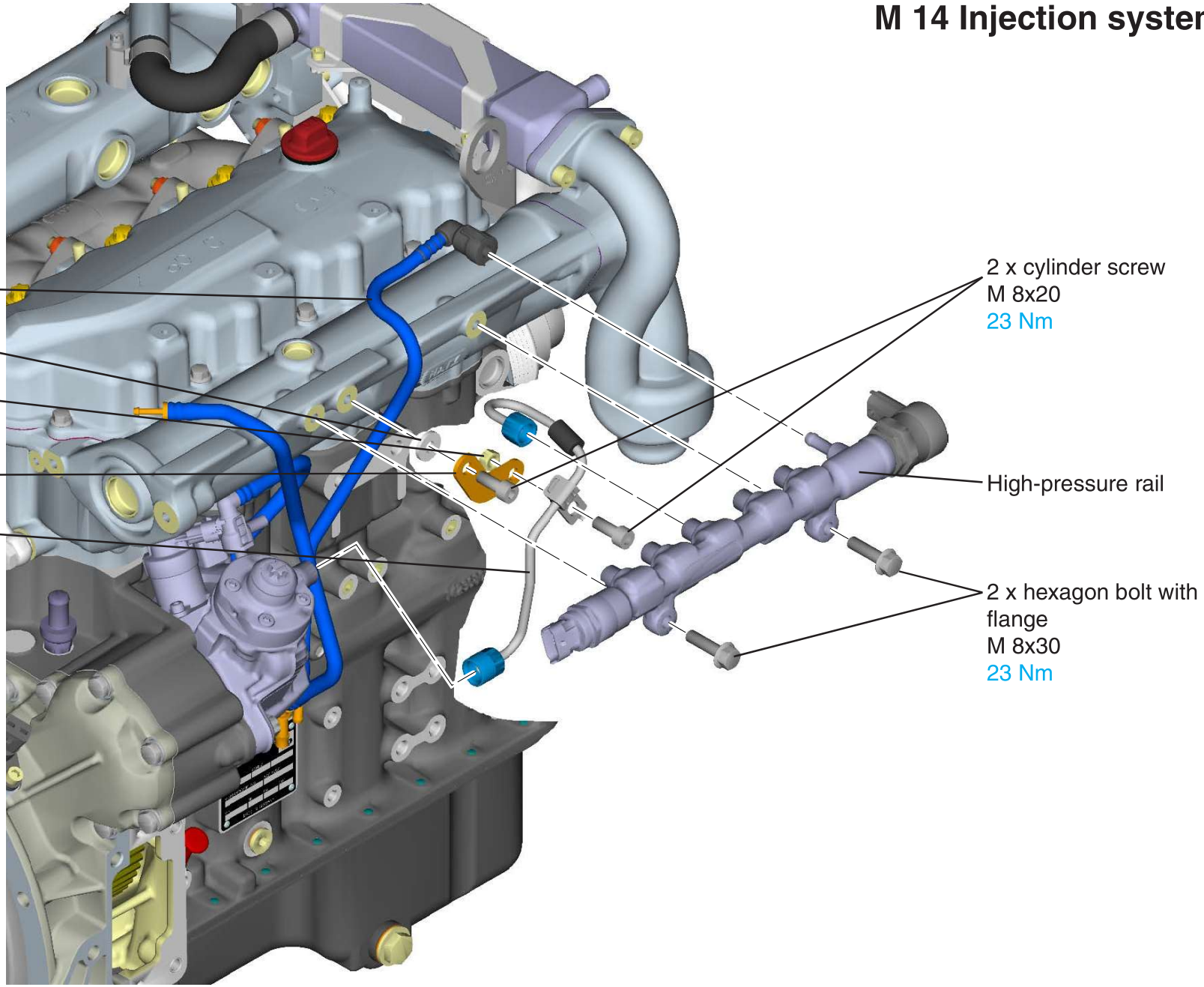


Fuel line
(mount on the return connection before installation of the high-pressure pump)

