ID no.	Name	Information	Series			Value	Unit
General engine data							
P00 01	Length of engine		TCD 2013	L4	4V	1010	mm
				L6	4V	1218	mm
P00 02	Width of engine		TCD 2013	L4	4V	780	mm
				L6	4V	780	mm
P00 03	Height of engine		TCD 2013	L4	4V	908	mm
				L6	4V	983	mm
P00 04	Engine weight according to DIN 70020-A approx.		TCD 2013	L4	4V	530	kg
				L6	4V	620	kg
P00 10	Working principle		TCD 2013		4V	Four-stroke diesel	-
P00 20	Combustion process		TCD 2013		4V	Direct injection	-
P00 30	Total volume		TCD 2013	L4	4V	4761	cm3
				L6	4V	7142	cm3
P00 31	Bore		TCD 2013		4V	108	mm
P00 32	Stroke		TCD 2013		4V	130	mm
P00 40	Compression ratio		TCD 2013		4V	18	-
P00 50	Direction of rotation	looking onto the flywheel	TCD 2013		4V	left	-
P00 71	Ignition sequence		TCD 2013	L4	4V	1 - 3 - 4 - 2	-
				L6	4V	1 - 5 - 3 - 6 - 2 - 4	-
Cylinder head							
P01 01	Valve seat ring bore, inlet	Standard, fit H7	TCD 2013		4V	39,2	mm
P01 02	Valve seat ring bore, outlet	Standard, fit H7	TCD 2013		4V	36,7	mm
P01 05	Valve guide, bore in cylinder head	Standard, fit H6	TCD 2013		4V	$13^{+0,1}_{-0,1}$	mm
P01 08	Cylinder head, height	Standard	TCD 2013		4V	110	mm

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Checking the compression pressure

Commercial available tools:
– Compression pressure tester 8005

Special tools:
– Connector 100180

– W 01-01-01
– W 07-11-01
– W 07-15-11

Checking the compression pressure

- Check and set valve clearance.

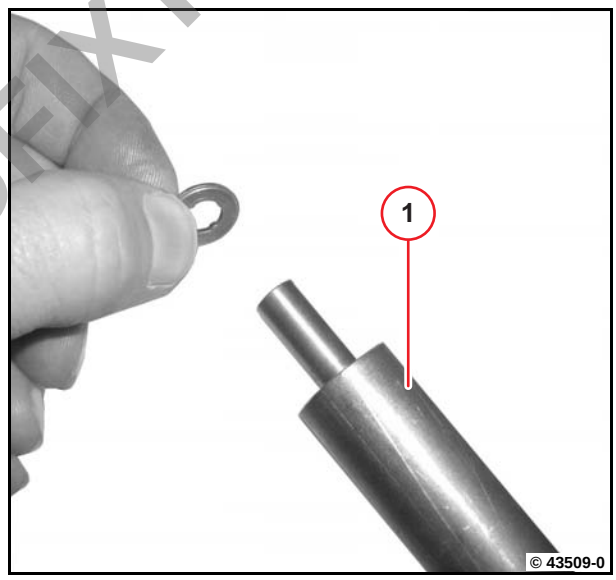
  W 01-01-01

- Remove injectors.

  W 07-15-11

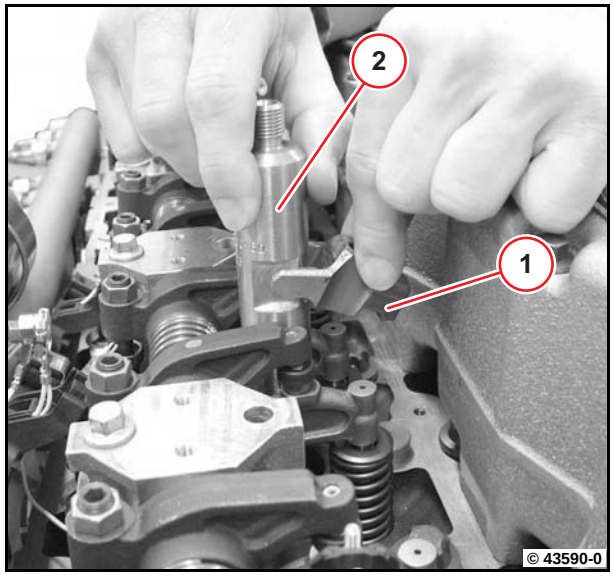
- Insert connector (1).

Use sealing ring for injector.



- Place clamping claw (1) on bulge of connection piece (2).
- Insert connection piece (2) and clamping claw (1).
- Tighten connection piece (2) with clamping claw (1).

