



Workshop Manual
competence level 2

D 2011
TD 2011

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The engine company.

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1 Foreword



- Read and observe the information in this documentation. You will avoid accidents, retain the manufacturer's warranty and possess a fully functional and ready to operate engine.
- 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 this and are aware of the risks involved.
- Make sure that this documentation is available to everyone involved in the operation, maintenance and repair and that they have understood the contents.
- Failure to observe this documentation may lead to malfunctions and engine damage as well as injury to persons for which the manufacturer will not accept any liability.
- Prerequisite for proper maintenance and repair is the availability of all the necessary equipment, conventional and special tools and their perfect condition.
- Engine parts such as springs, clamps, elastic retaining rings etc. pose an increased risk of injury when handled incorrectly.
- The pertinent rules for the prevention of accidents and other generally recognised health and safety regulations must be observed.
- Maximum economy, reliability and long life is only guaranteed when using DEUTZ original parts.
- Repair of the engine must correspond to its use for the intended purpose. Only parts released by the manufacturer for the respective purpose may be used for conversion work. Unauthorised modifications to the engine exclude manufacturer liability for resulting damages. Failure to observe this will void the warranty!
- The engines made by DEUTZ are developed for a wide range of applications. A wide range of variants ensures that the respective special requirements are met.
- The engine is equipped according to the installation case, i.e. not all the parts and components described in this documentation are installed in your engine necessarily.
- We have done our best to highlight the differences so that you can easily find the operating, maintenance and repair instructions relevant to your engine.

We are at your service for any questions you may have in this matter.

Your DEUTZ AG





2 General



DEUTZ 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. It goes without saying that the high environmental protection requirements are also met.

Maintenance and care are the only way the engine can satisfy the demands you make on it. 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 particularly heeded.

Please consult one of our service representatives responsible for operating faults and spare parts questions. Our trained specialist personnel ensures fast and professional repairs using original DEUTZ spare parts in the event of damage.

Original spare parts from DEUTZ AG are always manufactured according to the state of the art.





3 User notes



3

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 system.
 - After all work on the fuel system, it must be bled - see the operation manual, chapter "6 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.

- Damaged injection lines and high-pressure pipes must be renewed.
- Injection lines and high pressure fuel lines must never be connected when the engine is running.
- Do not place hands near to a leak in the high pressure fuel system.
- Also carefully check all high pressure components visually before performing tests on the running engine. Wear suitable protective clothing (for example protective glasses). Leaks are a potential source of danger for workshop personnel.
- Even if no leaks are discernible on the high pressure fuel system, the workshop personnel should avoid the immediate danger zone or wear suitable protective clothing (such as protective glasses) when performing tests on the running engine and during the first trial run.
- Always stay out of range of a fuel jet, as it could cause severe injury.
- Smoking is strictly prohibited when working on the fuel system.
- Do not work near to sparks and flames.
- Never disconnect an injector when the engine is running.

3.2.2 Cleanliness instructions and measures for handling the DEUTZ Common Rail System

The DEUTZ Common Rail system used in the DEUTZ engines consists of high-precision components which are exposed to extreme stress. Great attention must be paid to cleanliness when working on the fuel system due to the high precision technology.

Notes and measures to be observed before starting work on the fuel system

- The fuel system must be closed. Make a visual inspection for leaks / damage to the fuel system.
- Clean the whole engine and engine room with the system closed before starting work on the fuel system.
- The engine must be dry when you start working on the fuel system.
- Blowing (dry) with compressed air is only permissible with the fuel system closed.
- When using a steam jet, first cover up the control unit, the cable plugs, all other electrical plug connections and the generator. Also, the steam jet may not be pointed directly at them.
- Electrical plug connections must be plugged when spraying.
- Remove loose parts (for example paint chips from assembly work) with an industrial vacuum cleaner or other suction device. Only suction may be used in assembly work on the open fuel system.
- Only work on the fuel system in a clean environment (no dust, no grinding or welding). Avoid draughts (dust). Clean the workshop floor regularly. No brake or performance test benches may be kept or operated in the same room.
- Air currents which kick up dust, such as those caused by brake repairs or the starting of engines, should be avoided.
- For work such as removal and installation on defective hydraulic components on the Common Rail System it is recommended to partition off a separate workshop area in the factory. This must be separate from other areas in which general vehicle repairs such as brake repairs are carried out.
- No general machine tools may be operated in this room.
- Regular cleaning of the workshop area is mandatory. Draughts, ventilation systems and heating fans should be minimised.
- Areas of the engine room from which particles of dirt could be loosened (for example the bottom part of the tipped driver cab) must be covered with fresh clean film.
- Working materials and tools must be cleaned before work. Only use tools without damage to the chrome plating or tools which are not chrome-plated.

Notes and measures to be observed during work on the fuel system or with the fuel system open.

- Only work in clean overalls.
- Only lint-free cleaning cloths may be used for work on the fuel system.
- Remove loose parts (for example paint chips from assembly work) with an industrial vacuum cleaner or other suction device. Only suction may be used in assembly work on the open fuel system.
- Working materials and tools must be cleaned before work. Only use tools without damage to the chrome plating or tools which are not chrome-plated.
- Do not use used cleaning fluid or test fluid for cleaning.
- Compressed air must not be used for cleaning on the open fuel system.
- Work on removed components may only be performed at a suitably equipped workbench.

- When removing and installing components, no materials which can leave behind particles or fibres (cardboard, wood, cloths) may be used.
- Removed parts may only be rubbed down with clean, lint-free cloths. No dirt particles may be rubbed into the components.
- Openings on the components and on the engine must be closed immediately with suitable stoppers/caps.
- The stoppers/caps may only be removed immediately before installing.
- Store stoppers/caps free from dust and dirt in the original packaging and dispose of after using once.
- Only remove new parts from the original packaging just before installation.
- Removed components must be kept in new, sealable bags or - if available - in the packaging of the new parts.
- Always use the original packaging of the new part to send back the removed components.

Notes and measures for the vehicle workshop area

- For work such as removal and installation on defective hydraulic components on the Common Rail System it is recommended to partition off a separate workshop area in the factory. This must be separate from other areas in which general vehicle repairs such as brake repairs are carried out.
- The workshop floor is sealed or tiled.
- No welding gear, grinders, general machine tools, brakes or performance test benches may be operated in this room.
- Regular cleaning of the workshop area is mandatory. Draughts, ventilation systems and heating fans should be minimised.

Notes and measures for workbench and tools in the vehicle hall

- A special workbench must be set up for work on removed components.
- Clean the removal and installation tools regularly and keep them in a closed tool cabinet.
- Remove loose parts (for example paint chips from assembly work) with an industrial vacuum cleaner or other suction device.
- Working materials and tools must be cleaned before work. Only use tools without damage to the chrome plating or tools which are not chrome-plated.

3.2.3 Disposal regulations

The work described in the operation manual and workshop manual necessitates renewal of parts and

operating materials among other things. The renewed parts / operating materials must be stored, transported and disposed of according to regulations. The owner himself is responsible for this.

Disposal includes recycling and the scrapping of parts / operating materials, although recycling has priority.

Details of disposal and their monitoring are governed by regional, national and international laws and directives which the system operator must observe on his own responsibility.

3.3 Operation manual and workshop manual

To structure the information to suit the user, the service documentation is divided into operation manual and workshop manual.

The operation manual contains a general description and instructions for all other maintenance work.

It contains the following chapters:

1. Contents, General
2. Engine description
3. Operation
4. Operating media
5. Maintenance
6. Care and maintenance work
7. Faults, causes and remedies
8. Engine conservation
9. Technical data
10. Service

The workshop manual assumes knowledge of the contents of the operation manual. This applies especially for the safety regulations. The workshop manual describes repairs to the engine and components for which more effort and appropriately qualified technicians are required.

3.4 Job cards

The job cards are divided in the workshop manual into "W" and "I" job cards.

The "W" job card documents standard repairs on the engine and/or its components. The necessary tools and special tools are also specified in the "W" job card.

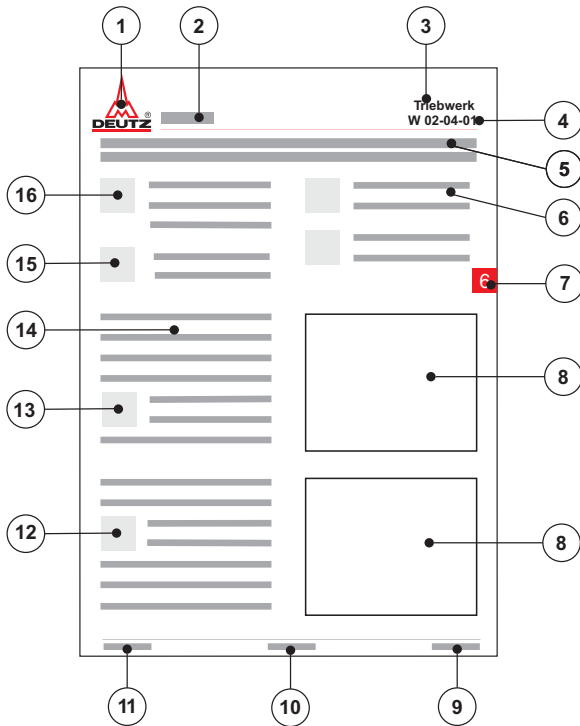
The "I" job card additionally documents the appropriate work procedures for repairing the engine and/or its components. The workshop must satisfy special conditions to perform these work procedures. Special tools and machine tools must be available, for example.

3.4.1 Numbering of job cards

The job card numbers follow the pattern **W 02-04-01**. The individual parts of this pattern are explained below:

- **W 02-04-01**: Documentation type
 - **W** Workshop manual
 - **I** Repair instructions
- **W 02-04-01**: Maintenance group
 - **00** ... General / interdisciplinary activities
 - **01** ... Cylinder head
 - **02** Drive system
 - **03** ... Crankcase
 - **04** ... Engine control system
 - **05** ... Speed governing
 - **06** ... Exhaust system / Charging
 - **07** ... Fuel system
 - **08** ... Lube oil system
 - **09** ... Cooling system
 - **10** ... Compressed air system
 - **11** ... Monitoring system
 - **12** ... Other components
 - **13** ... Electrical system
- **W 02-04-01**: Component grouping
- **W 02-04-01**: Consecutive number

3.4.2 Structure of a job card



1. DEUTZ AG, publisher of service documentation
2. Engine type (e.g. TCD 2013 4V)
3. Maintenance group
4. Job card number or topic
5. Title of job card
6. Reference to other job cards
7. Chapter
8. Graphic or photo
9. DEUTZ internal creation number
10. Page number
11. Date of issue of job card
12. Note
13. Danger / Important
14. Work sequence
15. Special tools; auxiliary materials
16. Conventional tools

3.5 Explanation of symbols



Danger!

of death or to health. Must be observed!
For example: The incorrect use or conversion of the turbocharger can lead to serious injury.



Caution!

Danger to the component/engine. Non-compliance can lead to destruction of the component/engine. Must be observed!



Note

General notes on assembly, environmental protection etc. No potential danger for man or machine.



Tool

Conventional and special tools required for the work.



Auxiliary materials

Working materials required in addition to the tools for performing the work (e.g. greases, oils, adhesives, sealants)



References

to important documents or job cards for the work process.

For example: Job card W 04-05-05



Reference

to a document or a job card within the work process.



Test and setting data

The necessary values are specified here. If several values are necessary, a cross reference is given to the Test and Setting Values table.

For example:

ID no. P01 61 = valve clearance, inlet



Tightening specification

The necessary values are specified here. If several values are necessary, a cross reference is given to the Tightening Specifications table.

For example:

ID no. A01 001 = cylinder head screws



- 5 Job card overview
- 5.1 Sorted alphabetically



Activity	Job card	Maintenance group
Calculating the thickness of shim	W 07-06-03	Fuel system
Check start of injection	W 07-06-01	Fuel system
Checking the compression pressure	W 00-02-06	General
Dismantling and assembling the cooling blower	W 09-11-02	Cooling system
Installing and removing charge air pressure-dependent full load stop	W 07-08-02	Fuel system
Mounting engine on assembly block and demounting	W 00-05-01	General
Remove and install the cooling blower	W 09-11-01	Cooling system
Removing and install the charge air line	W 06-02-03	Exhaust system/Charging
Removing and installing air duct	W 09-11-03	Cooling system
Removing and installing fuel pipes	W 07-10-06	Fuel system
Removing and installing rear cover	W 03-09-01	Crankcase
Removing and installing temperature transmitter	W 08-11-11	Lube oil system
Removing and installing the air bearing	W 09-13-02	Cooling system
Removing and installing the connection housing	W 03-09-04	Crankcase
Removing and installing the control line	W 08-16-01	Lube oil system
Removing and installing the crankcase bleeding	W 03-01-11	Crankcase
Removing and installing the exhaust damper	W 06-01-05	Exhaust system/Charging
Removing and installing the exhaust gas collection pipe (Exhaust gas recirculation)	W 06-09-08	Exhaust system/Charging
Removing and installing the exhaust gas return pipe	W 06-09-07	Exhaust system/Charging
Removing and installing the exhaust gas return valve	W 06-09-06	Exhaust system/Charging
Removing and installing the exhaust line	W 06-01-05	Exhaust system/Charging
Removing and installing the flywheel	W 12-06-01	Other components
Removing and installing the fuel filter console	W 07-10-08	Fuel system
Removing and installing the fuel filter console	W 07-10-08	Fuel system
Removing and installing the fuel injector pump	W 07-04-01	Fuel system
Removing and installing the fuel injectors	W 07-07-01	Fuel system
Removing and installing the fuel supply pump	W 07-11-01	Fuel system
Removing and installing the generator	W 13-02-03	Electrical system
Removing and installing the glow plug	W 13-06-02	Electrical system
Removing and installing the heating plugs	W 13-06-01	Electrical system
Removing and installing the hydraulic pump	W 12-08-02	Other components
Removing and installing the impulse transmitter	W 05-07-01	Speed control
Removing and installing the intake manifold	W 06-07-03	Exhaust system/Charging

5

Activity	Job card	Maintenance group
Removing and installing the lifting magnet (charge air pressure-dependent full load stop)	W 07-08-01	Fuel system
Removing and installing the lifting magnet (Engine shutdown)	W 11-00-03	Monitoring system
Removing and installing the lifting magnet (Start amount release)	W 07-02-07	Fuel system
Removing and installing the lubricating oil cooler	W 08-08-02	Lube oil system
Removing and installing the lubricating oil pan (metal sheet lubricating oil pan)	W 08-04-07	Lube oil system
Removing and installing the lubricating oil pump	W 08-04-05	Lube oil system
Removing and installing the magnet clip (Exhaust gas recirculation)	W 06-09-10	Exhaust system/Charging
Removing and installing the oil filter console	W 08-11-07	Lube oil system
Removing and installing the oil pressure regulating valve	W 08-11-02	Lube oil system
Removing and installing the oil pressure switch	W 08-11-08	Lube oil system
Removing and installing the oil suction pipe	W 08-04-06	Lube oil system
Removing and installing the rocker arm and rocker arm bracket	W 01-02-02	Cylinder head
Removing and installing the sensor (Exhaust gas recirculation)	W 06-09-09	Exhaust system/Charging
Removing and installing the starter	W 13-03-02	Electrical system
Removing and installing the starter	W 13-03-02	Electrical system
Removing and installing the thermostat (Lubricating oil cooler)	W 08-11-12	Lube oil system
Removing and installing the toothed belt wheel	W 04-04-15	Engine control
Removing and installing the turbocharger	W 06-06-04	Exhaust system/Charging
Removing and installing the V-belt pulley	W 12-01-04	Other components
Renew camshaft sealing ring (opposite side to flywheel)	W 04-03-01	Engine control
Renew toothed belt and tensioning pulley	W 04-04-12	Engine control
Renew toothed belt and tensioning pulley (Hydraulic pump)	W 12-08-03	Other components
Renew V-belts, check V-belt tension	W 12-02-01	Other components
Renewing the crankshaft sealing ring (flywheel side)	W 02-02-02	Drive system
Renewing the crankshaft sealing ring (opposite side to flywheel)	W 02-02-04	Drive system
Renewing the injection lines	W 07-03-01	Fuel system
Setting valve clearance	W 01-01-01	Cylinder head
Steuerzeiten prüfen	W 04-04-11	Engine control

5.2 Sorted numerically



Job card	Activity	Maintenance group
W 00-02-06	Checking the compression pressure	General
W 00-05-01	Mounting engine on assembly block and demounting	General
W 01-01-01	Setting valve clearance	Cylinder head
W 01-02-02	Removing and installing the rocker arm and rocker arm bracket	Cylinder head
W 02-02-02	Renewing the crankshaft sealing ring (flywheel side)	Drive system
W 02-02-04	Renewing the crankshaft sealing ring (opposite side to flywheel)	Drive system
W 03-01-11	Removing and installing the crankcase bleeding	Crankcase
W 03-09-01	Removing and installing rear cover	Crankcase
W 03-09-04	Removing and installing the connection housing	Crankcase
W 04-03-01	Renew camshaft sealing ring (opposite side to flywheel)	Engine control
W 04-04-11	Steuerzeiten prüfen	Engine control
W 04-04-12	Renew toothed belt and tensioning pulley	Engine control
W 04-04-15	Removing and installing the toothed belt wheel	Engine control
W 05-07-01	Removing and installing the impulse transmitter	Speed control
W 06-01-05	Removing and installing the exhaust line	Exhaust system/Charging
W 06-01-05	Removing and installing the exhaust damper	Exhaust system/Charging
W 06-02-03	Removing and install the charge air line	Exhaust system/Charging
W 06-06-04	Removing and installing the turbocharger	Exhaust system/Charging
W 06-07-03	Removing and installing the intake manifold	Exhaust system/Charging
W 06-09-06	Removing and installing the exhaust gas return valve	Exhaust system/Charging
W 06-09-07	Removing and installing the exhaust gas return pipe	Exhaust system/Charging
W 06-09-08	Removing and installing the exhaust gas collection pipe (Exhaust gas recirculation)	Exhaust system/Charging
W 06-09-09	Removing and installing the sensor (Exhaust gas recirculation)	Exhaust system/Charging
W 06-09-10	Removing and installing the magnet clip (Exhaust gas recirculation)	Exhaust system/Charging
W 07-02-07	Removing and installing the lifting magnet (Start amount release)	Fuel system
W 07-03-01	Renewing the injection lines	Fuel system
W 07-04-01	Removing and installing the fuel injector pump	Fuel system
W 07-06-01	Check start of injection	Fuel system
W 07-06-03	Calculating the thickness of shim	Fuel system
W 07-07-01	Removing and installing the fuel injectors	Fuel system

5

Job card	Activity	Maintenance group
W 07-08-01	Removing and installing the lifting magnet (charge air pressure-dependent full load stop)	Fuel system
W 07-08-02	Installing and removing charge air pressure-dependent full load stop	Fuel system
W 07-10-06	Removing and installing fuel pipes	Fuel system
W 07-10-08	Removing and installing the fuel filter console	Fuel system
W 07-10-08	Removing and installing the fuel filter console	Fuel system
W 07-11-01	Removing and installing the fuel supply pump	Fuel system
W 08-04-05	Removing and installing the lubricating oil pump	Lube oil system
W 08-04-06	Removing and installing the oil suction pipe	Lube oil system
W 08-04-07	Removing and installing the lubricating oil pan (metal sheet lubricating oil pan)	Lube oil system
W 08-08-02	Removing and installing the lubricating oil cooler	Lube oil system
W 08-11-02	Removing and installing the oil pressure regulating valve	Lube oil system
W 08-11-07	Removing and installing the oil filter console	Lube oil system
W 08-11-08	Removing and installing the oil pressure switch	Lube oil system
W 08-11-11	Removing and installing temperature transmitter	Lube oil system
W 08-11-12	Removing and installing the thermostat (Lubricating oil cooler)	Lube oil system
W 08-16-01	Removing and installing the control line	Lube oil system
W 09-11-01	Remove and install the cooling blower	Cooling system
W 09-11-02	Dismantling and assembling the cooling blower	Cooling system
W 09-11-03	Removing and installing air duct	Cooling system
W 09-13-02	Removing and installing the air bearing	Cooling system
W 11-00-03	Removing and installing the lifting magnet (Engine shutdown)	Monitoring system
W 12-01-04	Removing and installing the V-belt pulley	Other components
W 12-02-01	Renew V-belts, check V-belt tension	Other components
W 12-06-01	Removing and installing the flywheel	Other components
W 12-08-02	Removing and installing the hydraulic pump	Other components
W 12-08-03	Renew toothed belt and tensioning pulley (Hydraulic pump)	Other components
W 13-02-03	Removing and installing the generator	Electrical system
W 13-03-02	Removing and installing the starter	Electrical system
W 13-03-02	Removing and installing the starter	Electrical system
W 13-06-01	Removing and installing the heating plugs	Electrical system
W 13-06-02	Removing and installing the glow plug	Electrical system



6 Job cards



Checking the compression pressure



Standard tools:

– Compression pressure tester

8005

Special tools:

– Connector

100120



– [W 01-01-01](#)

– [W 07-07-01](#)



Attention!

Pay attention to utmost cleanliness when working on the fuel system.

Remove residue paint and particles of dirt before removing.

Clean the respective affected parts carefully. Blow damp areas dry with compressed air.

Observe the safety regulations and national specifications for handling fuels.

Close all connections immediately after opening with new, clean plugs/caps.

Do not remove plugs/caps until immediately before assembling.

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

After all work on the fuel system, it must be bled - see the operation manual, chapter "6 Fuel system".

Checking the compression pressure

- Set valve clearance.



[W 01-01-01](#)

- Removing fuel injectors.



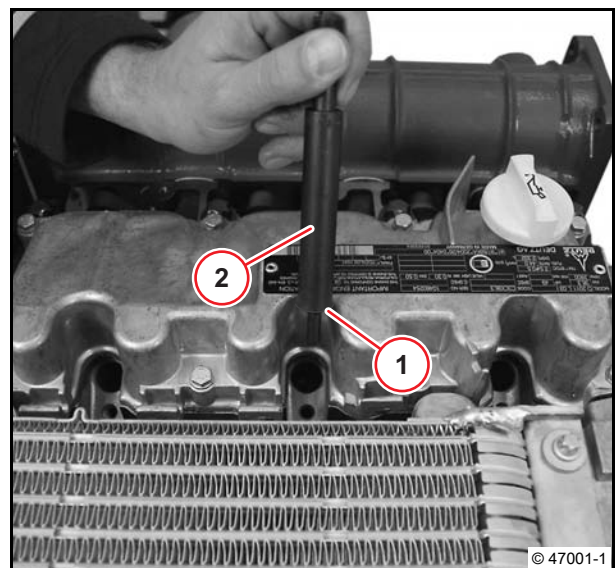
[W 07-07-01](#)

- Mount sealing ring (1).



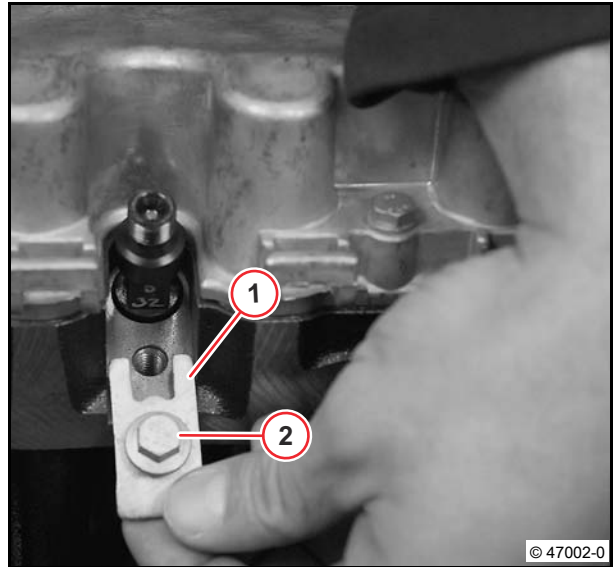
Use sealing ring (1) for fuel injector.

- Insert connector (2).

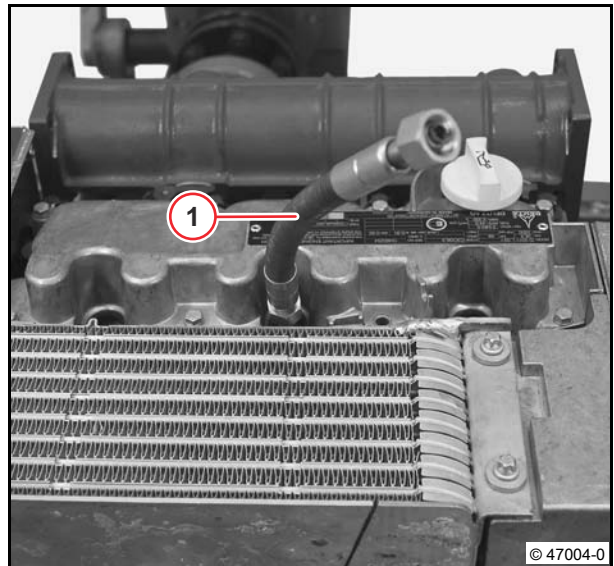


- Mount clamping shoe (1).
- Tighten screw (2).


 21 Nm

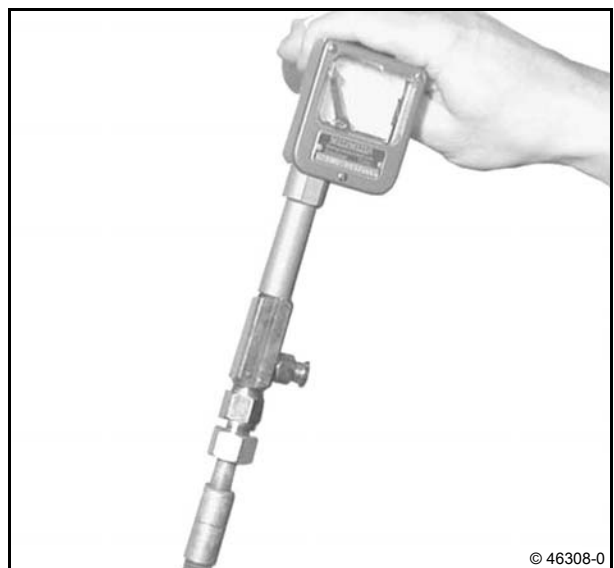


- Connect adapter (1) to connector.



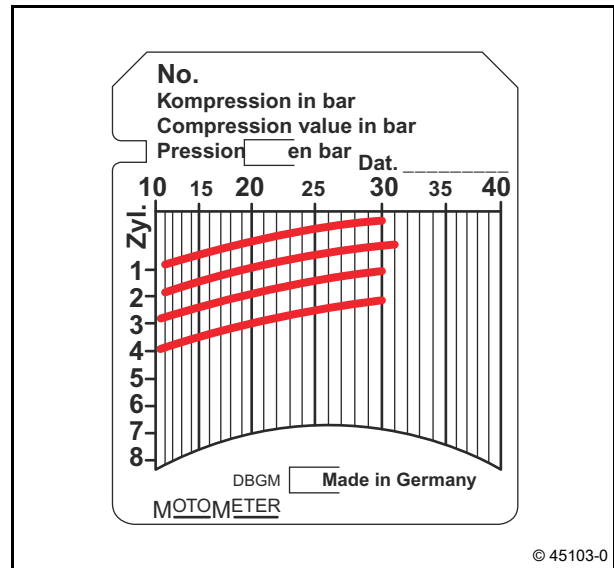
- Mount the compression tester on the adapter.
- Turn over engine with starter.

 25 - 30 bar (2500 - 3000 kPa)

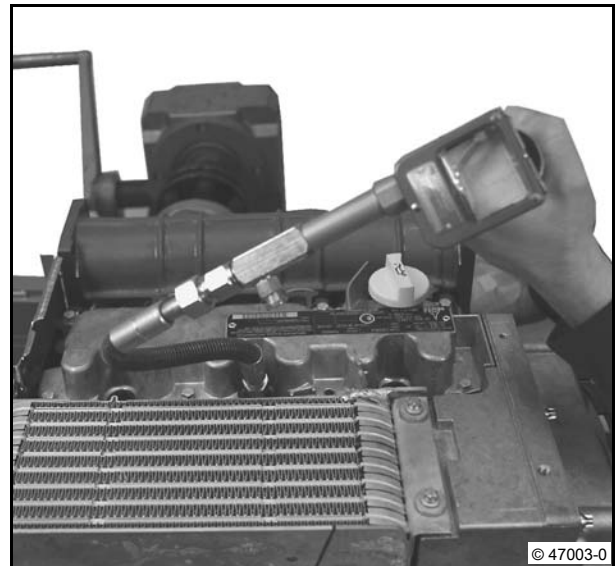




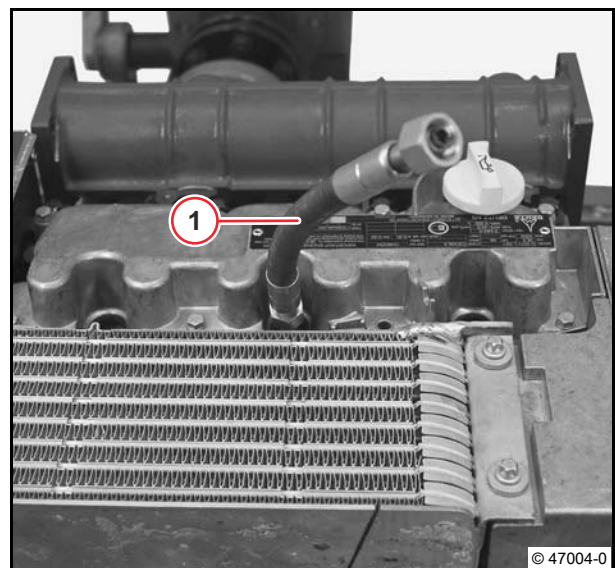
The measured compression pressure depends on the starting speed during the measuring process and the altitude of the engine installation site. Therefore, limit values cannot be determined exactly. The compression pressure measurement is only recommended as a reference measurement of all cylinders of an engine to each other. If more than 15% deviation has been determined, the cause should be determined by disassembling the cylinder unit concerned.



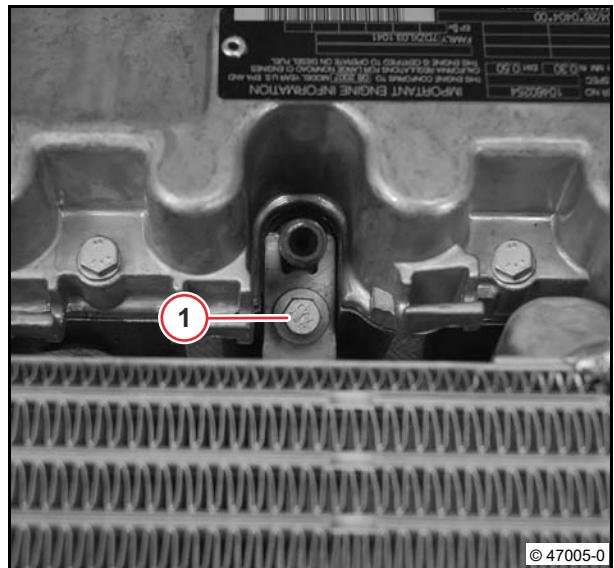
- Remove the compression pressure tester.



- Remove the compression pressure tester and adapter (1).



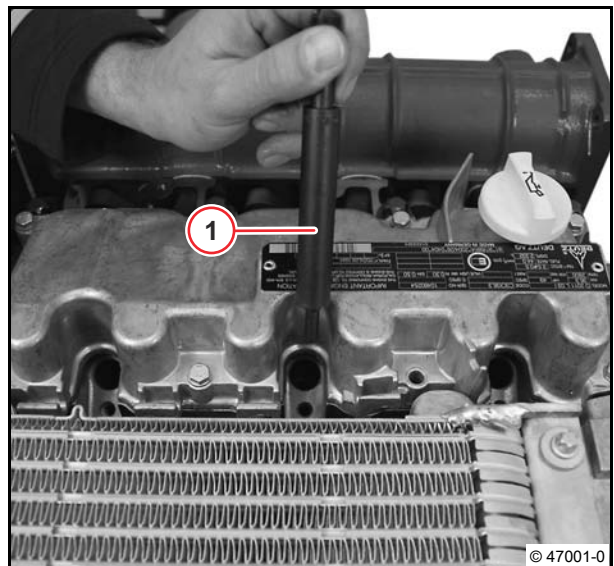
- Unscrew screw (1).



6

- Remove connector (1).
- Remove sealing ring.
- Install fuel injectors.

 [W 07-07-01](#)



Technical Data

Testing and setting data

ID no.	Name	Additional information	Value
P00 51	Compression pressure		25 - 30 bar (2500 - 3000 kPa)

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A07 001	Fuel injector on cylinder head			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Mounting engine on assembly block and demounting



Standard tools:

- Lifting gear
- Suspension ropes
- Eyelet bolts

Special tools:

- Assembly block 6067
- Supporting bracket 6067/114
- Clamping bracket 6067/115



- W 13-03-02



Danger!

When using hoists (workshop crane) the safety regulations for handling hoists must be observed.

It is not permitted to stay under moving loads.



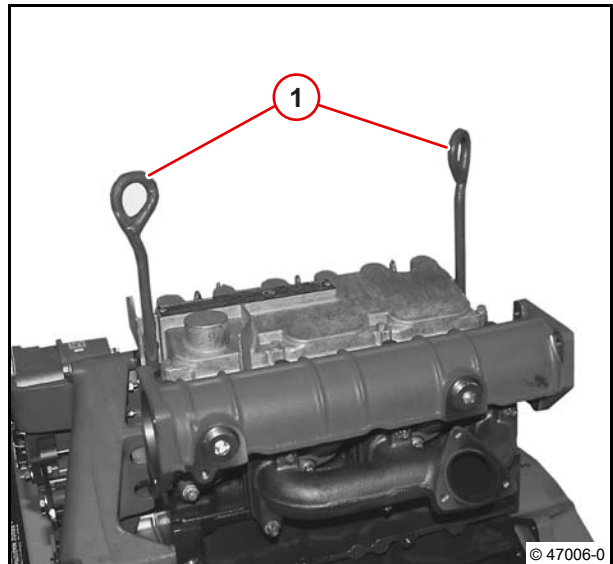
Different customer scopes are not taken into account in the repair sequence shown here, accessories which deviate from the standard equipment are not shown.

Mounting engine on assembly block

- Remove starter.

W 13-03-02

- Screw in eyelet bolts (1).



- Hang engine on workshop crane.

- D 2011 L02

approx. 169 - 175 kg

- D 2011 L03

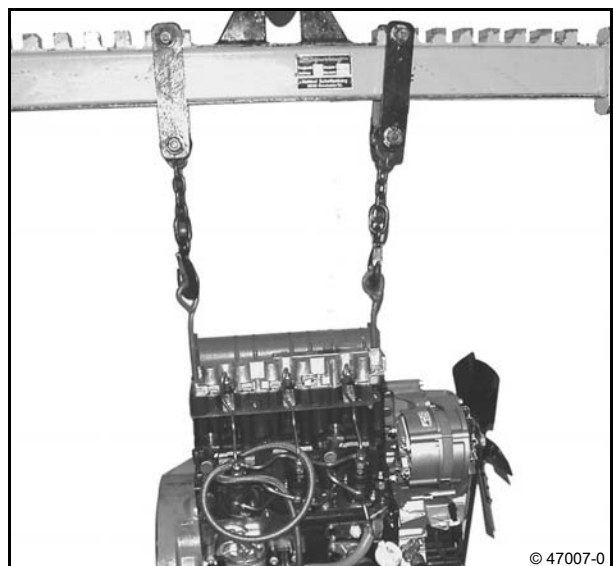
approx. 210 - 217 kg

- D 2011 L04

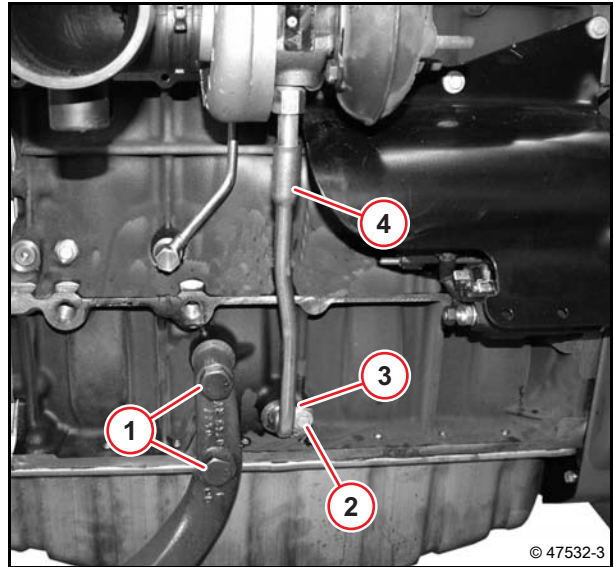
approx. 253 - 261 kg

- TD 2011 L04

approx. 255 - 258 kg

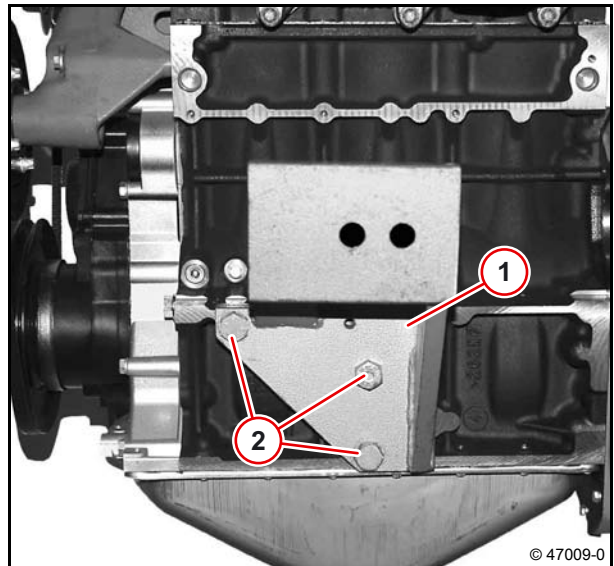


- Unscrew screws (1).
- Remove all mounting feet.
– TD 2011
- Unscrew screw (2).
- Remove holder (3).
- Remove oil return pipe (4).



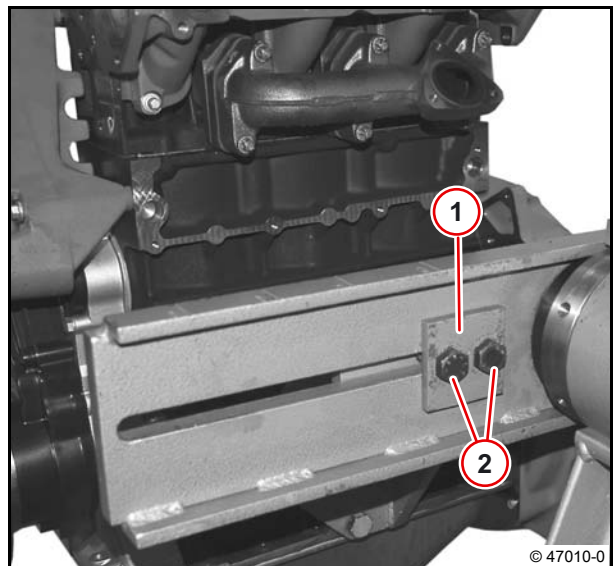
- Mount clamping holder (1).
- Tighten screws (2).

 90 Nm

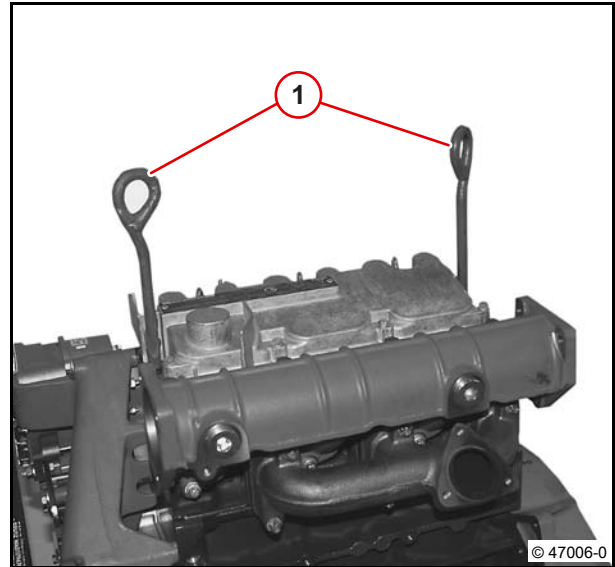


- Align engine on engine block.
- Mount retainer plate (1).
- Tighten screws (2) and lock nuts.

 90 Nm



- Unhook engine.
- Unscrew eyelet bolts (1).



Demounting engine from assembly block


- Screw in eyelet bolts (1).
- Hang engine on workshop crane.
 - D 2011 L02

 approx. 169 - 175 kg


– D 2011 L03

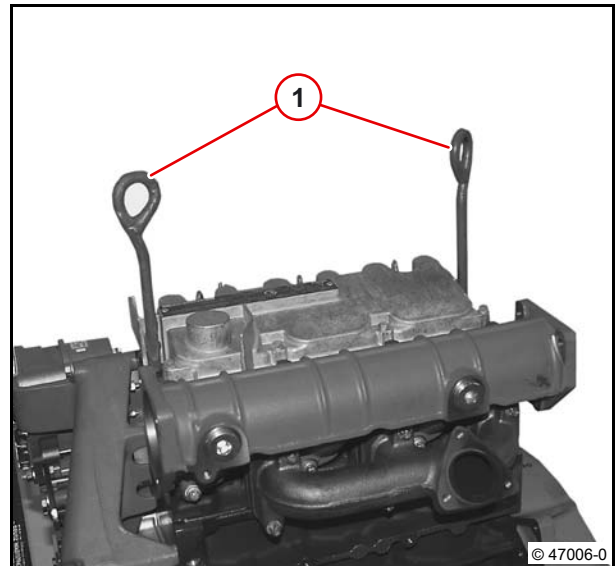
 approx. 210 - 217 kg

– D 2011 L04

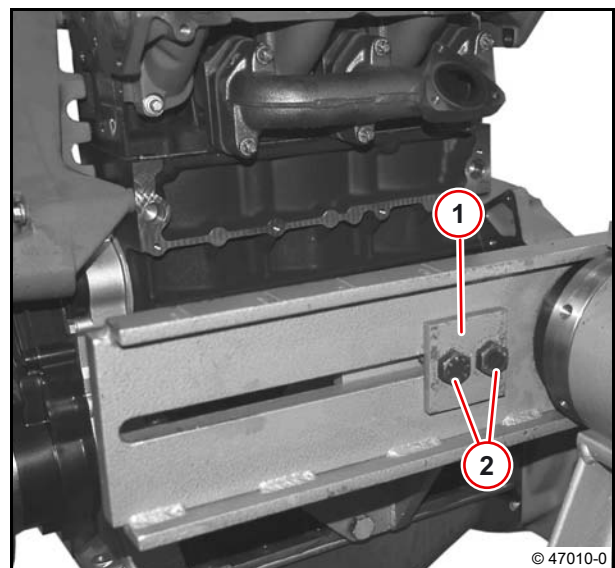
 approx. 253 - 261 kg

– TD 2011 L04

 approx. 255 - 258 kg



- Loosen lock nuts.
- Unscrew screws (2).
- Remove retainer plate (1).

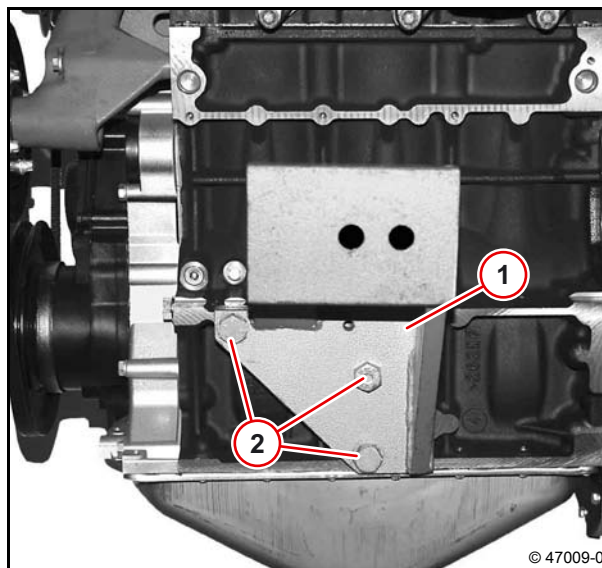




Danger!

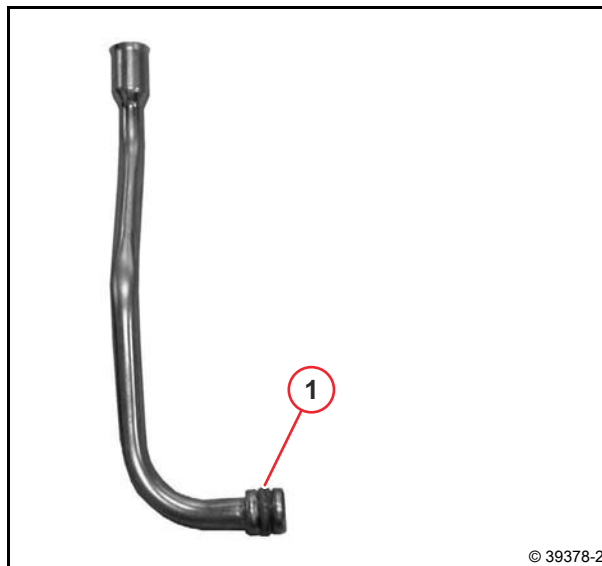
Lower engine with workshop crane.

- Unscrew screws (2).
- Remove clamping bracket (1).



– TD 2011

- Insert new O-ring (1).
- Lightly oil new O-ring (1).



– TD 2011

- Mount oil return pipe (1).



Attention!

Install tension-free.

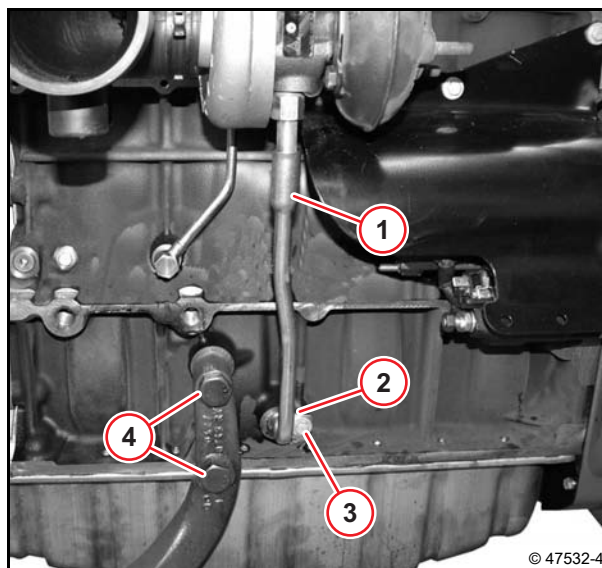
- Mount holder (2).
- Tighten screw (3).

 8.5 Nm

– D 2011, TD 2011

- Install all mounting feet.
- Tighten screws (4).

 200 Nm





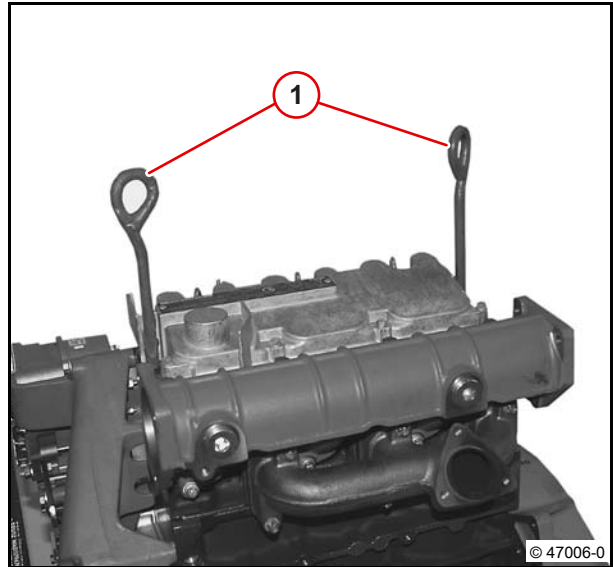
Danger!

Put the engine down on a secure surface.

- Unhook the engine from the workshop crane.
- Unscrew eyelet bolts (1).
- Install starter.



[W 13-03-02](#)



Technical Data

Testing and setting data

ID no.	Name	Additional information	Value
D 2011 L02			
P00 04	Engine weight according to DIN 70020-A		approx. 169 - 175 kg
D 2011 L03			
P00 04	Engine weight according to DIN 70020-A		approx. 210 - 217 kg
D 2011 L04			
P00 04	Engine weight according to DIN 70020-A		approx. 253 - 261 kg
TD 2011 L04			
P00 04	Engine weight according to DIN 70020-A		approx. 255 - 258 kg

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A00 001	Clamping bracket on crankcase			90 Nm
A00 002	Clamping bracket on adapter for assembly block			90 Nm
A00 003	Mounting foot/engine mounting on crankcase	M14x55-12.9 M14x100-12.9		200 Nm
TD 2011				
A08 049	Holder oil return line on crankcase	Torx, M6x14-8.8		8.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Setting valve clearance



Standard tools:
– Feeler gauges



Attention!

In case of internal exhaust gas recirculation, the inlet valve is opened briefly by an additional cam on the camshaft.

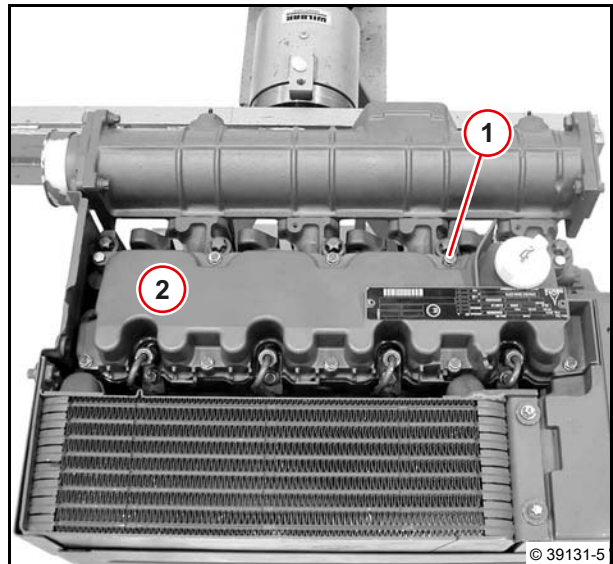
This is not to be confused with the valve overlap.



Allow the engine to cool down for at least 30 minutes before setting the valve clearance. Engine oil temperature $< 80\text{ }^{\circ}\text{C}$

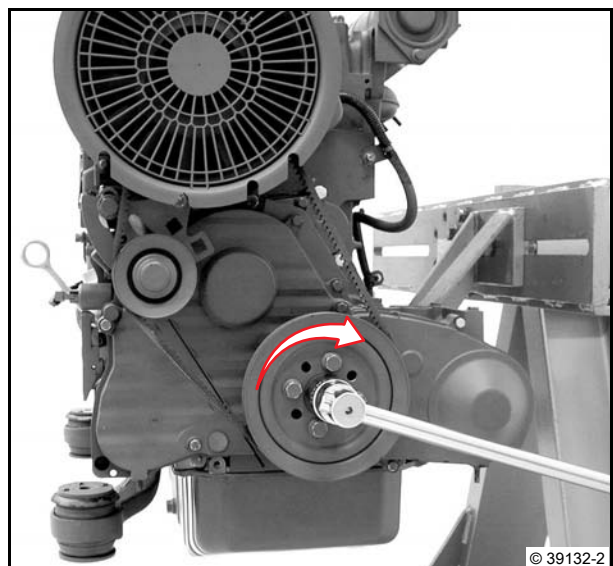
The following work procedure describes the setting of the valve clearance on an inlet valve. The procedure is the same for the setting on an outlet valve, taking into consideration the setting dimension.

- Unscrew all screws (1).
- Remove cylinder head cowling (2).
- Remove gasket.



Setting engine to valve overlap

- Turn crankshaft in the direction of the engine (arrow).
- Turn over crankshaft until the valve overlap is achieved on cylinder 1.





Arrangement of the inlet and exhaust valves.

IN = inlet valve

EX = exhaust valve

Valve overlap means:

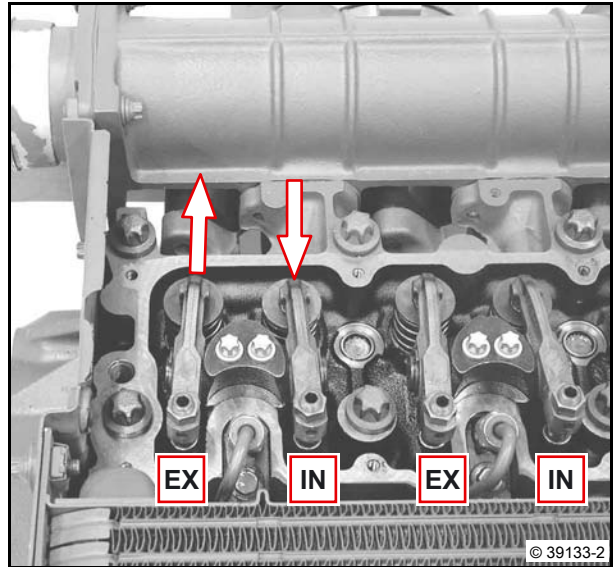
The inlet valve starts opening, exhaust valve closes.



Attention!

In case of internal exhaust gas recirculation, the inlet valve is opened briefly by an additional cam on the camshaft.

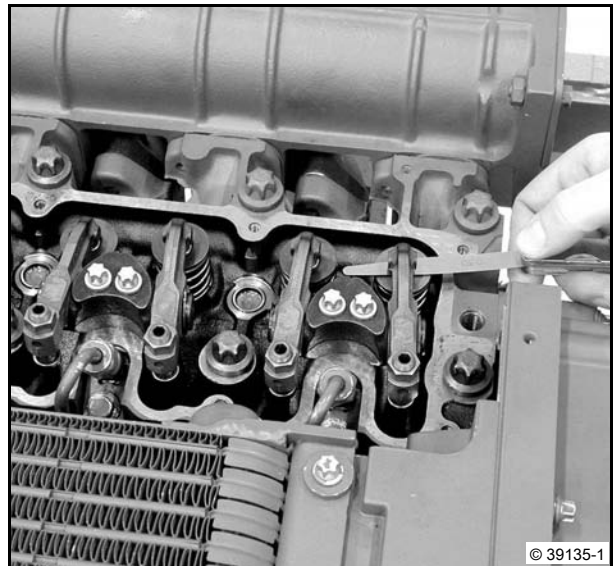
This is not to be confused with the valve overlap.



- Select feeler gauge.
- Check the setting on the appropriate valve.



The feeler gauge must pass between the rocker arm's sliding surface and the valve without too much resistance.



Setting valve clearance

- Loosen lock nut (1).
- Hold adjusting screw (2).
- Set valve clearance.



If there is not enough valve clearance, unscrew setting screw (2).

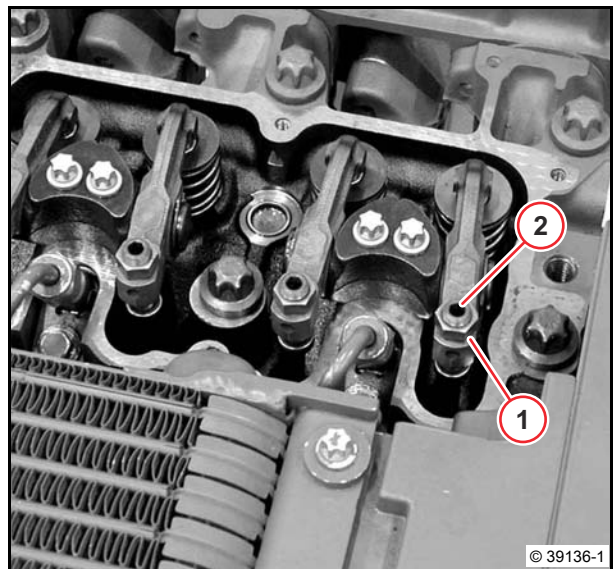
If there is too much valve clearance, turn in setting screw (2).

– Inlet

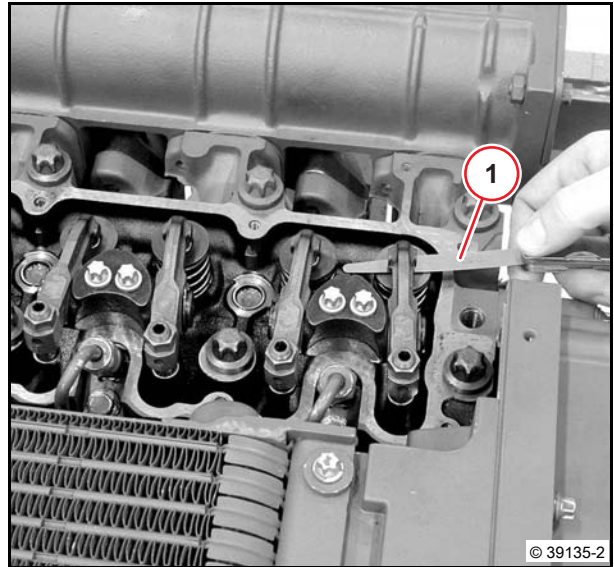
0.3 mm

– Outlet

0.5 mm



- Check the valve clearance with feeler gauge (1).

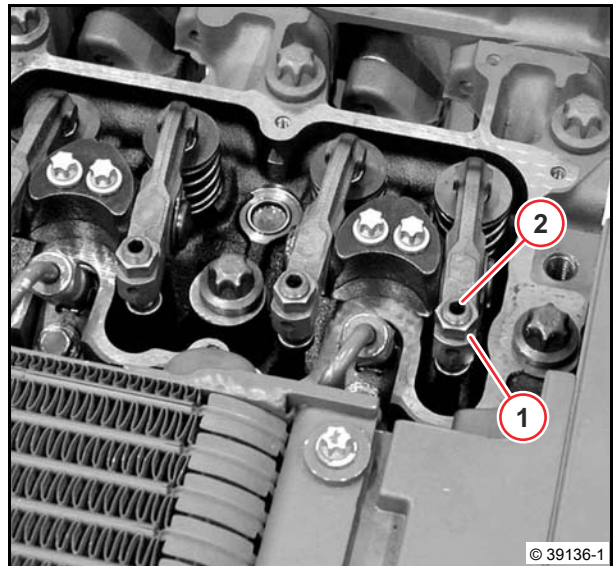


- Hold adjusting screw (2).
- Tighten lock nut (1).

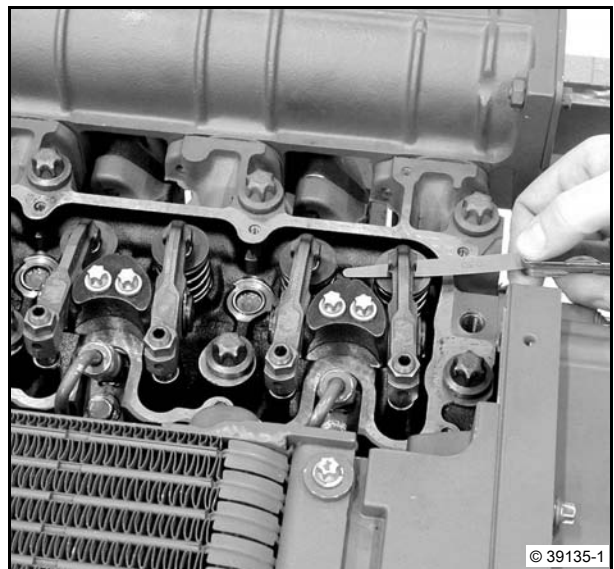
 20 Nm



Do not turn the setting screw when tightening the locking nut.



- Check the valve clearance again with feeler gauge.



Valve clearance setting schematic

– D 2011



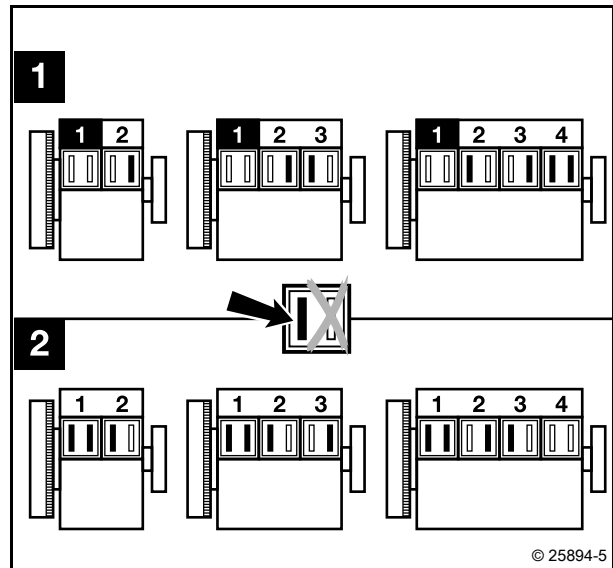
According to the order given below, the setting of the valve clearance is possible in two turns of the crankshaft (each 360°).

Crankshaft position 1

- Turn over crankshaft until the valve overlap is achieved on cylinder 1.
- Set black marked valves.

Crankshaft position 2

- Turn the crankshaft one turn (360°).
- Set black marked valves.



– TD 2011

Valves	Cylinders			
overlap	1	3	4	2
set to	4	2	1	3



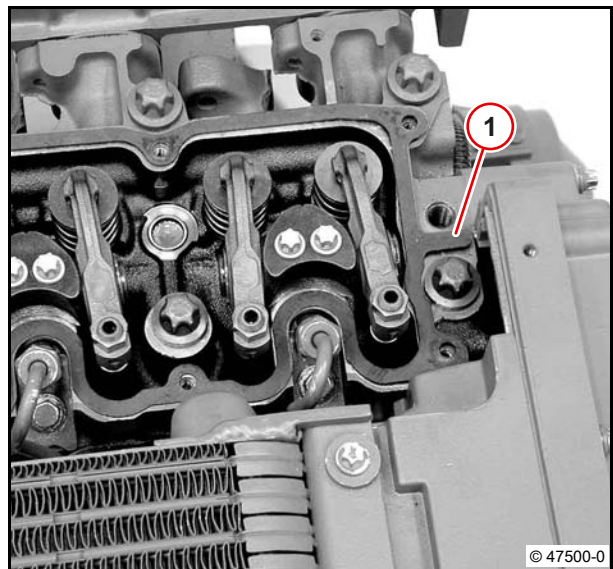
Valve overlap: Outlet valve is not yet closed, inlet valve begins to open.

When the outlet valve is fully open, the inlet valve opens briefly approx. 2 mm. This is not the valve overlap!

- Clean sealing surfaces.
- Mount new gasket.

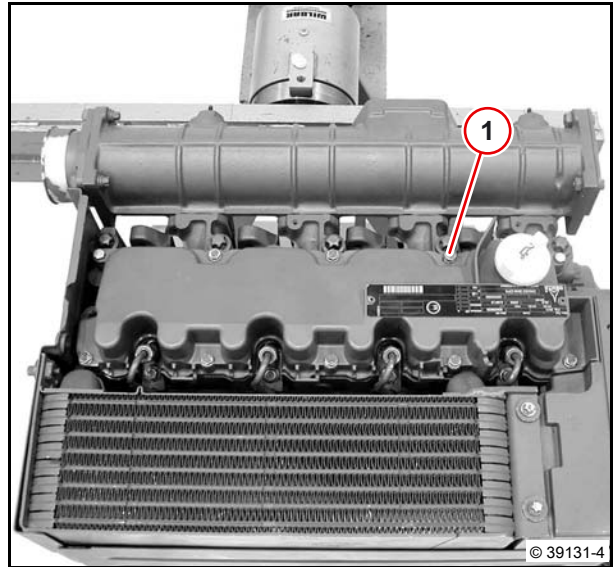


Note installation position: The bar (1) must face the front cover.



- Mount cylinder head cover.
- Oil the screws lightly.
- Tighten all screws (1) alternately.

 8.5 Nm



Technical Data

Testing and setting data

ID no.	Name	Additional information	Value
D 2011 L02			
P00 71	Ignition sequence		1-2
D 2011 L03			
P00 71	Ignition sequence		1-2-3
D 2011 L04			
P00 71	Ignition sequence		1-3-4-2
D 2011, TD 2011			
P01 61	Valve clearance (inlet)		0.3 mm
P01 62	Valve clearance (outlet)		0.5 mm

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A01 003	Locking nut, valve adjuster			20 Nm
A01 004	Cylinder head cover on cylinder head			8.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the rocker arm and rocker arm bracket



Standard tools:
– Torx tool set

8189

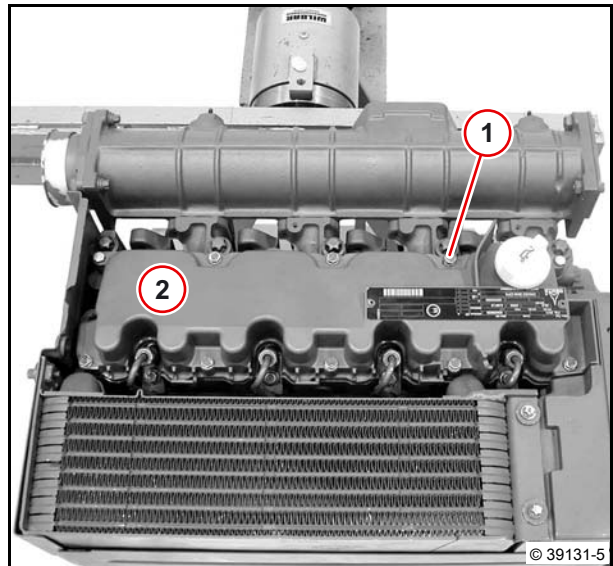


– W 01-01-01

6

Removing the rocker arm and rocker arm bracket

- Unscrew all screws (1).
- Remove cylinder head cowling (2).
- Remove gasket.



- Unscrew screws (1).

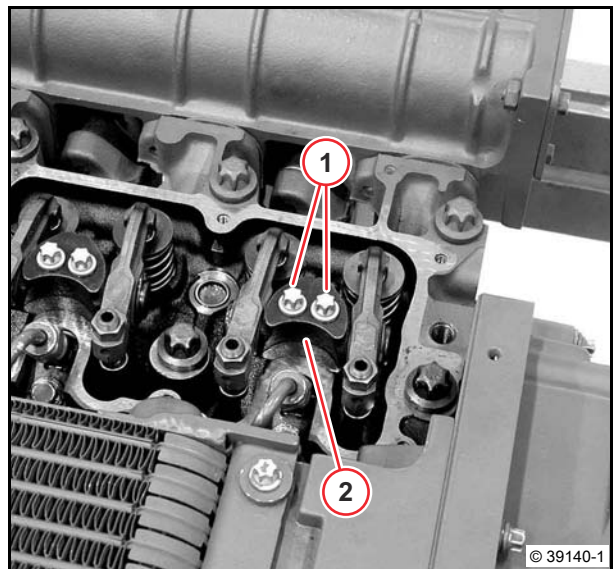


Loosen screws evenly to avoid tension on the rocker arm brackets.

- Remove rocker arm bracket (2).



Lay out components in the order in which they should be installed.
Note order of cylinders.

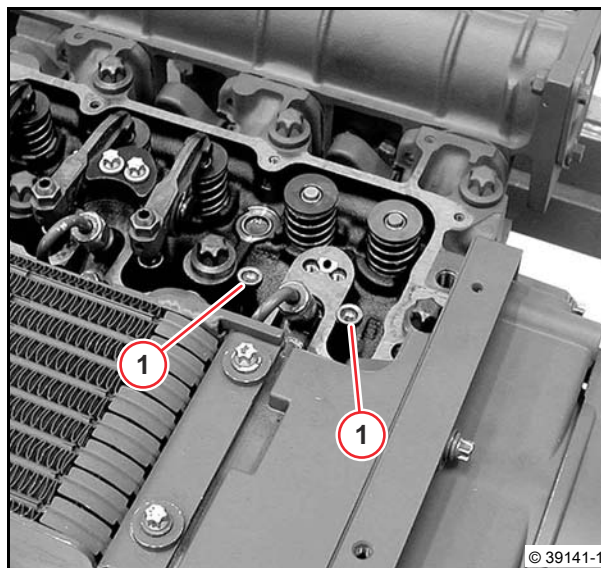


- Remove push rods (1).



Lay out components in the order in which they should be installed.

- Visually inspect the components.

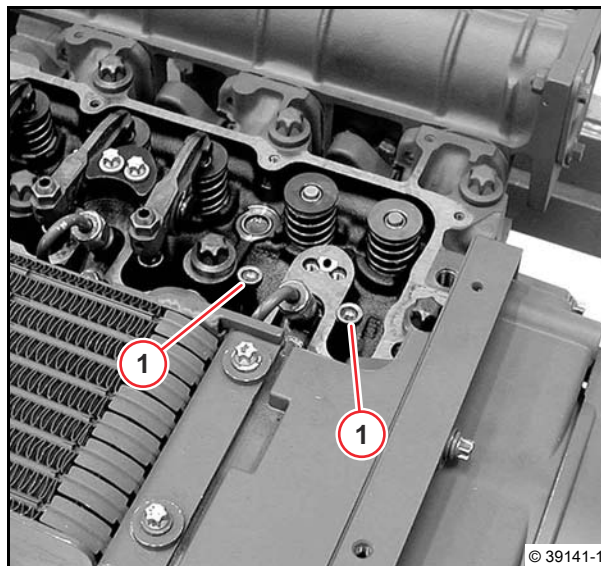


Installing the rocker arm and rocker arm bracket

- Insert stop rods (1).



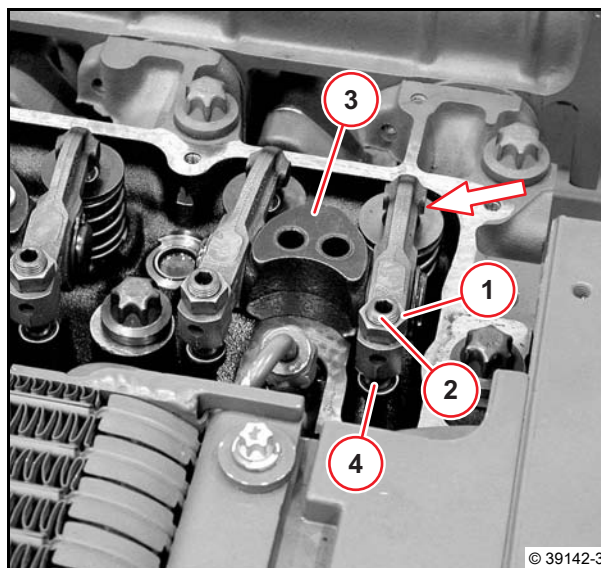
Note the assignment of the stop rods.
The stop rod must be seated with the ball head in the ladle of the tappet.




- Loosen lock nut (1).
- Unscrew setting screws (2).
- Mount rocker arm bracket (3).
- Position rocker arm.



The ball heads (4) must be seated in the ladles of the stop rods.
The rocker arm (arrow) must sit on the valve stem.



- Lightly oil screws (1).
- Tighten screws .

 21 Nm

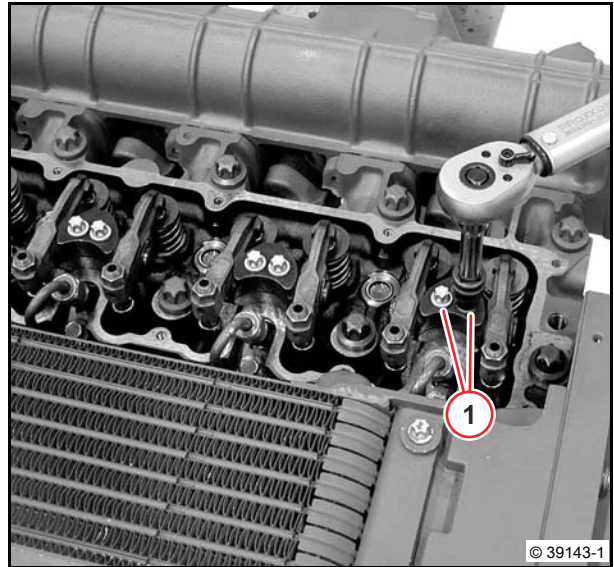


Attention!

Makes sure that the stop rods are not under stress due to valve overlap when fastening the screws.

- Set valve clearance.

 W 01-01-01

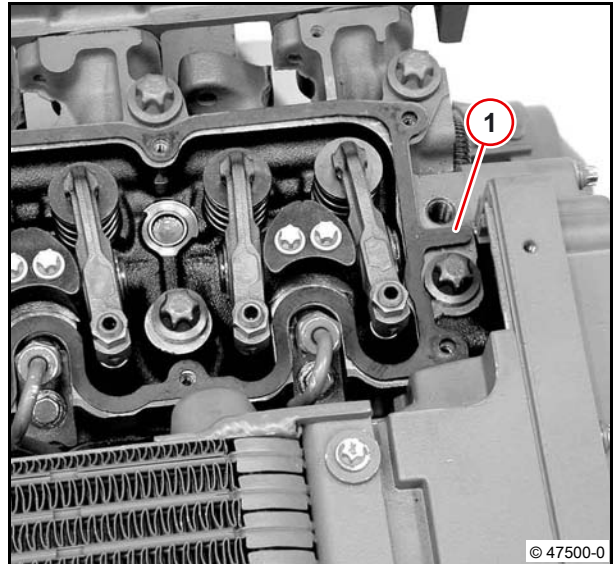


© 39143-1

- Clean sealing surfaces.
- Mount new gasket.



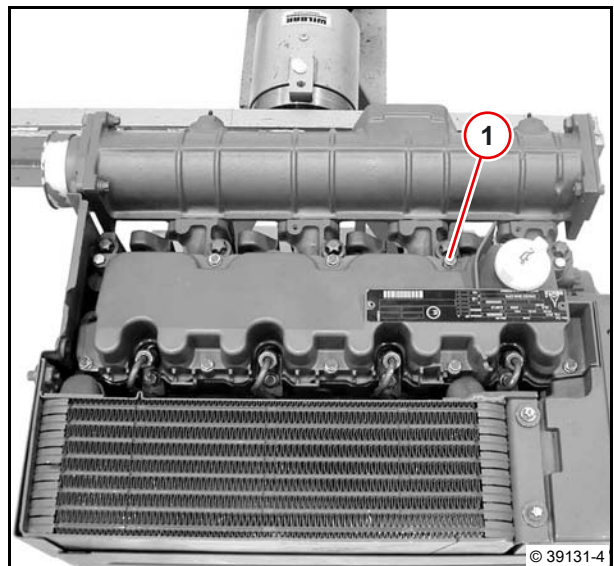
Note installation position: The bar (1) must face the front cover.



© 47500-0

- Mount cylinder head cover.
- Oil the screws lightly.
- Tighten all screws (1) alternately.

 8.5 Nm



© 39131-4

Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A01 002	Rocker arm bracket on cylinder head			21 Nm
A01 004	Cylinder head cover on cylinder head			8.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Renewing the crankshaft sealing ring (flywheel side)



Standard tools:

- Pricker 8198
- Assembly lever 9017

Special tools:

- Assembly tool 142680



- Self-tapping screw
- Washer



- W 12-06-01

Removing the crankshaft sealing ring

- Remove flywheel.

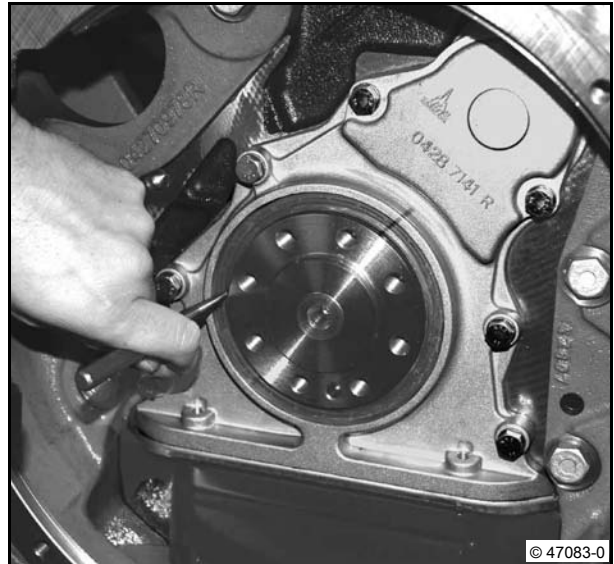
W 12-06-01

- Make a hole of approximately 3 mm in the crankshaft sealing ring with a pricker.

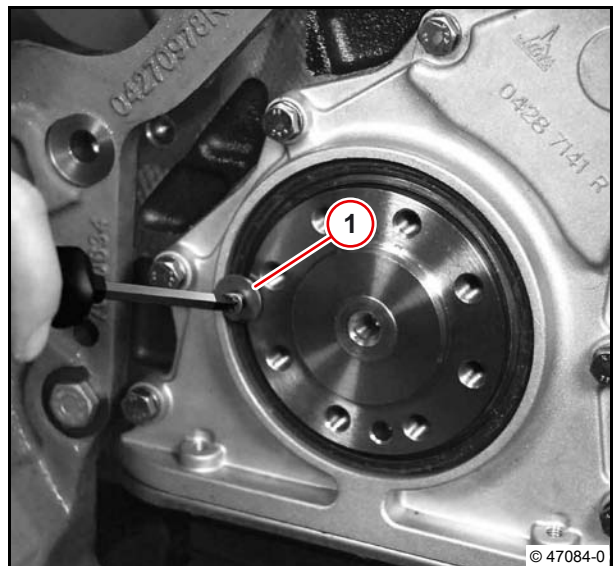


Attention!

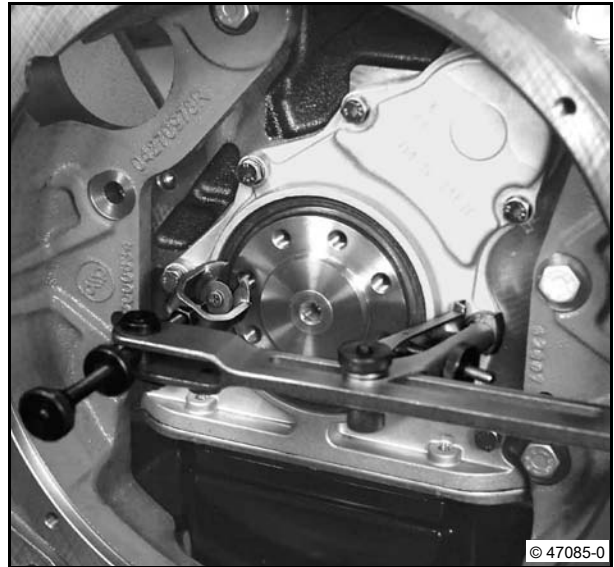
Do not damage the rear cover and crankshaft!



- Screw in a self-tapping screw (1) with washer.



- Pull out the crankshaft sealing ring with assembly lever.
- Visually inspect the crankshaft sealing ring running surface.



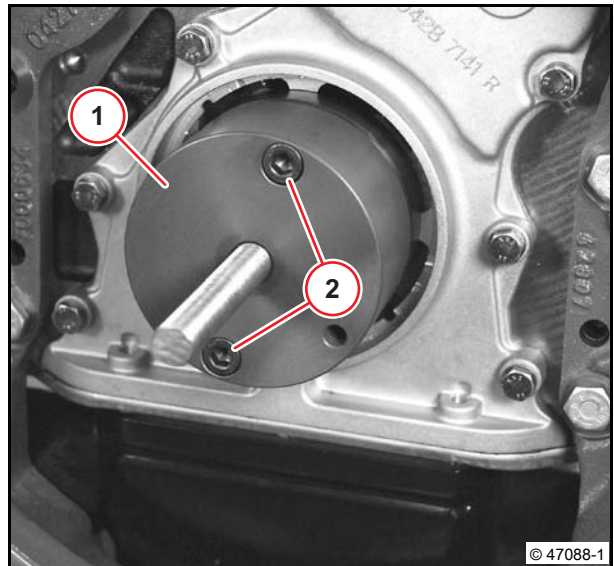
6

Installing the crankshaft sealing ring

- Mount guide sleeve (1).
- Tighten screws (2).



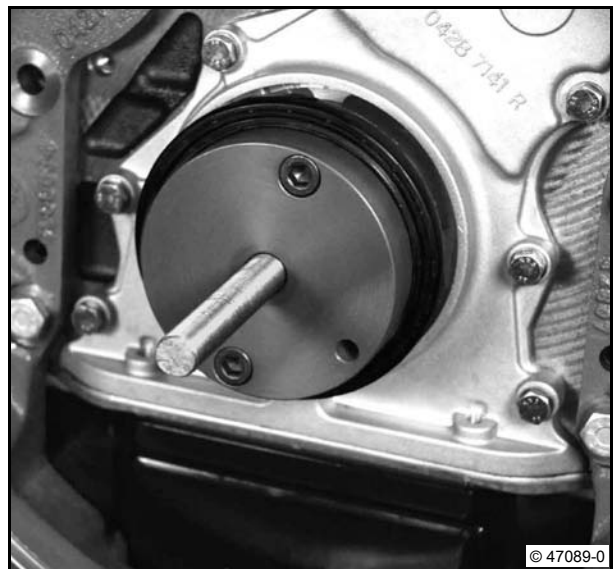
The bores in the guide sleeve must match the threaded holes in the crankshaft flange.



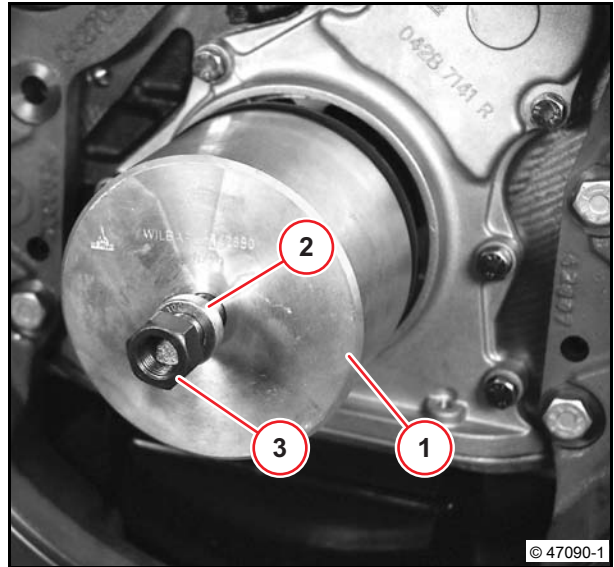
- Place the crankshaft sealing ring carefully on the peripheral surface.



Do not oil waxed crankshaft sealing rings.
The sealing lip faces the crankcase.



- Mount assembly sleeve (1).
- Press on the crankshaft sealing ring to the stop.
- Plug in the bearing (2).
- Screw on nut (3).



- Tighten nut to the stop of the assembly sleeve (1).

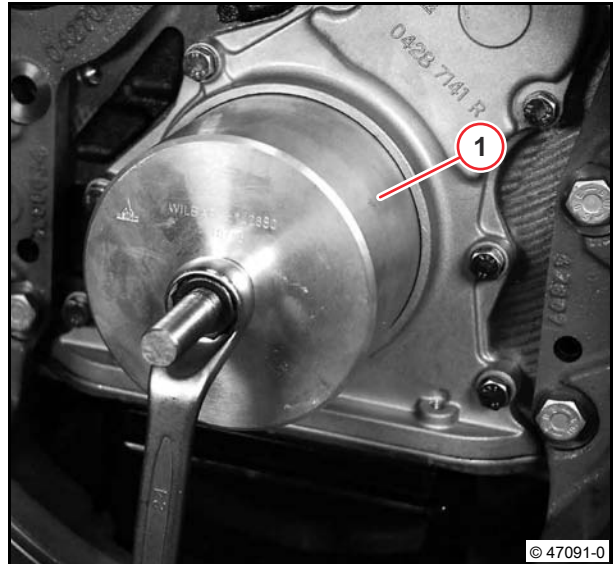


The installation depth is determined by the assembly tool.