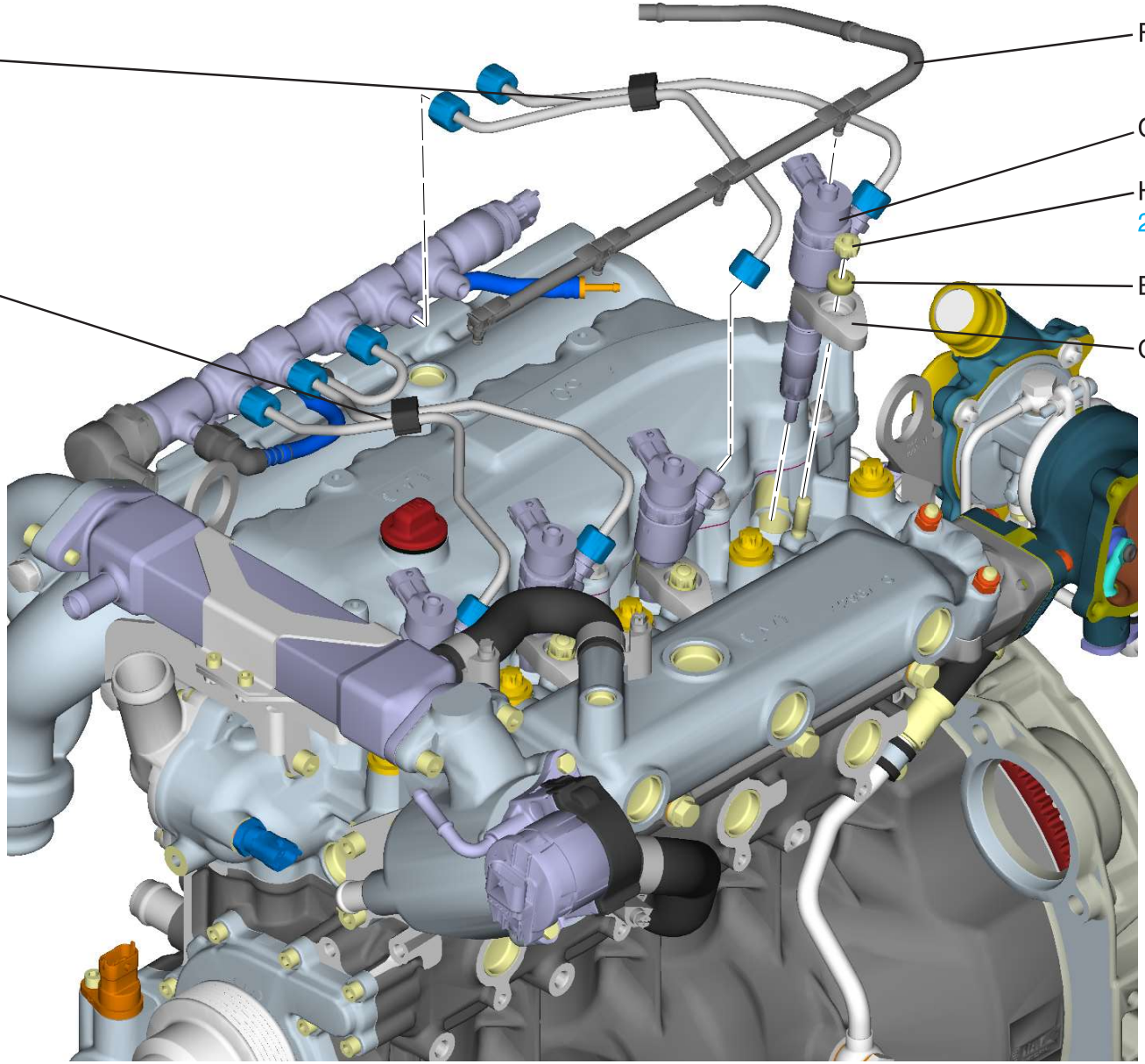
High-pressure pump CP4

3 x hexagon bolt with flange
M 8x30
23 Nm

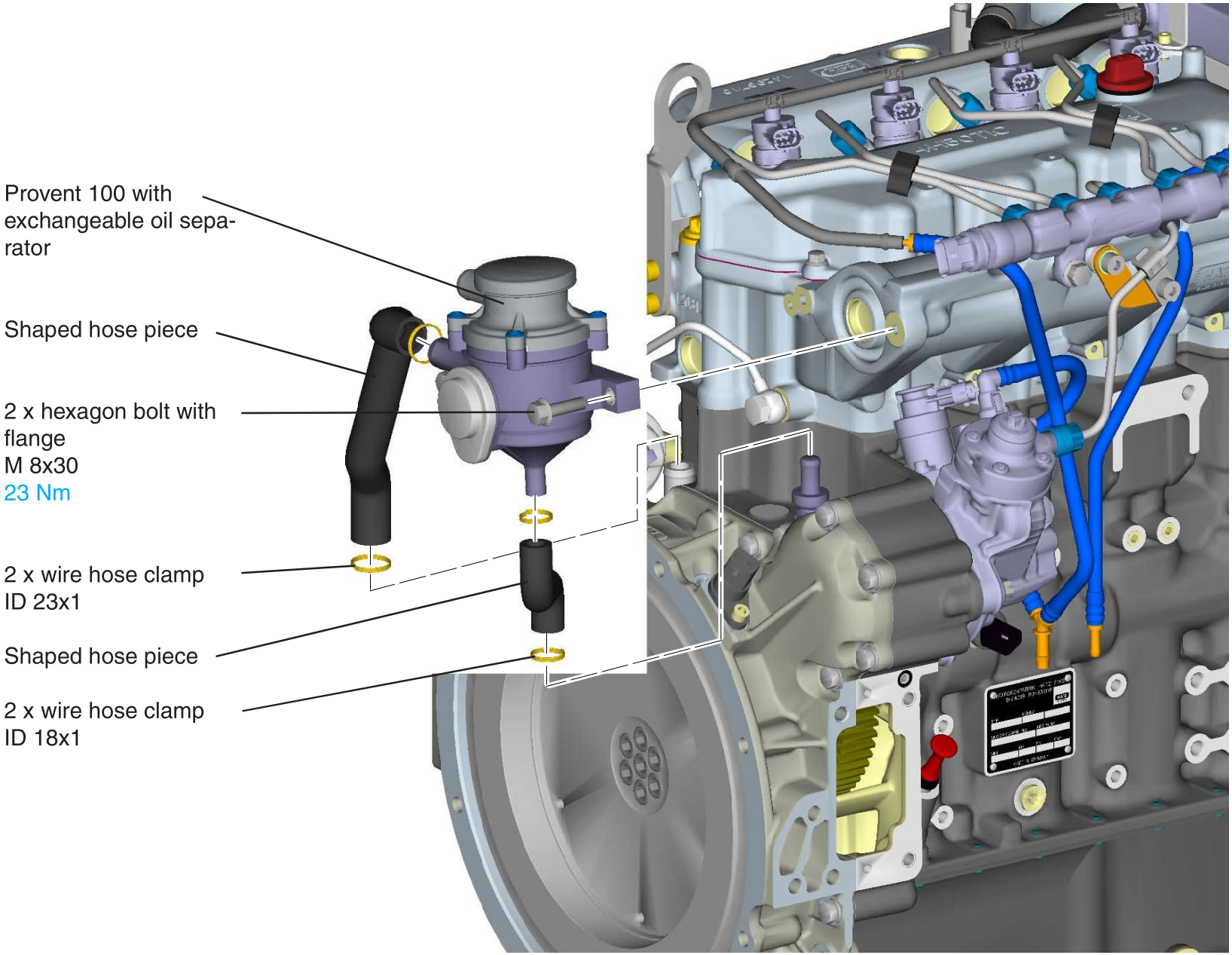
M 14 Injection system



M 14 Injection system



M 31 Crankcase ventilation



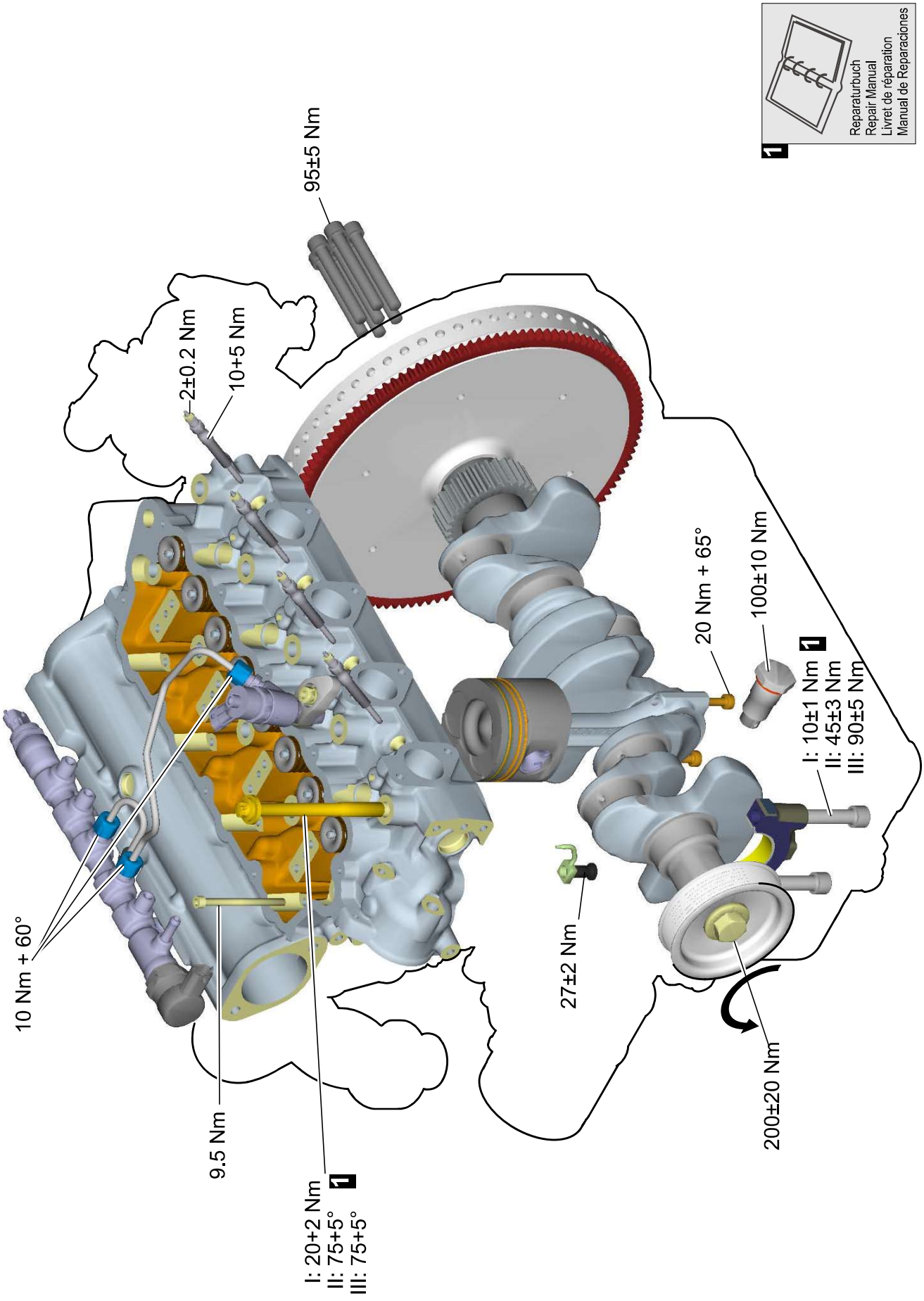
4. Tables

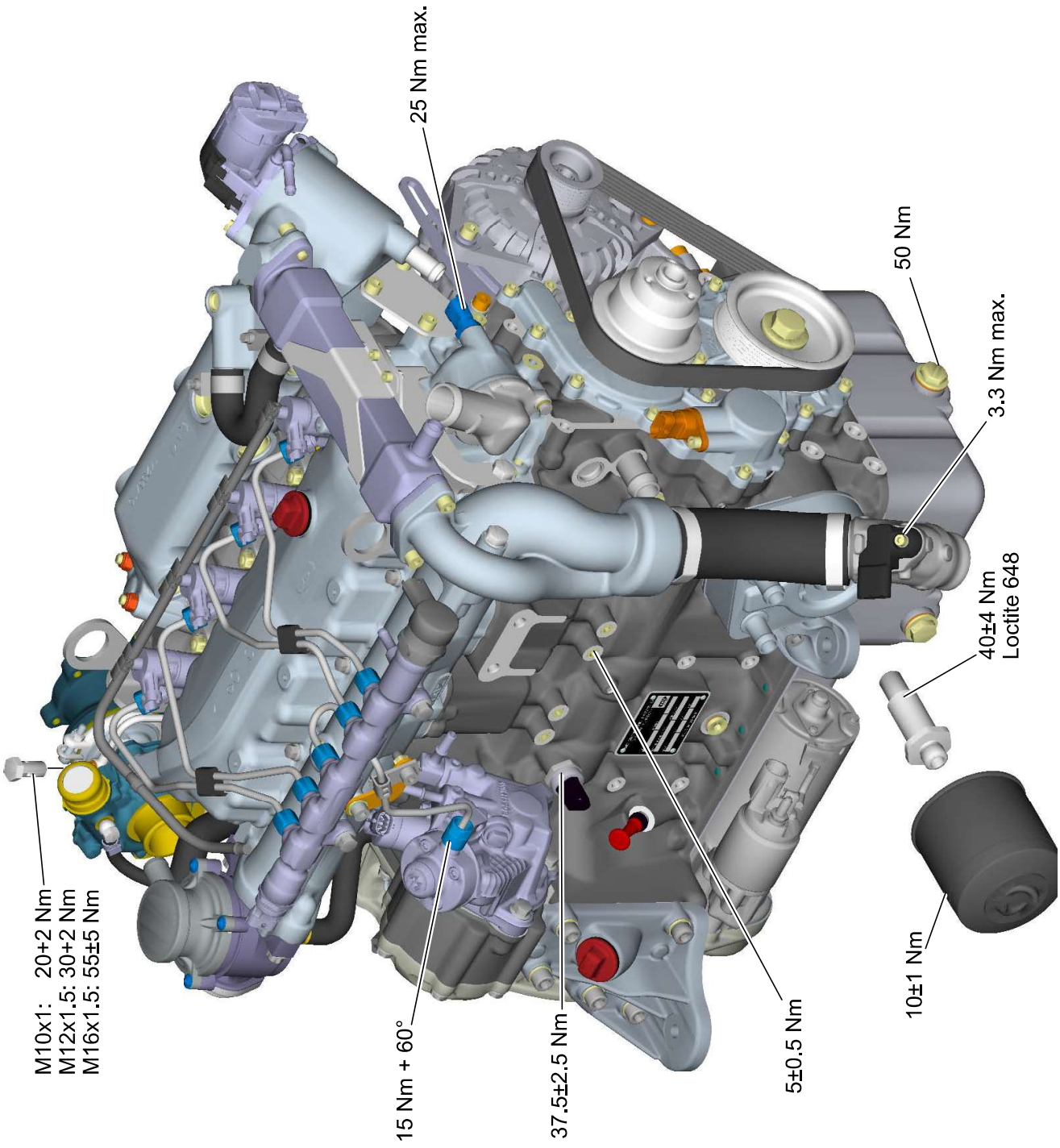
Screw tightening torque

General [Nm]:

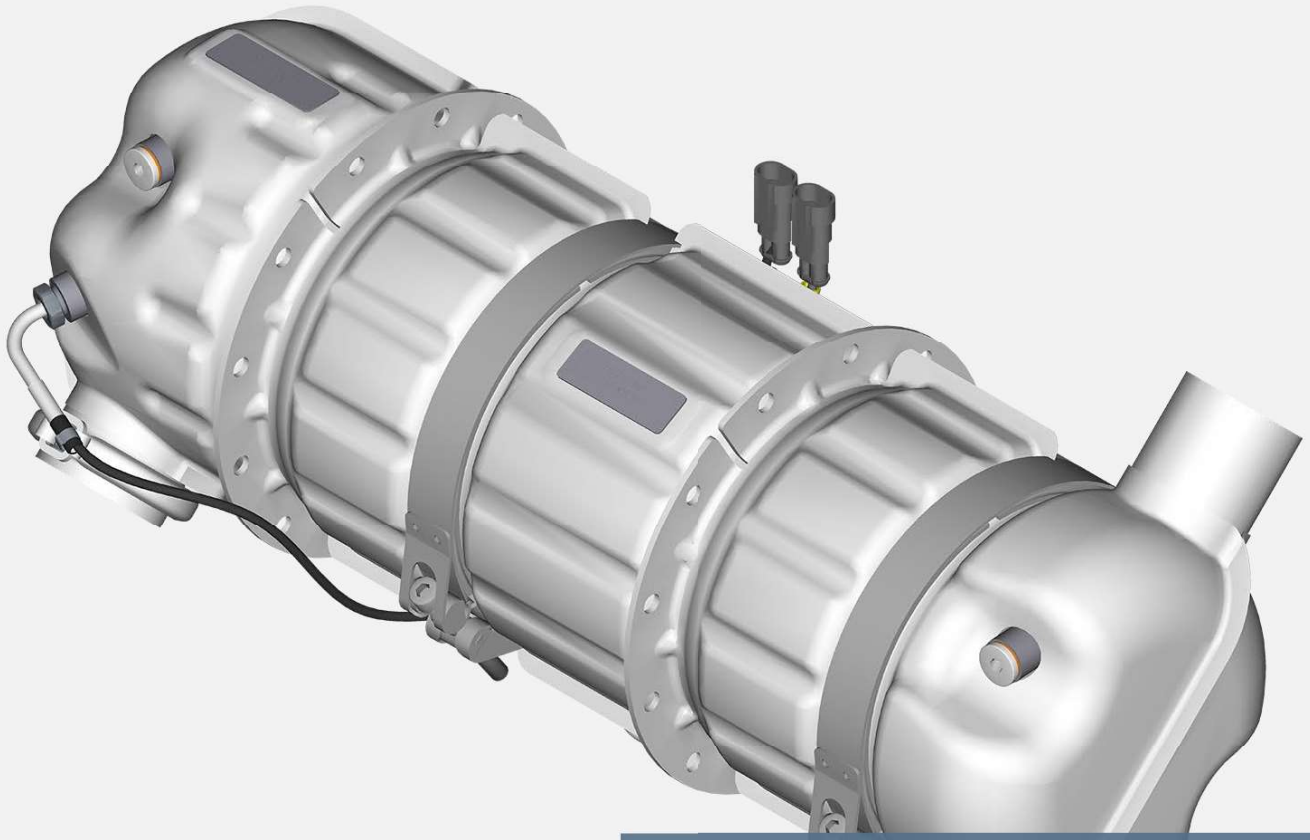
Nm ÷ 9.81(10) = kpm
Nm ÷ 1.3558 = Lbs ft

Thread	Screw quality			
	5.8	8.8	10.9	12.9
M 4	1.7	2.8	3.9	4.7
M 5	3.4	5.5	7.8	9.3
M 6	6.0	9.5	13	16
M 8	14	23	33	39
M10	29	46	65	78
M12	50	80	110	140
M14	80	130	180	220
M16	120	190	270	330
M18	170	270	380	450
M20	240	380	530	640
M22	320	510	720	860


1
Reparaturbuch
Repair Manual
Livret de réparation
Manual de Reparaciones
95±5 Nm
2±0.2 Nm
10+5 Nm
20 Nm + 65°
100±10 Nm
I: 10±1 Nm
II: 45±3 Nm
III: 90±5 Nm
10 Nm + 60°
27±2 Nm
9.5 Nm
I: 20+2 Nm
II: 75+5°
III: 75+5°
200±20 Nm


M10x1: 20+2 Nm
M12x1.5: 30+2 Nm
M16x1.5: 55±5 Nm
15 Nm + 60°
37.5±2.5 Nm
5±0.5 Nm
25 Nm max.
50 Nm
3.3 Nm max.
40±4 Nm
Loctite 648
10±1 Nm

CREATING POWER SOLUTIONS.