  A07 001



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ID no.	Name	Screw type	Notes / Remarks	Series			Pre-clamping value	Post-clamping value
A00 001	Clamping bracket on crankcase			TCD 2013		4V	70 Nm	
A00 002	Clamping bracket on adapter for engine assembly block			TCD 2013		4V	90 Nm	
A01 001	Cylinder head on crankcase	M15x2-135 M15x2-170	Use new screws.	TCD 2013		4V	40 Nm	95 Nm +180 °
A01 002	Toggle level block on cylinder head	M8x100	with two clamping sleeves	TCD 2013		4V	21 Nm	
A01 003	Lock nut, valve clearance setting screw	M10		TCD 2013		4V	20 Nm	
A01 004	Cylinder head cover on cylinder head	M6	Gasket can be reused several times if there is no damage	TCD 2013		4V	8.5 Nm	
A02 010	Main bearing on crankcase	M18x2.5-10.9	Screws can be used a max. 3 times, otherwise renew every time they are loosened.	TCD 2013		4V	50 Nm	+60 ° +60 °
A02 020	Con rod screws on con rod	M12x1.5x73	Use new screws.	TCD 2013		4V	30 Nm	+60 ° +60 °
A02 071	Piston cooling nozzle on crankcase	M8x35		TCD 2013		4V	21 Nm	
A03 007	Locking screw on crankcase (coolant)	AM14x1.5-ST-A4C	with sealing ring	TCD 2013		4V	34 Nm	
A03 020	Front cover on crankcase	M8x35 M8x70	with 1 clamping sleeve	TCD 2013		4V	30 Nm	
A03 030	Oil pan on crankcase (heavy duty version)	M8x40-10.9 M8x160-10.9	Observe tightening sequence.	TCD 2013		4V	35 Nm	
A03 031	Locking screw on the oil pan	M18x1.5		TCD 2013		4V	55 Nm	
A03 060	Crankcase breather on cylinder head	M8x30-10.9		TCD 2013		4V	20 Nm	
A03 061	Pipe clip for return line	M8x16-10.9		TCD 2013		4V	13 Nm	
A03 062	Return line on pipe union (gearcase)	Lock nut		TCD 2013		4V	20 Nm	

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13/20
9312-001
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Checking and setting the valve clearance

Commercial available tools:
– Rotation angle disc 8190
– Screwdriver insert for hexagon socket head screws (4 mm) 8194
– Screwdriver insert for hexagon socket head screws (5 mm) 8193
– Open end wrench adapter 8196

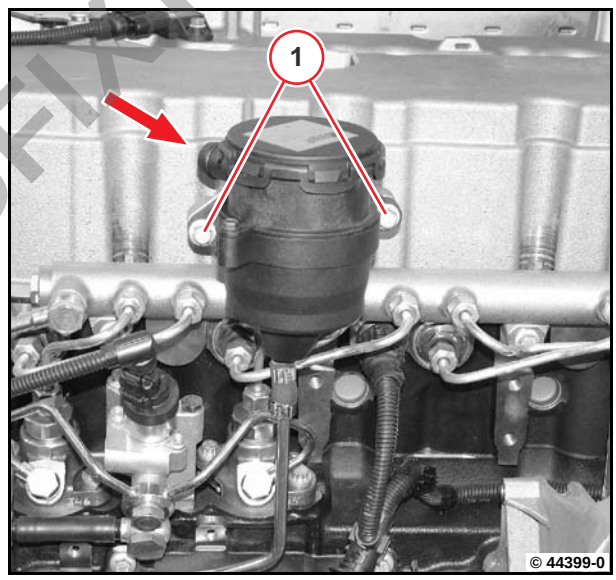
Special tools:
– Turn-over gear 100370

Allow the engine to cool down for at least 30 minutes before setting the valve clearance. Engine oil temperature < 80 °C

6

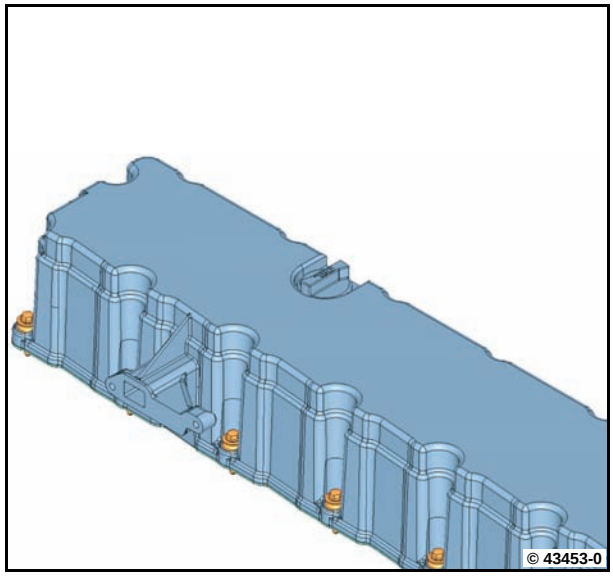
Disassembly

- Unscrew screws (1).
- Remove hose pipe (arrow).



- Remove the cylinder head hood.

Gasket and screws are captively locked on the cylinder head hood.



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Removing and installing cylinder head

Commercial available tools:
– Rotation angle disc 8190
– Pin wrench insert Torx E14 8113

Special tools:
– Socket wrench insert 110700
– Assembly case 110900
– Support bracket 120900
– Base plate 120910

– Fitting compound
DEUTZ AP1908

– W 01-02-02
– W 01-04-09
– W 01-07-08
– W 06-01-05
– W 06-02-03
– W 09-08-04

Close all openings again immediately!

Collect leaking operating substances in suitable vessels and dispose of according to regulations.

The relevant documentation from the vehicle manufacturer must be observed when emptying and filling the cooling system.

Removing the cylinder head

- Remove exhaust pipe and turbocharger.

  W 06-01-05

- Remove the charge air pipe.