- Remove assembly tool.
- Install flywheel.



[W 12-06-01](#)





Renewing the crankshaft sealing ring (opposite side to flywheel)



Standard tools:

- Pricker 8198
- Assembly lever 9017

Special tools:

- Assembly tool 142690



- Self-tapping screw
- Washer



- W 04-04-15

Removing the crankshaft sealing ring

- Remove toothed belt wheel.

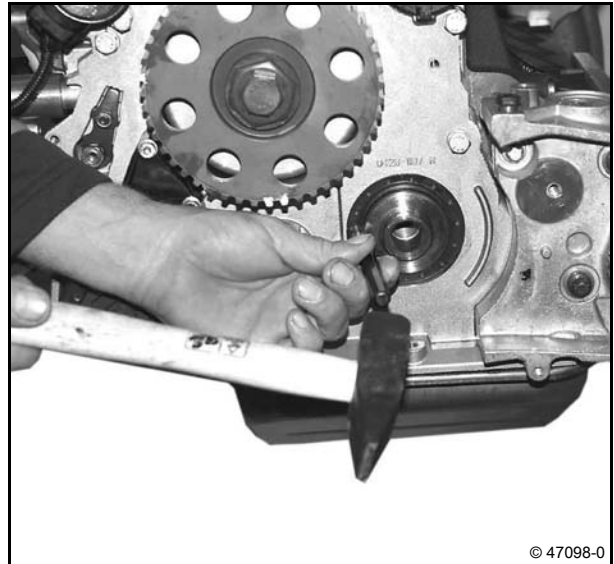
W 04-04-15

- Make a hole of approximately 3 mm in the crankshaft sealing ring with a pricker.



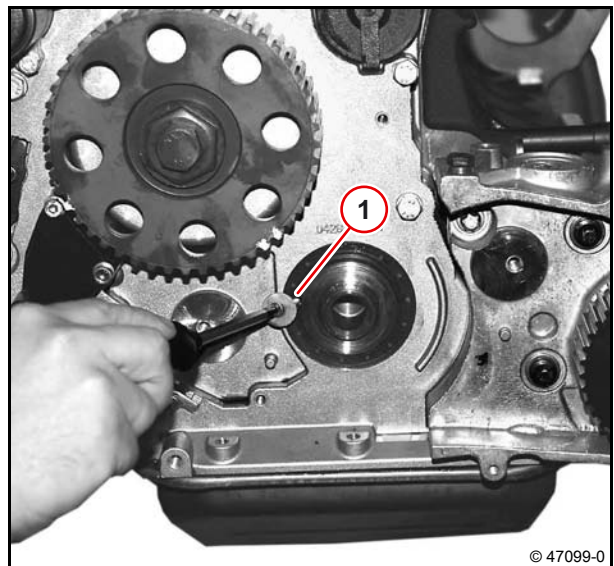
Attention!

Do not damage the front cover or crankshaft.



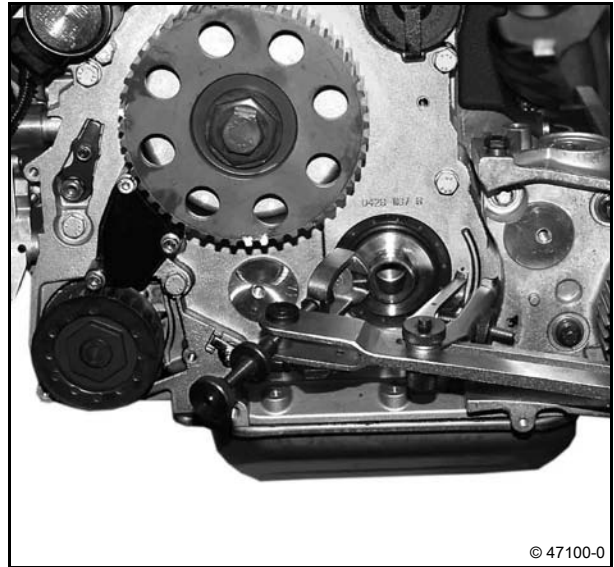
© 47098-0

- Screw in a self-tapping screw (1) with washer.

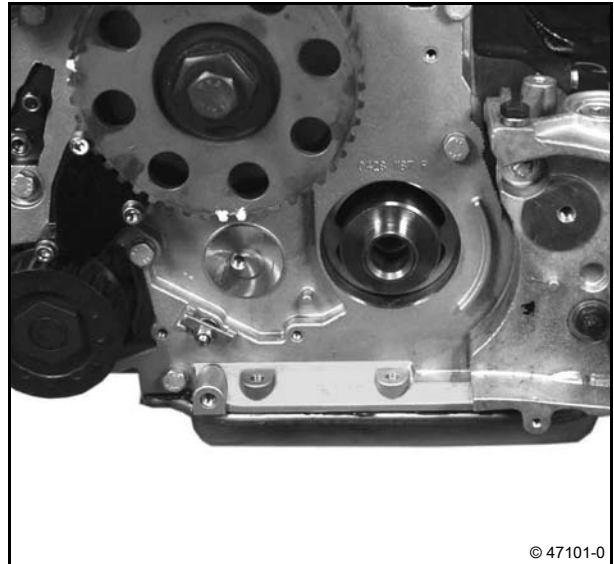


© 47099-0

- Pull out the crankshaft sealing ring with assembly lever.
- Visually inspect the crankshaft sealing ring running surface.



- Visually inspect all running surfaces.



Installing the crankshaft sealing ring

- Place new crankshaft sealing ring on assembly tool.



Do not oil waxed crankshaft sealing rings.
The sealing lip faces the crankcase.



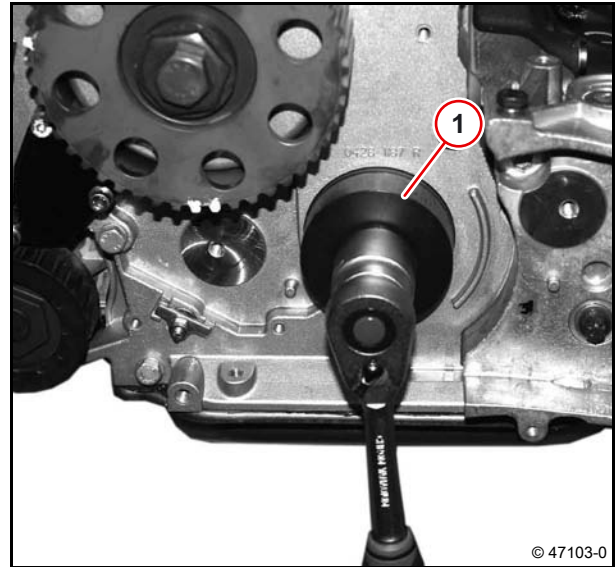
- Mount assembly tool (1).
- Tighten screw until it reaches the assembly tool (1).



The installation depth is determined by the assembly tool.

- Unscrew screw.
- Remove assembly tool.
- Install toothed belt wheel.

 [W 04-04-15](#)





Removing and installing the crankcase bleeding



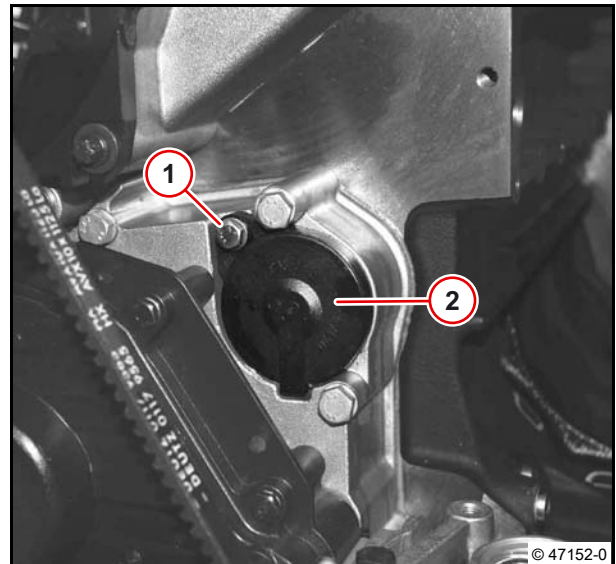
Standard tools

Special tools:

– Disassembly tool 110901

Removing the crankcase bleeding

- Unscrew screw (1).
- Remove crankcase bleeding (2).

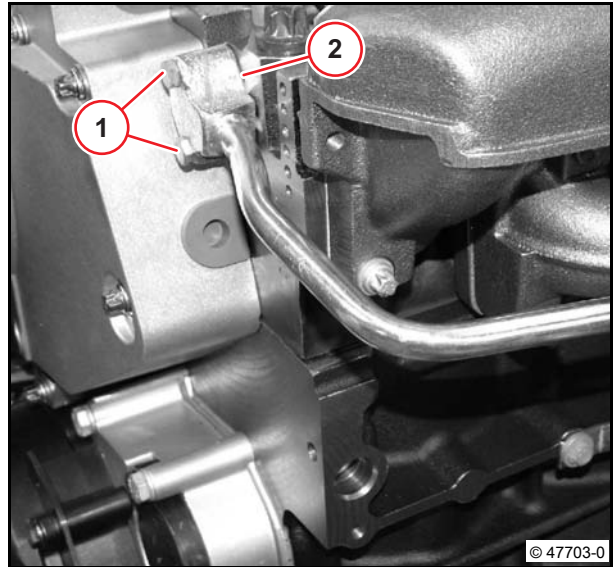


- Remove the O-ring (1) with the disassembly tool.
- Visually inspect the components.



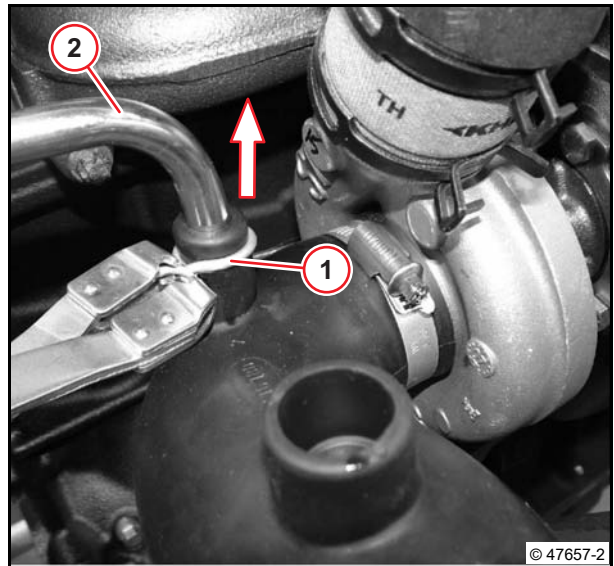
– TD 2011

- Unscrew screws (1).
- Remove gasket (2).

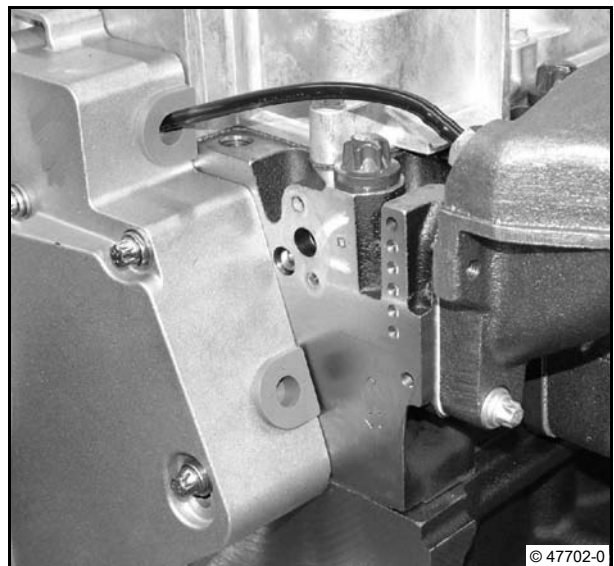


6

- Loosen hose clip (1) with clamping tongs.
- Pull off hose clip (1) in the direction of the arrow.
- Pull out the pipe (2) in the direction of the arrow.

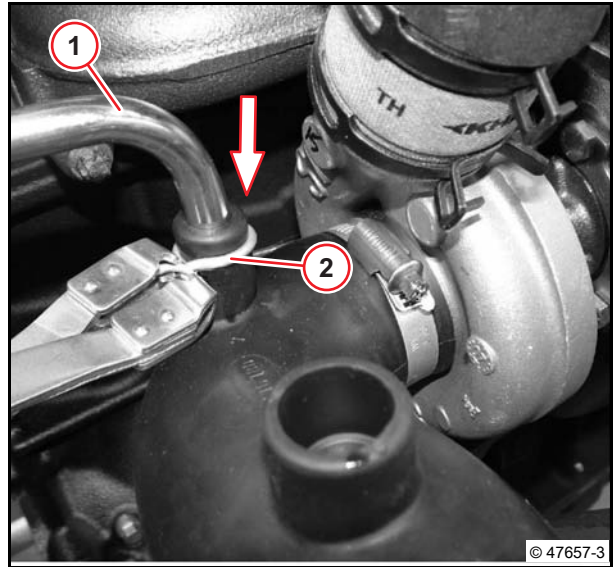


- Clean sealing surfaces.



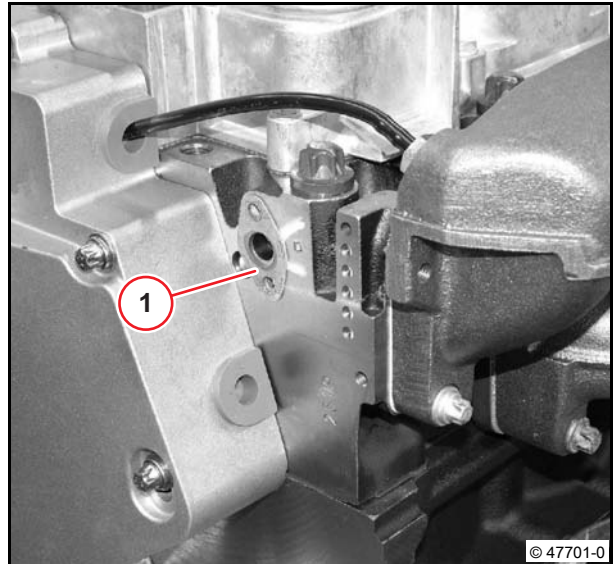
Install crankcase bleeding

- Push on the pipe (1) in the direction of the arrow.
- Position the hose clip (2) with clamping tongs.



6

- Fix new gasket (1) to the crankcase with a little grease.

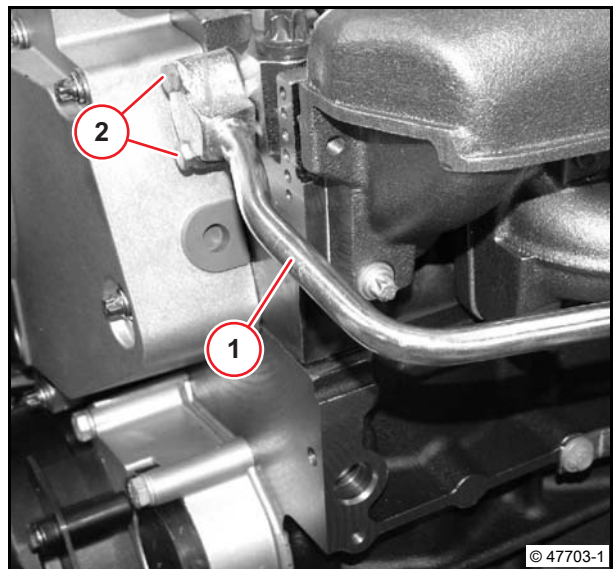


- Position pipe (1).
- Tighten screws (2).

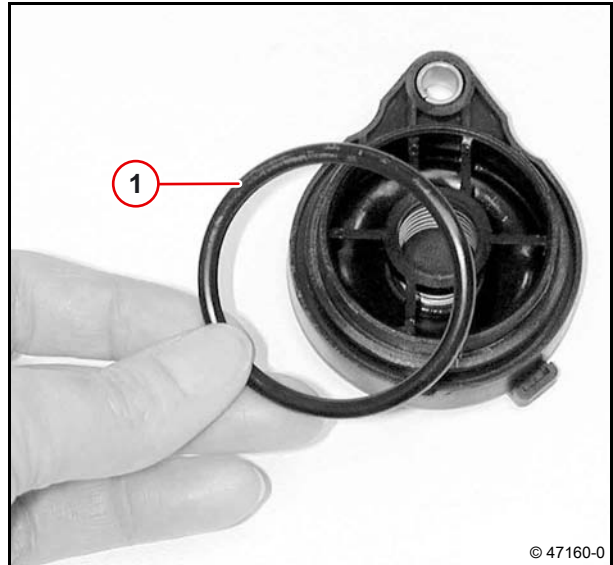
 8.5 Nm




Attention!
Install tension-free.



- D 2011, TD 2011
- Clean sealing surfaces.
- Insert new O-ring (1).

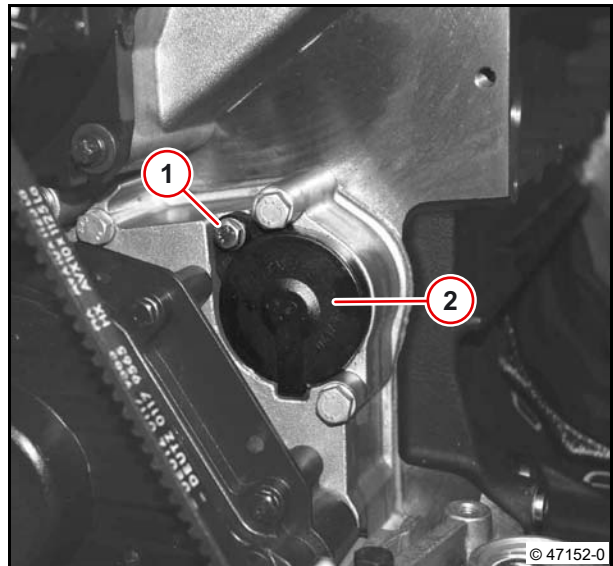


6

- Mount crankcase vent (2).
-  Ensure that the installation location is free from faults.
The crankcase bleeding must fit evenly.

- Tighten screw (1).

 8.5 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A03 060	Crankcase bleeding on front cover / on cylinder head cover / on cylinder head			8.5 Nm
TD 2011 L04				
A03 062	Crankcase breather, pipe to cylinder head	M6x30-8.8		8.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing rear cover



Standard tools



– W 02-02-02
– W 03-09-04
– W 08-04-07



– Packing compound
DEUTZ DW 67

Removing rear cover

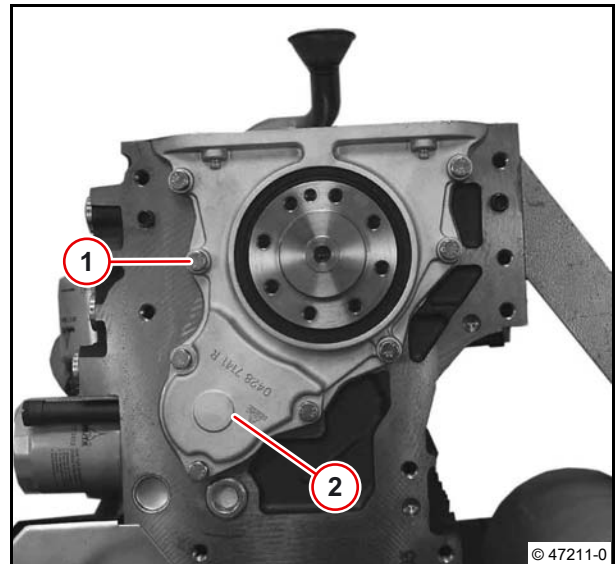
- Remove connection housing.

W 03-09-04

- Remove lubricating oil pan.

W 08-04-07

- Unscrew all screws (1).
- Remove rear cover 2.



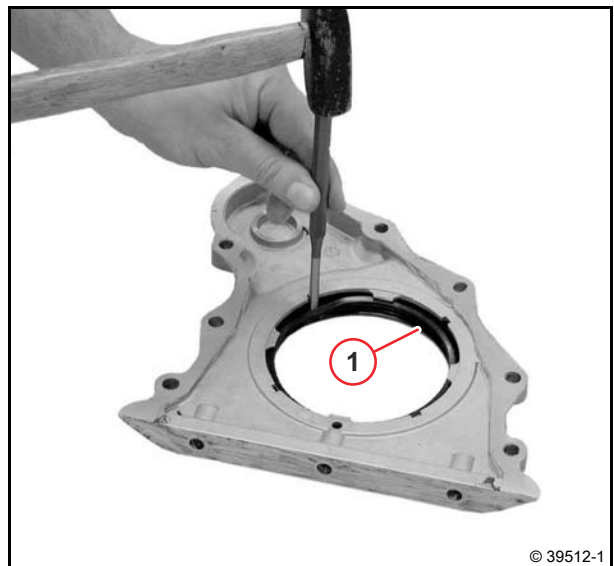
- Knock out crankshaft sealing ring (1).



Attention!

Do not damage the sealing surfaces.

- Visually inspect the components.

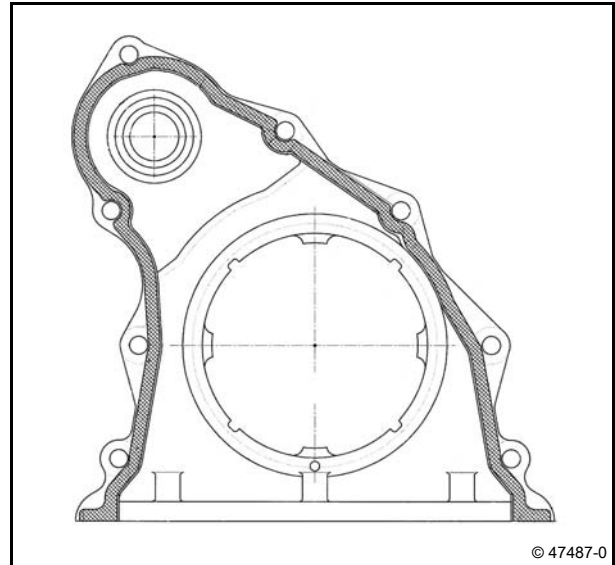


Installing rear cover

- Clean sealing surfaces.
- Apply packing compound evenly to the sealing surface.

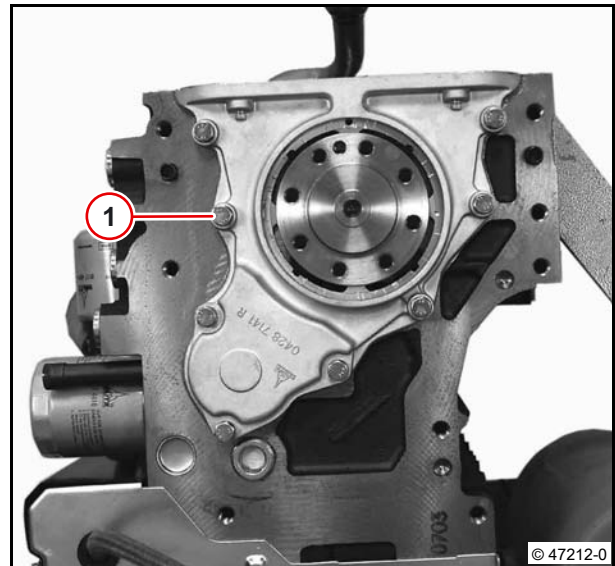


Sealing cord strength approx. 0.5 - 0.6 mm.




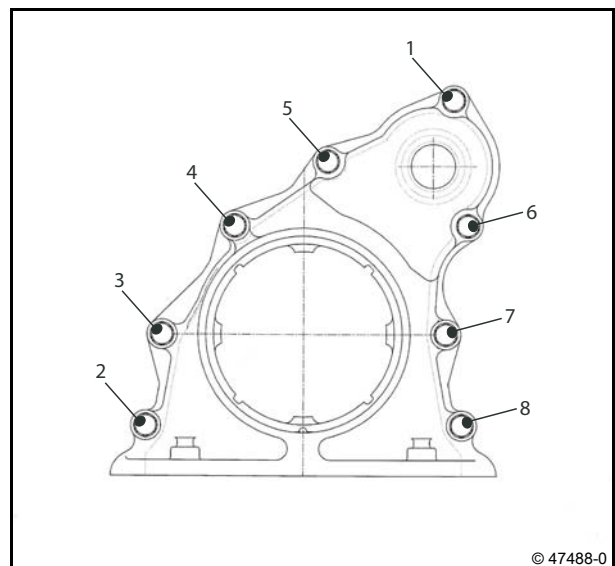
6

- Mount rear cover.
- Oil the screws lightly.
- Fasten all screws (1).
- Align front cover flush with the oil tray sealing surface.



- Tighten the screws according to the tightening sequence.

 21 Nm



- Renew crankshaft sealing ring (flywheel side).

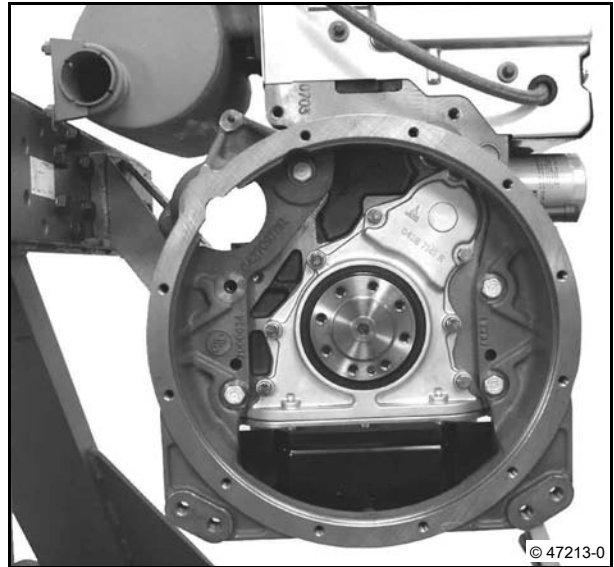
 [W 02-02-02](#)

- Install lubricating oil pan.

 [W 08-04-07](#)

- Install connection housing.

 [W 03-09-04](#)



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A03 010	Rear cover on crankcase		Observe tightening sequence	21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the connection housing



Standard tools



– W 12-06-01

6

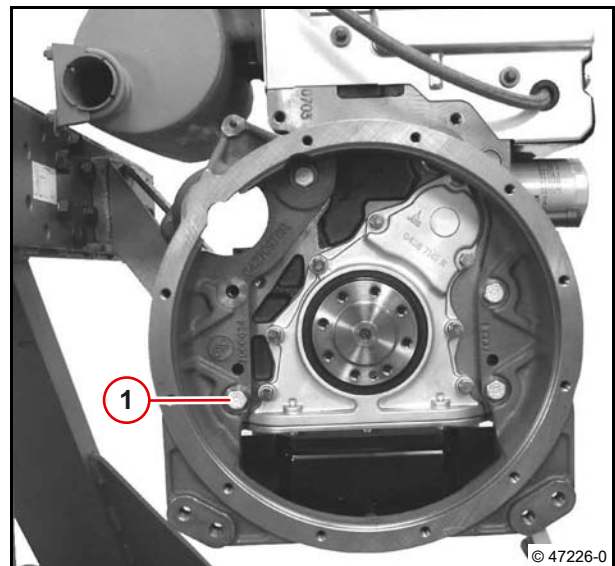
Removing the connection housing

- Remove flywheel.



W 12-06-01

- Unscrew all screws (1).
- Remove connection housing.

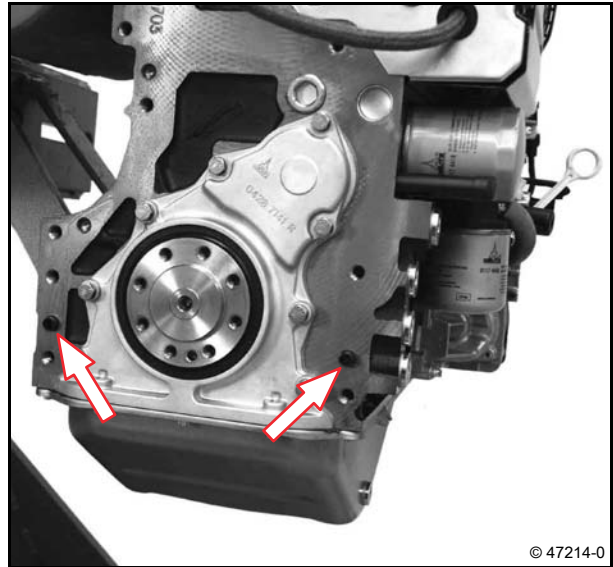


- Visually inspect the components.

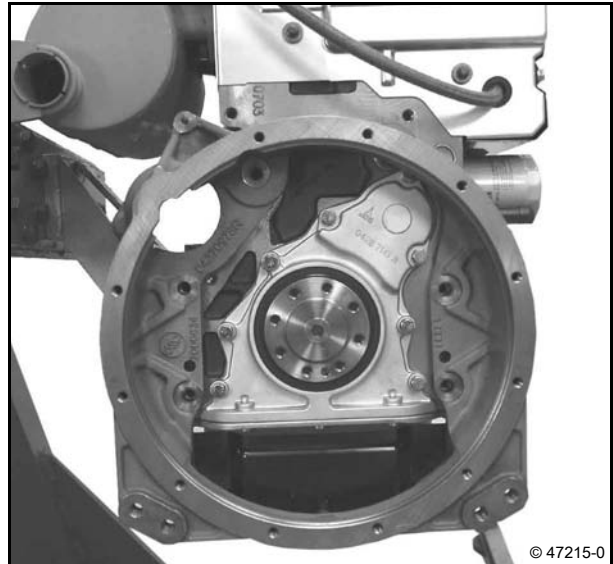


Installing the connection housing

- Clean contact surfaces.
- Make sure the clamping bushings (arrows) are in place.
- Drive in clamping sleeves in the crankcase as far as they will go.

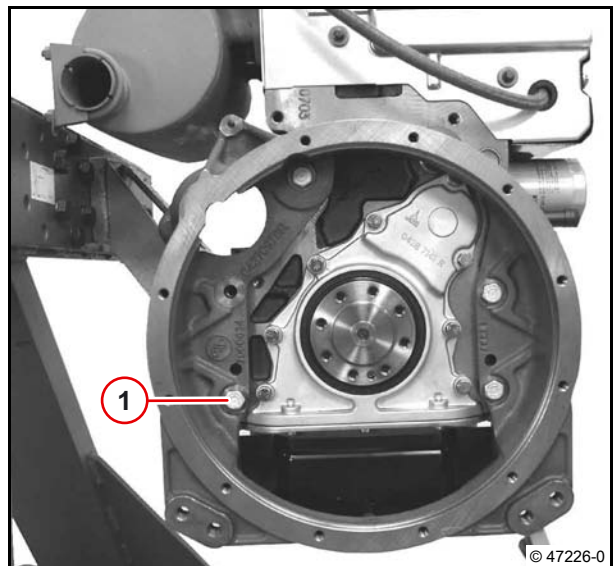


- Mount connection housing.
- Centre connection housing over the clamping bushings.



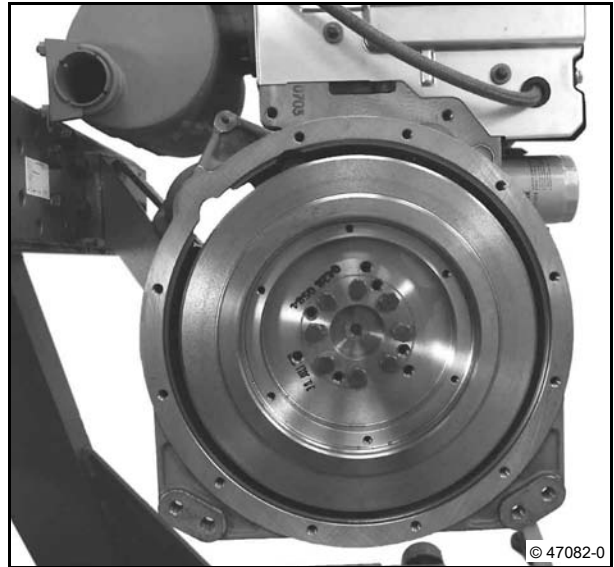
- Tighten all screws (1) alternately.

 [Technical Data](#)



- Install flywheel.

 [W 12-06-01](#)



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A03 081	Connection housing/connection ring to crankcase	M12x20 M12x30 M12x35 M12x55 M12x70 M12x75 M12x95		106 Nm
A03 082	Connection housing to crankcase	M8x10 M8x30 M8x50		22 Nm
A03 082	Connection housing/connection ring to crankcase	M10x40 M10x30 M10x25		45 Nm
A03 082	Connection housing to crankcase	Cylinder head screws M10x40		60 Nm
A03 082	Connection housing/connection ring to crankcase	M14x55		180 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Renew camshaft sealing ring (opposite side to flywheel)



Standard tools:

- Pricker 8198
- Assembly lever 9017

Special tools:

- Assembly tool 142050
- Counter support 144130



- Self-tapping screw
- Washer

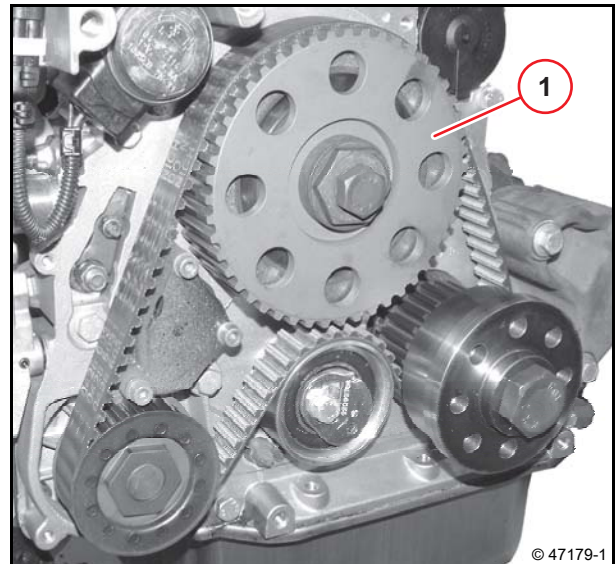


- W 04-04-15

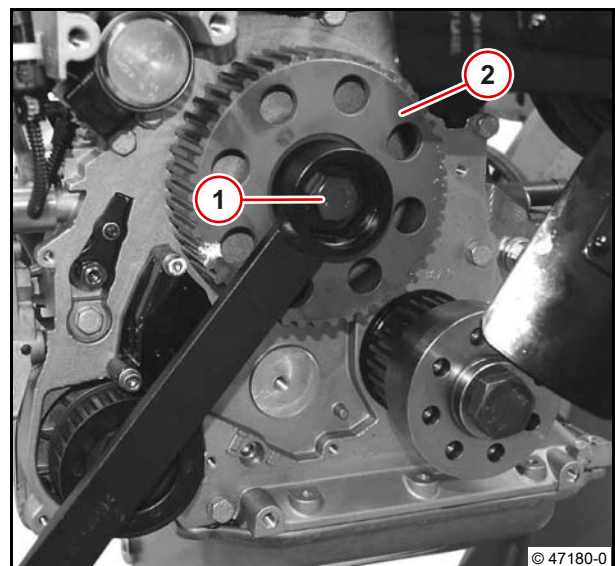
Remove camshaft sealing ring

- Remove toothed belt wheel (1).

W 04-04-15



- Position holder.
- Unscrew screw (1).
- Remove toothed belt wheel (2).

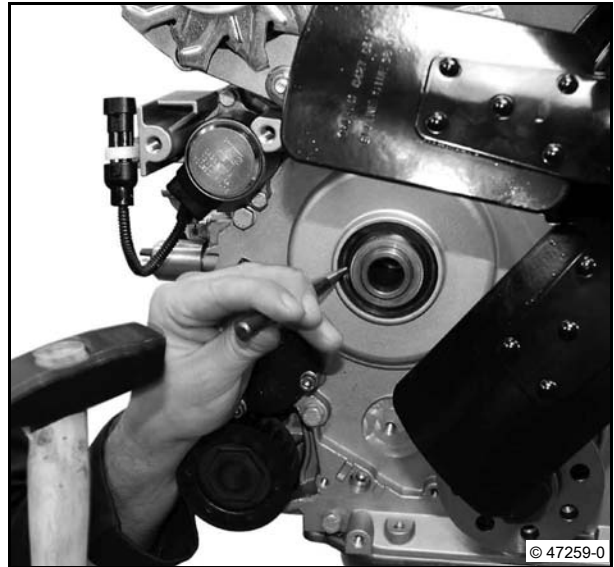




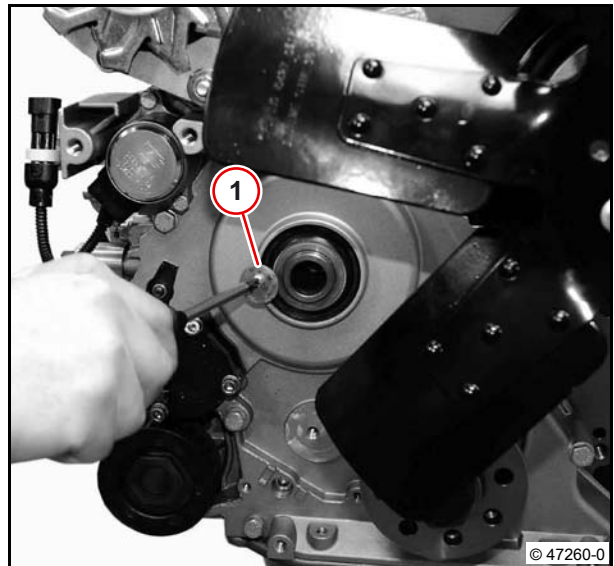
Attention!

Do not damage front cover and camshaft!

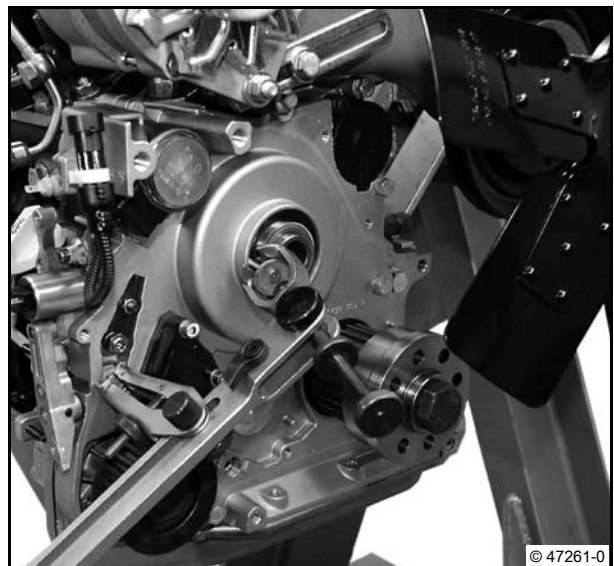
- Make a hole of approx. 3mm in the camshaft sealing ring with a pricker.



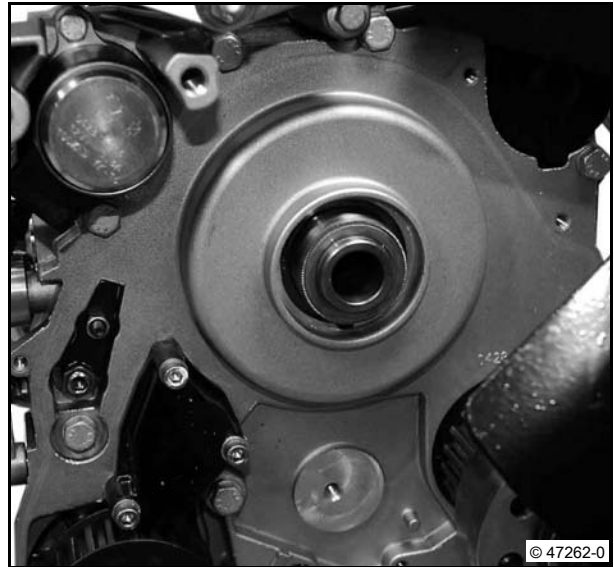
- Screw in a self-tapping screw (1) with washer.



- Pull out camshaft sealing ring with assembly lever.
- Visually inspect the components.



- Visually inspect all running surfaces.

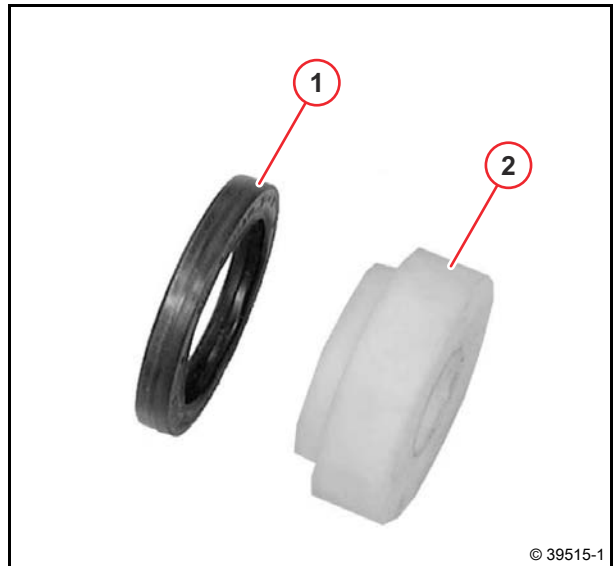


Install camshaft sealing ring

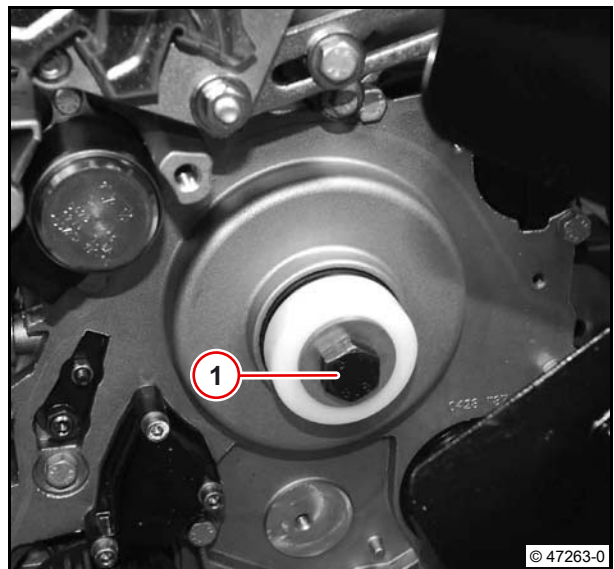
- Mount new camshaft sealing ring (1) on assembly tool (2).



Do not oil waxed crankshaft sealing rings.
The sealing lip faces the crankcase.



- Carefully insert camshaft sealing ring.
- Fasten screw (1).

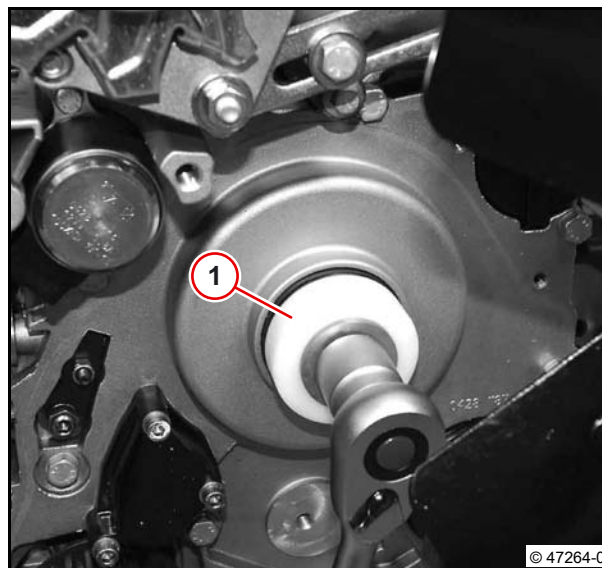


- Tighten screw until it reaches the assembly tool (1).



The installation depth is determined by the assembly tool.

- Unscrew screw.
- Remove assembly tool.

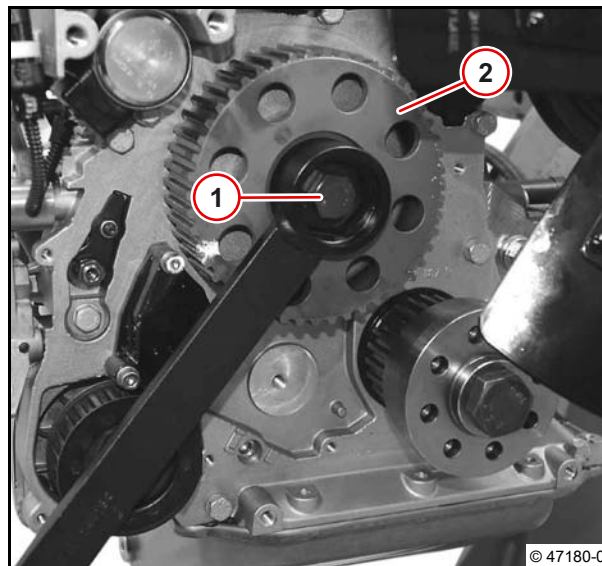


6



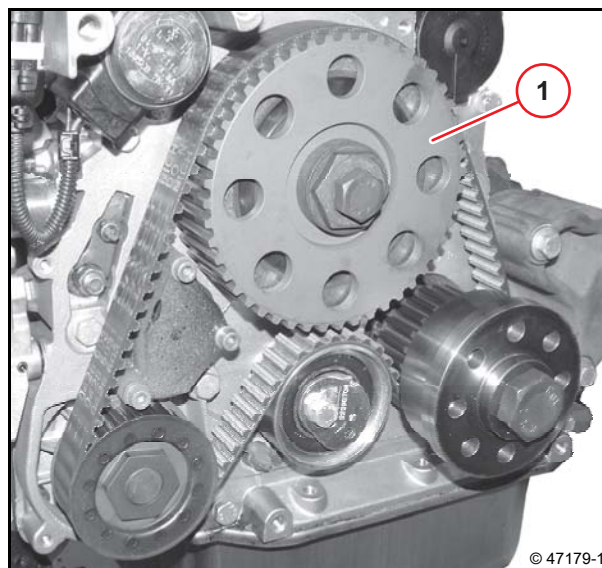
All connecting surfaces must be clean and free of oil.

- Mount toothed belt wheel (2).
- Position holder.
- Turn in new screw (1).



- Install toothed belt wheel (1).

 [W 04-04-15](#)



Check control times



Standard tools

Special tools:
– Adjustable bolt

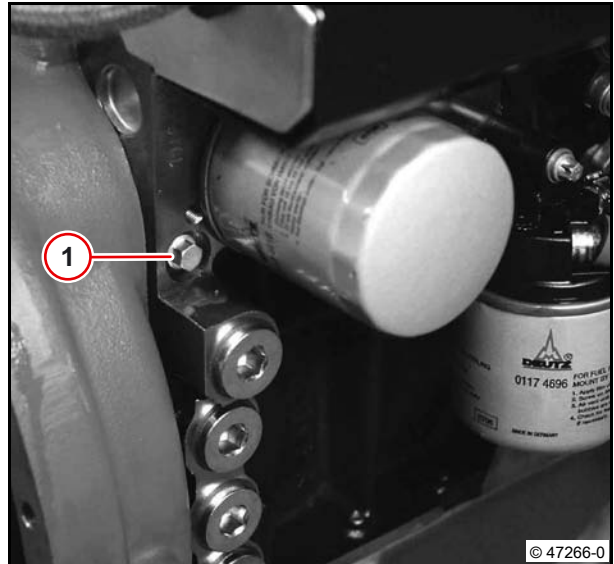
100700



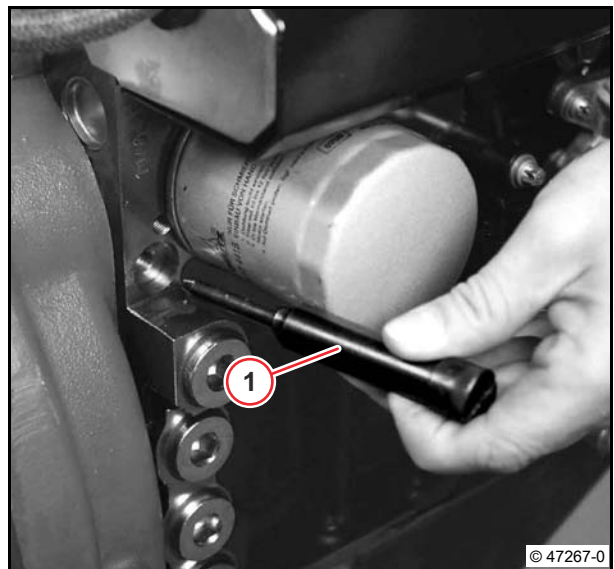
– Chalk

Check control times

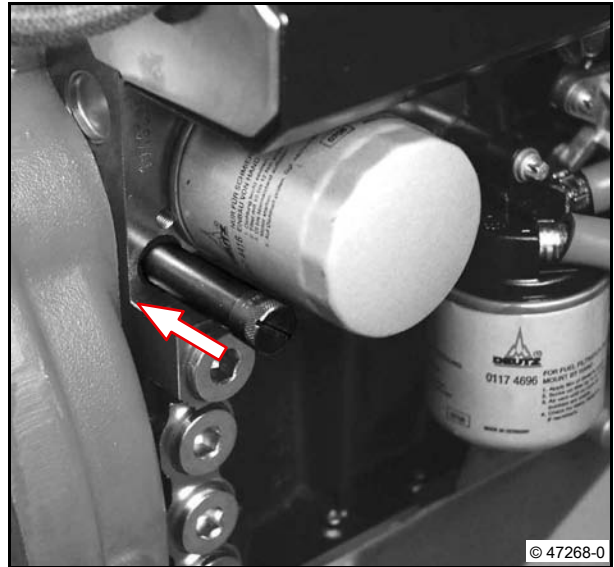
- Unscrew locking screw (1).
- Remove sealing ring.



- Insert adjustable bolt (1).

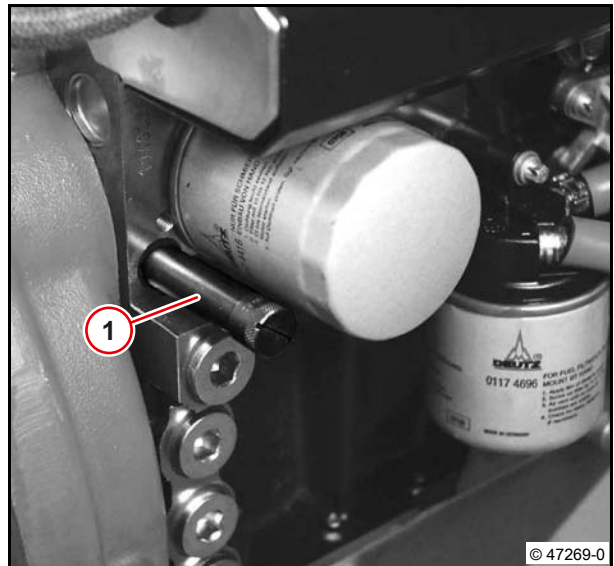


- Press adjustable bolt in lightly in direction of arrow and hold.
- Turn crankshaft slowly in direction of engine until the adjustable bolt engages with the bore of the camshaft.

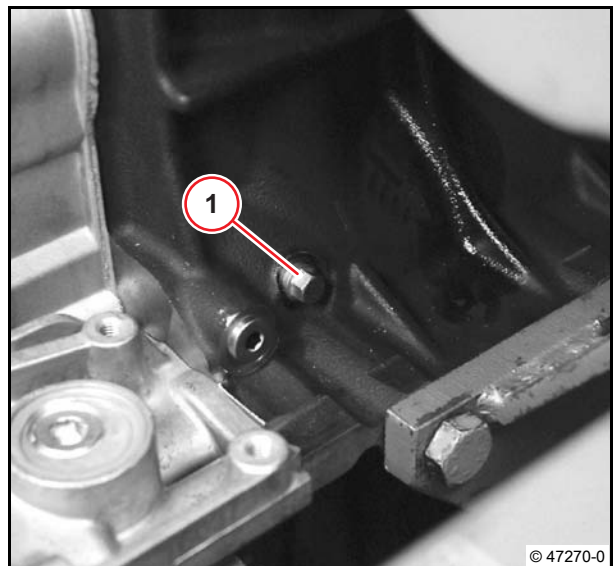


6


- Knock in the adjustable bolt (1) to the stop.



- Unscrew locking screw (1).
- Remove sealing ring.



- Tension central screw in direction of arrow.

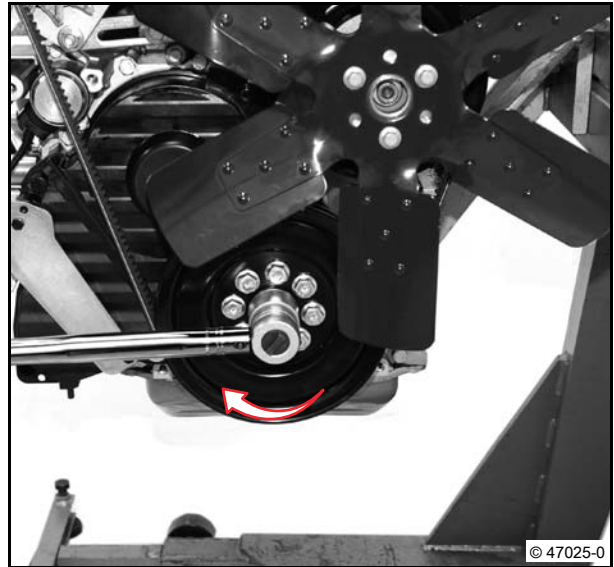
 40 Nm

- Carefully relax torque wrench.

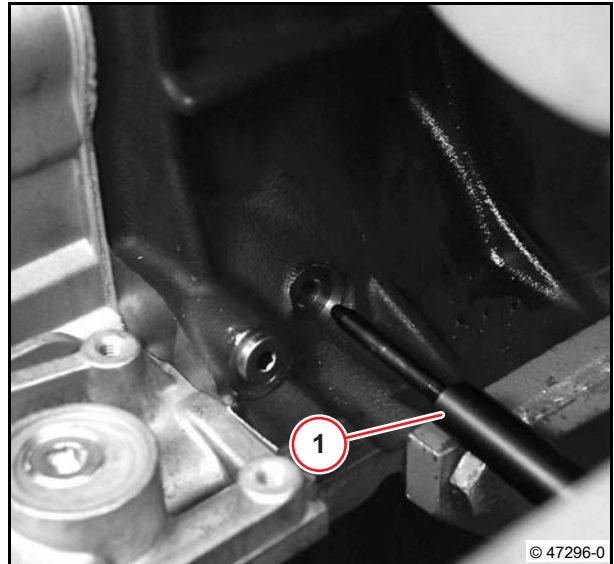


Attention!

Do not twist crankshaft.



- Insert adjustable bolt (1).



- Screw in adjustable bolt (1).



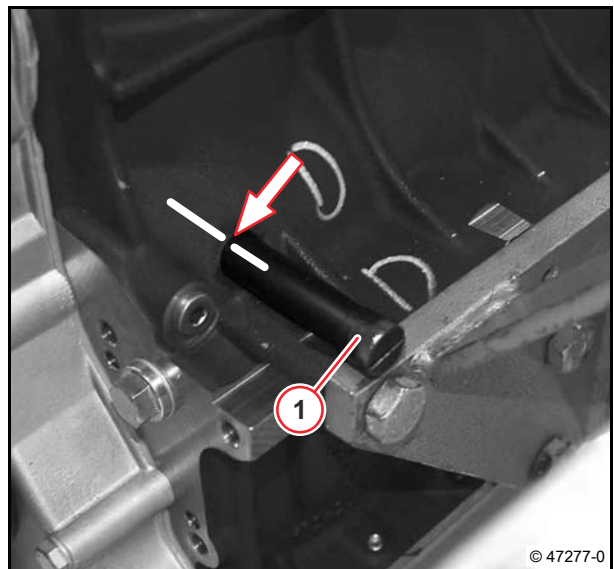
Screw in adjustment bolts until they come into contact with the crankshaft



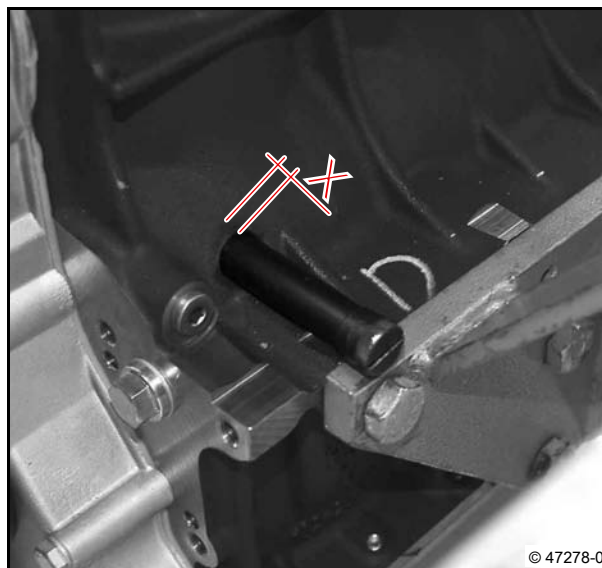
Attention!

Do not twist crankshaft.

- Apply help marking (arrow).

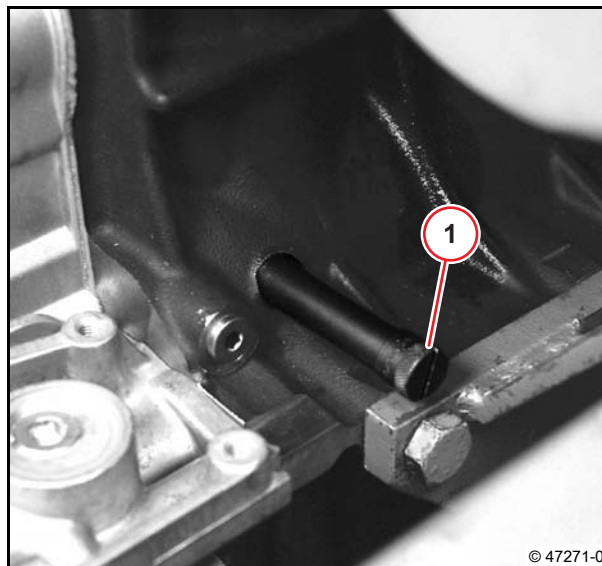


- The engine control times are set correctly if the adjusting bolt can still be screwed into the crankcase 0.75 to 2.25 revolutions as far as the system.
- If the screwing depth "X" diverges from the specification, the toothed belt and clamping roller must be replaced.



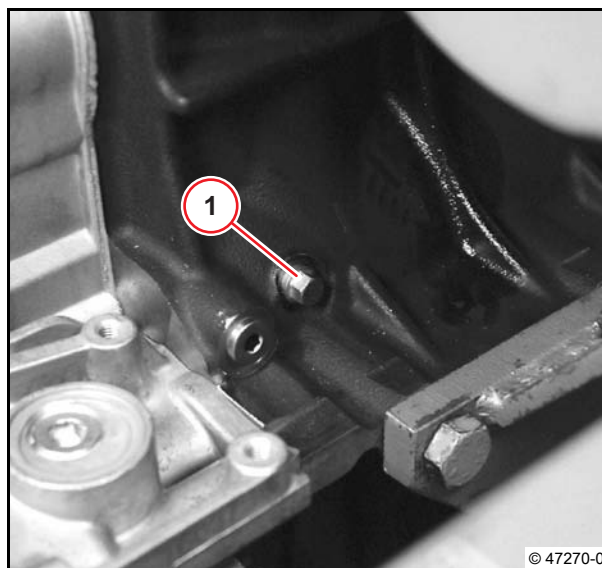
6

- Unscrew adjustable bolt (1).

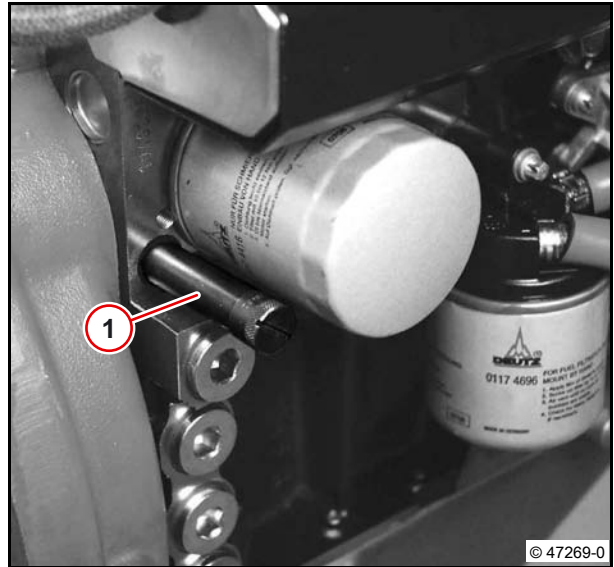


- Insert new sealing ring.
- Tighten screw plug (1).

 18 Nm

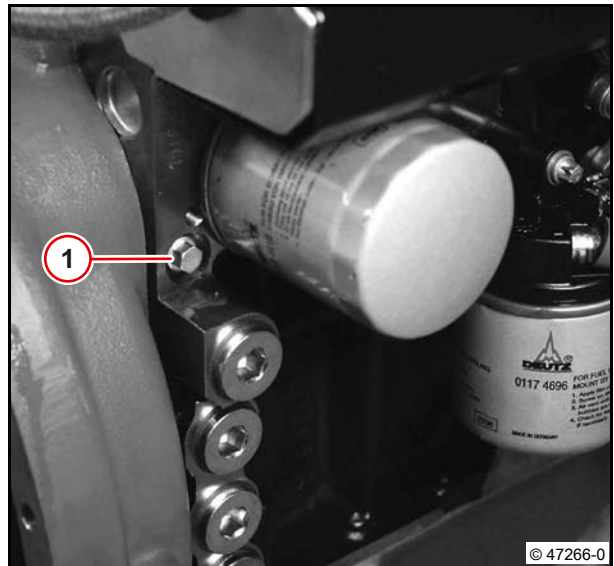


- Unscrew adjustable bolt (1).



- Insert new sealing ring.
- Tighten screw plug (1).

 18 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A03 003	Locking screw on crankcase	M10x1	Adapter for adjustable bolt on camshaft lock/ crankshaft lock. Replace sealing ring.	18 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Renew toothed belt and tensioning pulley



Standard tools:

- Rotation angle disc 8190
- Special bit, 70 mm long 9120

Special tools:

- Adjustable bolt 100700
- Counter support 144130



- Chalk



- W 12-01-04
- W 12-08-03



Attention!

Re-tensioning of toothed belts which have already been running is not permissible! The setting of engine control times should only be carried out with new toothed belts! The crankshaft may only be turned in the direction of the engine.

Remove toothed belt and tensioning pulley

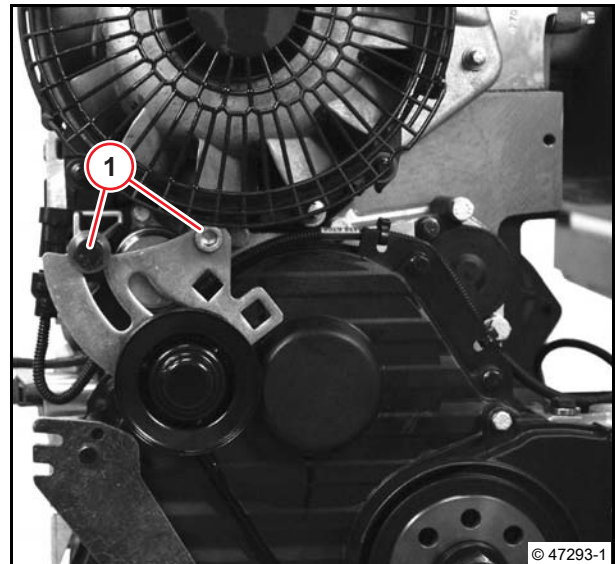
- Remove V-belt pulley.

 W 12-01-04

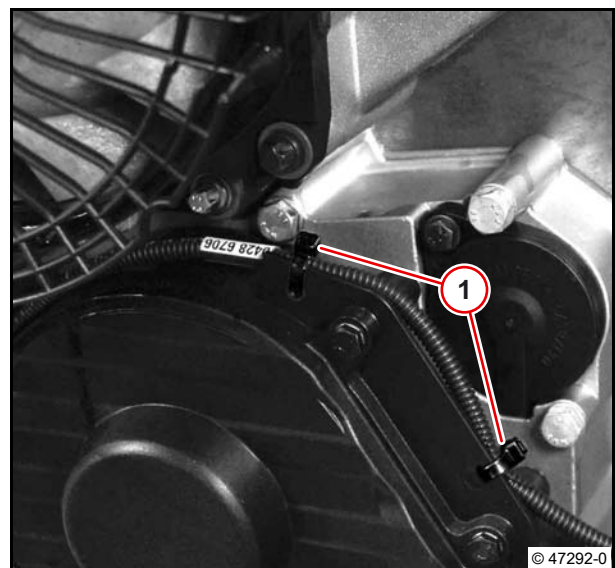
- Remove toothed belt and tensioning pulley (hydraulic pump).

 W 12-08-03

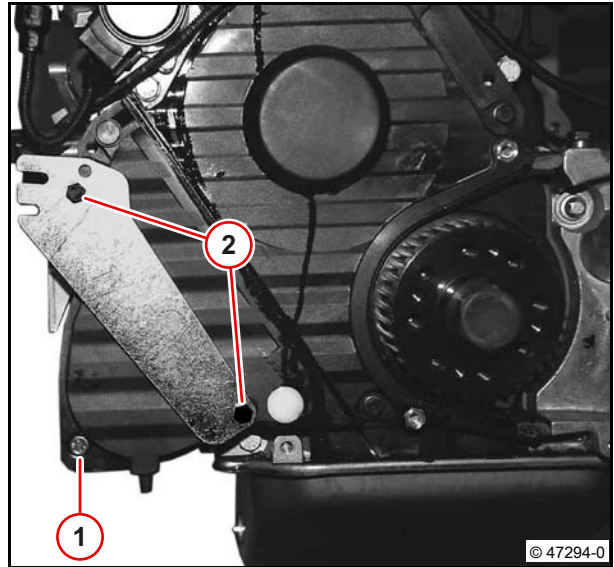
- Unscrew screws (1).



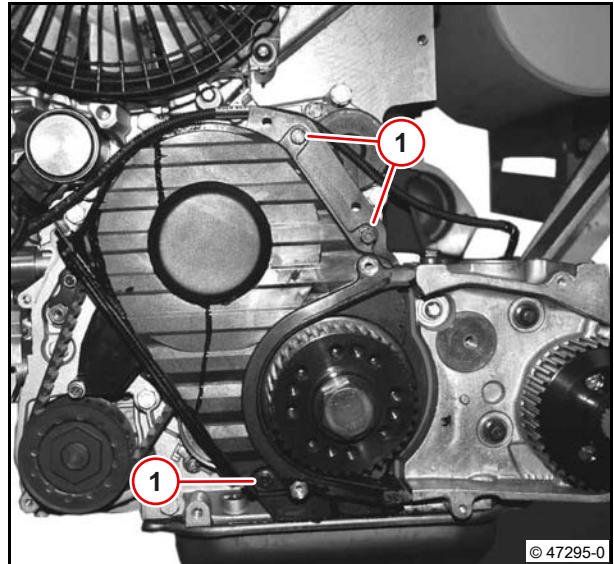
- Remove cable tie (1).



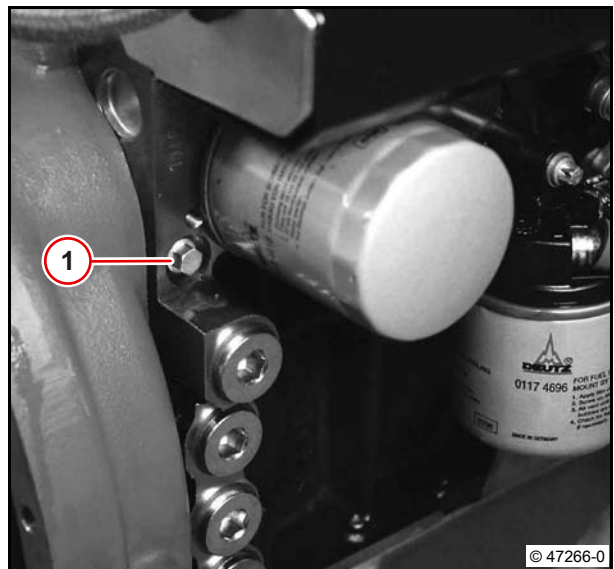
- Unscrew screw (1) with special bit.
- Unscrew screws (2).
- Remove holder.
- Remove protective hood.



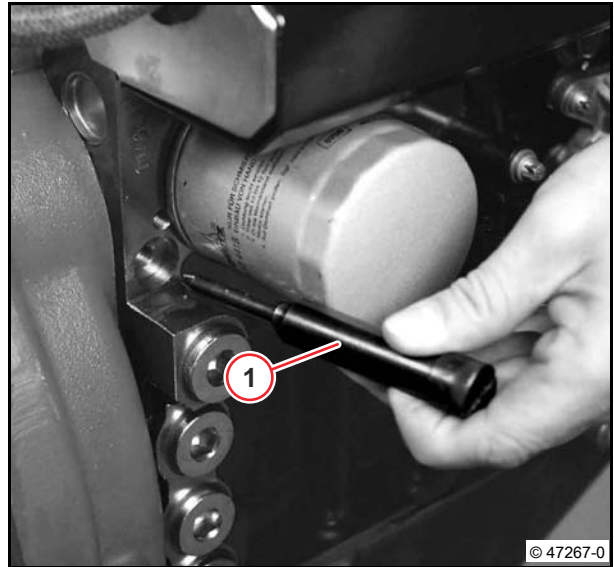
- Unscrew screws (1).
- Remove protective hood.



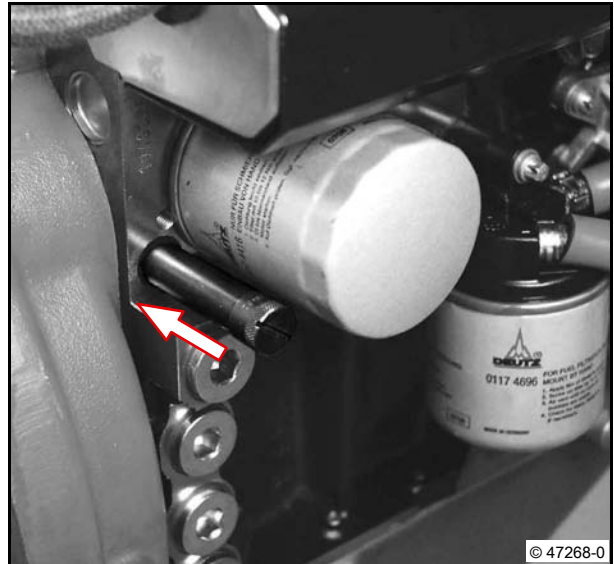
- Unscrew locking screw (1).
- Remove sealing ring.



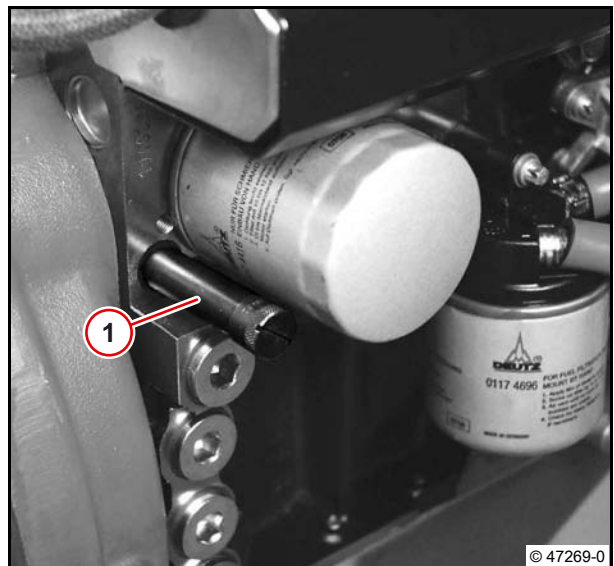
- Insert adjustable bolt (1).



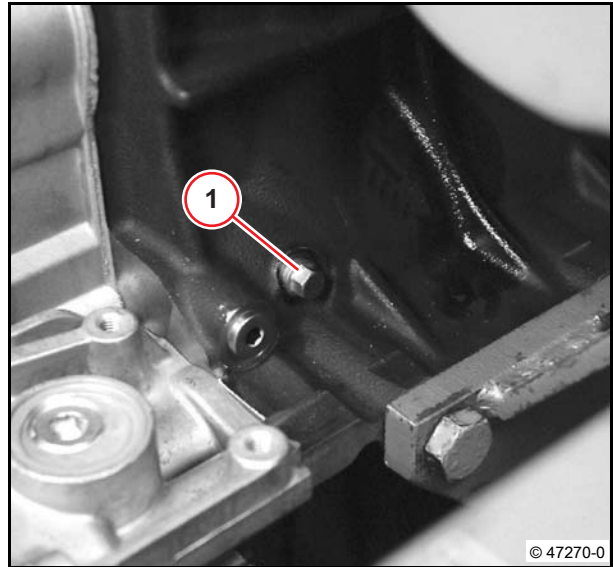
- Press adjustable bolt in lightly in direction of arrow and hold.
- Turn crankshaft slowly in direction of engine until the adjustable bolt engages with the bore of the camshaft.



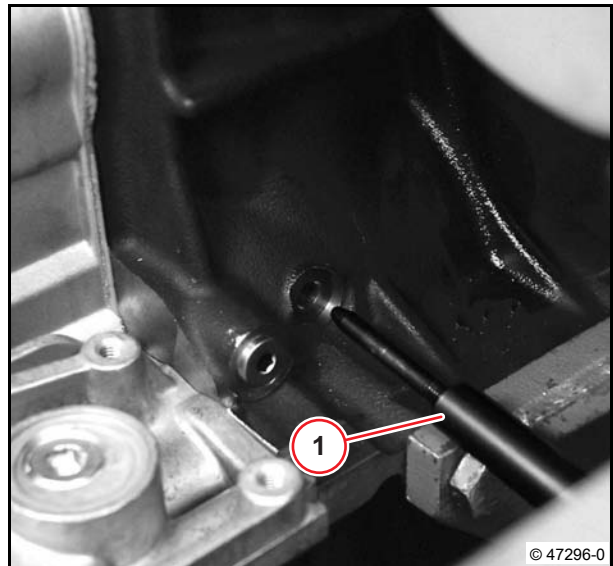
- Knock in the adjustable bolt (1) to the stop.



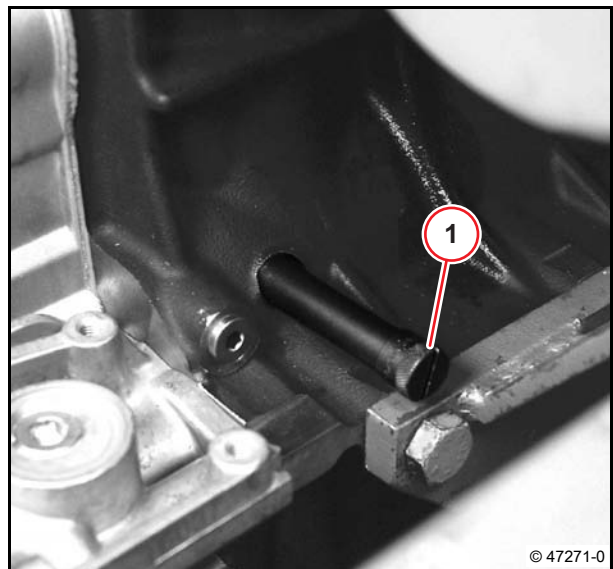
- Unscrew locking screw (1).
- Remove sealing ring.



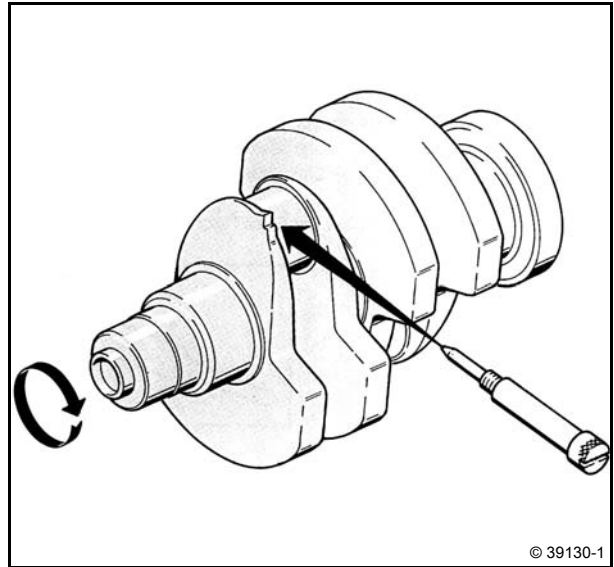
- Insert adjustable bolt (1).



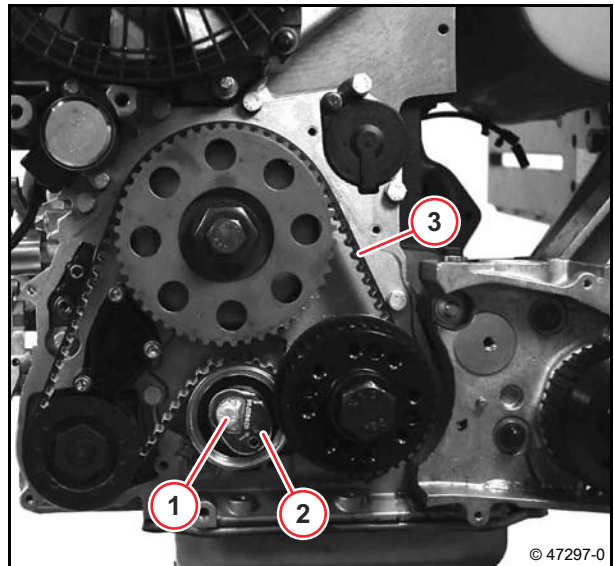
- Knock in the adjustable bolt (1) to the stop.



- Turn crankshaft in the direction of the engine until it reaches the stop of the adjustable bolt.



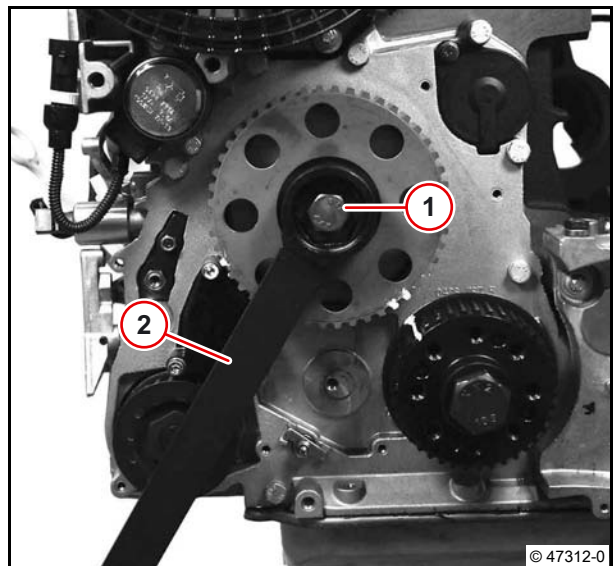
- Unscrew screw (1).
- Remove tensioning pulley (2).
- Remove the toothed belt (3).



- Position counter support (2).
- Loosen screw (1).



Attention!
Do not turn camshaft.

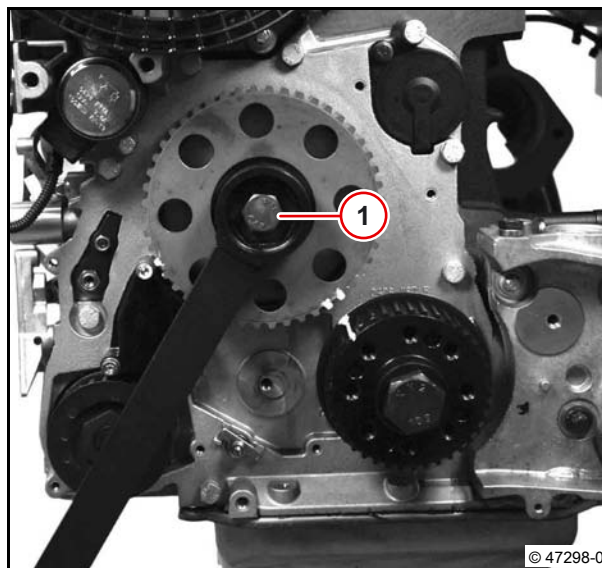


Install toothed belt and tensioning pulley

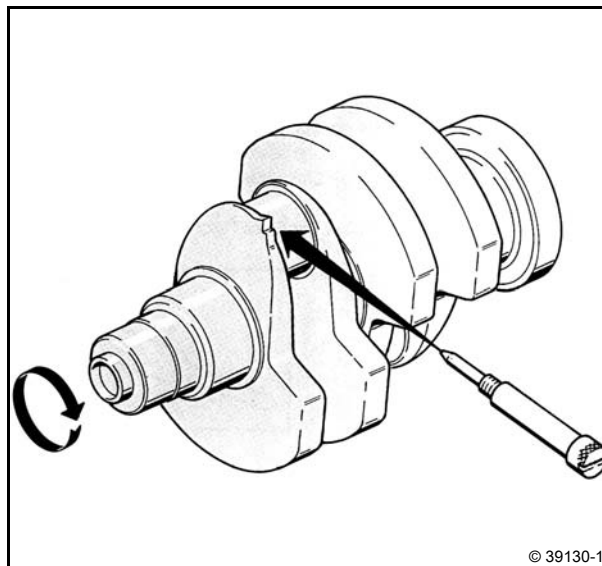
- Fasten screw (1).



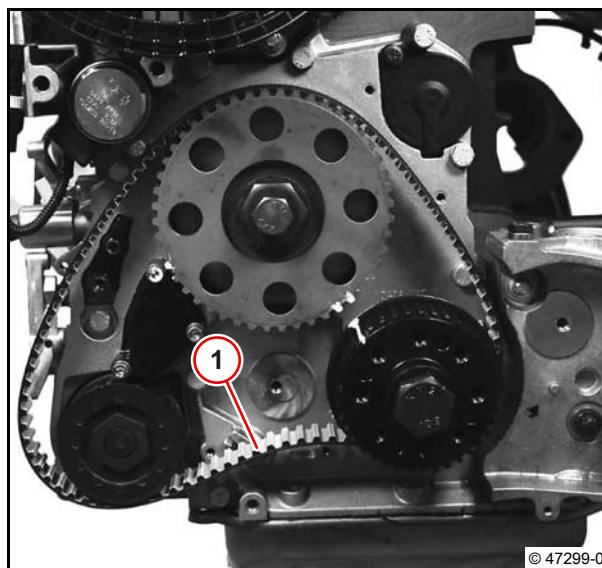
To guarantee the length adjustment of the toothed belt, the toothed belt wheel must still be able to be turned slightly.



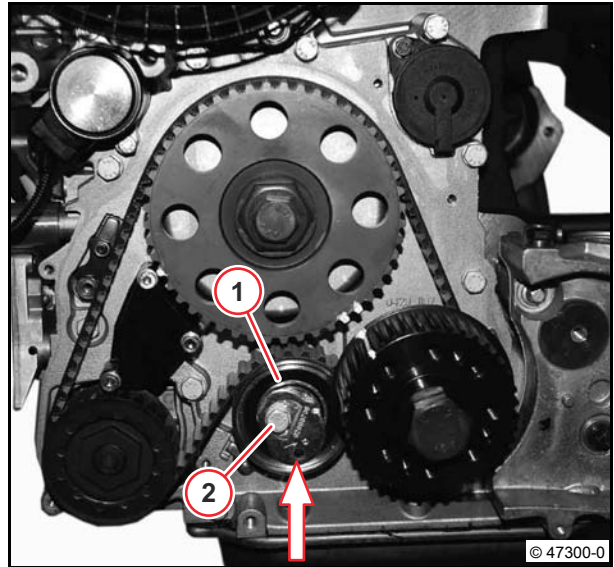
- Turn crankshaft in the direction of the engine until it reaches the stop of the adjustable bolt.