Montagehinweis 05674601
DPF chassisfest H50TICD

Assembly advice 05674601
DPF chassis mounted H50 TICD

Hatz Diesel

Historie

Version	Datum	Verfasser	Änderungen
0.0	05.03.2019	Hahn Alexander	ÄM H19/031-1
0.1	15.07.2019	Hahn Alexander	Update

Inhaltsverzeichnis

CAUTION

Danger of cutting!

Sharp edges on the diesel particulate filter.

- Wear personal protective equipment (cut-resistant gloves).

DANGER

Danger of fire from hot exhaust gas system.

The exhaust gas system and, in particular, the diesel particulate filter can become very hot. Combustible materials can ignite on the exhaust gas system, even when the engine has already been switched off.

- Keep inflammable materials away from the exhaust gas system.
- Do not operate and place the engine in the direct vicinity of combustible materials.

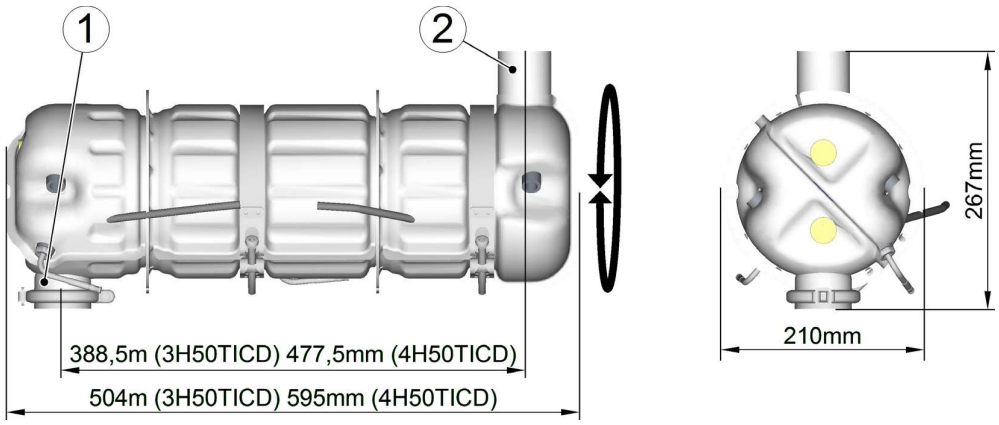
DANGER

Danger of burns.

During the regeneration process, the diesel particulate filter and the exhaust system become very hot. There is a danger of burns when working on a hot exhaust system.

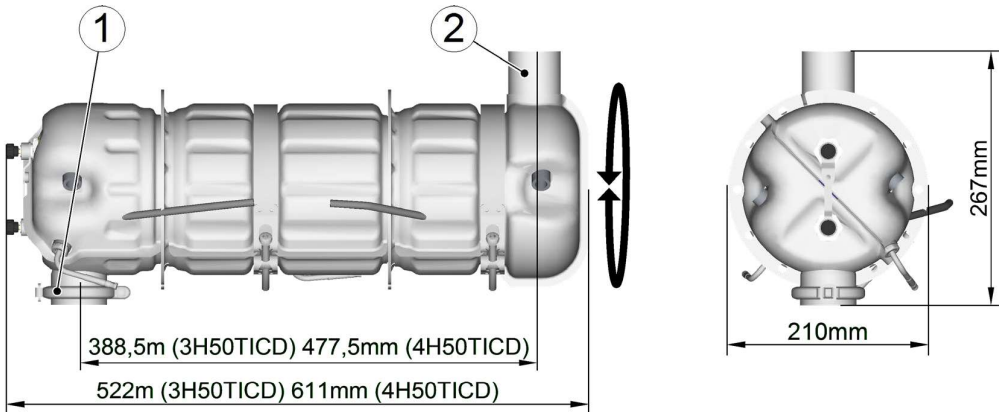
- Let the diesel particulate filter and exhaust system cool down.
- Wear safety gloves.

Overview/dimensions: removed diesel particulate filter (chassis) active



		Dimensions
1	Exhaust inlet	Inside Ø55.60mm
2	Exhaust outlet	Outside Ø55mm

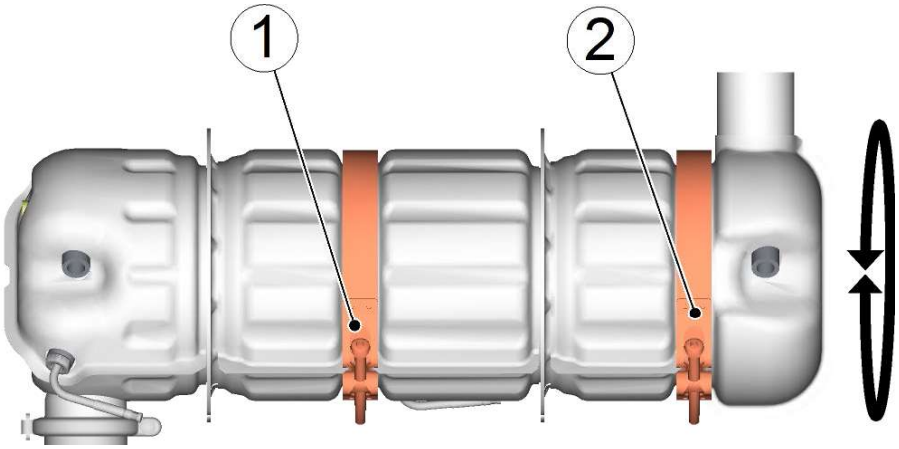
Overview/dimensions: removed diesel particulate filter (chassis) active premium



		Dimensions
1	Exhaust inlet	Inside Ø55.60mm
2	Exhaust outlet	Outside Ø55mm

Inlet/outlet position correction

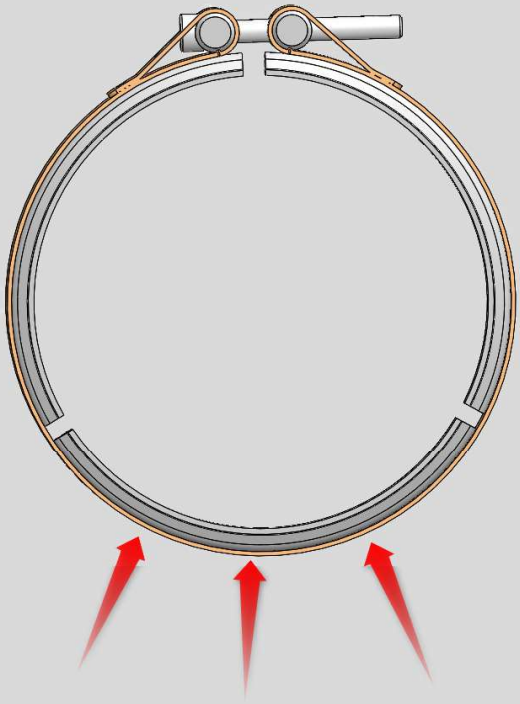
The outlet of the chassis-mounted DPF can be rotated to any position.