  W 06-02-03

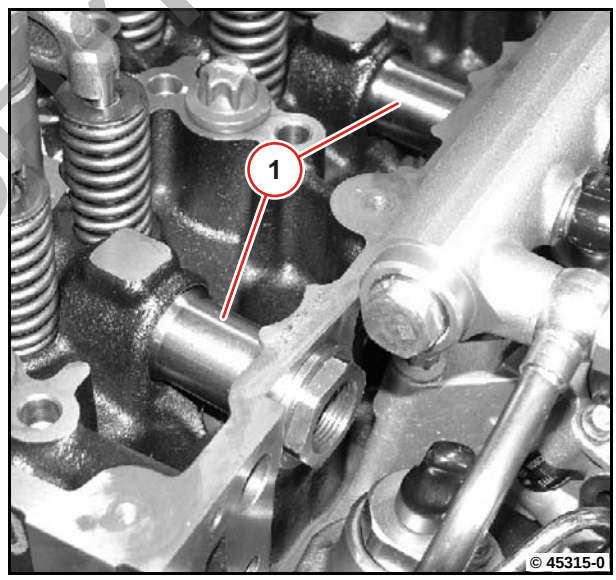
- Remove the valve control.

  W 01-02-02

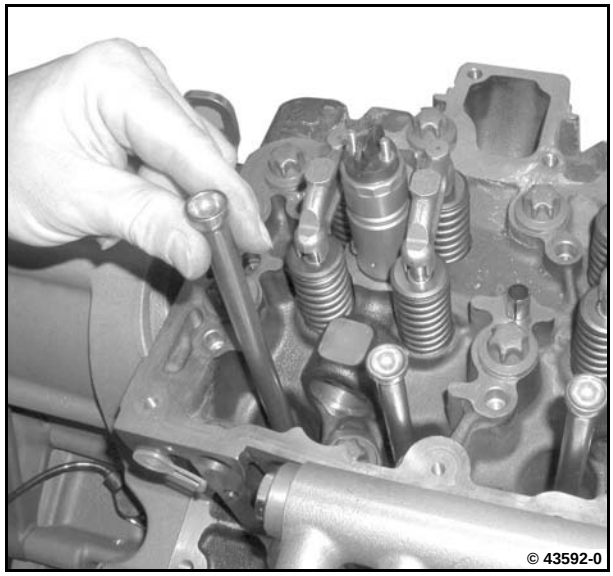
- Remove thermostat housing.

  W 09-08-04

- Unscrew pressure pieces (1).



- Take out stop rods.



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1 Foreword

2 General

3 User notes
3.1 General
3.2 Specifications
3.2.1 Safety regulations and rules for the prevention of accidents
3.2.2 Disposal regulations
3.3 Operating manual and workshop manual
3.4 Job cards
3.5 Explanation of symbols

4 Technical data
4.1 Testing and setting data
4.2 Tightening specifications

5 Job card overview
5.1 Sorted alphabetically
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5.3 Job card references

6 Job cards

7 Commercial tools

8 Special tools

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3.1 General

The documentation of the workshop manual has been created based on the engine available at the time of going to press.
There may be deviations in the descriptions, illustrations and parts due to further developments.

The maintenance work described in the operation manual and in the workshop manual must be carried out on schedule and completely. The maintenance personnel must have the necessary technical knowledge to perform the work. Safety and protection devices which are removed during maintenance work must be replaced again afterwards.

Caution!

The rules for the prevention of accidents and the safety regulations must be observed during maintenance work.

Reference is made in the workshop manual job cards to the regulations in chapter 3.2. These must be read before working on the engine and must be strictly followed.

The maintenance intervals and the work to be performed are specified in the maintenance schedule of the operation manual. The job cards contain technical documentation on the execution of maintenance work.

3.2 Specifications

3.2.1 Accident prevention and safety regulations

The legally prescribed rules for the prevention of accidents must be observed. These are available from professional associations or from dealers. These are dependent on the application site, operating mode and the operating and auxiliary materials being used.

Special protection measures are specified depending on the work being carried out, and are identified in the job description.

Among other things it generally applies that:

- for the personnel:
  - Only briefed personnel may operate or maintain the engine. Unauthorised persons are prohibited access to the machine room.
  - Wear close-fitting clothing and ear protectors in the machine room when the engine is in operation.
  - Only deploy trained personnel to do repairs and maintenance work.
  - Do not work on the fuel system when the engine is running. The fuel system is under high pressure - danger of death.
  - Go to the workshop immediately in case of leaks in the fuel system.
- for the engine room:
  - Ensure adequate ventilation (do not cover air shafts).
  - Provide first aid kit and suitable fire extinguishers. Check the filling and readiness for operation regularly.
  - Only store inflammable materials in the machine room if they are essential for operation of the system.
  - Smoking and naked flames are prohibited in the machine room.
- for operation, maintenance and repairs on the engine:
  - Wait 30 seconds after switching off the engine before working on the fuel sytem.
  - After all work on the fuel system, it must be bleeded - see the operation manual, chapter "6.2 Fuel system“.
  - Only start the engine when all the protective devices have been fitted. Make sure no-one is standing in the danger area.
  - Cleaning, maintenance and repair work may only be performed with the engine at a standstill and secured against starting.
  - Injection lines and high pressure pipes must not be deformed.

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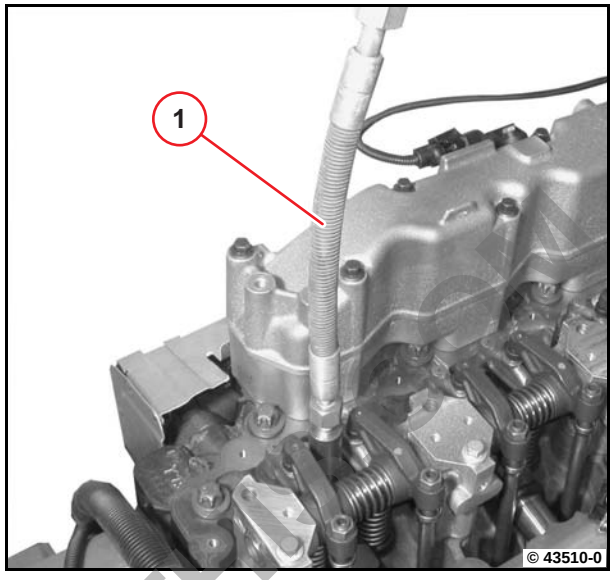
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- Remove the compression pressure tester and adapter (1).
- Remove sealing ring.
- Install the injectors.