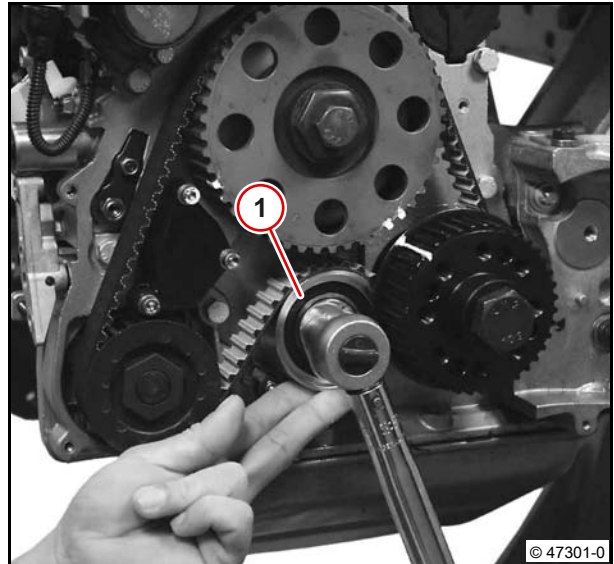
- Mount new toothed belt (1).



- Mount new tensioning pulley (1).
- Position setting eccentric (arrow) at 6 o'clock.
- Fasten screw (2).



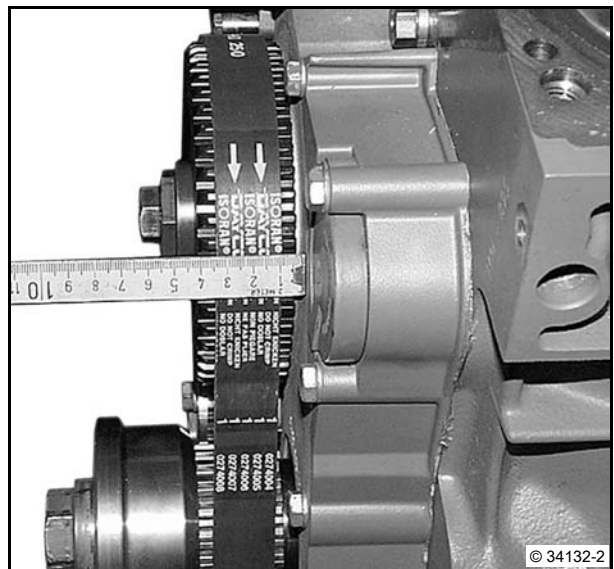
- Press tensioning pulley (1) against the toothed belt.
- Fasten screws.



- Align toothed belt.



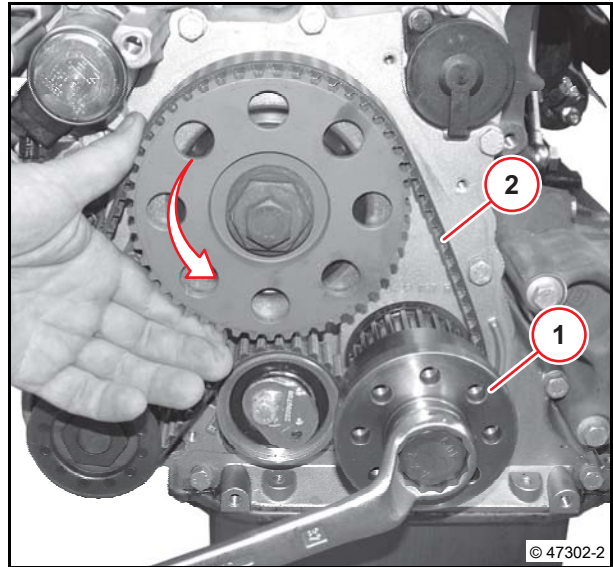
Align toothed belt centrally on the toothed belt wheels.



- Align toothed belt.
- Press tensioning pulley (1) against the stop.
- Turn the toothed belt wheel by hand in the direction of the arrow.



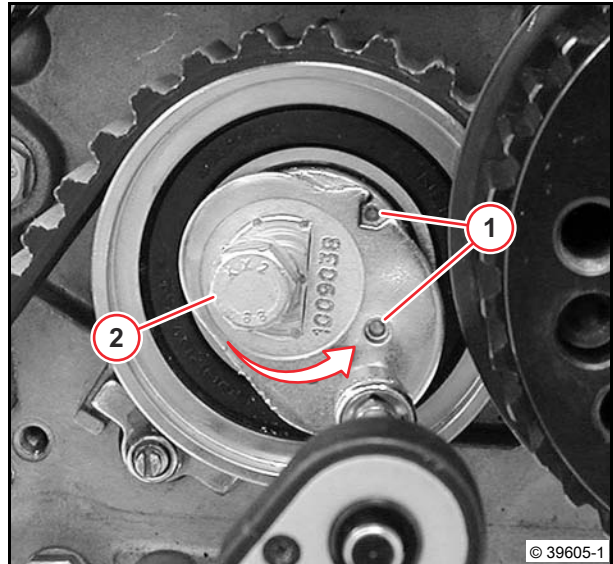
The tension side (2) is tightened.



6

- Turn setting eccentric in the direction of arrow with hexagon socket.
- Bring markings (1) and bores into alignment.
- Tighten screw (2).

21 Nm

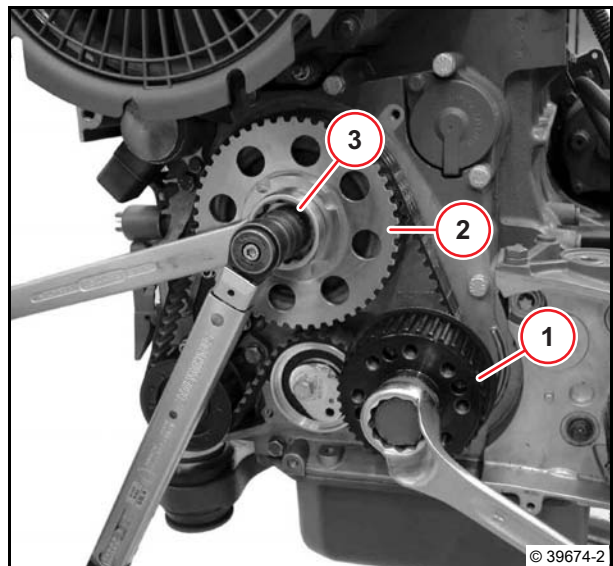


- Press tensioning pulley (1) against the stop.
- Hold toothed belt wheel (2) with counter support.
- Tighten new screw (3).

– Stage 1:
 30 Nm

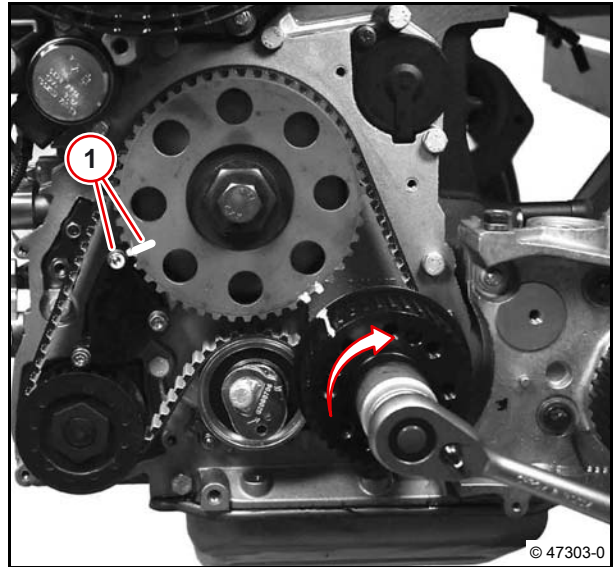
- Tighten new screw (3) with rotation angle disc.
- Stage 2:

210°



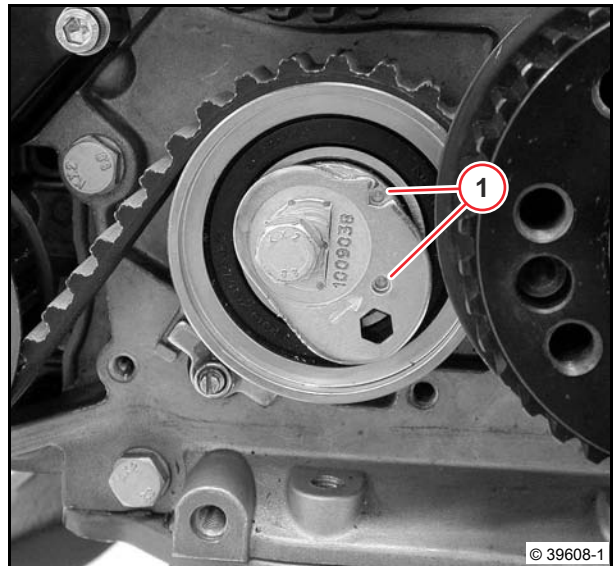
Check toothed wheel tension

- Unscrew adjustable bolt to the camshaft and crankshaft lock.
- Bring help markings (1) on toothed wheel and opposite screw into line.
- Turn crankshaft two revolutions in the direction of the arrow (direction of engine) until the help markings are in line.



Markings (1) and bores must be in alignment.

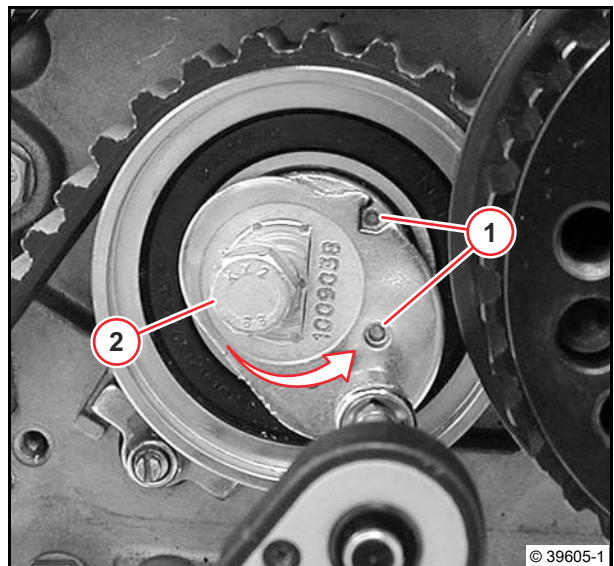
If the markings are not aligned with each other, the toothed belt tension must be corrected.



Correct toothed belt tension

- Loosen screw (2).
- Turn setting eccentric in the direction of arrow with hexagon socket.
- Bring markings (1) and bores into alignment.
- Tighten screw (2).

21 Nm



- Visually inspect the components.



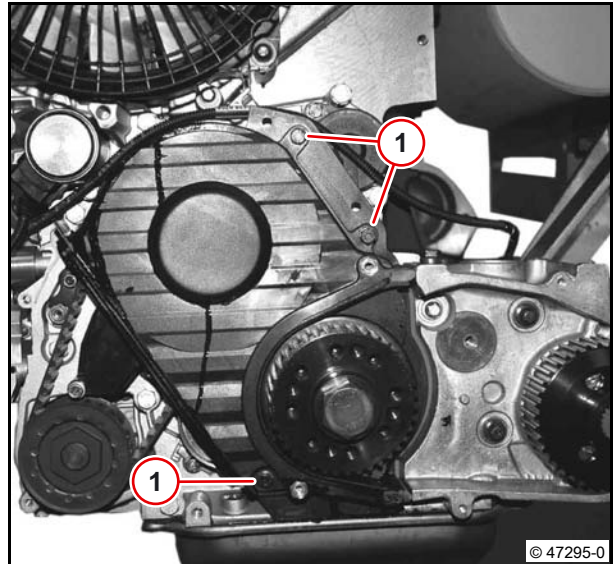
6

- Mount protective hood.



Ensure that the installation location is free from faults.

- Tighten screws (1).



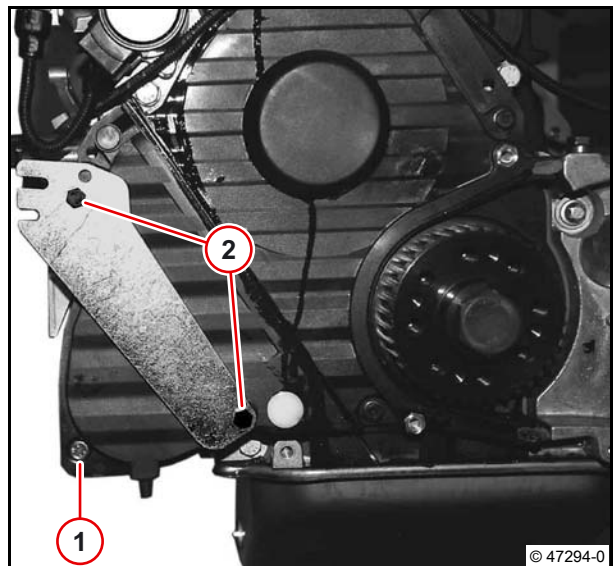
- Mount protective hood.

- Mount holder.

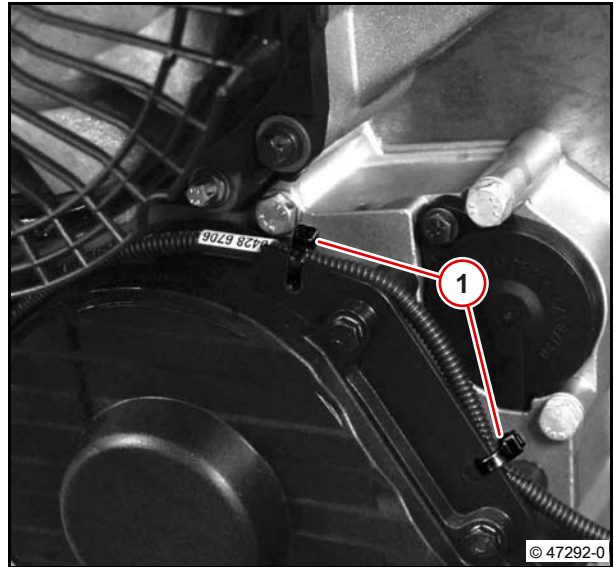
- Tighten screws (2).



- Tighten screw (1) with special bit.



- Fix cable tie (1).

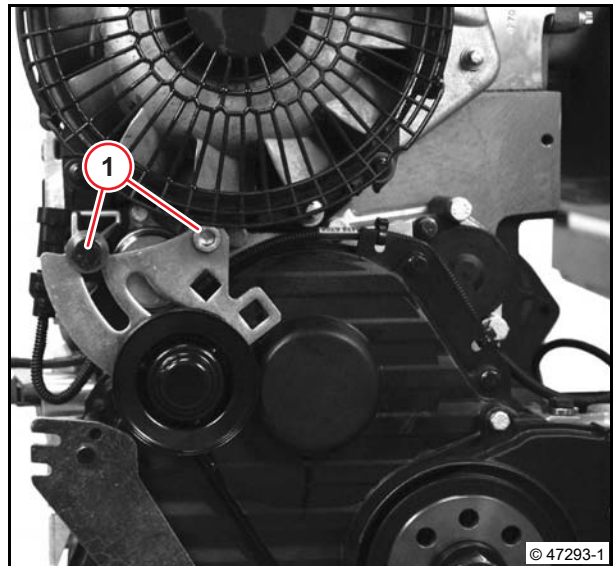


- Install toothed belt and tensioning pulley (hydraulic pump).

 [W 12-08-03](#)

- Insert V-belt tensioning pulley.
- Tighten screws (1).
- Install V-belt pulley.

 [W 12-01-04](#)



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A04 001	Toothed belt wheel on camshaft		Stage 1: Use new screw.	30 Nm
A04 001	Toothed belt wheel on camshaft		Stage 2:	210°
A04 052	Tensioning pulley on front cover			21 Nm
A04 053	Protective hood (toothed wheel) on front cover			7 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the toothed belt wheel



Standard tools:

- Socket wrench insert, spanner size 32 8036
- Force multiplier 8049
- Rotation angle disc 8190

Special tools:

- Counter support 143420
- Counter support 144130



- Packing compound DEUTZ DW 67



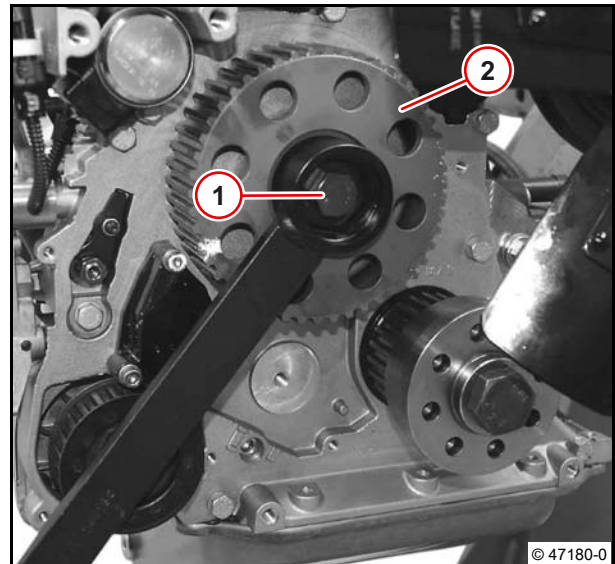
- W 04-04-12

Remove toothed belt wheel

- Remove toothed belt and tensioning pulley.

W 04-04-12

- Insert counter support 144130.
- Unscrew screw (1).
- Remove toothed belt wheel (2).

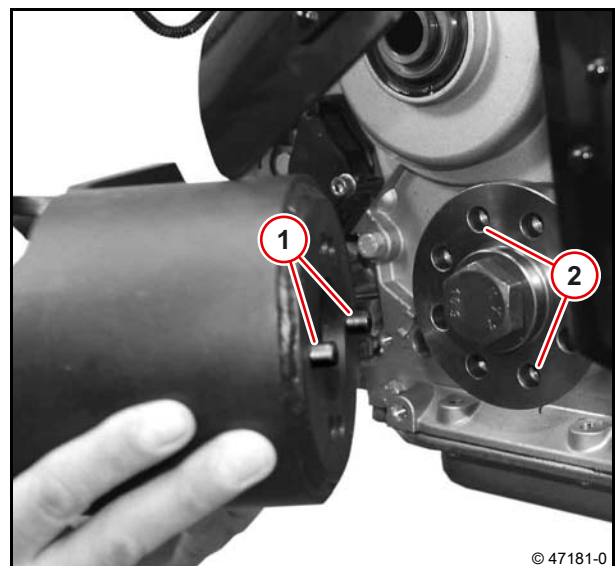


- Insert counter support 143420.
- Insert fixing bolts (1) in the bores (2).



Attention!

Do not twist crankshaft.

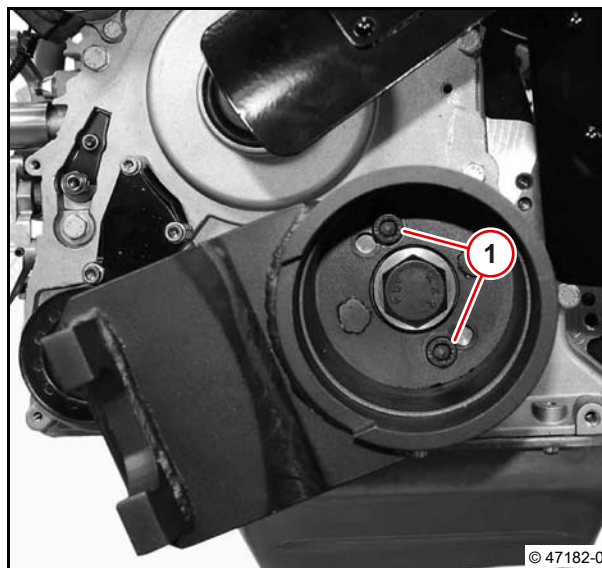


- Tighten screws (1).

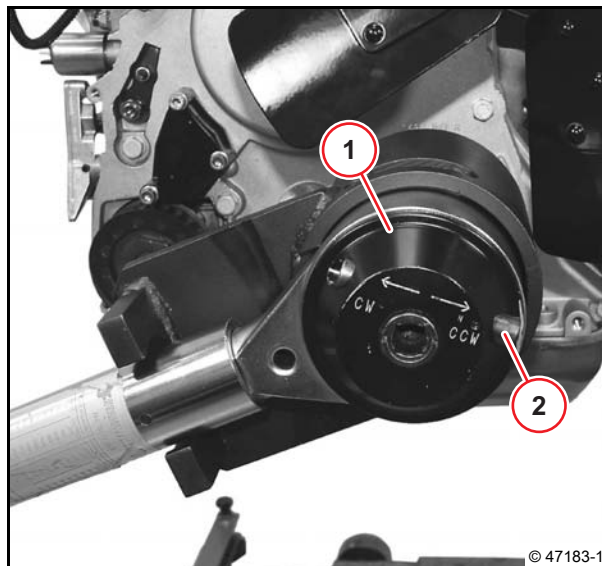


Attention!

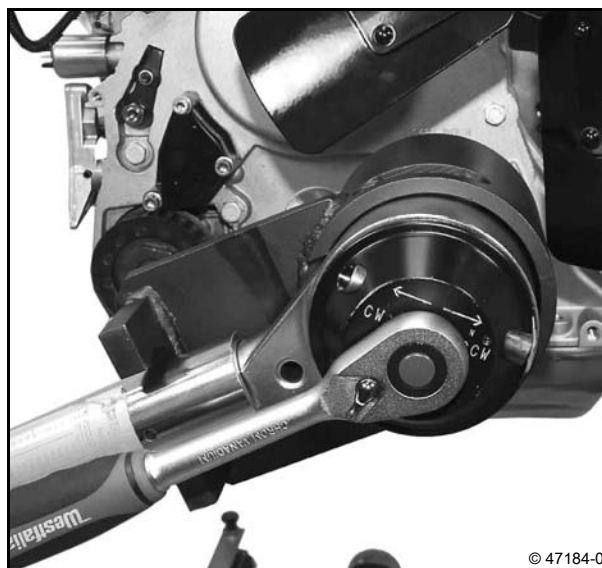
Do not twist crankshaft.



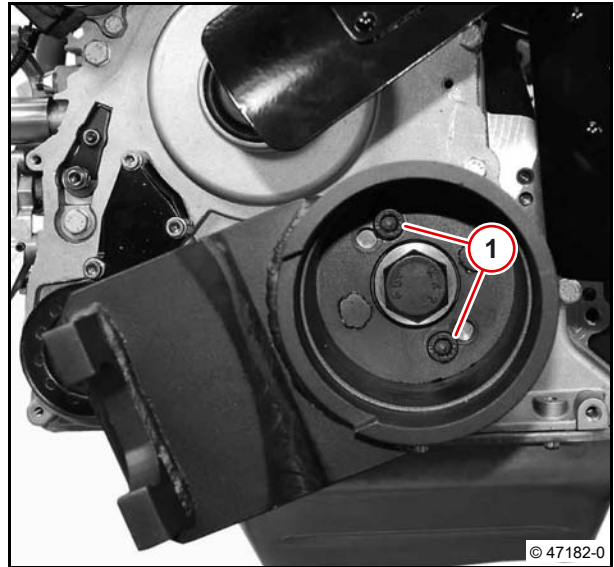
- Insert socket wrench insert and force multiplier (1).
- Snap in non-return device (2) in position CCW.



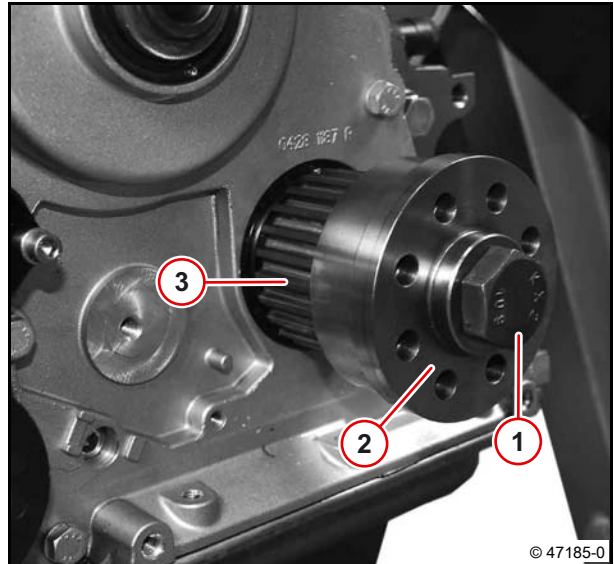
- Hold force multiplier.
- Loosen screw.
- Remove force multiplier and socket wrench insert.



- Unscrew screws (1).
- Remove counter holder.



- Unscrew screw (1).
- Remove flange (2).
- Remove toothed belt wheel (3).



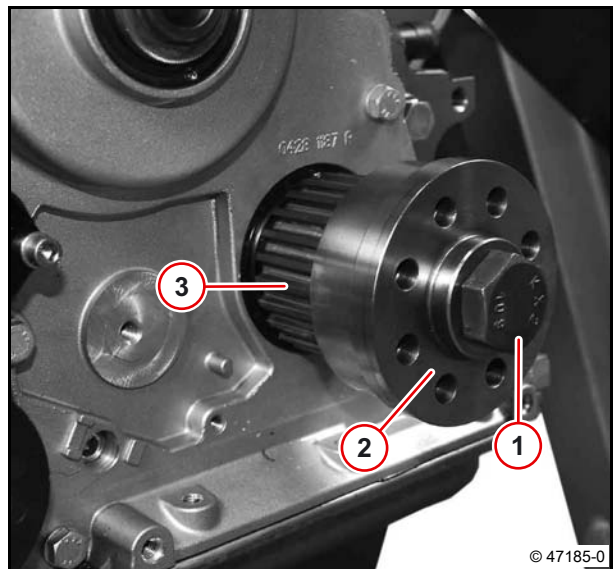
Install toothed belt wheel

- Mount toothed belt wheel (3).
- Mount flange (2).



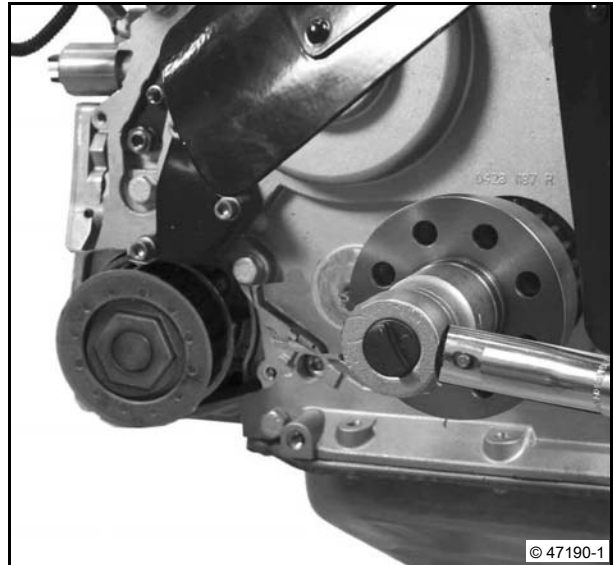
All connecting surfaces must be clean and free of oil.

- Turn in new screw (1).



- Tighten screw.
– Stage 1:

 130 Nm

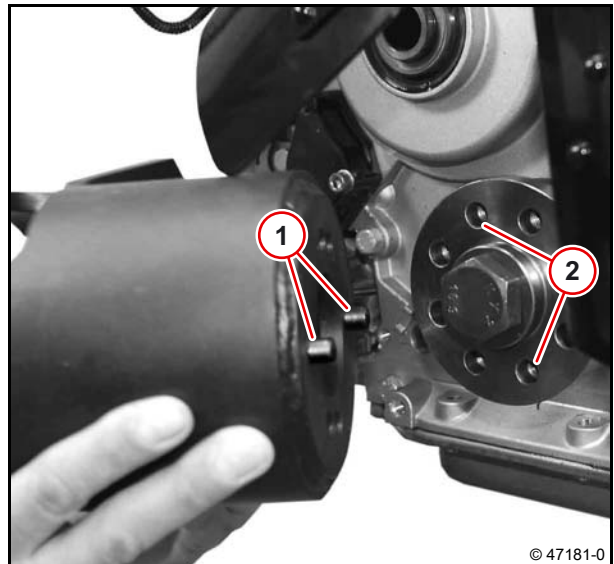


- Insert counter support 143420.
- Insert fixing bolts (1) in the bores (2).



Attention!

Do not twist crankshaft.

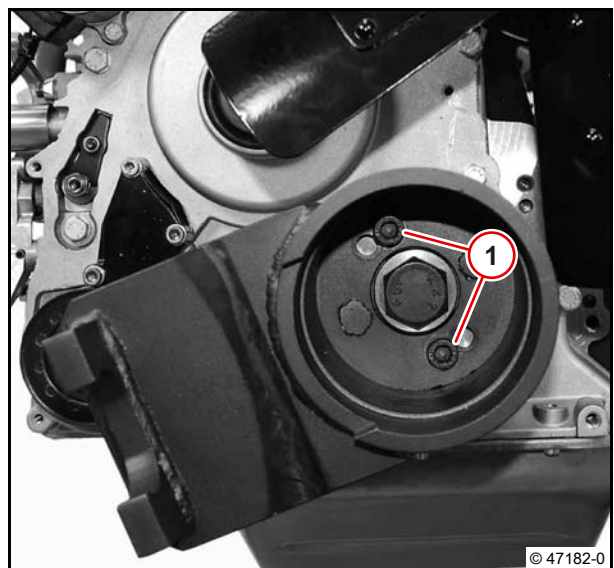


- Tighten screws (1).

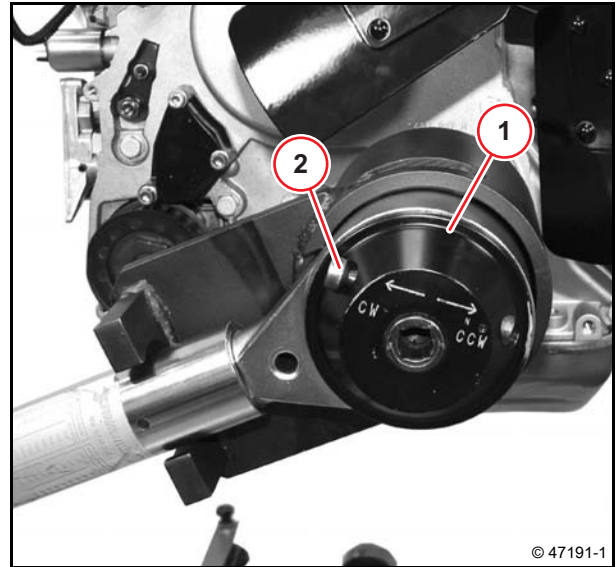


Attention!

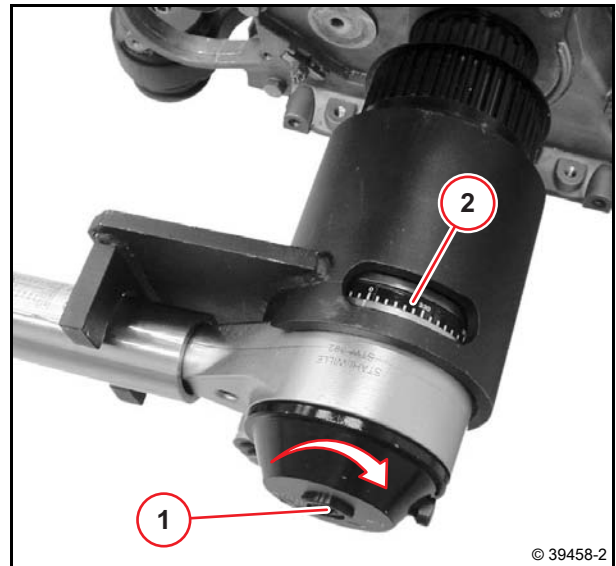
Do not twist crankshaft.



- Insert socket wrench insert and force multiplier (1).
- Snap in non-return device (2) in position CW.

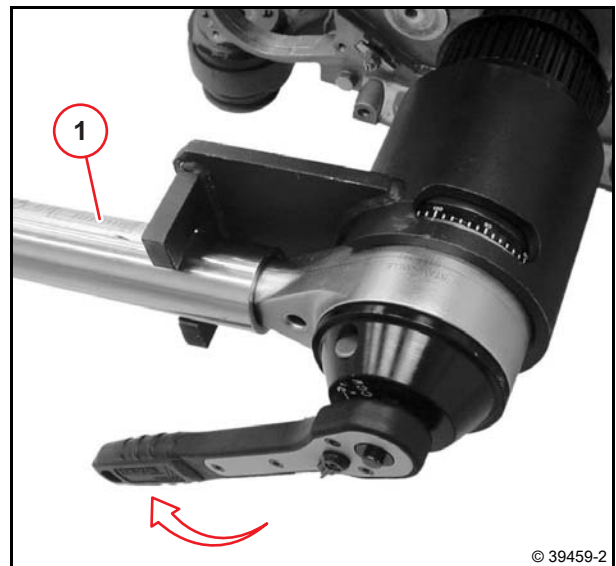


- Turn square bar (1) in direction of arrow to the stop.
- Set graduated collar (2) to zero.



- Hold force multiplier (1).
- Tighten screw.
- Stage 2:

 210°



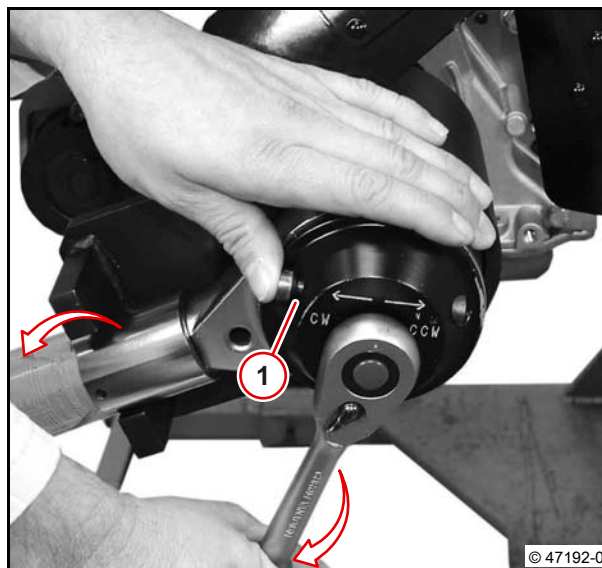
- Hold force multiplier against counter pressure (arrow),
- release non-return device (1) and force multiplier.



Danger!

There is danger of injury if a force multiplier is removed without being discharged.

- Remove force multiplier and socket wrench insert.
- Remove counter holder.



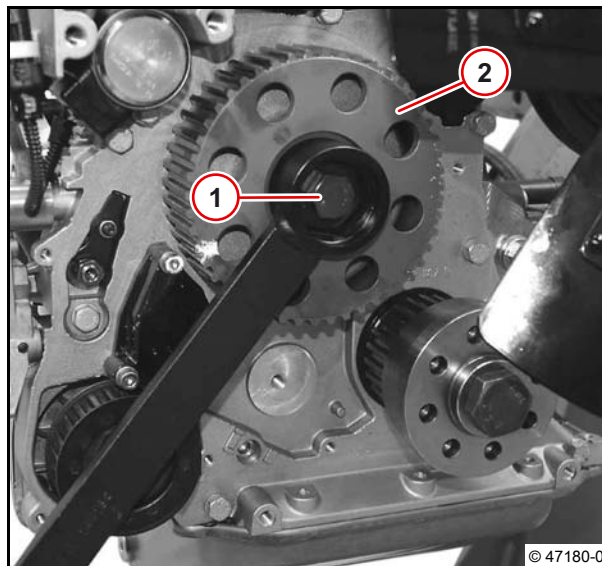
6



All connecting surfaces must be clean and free of oil.

- Mount toothed belt wheel (2).
- Insert counter support 144130.
- Tighten new screw (1).
- Install toothed belt and tensioning pulley.

 [W 04-04-12](#)



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A02 015	Toothed belt wheel on crankshaft		Stage 1: Use new screw.	130 Nm
A02 015	Toothed belt wheel on crankshaft		Stage 2:	210°



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



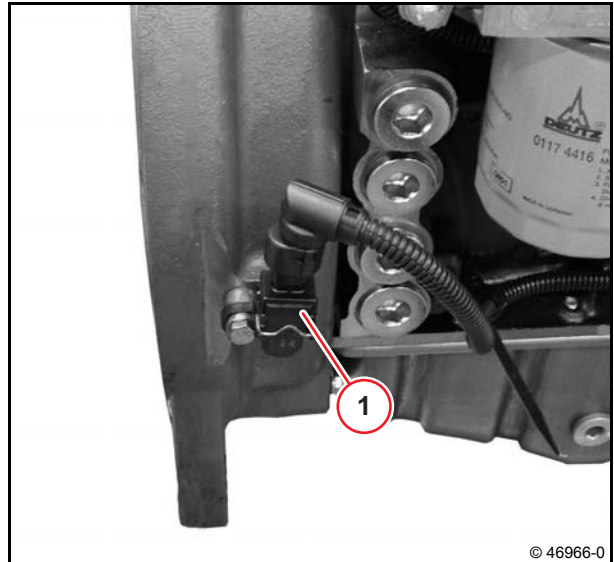
Removing and installing the impulse transmitter



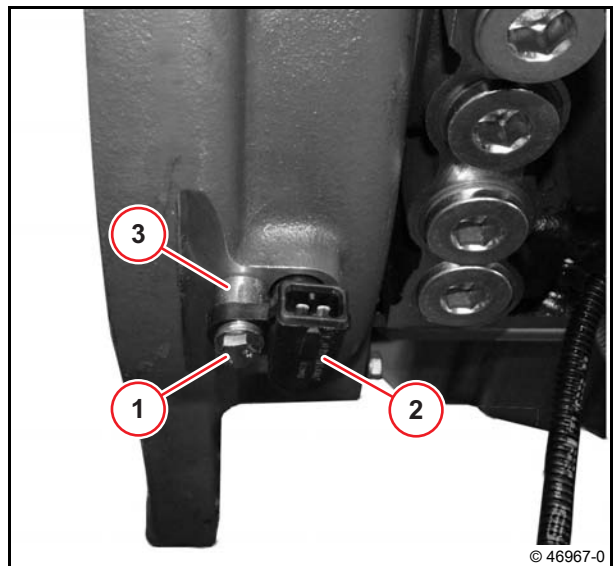
Standard tools

Removing the impulse transmitter

- Unlock cable plug (1) and disconnect.



- Unscrew screw (1).
- Remove impulse transmitter (2).
- Remove spacing sleeve (3).



- Visually inspect the components.
- Clean components.
- Clean sealing surfaces.

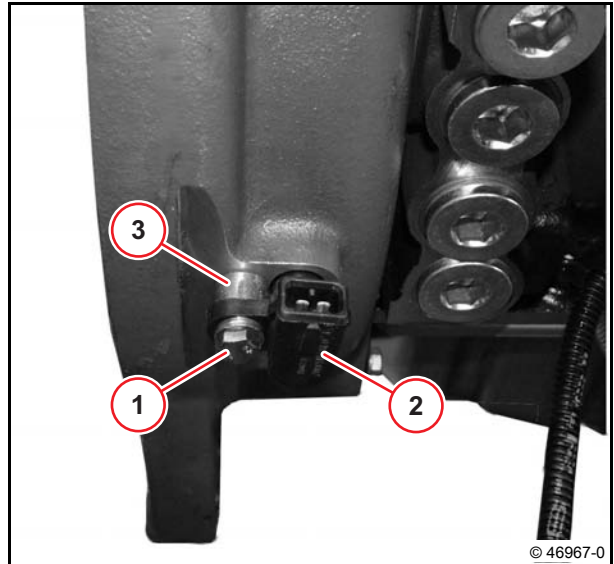


6

Installing the impulse transmitter

- Position spacing sleeve (3).
- Insert impulse transmitter (2).
- Fasten screw (1).
- Tighten screw (1).

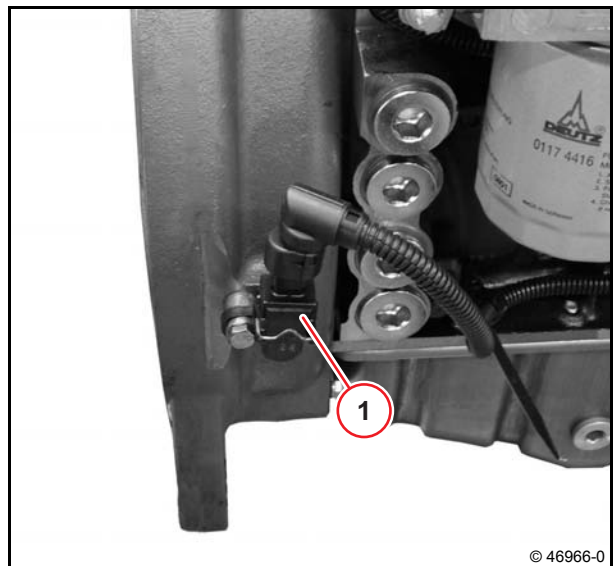
 8.5 Nm



- Plug in the cable plug (1).



Ensure that the cables are connected properly.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A05 011	Speed transmitter on connection housing			8.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



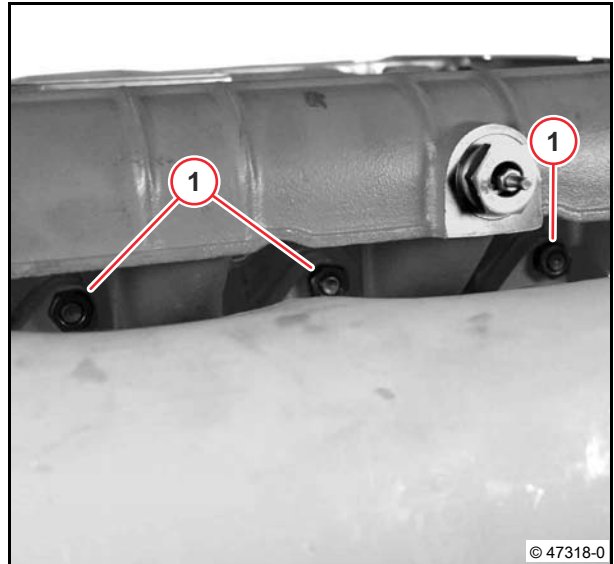
Removing and installing the exhaust damper



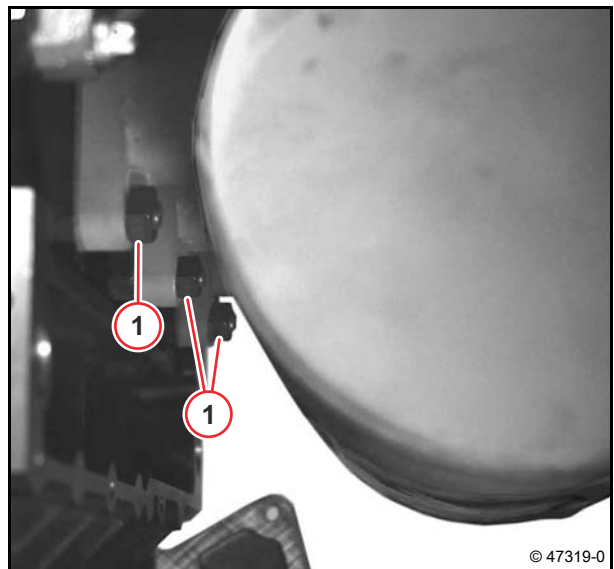
Standard tools

Remove exhaust damper

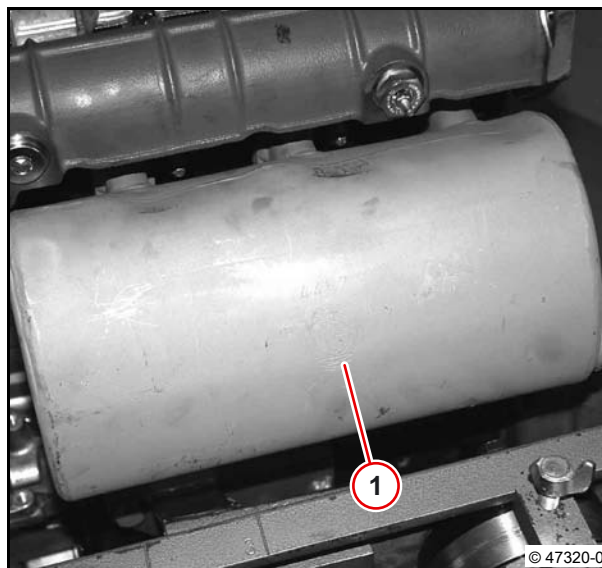
- Unscrew nuts (1).



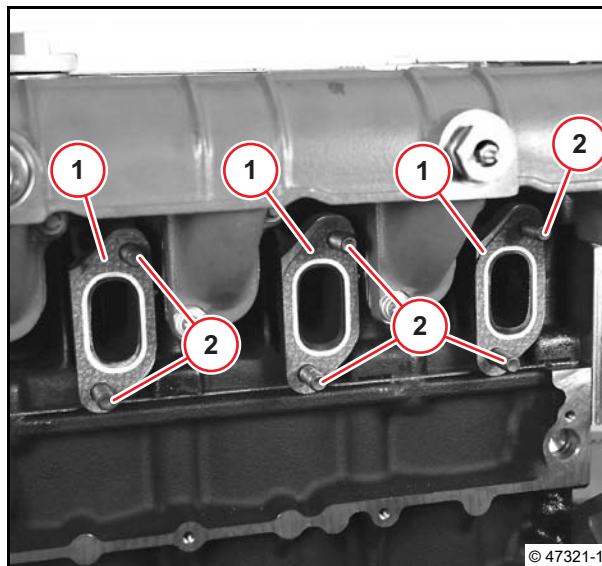
- Unscrew nuts (1).



- Remove exhaust damper (1).



- Remove gaskets (1).
- Unscrew studs (2).



Install exhaust damper

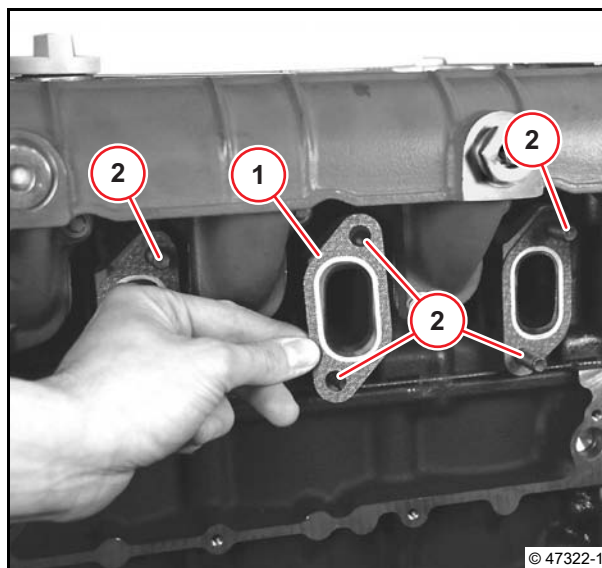
- Clean sealing surfaces.
- Turn on new pin bolts (2).

 8.5 Nm

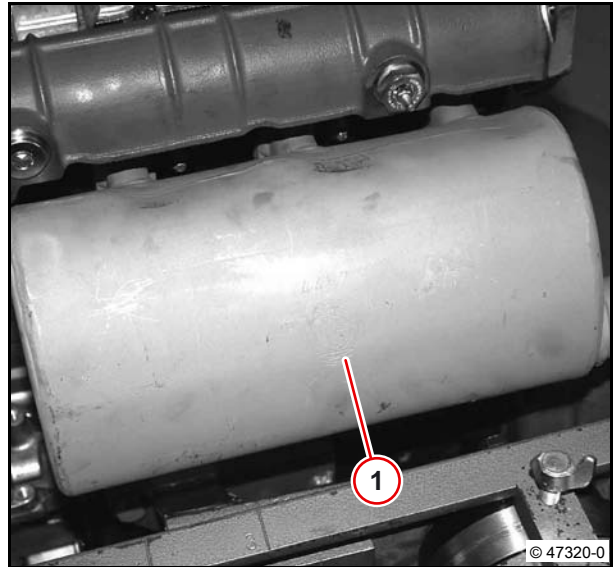
- Mount new gaskets (1).



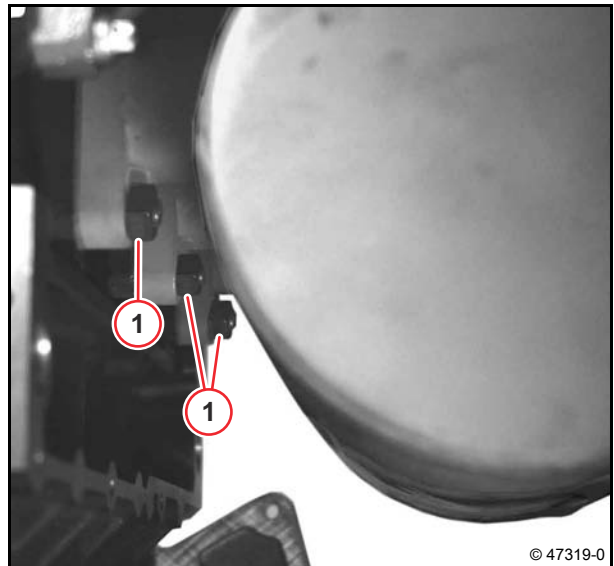
Note installation position.



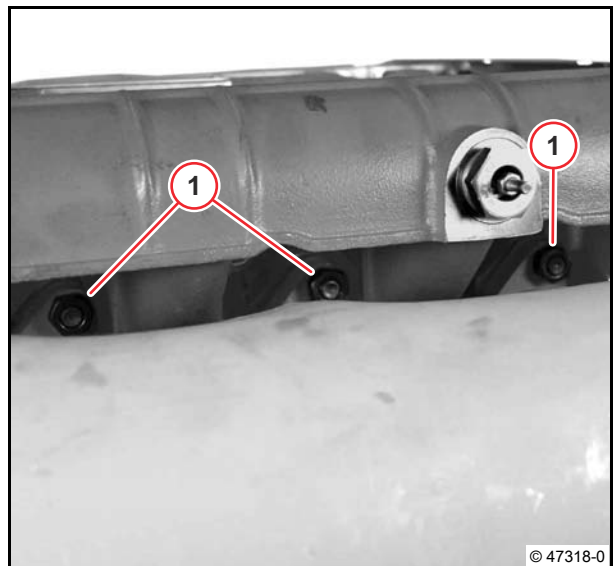
- Install exhaust damper (1).



- Screw on nuts (1).

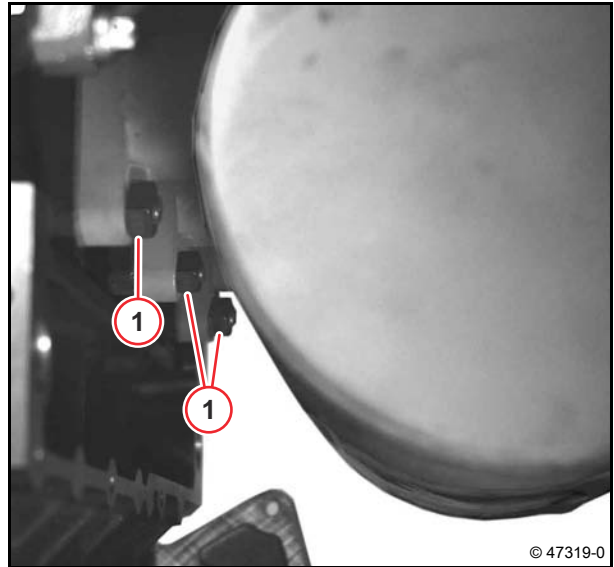


- Screw on nuts (1).



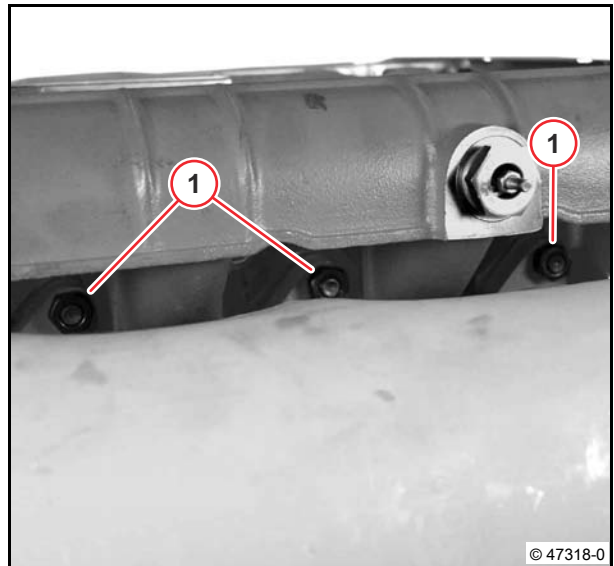
- Tighten nuts (1).

 40 Nm



- Tighten nuts (1).

 40 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 001	Exhaust damper on cylinder head			40 Nm
A06 005	Pin bolt on cylinder head		Use new pin bolts	8.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the exhaust line



Standard tools:
– Torx tool set

8189



– W 06-06-04

Removing exhaust line

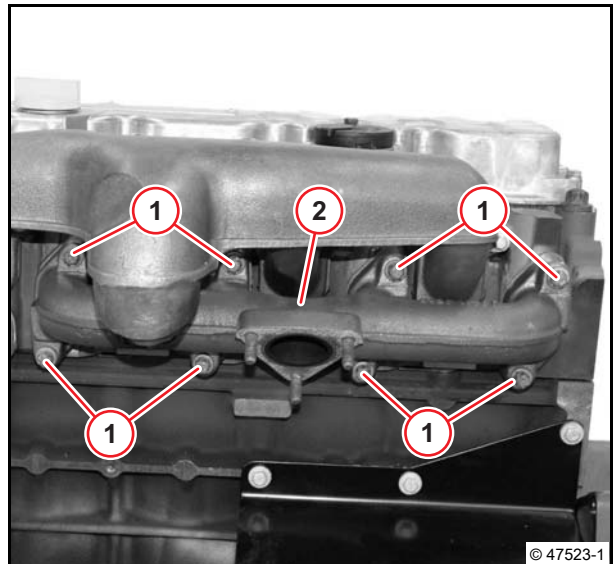
– TD 2011

- Remove turbocharger.

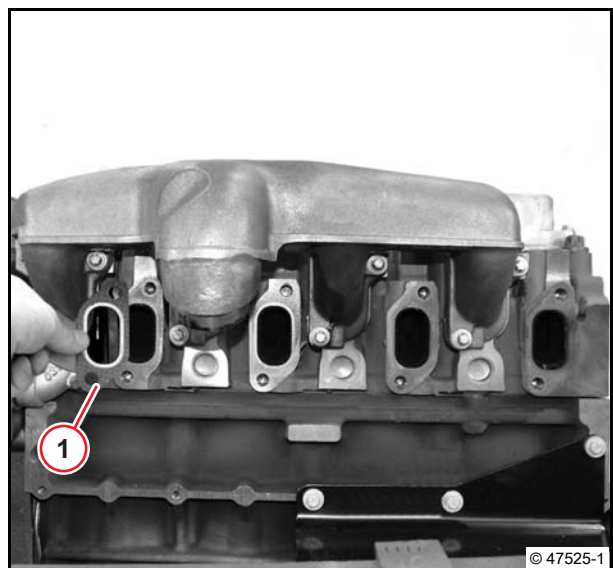


W 06-06-04

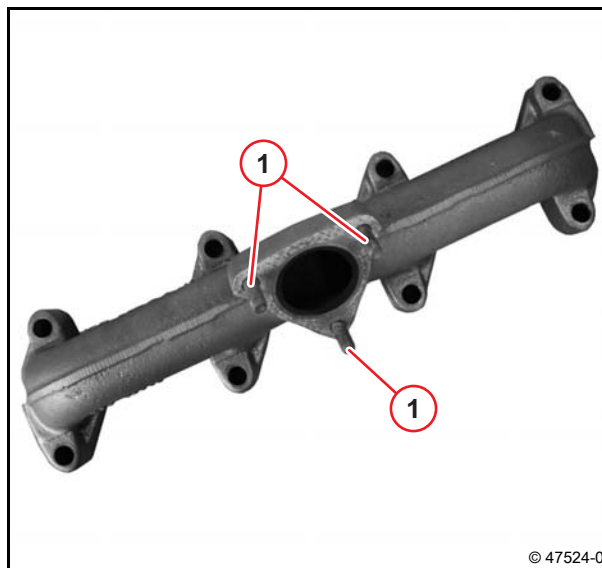
- Unscrew all screws (1).
- Remove exhaust line (2).



- Remove gaskets (1).



- Unscrew studs (1).
- Visually inspect the components.

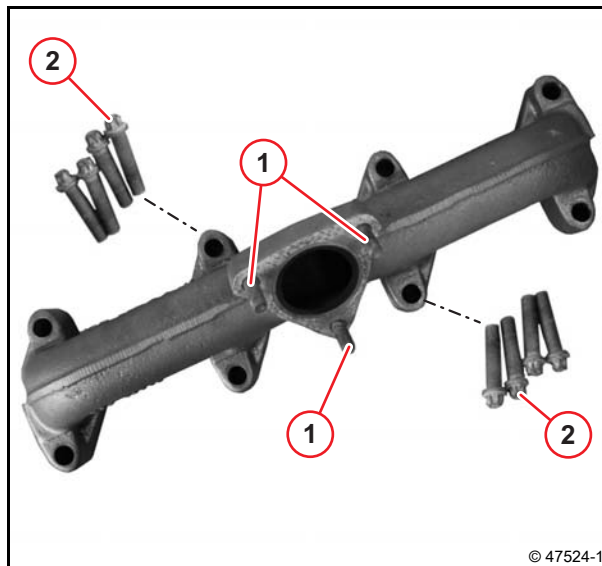


6

Installing exhaust line

- Clean sealing surfaces.
- Turn on new pin bolts (1).
- Tighten pin bolts (1).

12 Nm



- Clean sealing surfaces.
- Mount exhaust line (1).
- Mount new gaskets.



Note installation position.

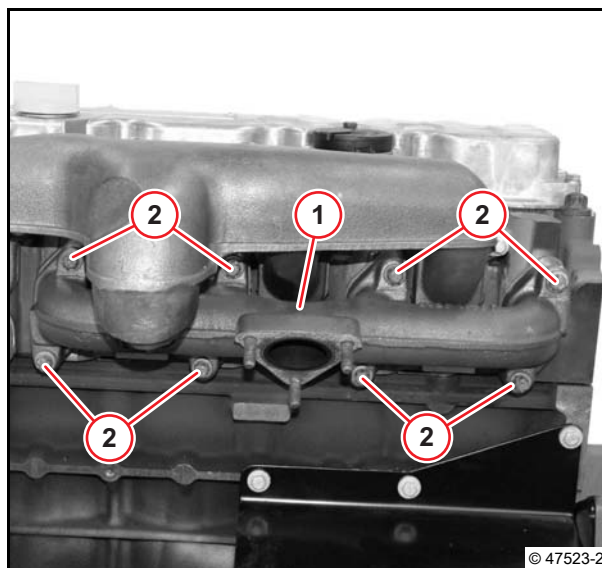
- Turn in new screws (2).
- Tighten new screws (2).

55 Nm

– TD 2011

- Install the turbocharger.

W 06-06-04



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 001	Exhaust pipe at cylinder head	Torx screw, coated	Use new screws.	55 Nm
A06 004	Pin bolts on exhaust pipe	coated	Use new pin bolts	12 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and install the charge air line



Standard tools:
– Torx tool set

8189



– W 06-01-05
– W 06-06-04

Remove charge air line

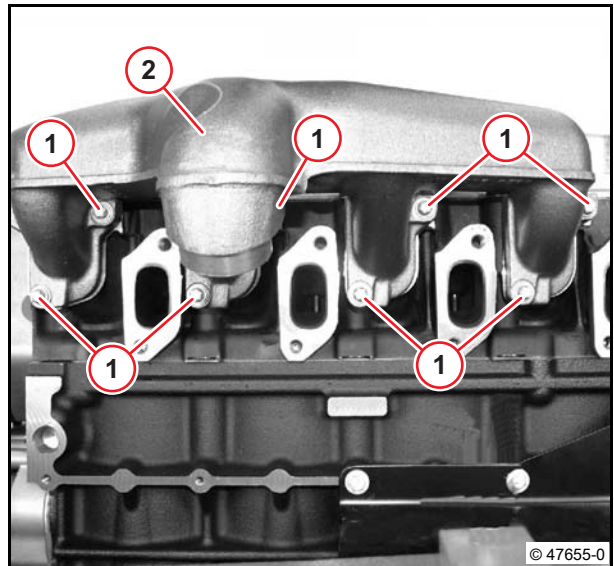
- Remove turbocharger.

 W 06-06-04

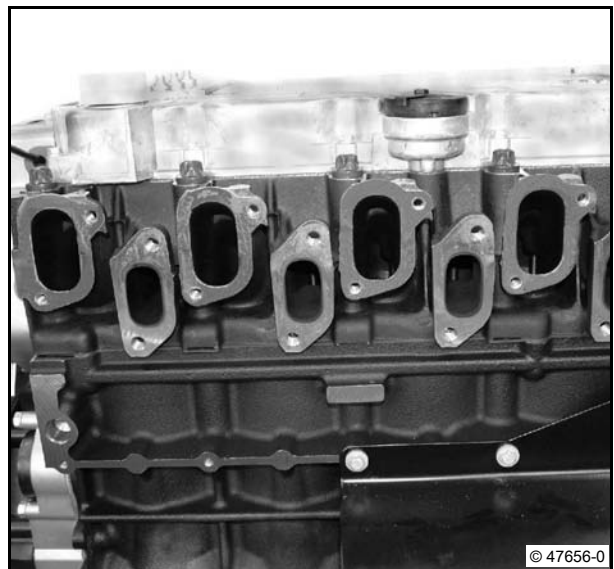
- Remove the exhaust pipe.

 W 06-01-05

- Unscrew all screws (1).
- Remove charge air pipe (2).
- Remove seals.



- Clean sealing surfaces.



Install charge air line

- Mount charge air line (1).
- Mount new gaskets.
- Tighten screws (2) alternately working from the centre to the outside.

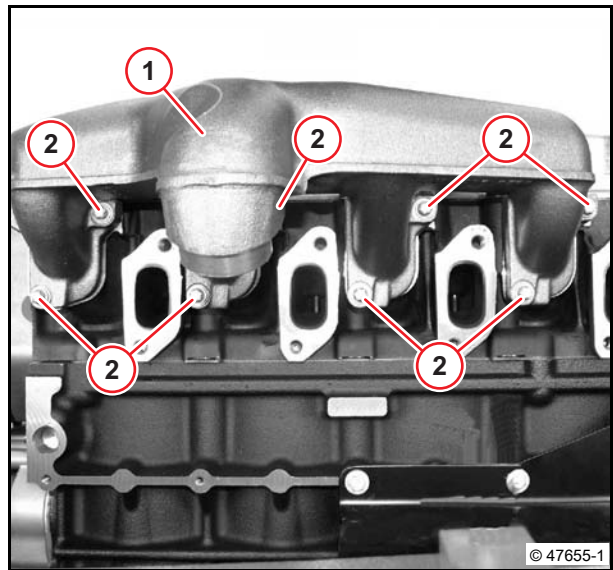
 21 Nm

- Install the exhaust pipe.

 W 06-01-05

- Install the turbocharger.

 W 06-06-04



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 030	Charge air pipe on cylinder head	Torx screw, coated	Use new screws.	21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the turbocharger



Standard tools:

- Clamping tongs 9088
- Spring band pliers 9090



- Lubricating oil
- Fitting compound DEUTZ S1



Attention!

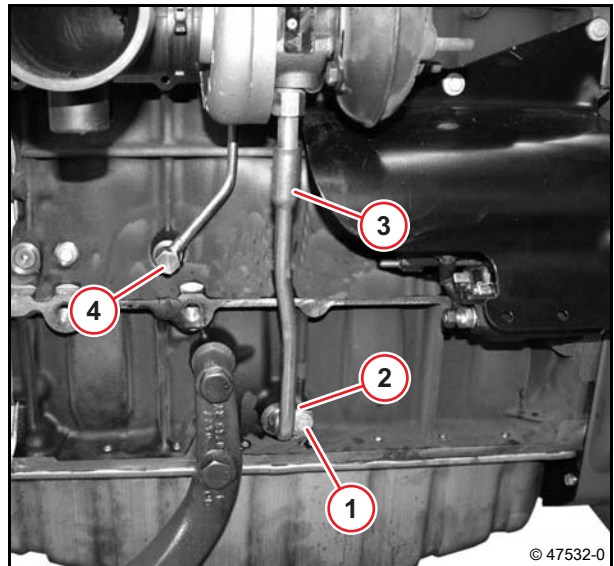
Do not remove the stoppers/caps until immediately before assembly.



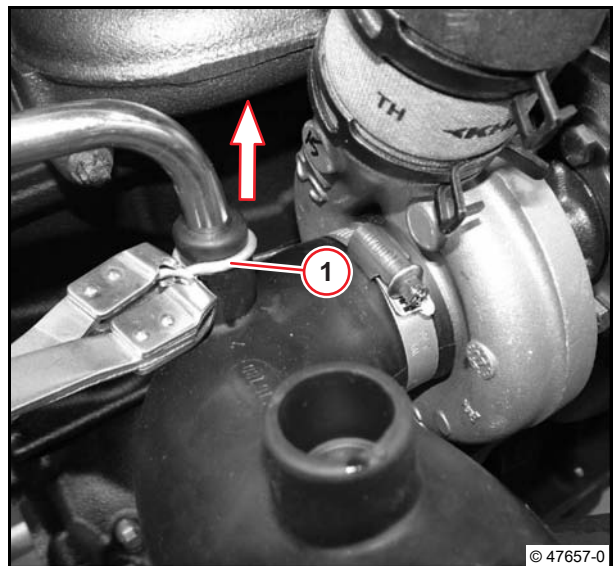
Collect leaking operating substances in suitable vessels and dispose of according to regulations.

Removing turbocharger

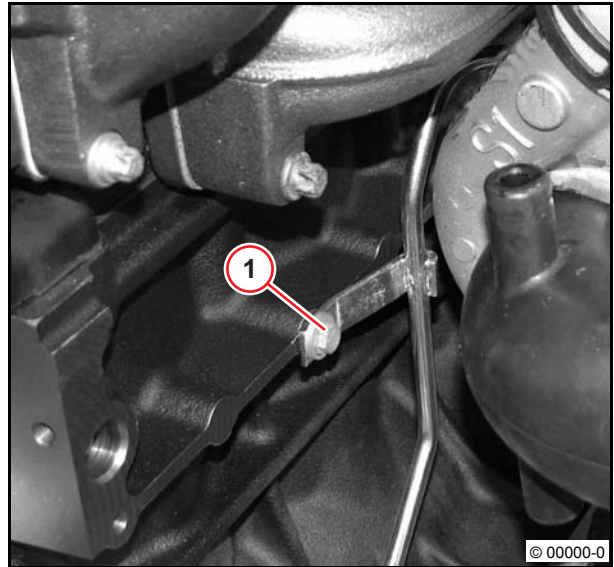
- Unscrew screw (1).
- Remove the holder (2).
- Remove oil return pipe (3).
- Unscrew hollow screw (4).
- Remove sealing rings.



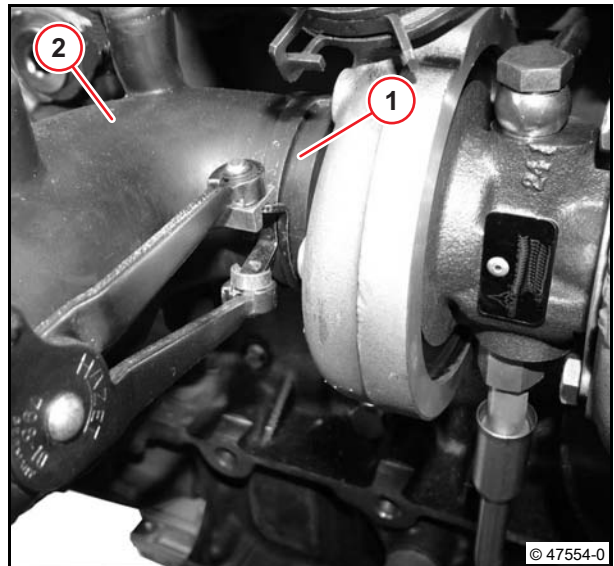
- Loosen hose clip (1) with clamping tongs.
- Pull off hose clip (1) in the direction of the arrow.



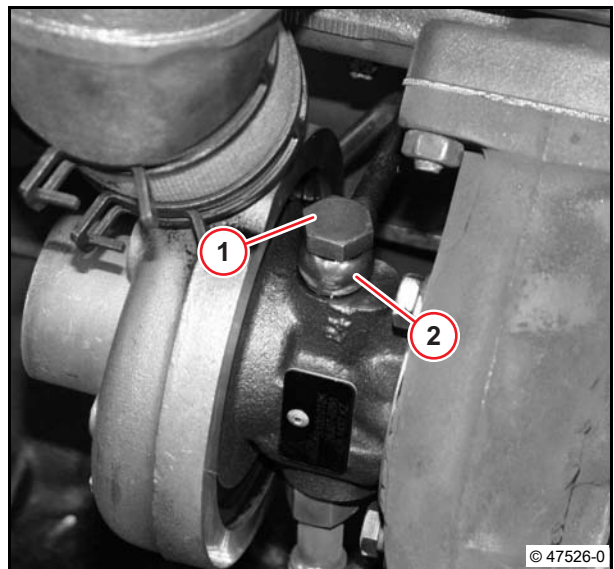
- Unscrew screw (1).



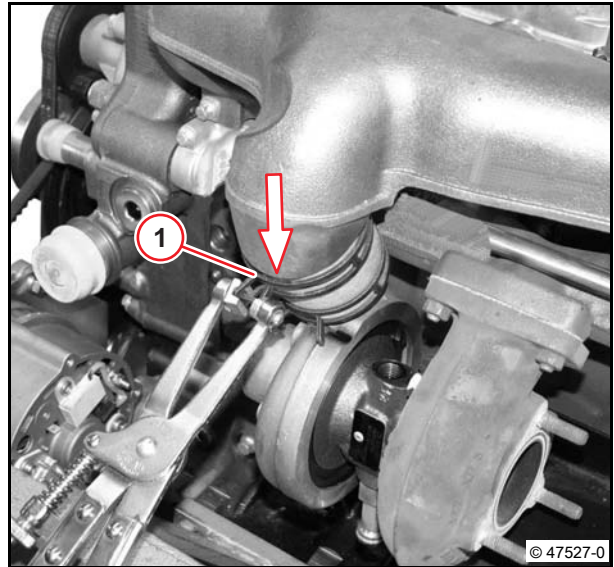
- Loosen spring band clip (1) with spring band pliers.
- Remove reducer (2).



- Unscrew hollow screw (1).
- Remove lubricating oil pipe (2).
- Remove sealing rings.
- Press in stoppers.

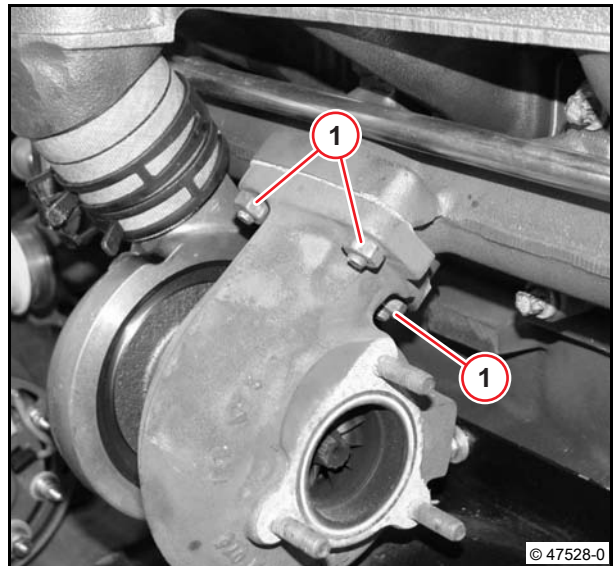


- Loosen spring band clip (1) with spring band pliers.
- Pull off spring band clip (1) in the direction of the arrow.

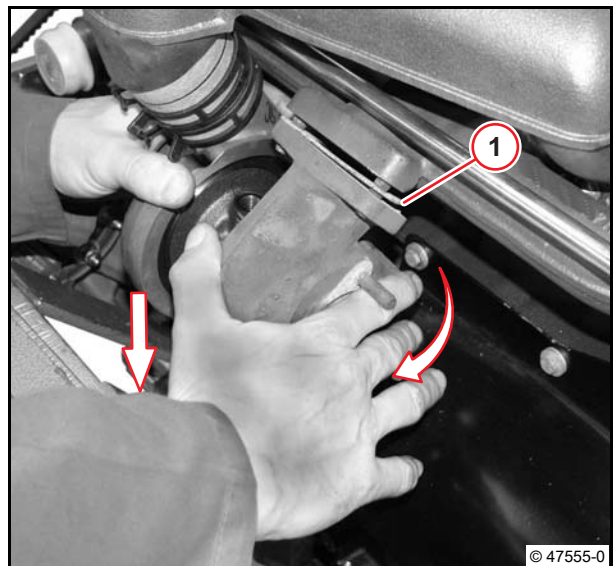


6

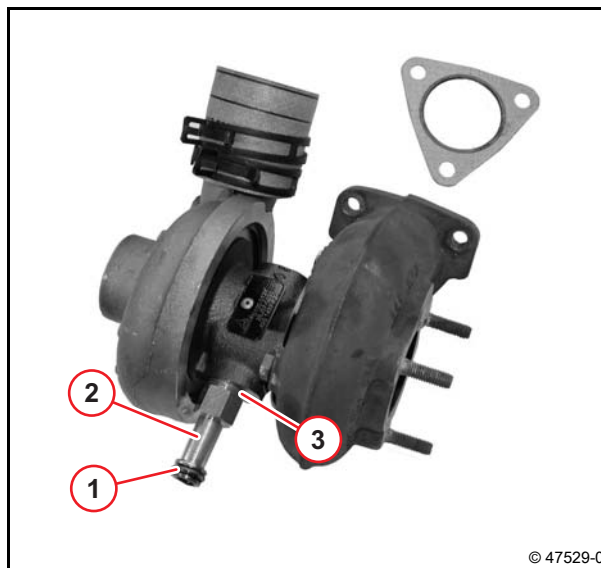
- Unscrew nuts (1).



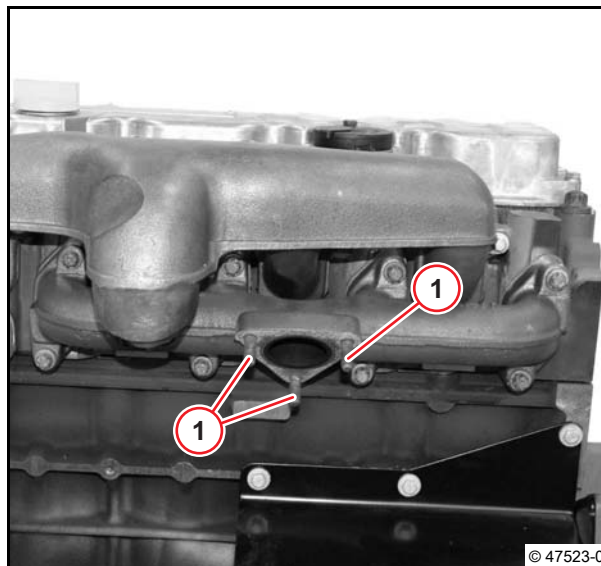
- Remove turbocharger in the direction of the arrow.
- Remove gasket (1).



- Remove the O-ring (1) with the disassembly tool.
- Unscrew screw-in nipple (2).
- Remove sealing ring (3).



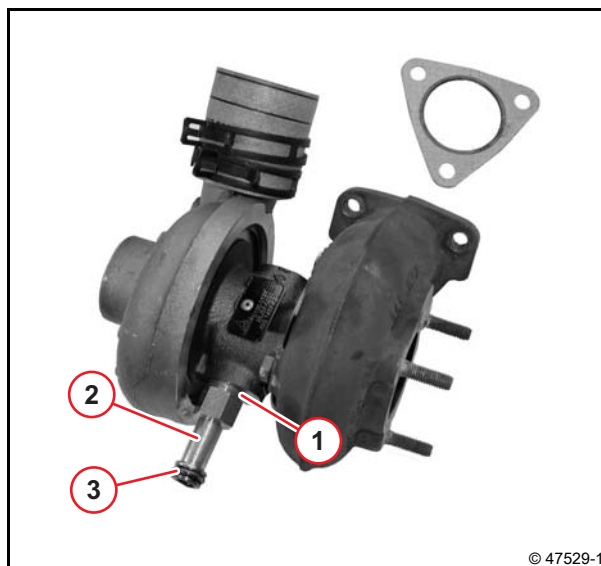
- Unscrew studs (1).
- Check components for visible signs of wear.



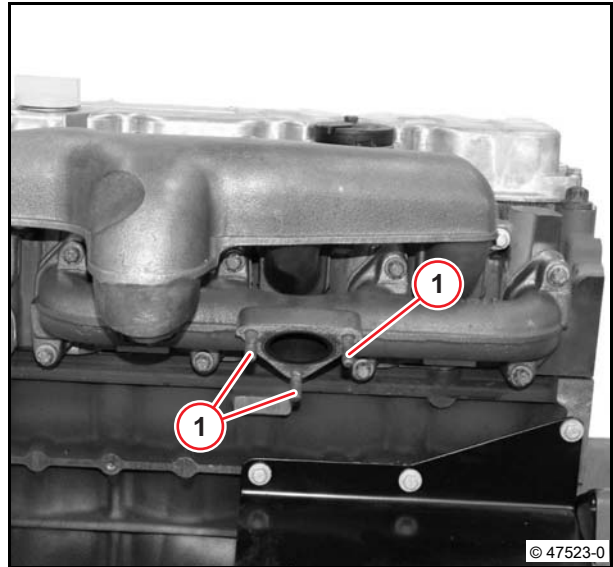
Installing the turbocharger

- Mount sealing ring (1).
- Tighten screw-in nipple (2).
- Insert new O-ring (3).

 40 Nm

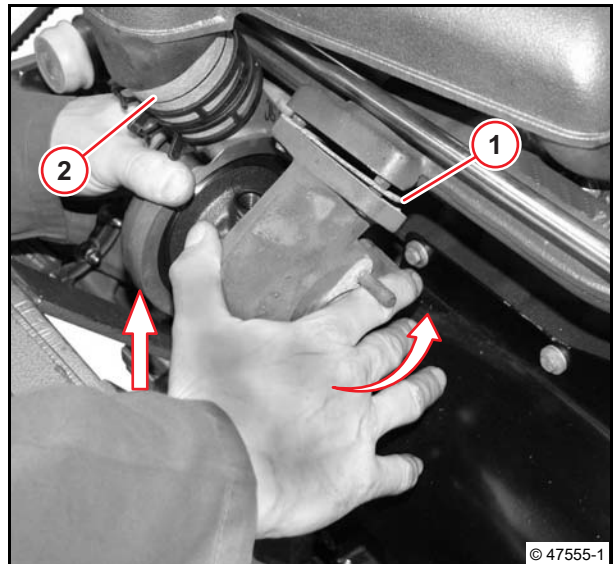


- Clean sealing surfaces.
- Coat pin bolts with mounting compound.
- Screw in studs (1).
- Tighten all pin bolts (1).

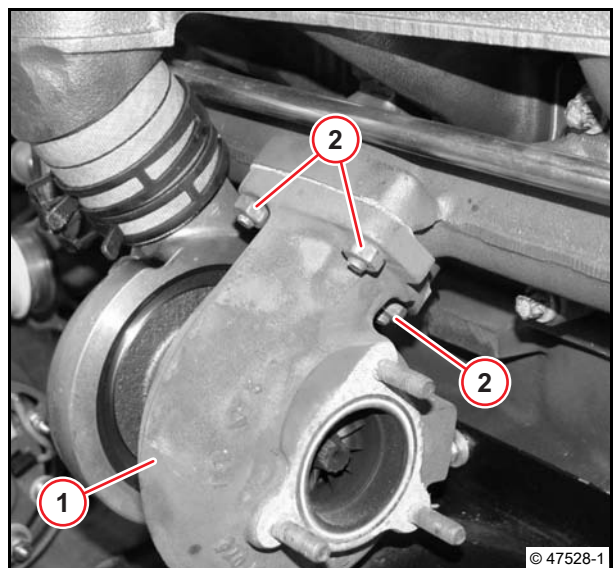
 12 Nm

6

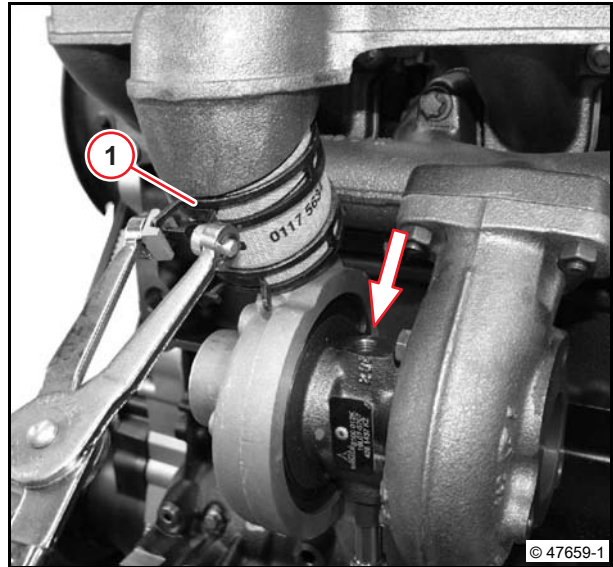
- Mount gasket (1).
- Plug in the tubing connection (2).
- Insert turbocharger in the direction of the arrow.



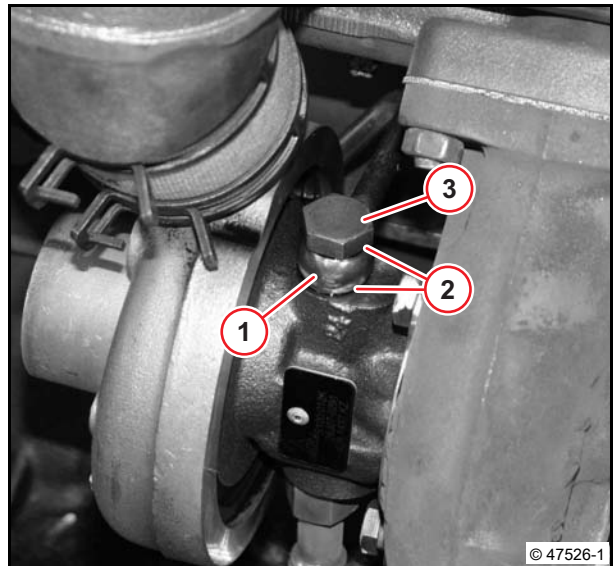
- Mount turbocharger (1).
- Turn on new nuts (2).
- Tighten nuts (2).

 21 Nm

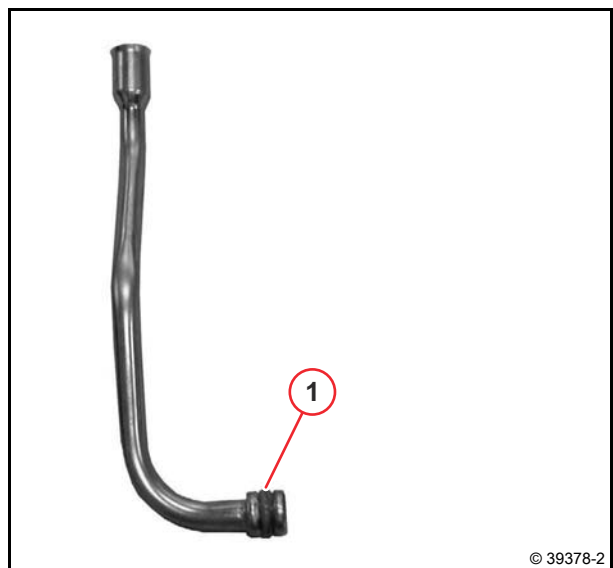
- Position the spring band clip (1) with the spring band pliers.
- Pull out stoppers.
- Fill in clean lubricating oil (arrow).