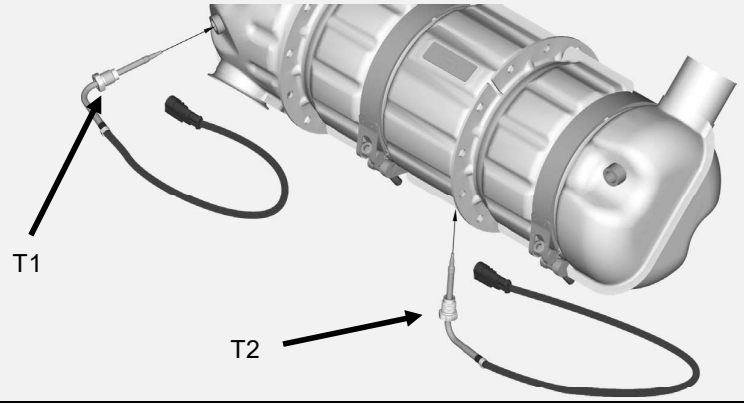
1	Inlet V-band clamp
Because the leak tightness of the system is no longer ensured after the position of the inlet is corrected, it is prohibited to perform a position correction here.	
2	V-band clamp for the position correction of the outlet
If further standards and regulations apply to the overall machine (e.g. permissible exhaust gas volume loss in the engine compartment), the machinery manufacturer is responsible for a leaktightness test where necessary.	

Tightening torque of the V-band clamp 12 ±1Nm.

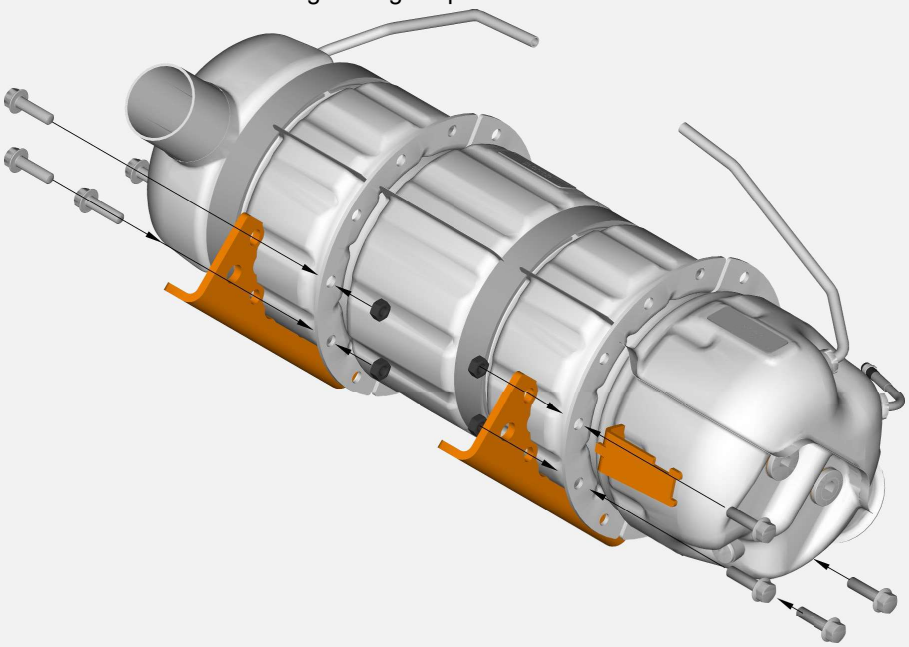
If a position correction is made, the following steps must be performed.

Step	Description
1	Tighten V-clamp to 12 ±1Nm.
2	Gently tap V-clamp with a light soft face hammer, from the places shown below. 
3	Re-Tighten V-clamp to 12 ±1Nm.

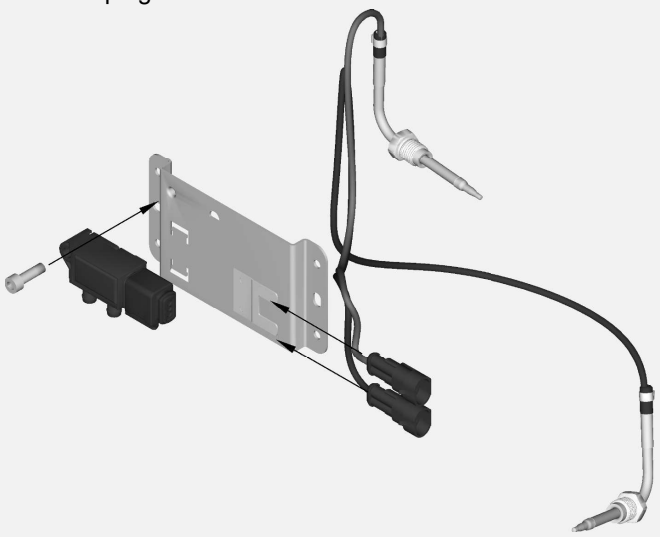
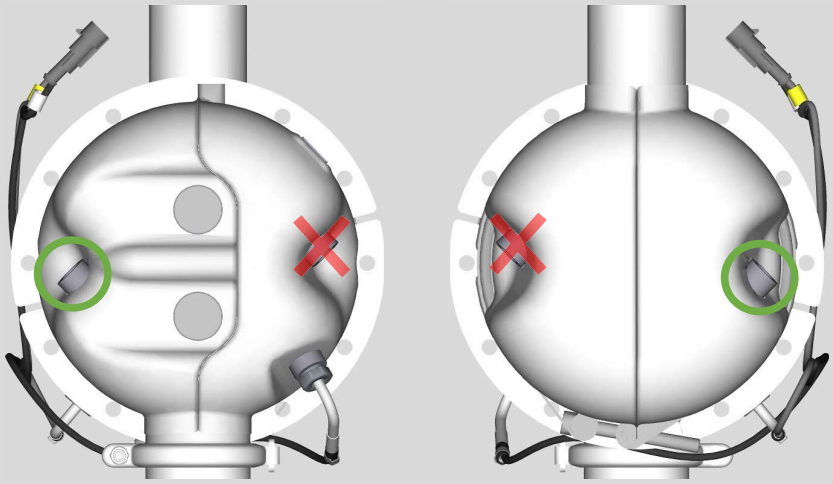
Installation of the temperature sensors

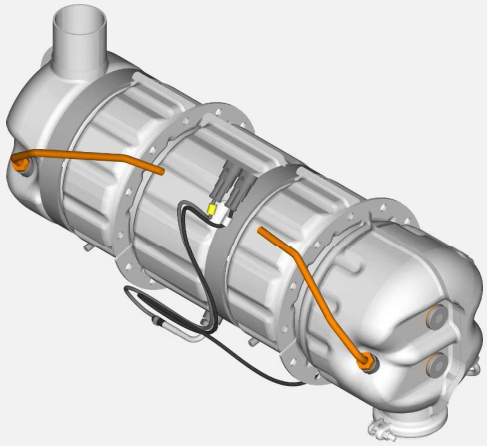
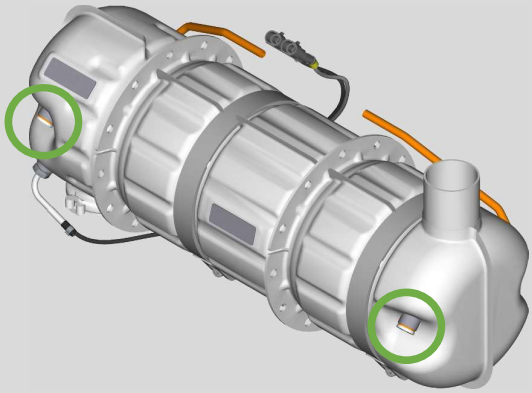
Step	Description
1	Coat the temperature sensor threads with Castrol Optimol TA and screw them into the two provided holes. Tightening torque: 45 ±5Nm. If using a pre-catalytic converter, see page 7 "Pre-catalytic converter". 