  W 07-15-11

- Install fuel pump.

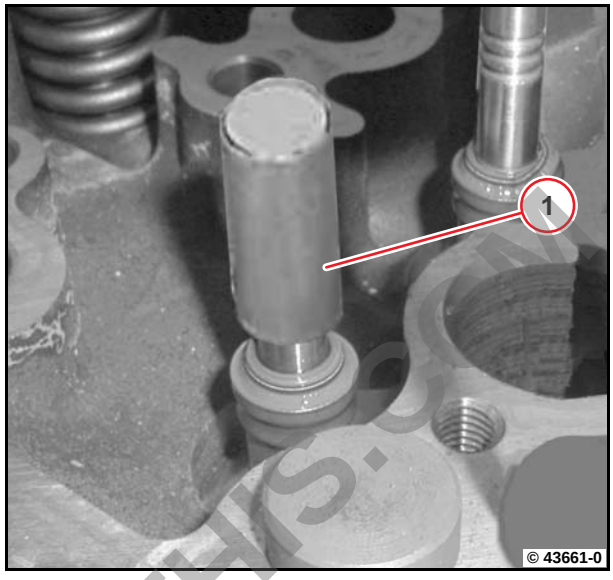
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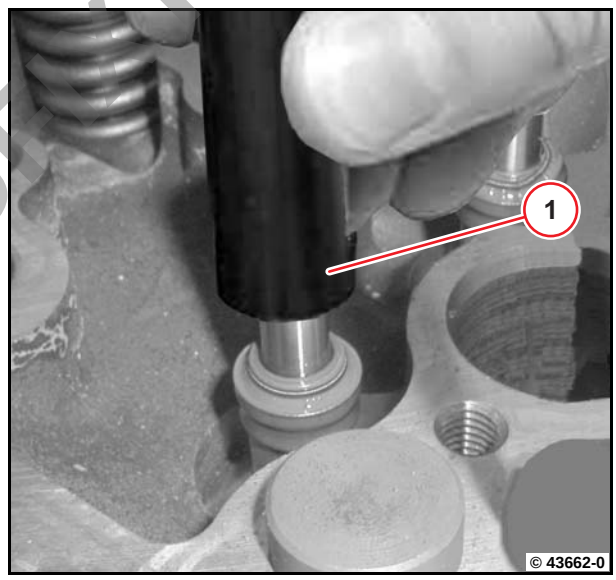
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- Oil the valve stem lightly.
- Insert and hold valve.
- Push assembly sleeve (1) over the valve V-grooves.

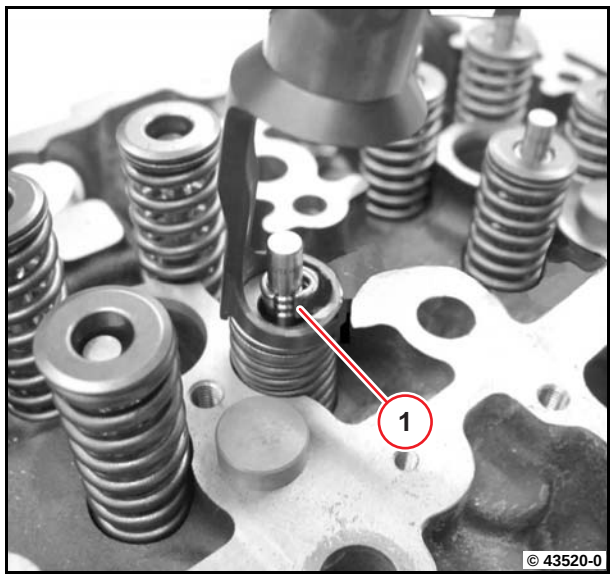


- Push new valve stem seal onto valve guide over the assembly sleeve with assembly tool (1).
- Remove assembly sleeve.



- Insert valve spring.
- Mount valve spring plate.
- Place assembly lever on valve spring plate.
- Press down the valve spring with the assembly lever and insert both tapper collets (1).

Make sure the tapper collets fit correctly in the valve keyway.



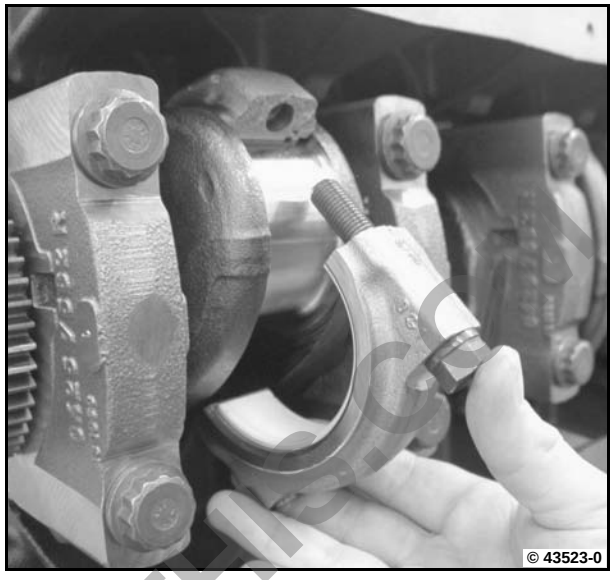
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- Turn crankshaft until the nuts of the big end bearing cover are completely accessible.
- Remove screws.
- Remove the con rod bearing cover.