- Mount lubrication oil line (1).
- Mount sealing rings (2).
- Screw on hollow screw (3).



- Insert new O-ring (1).
- Lightly oil new O-ring (1).



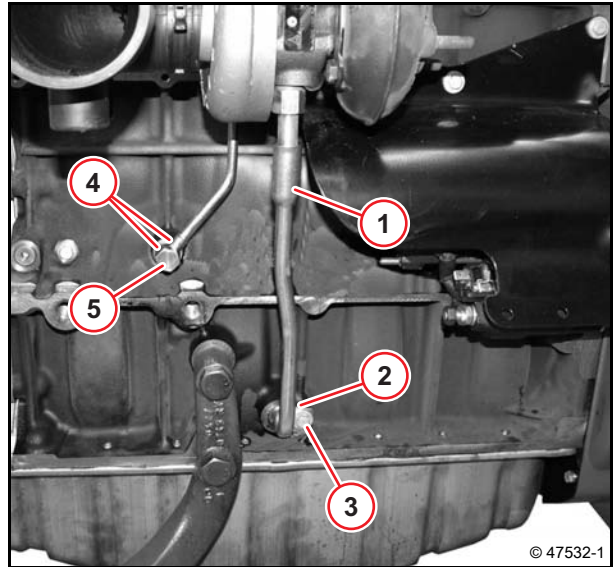
- Mount oil return pipe (1).
- Mount holder (2).
- Tighten screw (3).

 8.5 Nm



Attention!
Install tension-free.

- Mount new sealing rings (4).
- Tighten hollow screw (5).

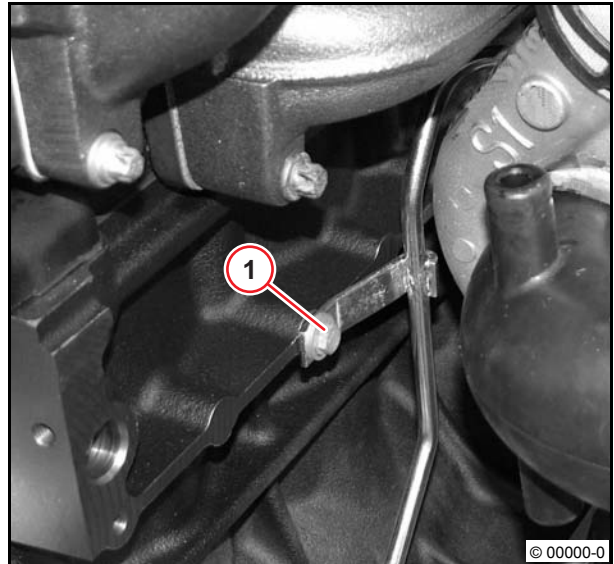


- Fasten screw (1).
- Tighten screw (1).

 8.5 Nm



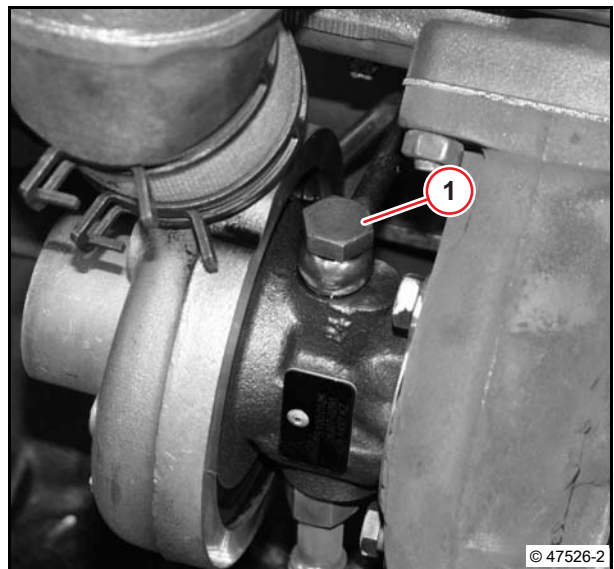
Attention!
Install tension-free.



 **Attention!**
Install tension-free.

- Tighten hollow screw (1).

 29 Nm

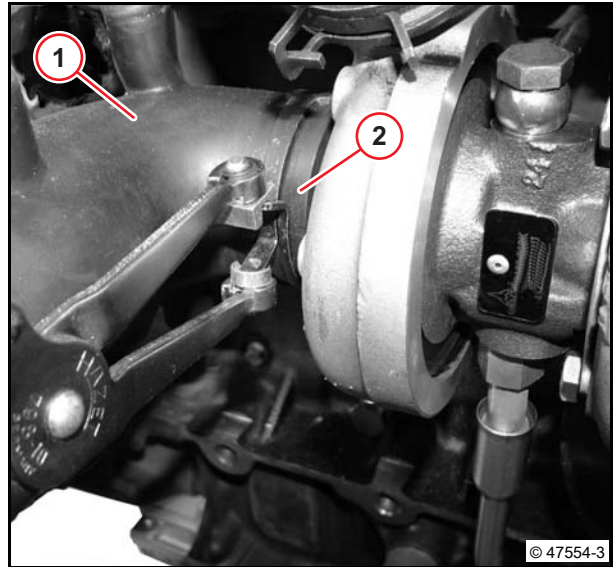


- Mount the reducer (1).

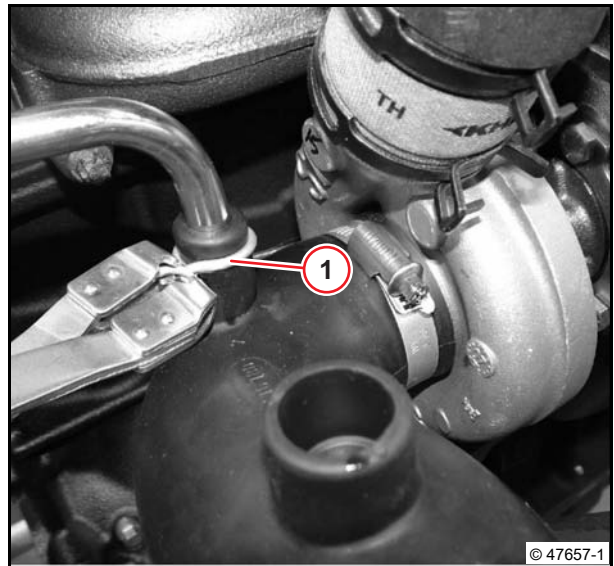


Attention!
Install tension-free.

- Position spring band clip (2) with spring band pliers.



- Position hose clip (1) with clamping tongs.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 004	Pin bolts on exhaust pipe	coated	Use new pin bolts	12 Nm
A06 020	Turbocharger on exhaust pipe	M8		21 Nm
A08 041	Lubricating oil pipe, holder on crankcase	M6x14-8.8		8.5 Nm
A08 042	Lubricating oil pipe on turbocharger / crankcase	Hollow screw	Replace sealing rings	29 Nm
A08 044	Oil return line, hex spuds to turbocharger	M16x1.5	Use new sealing ring	40 Nm
A08 049	Holder oil return line on crankcase	Torx, M6x14-8.8		8.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the intake manifold



Standard tools:
– Torx tool set

8189



– W 06-01-05
– W 06-01-05

Exhaust pipe
Exhaust damper

Removing the intake manifold

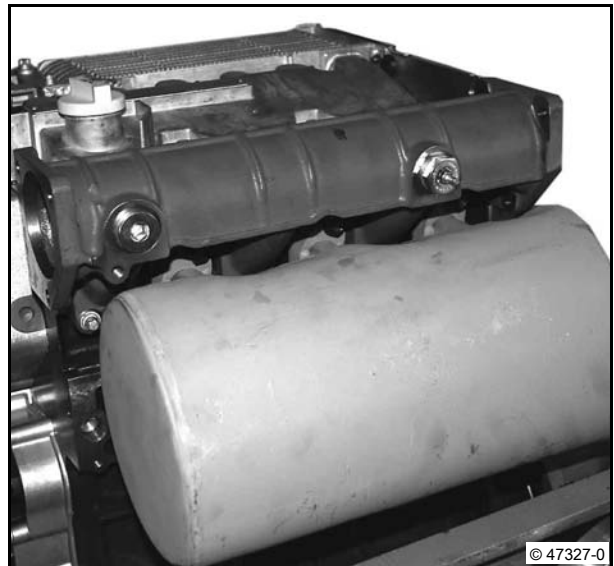
- Remove the exhaust pipe.

 W 06-01-05

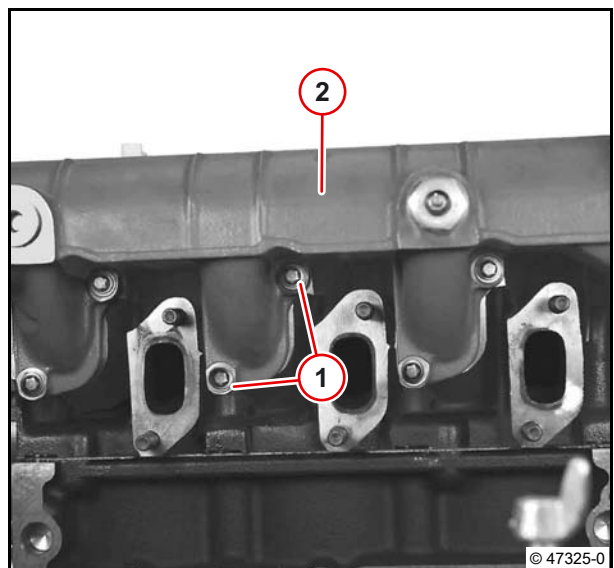
– or

- Remove exhaust damper.

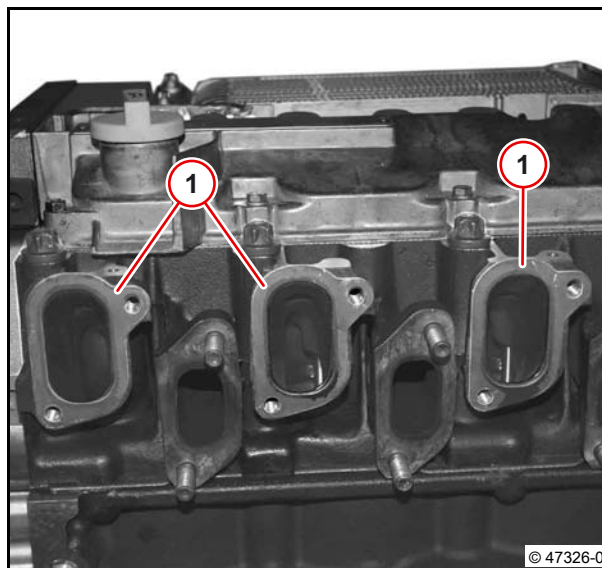
 W 06-01-05



- Unscrew all screws (1).
- Remove intake manifold (2).



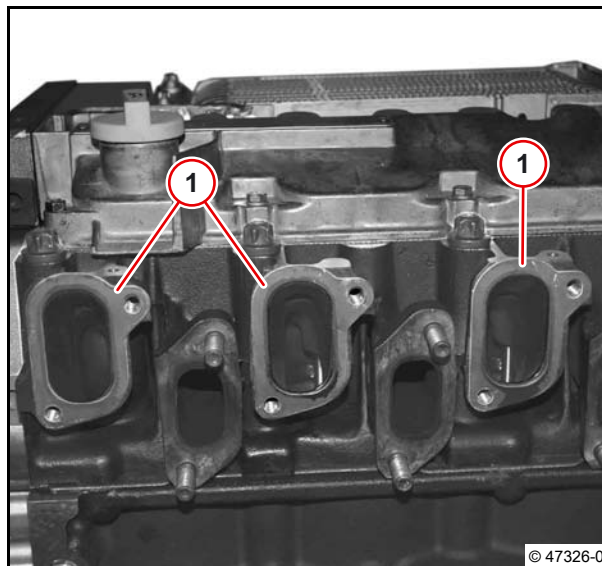
- Remove gaskets (1).
- Visually inspect the components.



6

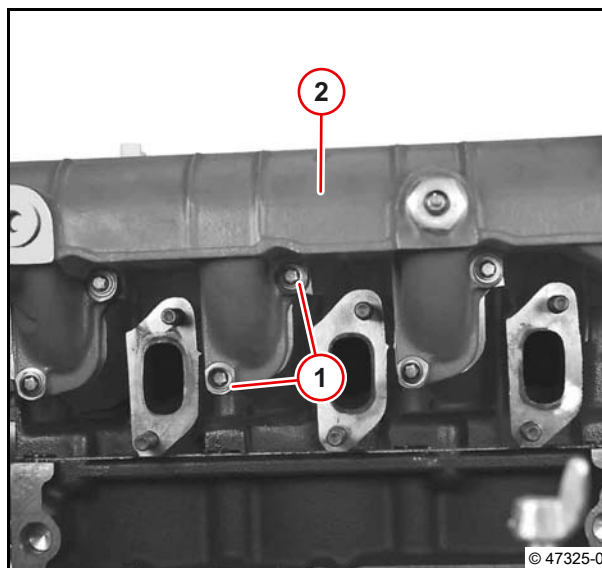
Installing the intake manifold

- Clean sealing surfaces.
- Mount new gaskets (1).



- Mount intake manifold (2).
- Turn in new screws (1).
- Tighten all screws (1).

 21 Nm



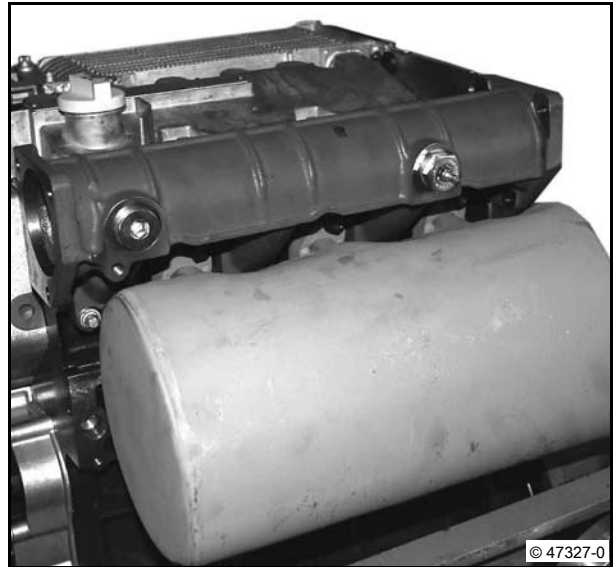
- Install the exhaust pipe.

 W 06-01-05

– or

- Install exhaust damper.

 W 06-01-05



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 030	Air suction intake pipe on cylinder head	Torx screw, coated	Use new screws.	21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the exhaust gas return valve

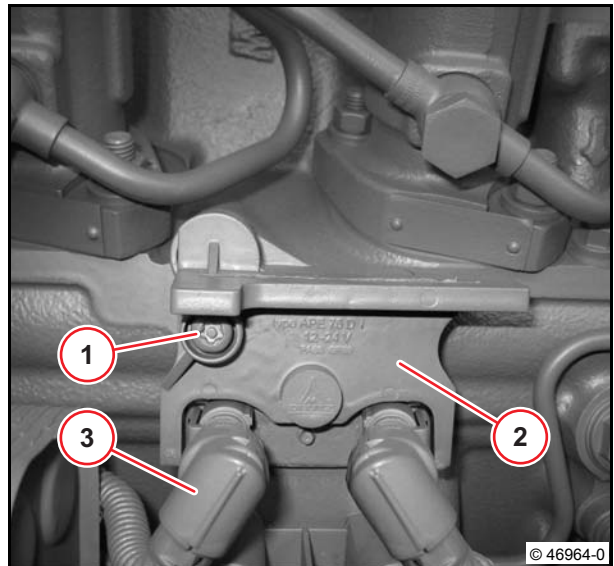


Standard tools:
– Special bit, 70 mm long 9120

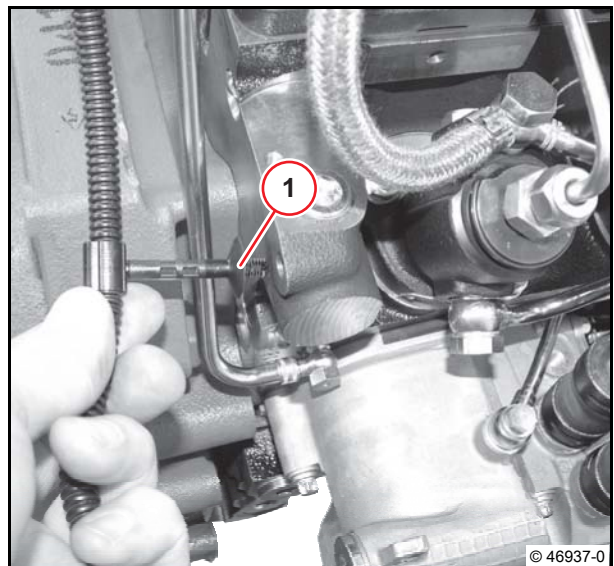
6

Removing the exhaust gas return valve

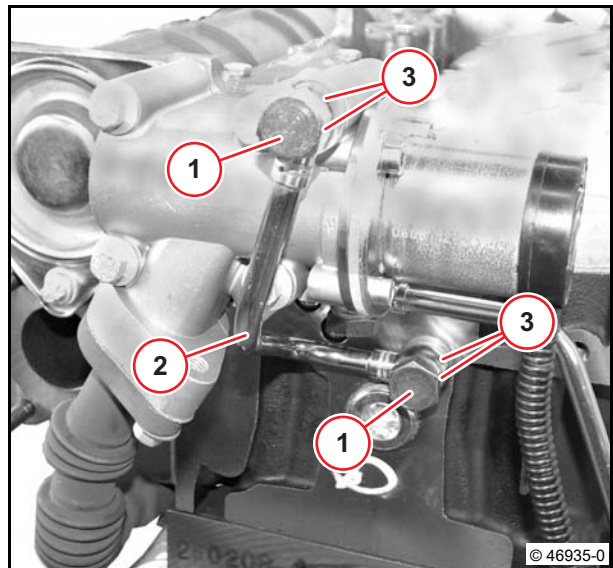
- Unscrew screw (1) with special bit.
- Remove safety cover (2).
- Unlock cable plug (3) and remove.



- Pull out pipe holder (1).

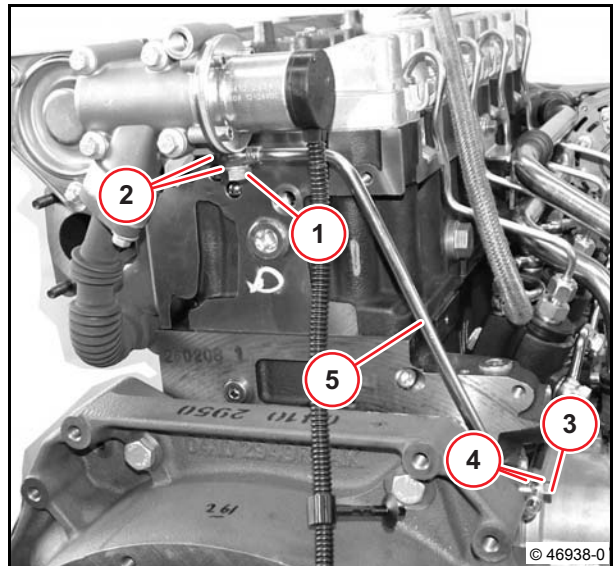


- Unscrew hollow screws (1).
- Remove pipe (2).
- Remove sealing rings (3).

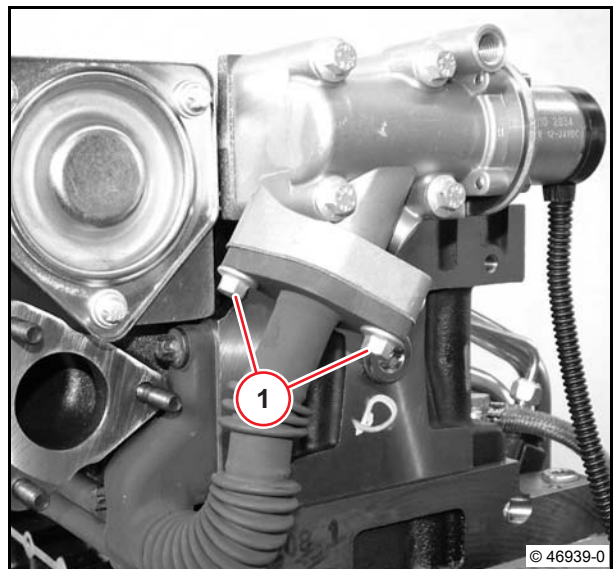


6

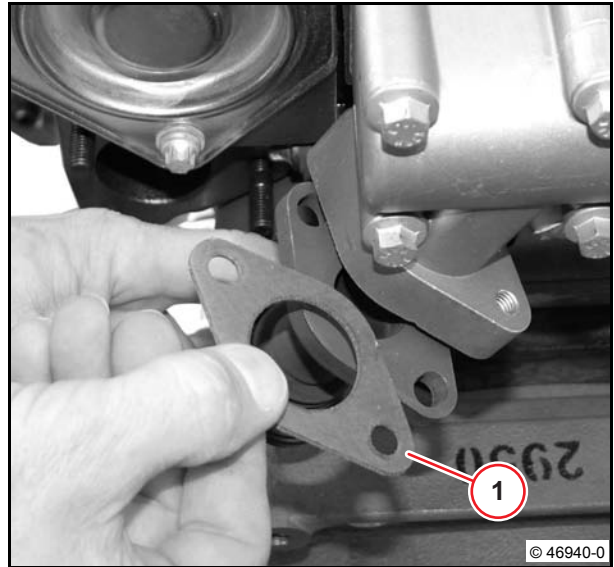
- Unscrew hollow screw (1).
- Remove sealing rings (2).
- Unscrew hollow screw (3).
- Remove sealing rings (4).
- Remove pipe (5).



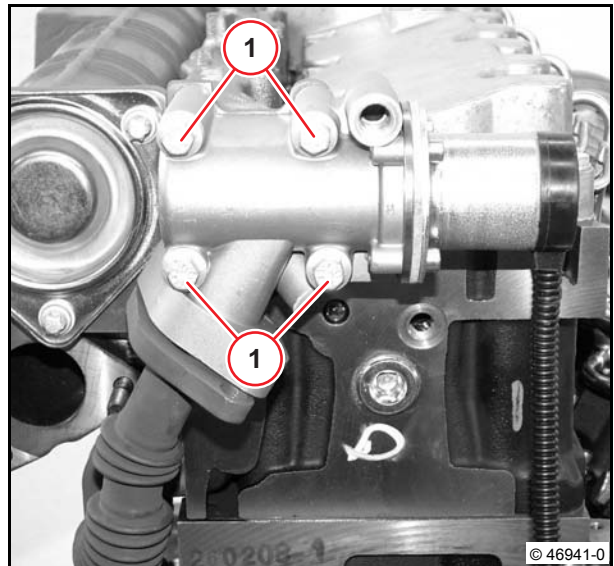
- Unscrew screws (1).



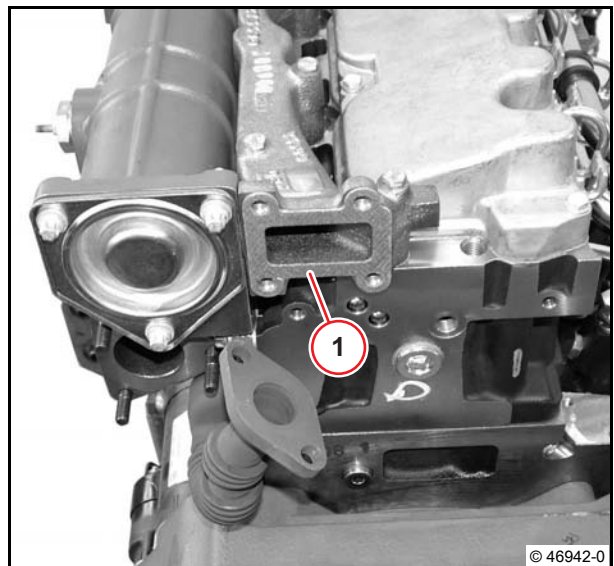
- Remove gasket (1).



- Unscrew screws (1).
- Remove the exhaust gas return valve.



- Remove gasket (1).



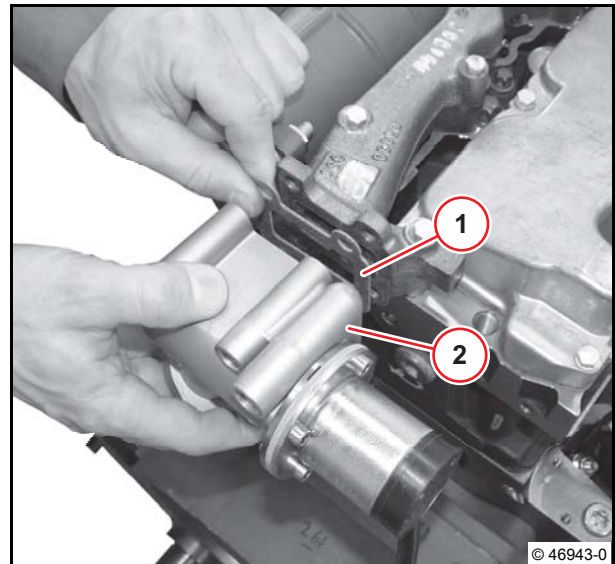
- Visually inspect the components.



6

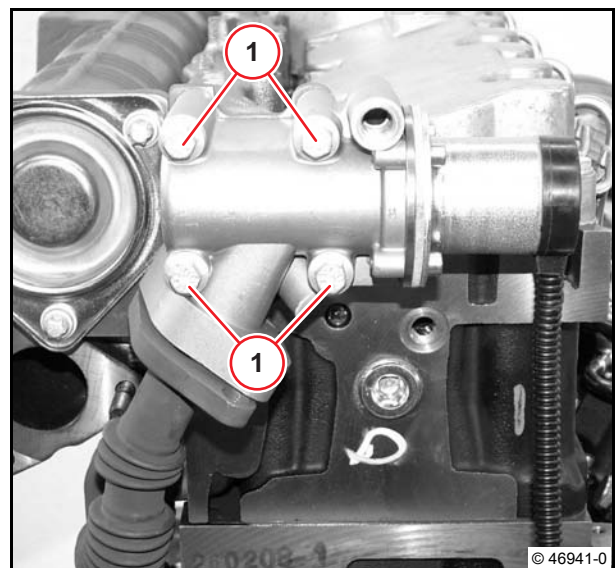
Installing the exhaust gas return valve

- Clean sealing surfaces.
- Mount gasket (1).
- Mount exhaust gas return valve (2).



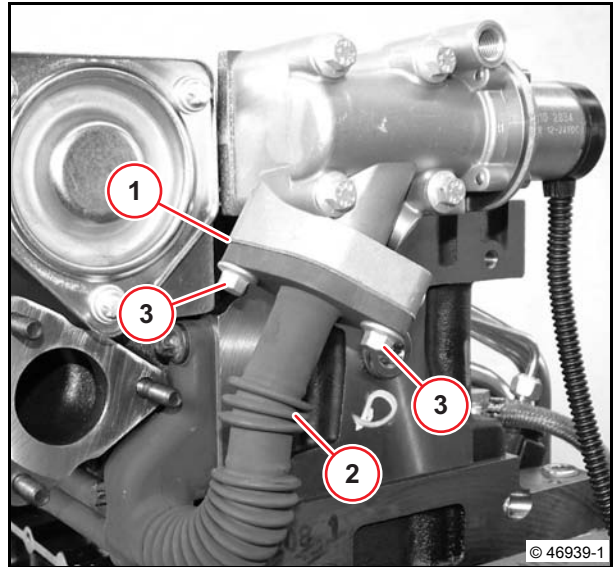
- Tighten screws (1).
- Tighten screws (1).

 20 Nm



- Clean sealing surfaces.
- Mount gasket (1).
- Mount exhaust gas collection pipe (2).
- Fasten screws (3).
- Tighten screws (3).

 20 Nm

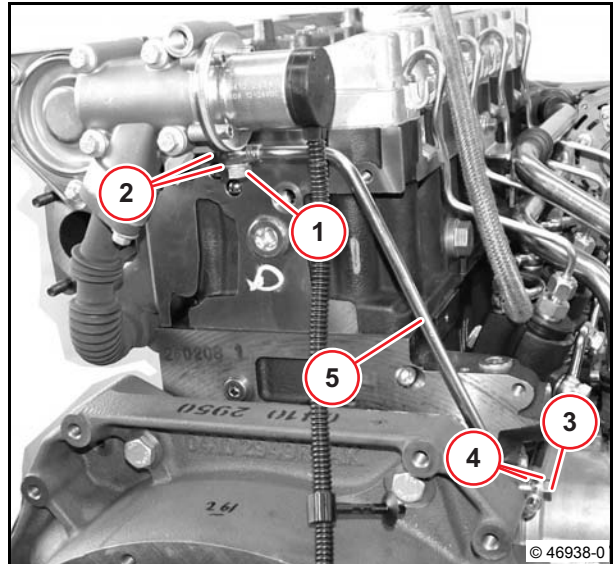


- Insert pipe (5).
- Mount new sealing rings (4).
- Screw on hollow screw (3).
- Mount sealing rings (2).
- Screw on hollow screw (1).
- Tighten hollow screw (1).

 29 Nm

- Tighten hollow screw (3).

 12 Nm

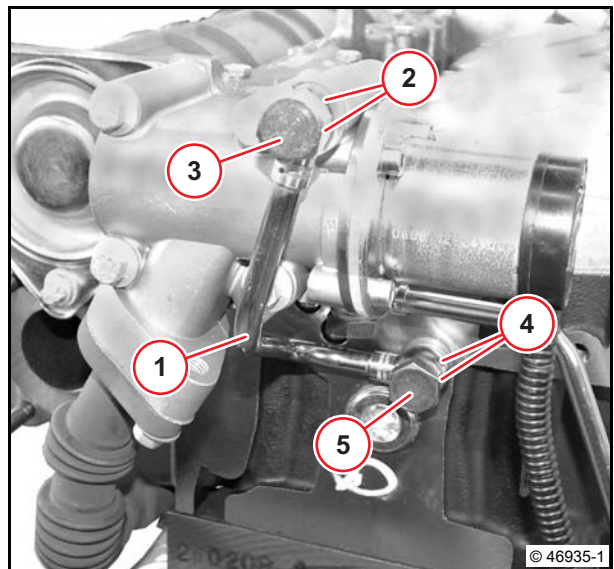


- Insert pipe (1).
- Mount sealing rings (2).
- Screw on hollow screw (3).
- Mount new sealing rings (4).
- Turn in hollow screw (5).
- Tighten hollow screw (3).

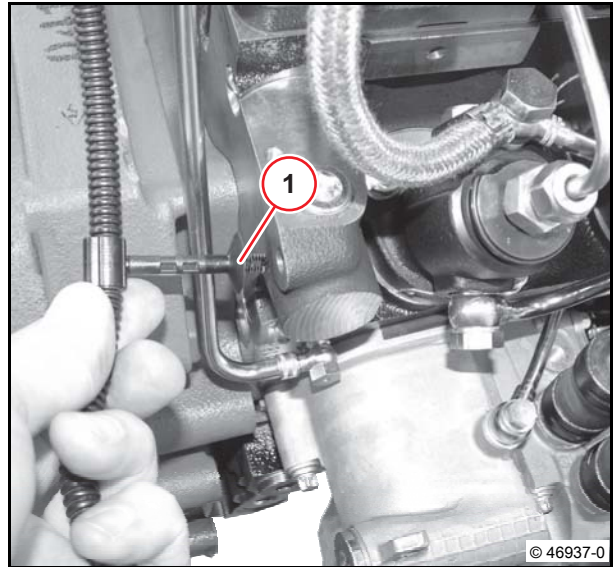
 29 Nm

- Tighten hollow screw (5).

 29 Nm



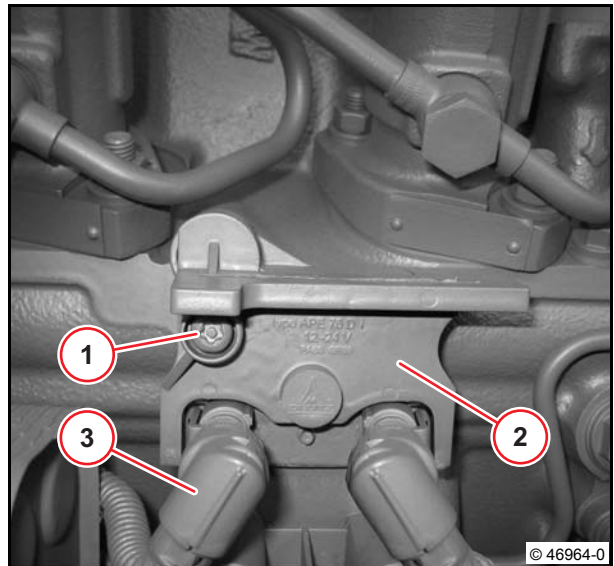
- Press in pipe holder (1).



6

- Plug in the cable plug (3).
- Mount the safety cover (2).
- Fasten screw (1).
- Tighten screw (1) with special bit.

 8 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 057	Pipe to exhaust gas return valve/ cylinder head (cooling - intake)	Hollow screw M12x1.5		29 Nm
A06 062	Exhaust return pipe to exhaust return valve	M8x65-10.9		20 Nm
A06 063	Exhaust gas collection pipe to exhaust gas return valve			20 Nm
A06 071	Pipe to crankcase (exhaust gas return - cooling - return)	Hollow screw M8x1		12 Nm
A06 072	Pipe to exhaust gas return valve (exhaust gas return - cooling - return)	Hollow screw M12x1.5		29 Nm
A06 074	Exhaust gas return pipe to cylinder head (exhaust gas return)			8.5 Nm
A06 075	Safety cover on sensor housing (exhaust gas return)	Locking screw Torx-Plus 30IPR		8 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



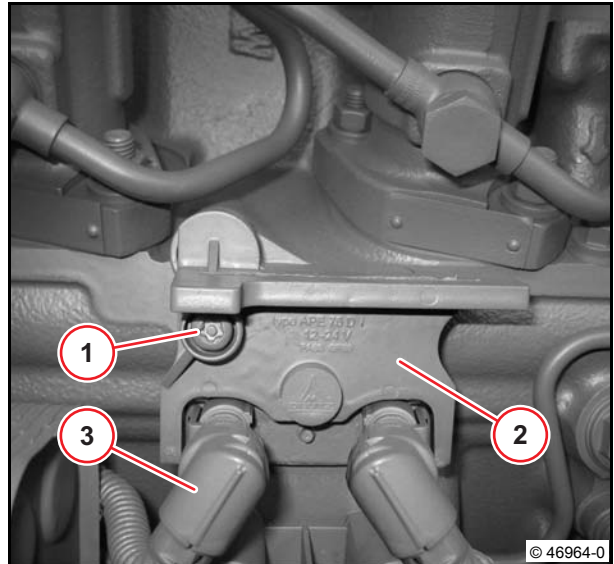
Removing and installing the exhaust gas return pipe



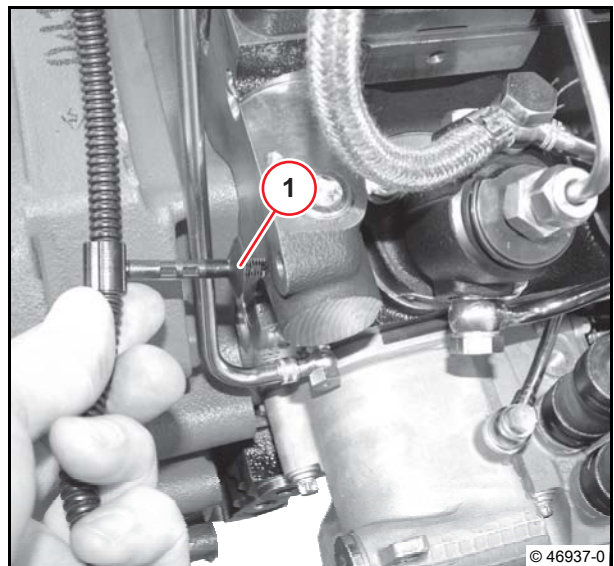
Standard tools:
– Special bit, 70 mm long 9120

Removing the exhaust gas return pipe

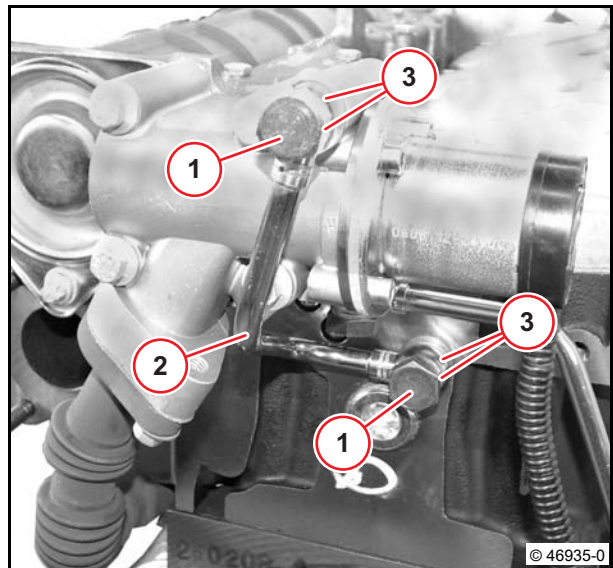
- Unscrew screw (1).
- Remove safety cover (2).
- Unlock cable plug (3) and remove.



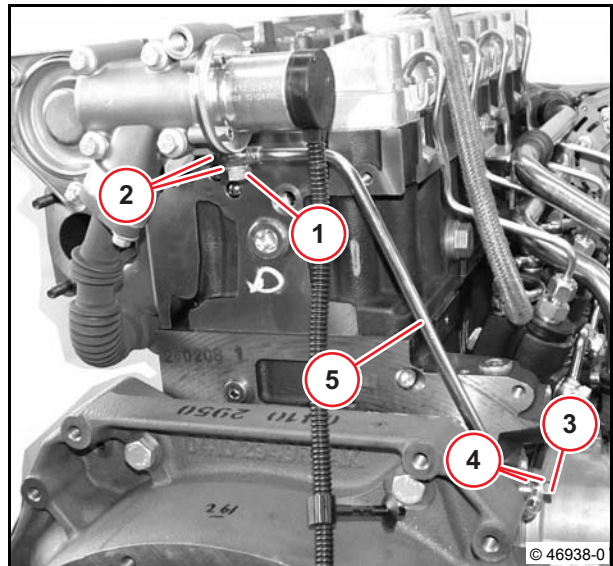
- Pull out pipe holder (1).



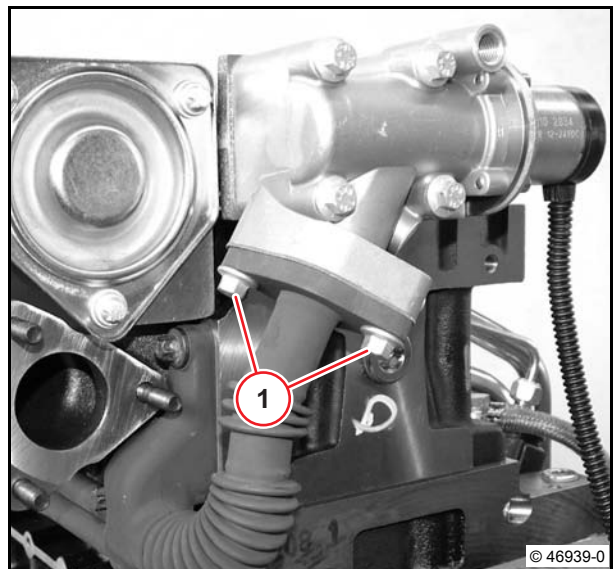
- Unscrew hollow screws (1).
- Remove pipe (2).
- Remove sealing rings (3).



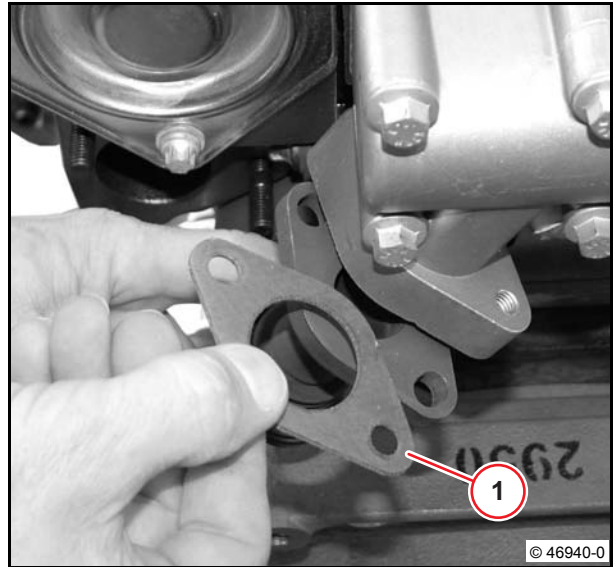
- Unscrew hollow screw (1).
- Remove sealing rings (2).
- Unscrew hollow screw (3).
- Remove sealing rings (4).
- Remove pipe (5).



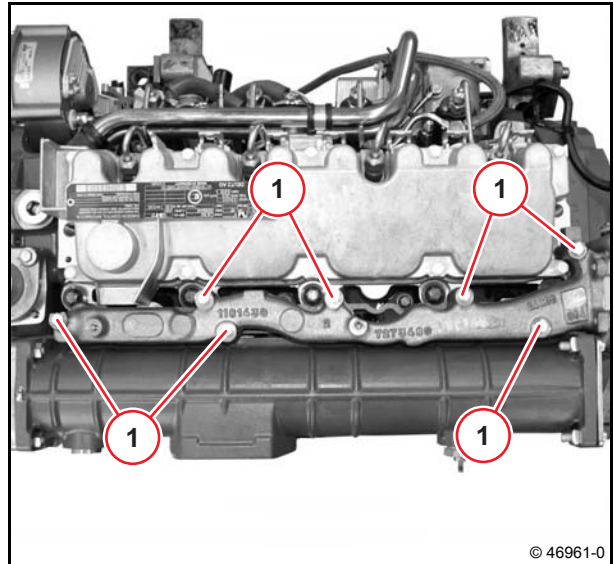
- Unscrew screws (1).



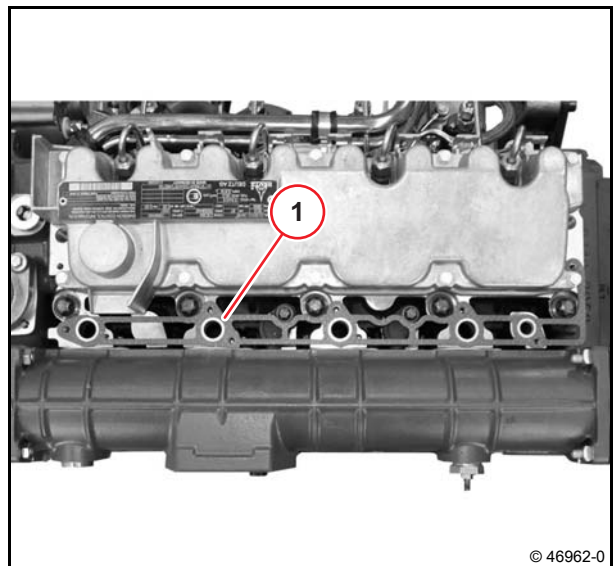
- Remove gasket (1).



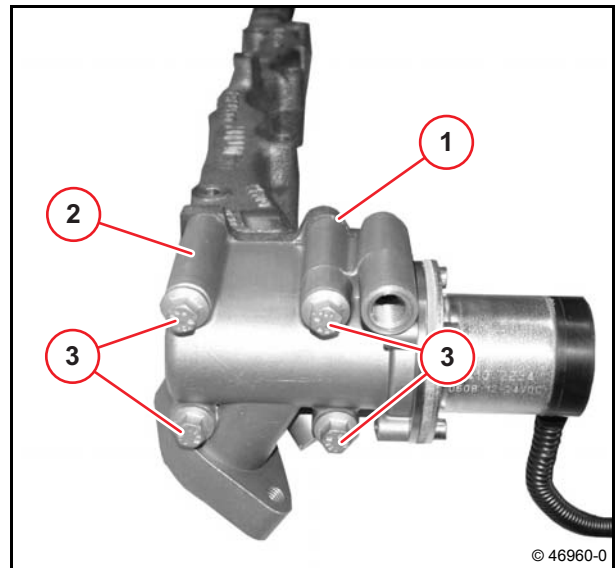
- Unscrew screws (1).
- Remove the exhaust return pipe.



- Remove gasket (1).

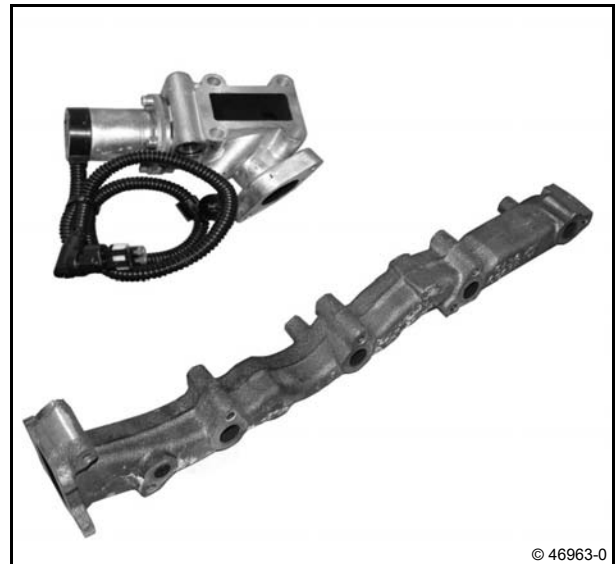


- Unscrew screws (3).
- Remove exhaust gas return valve (2).
- Remove gasket (1).



6

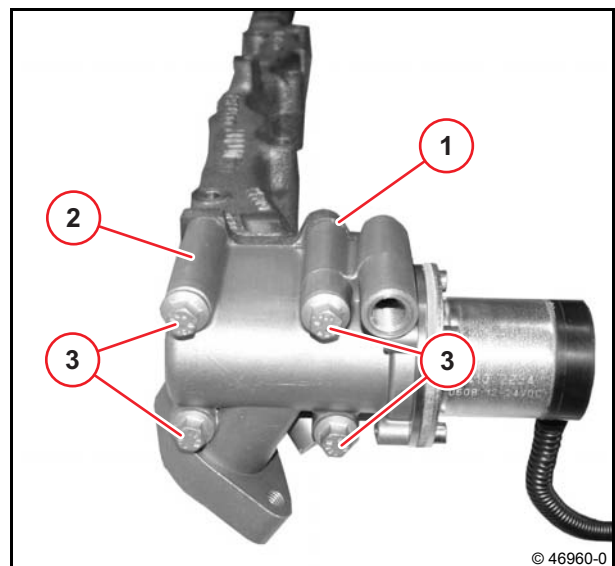
- Visually inspect the components.



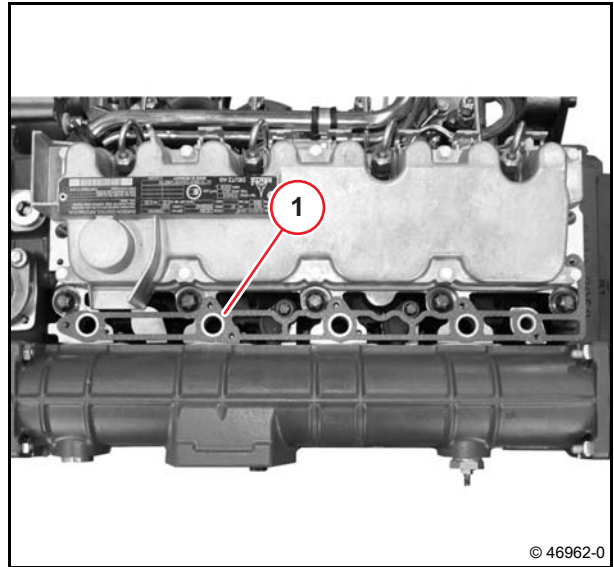
Installing the exhaust gas return pipe

- Clean all sealing surfaces.
- Mount gasket (1).
- Mount exhaust gas return valve (2).
- Fasten screws (3).
- Tighten screws (3).

 20 Nm

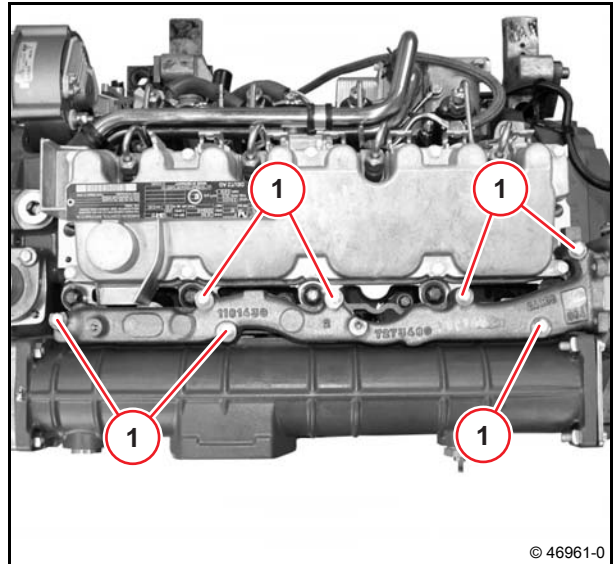


- Clean all sealing surfaces.
- Mount gasket (1).



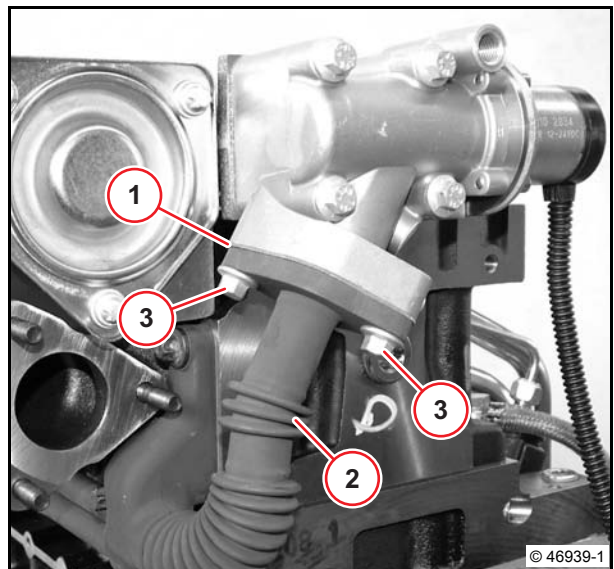
- Install the exhaust gas return pipe.
- Tighten screws (1).
- Tighten screws (1).

 8.5 Nm



- Clean sealing surfaces.
- Mount gasket (1).
- Mount exhaust gas collection pipe (2).
- Fasten screws (3).
- Tighten screws (3).

 20 Nm

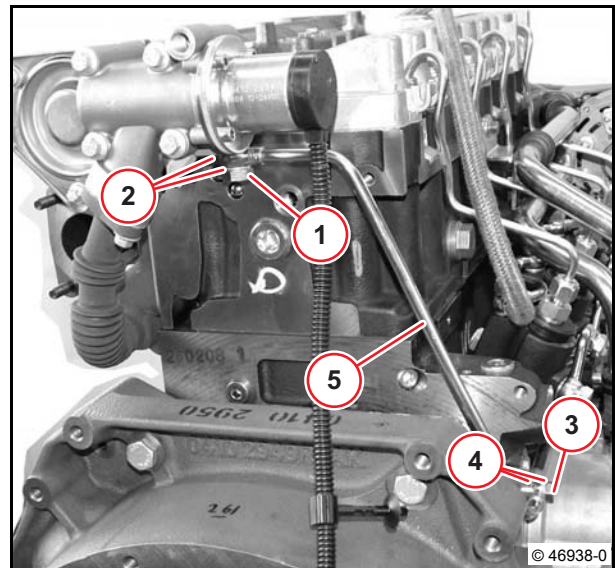


- Insert pipe (5).
- Mount new sealing rings (4).
- Screw on hollow screw (3).
- Mount sealing rings (2).
- Screw on hollow screw (1).
- Tighten hollow screw (1).

29 Nm

- Tighten hollow screw (3).

12 Nm

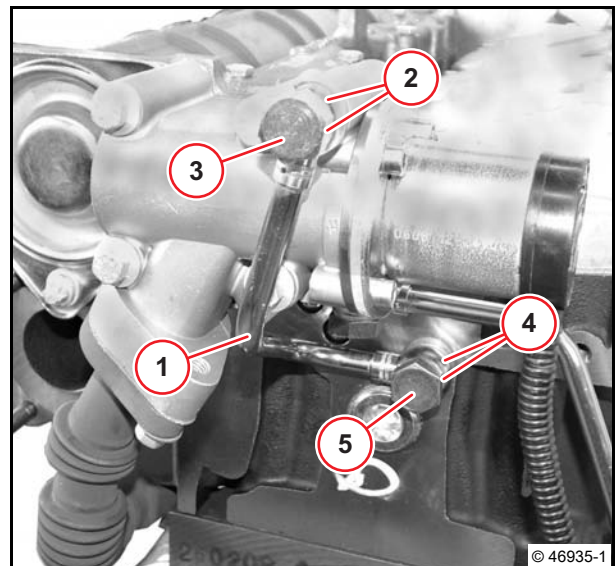


- Insert pipe (1).
- Mount sealing rings (2).
- Screw on hollow screw (3).
- Mount new sealing rings (4).
- Turn in hollow screw (5).
- Tighten hollow screw (3).

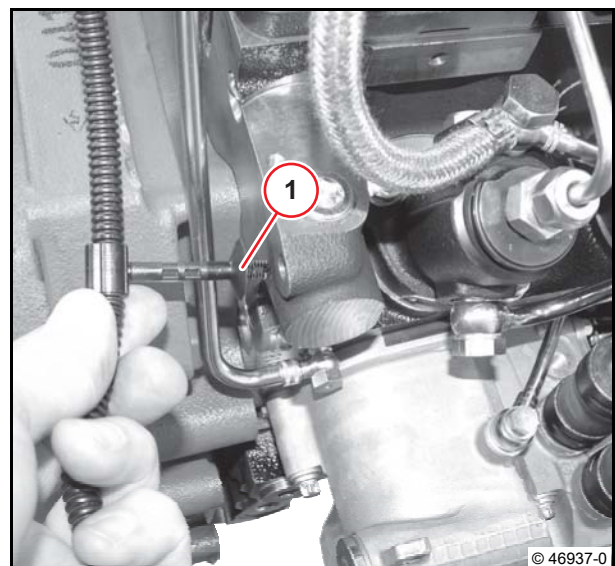
29 Nm

- Tighten hollow screw (5).


29 Nm

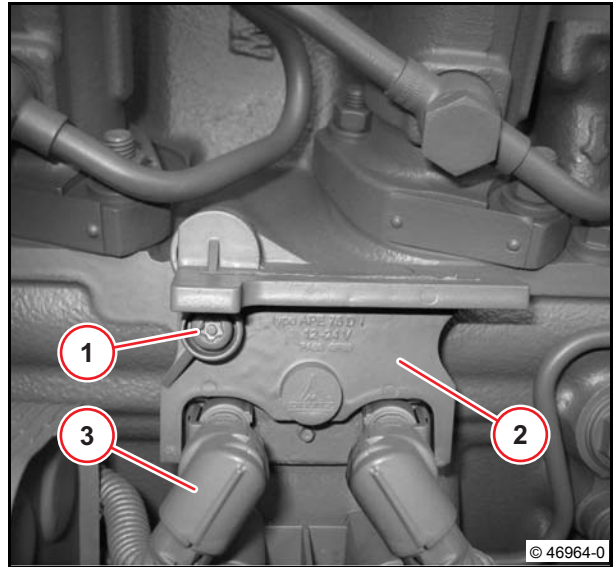


- Press in pipe holder (1).



- Plug in the cable plug (3).
- Mount the safety cover (2).
- Fasten screw (1).
- Tighten screw (1).

 8 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 057	Pipe to exhaust gas return valve/ cylinder head (cooling - intake)	Hollow screw M12x1.5		29 Nm
A06 062	Exhaust return pipe to exhaust return valve	M8x65-10.9		20 Nm
A06 063	Exhaust gas collection pipe to exhaust gas return valve			20 Nm
A06 071	Pipe to crankcase (exhaust gas return - cooling - return)	Hollow screw M8x1		12 Nm
A06 072	Pipe to exhaust gas return valve (exhaust gas return - cooling - return)	Hollow screw M12x1.5		29 Nm
A06 074	Exhaust gas return pipe to cylinder head (exhaust gas return)			8.5 Nm
A06 075	Safety cover on sensor housing (exhaust gas return)	Locking screw Torx-Plus 30IPR		8 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the exhaust gas collection pipe (Exhaust gas recirculation)



Standard tools:
– Cleaning brush

8167



– W 06-01-05
– W 06-09-07

Remove exhaust gas collection pipe

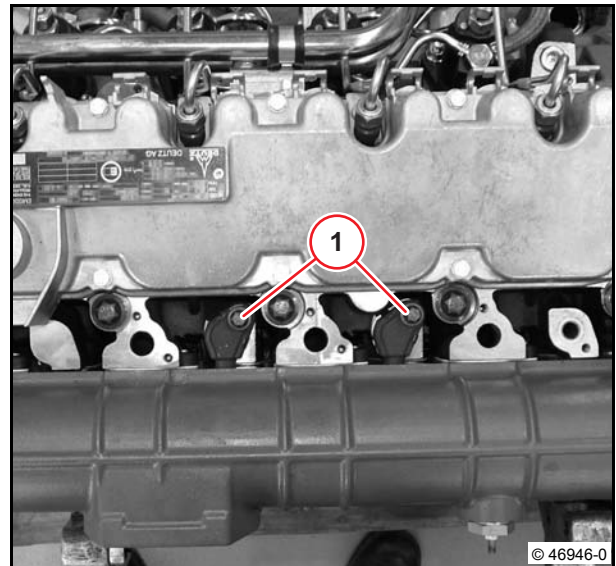
- Remove the exhaust pipe.

W 06-01-05

- Remove the exhaust return pipe.

W 06-09-07

- Unscrew screws (1).



- Unscrew screws (1).

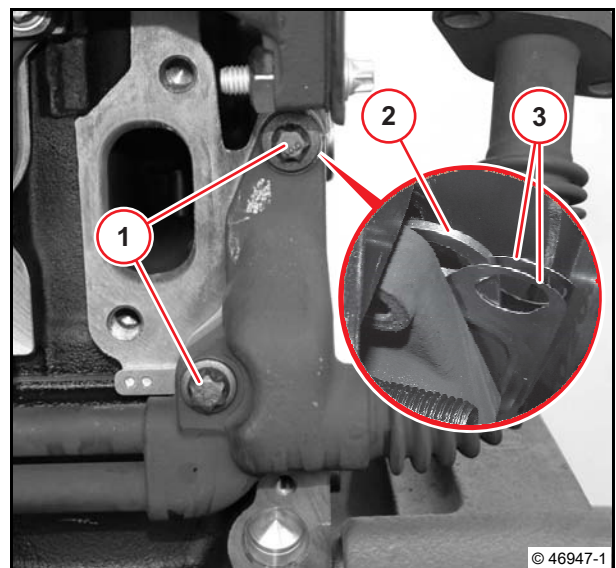


Note different screw lengths.

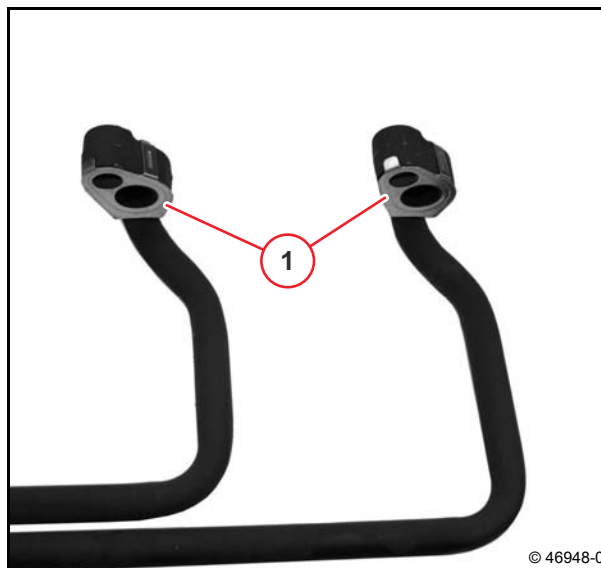
- Remove throttle (2).
- Remove gaskets (3).



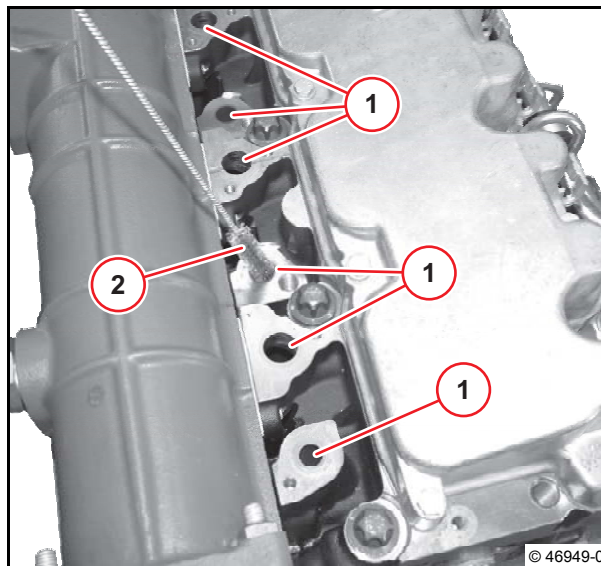
Note installation position.



- Remove gaskets (1).

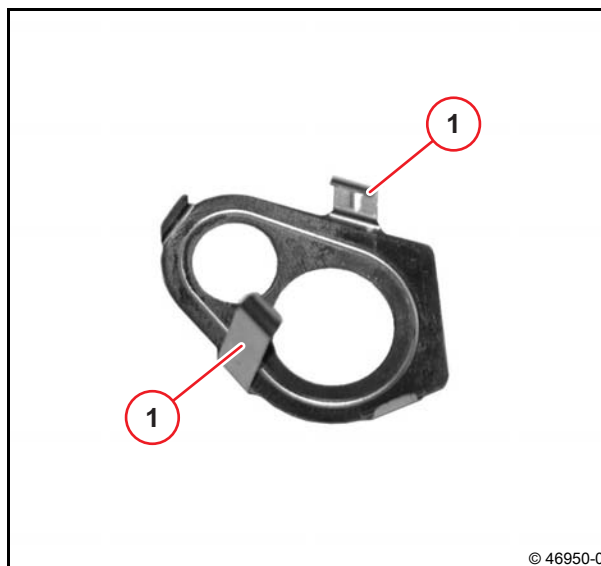


- Clean exhaust channels (1) with cleaning brush (2).
- Clean all sealing surfaces.



Install exhaust gas collection pipe

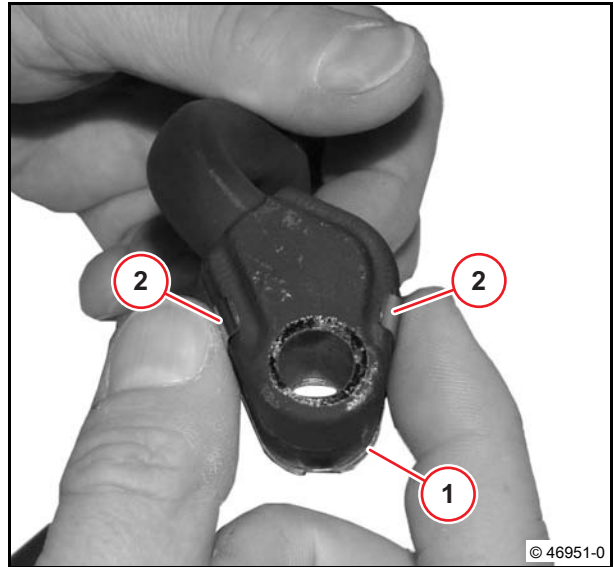
- Check that mounting lugs (1) are sufficiently pre-tensioned.



- Mount gasket (1).



Make sure that the installation site of the mounting lugs (2) is in perfect condition.



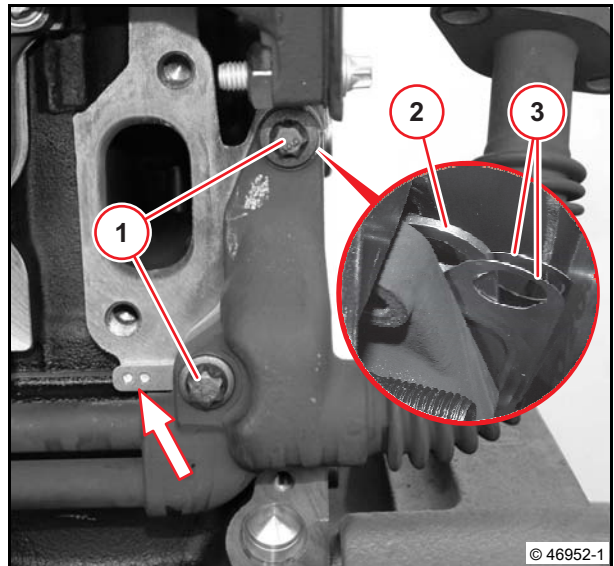
- Mount new gaskets (3).
- Mount new throttle (2).



Note installation position.

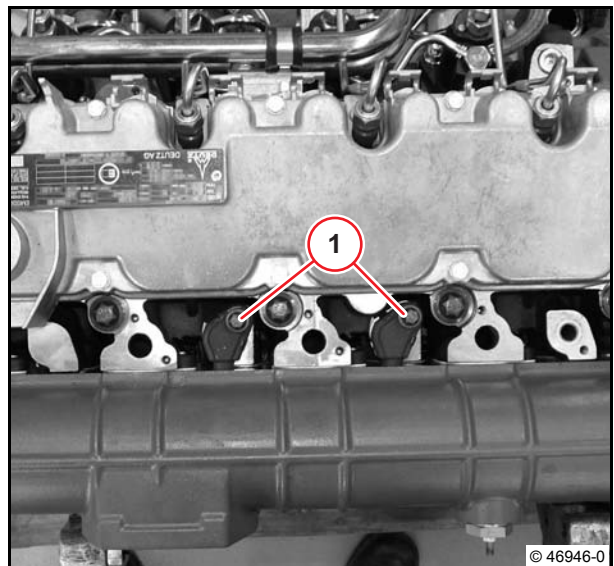
The marking (arrow) on the throttle is dependent on the engine version.

- Insert exhaust gas collection pipe.
- Turn in new screws (1).



- Turn in new screws (1).
- Tighten new screws (1).

 55 Nm



- Tighten new screws (1).

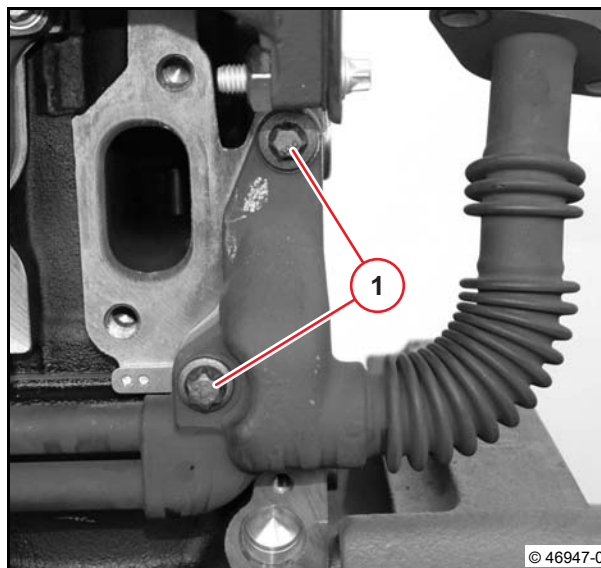
 55 Nm

- Install the exhaust gas return pipe.

 W 06-09-07

- Install the exhaust pipe.

 W 06-01-05



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 073	Exhaust gas collection pipe (exhaust gas return) on cylinder head	Torx M10x25-10.9 Torx M10x30-10.9 Torx M10x45-10.9	Use new screws.	55 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the sensor (Exhaust gas recirculation)



Standard tools

Special tools:

- Special bit, 70 mm long 9120

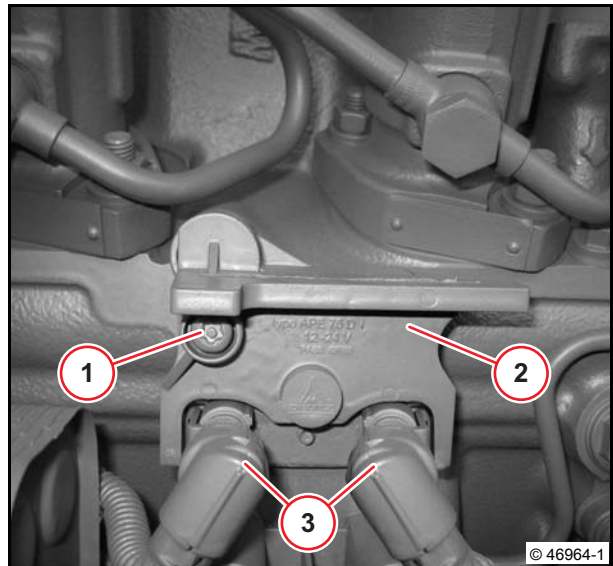


Attention!

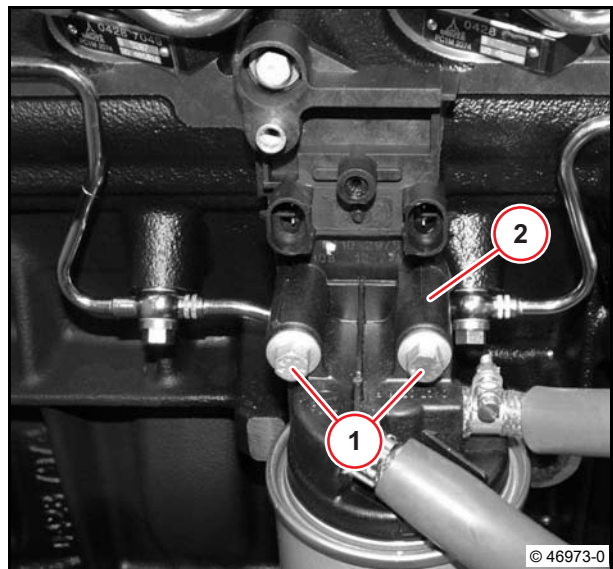
If the sensor (exhaust gas return) is exchanged/adjusted, the engine must be set on the engine test bench.

Remove sensor

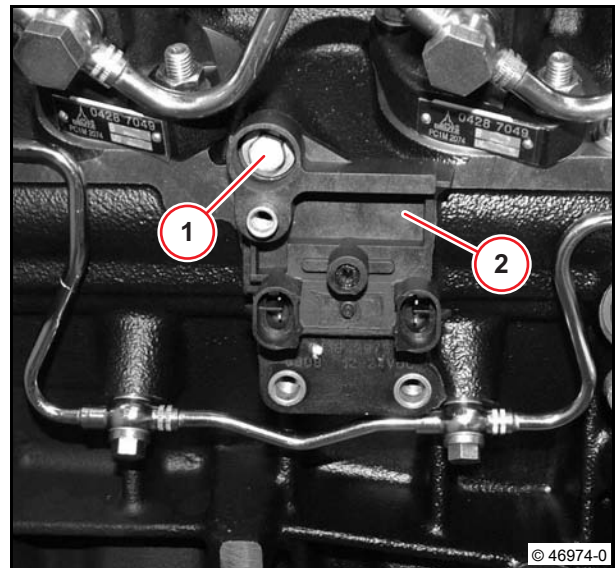
- Disconnect the battery.
- Unscrew screw (1) with special bit.
- Remove safety cover (2).
- Unlock cable plug (3) and remove.



- Unscrew screws (1).
- Swing fuel filter console (2) to the side.

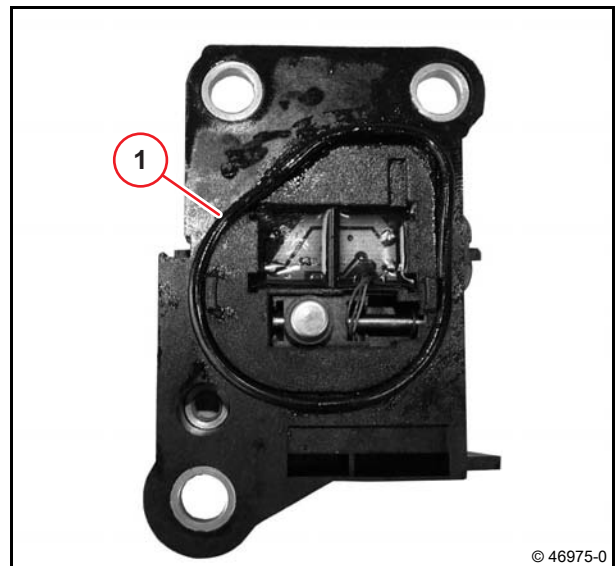


- Unscrew screw (1).
- Remove sensor (2).
- Clean sealing surfaces.



6

- Remove sealing ring (1).
- Visually inspect the components.

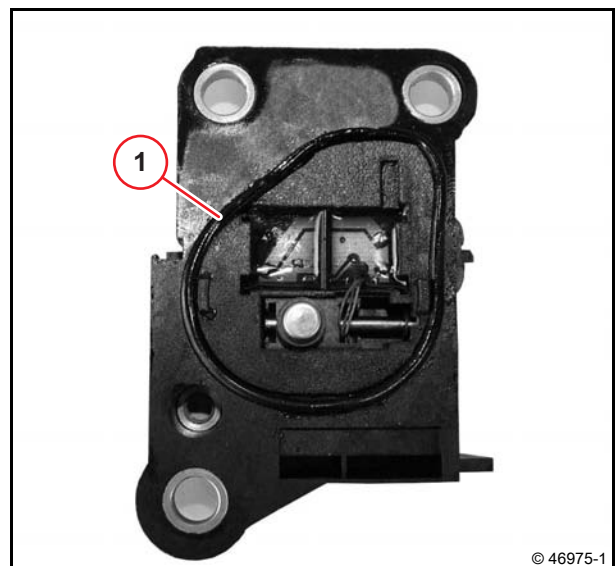


Install sensor

- Insert new sealing ring (1).



Ensure that the installation location of the sealing ring is free from faults.

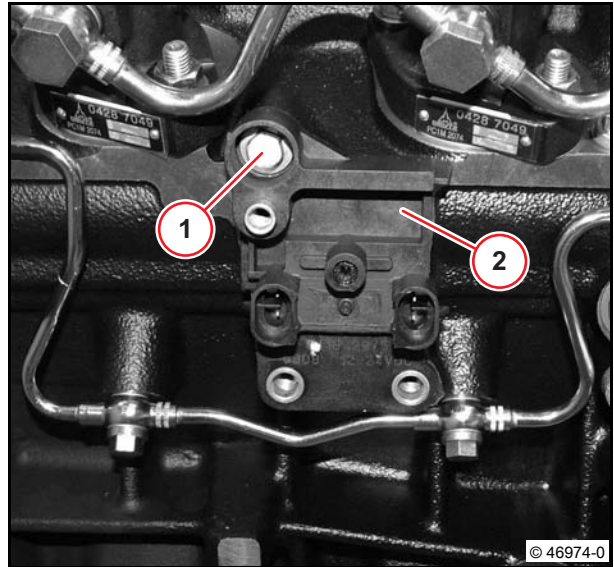


- Mount sensor (2).



Ensure that the installation location is free from faults.

- Fasten screw (1).

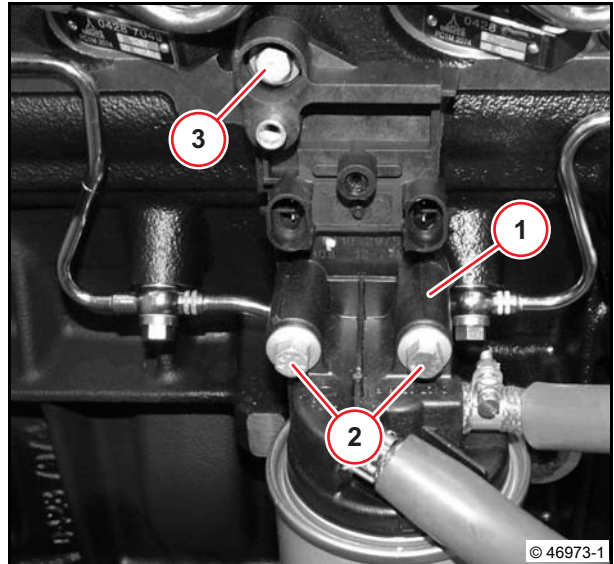


- Mount fuel filter console (1).
- Tighten screws (2).
- Tighten screws (2).

 21 Nm

- Tighten screw (3).

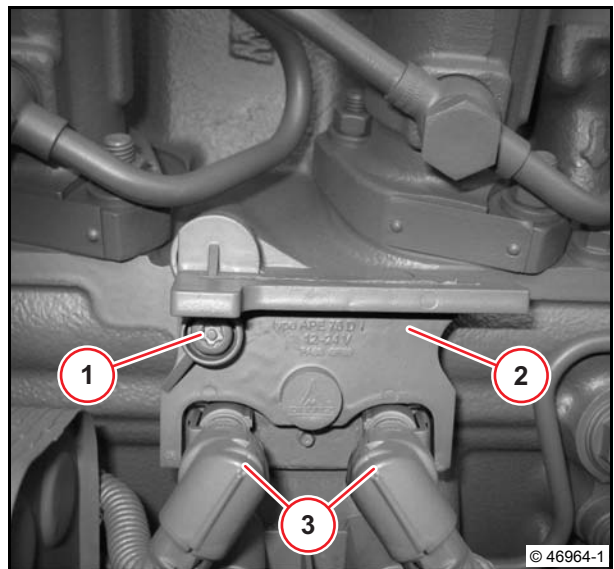
 21 Nm



- Plug in the cable plug (3).
- Mount the safety cover (2).
- Fasten screw (1).
- Tighten screw (1) with special bit.

 8 Nm

- Connect the battery.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 075	Safety cover on sensor housing (exhaust gas return)	Locking screw Torx-Plus 30IPR		8 Nm
A06 076	Sensor exhaust gas return on crankcase			21 Nm
A07 087	Fuel filter console to crankcase			21 Nm

6



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the magnet clip (Exhaust gas recirculation)



Standard tools

- W 06-09-09
- W 07-04-01

Remove magnet clip

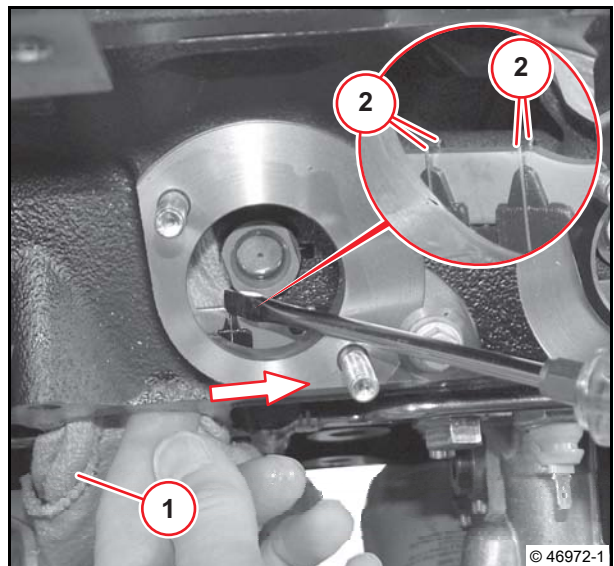
- Disconnect the battery.
- Remove sensor of exhaust gas return.

 W 06-09-09

- Remove fuel injector 3rd cylinder.

 W 07-04-01

- Insert clean rags (1) under the control linkage.
- Move the control linkage in the direction of the arrow.
- Hold on to the control linkage.
- Bend the retaining tab (2).

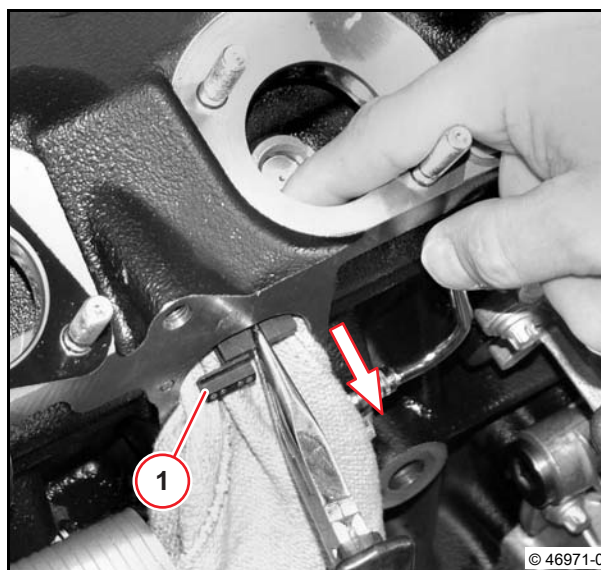


- Hold on to the control linkage.
- Pull off magnet clip (1) in the direction of the arrow.



Attention!

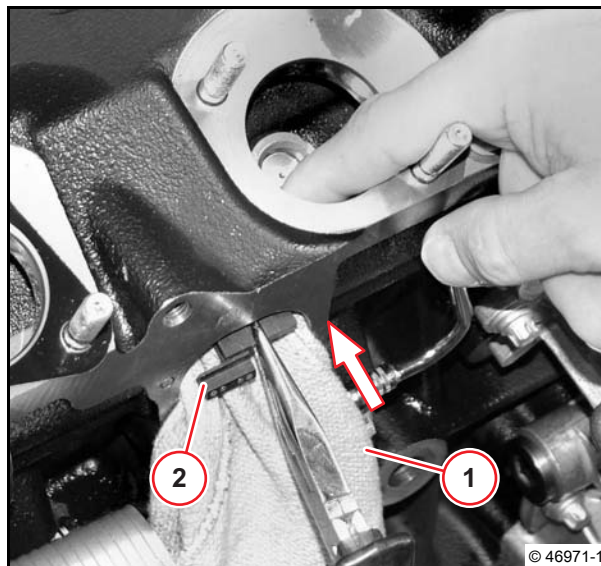
Make sure no parts fall into the crankcase!
Pay attention to utmost cleanliness.



6

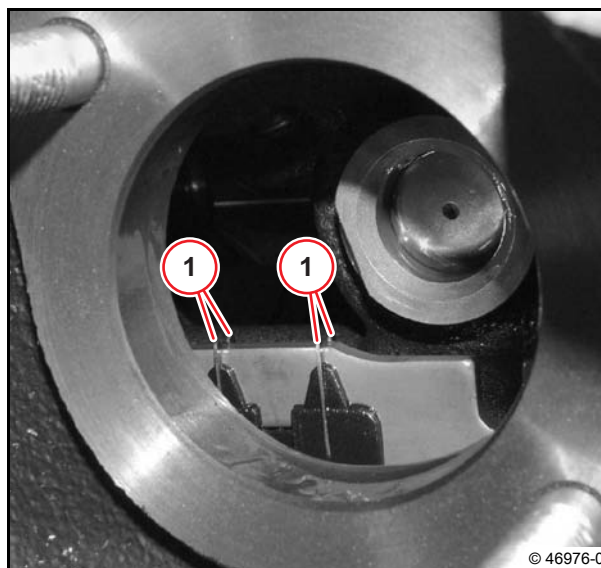
Install magnet clip



- Insert clean rags (1) under the control linkage.
- Position control linkage.
- Hold on to the control linkage.
- Push new magnet clip (2) onto the control linkage.