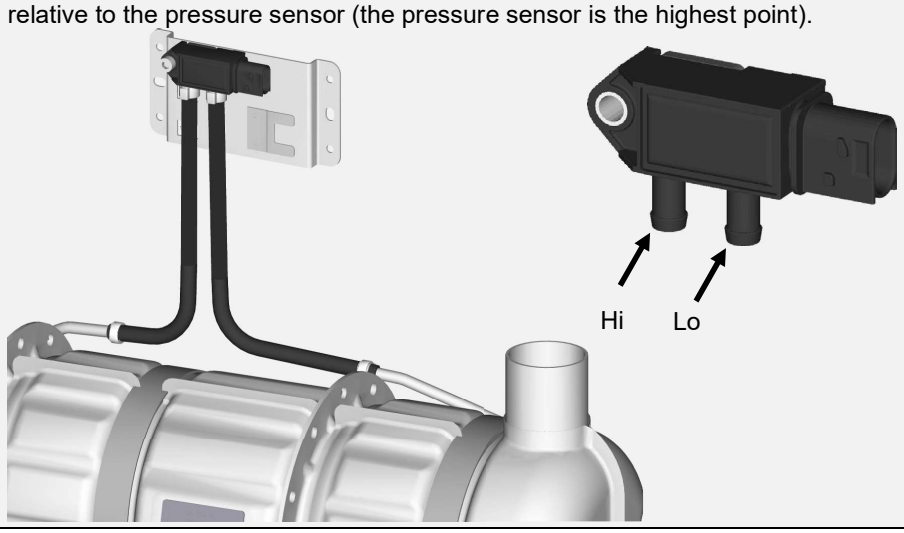
Installation of the DPF holder + cable holder

Step	Description
1	Attach the mounting bracket and retaining plate for the cables with hex screws M8x30 and hex nuts M8. Tightening torque: 23Nm. 

Installation of the pressure pipes/pressure sensor

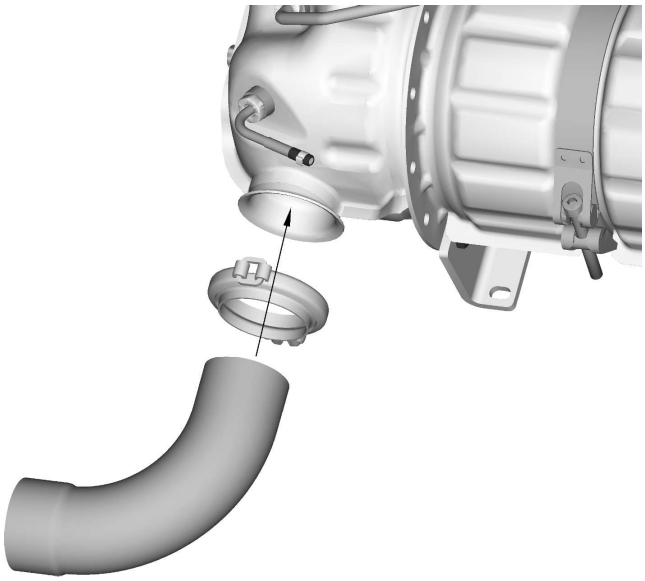
Step	Description
1	Attach the pressure sensor to the bracket using the cyl. screw M6x20. The temperature sensor plugs can be mounted on the bracket. 
2	Two threaded mounting positions are found on both the exhaust gas inlet and exhaust gas outlet. Because the pressure pipes and pressure lines must always rise continuously relative to the pressure sensor, the threaded connection that faces up must be used (see green circle). **Exhaust gas inlet** **Exhaust gas outlet** 

3	Coat the thread of the pressure pipes with Castrol Optimol TA and screw into the two threads facing up. Tightening torque: 45 ±5Nm. If you use your own pressure pipes, they must be at least 200mm long. To assemble the pressure pipe a clamping screw (056475XX) can be used, this can be obtained from Hatz. 
4	Close the two remaining threads using sealing ring A14x18 and locking screw M14x1.5 (see green circle). Tightening torque: 45 ±5Nm. 

5	Connect the pressure sensor and the two pressure pipes to the 1000 mm hose and the 4 hose clamps. The hose must be divided to the desired lengths. Total length (pressure tube + hose): • Minimal 300mm (200mm pressure tube + 100mm hose) • Maximal 900mm The engine compartment flushing must be designed so that the maximum permissible temperature (275 ° C) of the hose is not exceeded, even under extreme environmental conditions. The engine compartment flushing must be designed so that the maximum permissible temperature (275°C) oft he hose is not exceeded. The high pressure (Hi) side is connected to the pressure pipe at the DPF inlet. The low pressure (Lo) side is connected to the pressure pipe at the DPF outlet. The pressure lines must be installed in such a way that they rise continuously relative to the pressure sensor (the pressure sensor is the highest point). 

Exhaust gas pipes downstream from exhaust gas turbocharger and upstream of DPF exhaust inlet

- The exhaust gas pipes between the exhaust gas turbocharger and the DPF exhaust gas inlet must not exceed 1.5m and contain no more than 3 elbows. The pipe cross-section must not become narrower.
- Downstream from the exhaust gas turbocharger, only an elbow with a maximum angle of 90° may be used, and it must be followed by a long compensator (at least 200mm elastic length). The compensator must be attached close to the pivot point of the elastic bearing. A fixed point is required after the compensator.
- The exhaust gas pipe at the DPF exhaust inlet must have a Ø of 55±0.4mm and must be attached using the supplied V-band clamp (see figure) tightening torque of V-band clamp: 9 ±1Nm.
- The exhaust pipe between engine and diesel particulate filter must be gastight. A maximum of 5 l / min may escape between exhaust gas turbocharger and diesel particulate filter.

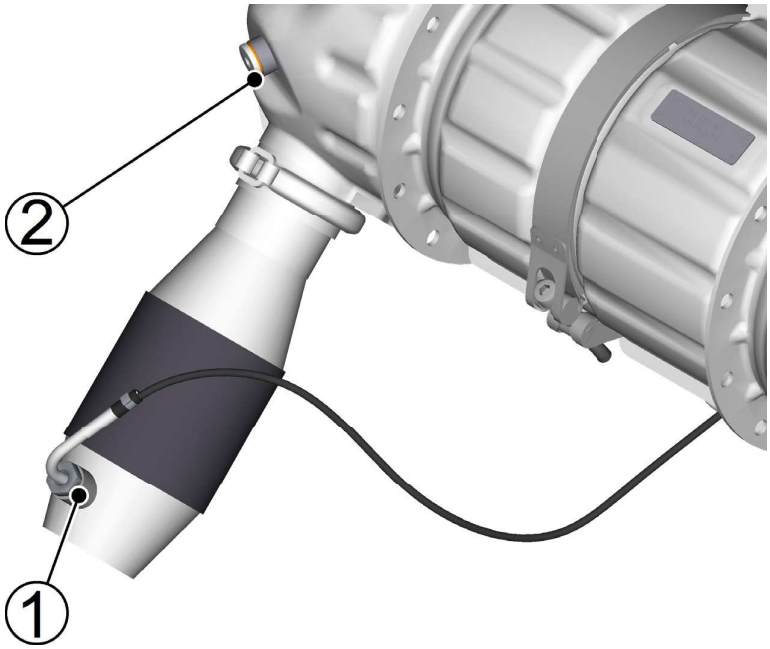


- The pipes must be fully insulated, for which an insulating tape is available from Hatz. This insulating tape must be wrapped so it overlaps in two layers. If an insulating tape from a different source is used, it must have the following properties:
  - Stable at continuous temperature 450°C, short-term 550°C
  - U-value 20W/(m²K) at 300°

Pre-catalytic converter

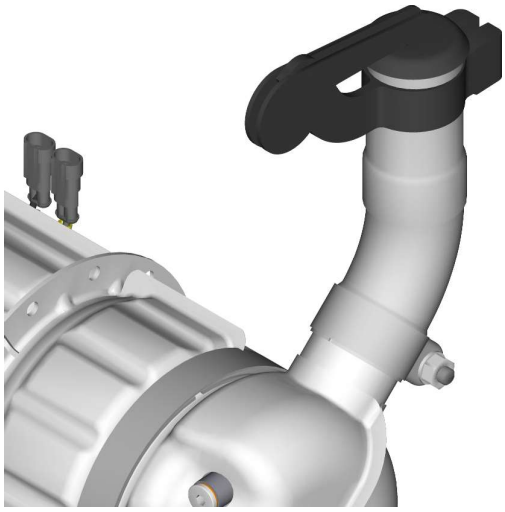
To prevent the diesel oxidation catalyst (DOC) from clogging, a pre-catalytic converter is used for low load/weak load applications. For chassis mounted DPFs, the pre-catalytic converter is available as an option from Hatz and must be mounted as close as possible to the DOC/DPF in the exhaust gas pipe.