Attention!
The alignment of the con rod and big end bearing cover must be maintained. If the con rod and the big end bearing cover are installed the wrong way around, the con rod will be useless!
Do not damage the break areas of the con rod and the big end bearing cover!

- Position big end bearing cover in the respective installation location and alignment.

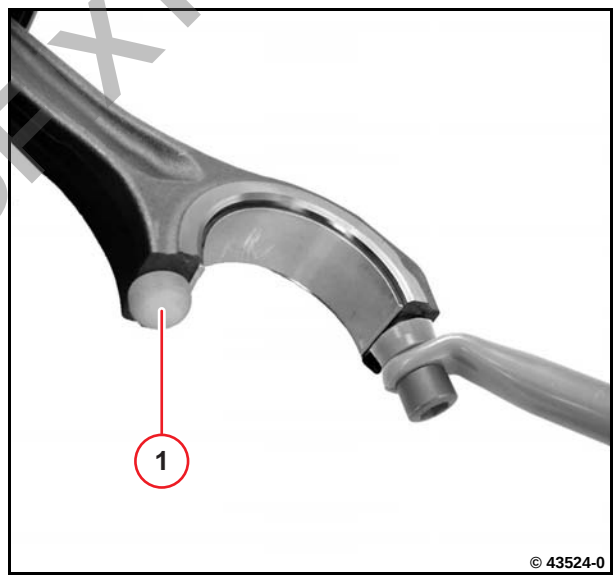


6

In order to provide a better view the con rod is shown in its uninstalled state.

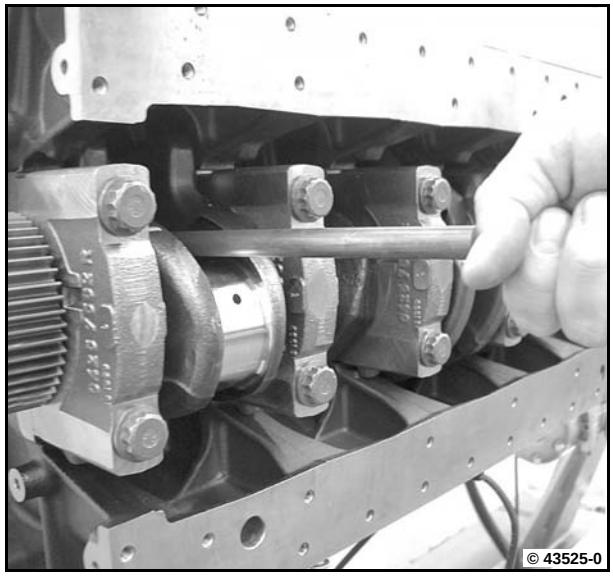
- Insert protective plug (1) in con rod.
- Mount assembly device on con rod.

Attention!
Do not damage the fractured surfaces of the con rod!



- Press out piston with assembly device.
- Remove assembly device and protective plug.
- Position con rod and piston according to the installation location and alignment.

Attention!
The alignment of the con rod and big end bearing cover must be maintained. If the con rod and the big end bearing cover are installed the wrong way around, the con rod will be useless!
Do not damage the break areas of the con rod and the big end bearing cover!

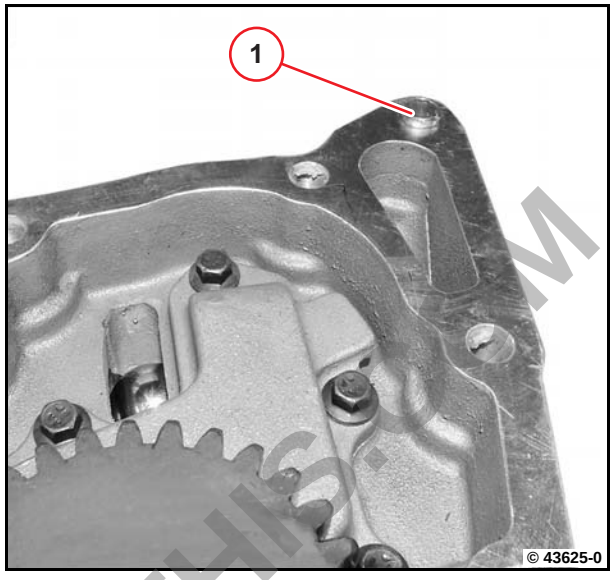


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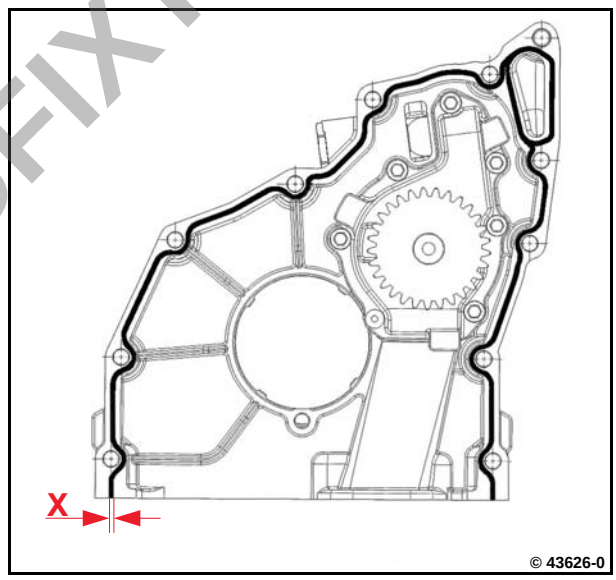
Install front cover

Make sure the clamping bushing (1) is in place.