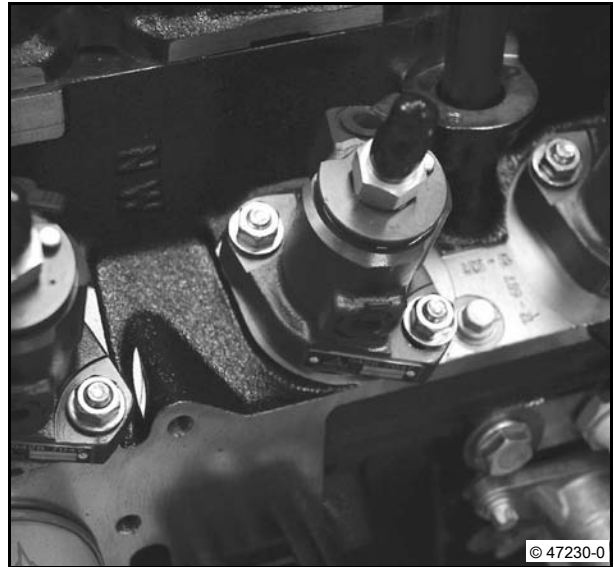


Attention!

The magnet clip must sit tightly in the recess of the control linkage.
Retaining tab (1) must snap in.
Ensure that the installation location is free from faults.



- Install fuel injector 3rd cylinder.
 [W 07-04-01](#)
- Install sensor of exhaust gas return.
 [W 06-09-09](#)
- Connect the battery.





Removing and installing the lifting magnet (Start amount release)



Standard tools:

– Plier insert

8027

Special tools:

– Disassembly tool

110901

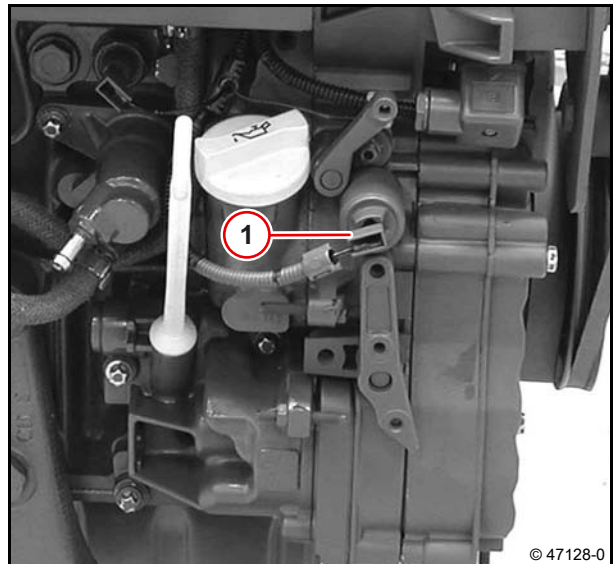


Collect leaking operating substances in suitable vessels and dispose of according to regulations.

6

Remove lifting magnet

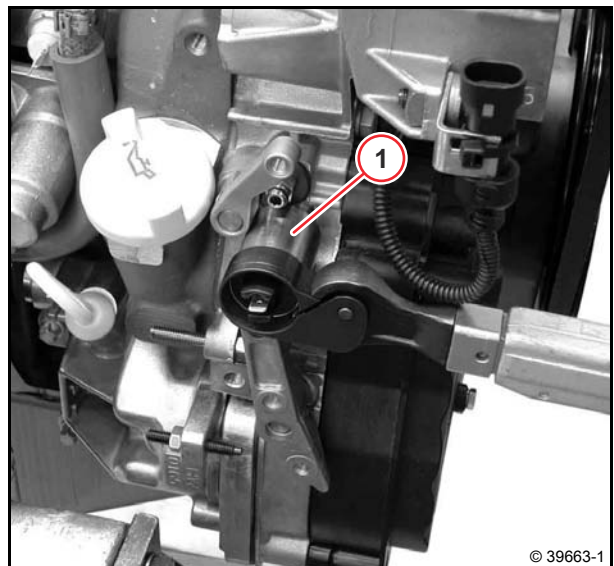
- Pull out cable plug (1).



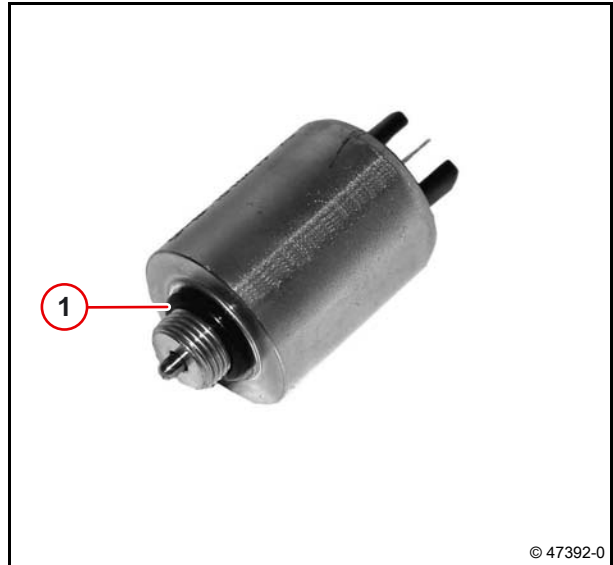
- Unscrew lifting magnet (1) with plier insert.



Note direction of terminal.



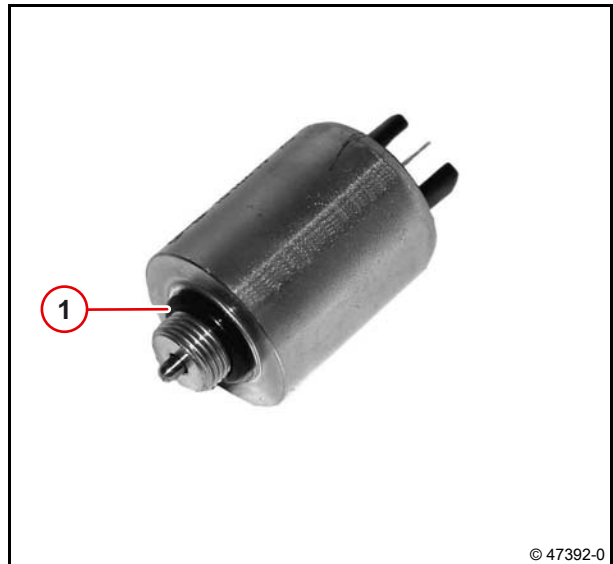
- Remove the O-ring (1) with the disassembly tool.
- Visually inspect the components.



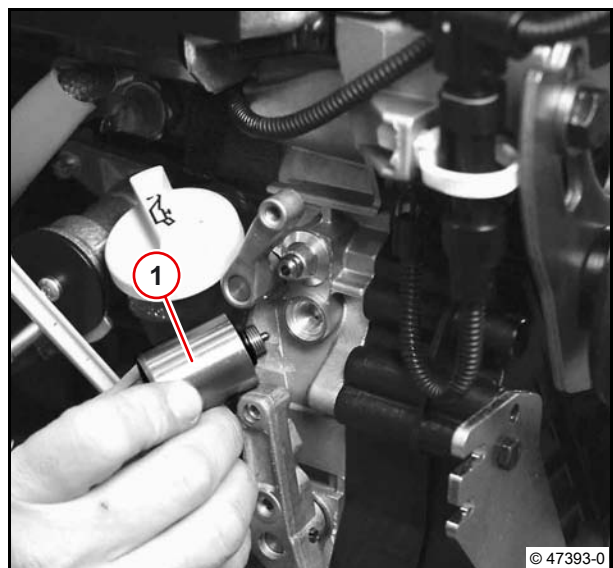
6

Install lifting magnet

- Insert new O-ring (1).



- Clean all sealing surfaces.
- Insert lifting magnet (1).

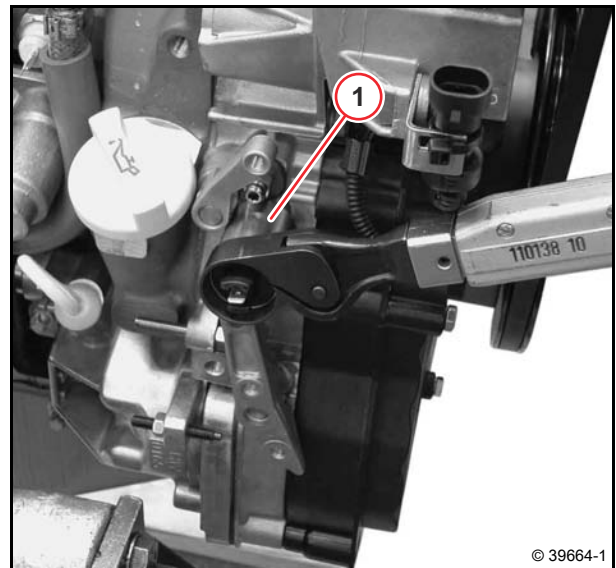


- Tighten lifting magnet (1) with plier insert.

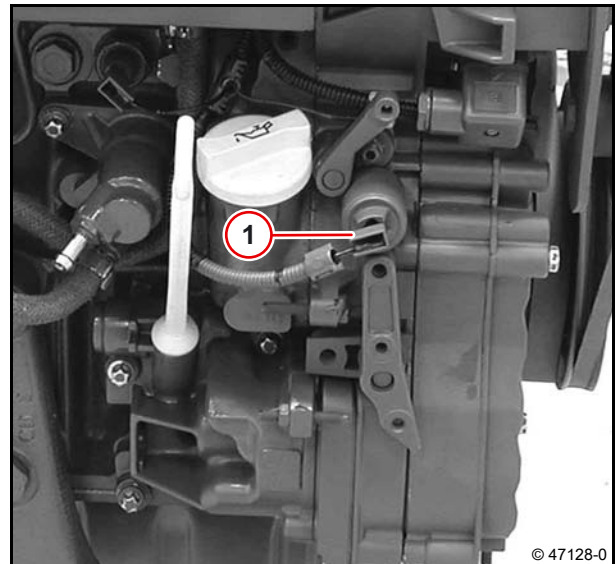
 10 Nm



Note direction of terminal.



- Plug in the cable plug (1).



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A05 065	Lifting magnet (start amount release) on front cover			10 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Renewing the injection lines



Standard tools:

– Dog wrench

8018

Special tools:

– Plugs/caps

170160



– [W 08-08-02](#)



Danger!

Wait 30 seconds after switching off the engine before working on the fuel system.



Attention!

Pay attention to utmost cleanliness when working on the fuel system.

Remove residue paint and particles of dirt before removing.

Clean the respective affected parts carefully. Blow damp areas dry with compressed air.

Observe the safety regulations and national specifications for handling fuels.

Close all connections immediately after opening with new, clean plugs/caps.

Do not remove plugs/caps until immediately before assembling.

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

Injection pipes may not be bent.

After all work on the fuel system, it must be bled - see the operation manual, chapter "6 Fuel system".

Removing injection pipes

– D 2011 i

- Remove the lubricating oil cooler.



[W 08-08-02](#)

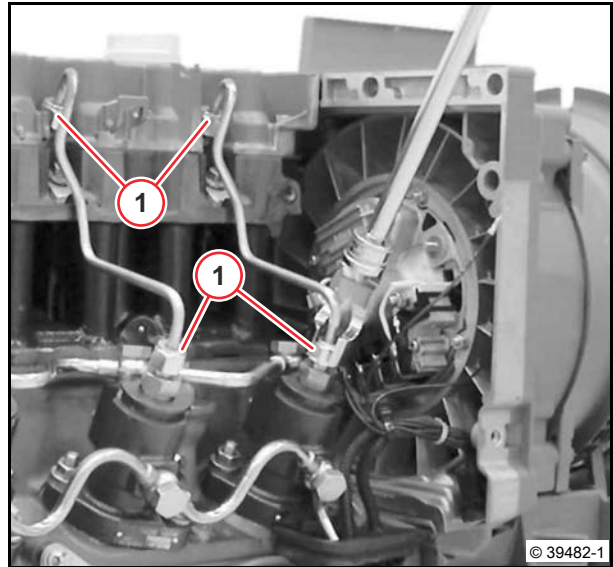


- Unscrew lock nuts (1) with dog wrench.
- Remove injection line.



Lay out components in the order in which they should be installed.

Note assignment!



- Visually inspect the components.



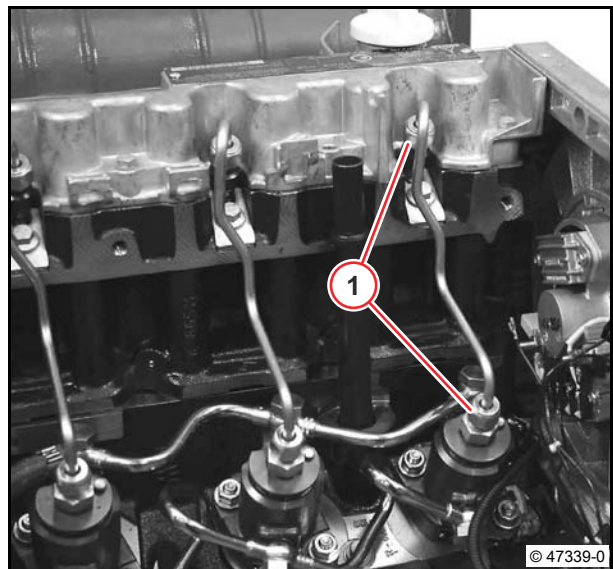
Installing injection pipes

- Mount new injection pipe.
- Screw on union nuts (1).



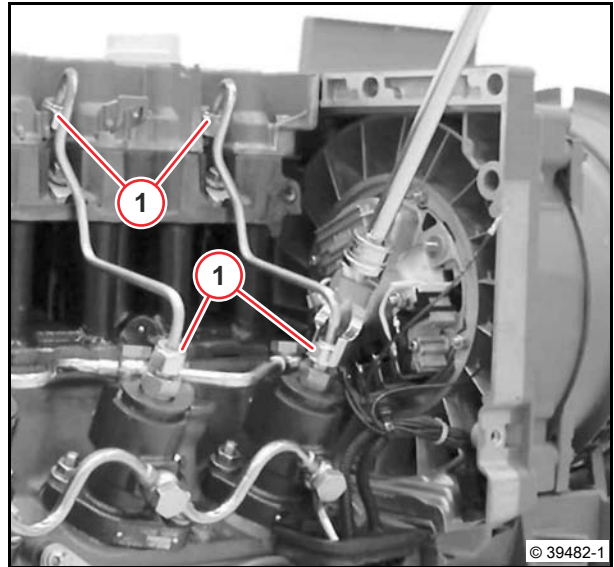
Attention!

Install injection line without tension.
Note installation position.



- Tighten union nuts (1) with claw spanner.

 25 Nm



6

– D 2011 i

- Install the lubricating oil cooler.

 W 08-08-02



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A07 003	Injection line on fuel injector / injection pump	M12x1.5		25 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the fuel injector pump



Standard tools

Special tools:

- Adjustable bolt 100710
- Rig pin 101100
- Test template 103040
- Special pliers 103220
- Disassembly tool 110901
- Plugs/caps 170160



- Fitting compound
DEUTZ AP1908



- W 07-03-01
- W 07-06-03
- W 07-06-01
- W 07-10-06
- W 11-00-03
- W 12-01-04



Danger!

Wait 30 seconds after switching off the engine before working on the fuel system.



Attention!

Pay attention to utmost cleanliness when working on the fuel system. Remove residue paint and particles of dirt before removing.

Clean the respective affected parts carefully. Blow damp areas dry with compressed air.

Observe the safety regulations and national specifications for handling fuels.

Close all connections immediately after opening with new, clean plugs/caps.

Do not remove plugs/caps until immediately before assembling.

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

After all work on the fuel system, it must be bled - see the operation manual, chapter "6 Fuel system".

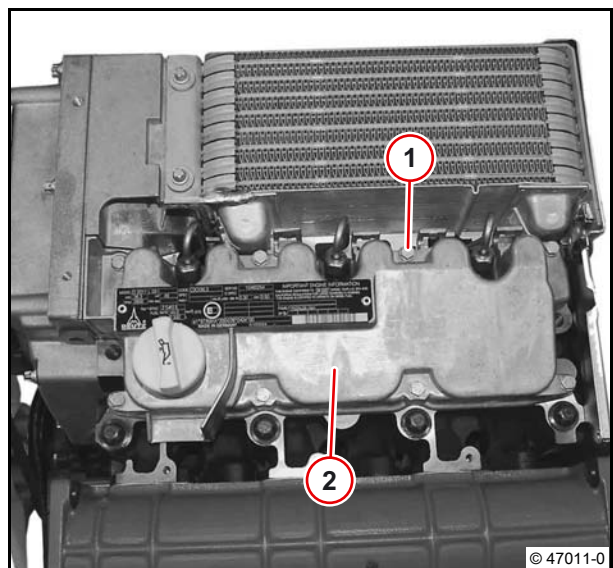


The following work process is described for a cylinder as an example.

Removing the fuel injector pump

- Unscrew all screws (1).
- Remove cylinder head cowling (2).
- Remove gasket.
 - D 2011 i
- Remove V-belt pulley.

W 12-01-04



- Remove injection lines.

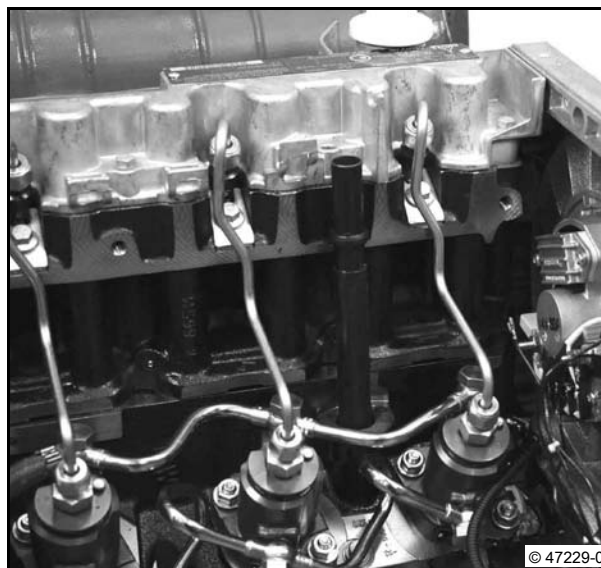
W 07-03-01

- Remove fuel pipes.

W 07-10-06

- Remove lifting magnet (engine shutdown).

W 11-00-03



© 47229-0

- Turn crankshaft until the valves of the respective cylinder overlap.



Arrangement of the inlet and exhaust valves.

IN = inlet valve

EX = exhaust valve

Valve overlap means:

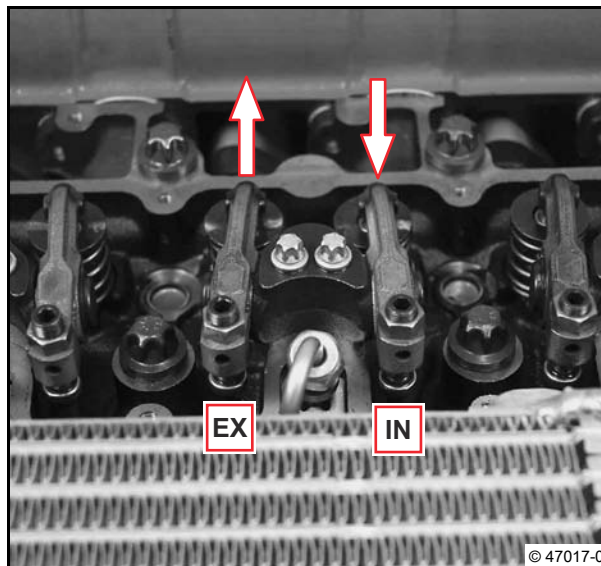
The inlet valve starts opening, exhaust valve closes.



Attention!

In case of internal exhaust gas recirculation, the inlet valve is opened briefly by an additional cam on the camshaft.

This is not to be confused with the valve overlap.



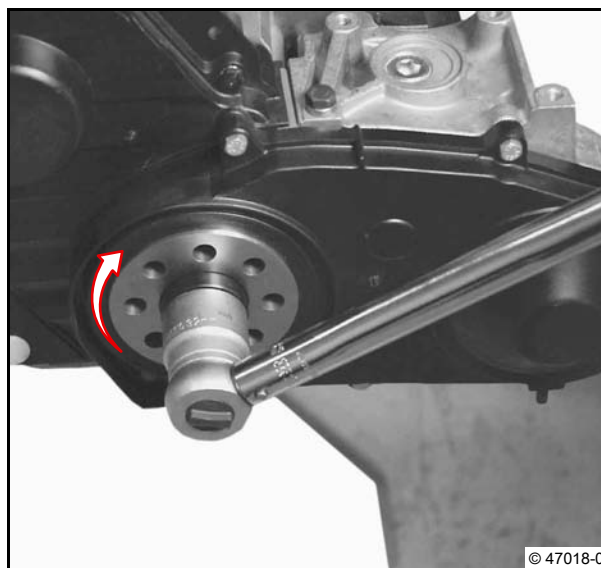
© 47017-0

– D 2011 L03

- Turn crankshaft 120° in the direction of the engine (arrow).

– D 2011 L02, D 2011 L04, TD 2011 L04

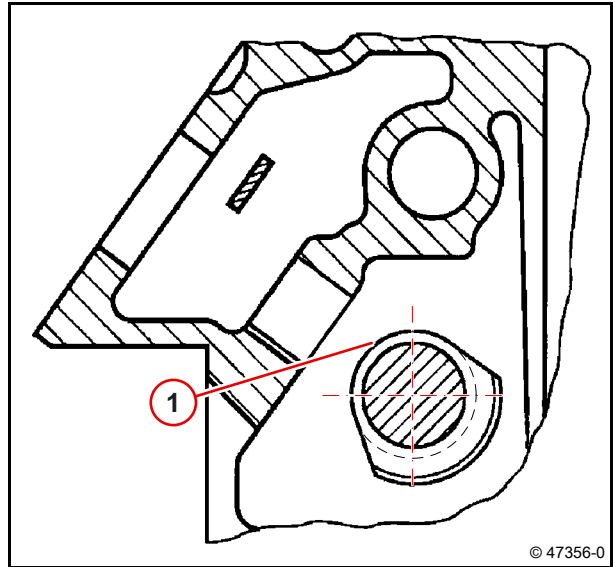
- Turn crankshaft approx. 180° in the direction of the engine.



© 47018-0



The cam (1) for the actuation of the injection pump of the corresponding cylinder must be located on the base circle.



- Loosen nuts (1) alternately.

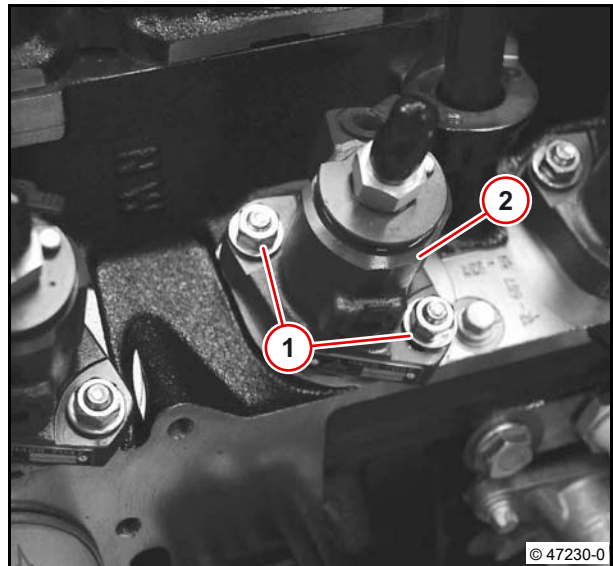


Loosen nuts evenly to avoid tension on the injection pump.

- Unscrew nuts (1).
- Remove washers.
- Remove fuel injector pump(2).



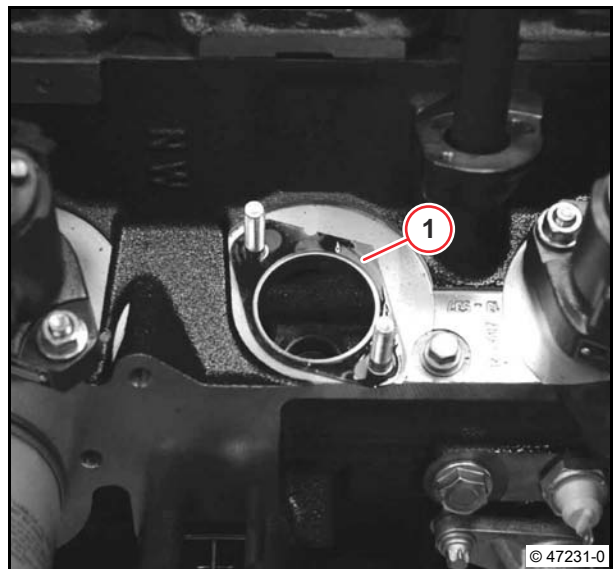
Lay out components in the order in which they should be installed.
Note assignment!



- Remove shim (1).



Lay out components in the order in which they should be installed.
Note assignment!



- Pull out roller tappet (1) with special pliers.



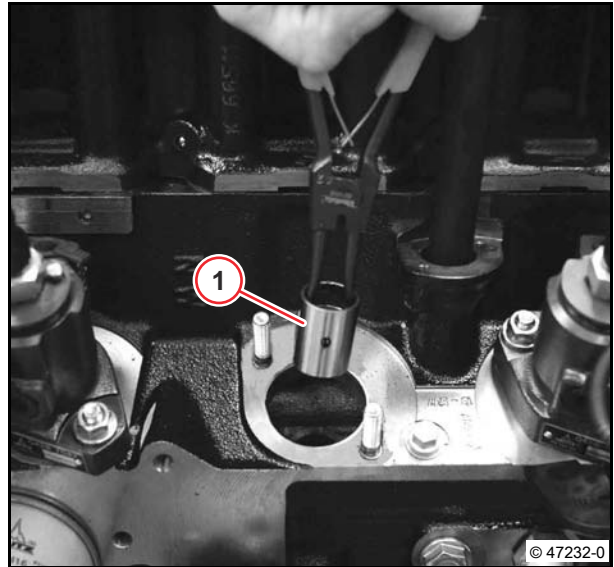
Attention!

Do not damage the roller tappet!

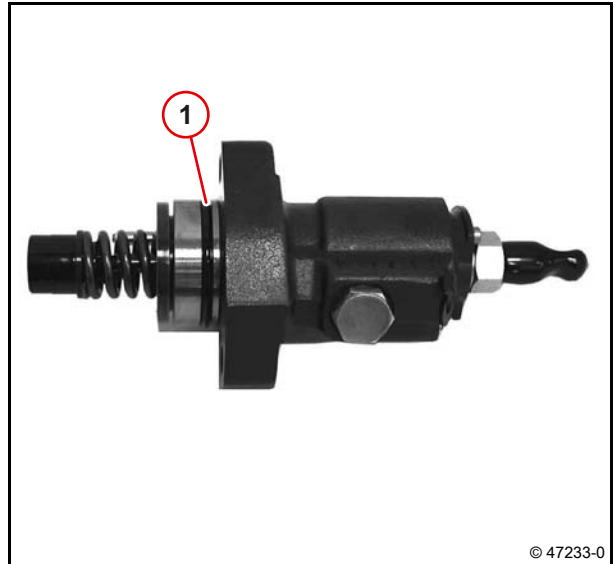


Lay out components in the order in which they should be installed.

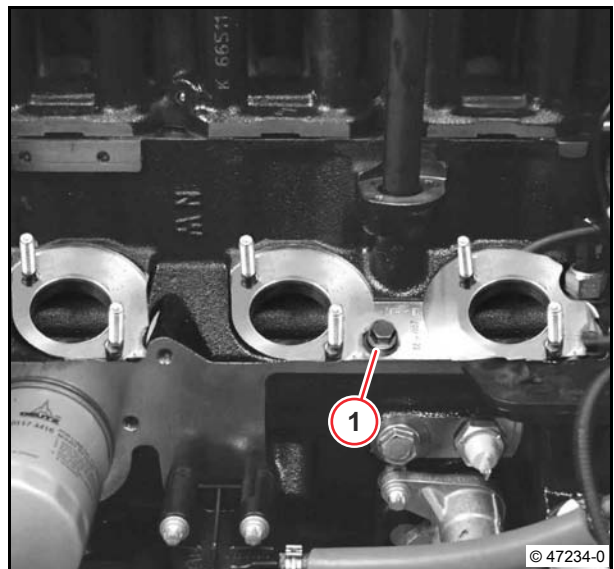
Note assignment!



- Remove the O-ring (1) with the disassembly tool.
- Visually inspect the components.



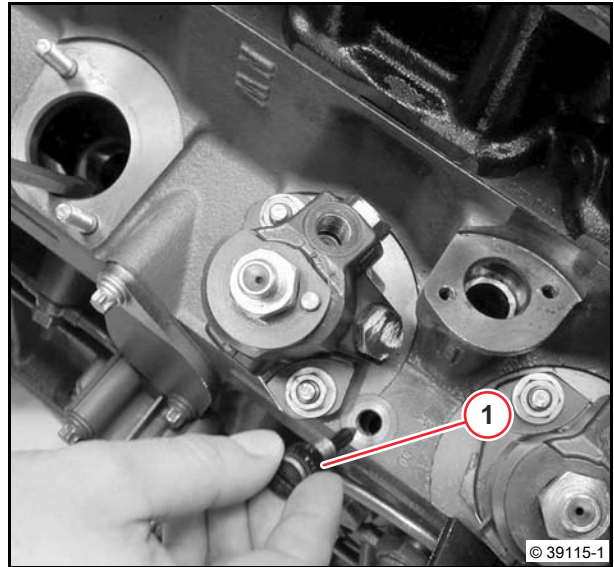
- Unscrew locking screw (1).
- Remove sealing ring.



- Bring control linkage into the middle position.
- Knock in the adjustable bolt (1) to the stop.



Ignition off.
Stop magnet free.



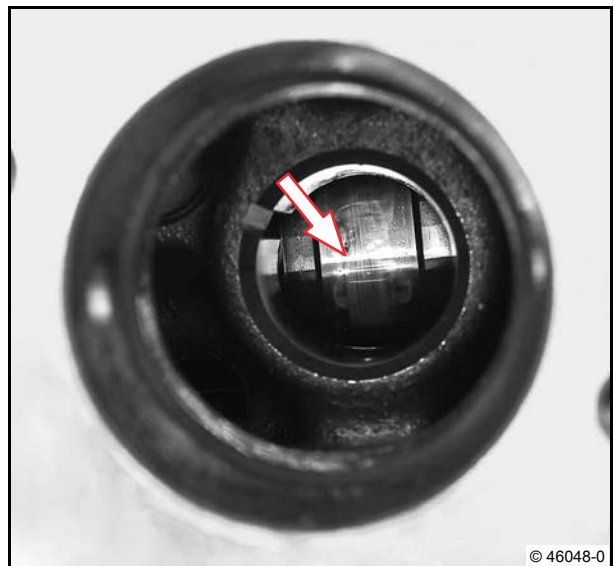
Installing the fuel injector pump



Note assignment of injection pump/roller tap-
pet/shim to the cam.



- Turn camshaft until the cam for the injection pump is
on the base circle (arrow).

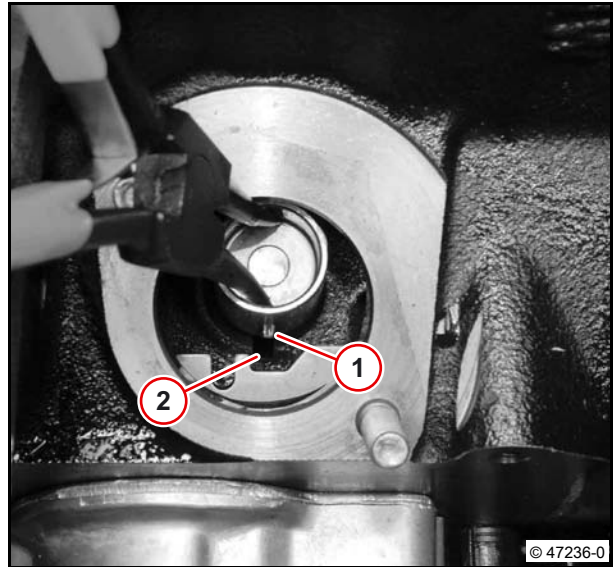


- Oil the roller tappet lightly.
- Insert roller tappet with special pliers.



Note assignment!

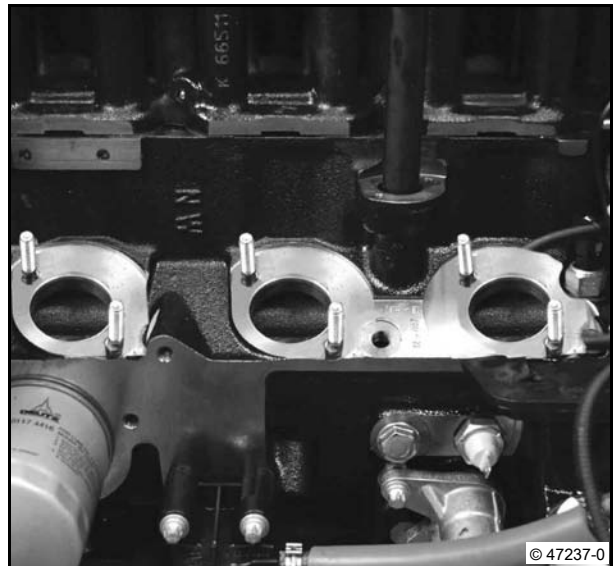
The pilot pin (1) must lock in groove (2).



6

- Oil the locating hole lightly.
- Determining the thickness of the shim.

W 07-06-03



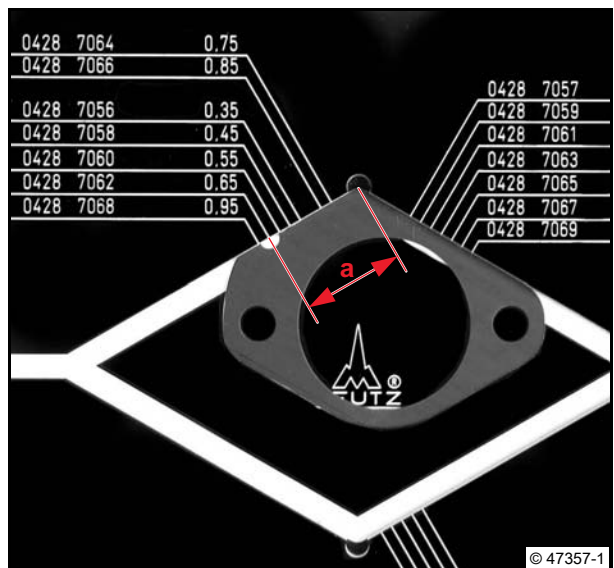
- Select shim using table.

P07 21

- Check thickness of the shim with test template.



The reference line must lie centrally to the round recess (dimension a).

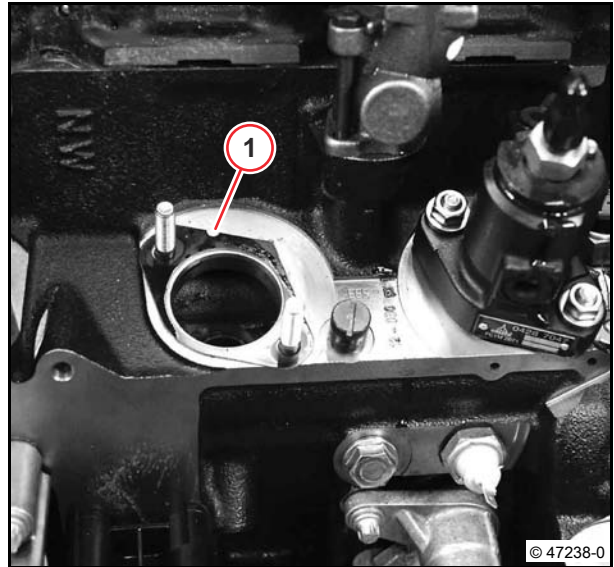


- Position shim.

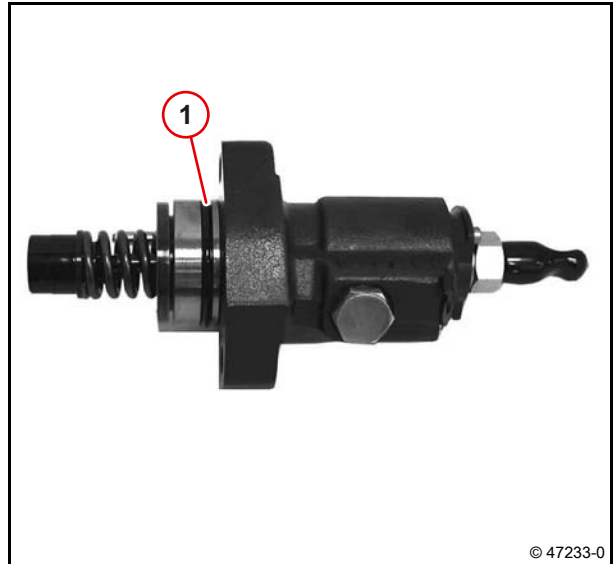


Note assignment!

The bolt (1) must face in the direction of the cylinder head.



- Insert new O-ring (1).



- Pull out locking pin (1).



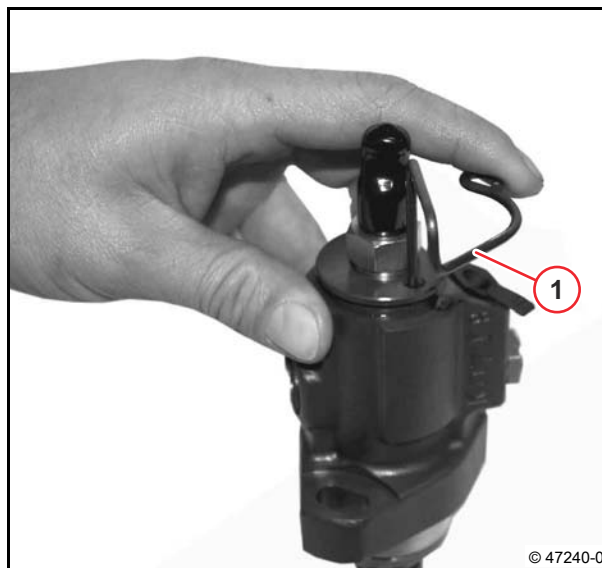
Pay attention to sealing.



- Insert rig pin (1).



Do not press in rig pin.

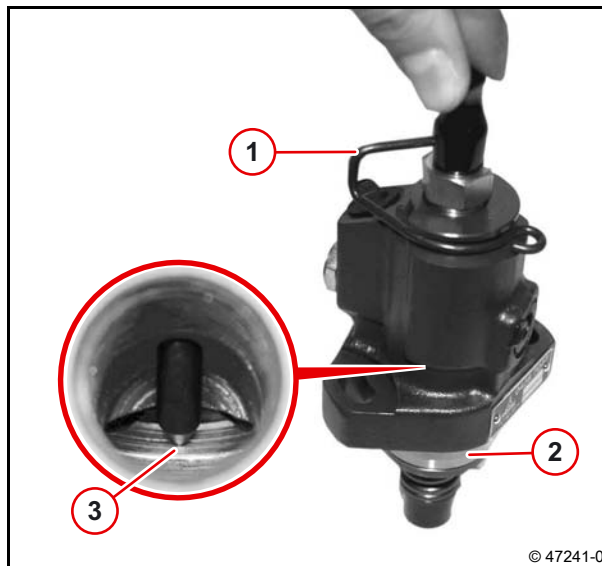


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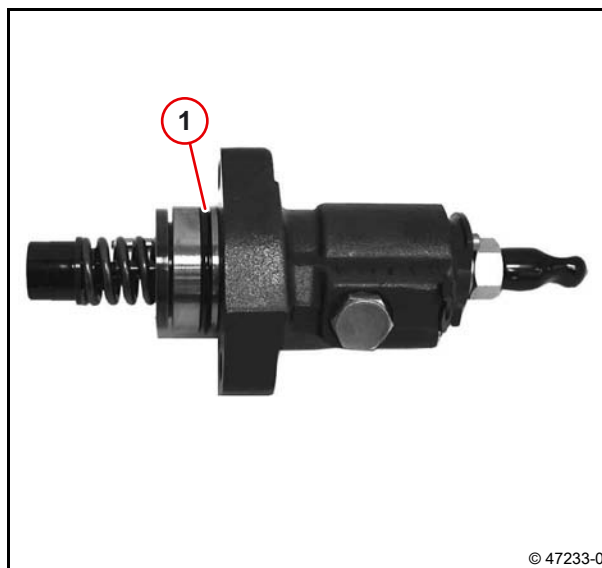
- Press in rig pin (1) slightly.
- Turn adjusting sleeve (2) back and forth.



Turn the adjusting sleeve until the rig pin you can feel and hear it lock into the punch mark (3).



- Coat the O-ring with fitting compound.



- Insert injection pump (1).

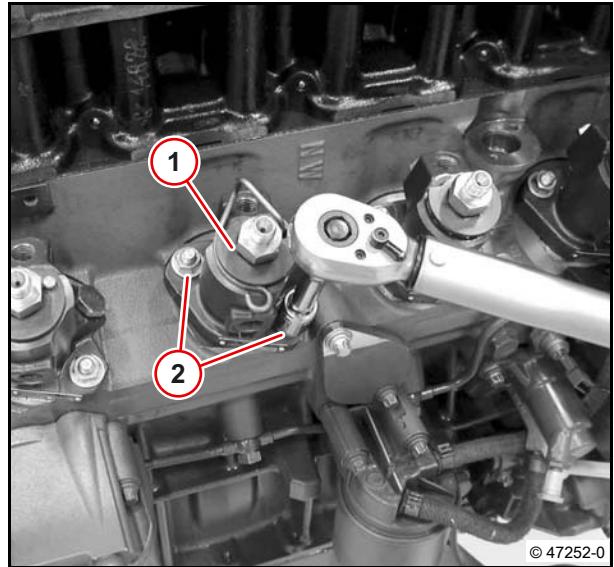


Note assignment!

- Tighten nuts (2) alternately.

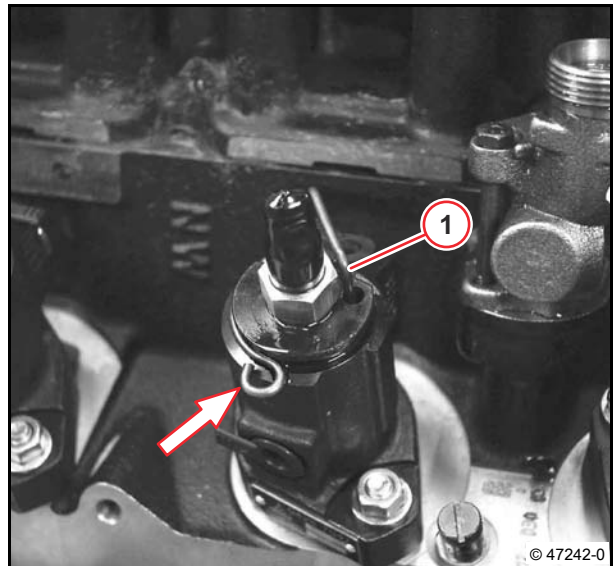


21 Nm

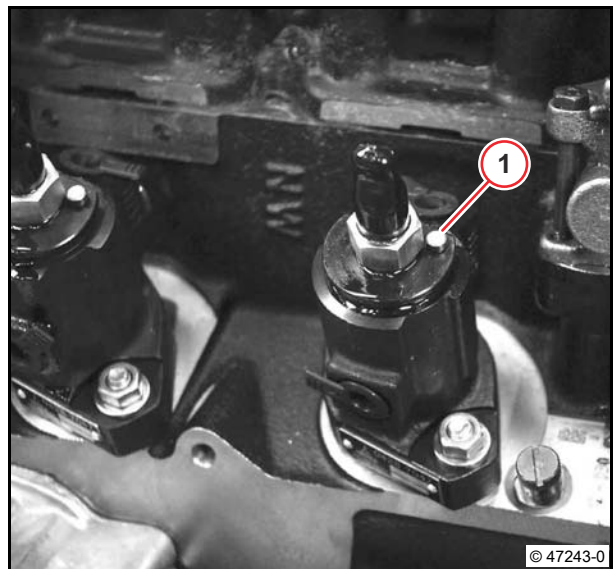


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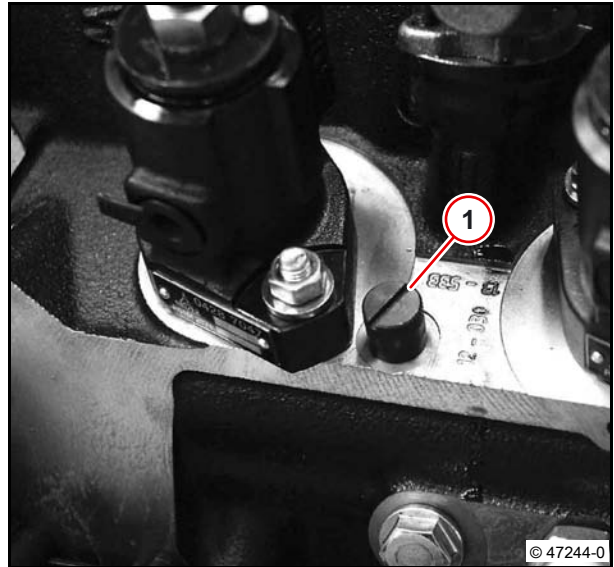
- Loosen clamping bar (arrow).
- Pull out rig pin (1).



- Press in the locking pin (1) to the stop.



- Unscrew adjustable bolt (1).

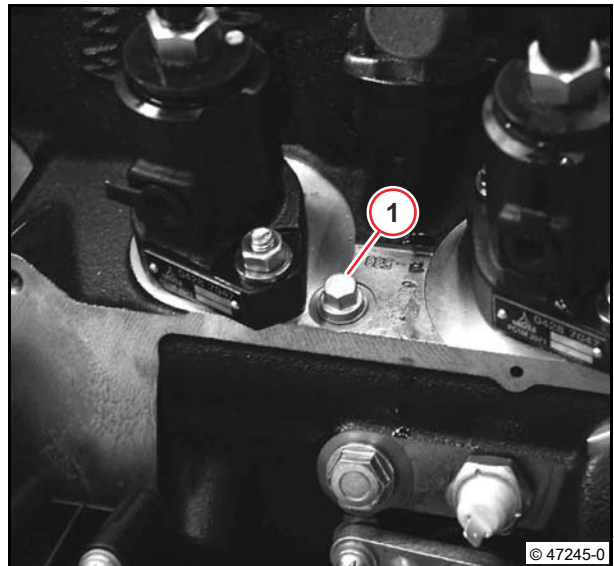


- Mount new sealing ring.
- Tighten screw plug (1).

 18 Nm

- Check start of injection.

 W 07-06-01



- Install lifting magnet (engine shutdown).

 W 11-00-03

- Install fuel pipes.

 W 07-10-06

– D 2011, D 2011 i

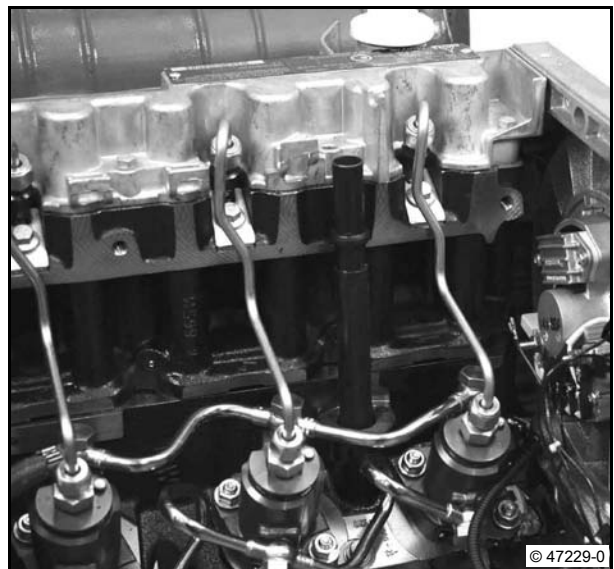
- Install injection lines.

 W 07-03-01

– D 2011 i

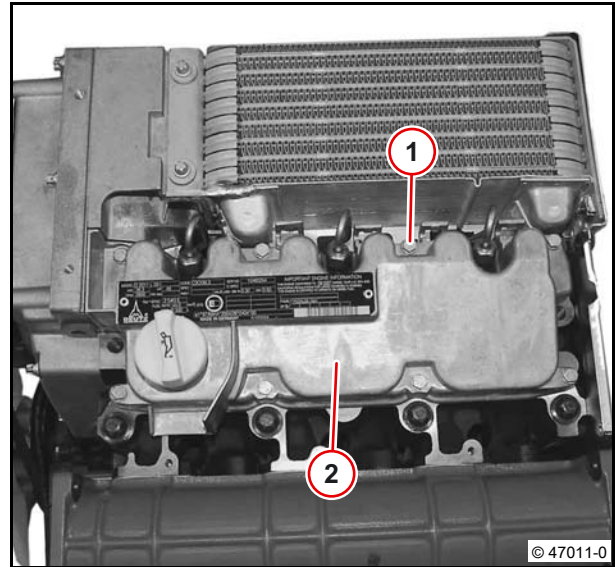
- Install V-belt pulley.

 W 12-01-04



- Mount new gasket.
- Mount cylinder head cover (2).
- Tighten all screws (1).

 8.5 Nm



Technical Data

Testing and setting data

ID no.	Thickness of shim (difference S_s calculated)	Dimension a of the identification	Thickness of shim	Part number
P07 21	bis 0,375	17 mm	0,35 mm	04287618
	0,3751 - 0,425	15 mm	0,40 mm	04287619
	0,4251 - 0,475	20 mm	0,45 mm	04287620
	0,4751 - 0,525	18 mm	0,50 mm	04287621
	0,5251 - 0,575	23 mm	0,55 mm	04287622
	0,5751 - 0,625	21 mm	0,60 mm	04287623
	0,6251 - 0,675	26 mm	0,65 mm	04287624
	0,6751 - 0,725	24 mm	0,70 mm	04287625
	0,7251 - 0,775	8 mm	0,75 mm	04287626
	0,7751 - 0,825	27 mm	0,80 mm	04287627
	0,8251 - 0,875	11 mm	0,85 mm	04287628
	0,8751 - 0,925	30 mm	0,90 mm	04287629
	0,9251 - 0,975	29 mm	0,95 mm	04287630
	0,9751 - 1,025	33 mm	1,00 mm	04287631
	1,0251 - 1,075	7 mm	1,05 mm	04287632
	1,0751 - 1,125	10 mm	1,10 mm	04287633
	1,1251 - 1,175	13 mm	1,15 mm	04287634
1,1751 - 1,250	16 mm	1,20 mm	04287635	
1,2501 - 1,36	19 mm	1,30 mm	04287636	

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A01 004	Cylinder head cover on cylinder head			8.5 Nm
A03 004	Locking screw on crankcase		Adapter for adjustable bolt on control linkage lock. Replace sealing ring.	18 Nm
A07 012	Injection pump on crankcase			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Check start of injection



Standard tools

Special tools:

- Adjustable bolt 100700
- Degree scale 101020
- Adapter 101030
- Pointer 101300
- High-pressure hand pump 101500
- Supply tank 101510
- Plugs/caps 170160



- W 07-03-01
- W 07-10-06
- W 11-00-03
- W 12-01-04

D 2011i



Danger!

Wait 30 seconds after switching off the engine before working on the fuel system.



Attention!

Pay attention to utmost cleanliness when working on the fuel system. Remove residue paint and particles of dirt before removing.

Clean the respective affected parts carefully. Blow damp areas dry with compressed air.

Observe the safety regulations and national specifications for handling fuels.

Close all connections immediately after opening with new, clean plugs/caps.

Do not remove plugs/caps until immediately before assembling.

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

After all work on the fuel system, it must be bled - see the operation manual, chapter "6 Fuel system".



This descriptions refers to the cylinder on the front cover.

When checking other cylinders, the corresponding ignition UDC should be calculated from the degree scale.

Check start of injection

- Remove injection lines.

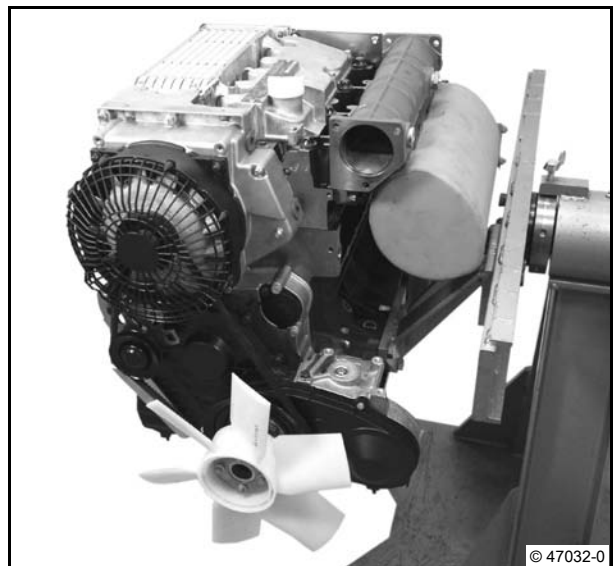
 W 07-03-01

- Remove fuel pipes.

 W 07-10-06


- Remove lifting magnet (shut-off magnet).

 W 11-00-03

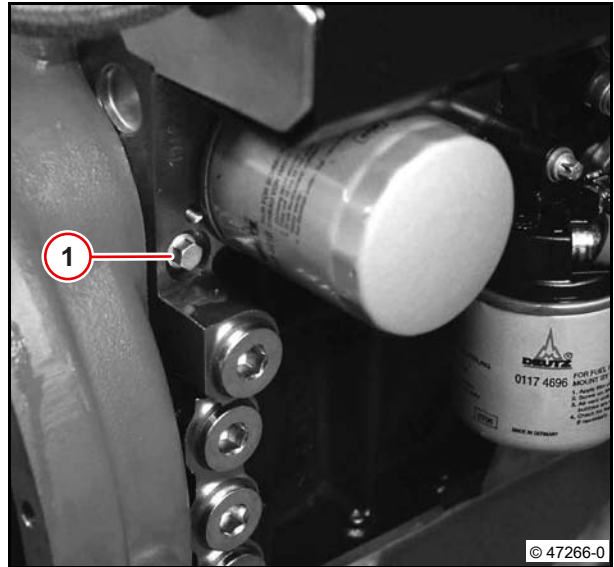


– D 2011i

- Remove V-belt pulley.

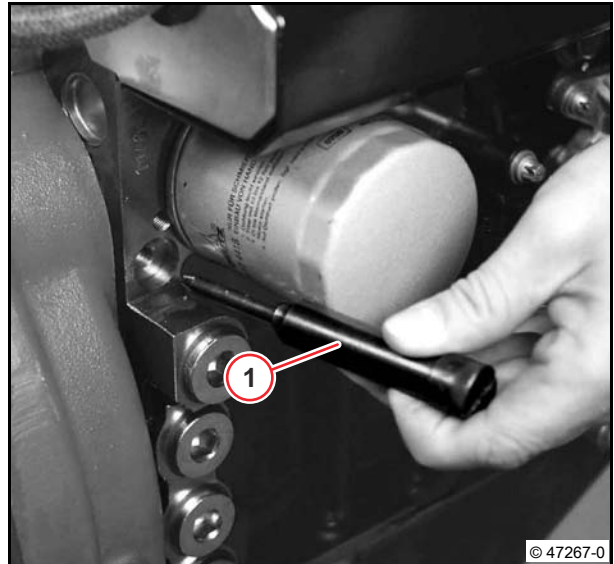
 W 12-01-04 L03i

- Unscrew locking screw (1).
- Remove sealing ring.

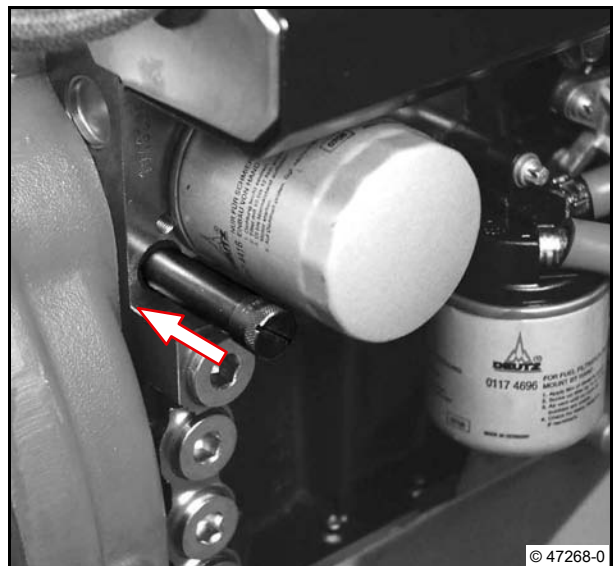


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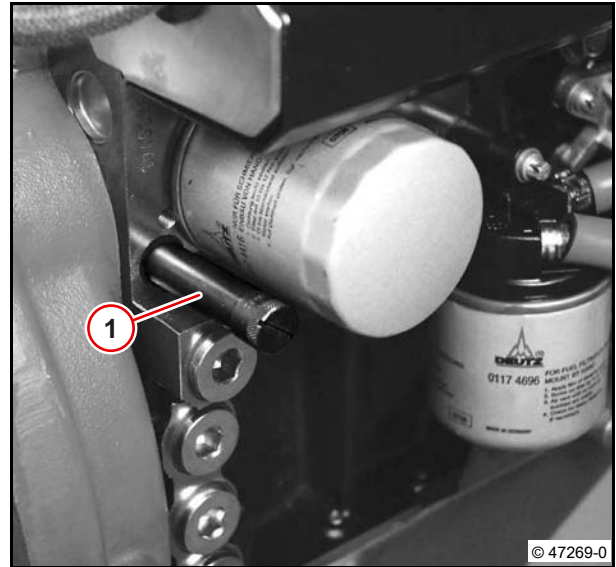
- Insert adjustable bolt (1).



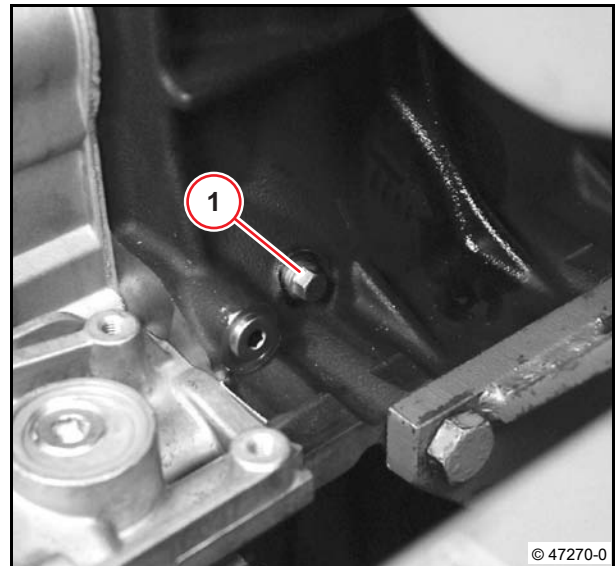
- Press adjustable bolt in lightly in direction of arrow and hold.
- Turn crankshaft slowly in direction of engine until the adjustable bolt engages with the bore of the camshaft.



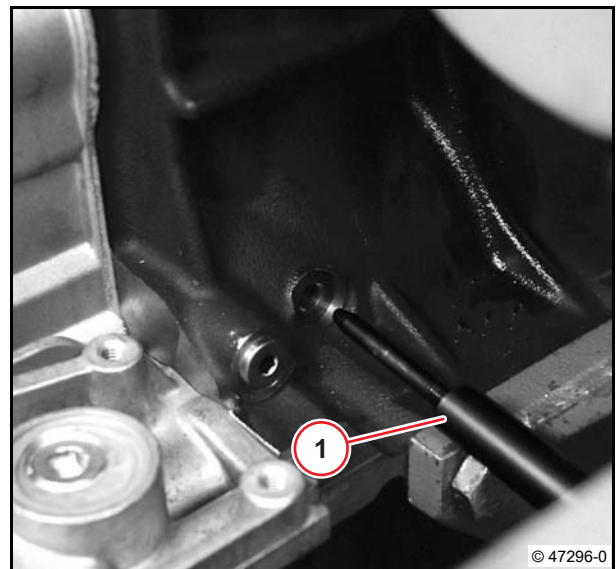
- Knock in the adjustable bolt (1) to the stop.



- Unscrew locking screw (1).
- Remove sealing ring.



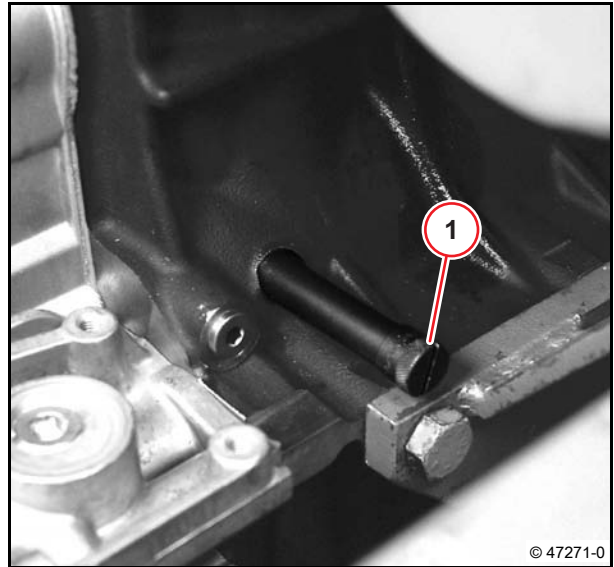
- Insert adjustable bolt (1).



- Knock in the adjustable bolt (1) to the stop.
- Turn crankshaft carefully against the adjustable bolt.

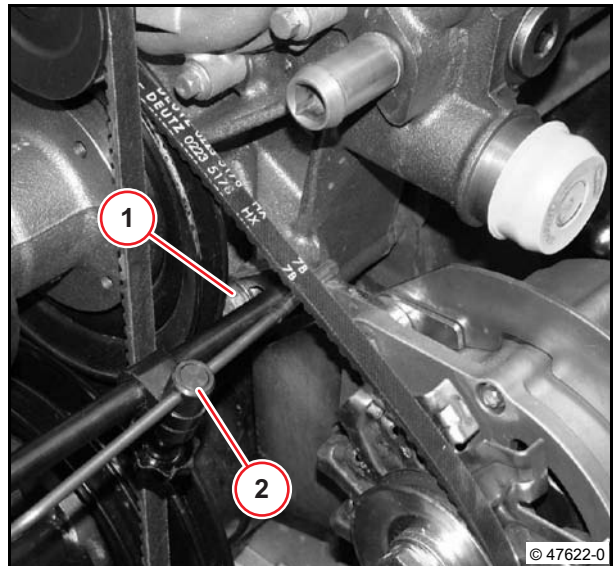


The cylinder on the front cover is now located in the ignition UDC.

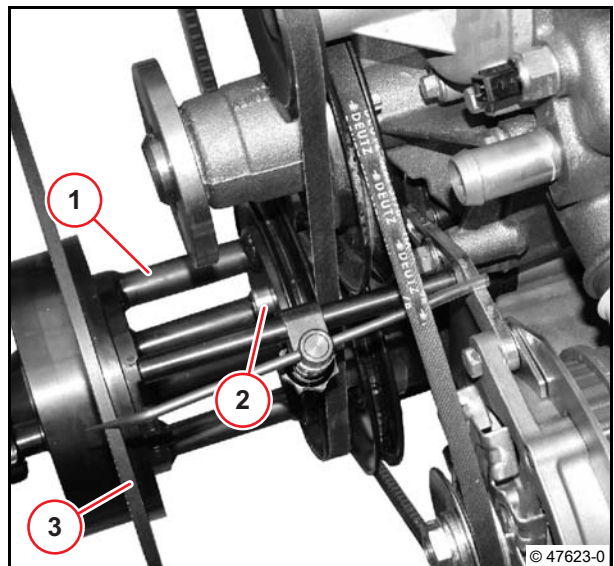


- Loosen screw (1).
- Mount pointer with holding device (2).
- Tighten screw (1).

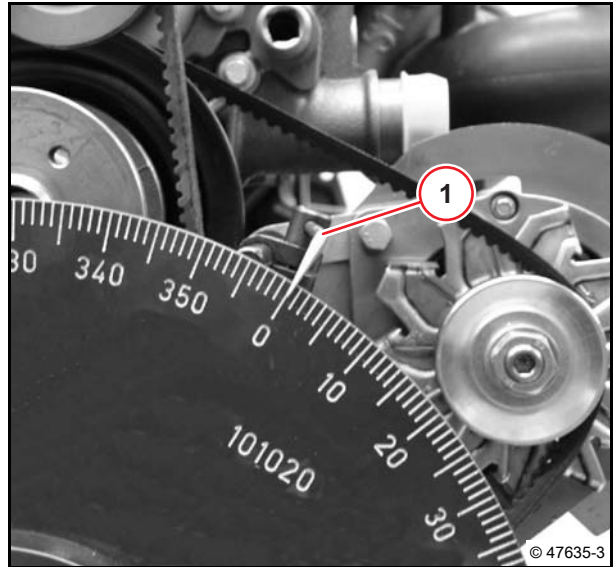
 21 Nm



- Mount adapter (1).
- Tighten screws (2).
- Screw on degree scale (3).



- Bring degree scale into line with pointer.
- Set the pointer (1) in line with the "0°" marking.
- Fasten degree scale.
- Fasten pointer.



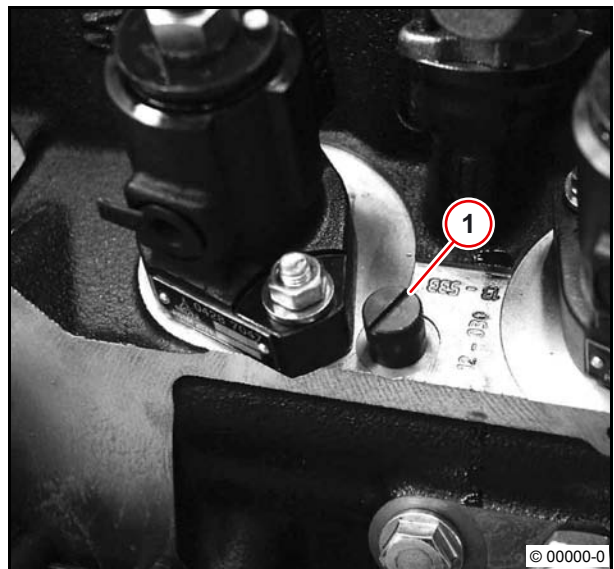
- Unscrew locking screw (1).
- Remove sealing ring.



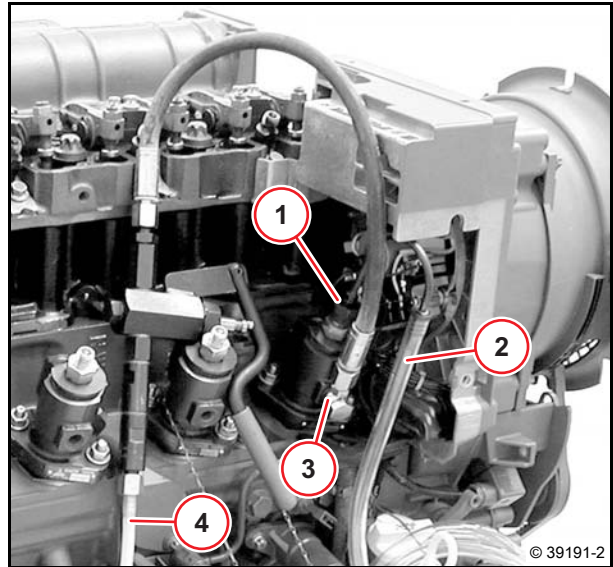
- Bring control linkage into the middle position.
- Knock in the adjustable bolt (1) to the stop.



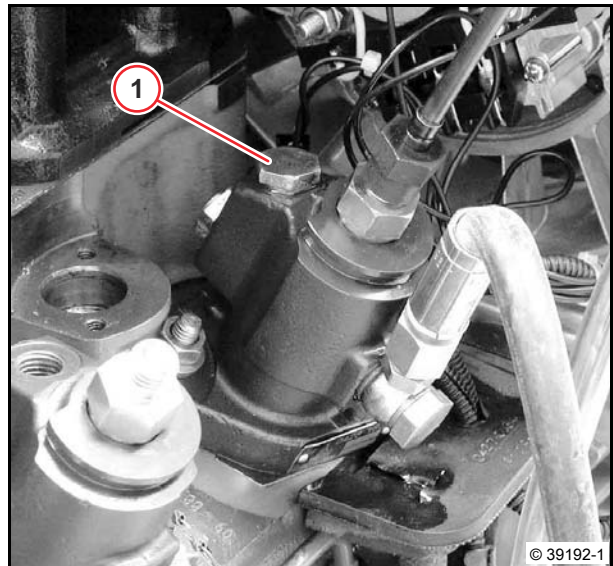
Ignition off.
Stop magnet free.



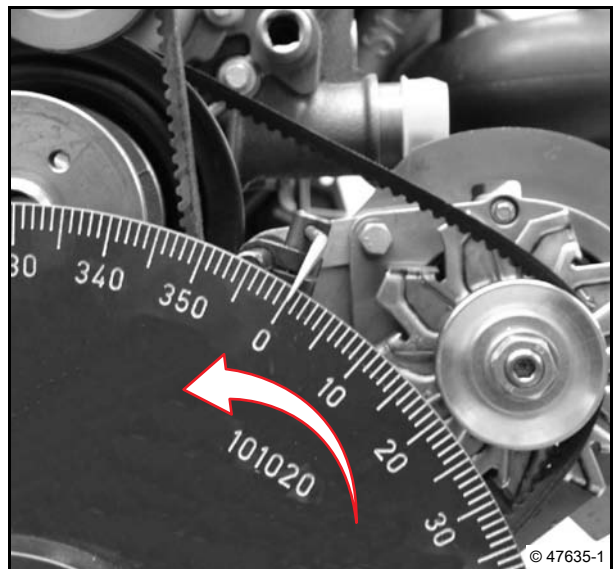
- Mount overflow pipe (1).
- Connect hose (2) to overflow pipe.
- Connect hose (2) to supply tank.
- Connect pressure pipe (3) to fuel injector.
- Connect intake pipe (4) to supply tank.
- Fill supply tank with clean fuel.



- Mount locking screw (1).
- Do not tighten locking screw.

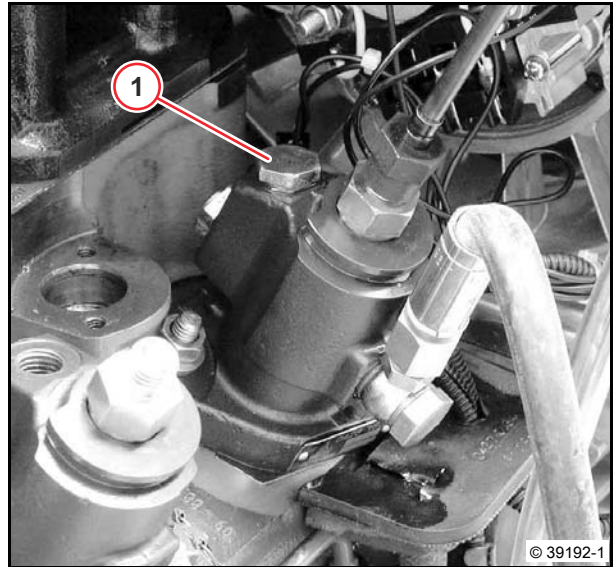


- Unscrew adjustable bolt to the camshaft and crankshaft lock.
- Turn crankshaft **carefully** approx. 90° in the direction of the arrow (against the direction of the engine).



- Bleed the suction chamber of the injection pump.
- Activate high-pressure hand pump until fuel emerges at the locking screw (1).
- Tighten screw plug (1).

45 Nm



- Actuate the high-pressure hand pump constantly.

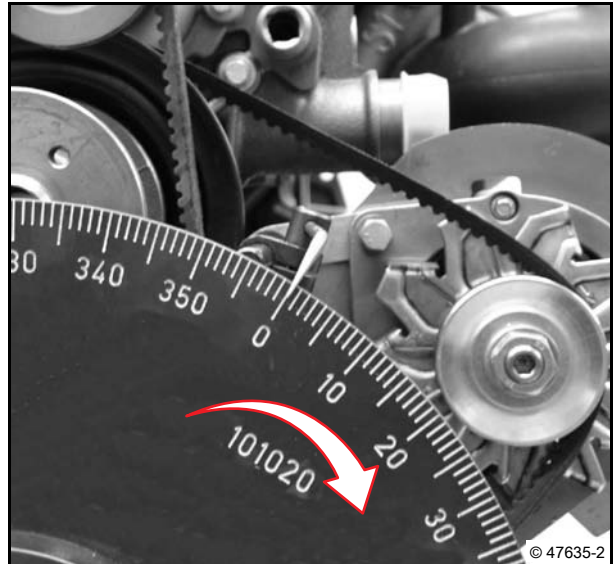


The fuel must flow evenly out of the overflow pipe.

- Turn the crankshaft slowly and evenly in the direction of the arrow (engine direction of rotation) until the fuel flow turns to drops.



As soon as the fuel flow becomes drops, the start of injection has been reached.



- Read start of injection on the degree scale.



Start of injection:

Note specifications on the company plate.

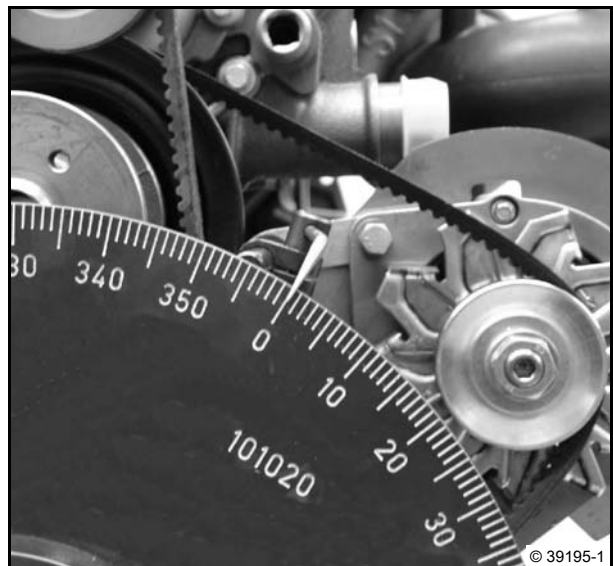
The start of injection must be set if it does not match the specifications.

The start of injection of other injection pumps should be checked using this method.

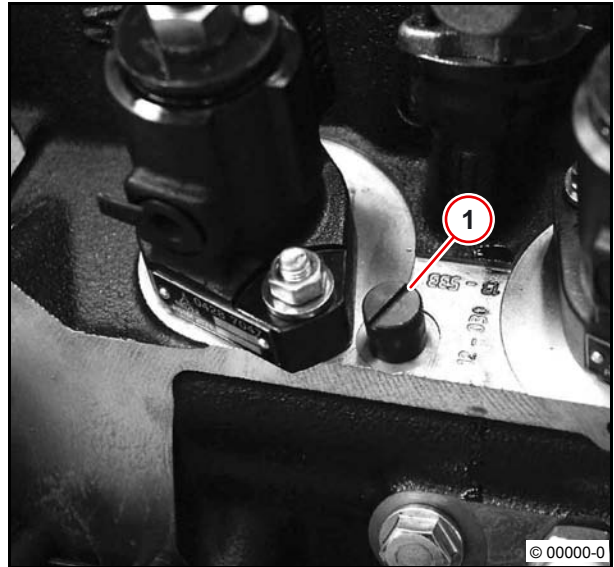
Calculate the ignition UDC of each cylinder with the degree scale.

Observe ignition interval.

Cylinders	Ignition interval
2	180°
3	120°
4	180°

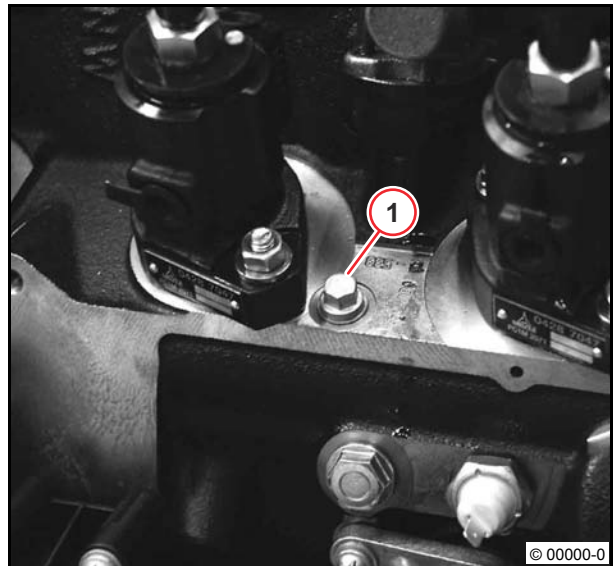


- Unscrew adjustable bolt (1).



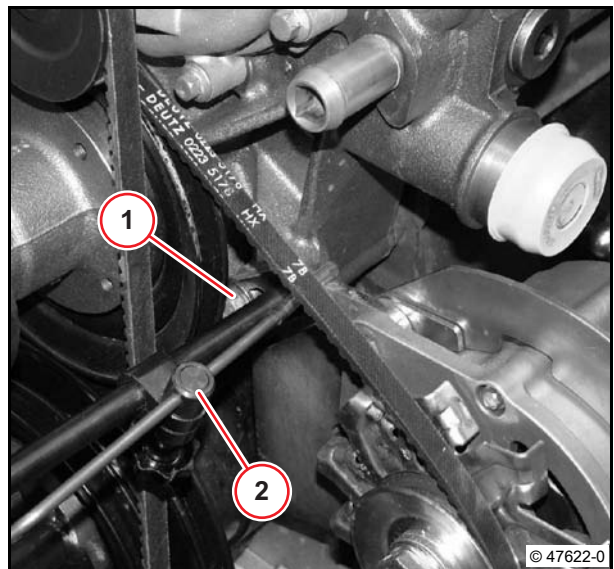
- Mount new sealing ring.
- Tighten screw plug (1).

 18 Nm

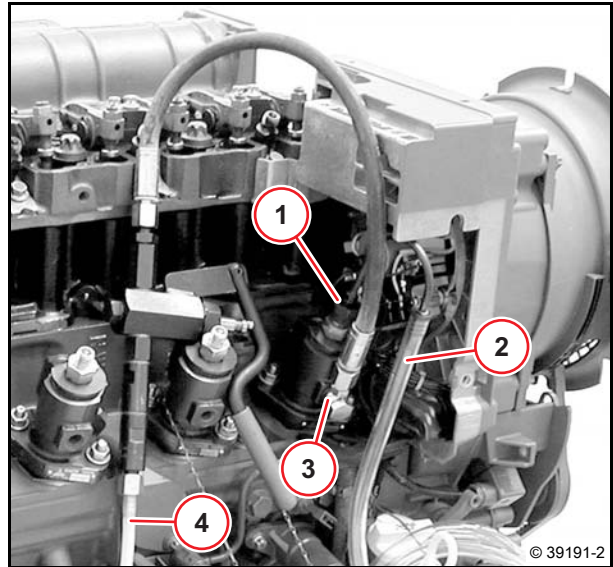


- Loosen screw (1).
- Remove pointer with holding device (2).
- Tighten screw (1).

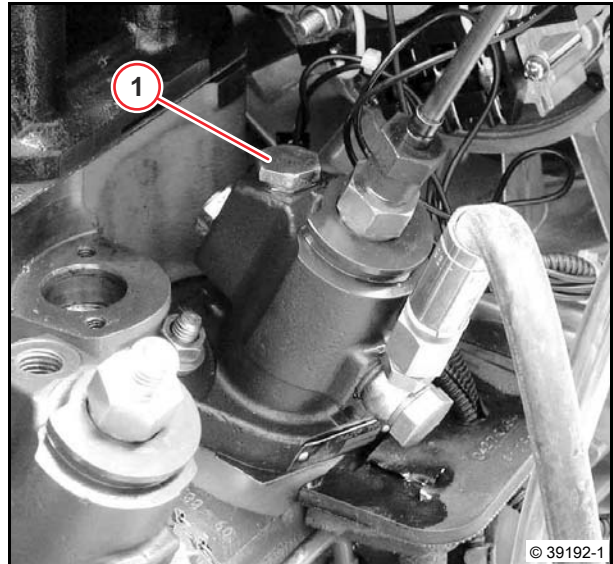
 21 Nm



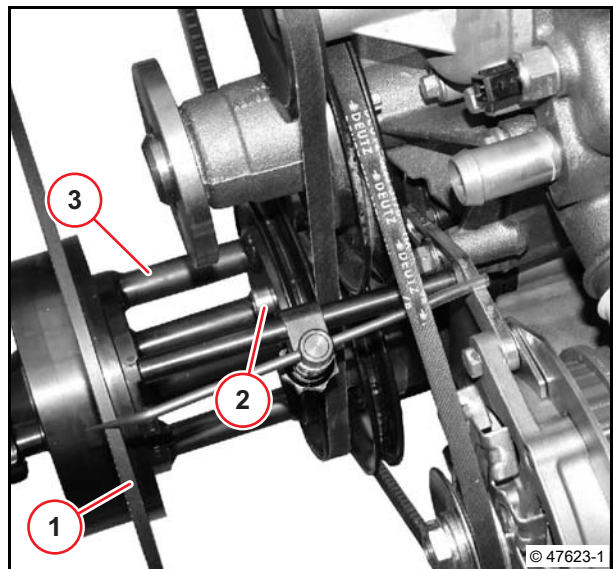
- Remove intake pipe (4).
- Remove pressure pipe (3).
- Remove hose (2).
- Remove overflow pipe (1).
- Remove the high-pressure hand pump.



- Unscrew locking screw (1).
- Remove sealing ring.

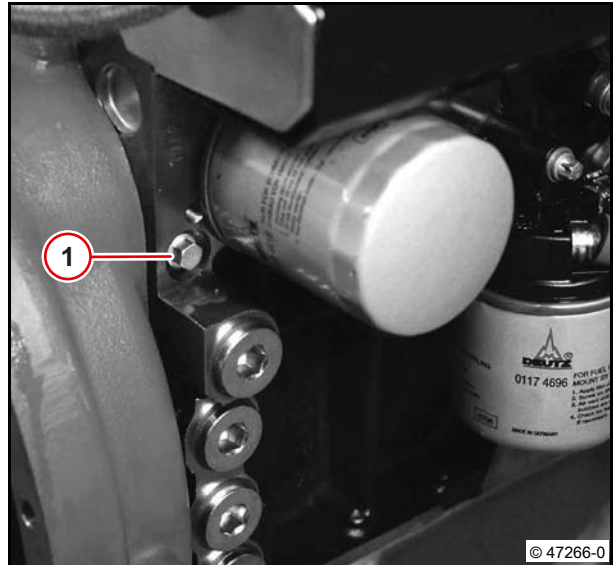


- Unscrew degree scale (1).
- Unscrew screws (2).
- Remove adapter (3).



- Insert new sealing ring.
- Tighten screw plug (1).

 18 Nm



6

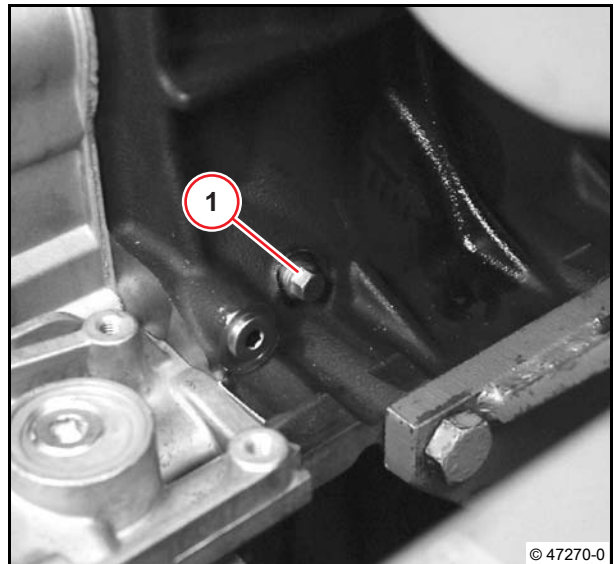
- Insert new sealing ring.
- Tighten screw plug (1).