When using the pre-catalytic converter, temperature sensor T1 must be screwed into the thread (1) of the pre-catalytic converter. Coat the thread of the temperature sensor with Castrol Optimol TA. Lock the remaining thread (2) with the sealing ring A14x18 and locking screw M14x1.5. Tightening torque: 45 ±5 Nm.



Exhaust pipe downstream from the DPF exhaust gas outlet

Without a compensator, the following may be installed downstream from the DPF: an elbow with a maximum angle of 45°, a 100mm exhaust gas pipe and a weather cap (see figure).

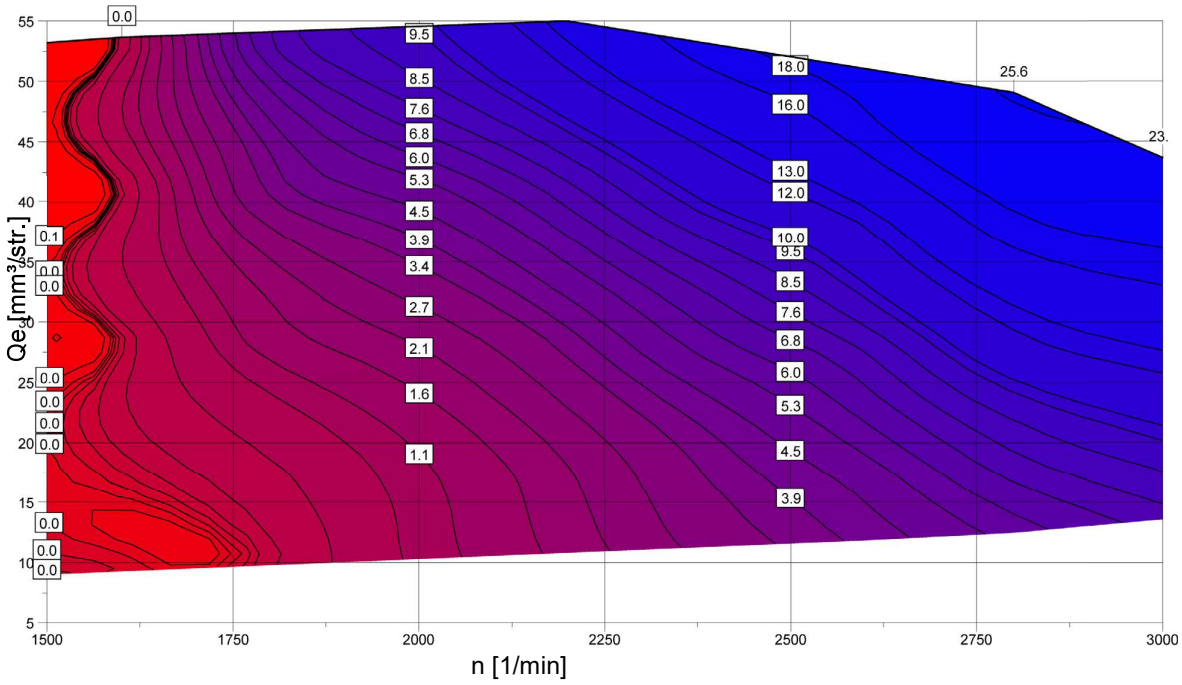


If a longer exhaust gas pipe is required, the following points must be adhered to:

- Do not under any circumstances constrict the line cross-section after the exhaust gas aftertreatment exit.

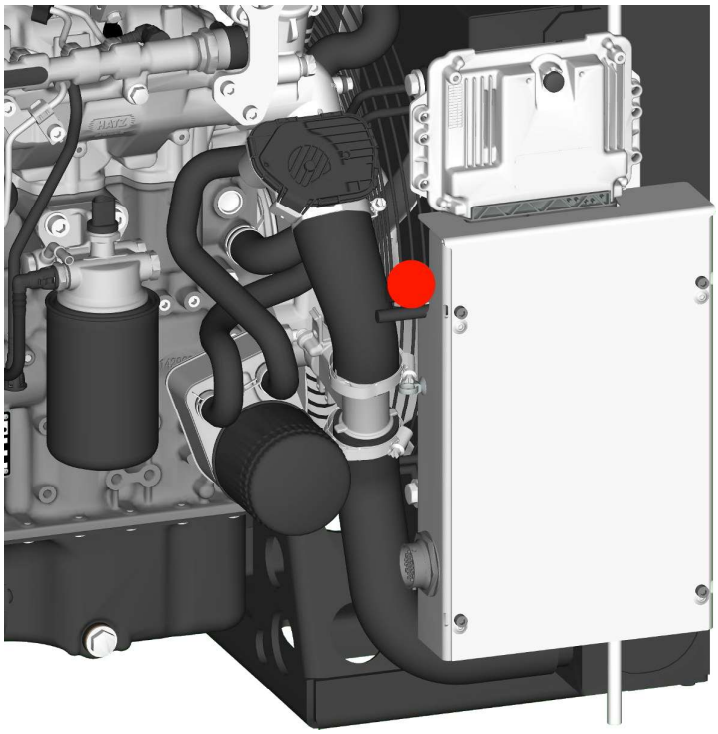
- Prevent water from entering into the exhaust gas pipe (e.g. flaps or suitable pipe elbows at the end).
- When installing an exhaust gas pipe, an elastic intermediate part must be installed along the exhaust gas pipe to absorb the engine movement. The compensator must be attached close to the pivot point of the elastic bearing. A fixed point is required after the compensator.
- A compensator is also required for a rigidly mounted engine.
- In long exhaust gas pipes and in engines at low load, the exhaust gas condenses. Such exhaust gas pipes must have a condensate drain. The condensate drain must be located at the lowest point in the exhaust system. This enables the condensate to flow out by the force of gravity.
- Keep the exhaust gas backpressure within the permissible tolerance window in relation to the possible pipe lengths and number of pipe elbows (angles). see tolerance field.