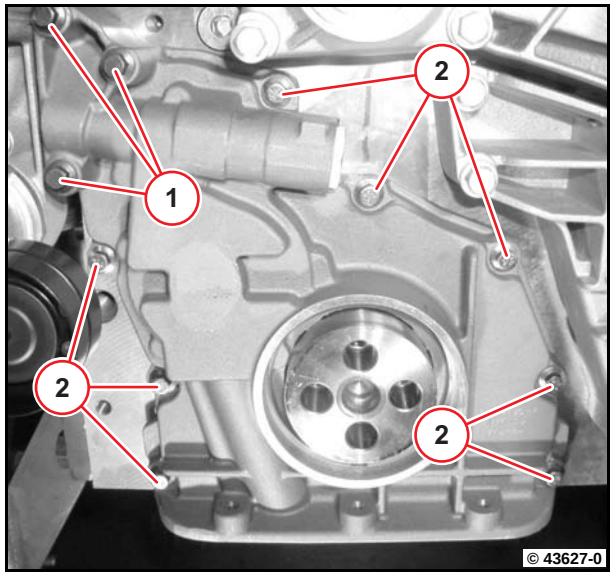
- Clean sealing surfaces.
- Coat sealing surfaces with sealant before inserting.

Sealant width "X“ = approx. 2 mm.



- Mount front cover.
- Tighten screws (1) and (2) evenly.

A03 020



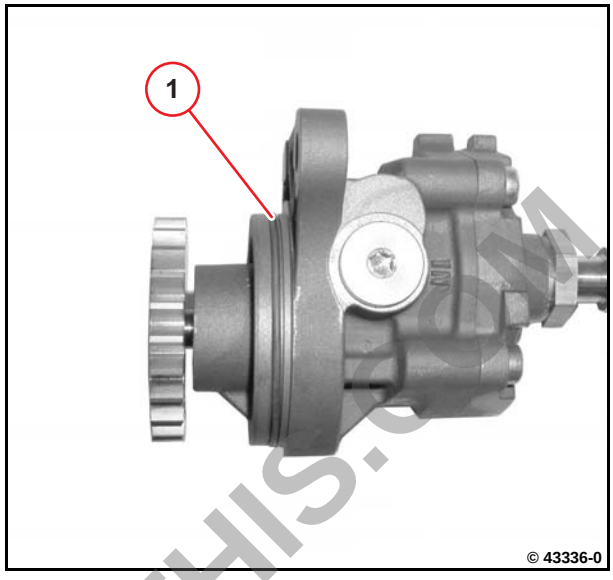
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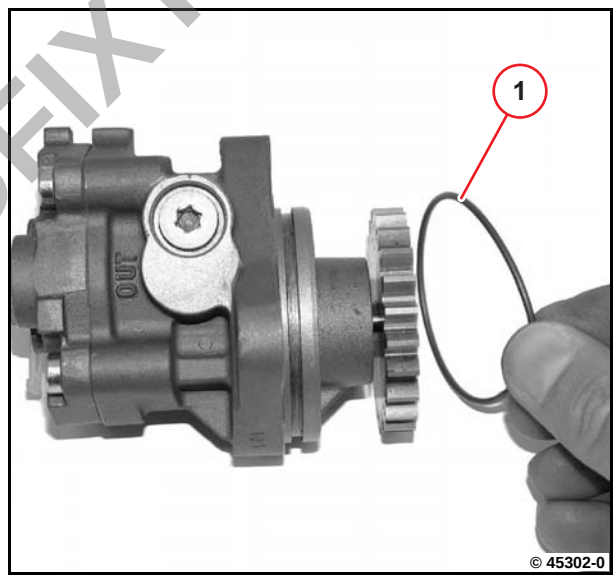
- Remove the O-ring (1) with the disassembly tool.
- Visually check the fuel supply pump.



6

Installing the fuel supply pump

- Clean contact surfaces.
- Mount new O-ring (1).



- Install fuel pump.
- Tighten screws (1).

A07 024

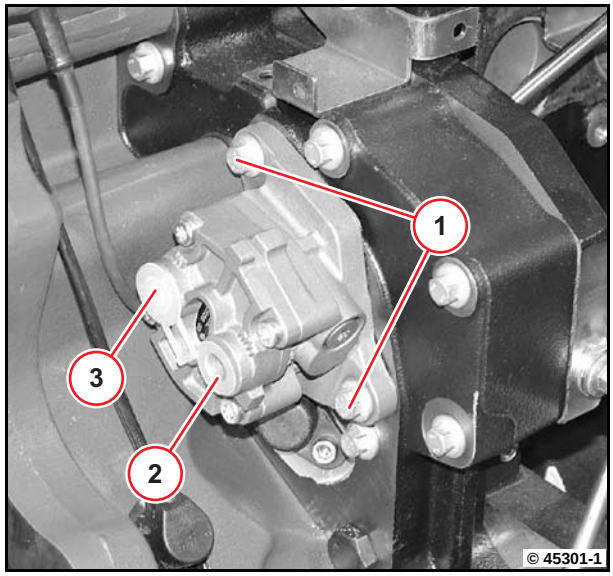
- Mount the fuel pipe at the fuel connection (2).