 18 Nm

– D 2011 i

- Install V-belt pulley.

 W 12-01-04



- Install injection lines.

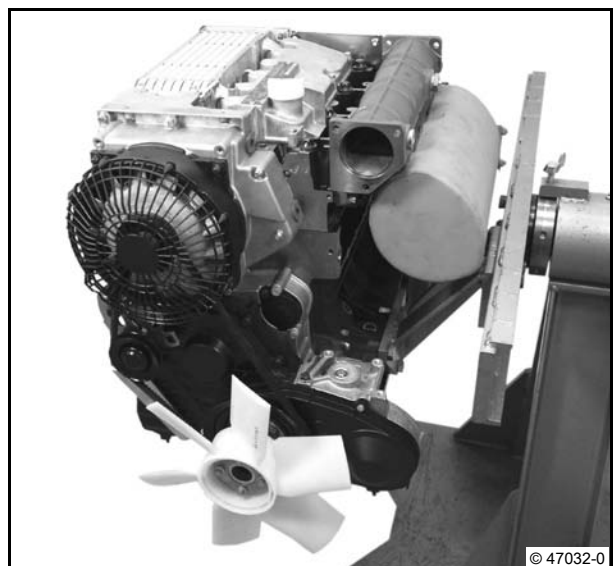
 W 07-03-01

- Install fuel pipes.

 W 07-10-06

- Install lifting magnet (shut-off magnet).

 W 11-00-03



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A03 003	Locking screw on crankcase	M10x1	Adapter for adjustable bolt on camshaft lock/ crankshaft lock. Replace sealing ring.	18 Nm
A03 004	Locking screw on crankcase		Adapter for adjustable bolt on control linkage lock. Replace sealing ring.	18 Nm
A03 020	Front cover on crankcase			21 Nm
A07 071	Locking screw on injection pump		Replace sealing ring	45 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Calculating the thickness of shim



Standard tools:
– Depth measuring screw 8170



– W 07-04-01



All contact and measuring surfaces must be absolutely clean to rule out measuring errors!

The following work process should be carried out on each injection pump if necessary.

- Remove injection pump and shim.
- Removal and installation of roller tappet, visual inspection.

 W 07-04-01



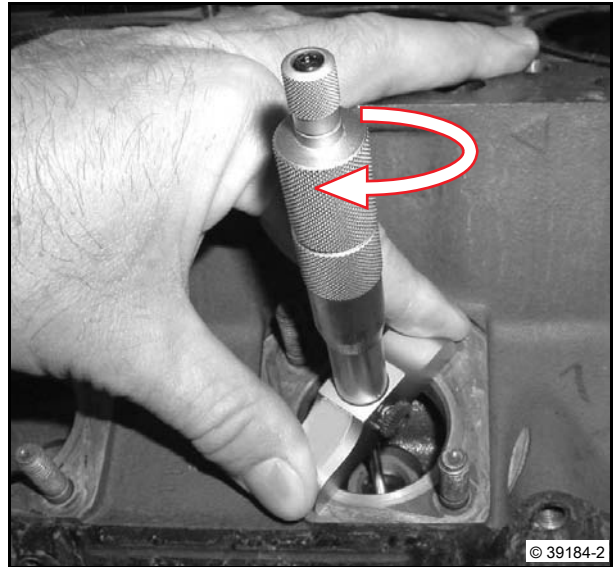
- Mount probe for measuring range 50 to 75 mm on depth measuring screw.



Measuring range default approx. 52 mm.

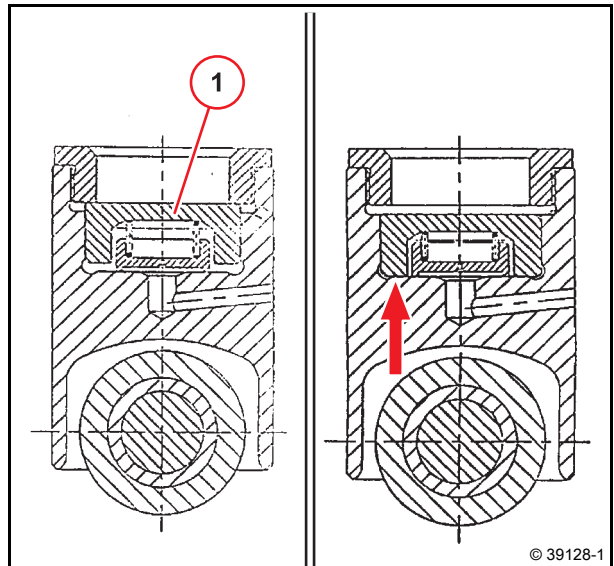


- Place the depth measuring screw on the contact surface of the crankcase and keep it pressed against the stop.
- Turn the depth measuring screw until the probe is touching the roller tappet.




6

- To determine the total depth dimension, in the case of hydro-roller tappets, the working piston (1) in the roller tappet must be pressed down until touching (arrow) (approx. 1 mm) by turning the depth measuring screw further.



- Measure, read and note the depth dimension "A" from the crankcase rest to the plate spring rest of the roller tappet.

– Example:

 60,25 mm



- Read and note installation dimension "X" from the rating plate of the respective injection pump.



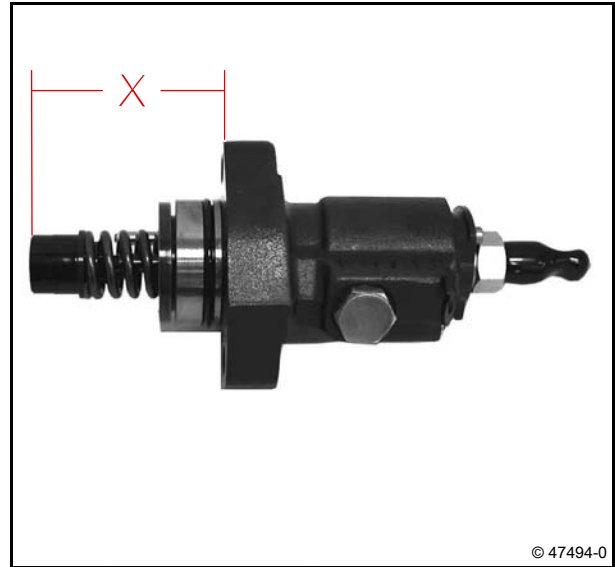
The installation dimension "X" serves to calculate the shim/gasket.

Do not measure on the removed injection pump.

The exact installation dimension "X" is specified on the injection pump's rating plate.

Example: 6088

Installation dimension "X" = 60.88 mm



© 47494-0

6

- Calculate thickness of the shim "S_s".

Calculation example

Desired: - Thickness of shim S_s
 Given: - Installation dimension of the injection pump X
 Measured: - Depth gauge A
 Calculation: $S_o = X - A$
 $S_o = 60,88 \text{ mm} - 60,25 \text{ mm}$
 Result: $S_o = 0,63 \text{ mm}$

- Select shim using table.

 P07 21

- Install injection pumps.

 W 07-04-01



Calculation for conversion of the injection pumps, of camshaft 11.0 mm on 11.7 mm stroke, without converting the camshaft - see following example of calculation.

© 39877-1

Calculation example

Desired: - Thickness of shim S_s
 Given: - Installation dimension of the injection pump X
 Measured: - Depth gauge A
 Calculation: $S_o = X - 0,7 \text{ mm} - A$
 $S_o = 61,60 \text{ mm} - 0,7 \text{ mm} - 60,25 \text{ mm}$
 Result: $S_o = 0,65 \text{ mm}$

- Select shim using table.

 P07 21

- Install injection pumps.

 W 07-04-01

Technical Data

Testing and setting data

ID no.	Thickness of shim (difference S_s calculated)	Dimension a of the identification	Thickness of shim	Part number
P07 21	bis 0,375	17 mm	0,35 mm	04287618
	0,3751 - 0,425	15 mm	0,40 mm	04287619
	0,4251 - 0,475	20 mm	0,45 mm	04287620
	0,4751 - 0,525	18 mm	0,50 mm	04287621
	0,5251 - 0,575	23 mm	0,55 mm	04287622
	0,5751 - 0,625	21 mm	0,60 mm	04287623
	0,6251 - 0,675	26 mm	0,65 mm	04287624
	0,6751 - 0,725	24 mm	0,70 mm	04287625
	0,7251 - 0,775	8 mm	0,75 mm	04287626
	0,7751 - 0,825	27 mm	0,80 mm	04287627
	0,8251 - 0,875	11 mm	0,85 mm	04287628
	0,8751 - 0,925	30 mm	0,90 mm	04287629
	0,9251 - 0,975	29 mm	0,95 mm	04287630
	0,9751 - 1,025	33 mm	1,00 mm	04287631
	1,0251 - 1,075	7 mm	1,05 mm	04287632
	1,0751 - 1,125	10 mm	1,10 mm	04287633
	1,1251 - 1,175	13 mm	1,15 mm	04287634
	1,1751 - 1,250	16 mm	1,20 mm	04287635
1,2501 - 1,36	19 mm	1,30 mm	04287636	

Removing and installing the fuel injectors



Standard tools:

– Assembly pliers 8024

Special tools:

– Puller 110090

– Extraction tool 120660

– Slide hammer 150800

– Plugs/caps 170160



– W 07-03-01

– W 07-07-02



Danger!

Wait 30 seconds after switching off the engine before working on the fuel system.



Attention!

Pay attention to utmost cleanliness when working on the fuel system.

Remove residue paint and particles of dirt before removing.

Clean the respective affected parts carefully. Blow damp areas dry with compressed air.

Observe the safety regulations and national specifications for handling fuels.

Close all connections immediately after opening with new, clean plugs/caps.

Do not remove plugs/caps until immediately before assembling.

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

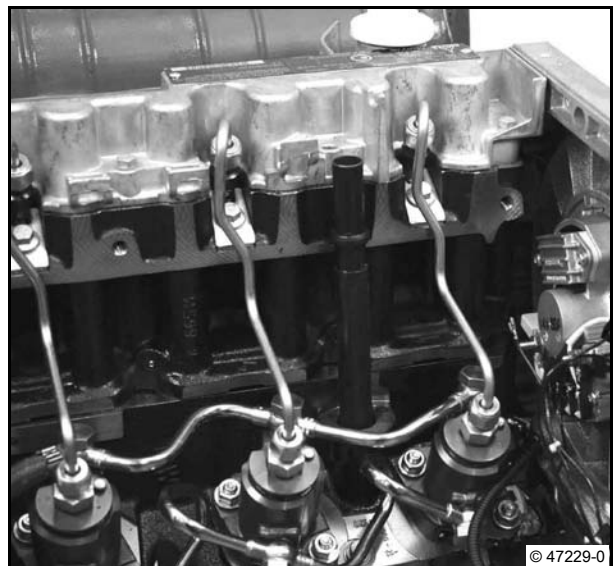
After all work on the fuel system, it must be bled - see the operation manual, chapter "6 Fuel system".

Removing fuel injector

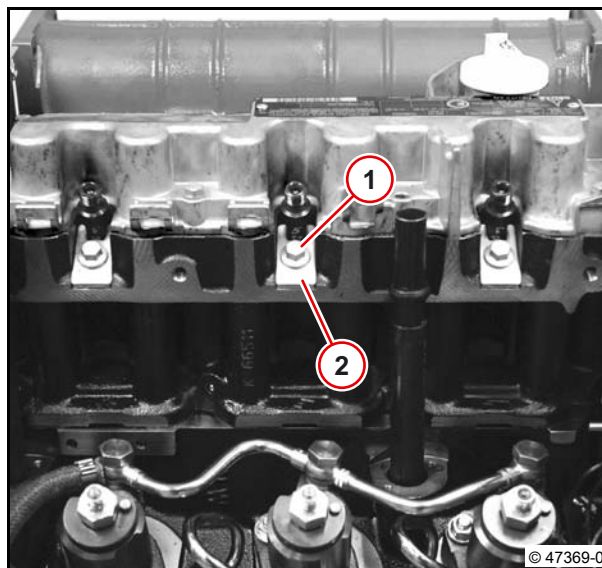
- Remove injection lines.



W 07-03-01



- Unscrew screw (1).
- Remove clamping shoe (2).

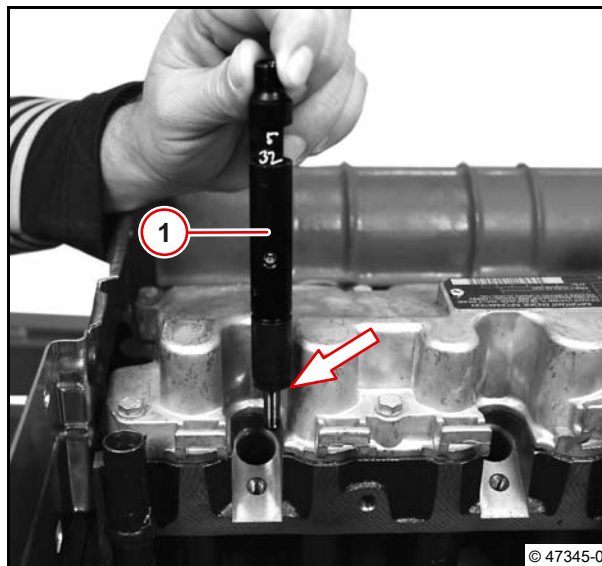


- Pull out fuel injector (1) and sealing ring (arrow).



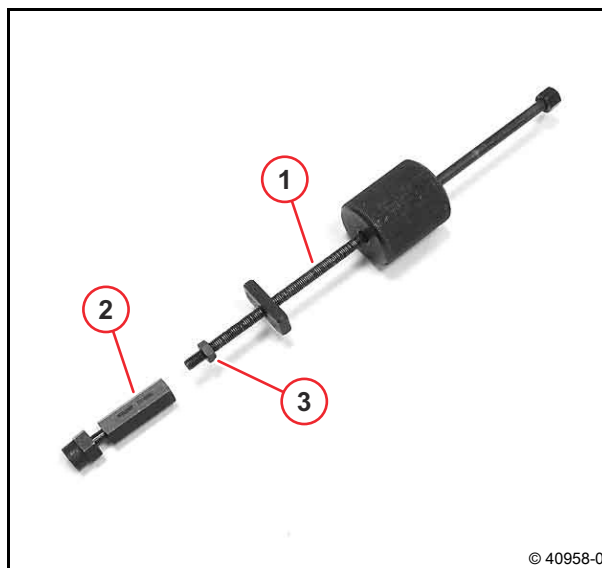
Lay out components in the order in which they should be installed.

Note cylinder assignment.

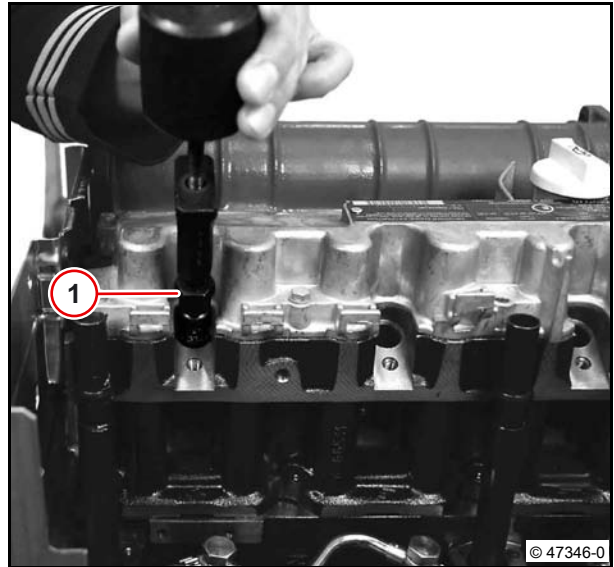


Removing stuck fuel injectors

- Assembly sliding hammer (1) and puller (2).
- Tighten lock nut (3).



- Mount sliding hammer on fuel injector.
- Screw on lock nut (1).
- Pull out stuck fuel injector.

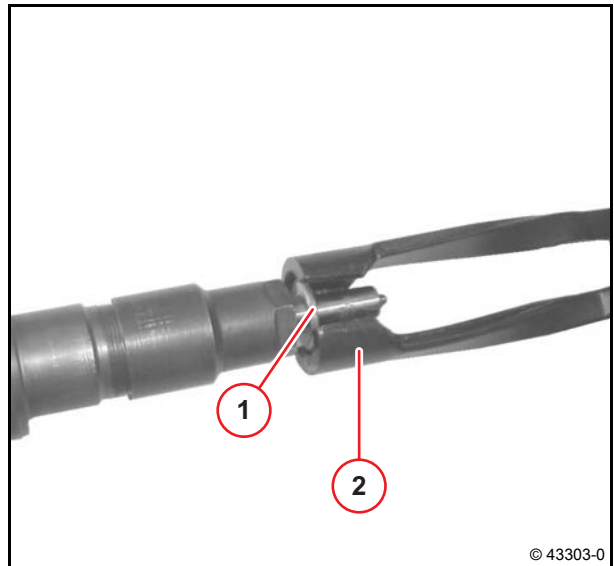


- Grip a tight sealing ring (1) with the assembly pliers (2) and pull off, turning slightly.



Attention!

Do not damage the nozzle tip!

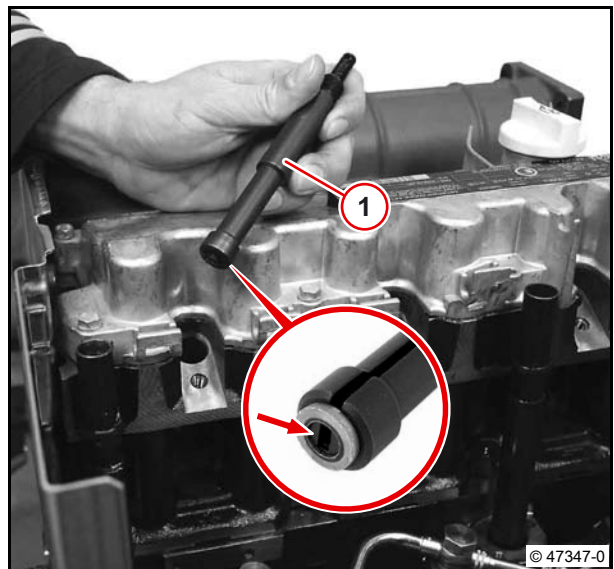


Removing a tightly fixed sealing ring from the cylinder head

- Insert extraction device (1).



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



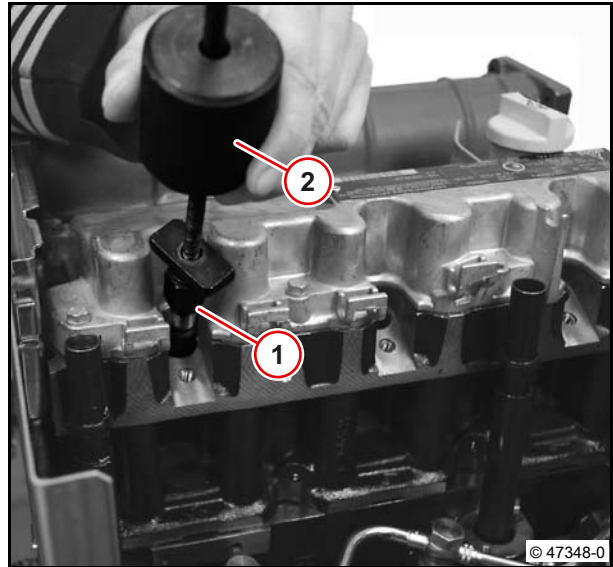
- Turn in the spindle.



The sealing ring must be fixed on the puller.

Hold puller on hexagon.

- Mount adapter (1) and slide hammer (2) on extraction device.
- Remove tight sealing ring.



- Visually inspect the components.
- Check the fuel injector.

 [W 07-07-02](#)



Installing the fuel injector

- Mount new sealing ring (1) on fuel injector.

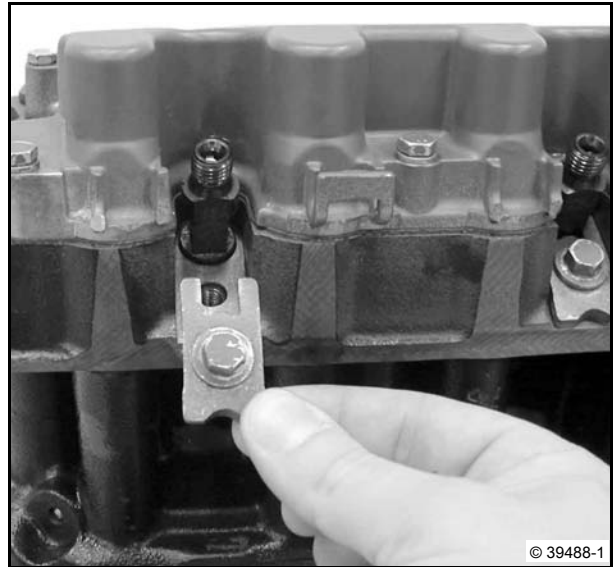


- Insert fuel injector.
- Mount clamping shoe.



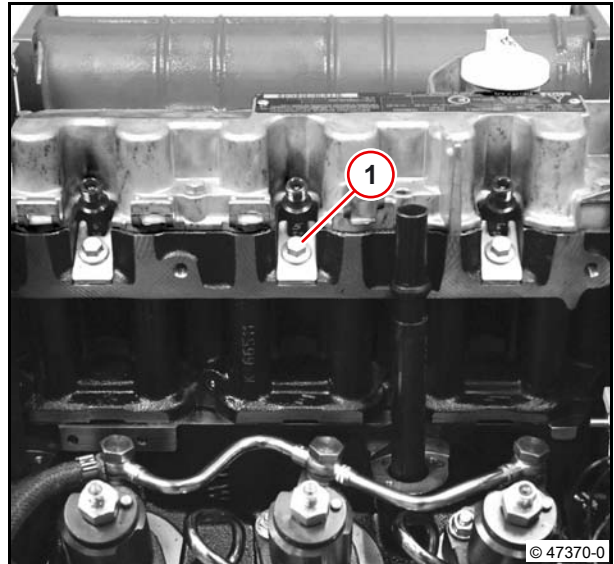
Note installation position of the clamping shoe.

- Fasten screws.



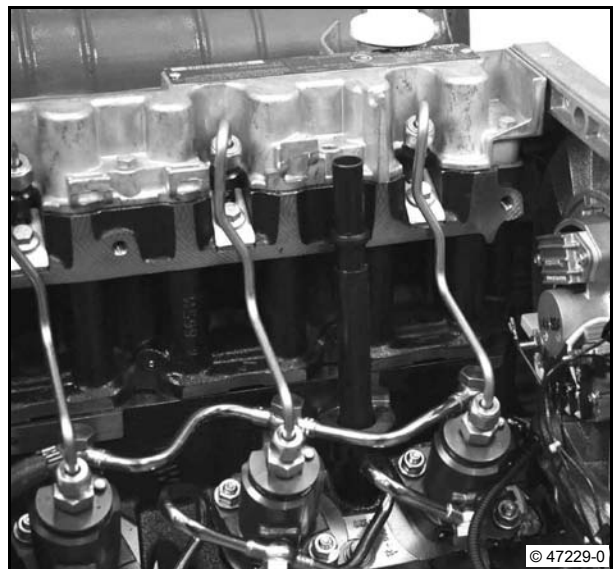
- Tighten screw (1).

 21 Nm



- Install injection lines.

 W 07-03-01



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A07 001	Fuel injector on cylinder head			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the lifting magnet (charge air pressure-dependent full load stop)



Standard tools:

– Plier insert 8027

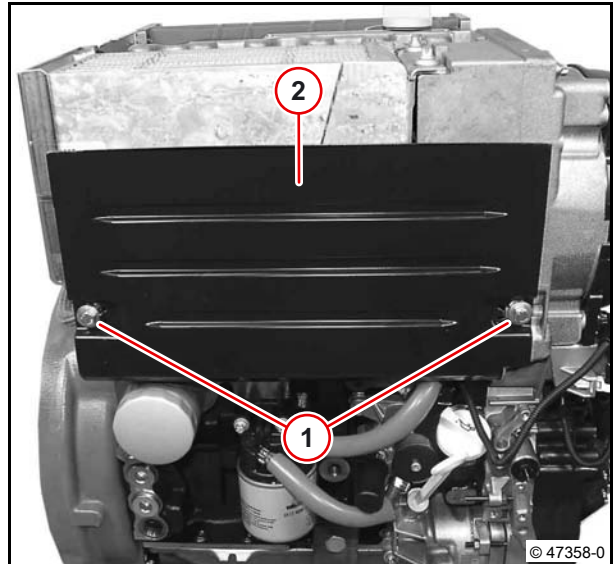
Special tools:

– Disassembly tool 110901

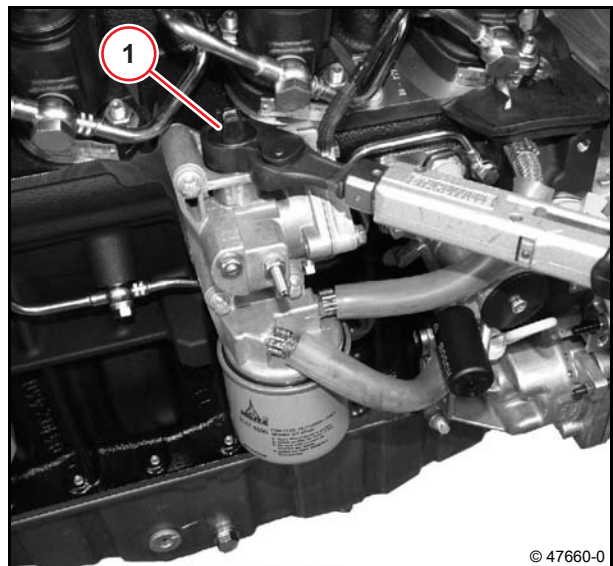
Remove lifting magnet

– TD 2011 i

- Unscrew screws (1).
- Remove air guidance cowling (2).



- Pull out cable plug.
- Unscrew lifting magnet (1) with plier insert.



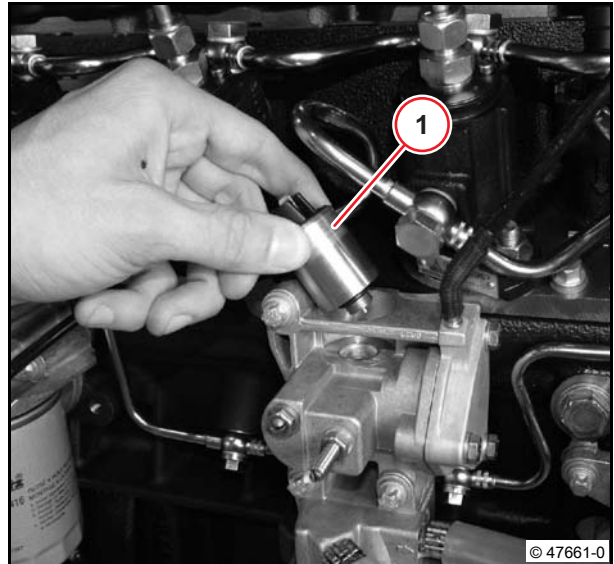
- Remove the O-ring with the disassembly tool.
- Visually inspect the components.



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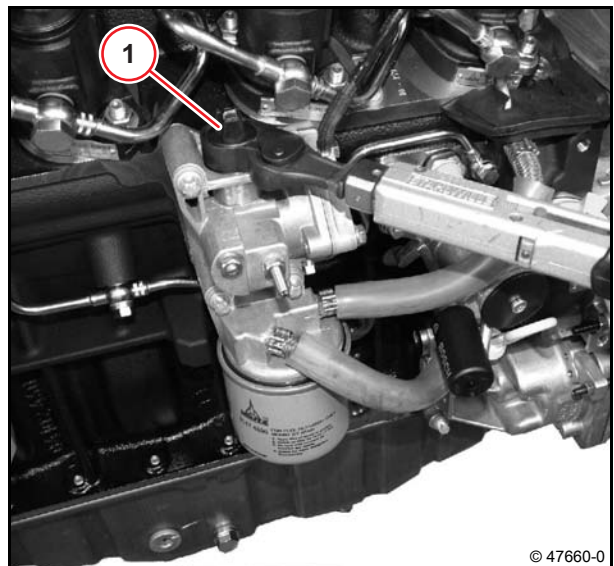
Install lifting magnet

- Mount new O-ring.
- Insert lifting magnet (1).



- Tighten lifting magnet (1) with plier insert.

 10 Nm

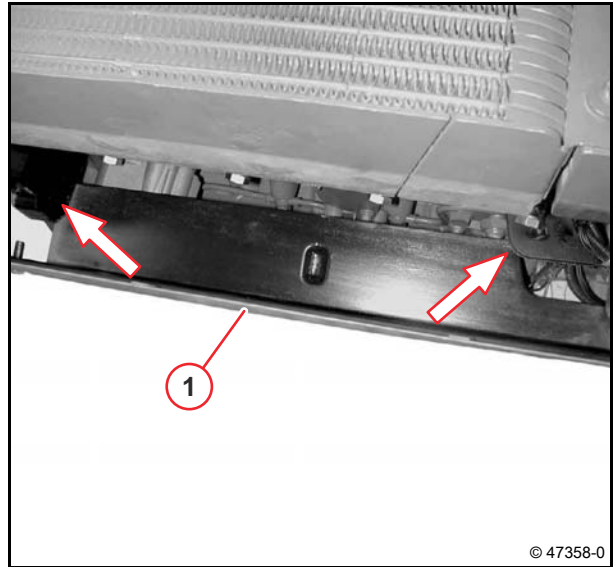


- TD 2011 i

- Mount air guidance cowling (1).

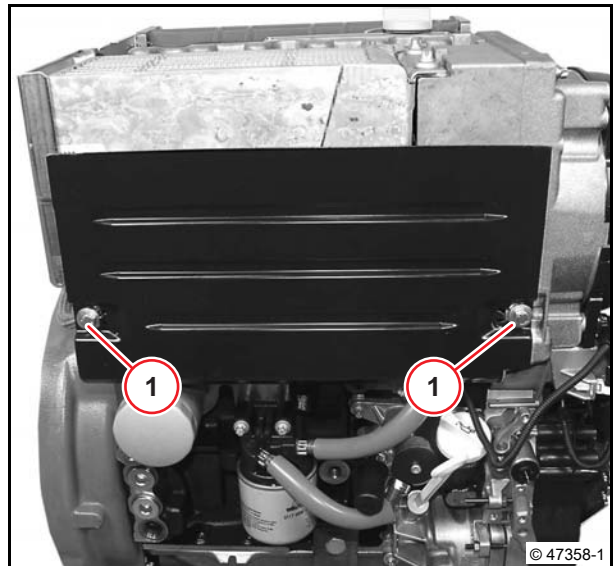


Air guidance cowling must sit under the stand plate and rubber profile (arrow).



- Tighten screws (1).

 21 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 094	Lifting magnet on fuel filter console		Renew O-ring	10 Nm
A09 087	Air guidance cowling on blower jacket / stand plate			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Installing and removing charge air pressure-dependent full load stop



Standard tools:

– Plier insert

8027

Special tools:

– Disassembly tool

110901



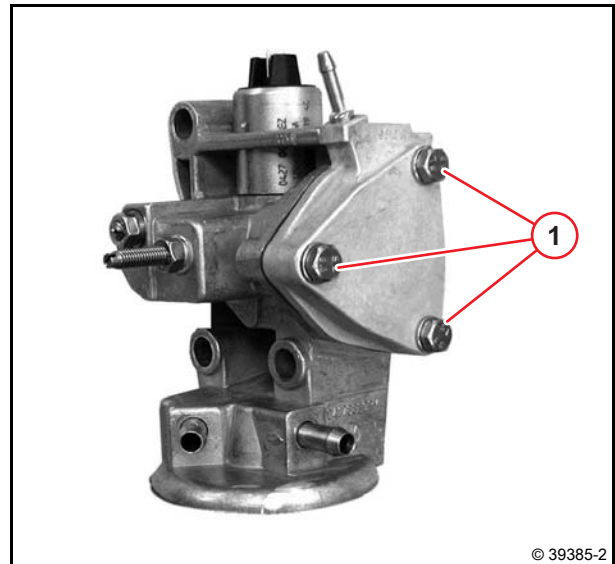
– W 07-10-08

Removing the charge air-pressure dependent full load stop

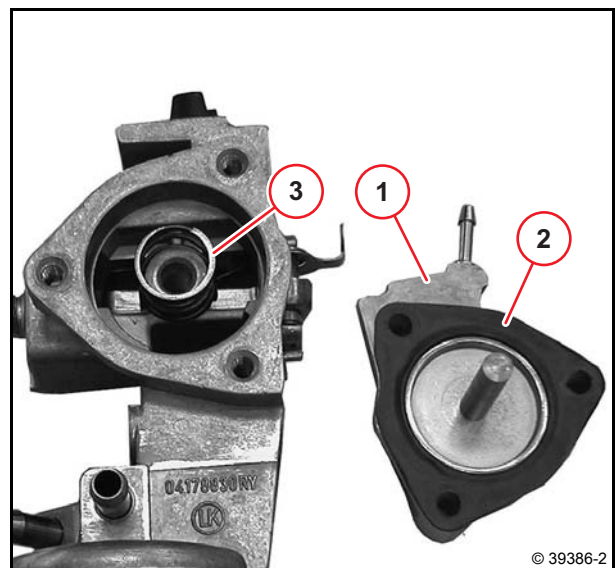
- Remove fuel filter console.

 W 07-10-08

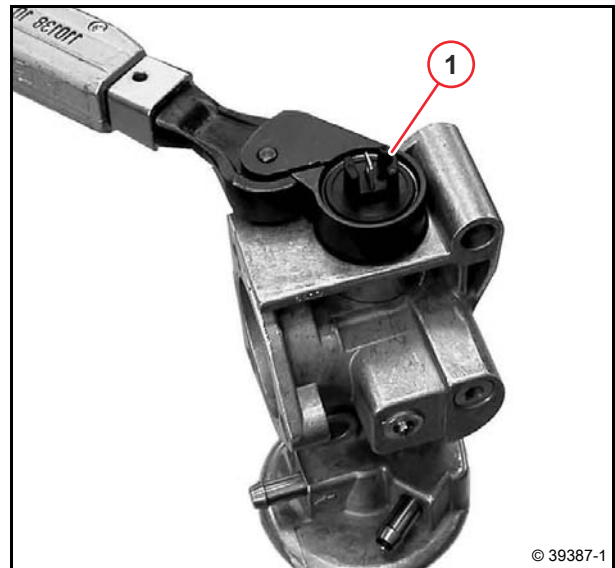
- Unscrew screws (1).



- Remove cover (1).
- Remove diaphragms (2).
- Remove spring (3).



- Unscrew lifting magnet (1) with plier insert.



6

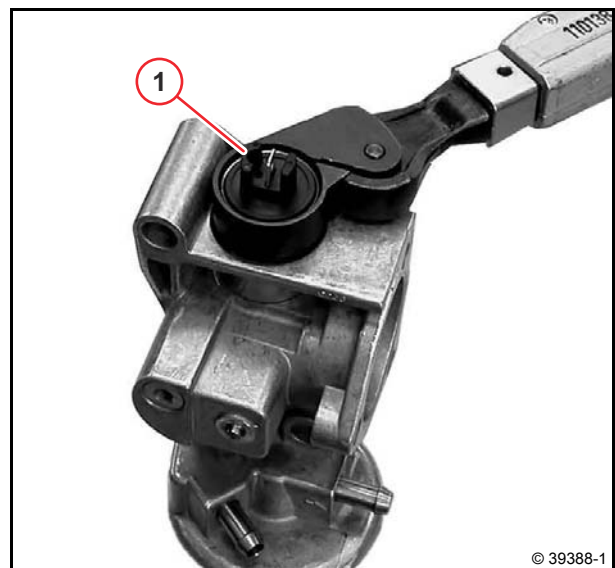
- Remove the O-ring with the disassembly tool.
- Visually inspect the components.



Installing the charge air-pressure dependent full load stop

- Clean sealing surfaces.
- Mount new O-ring.
- Tighten lifting magnet (1) with plier insert.

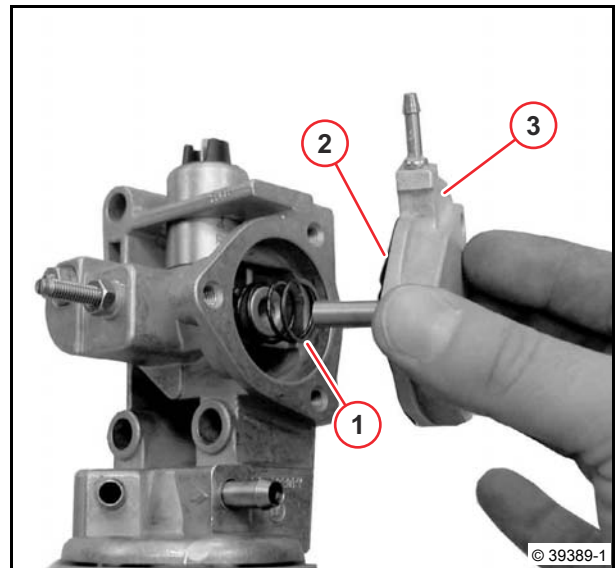
 10 Nm



- Insert spring (1).
- Insert diaphragm (2) and cap (3).

**Attention!**

Note installation position.

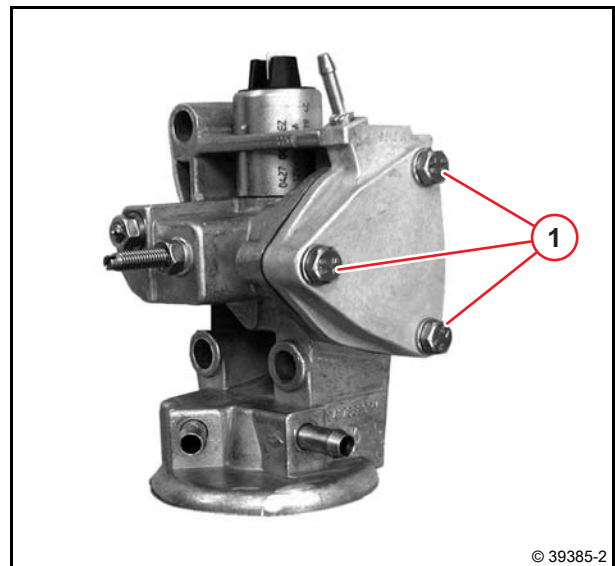


6

- Tighten screws (1).



- Install the fuel filter console.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A06 094	Lifting magnet on fuel filter console		Renew O-ring	10 Nm
A07 096	Cap on charge air-dependent full load stop			8 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing fuel pipes



Standard tools:

- Hose clip pliers 8011
- Torx tool set 8189

Special tools:

- Plugs/caps 170160



- Fitting compound
DEUTZ AP1908



Danger!

Wait 30 seconds after switching off the engine before working on the fuel system.



Attention!

Pay attention to utmost cleanliness when working on the fuel system.

Remove residue paint and particles of dirt before removing.

Clean the respective affected parts carefully. Blow damp areas dry with compressed air.

Observe the safety regulations and national specifications for handling fuels.

Close all connections immediately after opening with new, clean plugs/caps.

Do not remove plugs/caps until immediately before assembling.

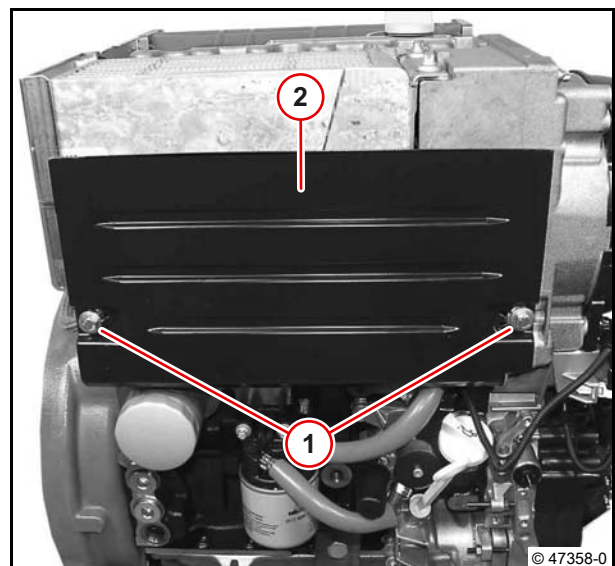
Collect leaking operating substances in suitable vessels and dispose of according to regulations.

After all work on the fuel system, it must be bled - see the operation manual, chapter "6 Fuel system".

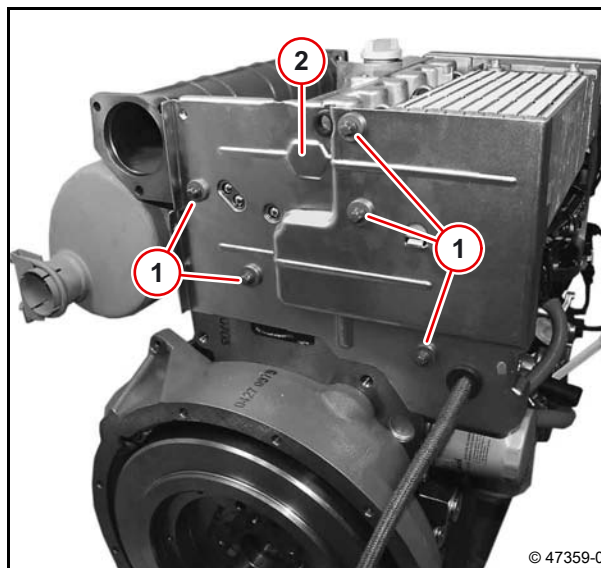
Removing fuel pipes

- D 2011 i, TD 2011 i

- Unscrew screws (1).
- Remove air guidance cowling (2).



- Unscrew screws (1).
- Remove stand plate (2).

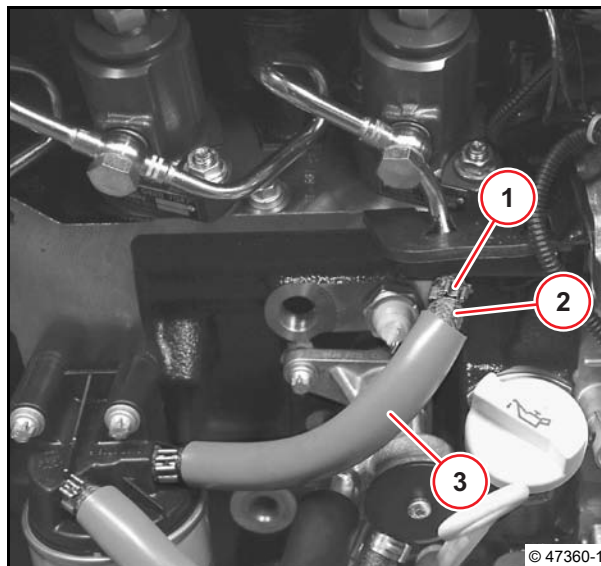


– D 2011, TD 2011

- Loosen hose clip (1).
- Pull off fuel pipe (2).
- Pull off protective hose (3).



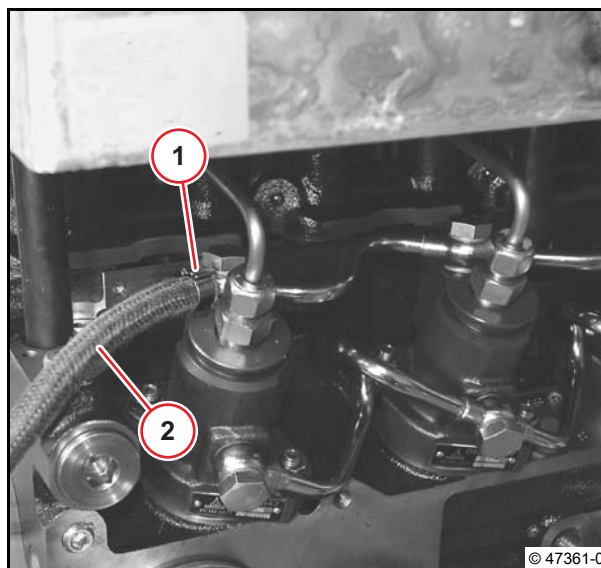
Collect draining fuel and dispose of according to regulations.



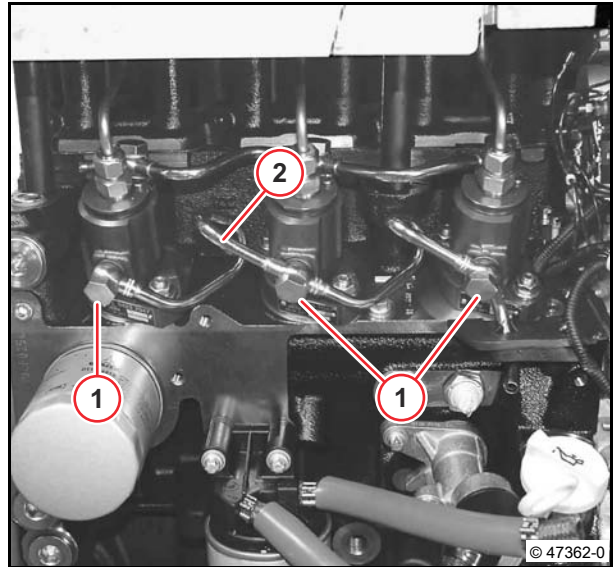
- Loosen hose clip (1).
- Pull off fuel pipe (2).




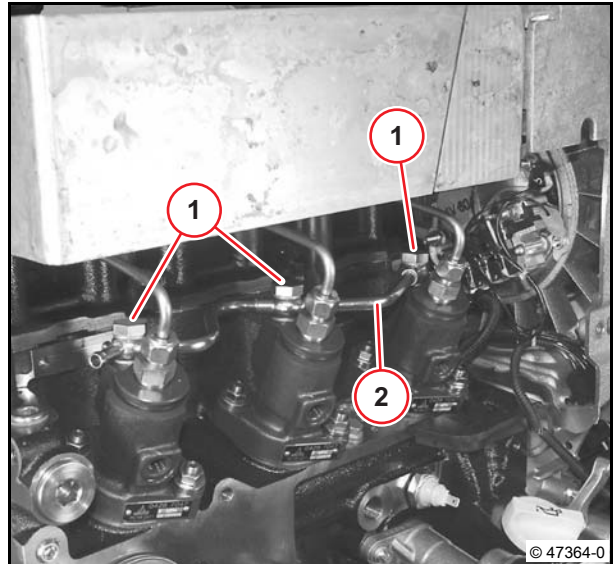
Collect draining fuel and dispose of according to regulations.



- Unscrew hollow screws (1).
- Remove fuel pipe (2).
- Remove sealing rings.



- Unscrew hollow screws (1).
 - Remove fuel return line (2).
-  Remove fuel return line in the direction of the flywheel.
- Remove sealing rings.



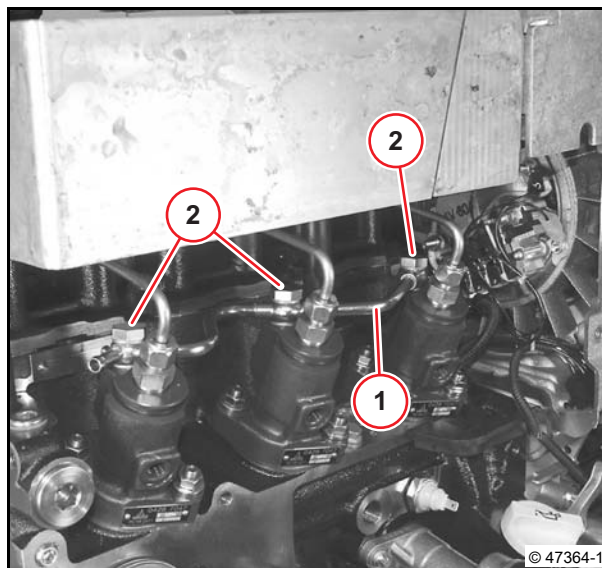
- Visually inspect the components.



Installing fuel pipes

- Mount new sealing rings.
- Mount fuel return pipe (1).
- Tighten hollow screws (2).

 29 Nm



6

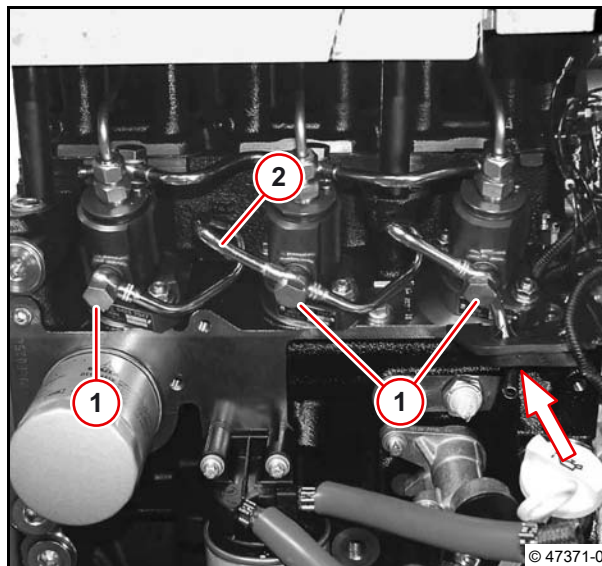
- Mount new sealing rings.
- Mount fuel pipe (2).



Position hose connection (arrow) in rubber profile.

- Tighten hollow screws (1).

 29 Nm



- Mount fuel hose (2).



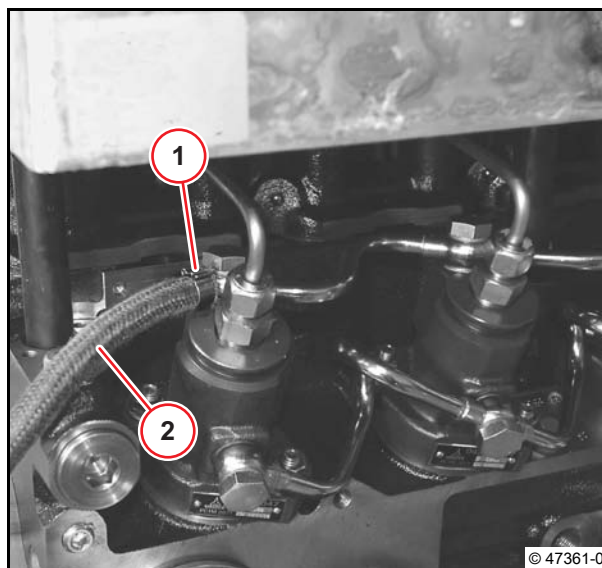
Lay hose without contact.

Ensure that the installation location is free from faults.

- Mount new hose clip (1).
- Fix the hose clip (1) with the hose clip pliers.



Ensure that the installation location is free from faults.



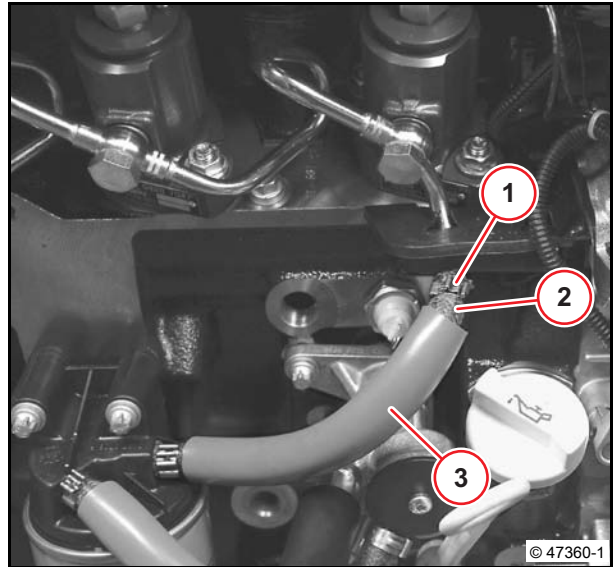
- Slip protective hose (3) over with mounting compound.




Lay hose without contact.

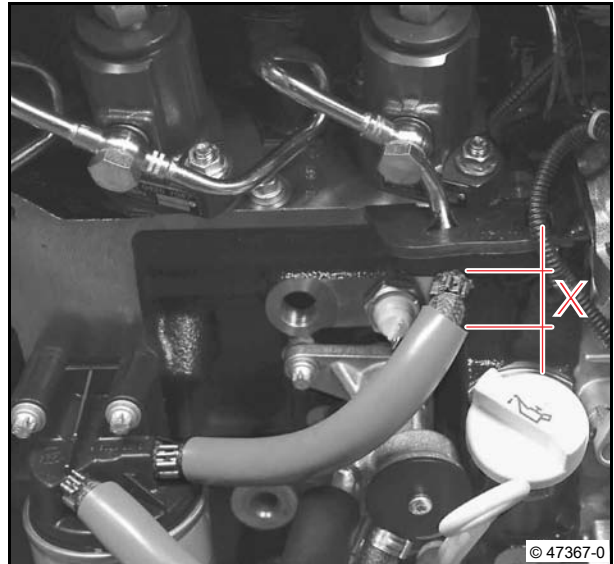
Ensure that the installation location is free from faults.

- Mount fuel hose (2).
- Mount new hose clip (1).



- Position protective hose, dimension X.

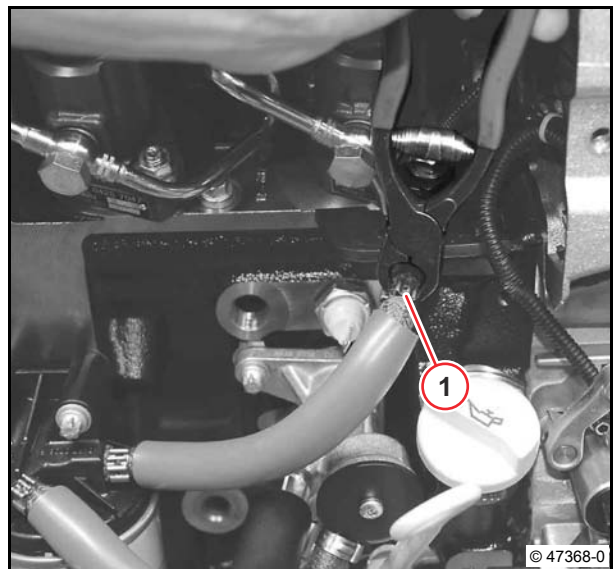
 20 mm



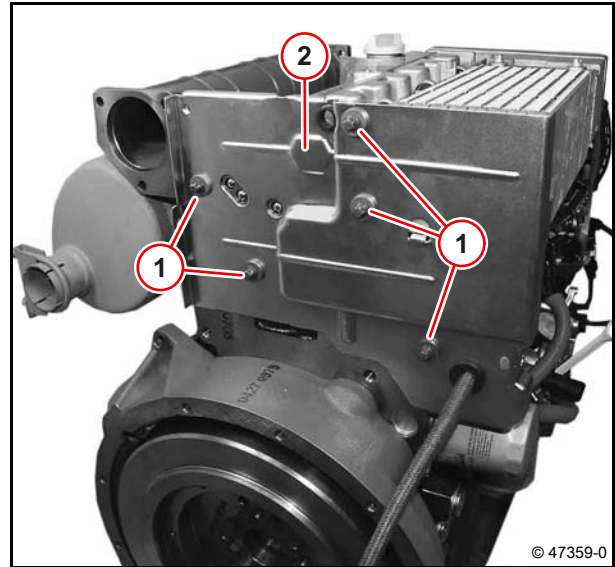
- Fix the hose clip (1) with the hose clip pliers.




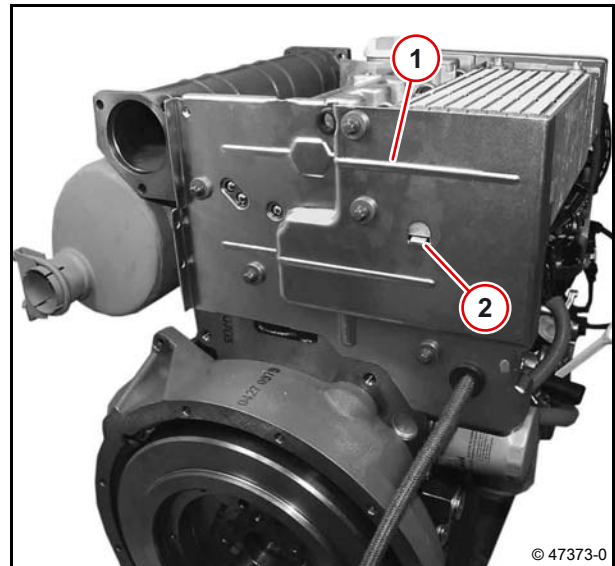
Ensure that the installation location is free from faults.





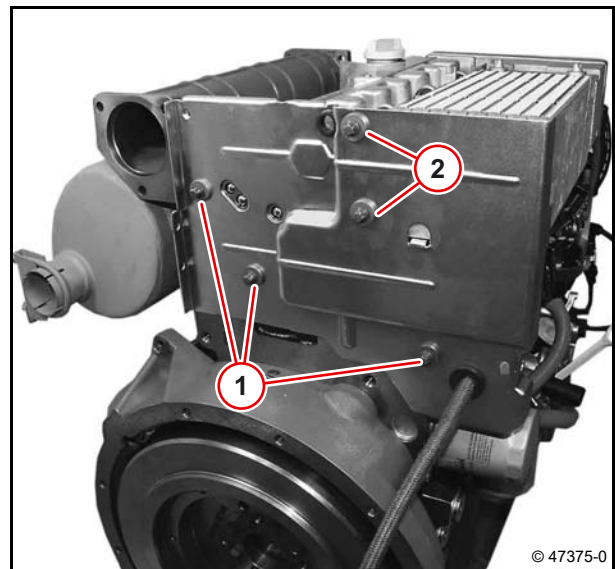
- D 2011 i, TD 2011 i
- Install stand plate (2).
- Tighten screws (1).



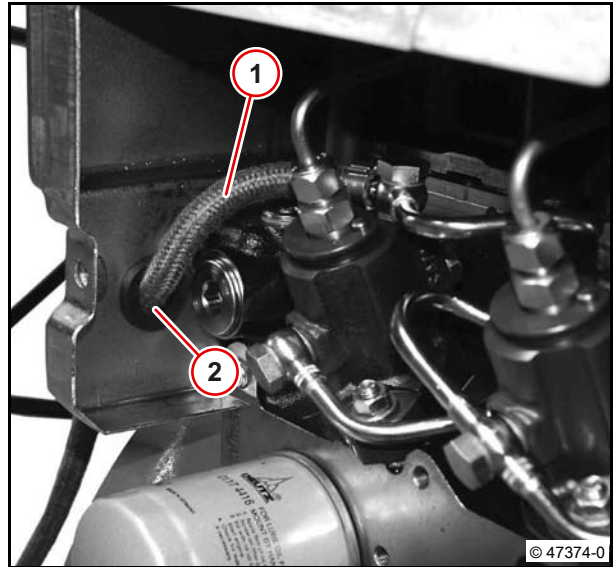
- Position stand plate (1).
-  Lug (2) must lie in the hole.



- Tighten screws (1).
 21 Nm
- Tighten screws (2).
 21 Nm



- Feed hose pipe (1) through the hole (2).

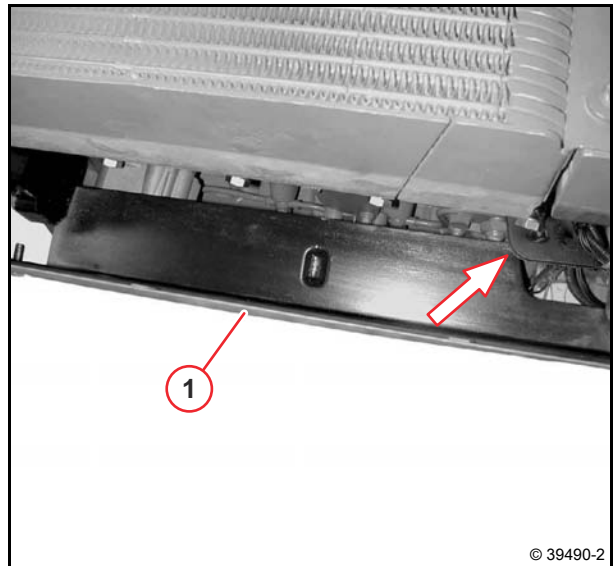


- Mount air guidance cowling (1).



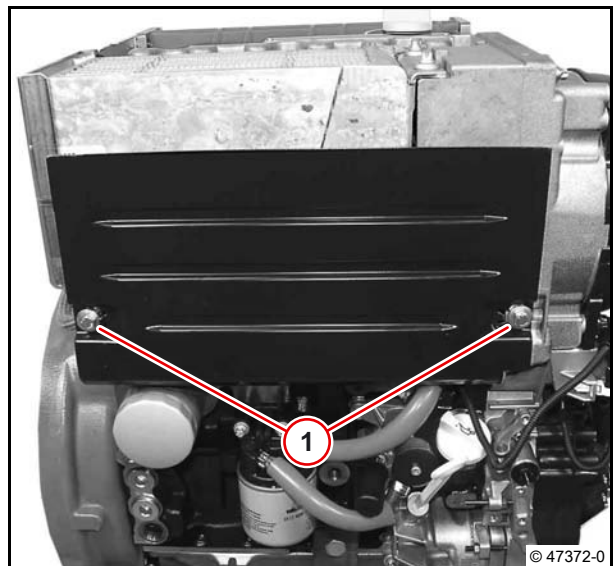
Note installation position.

Air guidance cowling must sit under the stand plate and rubber profile (arrow).



- Tighten screws (1).

 21 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A07 015	Fuel supply line to injection pump	Hollow screw	Replace sealing rings	29 Nm
A07 061	Fuel return line on injection pump	Hollow screw	Replace sealing rings	29 Nm
A09 070	Stand plate on crankcase / lubricating oil cooler	Torx M8x20		21 Nm
A09 087	Air guidance cowling on blower jacket / stand plate			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the fuel filter console



Standard tools:

- Hose clip pliers 8011
- Torx tool set 8189

Special tools:

- Special wrench 170050
- Plugs/caps 170160



- Fitting compound
DEUTZ AP1908



- Operation manual



Danger!

Wait 30 seconds after switching off the engine before working on the fuel system.



Attention!

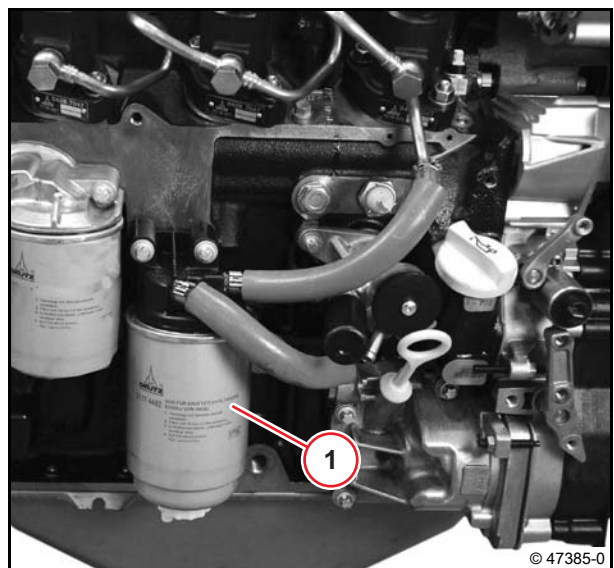
Pay attention to utmost cleanliness when working on the fuel system. Remove residue paint and particles of dirt before removing. Clean the respective affected parts carefully. Blow damp areas dry with compressed air. Observe the safety regulations and national specifications for handling fuels. Close all connections immediately after opening with new, clean plugs/caps. Do not remove plugs/caps until immediately before assembling. Collect leaking operating substances in suitable vessels and dispose of according to regulations. After all work on the fuel system, it must be bled - see the operation manual, chapter "6 Fuel system".

Removing the fuel filter console

- Unscrew fuel filter (1) with special wrench.



Collect draining fuel and dispose of according to regulations.

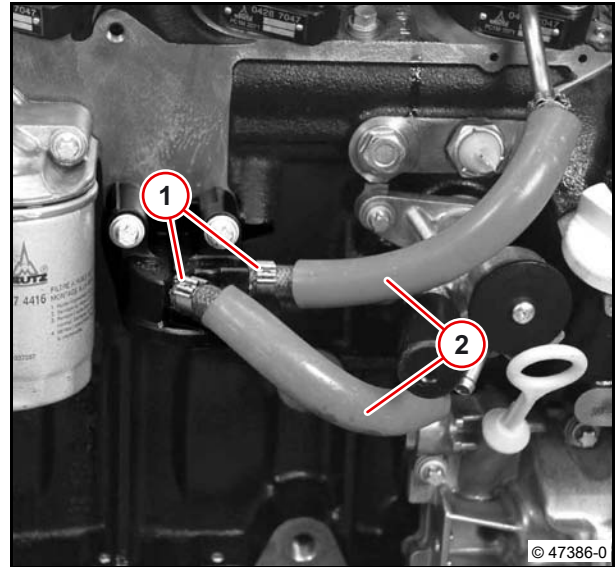


- Loosen hose clips (1).

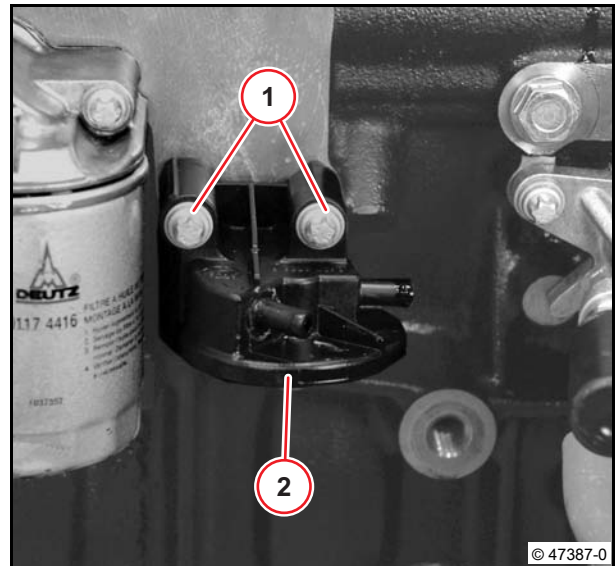


Collect draining fuel and dispose of according to regulations.

- Pull off fuel hoses.
- Pull off protective hoses (2).



- Unscrew screws (1).
- Remove fuel filter console (2).



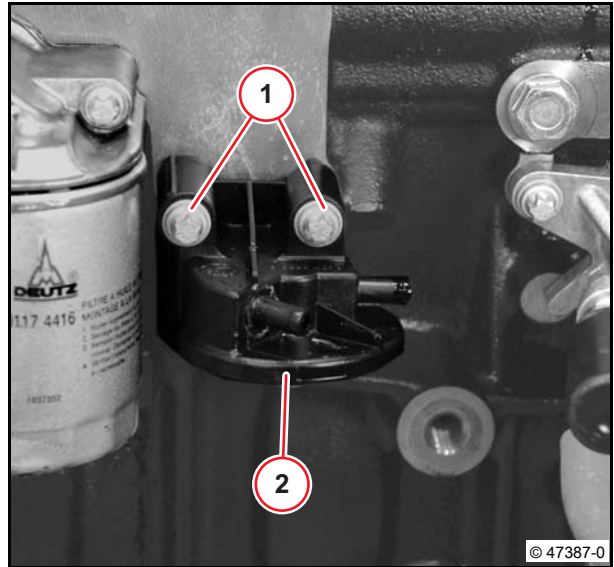
- Visually inspect the components.



Installing the fuel filter console

- Install the fuel filter console (2).
- Tighten screws (1).

21 Nm



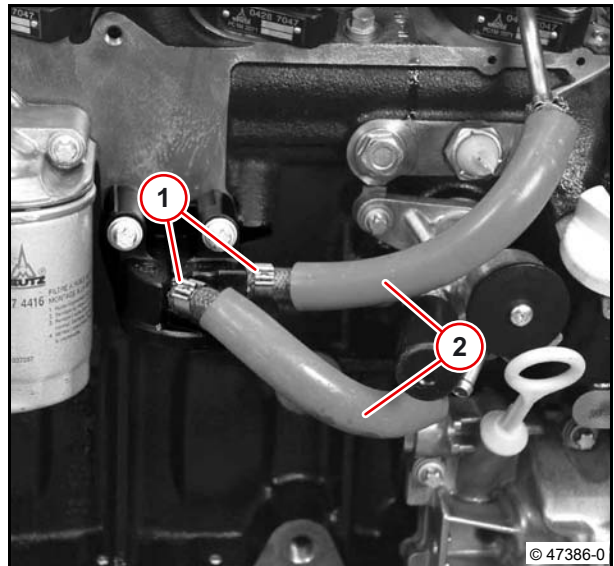
- Slip protective hoses (2) over with mounting compound.



Note assignment!

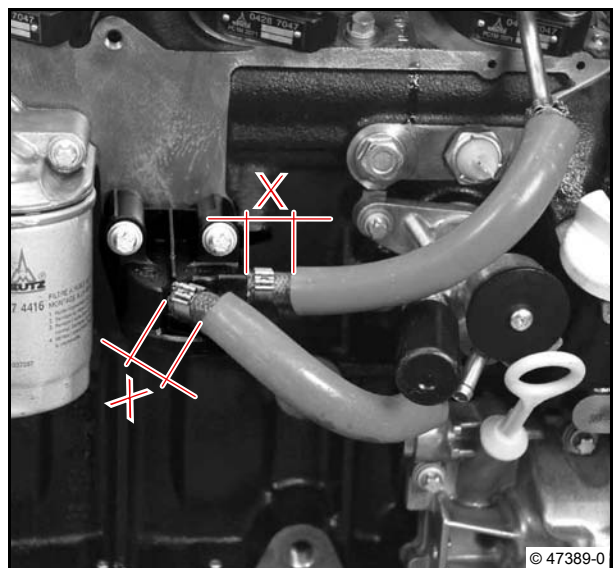
Lay hoses without contact.

- Install fuel hoses.
- Mount new hose clips (1).



- Position protective hoses, dimension X.

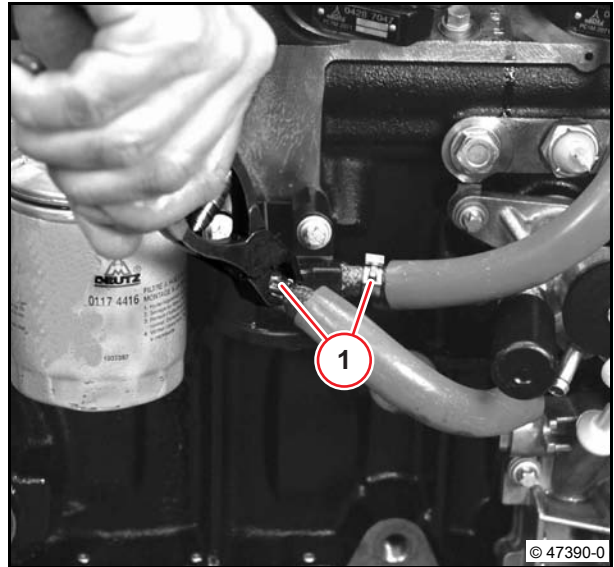
20 mm



- Fasten hose clips (1) with hose clip pliers.



Ensure that the installation location is free from faults.



- Clean sealing surfaces.
- Lightly oil gasket on new fuel filter.
- Screw on fuel filter by hand.



The seal must fit evenly.

- Lightly oil gasket on new fuel filter.
- Tighten the fuel filter according to the instruction manual.

 Operation manual



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A07 087	Fuel filter console to crankcase			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the fuel filter console



Standard tools:

- Hose clip pliers 8011
- Torx tool set 8189

Special tools:

- Disassembly tool 110901
- Special wrench 170050
- Plugs/caps 170160



- Fitting compound
DEUTZ AP1908



Danger!

Wait 30 seconds after switching off the engine before working on the fuel system.



Attention!

Pay attention to utmost cleanliness when working on the fuel system.

Remove residue paint and particles of dirt before removing.

Clean the respective affected parts carefully. Blow damp areas dry with compressed air.

Observe the safety regulations and national specifications for handling fuels.

Close all connections immediately after opening with new, clean plugs/caps.

Do not remove plugs/caps until immediately before assembling.

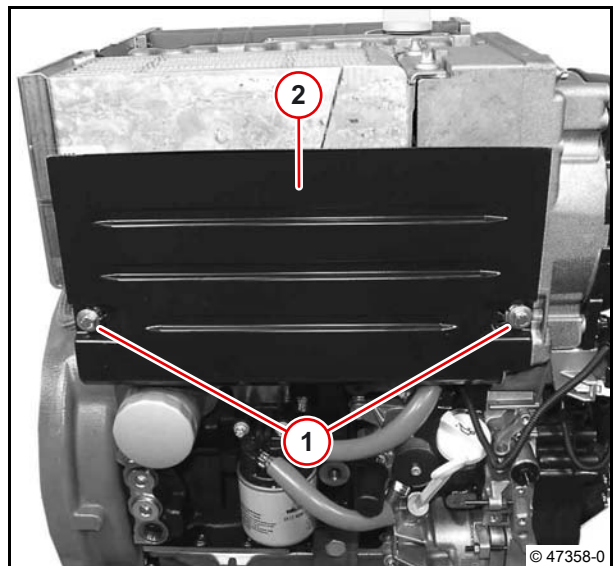
Collect leaking operating substances in suitable vessels and dispose of according to regulations.

After all work on the fuel system, it must be bled - see the operation manual, chapter "6 Fuel system".

Removing the fuel filter console

- TD 2011 i

- Unscrew screws (1).
- Remove air guidance cowling (2).



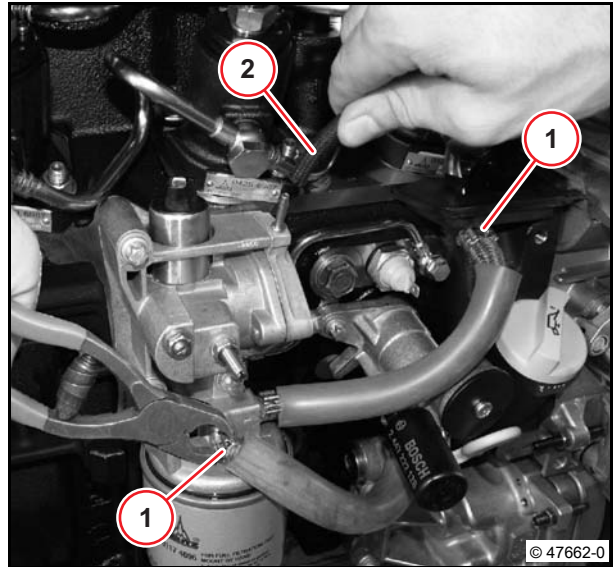
- TD 2011

- Loosen hose clips (1) with hose clip pliers.

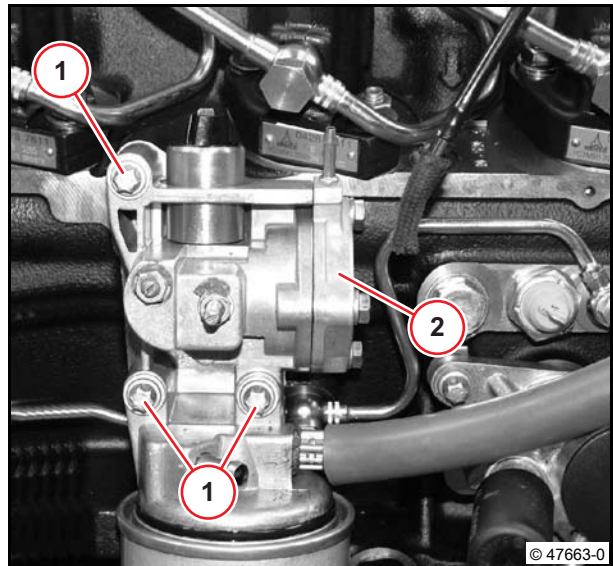


Collect draining fuel and dispose of according to regulations.

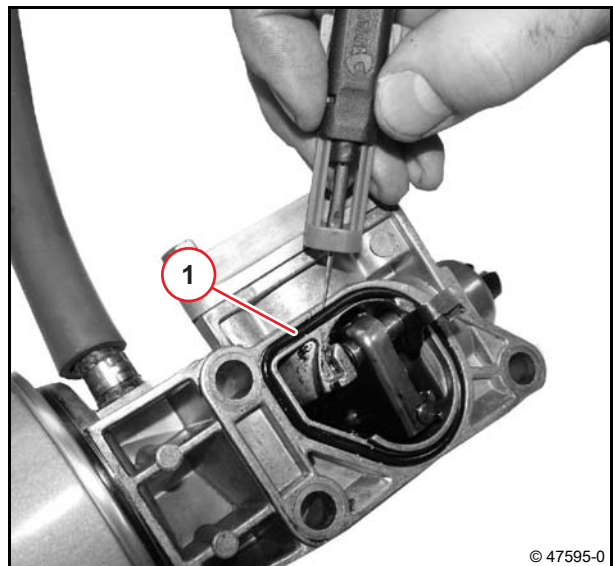
- Pull off fuel hoses.
- Pull off hose pipe (2).



- Unscrew screws (1).
- Remove fuel filter console (2).



- Remove the O-ring (1) with the disassembly tool.

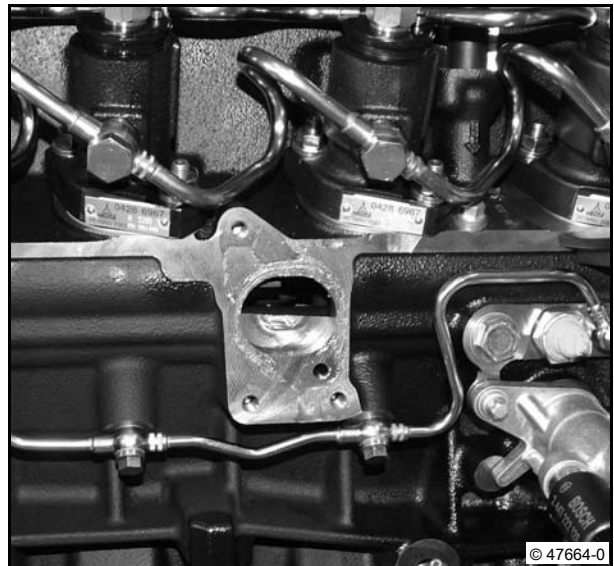


- Visually inspect the components.

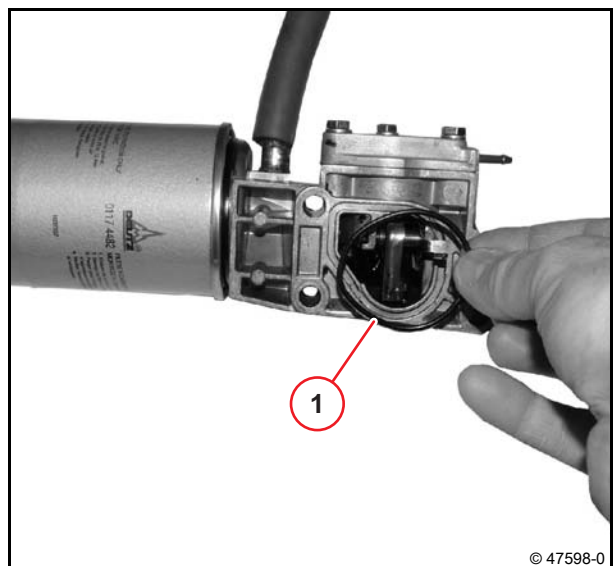


Installing the fuel filter console

- Clean sealing surfaces.

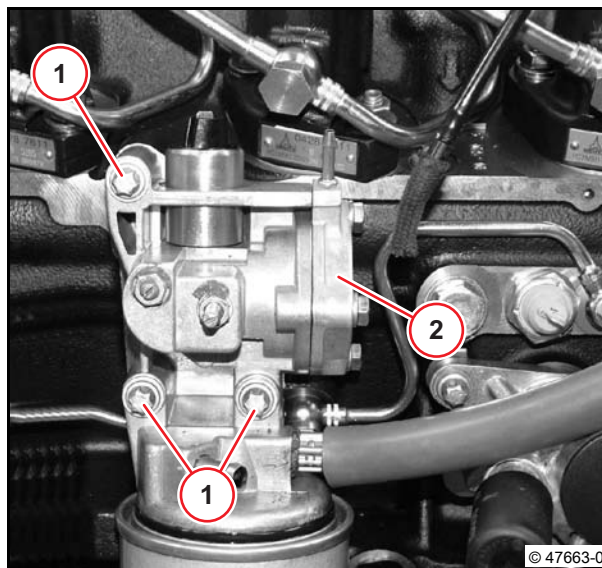


- Insert new sealing ring (1).



- Install the fuel filter console (2).
- Tighten screws (1).

22 Nm



6



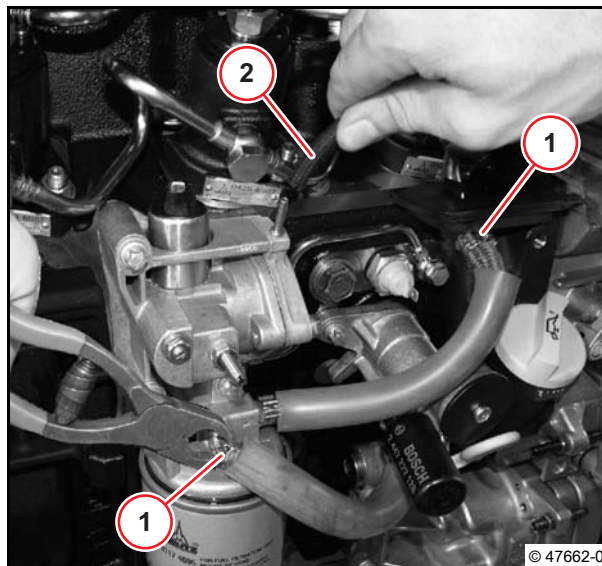
Note assignment!
Lay hoses without contact.

- Install fuel hoses.
- Mount new hose clips (1).
- Fasten hose clips (1) with hose clip pliers.



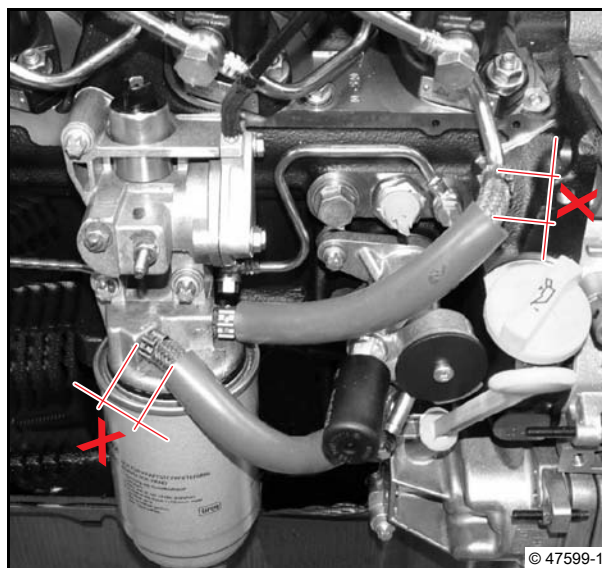
Ensure that the installation location is free from faults.

- Mount the hose pipe (2).



- Position protective hoses, dimension X.

20 mm

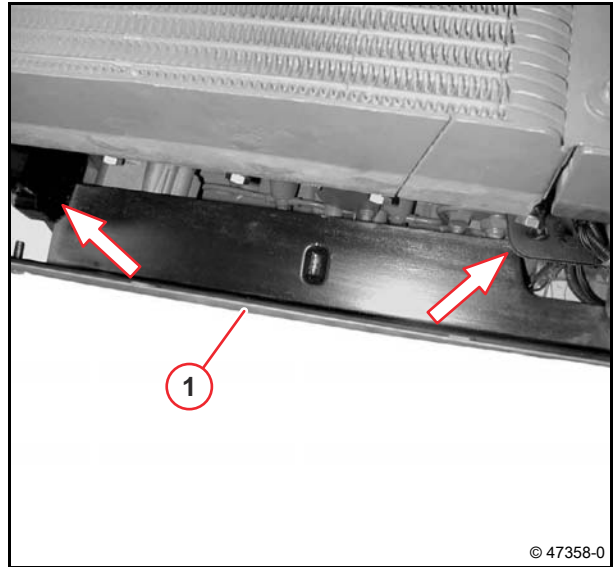


- TD 2011 i

- Mount air guidance cowling (1).