Max. permitted exhaust back pressure after DPF-System in mbar

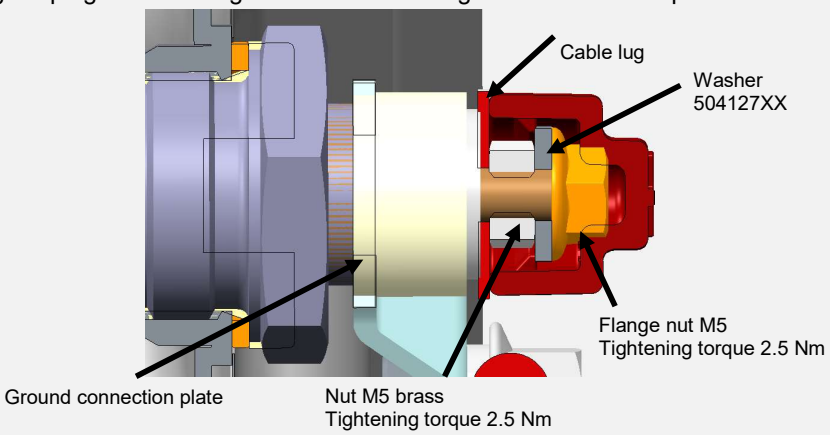
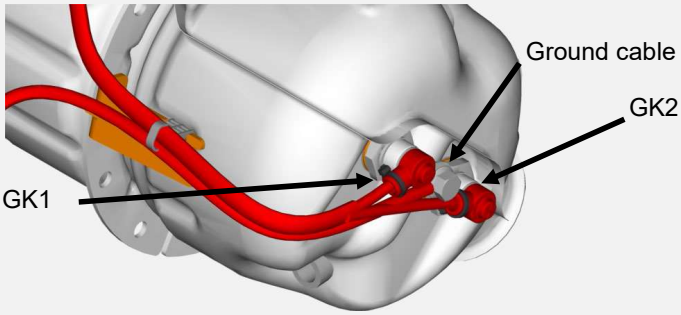
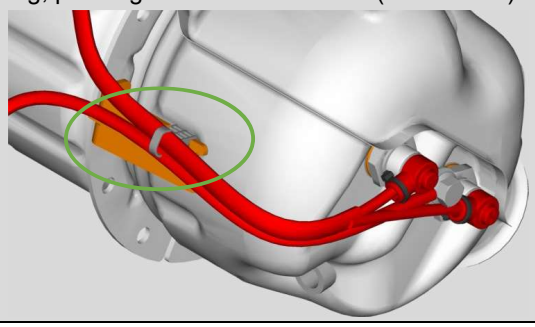


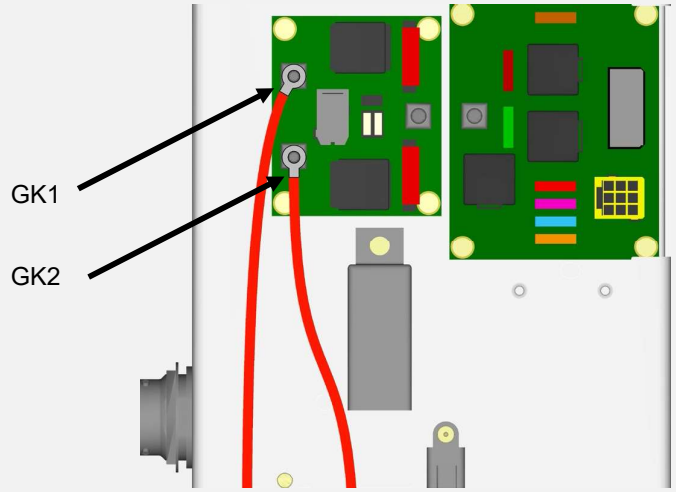
Wiring harness transfer point

The transfer point for the chassis-mounted DPF cable is at the plug retaining plate (see figure). From this point onward, a cable length of approx. 1.2m is present. In addition, a 2m extension wiring harness is available from Hatz.

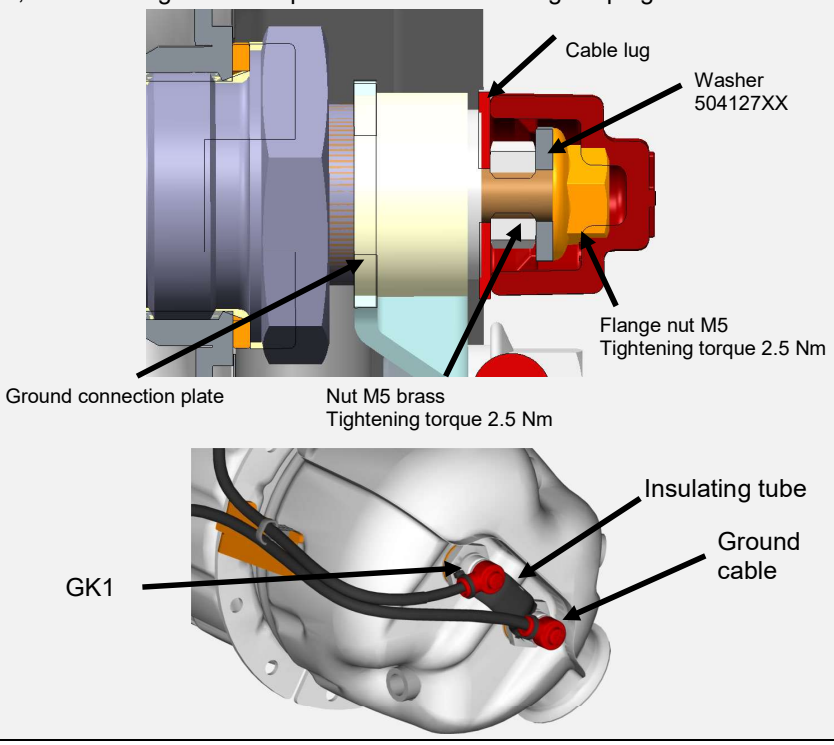


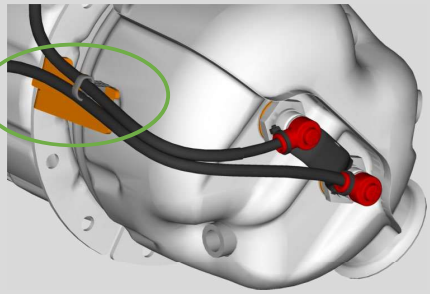
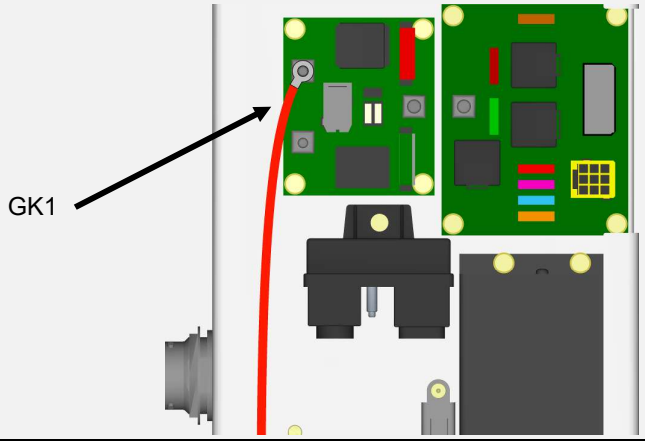
Cabling for auxiliary heater of DPF chassis (Active Premium) 12V

Step	Description
1	Screw the positive cables for the auxiliary heaters GK1 and GK2 (Ø6 mm²) onto the glow plug. Screw the ground line onto the ground connection plate.  
2	Attach the cables of the auxiliary heater to the cable holder using cable ties. The cables must be mechanically fastened after no more than 250 mm to protect them against pulling, pushing and vibration forces (strain relief). 

3	Connect cables GK1 and GK2 (Ø6mm²) with the "Power module" board of the particulate filter. 

Cabling for auxiliary heater of DPF chassis (Active Premium) 24V

Step	Description
1	Screw the positive cable of the auxiliary heater onto GK1 and the ground cable onto GK2 (Ø6 mm²). In the 24V version, the two glow plugs are connected in series; an insulating tube is required between the two glow plugs. 

2	Attach the cables of the auxiliary heater to the cable holder using cable ties. The cables must be mechanically fastened after no more than 250mm to protect them against pulling, pushing and vibration forces (strain relief). 
3	Connect cable GK1 (Ø6mm²) to the "Power module" board of the particulate filter.Because the 24V version is connected in series and only has a positive cable, the positive cable must be connected to GK1. 

Hot surfaces on DPF

The DPF becomes very hot during operation and, above all, during regeneration. Areas that become particularly hot are shown in red (see figure).