A07 045

Use new sealing rings.

- Mount the fuel pipe at the fuel connection (3).

Bleed the fuel system via the manual fuel pump on the fuel pre-filter according to the operation manual.



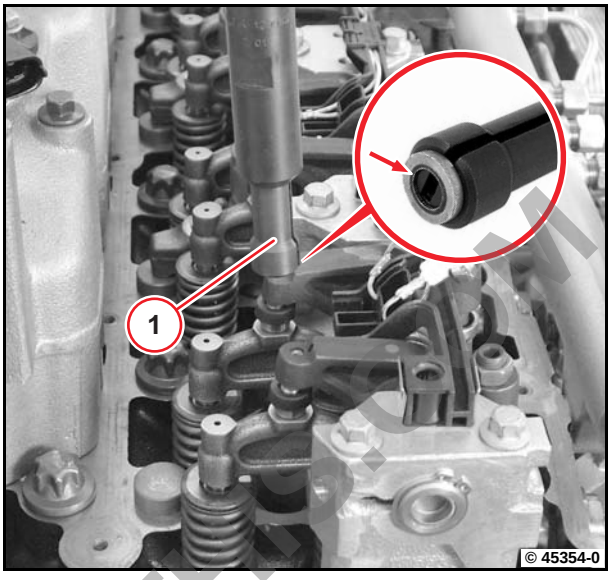
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Removing a tightly fixed sealing ring from the cylinder head

- Insert extraction device (1).

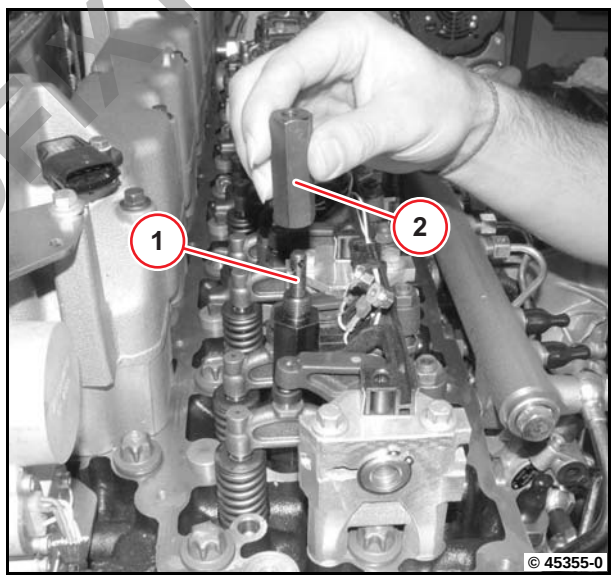
The holders (arrow) must sit in the bore of the sealing ring.



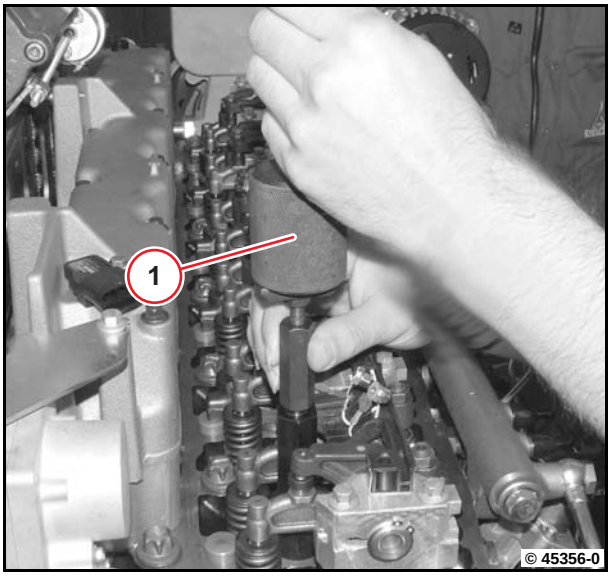
- Turn in the spindle (1) until the sealing ring is fixed to the extraction device.

Hold puller on hexagon.

- Install adapter (2) on disassembly device.



- Install slide hammer (1) on disassembly device.
- Remove tight sealing ring.



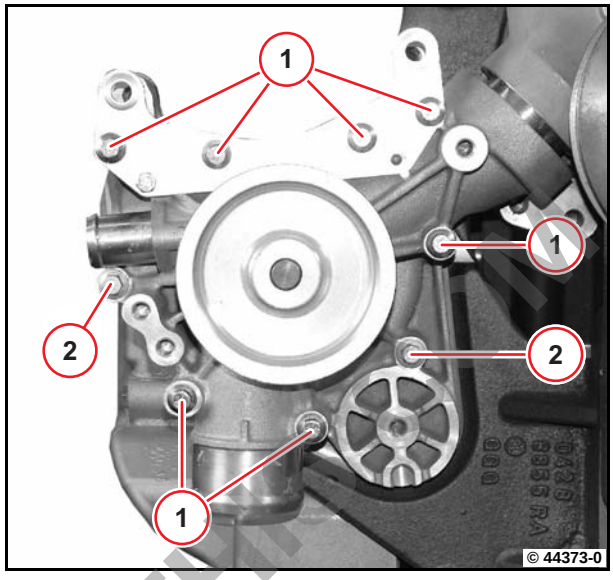
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- Tighten scews (1) and (2).