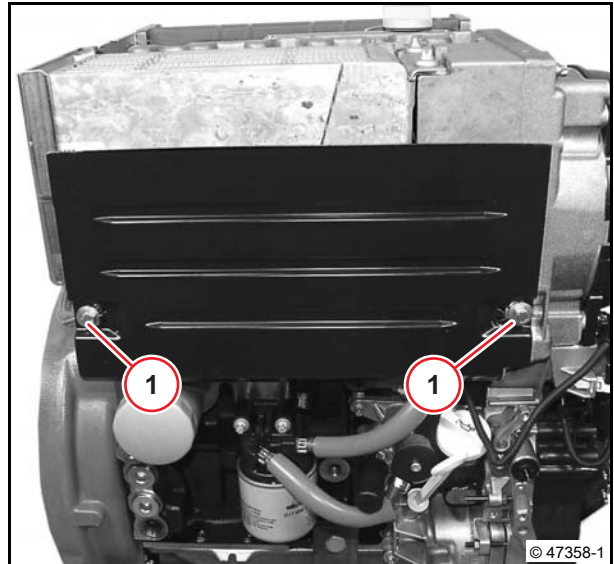


Air guidance cowling must sit under the stand plate and rubber profile (arrow).



- Tighten screws (1).

 21 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A07 087	Fuel filter console/full load stop to crankcase	Torx, M8x50-8.8		22 Nm
A09 087	Air guidance cowling on blower jacket / stand plate			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the fuel supply pump



Standard tools:
– Hose clip pliers 8011

Special tools:
– Disassembly tool 110901
– Plugs/caps 170160



– Fitting compound
DEUTZ AP1908
– Lubricating oil



Danger!

Wait 30 seconds after switching off the engine before working on the fuel system.



Attention!

Pay attention to utmost cleanliness when working on the fuel system.

Remove residue paint and particles of dirt before removing.

Clean the respective affected parts carefully. Blow damp areas dry with compressed air.

Observe the safety regulations and national specifications for handling fuels.

Close all connections immediately after opening with new, clean plugs/caps.

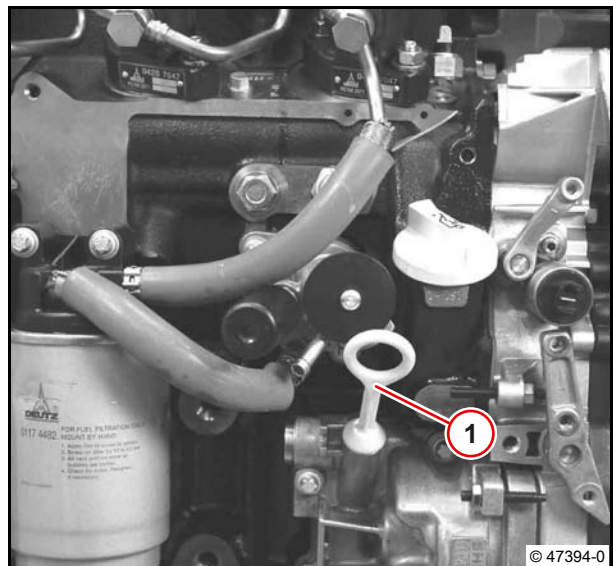
Do not remove plugs/caps until immediately before assembling.

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

After all work on the fuel system, it must be bled - see the operation manual, chapter "6 Fuel system".

Removing the fuel supply pump

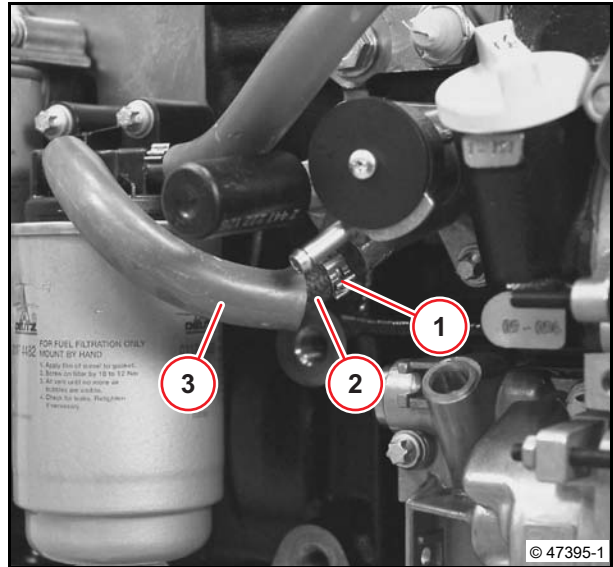
- Pull out oil dipstick (1).



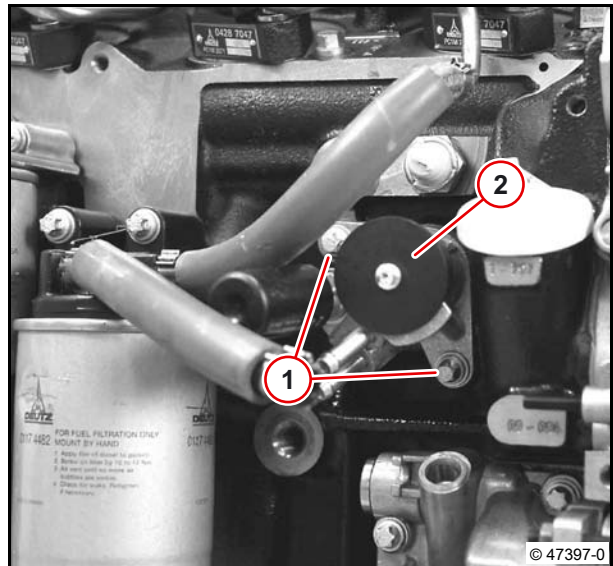
- Loosen hose clip (1).
- Pull off fuel pipe (2).
- Pull off protective hose (3).



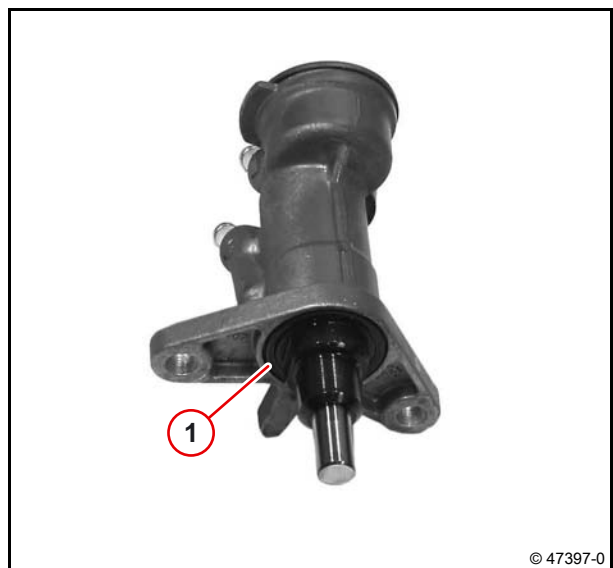
Collect draining fuel and dispose of according to regulations.



- Unscrew screws (1).
- Remove fuel supply pump (2).

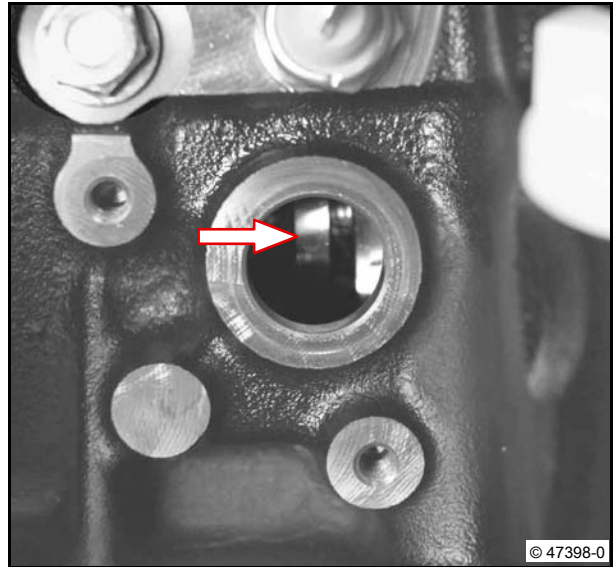


- Remove the O-ring (1) with the disassembly tool.
- Visually inspect the components.



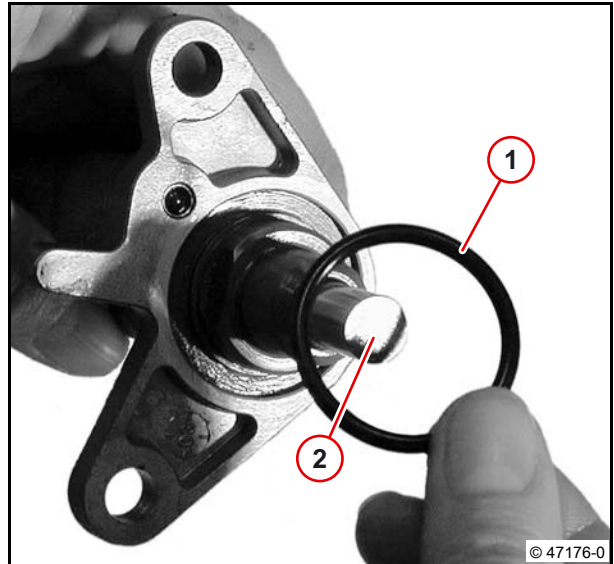
Installing the fuel supply pump

- Turn the crankshaft until the eccentric of the camshafts is in the top dead centre (arrow).



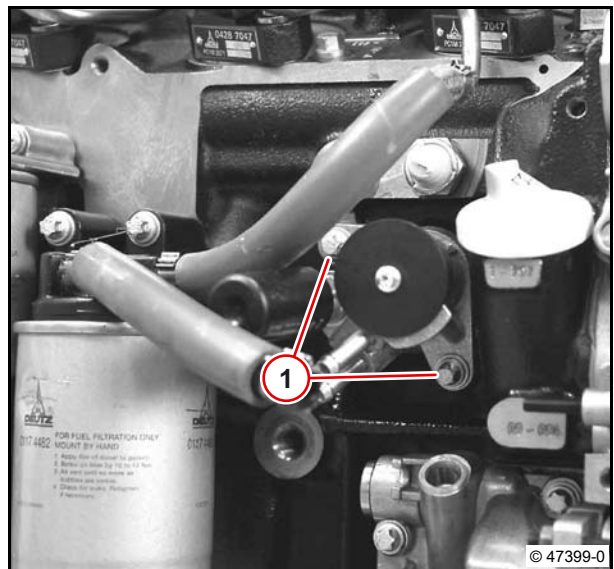
6

- Insert new O-ring (1).
- Oil tappet (2) lightly with lubricating oil.



- Clean all sealing surfaces.
- Mount fuel supply pump.
- Press fuel supply pump centrally on the crankcase.
- Tighten screws (1).

 21 Nm

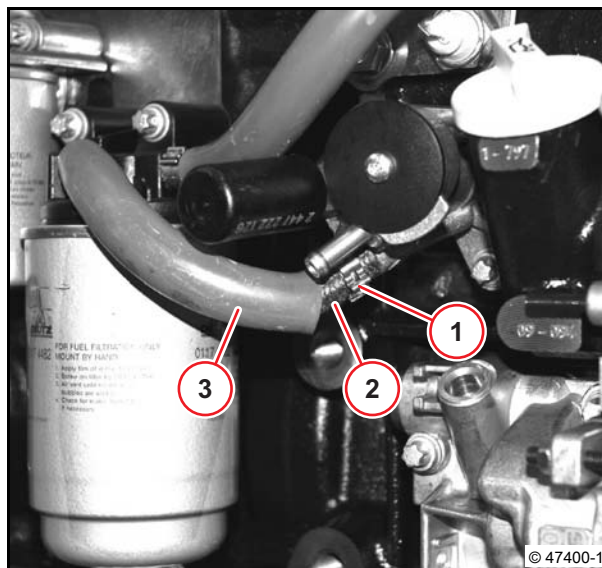


- Slip protective hose (3) over with mounting compound.



Lay hose without contact.

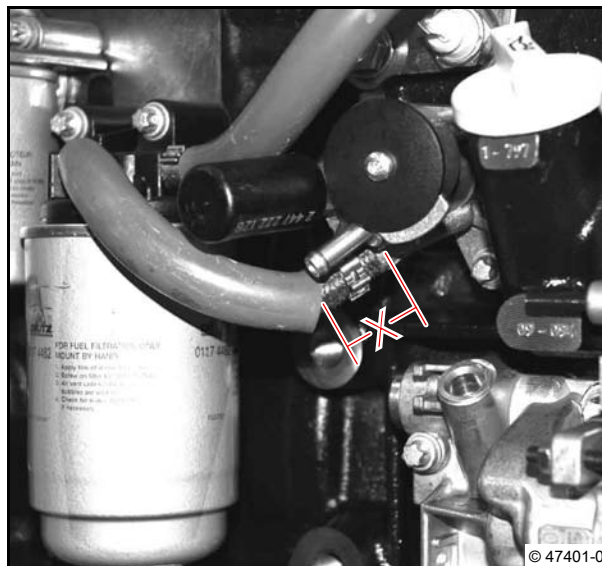
- Mount fuel hose (2).
- Mount new hose clip (1).



- Position protective hose, dimension X.



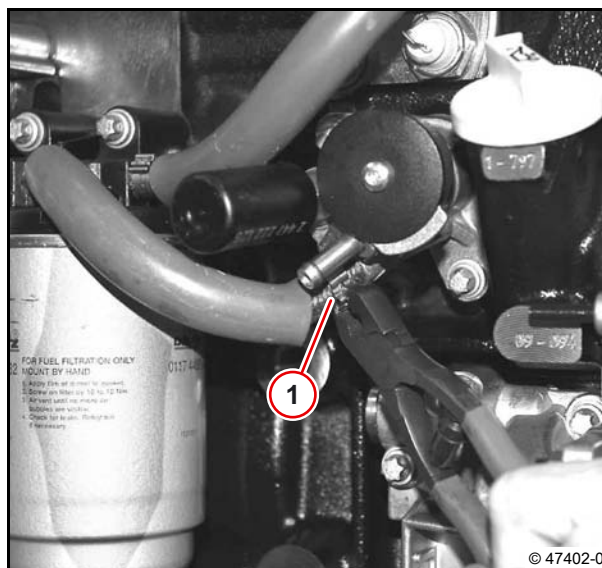
20 mm



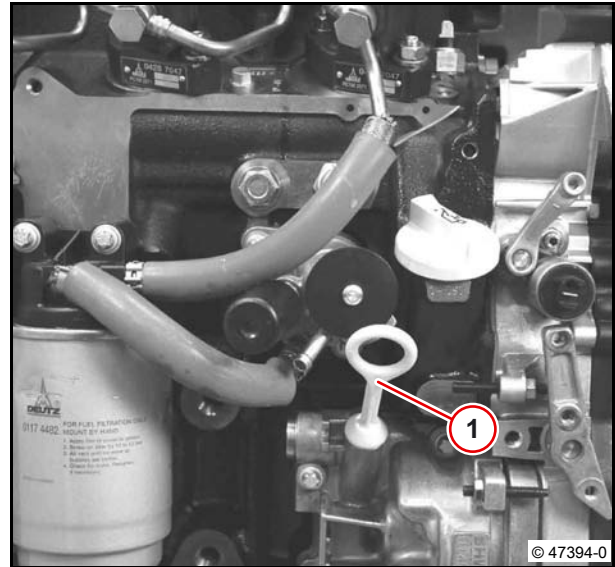
- Fix the hose clip (1) with the hose clip pliers.



Ensure that the installation location is free from faults.



- Insert oil dipstick (1).



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A07 024	Fuel supply pump on crankcase			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the lubricating oil pump



Standard tools:
– Torx tool set

8189



– W 04-04-12



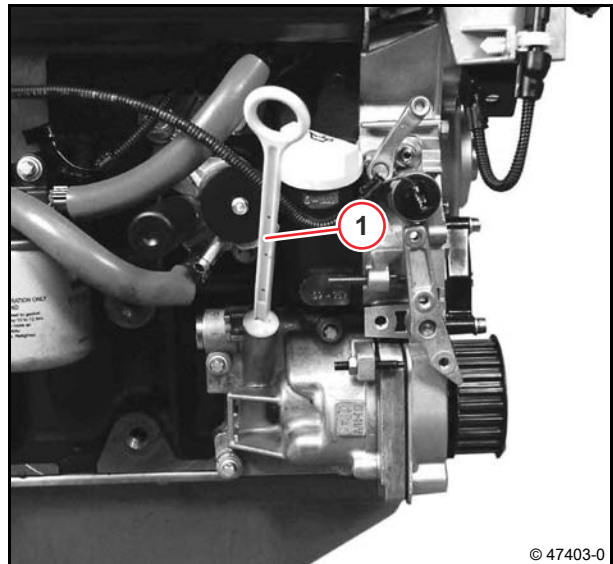
Collect leaking operating substances in suitable vessels and dispose of according to regulations.

Removing the lubricating oil pump

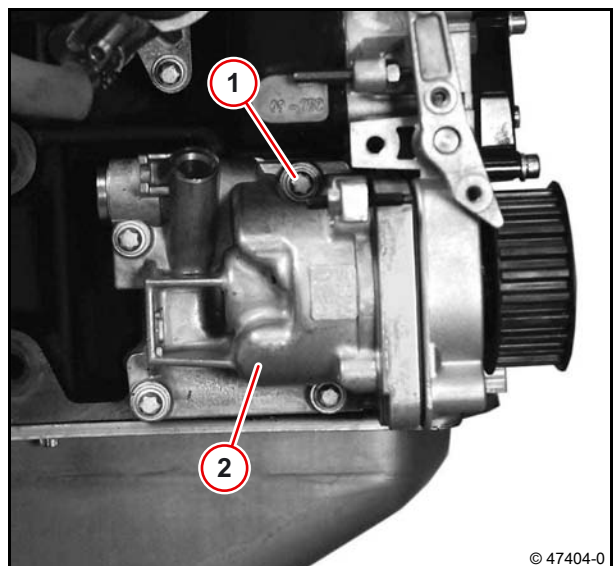
- Remove toothed belt and tensioning pulley.

 W 04-04-12

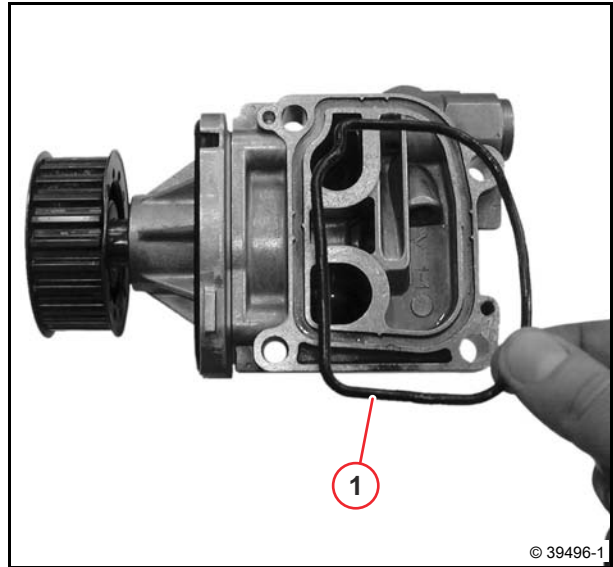
- Pull out oil dipstick (1).



- Unscrew all screws (1).
- Remove lubricating oil pump (2).



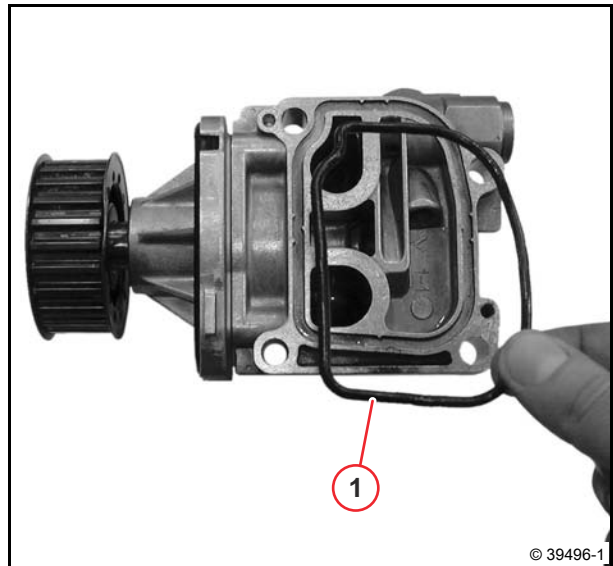
- Remove gasket (1).
- Visually inspect the components.



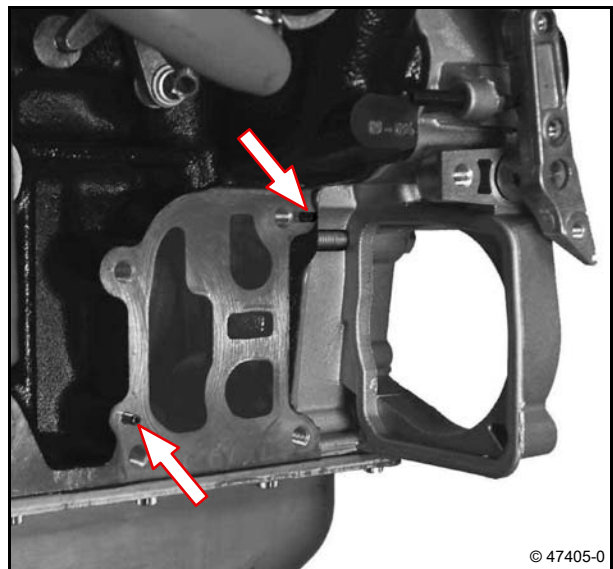
6

Install the lubricating oil pump

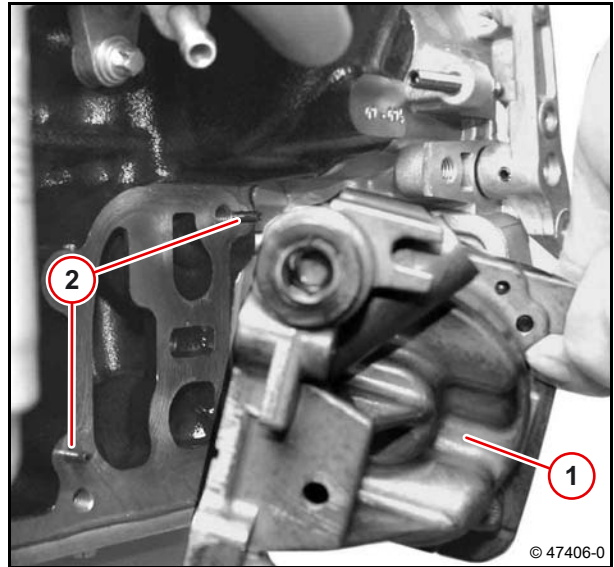
- Clean all sealing surfaces.
- Mount new gasket (1).



- Make sure the clamping bushings (arrows) are in place.

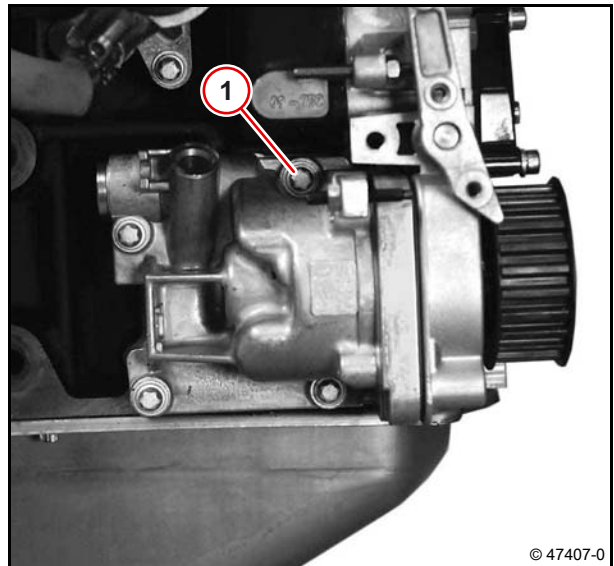


- Centre the lubricating oil pump (1) with clamping pins (2).
- Mount lubricating oil pump.



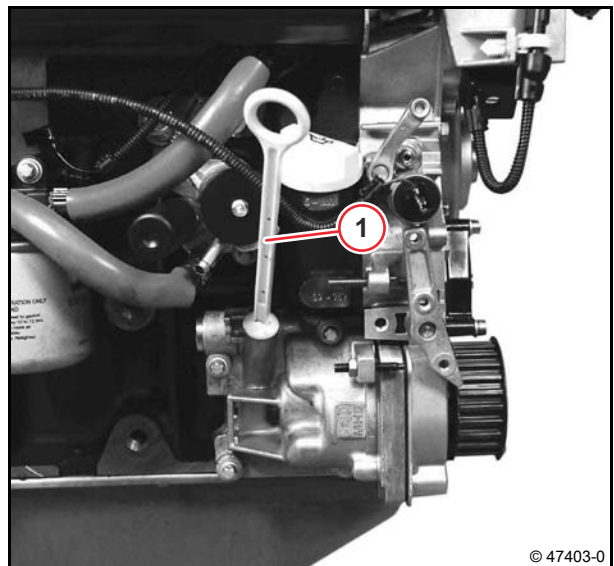
- Tighten all screws (1).

 21 Nm



- Insert oil dipstick (1).
- Install toothed belt and tensioning pulley.

 W 04-04-12



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A08 010	Lubricating oil pump on crankcase			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the oil suction pipe



Standard tools



– Packing compound
DEUTZ DW 73



– W 08-04-07



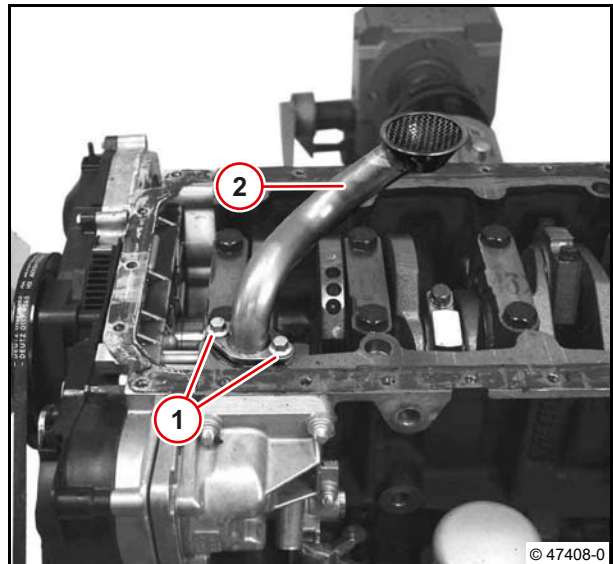
Collect leaking operating substances in suitable vessels and dispose of according to regulations.

Removing the oil suction pipe

- Remove lubricating oil pan.

 W 08-04-07

- Unscrew screws (1).
- Remove oil suction pipe (2).



- Visually inspect the components.
- Clean sealing surfaces.



Installing the oil suction pipe

- Clean sealing surfaces.



The sealing surfaces must be dry and free from grease and dirt.

- Apply packing compound (arrow).

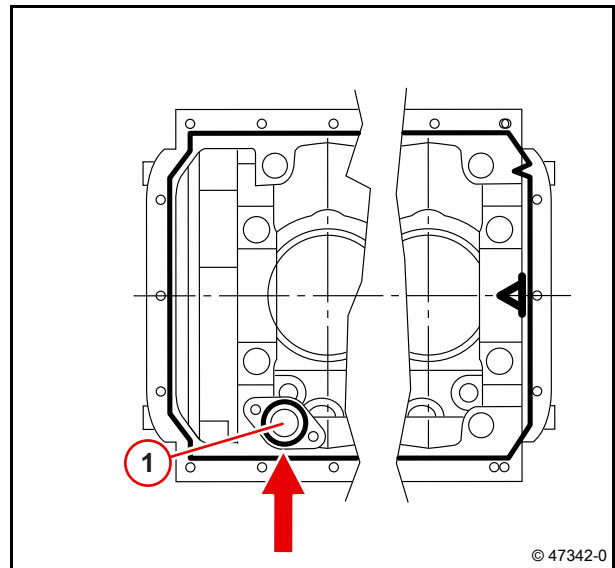


Sealing cord strength approx. 1.0 mm



Attention!

No packing compound must get into the oil channel (1)!



- Mount oil suction pipe (2).



Note installation position.

Do not displace the packing compound.

- Tighten screws (1).

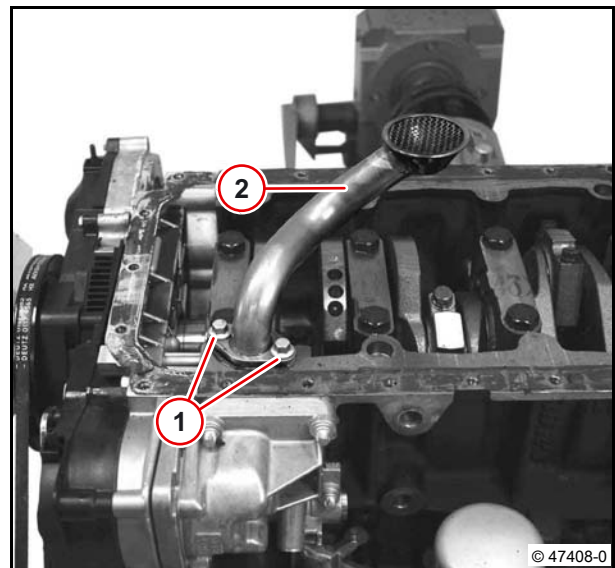


21 Nm

- Install lubricating oil pan.



W 08-04-07



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A08 015	Oil suction pipe on crankcase		Packing compound DW73	21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the lubricating oil pan (metal sheet lubricating oil pan)



Standard tools:
– Torx tool set 8189

Special tools:
– Separating tool 151500



– Packing compound
DEUTZ DW 73
– Lubricating oil



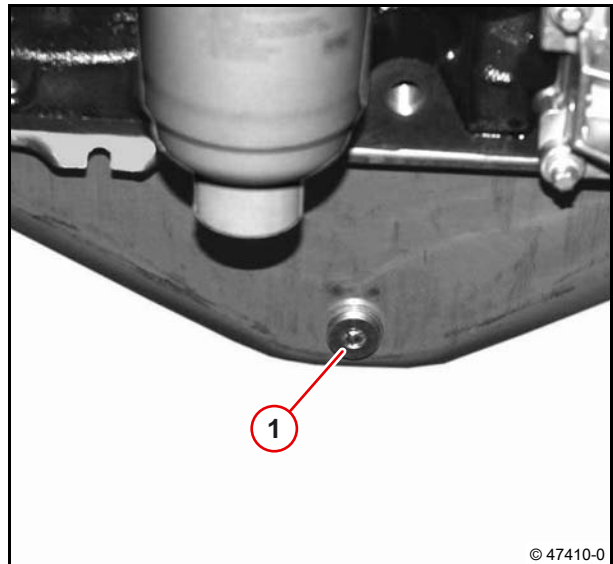
Collect leaking operating substances in suitable vessels and dispose of according to regulations.

Emptying and filling the engine with operating media must be carried out according to the operating manual and the appropriate documentation of the vehicle/equipment manufacturer.

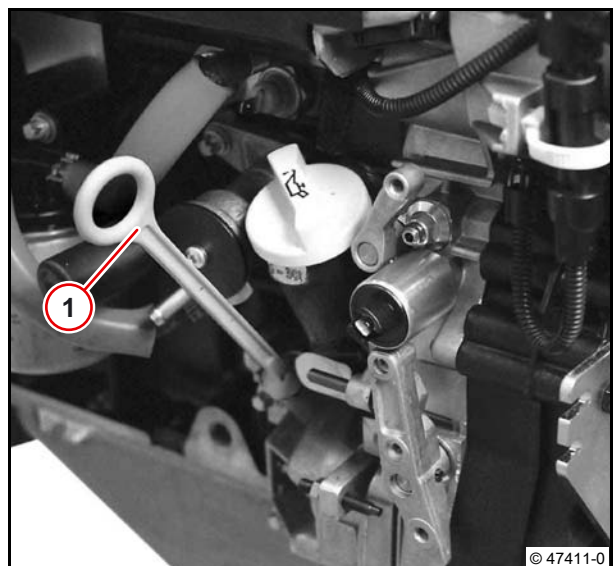
Removing the lubricating oil pan

- Unscrew locking screw (1).
- Drain lubricating oil, collect and dispose of according to regulations.
- Oil the screw plug lightly.
- Mount new sealing ring.
- Tighten screw plug (1).

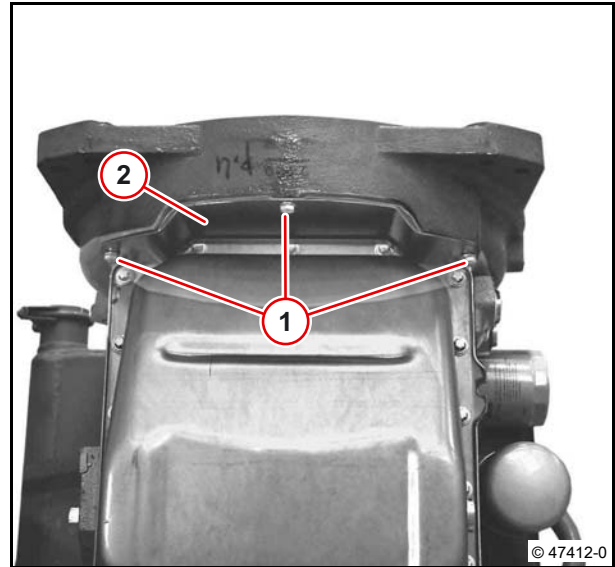
 55 Nm



- Pull out oil dipstick (1).
- Turn engine 180°.

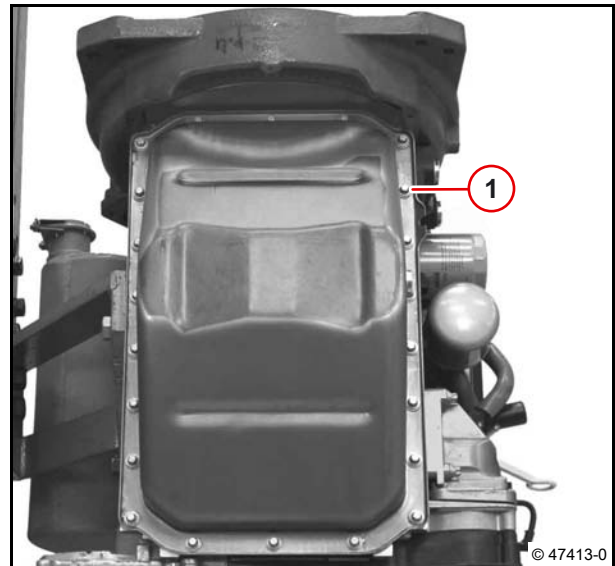


- Unscrew screws (1).
- Remove washers.
- Remove the cover (2).



6

- Unscrew all screws (1).

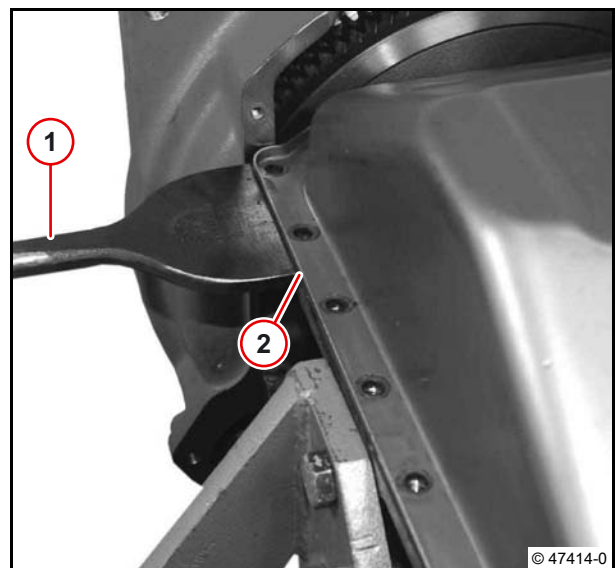


- Drive in separating tool (1) to the stop (2).



Attention!

The tool can only be driven in in the area of the crankcase.
Separation in the area of aluminium parts is not allowed.
Do not damage the sealing surfaces.

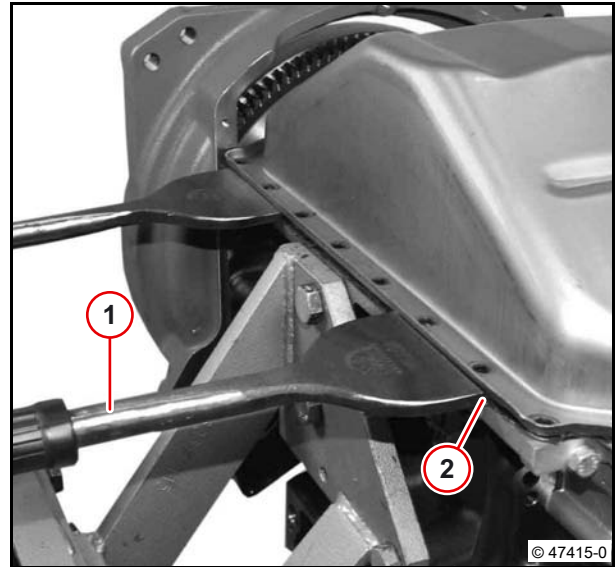


- Drive in second separating tool (1) to the stop (2).



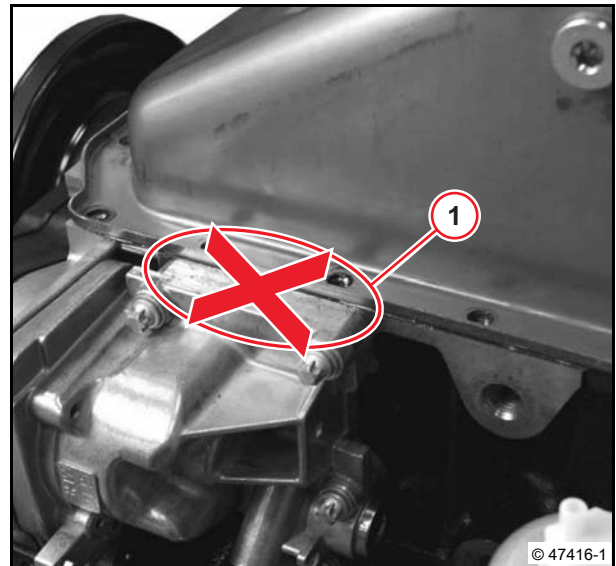
Attention!

The tool can only be driven in in the area of the crankcase.
Separation in the area of aluminium parts is not allowed.
Do not damage the sealing surfaces.

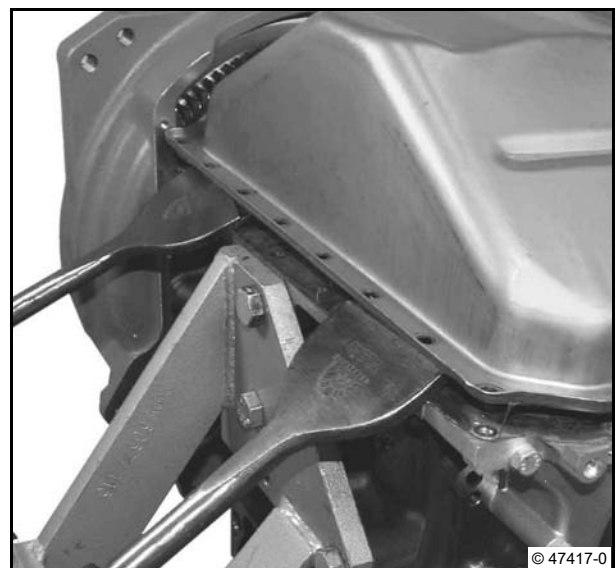


Attention!

Do not drive in separating tool in the area of the lubricating oil pump (1).



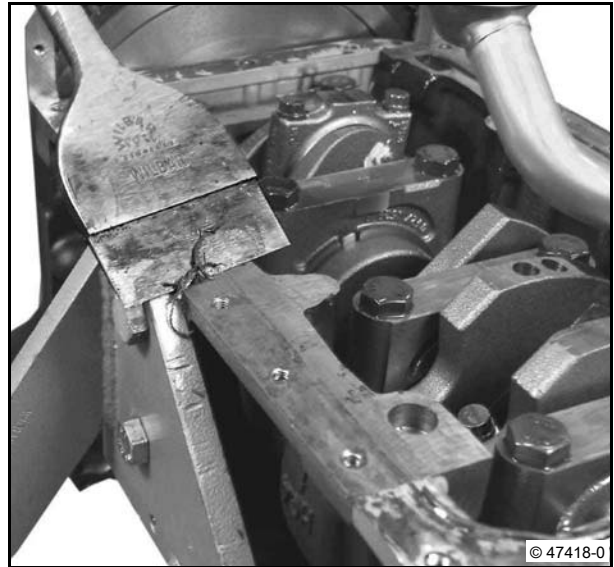
- Lever out lubricating oil pan.
- Remove lubricating oil pan.
- Visually inspect the components.



- Clean sealing surfaces.
- Scrape off sealing compound with separating tool.



The sealing surfaces must be dry and free from grease and dirt.



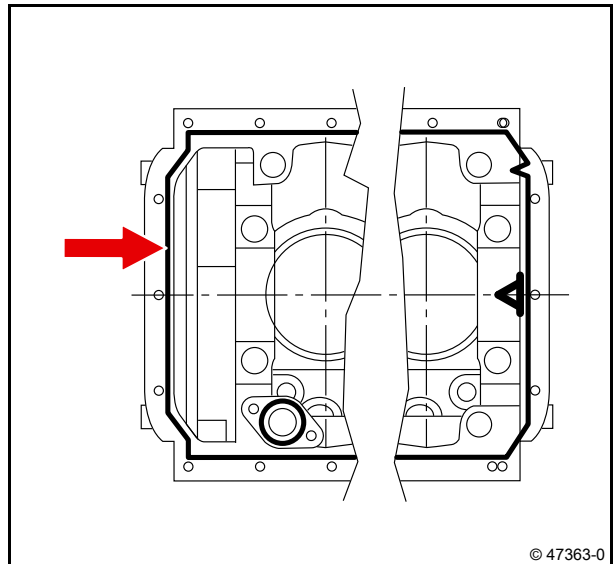
6

Installing the lubricating oil pan

- Apply packing compound (arrow).



Sealing cord strength approx. 3 mm



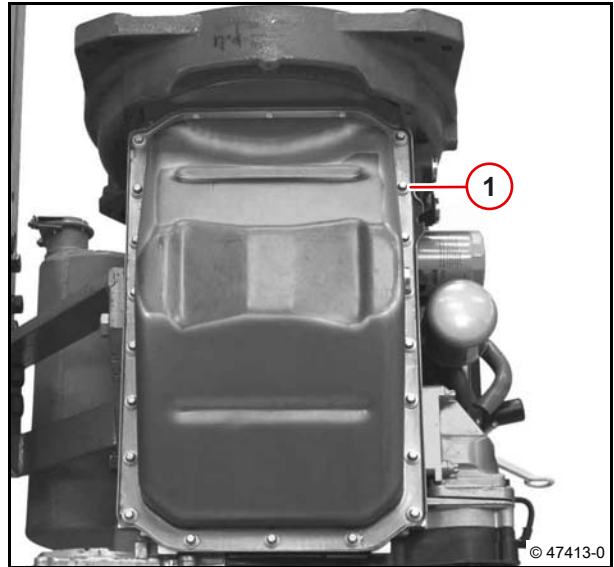
- Mount lubricating oil pan.
- Align lubricating oil pan to crankcase.



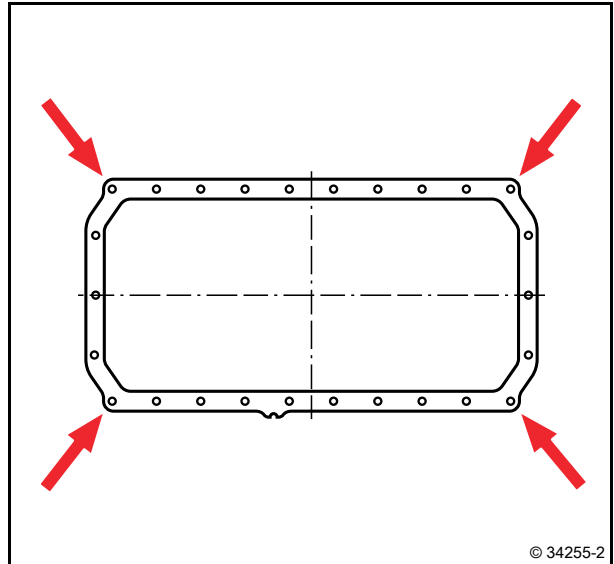
Do not move the packing compound when mounting the lube oil tray.



- Oil the screws lightly.
- Fasten all screws (1).

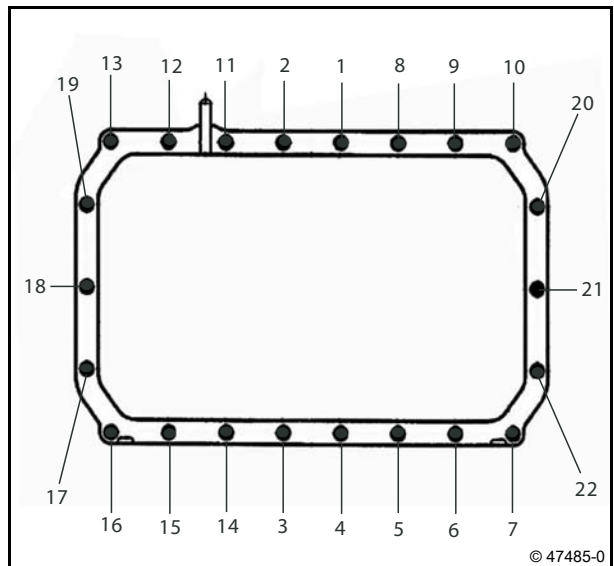


- Tighten screws (arrows).




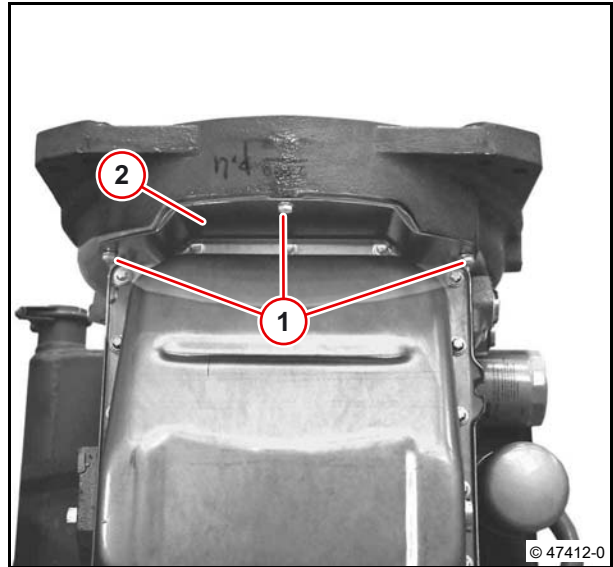
- Tighten the screws according to the tightening sequence.

21 Nm

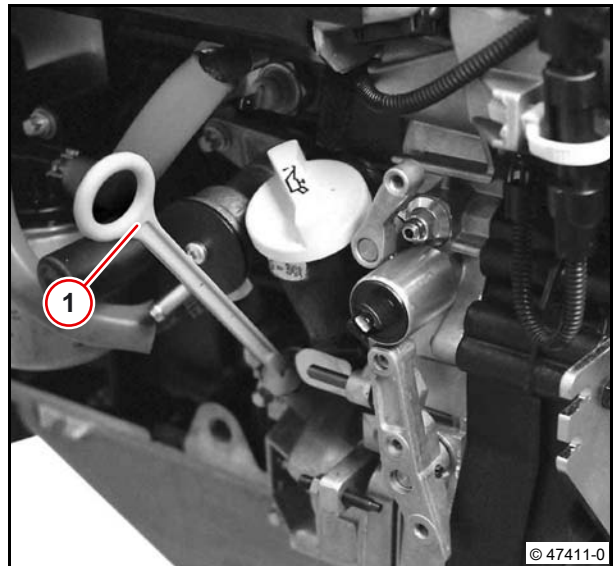


- Mount cover (2).
- Mount washers.
- Tighten screws (1).

 9 Nm



- Turn engine **180°**.
- Insert oil dipstick (1).
- Fill in lubricating oil according to operating manual.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A03 030	Lubricating oil pan (plate) on crankcase	M8x16	Observe tightening sequence!	21 Nm
A03 031	Locking screw on lubricating oil pan		Replace sealing ring	55 Nm
A03 085	Cover plate to connection housing			9 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the lubricating oil cooler



Standard tools:
– Torx tool set

8189

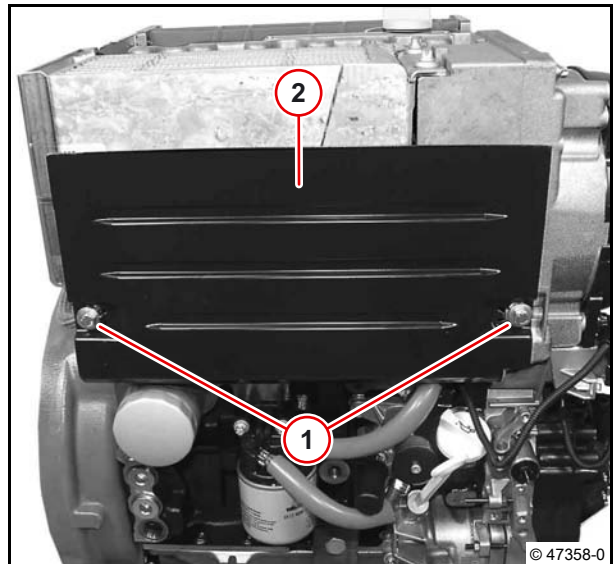


Collect leaking operating substances in suitable vessels and dispose of according to regulations.

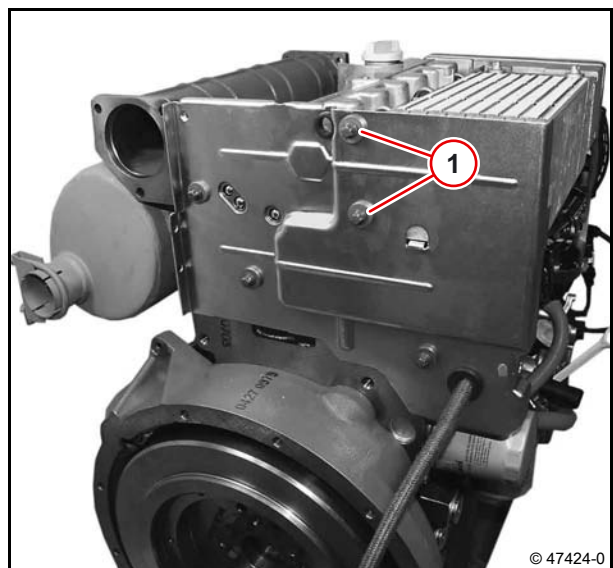
6

Removing the lubricating oil cooler

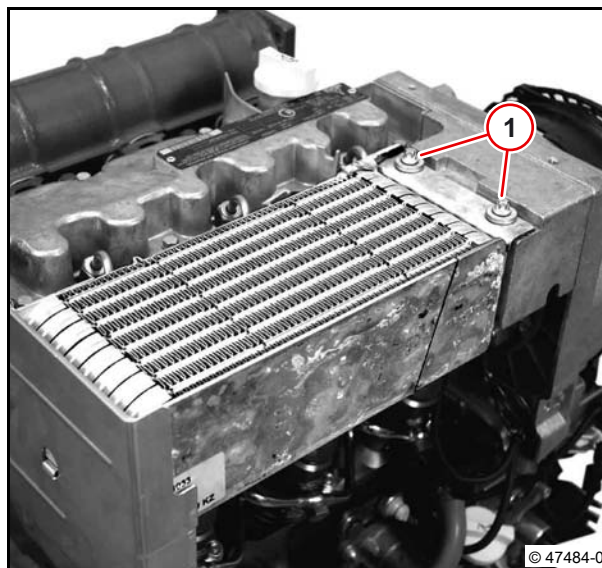
- Unscrew screws (1).
- Remove air guidance cowling (2).



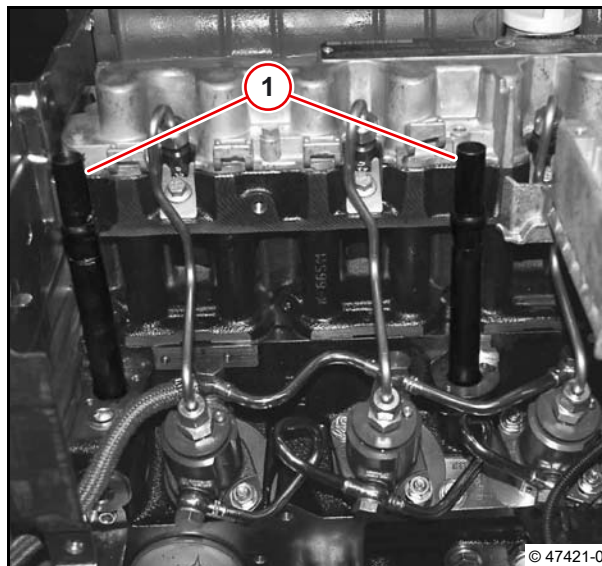
- Unscrew screws (1).



- Unscrew screws (1).
- Lift oil cooler.
- Visually inspect the components.



- Pull out plug elements (1).



- Visually inspect the components.

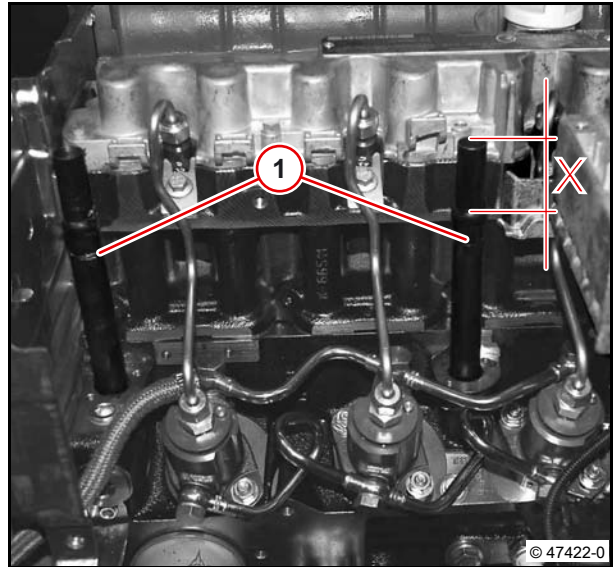


Installing the lubricating oil cooler

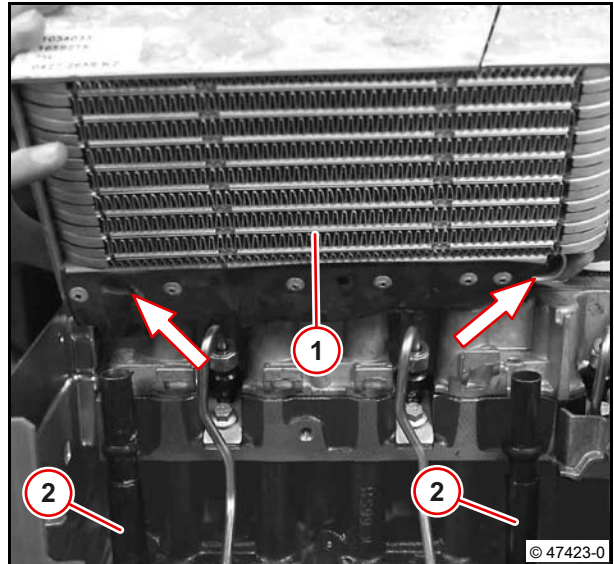
- Clean sealing surfaces.
- Insert plug elements (1).
- Press in plug elements as far as they will go.



Note installation position.
The "X" end faces upwards.



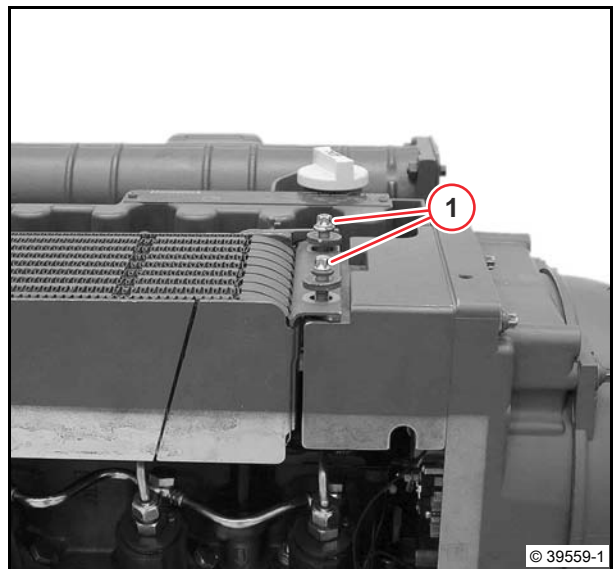
- Mount oil cooler (1).
- Align lubricating oil cooler.
- Insert plug elements (2) in holes (arrow)
- Press in oil cooler as far as it will go.



- Tighten screws (1).



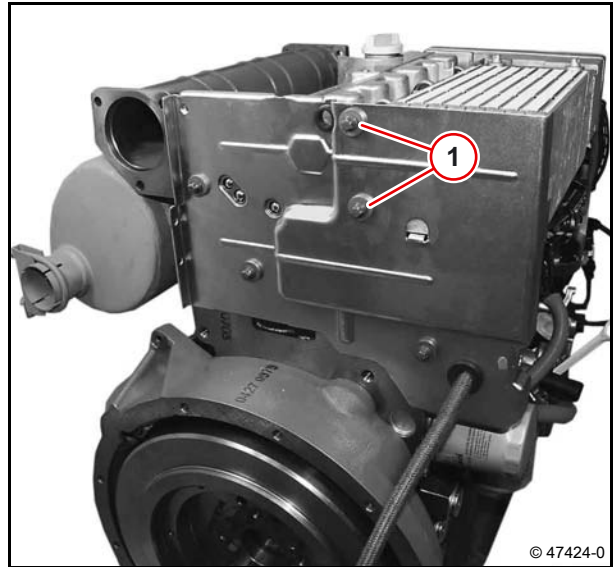
Screw length:
M8 x 25 mm



- Tighten screws (1).



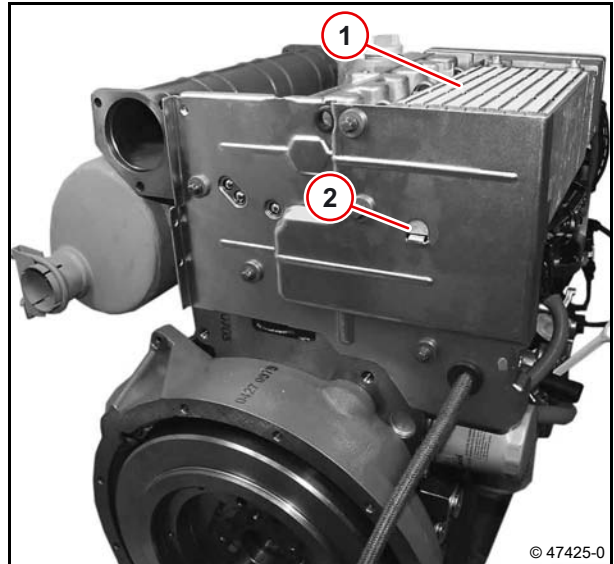
Screw length:
M8 x 20 mm



- Position oil cooler (1).



Lug (2) must lie in the hole.

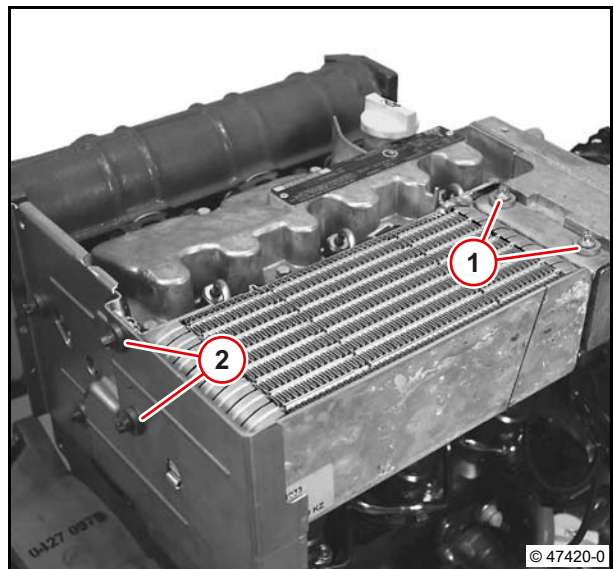


- Tighten screws (1).

 21 Nm

- Tighten screws (2).

 21 Nm

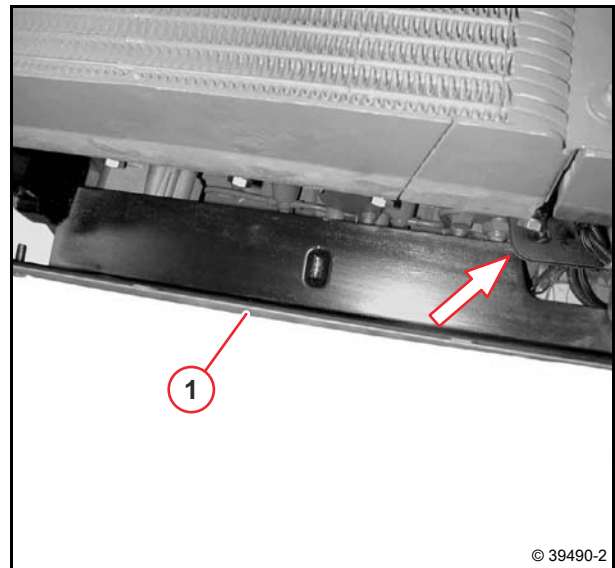


- Mount air guidance cowling (1).



Note installation position.

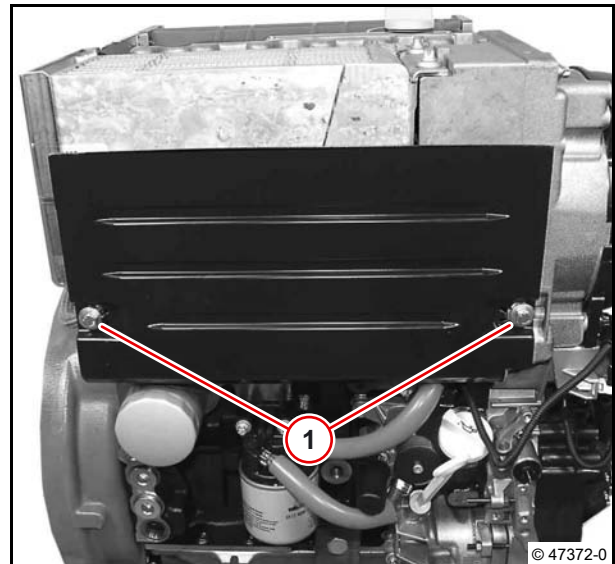
Air guidance cowling must sit under the stand plate and rubber profile (arrow).



- Tighten screws (1).



21 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A08 051	Lubricating oil cooler to air duct	Torx M8x25		21 Nm
A09 070	Stand plate on crankcase / lubricating oil cooler	Torx M8x20		21 Nm
A09 087	Air guidance cowling on blower jacket / stand plate			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the oil pressure regulating valve



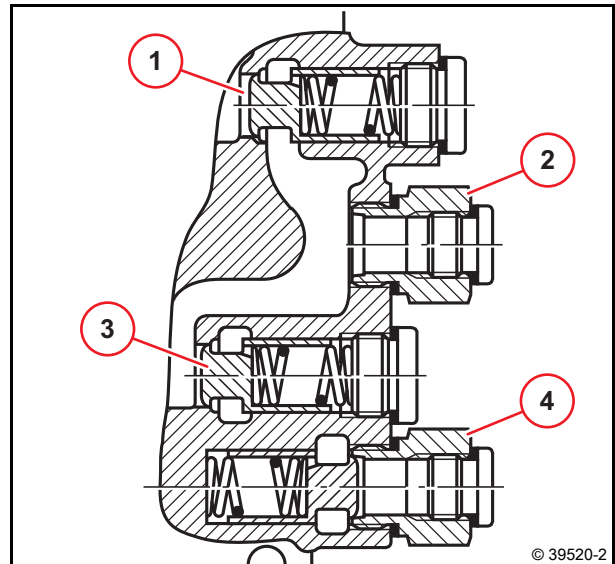
Standard tools:
– Slide gauge



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

Removing the oil pressure regulating valve

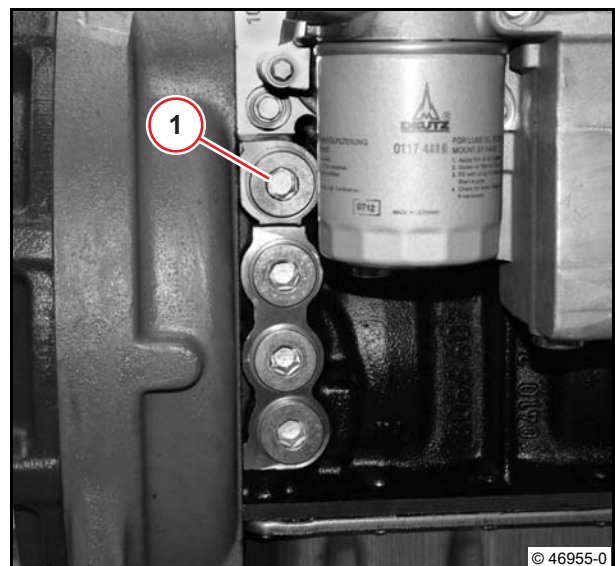
- (1) Oil pressure regulating valve
- (2) Oil channel output with transfer fitting (Option cabine heating connection)
- (3) Oil pressure regulating valve (TD 2011)
- (4) Oil channel input with transfer fitting (Option cabine heating connection)



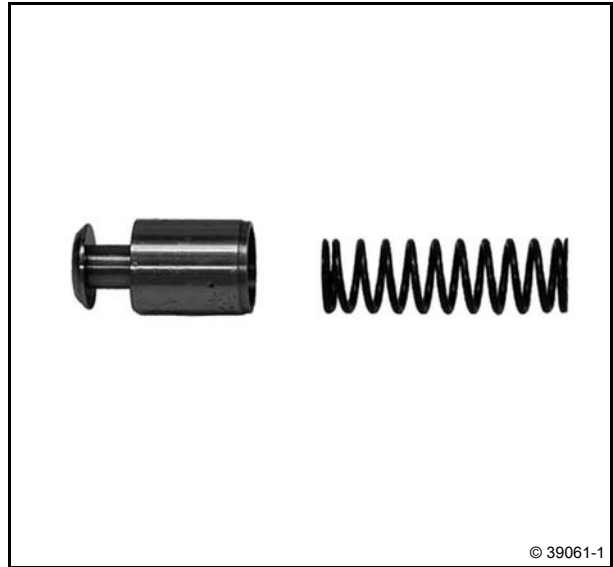
Attention!

Parts are under tensions and can spring out during disassembly!

- Unscrew locking screw (1).
- Remove sealing ring.
- Remove compression spring.
- Remove oil pressure regulating valve.



- Visually inspect the components.




6

- Measure length of the compressor spring with calliper gauge.

- Coloured marking, green

 56.5 mm

- Coloured marking, yellow

 80.5 mm

- Coloured marking, red

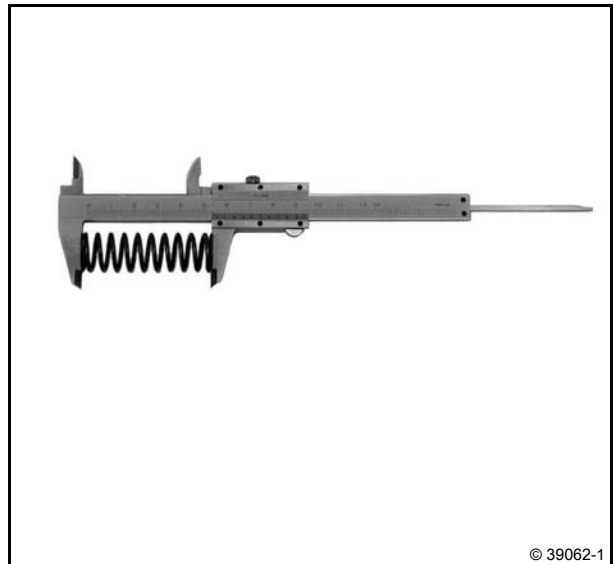
 78.4 mm

- Coloured marking, blue

 61.8 mm



When the wear limit is reached, the compressor spring must be renewed.



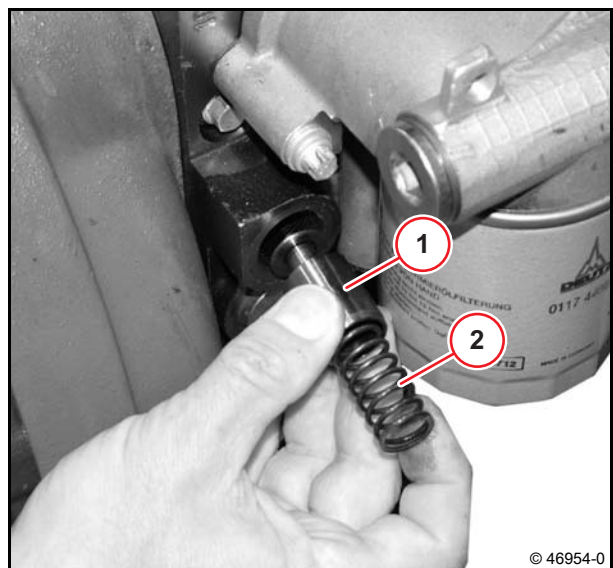
Installing the oil pressure regulating valve

- Lightly oil oil pressure regulating valve (1).



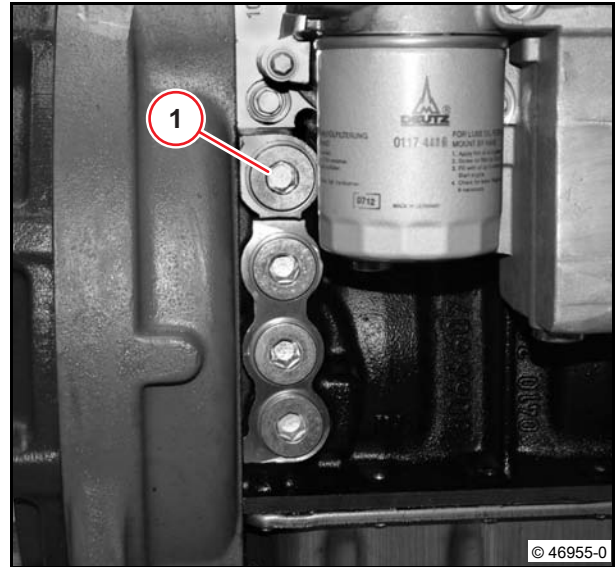
Note installation position.

- Insert oil pressure regulating valve.
- Insert compression spring (2)



- Mount new sealing ring.
- Mount locking screw (1).
- Tighten screw plug (1).

111 Nm



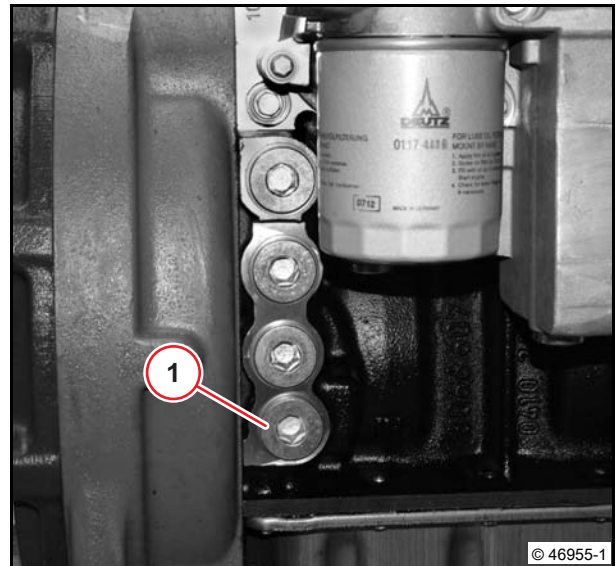
Cabin heating connection, input



Attention!

Parts are under tensions and can spring out during disassembly!

- Unscrew locking screw (1).
- Remove sealing ring.
- Remove compression spring.
- Remove oil pressure regulating valve.

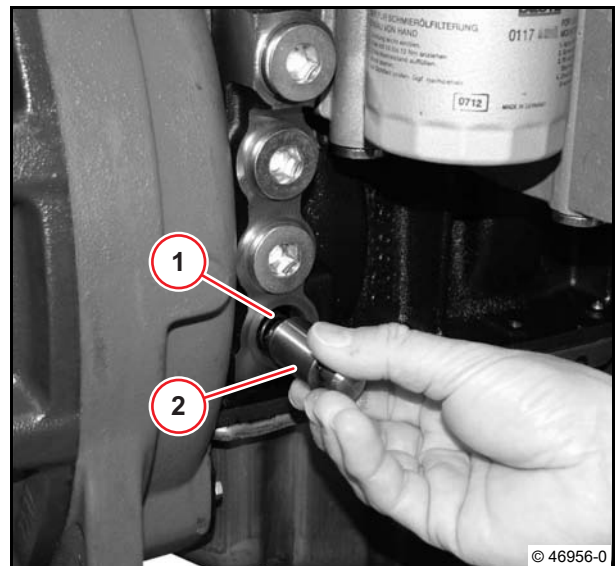


Attention!

Observe order of installation!

- Insert compression spring (1)
- Lightly oil oil pressure regulating valve (2).
- Insert oil pressure regulating valve.
- Mount new sealing ring.
- Tighten transfer fitting.

111 Nm



Technical Data

Testing and setting data

ID no.	Name	Additional information	Value
P08 41	Oil pressure regulating valve, opening pressure (without cabin heating connection)	Coloured marking, green	3 bar
P08 41	Oil pressure regulating valve, opening pressure (with cabin heating connection)	Coloured marking, yellow	1 bar
P08 42	Oil pressure regulating valve, opening pressure (with cabin heating connection)	Coloured marking, red	1.7 bar
P08 43	Oil pressure regulating valve, opening pressure (without cabin heating connection)	Coloured marking, blue	0.3 bar
P08 44	Oil pressure regulating valve, compression spring, length	without heating connection, green	56.5 mm
P08 44	Oil pressure regulating valve, compression spring, length	with heating connection, yellow	80.5 mm
P08 45	Oil pressure regulating valve, compression spring, length	with heating connection, red	78.4 mm
P08 46	Oil pressure regulating valve, compression spring, length	with heating connection, blue	61.8 mm

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A08 062	Locking screw on transfer fitting (heating connection)	M18x1.5	Use new sealing ring	50 Nm
A08 063	Locking screw on transfer fitting (heating connection)	M24x1.5	Use new sealing ring	111 Nm
A08 064	Transfer fitting on crankcase (heating connection)	M24x1.5	Use new sealing ring	111 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the oil filter console



Standard tools:

– Torx tool set

8189

Special tools:

– Disassembly tool

110901

– Special wrench

170050



– Operation manual



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

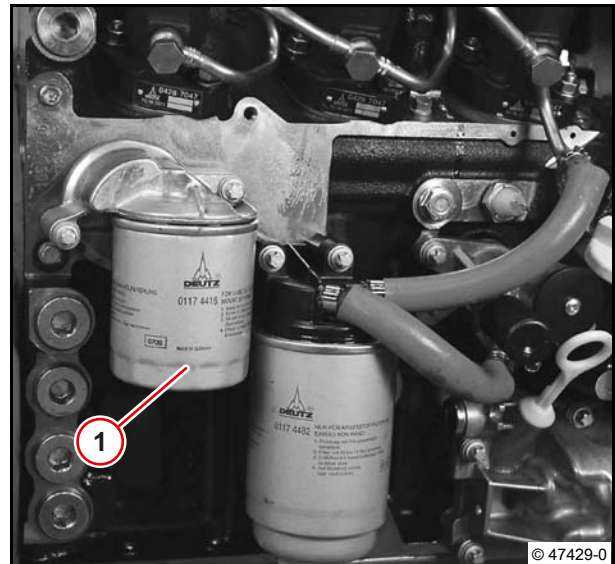
Emptying and filling the engine with operating media must be carried out according to the operating manual and the appropriate documentation of the vehicle/equipment manufacturer.

Removing the oil filter console

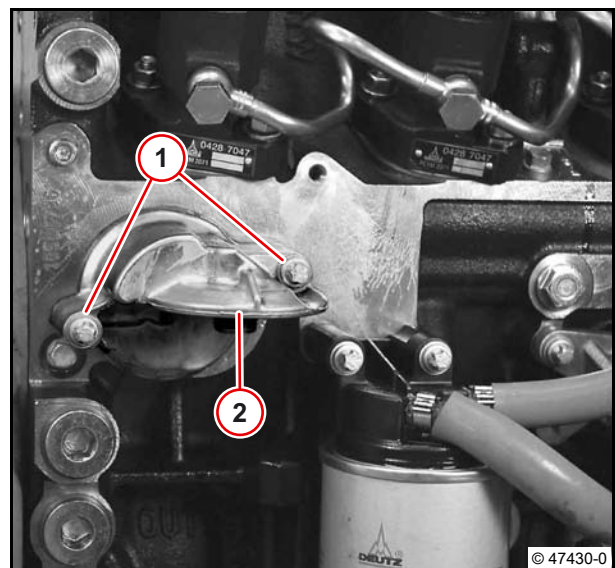
- Unscrew lubricating oil filter (1) with special wrench.



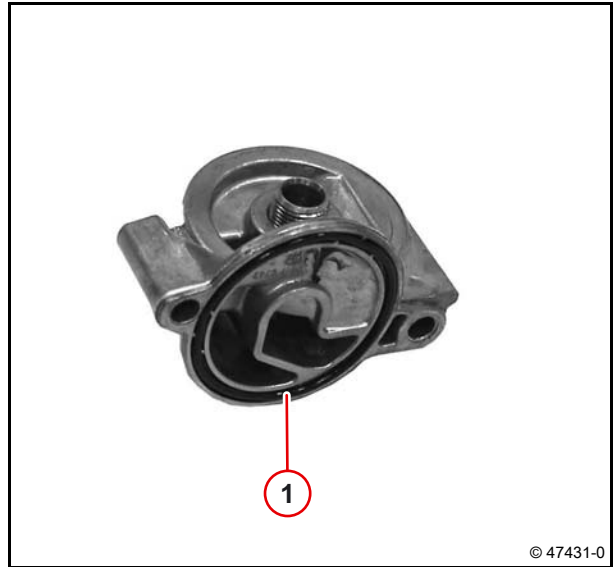
Collect draining lubricating oil and dispose of properly.



- Unscrew screws (1).
- Remove oil filter console (2).

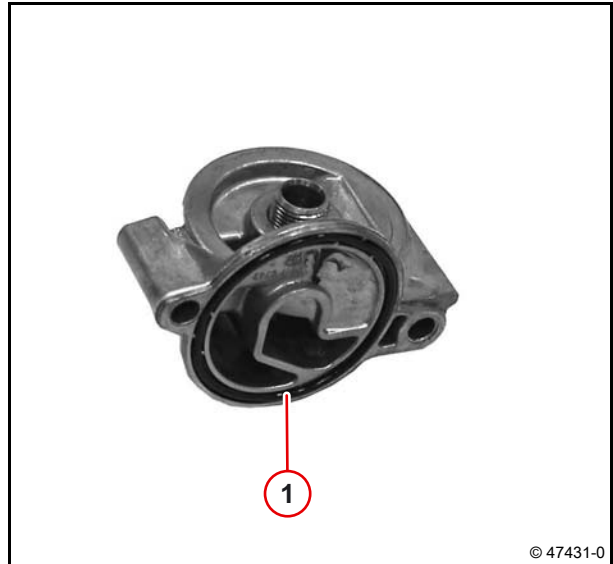


- Remove the O-ring (1) with the disassembly tool.
- Visually inspect the components.



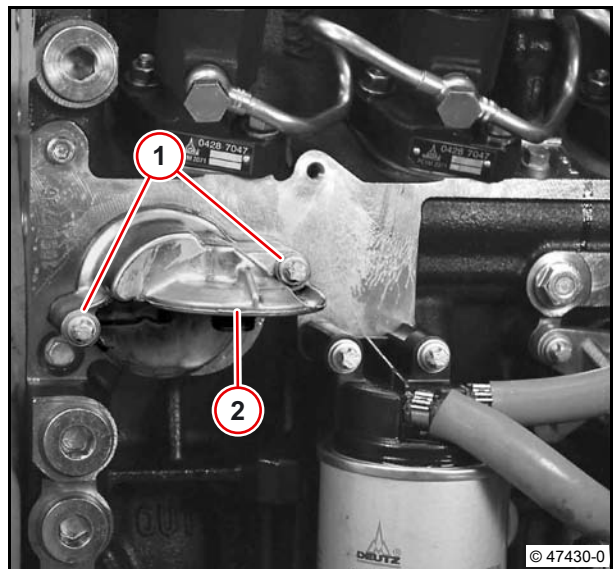
Installing oil filter console

- Clean sealing surfaces.
- Insert new O-ring (1).




- Mount oil filter console (2).
- Tighten screws (1).

 21 Nm

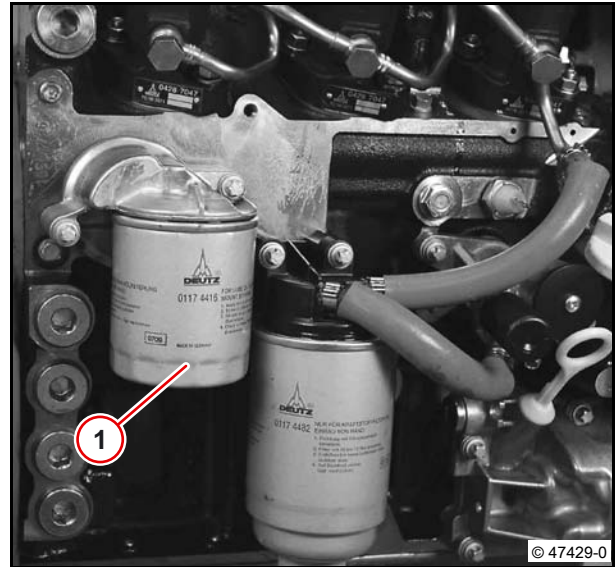


- Clean sealing surfaces.
- Lightly oil sealing ring on new lubricating oil filter.
- Tighten the lubricating oil filter (1) according to the operating instructions.