A09 010

Note different screw lengths:

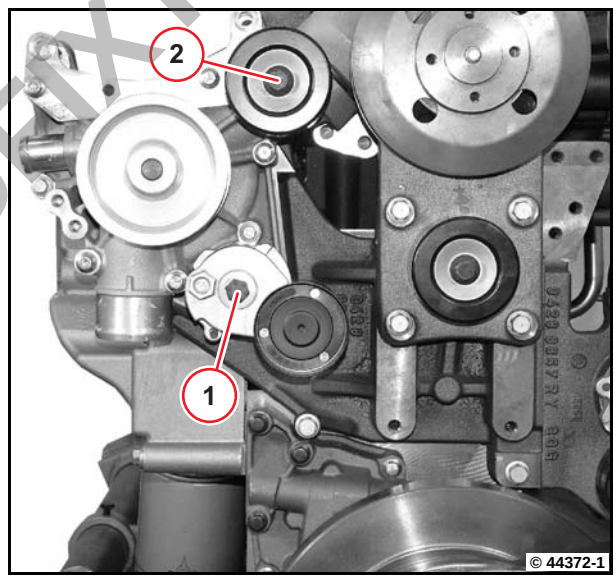


- Mount idler roller.
- Tighten screw (2).

A12 041

- Mount the belt tightener.
- Tighten screw (1).

A12 041



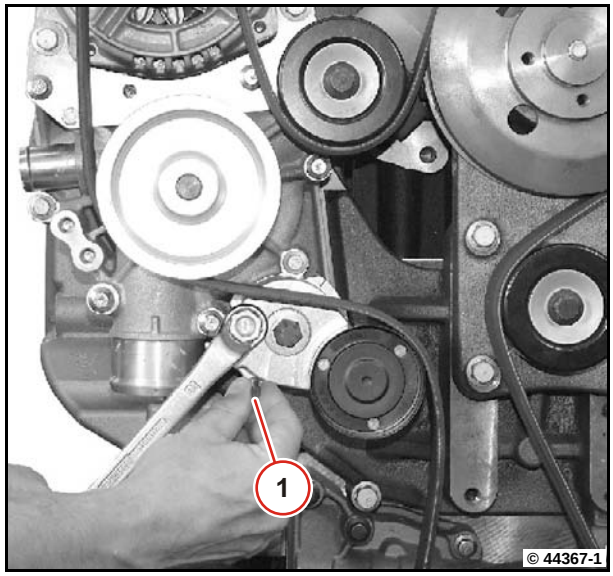
- Install generator.

W 13-02-03

- Fit the V-rib belt according to the running direction.
- Relieve the belt tightener.
- Remove holding pin (1).

Ensure that the installation location is free from faults.

The belt tightener clamps the V-rib belt automatically.



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Removing and installing the generator (operating side)

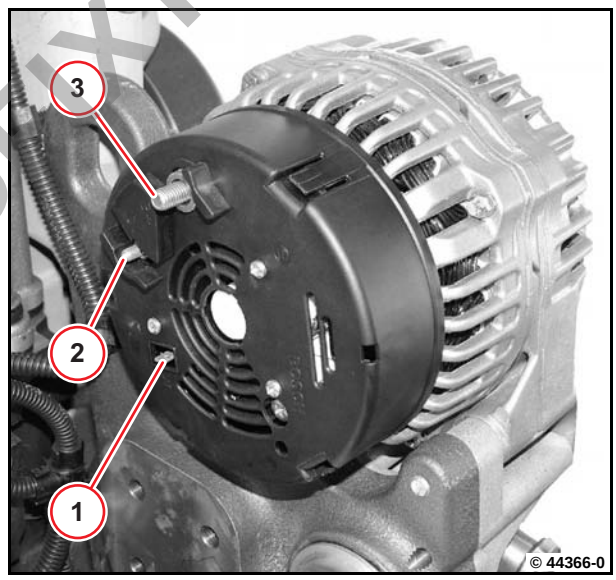
Commercial available tools

– Operation manual

Removing the generator

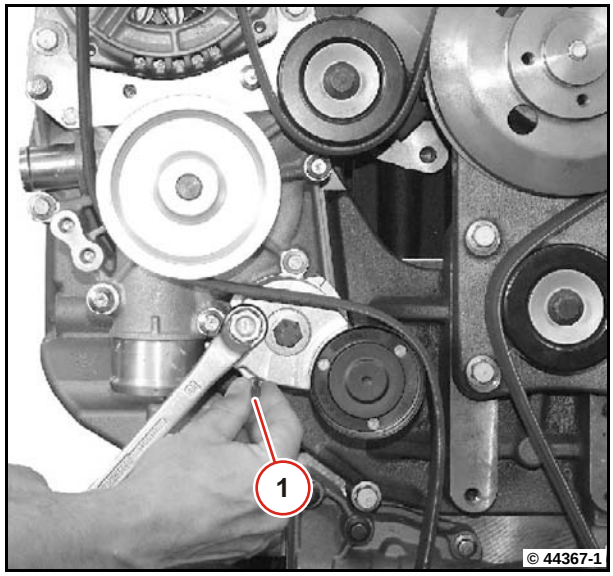
- Disconnect the battery's negative terminal.
- Remove cable from generator.

Note assignment!
- (1) = terminal W
- (2) = terminal D+
- (3) = terminal B+



- Check the wear limit of the V-rib belt.

  Operation manual
- Mark the running direction of the V-rib belt.
- Relieve the V-rib belt tension with the belt tightener.
- Insert holding pin (1).
- Remove V-rib belt.



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