 Operation manual



The seal must fit evenly.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A08 003	Oil filter console on crankcase			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the oil pressure switch



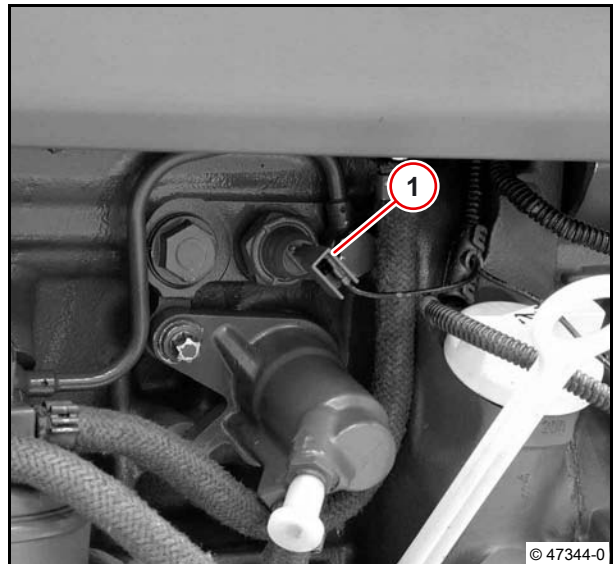
Standard tools



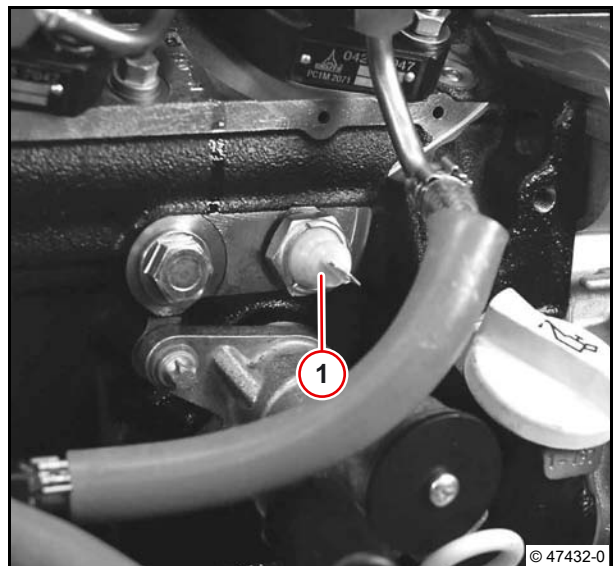
Collect leaking operating substances in suitable vessels and dispose of according to regulations.

Removing the oil pressure switch

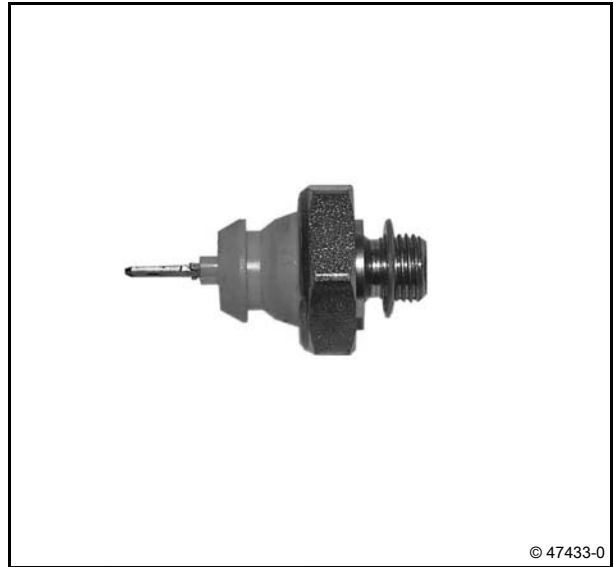
- Pull out cable plug (1).



- Unscrew oil pressure switch (1).



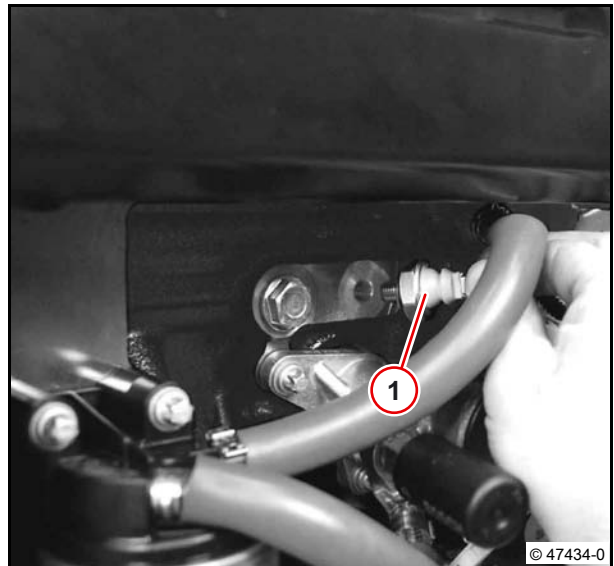
- Visually inspect the components.



6

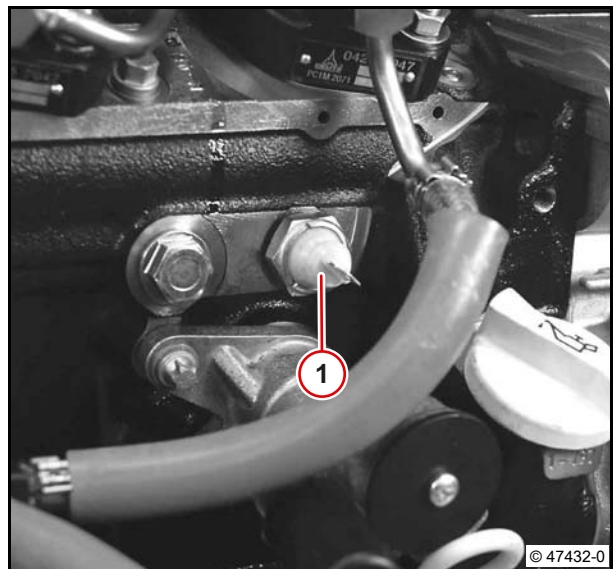
Installing the oil pressure switch

- Screw on oil pressure switch (1).



- Tighten oil pressure switch (1).

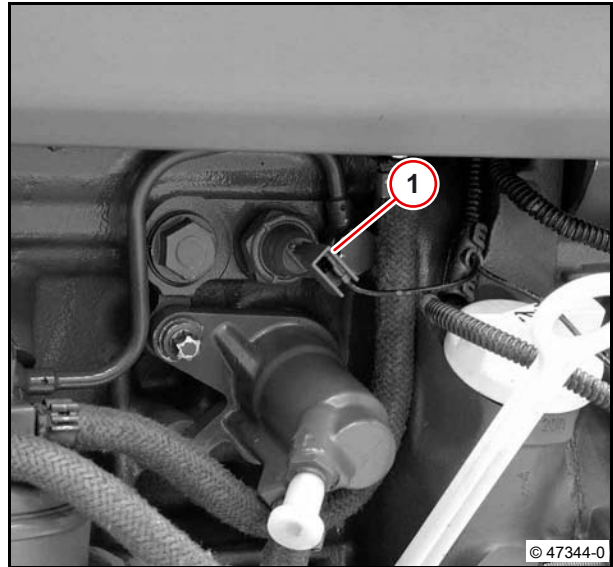
 13 Nm



- Plug in the cable plug (1).



Ensure that the connection is perfect.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A08 091	Oil pressure switch on crankcase	M10x1		13 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing temperature transmitter



Standard tools

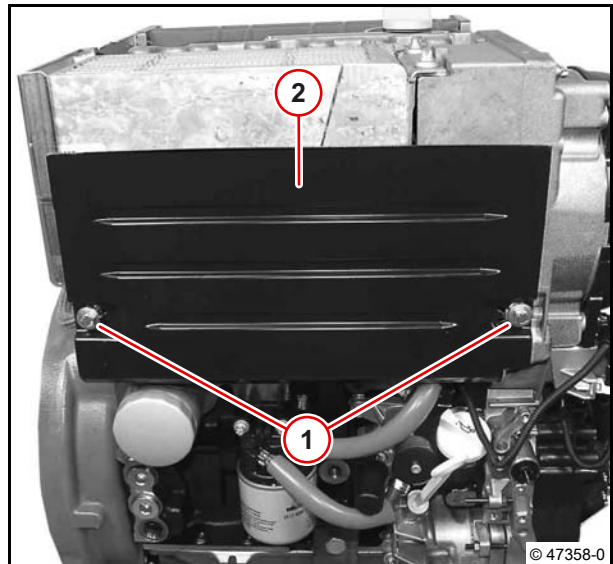


Collect leaking operating substances in suitable vessels and dispose of according to regulations.

Removing temperature transmitter

– D 2011 i, TD 2011 i

- Unscrew screws (1).
- Remove air guidance cowling (2).

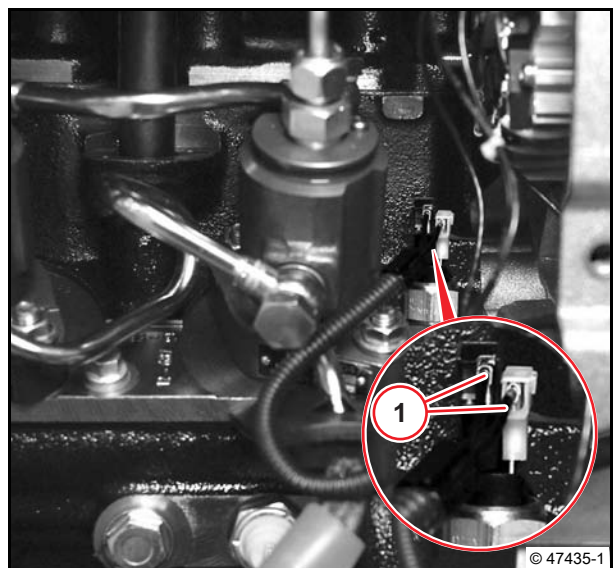


– D 2011, TD 2011

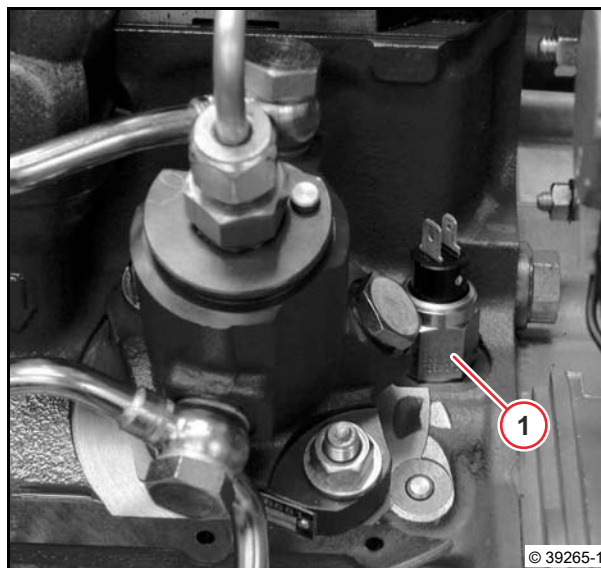
- Pull out cable plug (1).



Note the assignment of the terminal designations.



- Unscrew temperature transmitter (1).



6

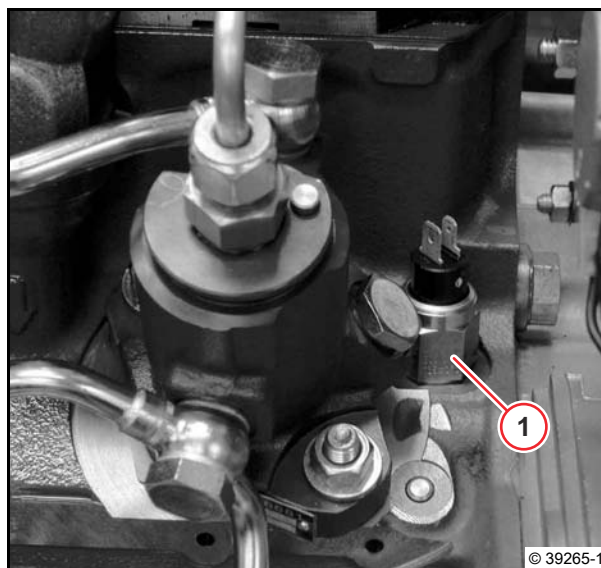
- Remove sealing ring.
- Visually inspect the components.



Installing temperature transmitter

- Mount new sealing ring.
- Tighten temperature transmitter (1).

 25 Nm

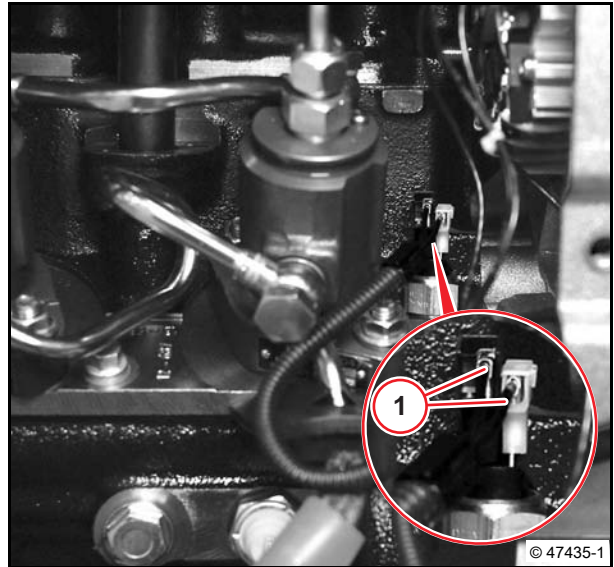


- Plug in the cable plug (1).



Note the assignment of the terminal designations.

Ensure that the connection is perfect.



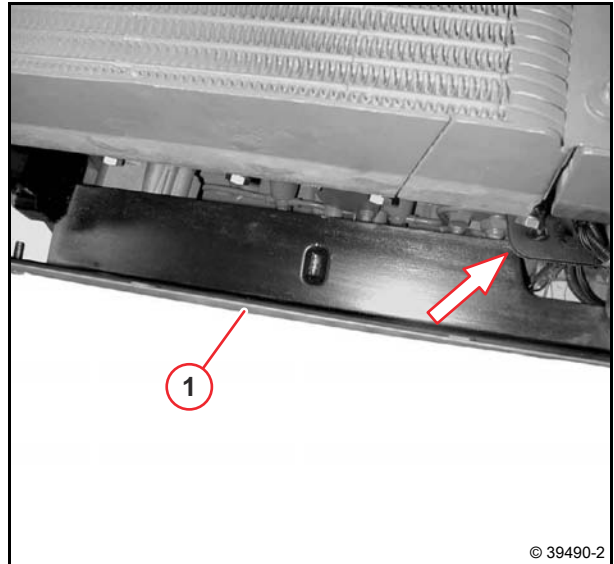
- D 2011 i, TD 2011 i

- Mount air guidance cowling (1).



Note installation position.

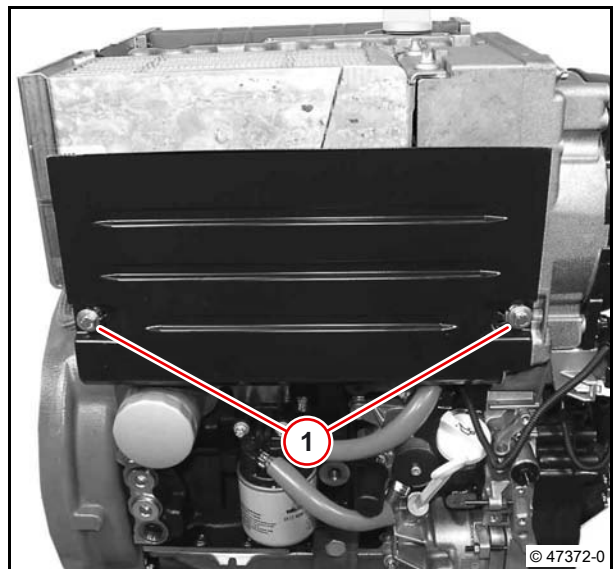
Air guidance cowling must sit under the stand plate and rubber profile (arrow).



- Tighten screws (1).



21 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A08 095	Temperature transmitter on crankcase			25 Nm
A09 087	Air guidance cowling on blower jacket / stand plate			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the thermostat (Lubricating oil cooler)



Standard tools:

- Slide gauge 8189
- Torx tool set

Special tools:

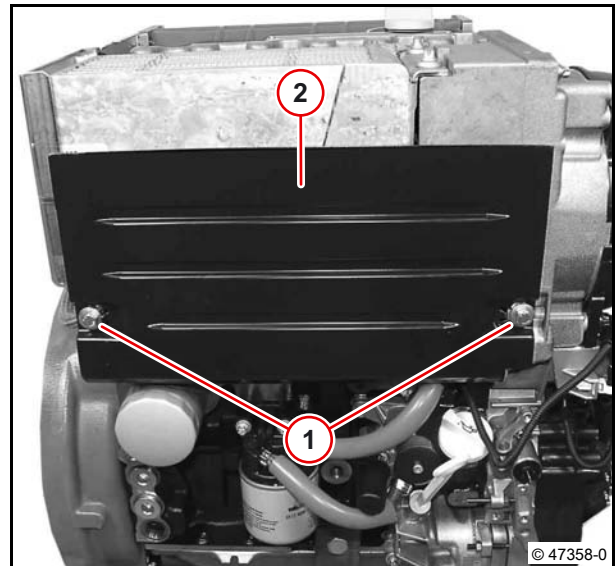
- Disassembly tool 110901



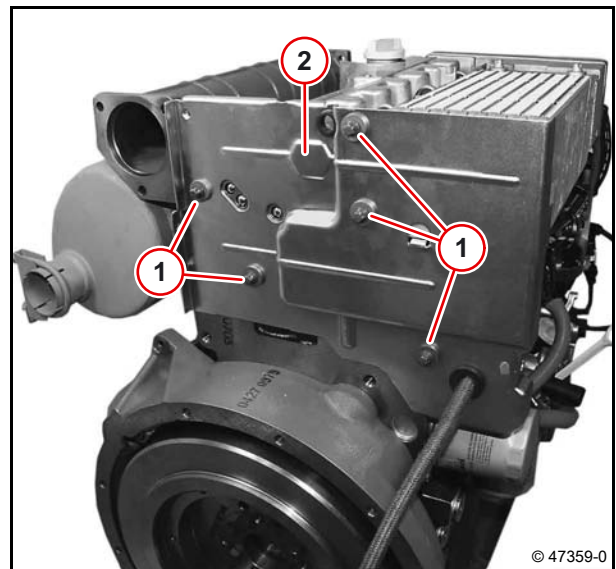
Collect leaking operating substances in suitable vessels and dispose of according to regulations.

Removing the thermostat

- Unscrew screws (1).
- Remove air guidance cowling (2).



- Unscrew screws (1).
- Remove stand plate (2).

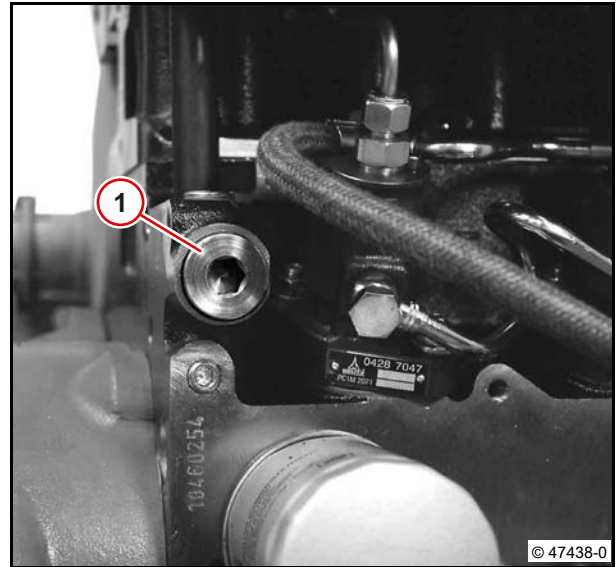




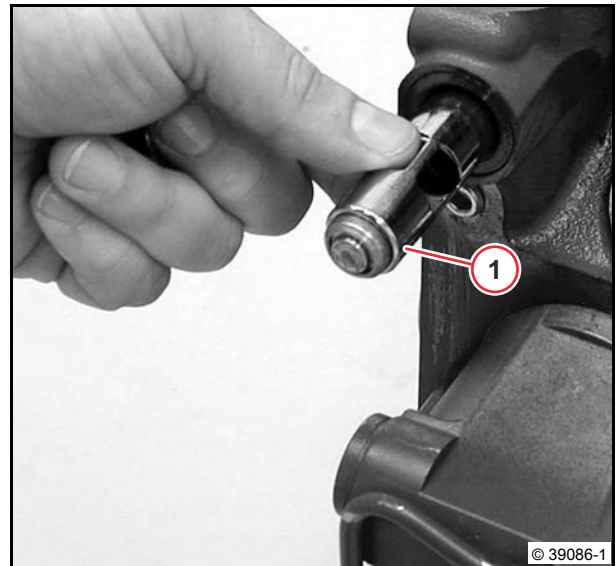
Attention!

Parts are under tensions and can spring out during disassembly!

- Unscrew locking screw (1).



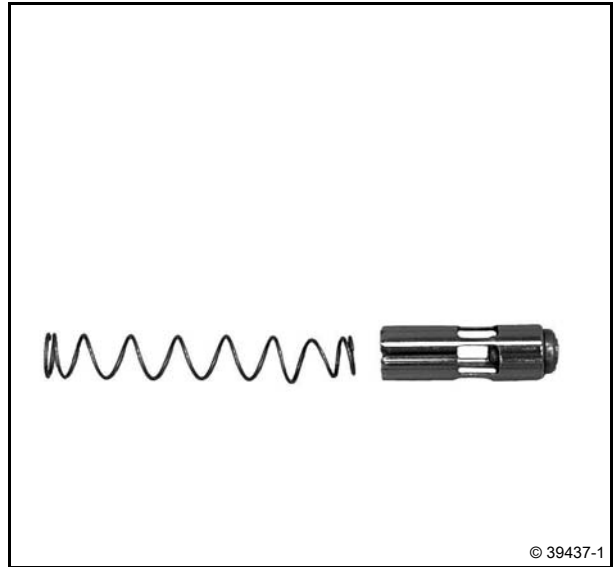
- Remove thermostat (1).
- Remove compression spring.



- Remove the O-ring (1) with the disassembly tool.



- Visually inspect the components.



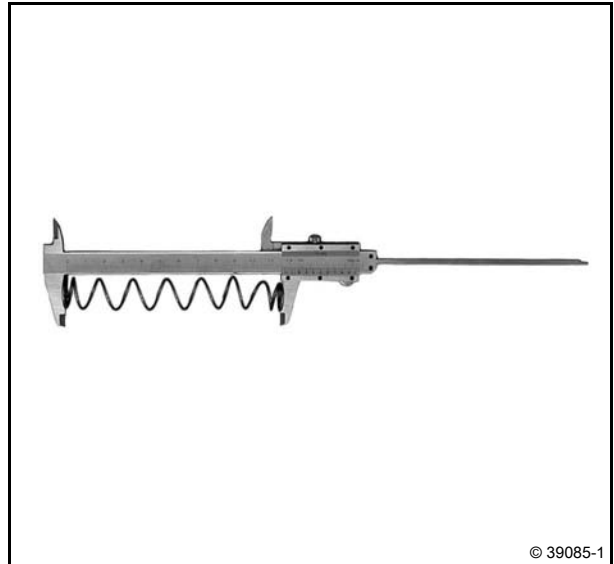
Installing the thermostat

- Measure length of the compressor spring with calliper gauge.

 116.7 mm



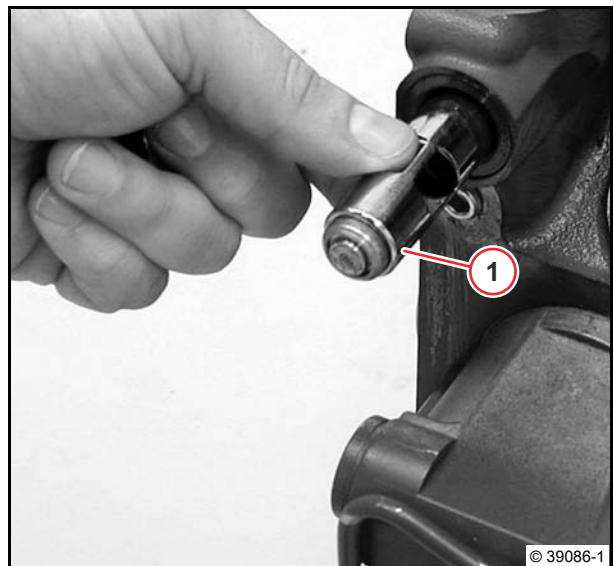
When the wear limit is reached, the compressor spring must be renewed.



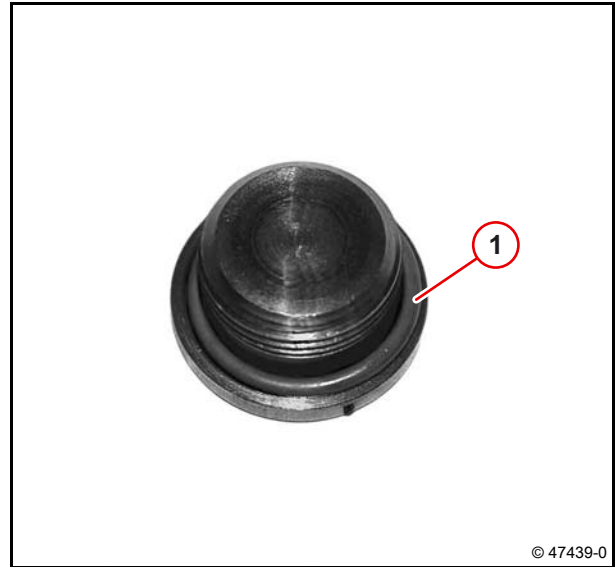
- Clean sealing surfaces.
- Oil the thermostat lightly.
- Insert compression spring.
- Insert thermostat (1).



Note installation position.

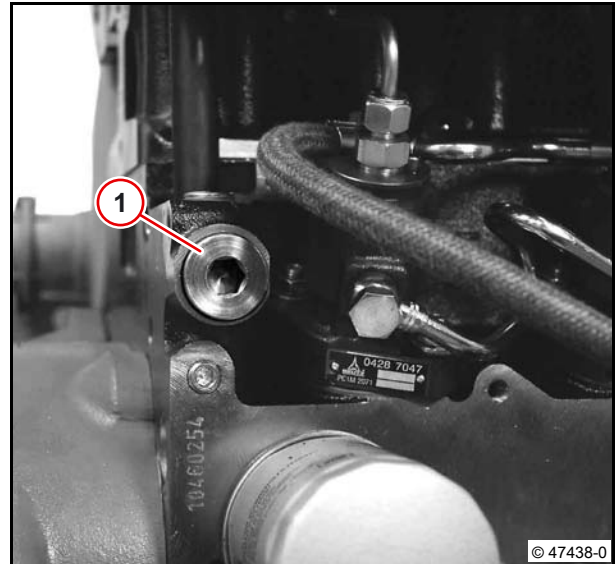


- Lightly oil new O-ring (1).
- Insert new O-ring (1).

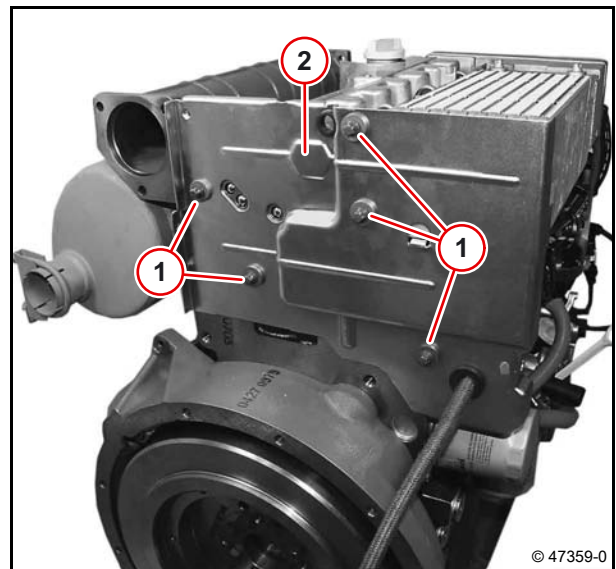


- Tighten screw plug (1).

 50 Nm



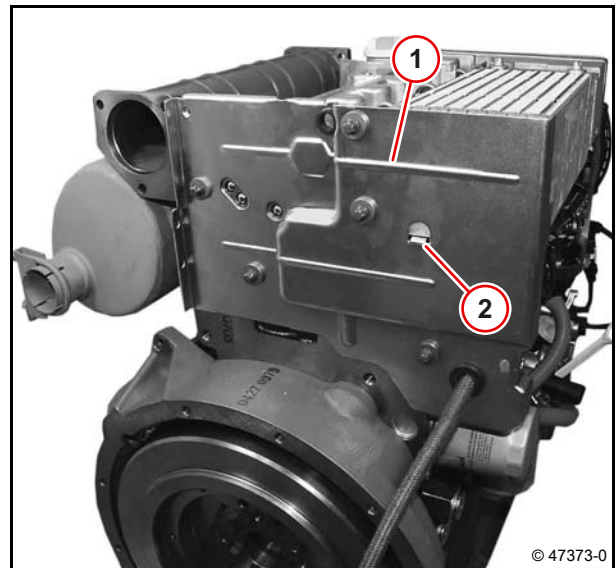
- Install stand plate (2).
- Tighten screws (1).



- Position stand plate (1).



Lug (2) must lie in the hole.



- Tighten screws (1).

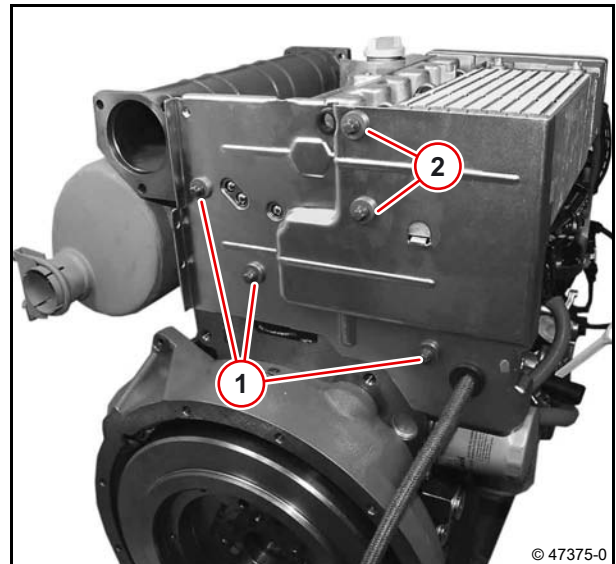


21 Nm

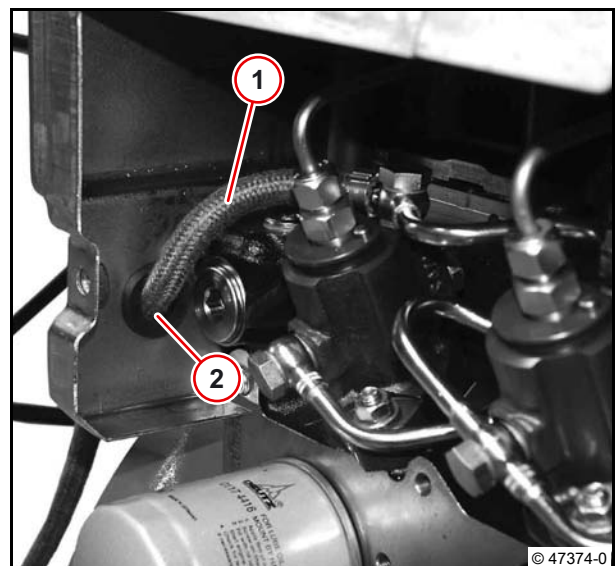
- Tighten screws (2).



21 Nm



- Feed hose pipe (1) through the hole (2).

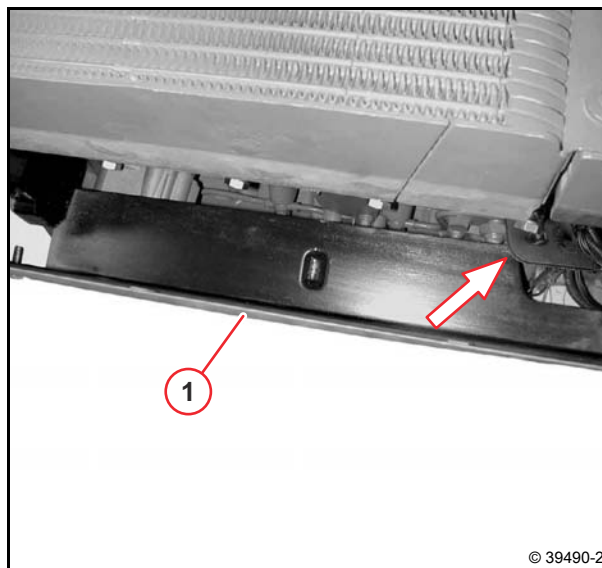


- Mount air guidance cowling (1).




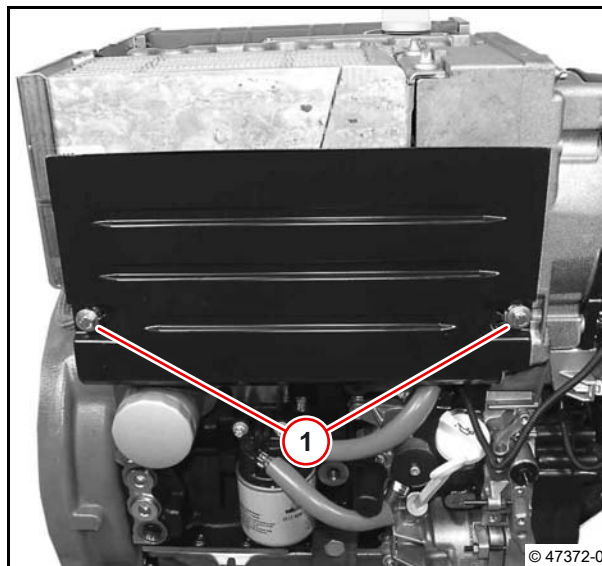
Note installation position.

Air guidance cowling must sit under the stand plate and rubber profile (arrow).



- Tighten screws (1).

 21 Nm



Technical Data

Testing and setting data

ID no.	Name	Additional information	Value
P08 74	Thermostat, compression spring, length		116.7 mm

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A08 072	Thermostat on crankcase, locking screw,			50 Nm
A09 070	Stand plate on crankcase / lubricating oil cooler	Torx M8x20		21 Nm
A09 087	Air guidance cowling on blower jacket / stand plate			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the control line



Standard tools



– W 07-10-08



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

Emptying and filling the engine with operating media must be carried out according to the operating manual and the appropriate documentation of the vehicle/equipment manufacturer.

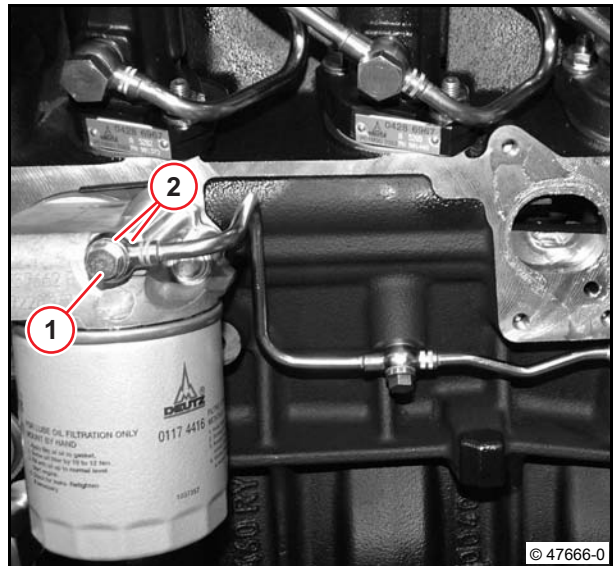
Removing control line

- Remove fuel filter console.



W 07-10-08

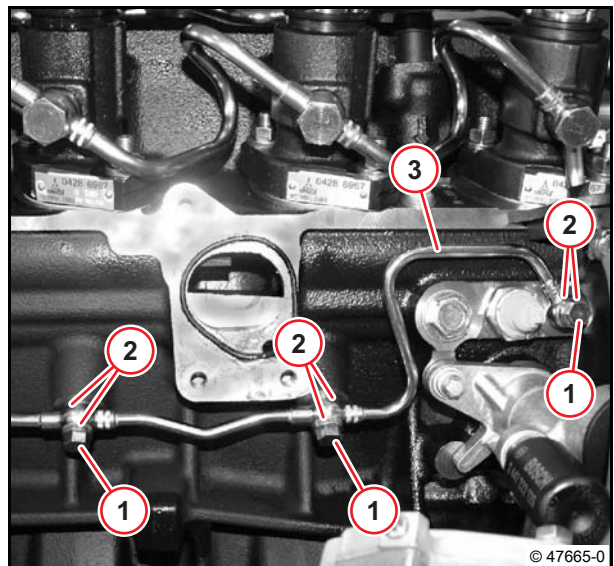
- Unscrew hollow screw (1).
- Remove sealing rings (2).



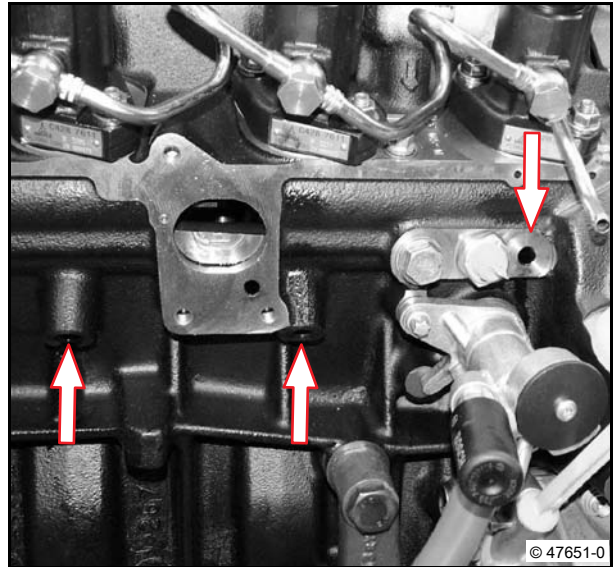
- Unscrew hollow screws (1).
- Remove sealing rings (2).
- Remove control line (3).



Collect draining lubricating oil and dispose of properly.

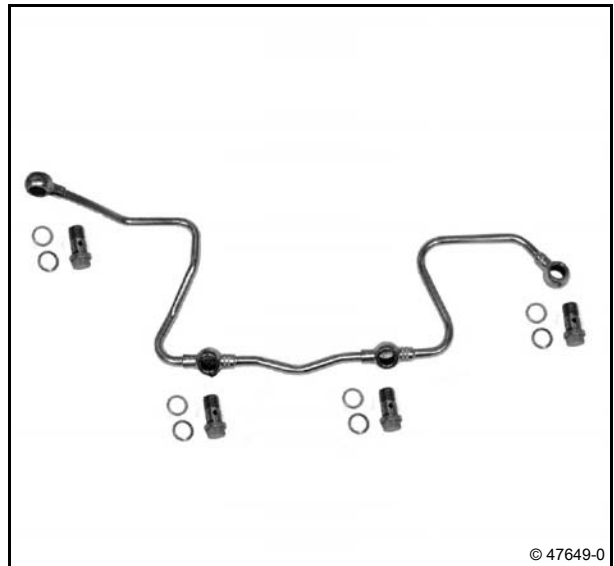


- Visually inspect sealing surfaces (arrows).



6

- Visually inspect the components.



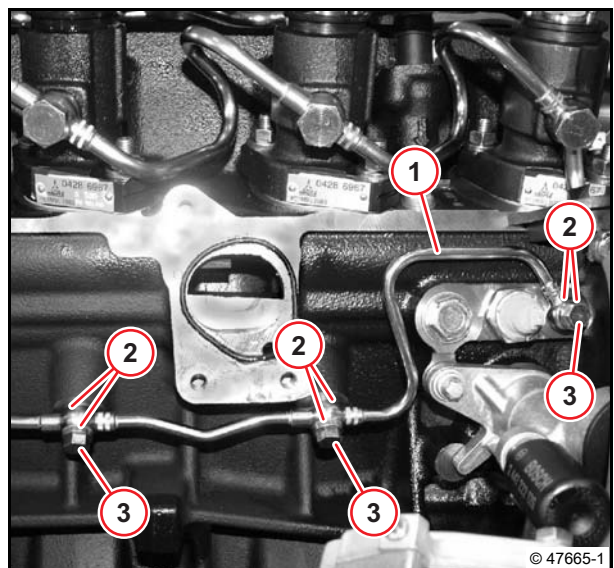
Installing control line

- Insert control line (1).
- Mount sealing rings (2).
- Screw in all hollow screws.
- Tighten hollow screws (3).

 18 Nm



Attention!
Install tension-free.

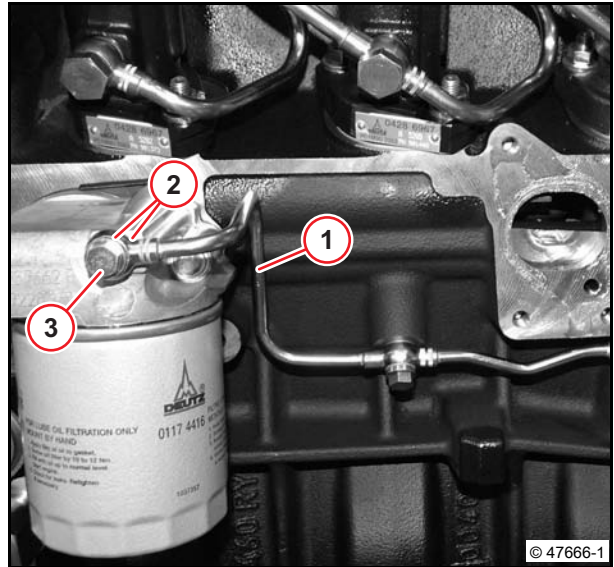


- Insert control line (1).
- Mount sealing rings (2).
- Tighten hollow screw (3).

 18 Nm

- Install the fuel filter console.

 W 07-10-08



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A08 048	Control line to oil filter console / crankcase	Hollow screw M10x1		18 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Remove and install the cooling blower



Standard tools:
– Torx tool set

8189



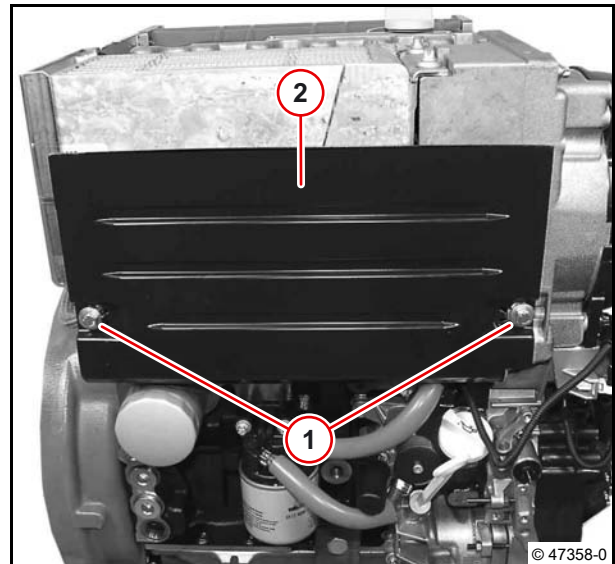
– W 12-02-01

Removing the cooling blower

- Remove V-belt.

W 12-02-01

- Unscrew screws (1).
- Remove air guidance cowling (2).

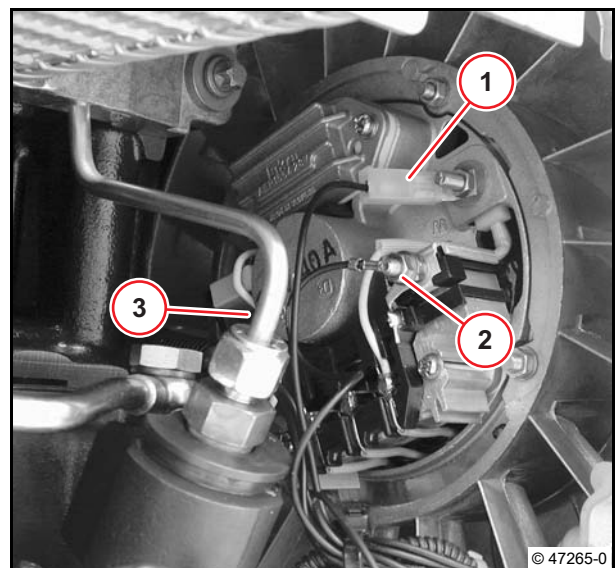


- Disconnect the battery's negative terminal.
- Remove cable from generator.

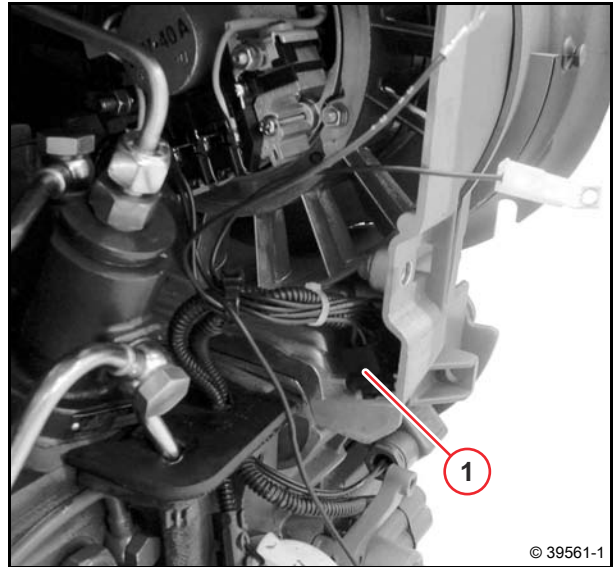


Note assignment!

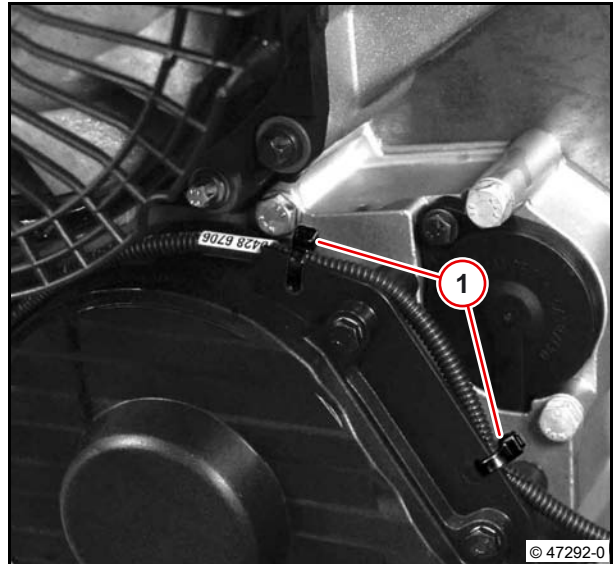
- (1) = terminal W
- (2) = terminal D+
- (3) = terminal B+



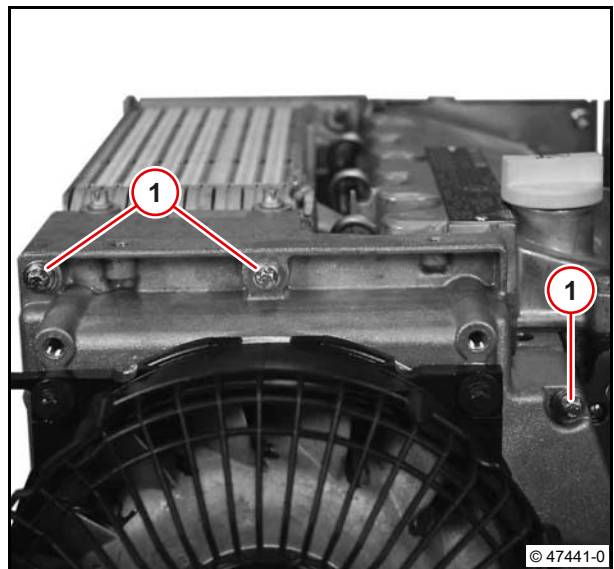
- Unlock cable plug (1) and remove.



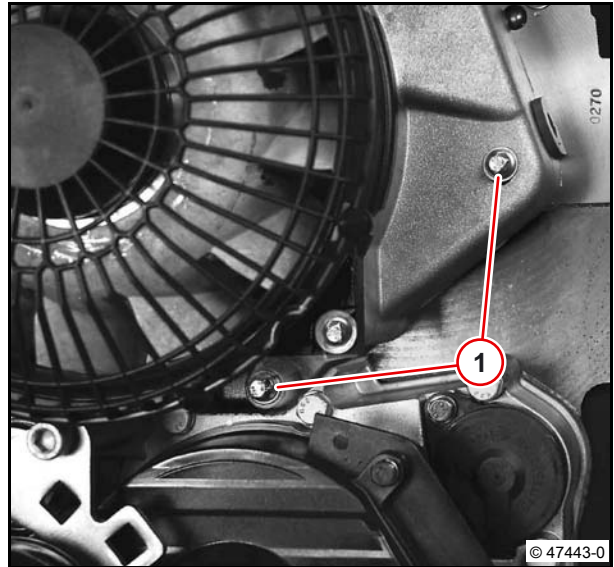
- Remove cable tie (1).



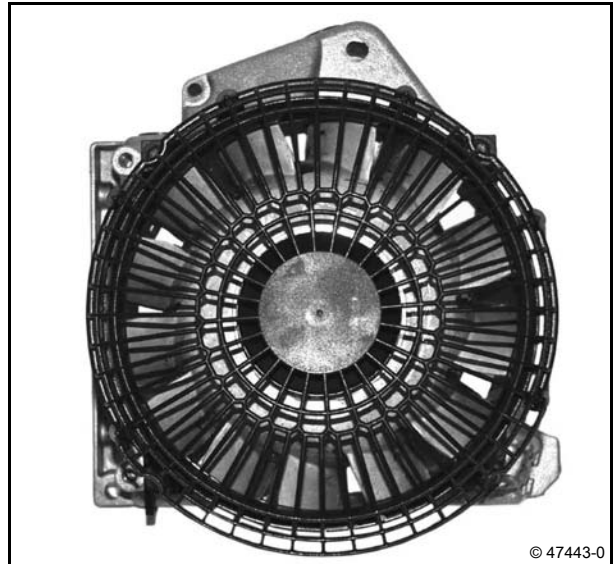
- Unscrew screws (1).



- Unscrew screws (1).
- Remove cooling blower.

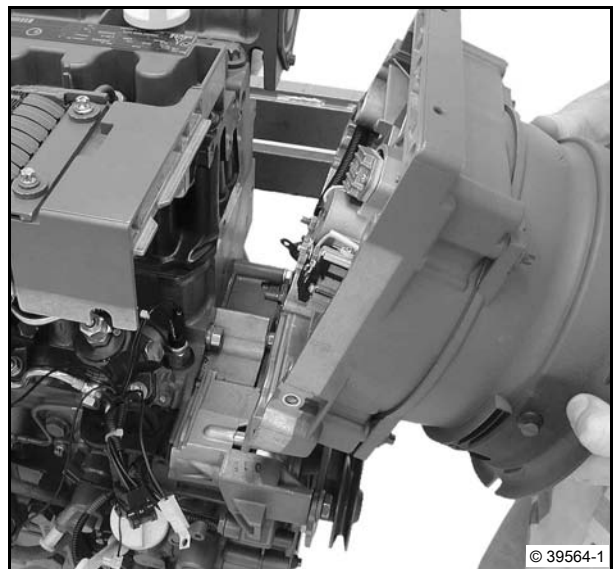


- Visually inspect the components.



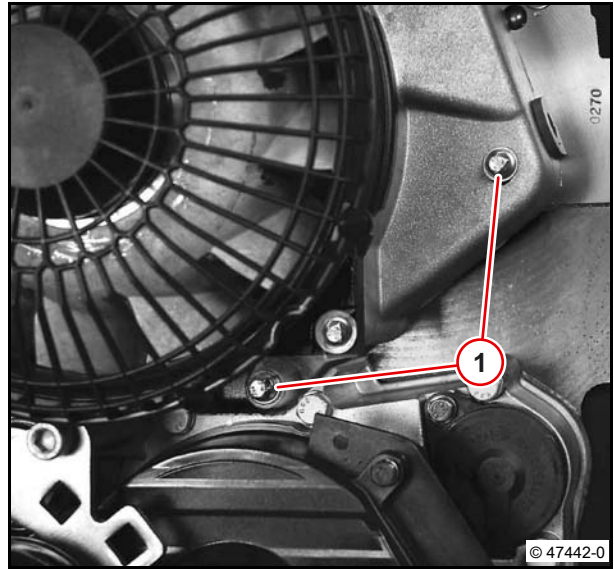
Install cooling blower

- Install cooling blower.
- Fasten all screws.



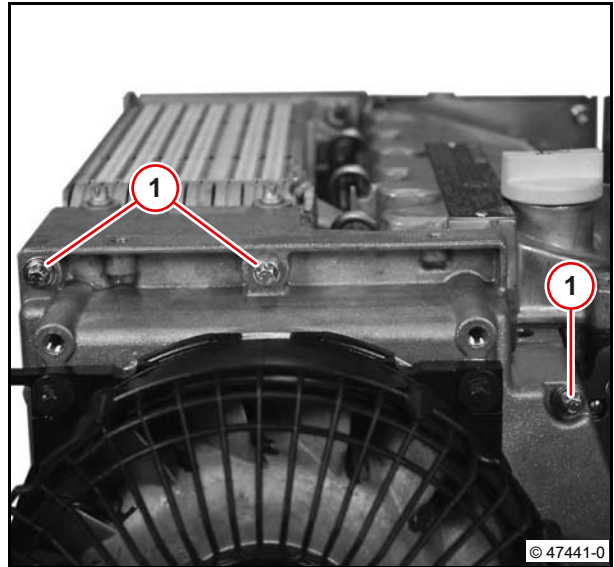
- Tighten screws (1).

 21 Nm

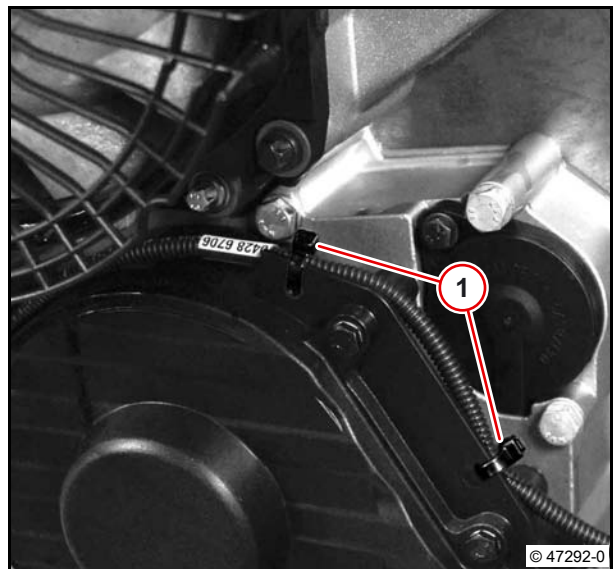


- Tighten screws (1).

 21 Nm



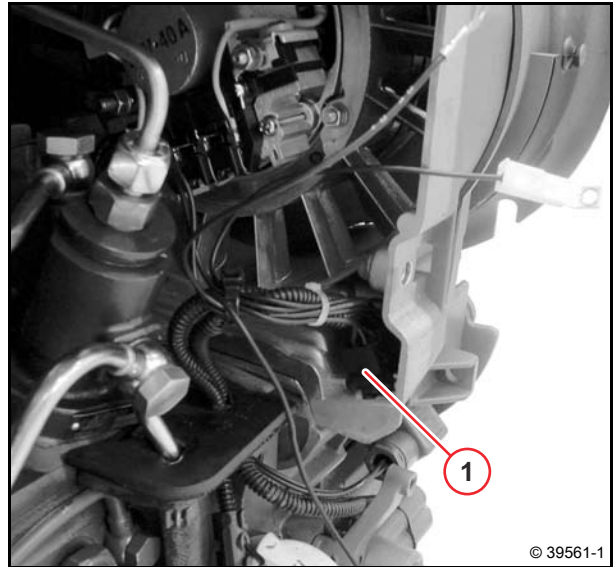
- Fix cable tie (1).



- Plug in the cable plug (1).



Ensure that the connection is perfect.



- Remove cable from generator.



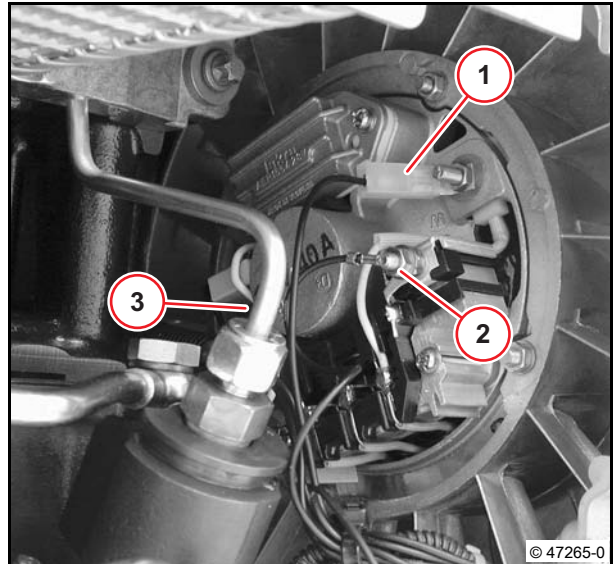
Note assignment!

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

- Tighten nut (2).

3.5 Nm

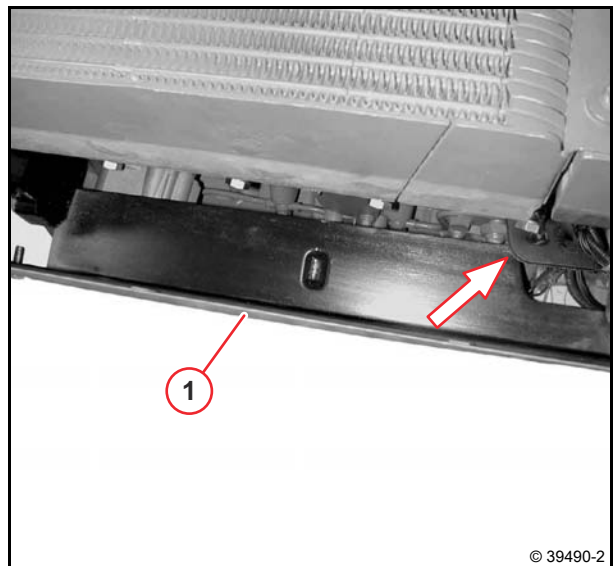
- Connect the battery's negative terminal.




- Mount air guidance cowling (1).
- Position air guidance cowling under the stand plate and rubber profile (arrow).



Note installation position.

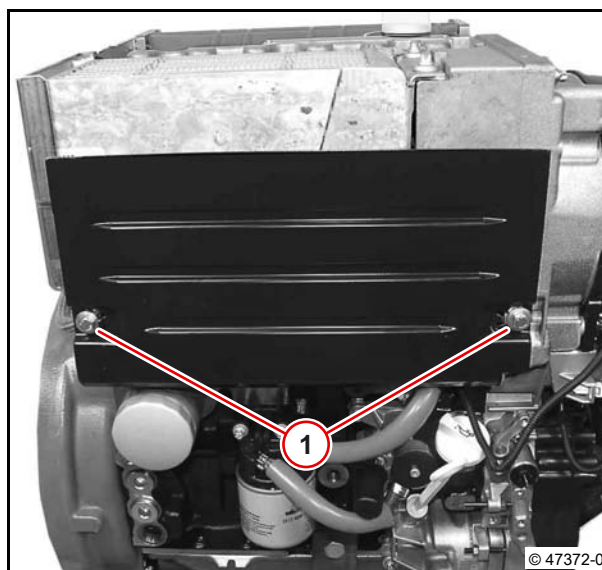


- Tighten screws (1).

 21 Nm

- Install V-belt.

 W 12-02-01



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A09 066	Blower jacket on crankcase / air duct	Torx screws		21 Nm
A09 087	Air guidance cowling on blower jacket / stand plate			21 Nm
A13 082	Cable G1.D+ to generator	M5		3.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Dismantling and assembling the cooling blower



Standard tools:
– Torx tool set

8189



– W 09-11-01

Dismantling the cooling blower

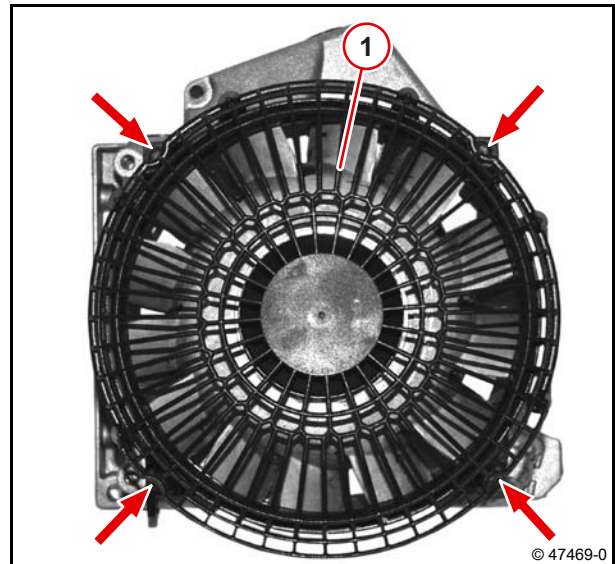
- Remove cooling blower.

W 09-11-01

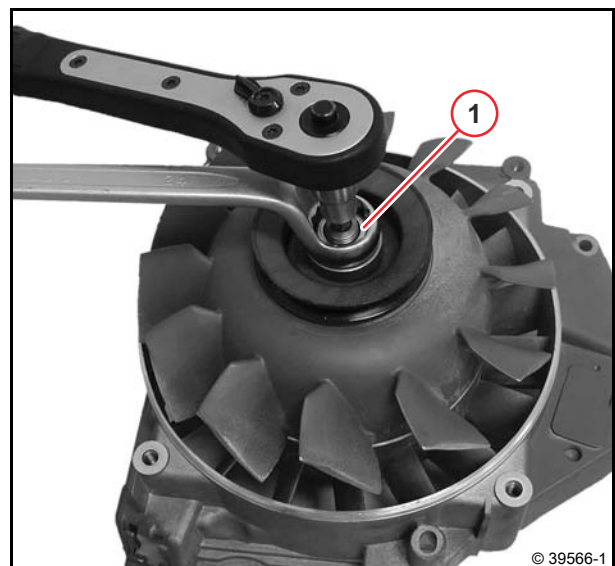
- Unscrew screws (arrows).
- Remove blower jacket (1).



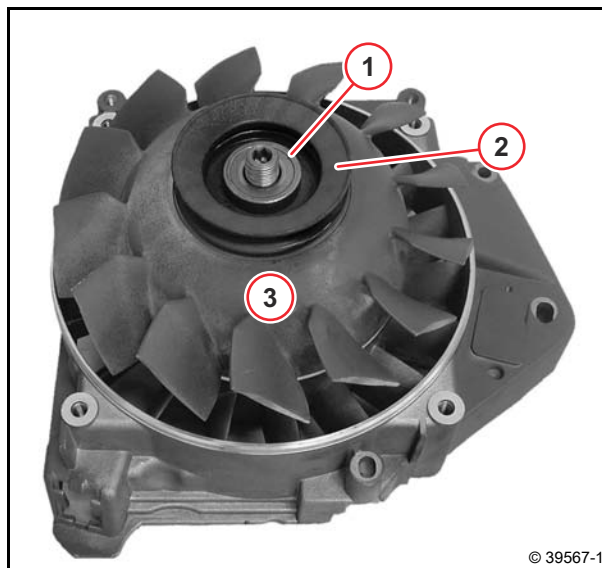
Note installation position.



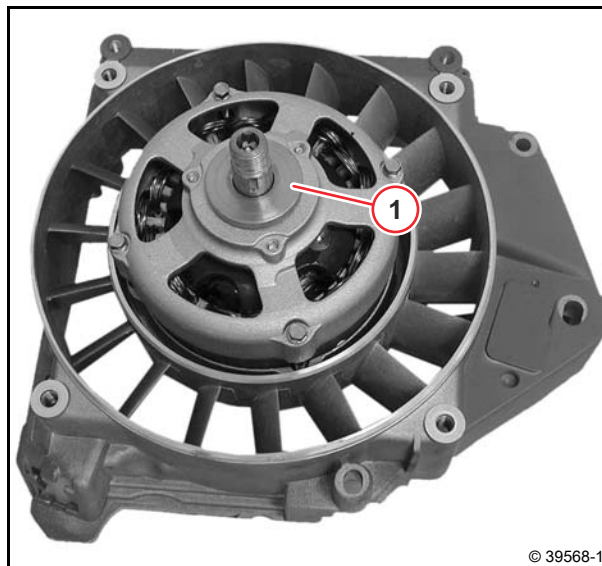
- Hold rotor shaft with hexagonal socket.
- Unscrew nut (1).



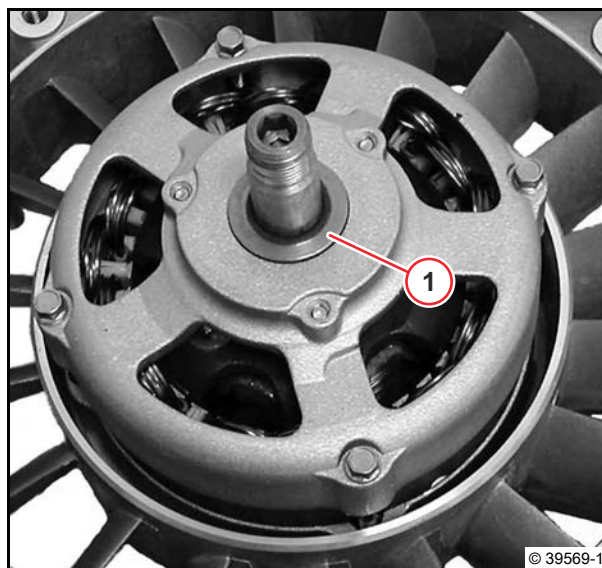
- Remove washer (1).
- Remove V-belt pulley (2).
- Remove running wheel (3).



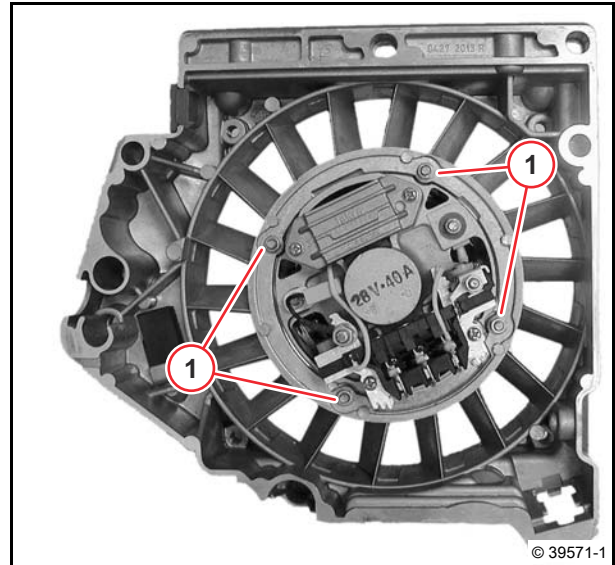
- Remove spacing disc (1).



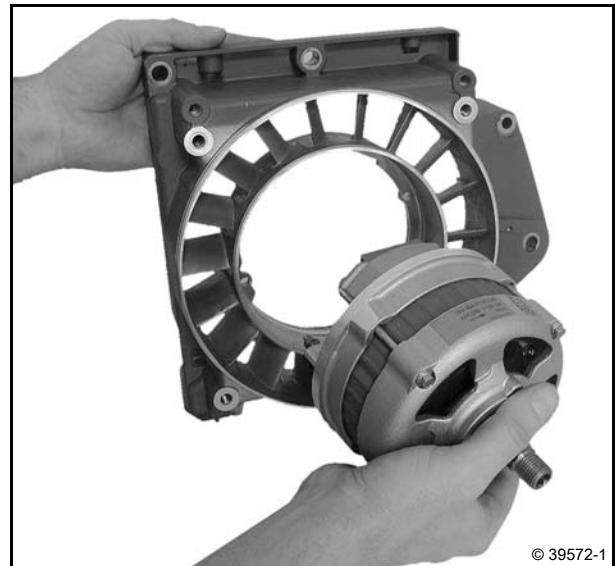
- Remove guide washer (1).



- Unscrew nuts (1).
- Remove washers.



- Remove generator.
- Visually inspect the components.

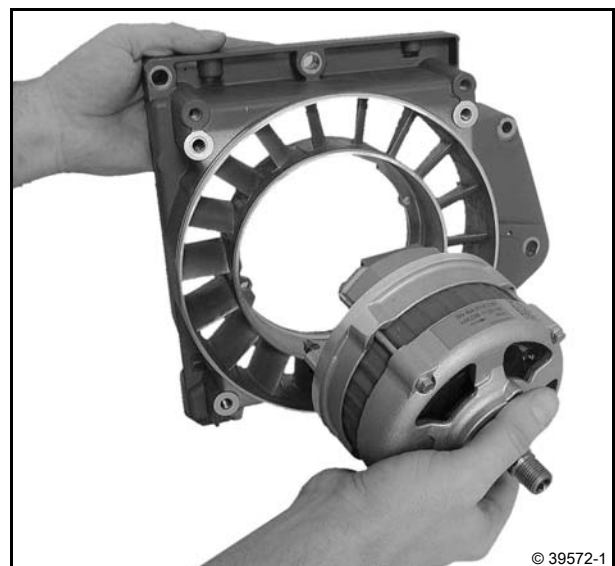



Assembling the cooling blower

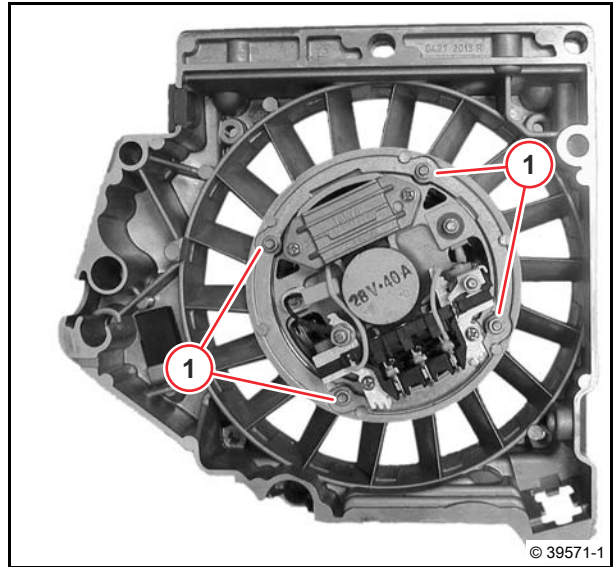
- Mount generator.




Ensure that the installation location is free from faults.

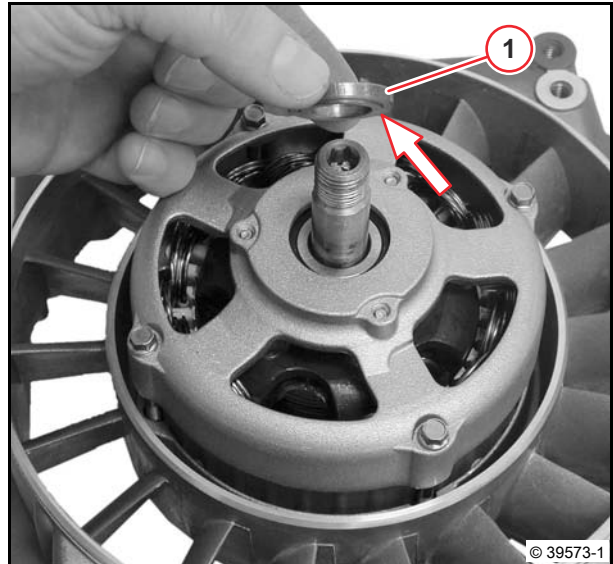


- Mount washers.
 - Tighten nuts (1) alternately.
-  4 Nm
- Check installation position.

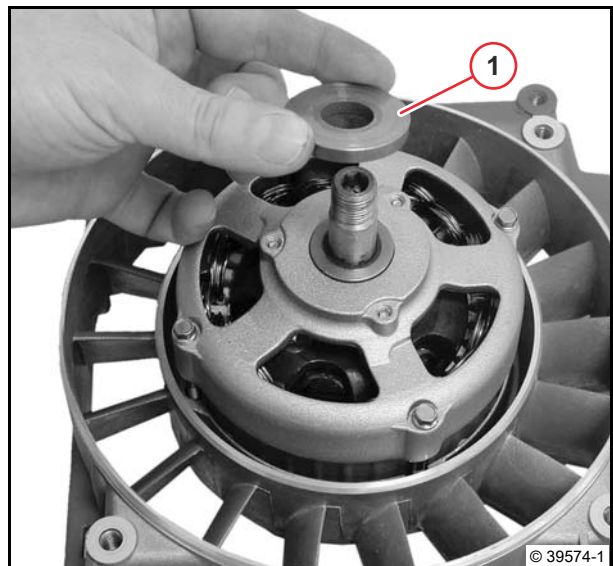


6

- Mount guide plate (1).
-  Recess (arrow) faces generator.



- Mount shim (1).

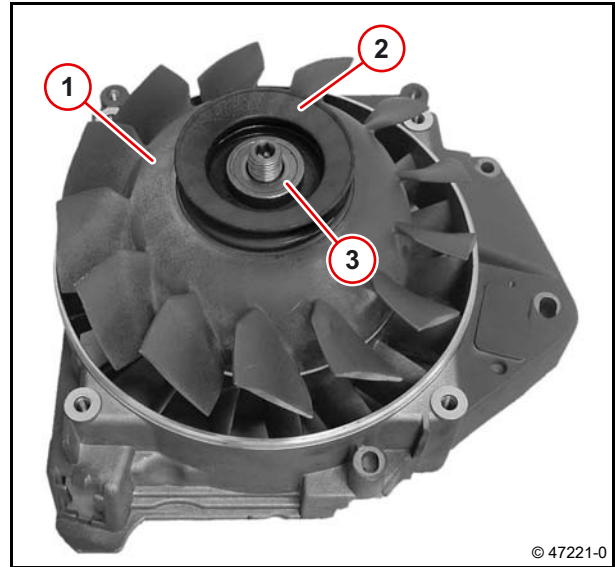


- Install running wheel (1).



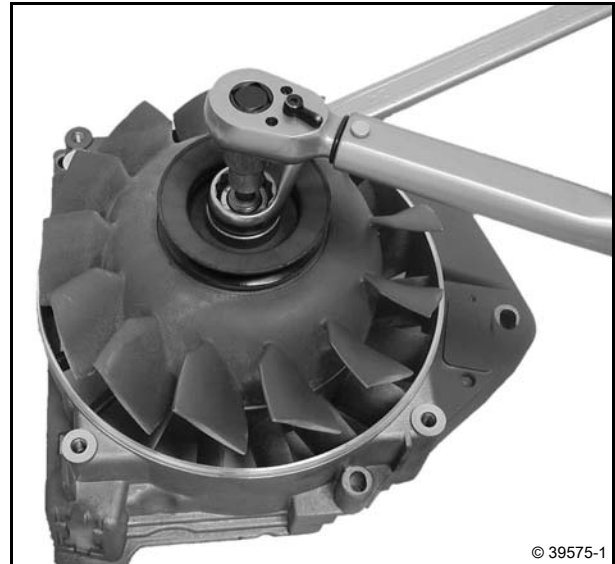
Ensure that the installation location is free from faults.

- Mount V-belt pulley (2).
- Install the washer (3).



- Screw on nut.
- Hold rotor shaft with hexagonal socket.
- Tighten nut.

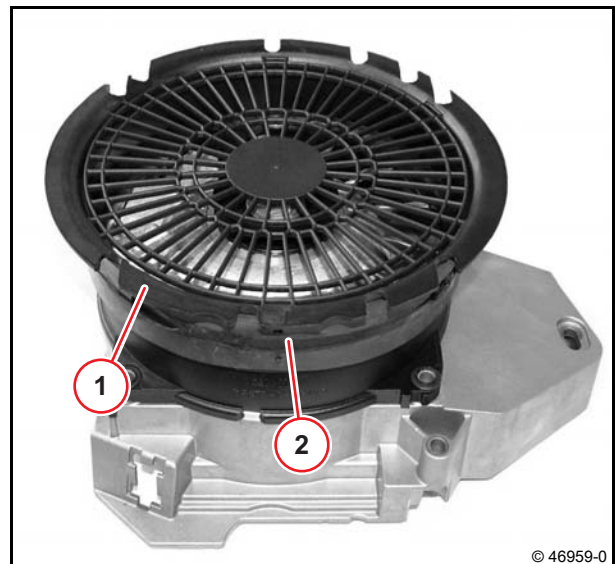
75 Nm



- Mount blower jacket (1).



Note installation position.
Gasket (2) faces the lubricating oil pan.

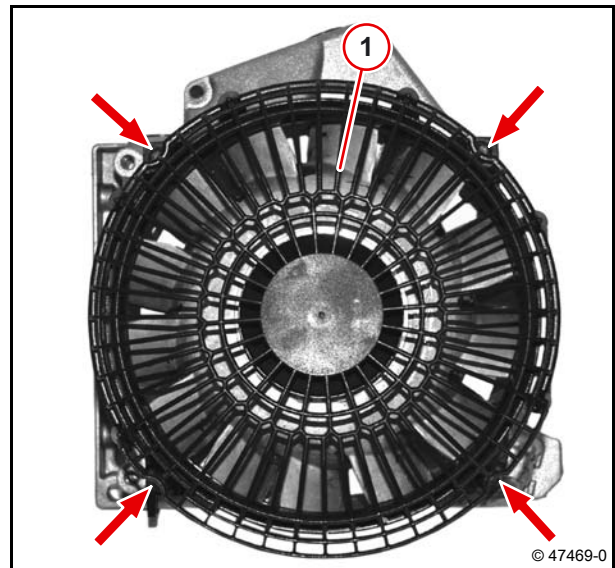


- Tighten screws (arrows).
- Tighten screws (arrows).

 22 Nm

- Install cooling blower.

 W 09-11-01



Technical Data

Testing and setting data

ID no.	Name	Additional information	Value
P09 91	Permissible gap between running wheel and blower jacket		0.2 - 0.8 mm

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A09 065	Blower jacket casing on generator			4 Nm
A09 067	Blower jacket on blower jacket casing			22 Nm
A13 021	Running wheel / belt pulley on generator			75 Nm
A13 081	Charging current cable to generator B+			6.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing air duct



Standard tools:
– Torx tool set

8189



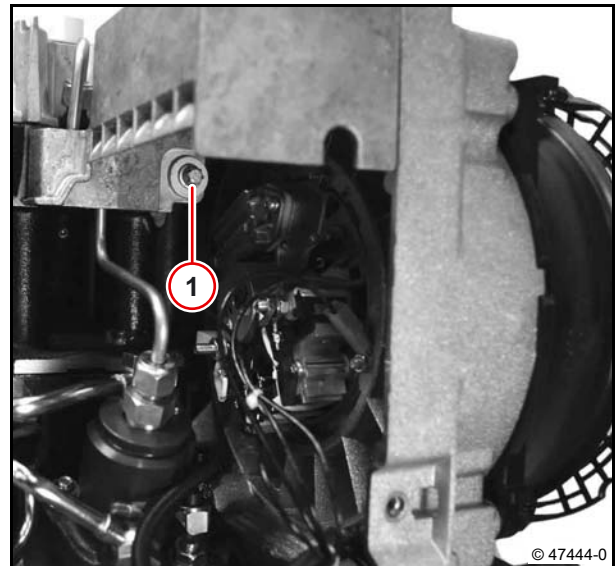
– W 08-08-02

Removing air duct

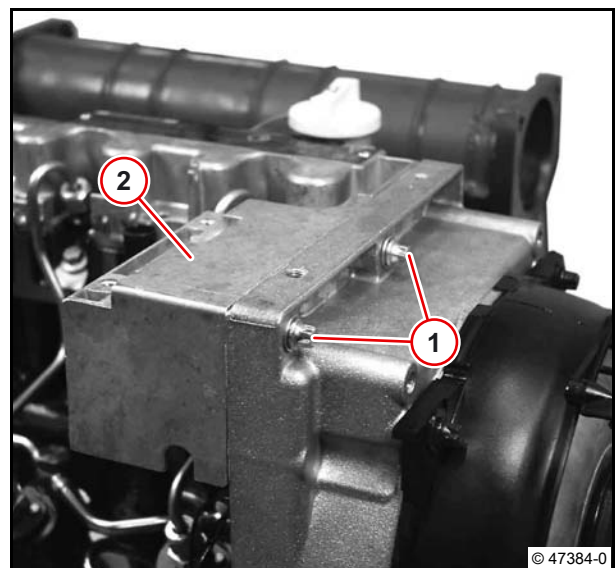
- Remove the lubricating oil cooler.

 W 08-08-02

- Unscrew screw (1).

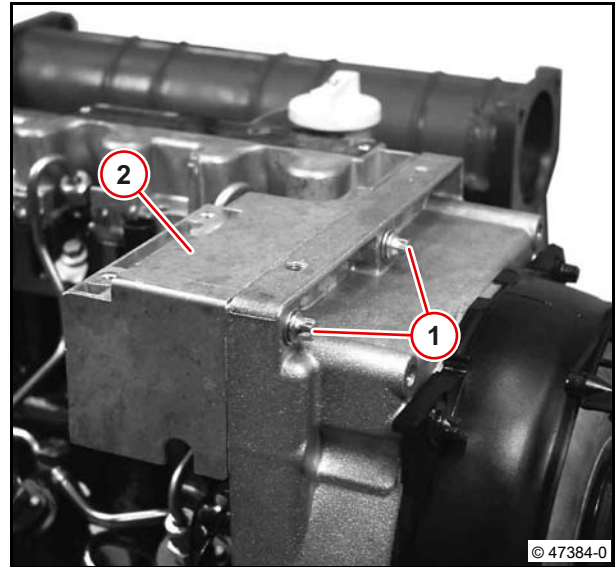


- Unscrew screws (1).
- Remove air duct (2).
- Visually inspect the components.




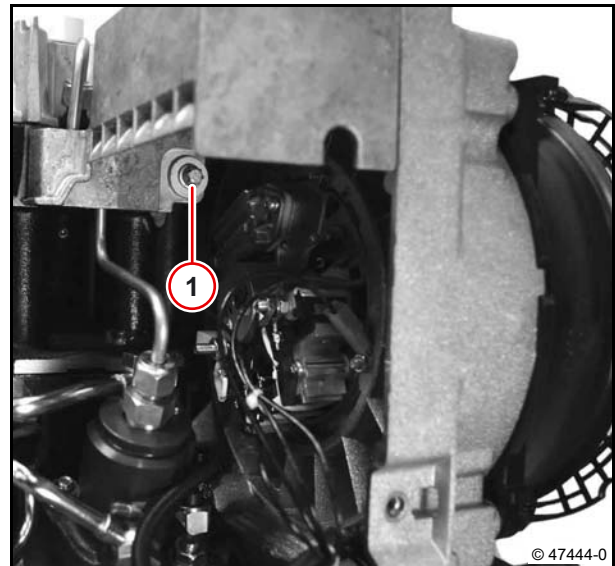
Installing air duct

- Mount air duct (2).
- Tighten screws (1).



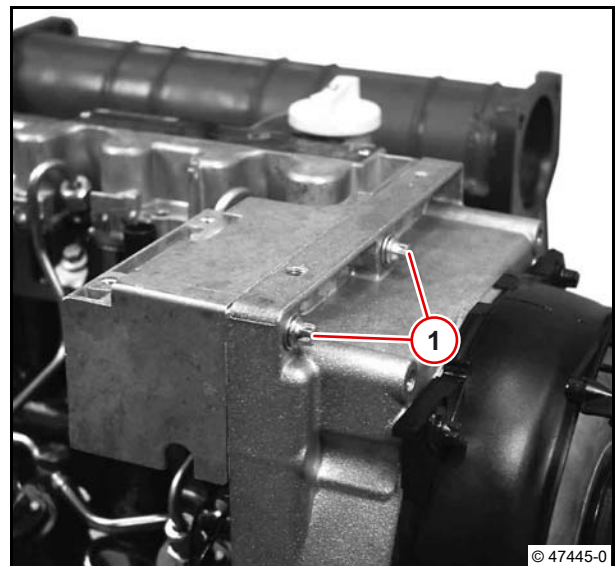
- Pre-tighten screw (1).

 3 Nm



- Tighten screws (1).

 21 Nm

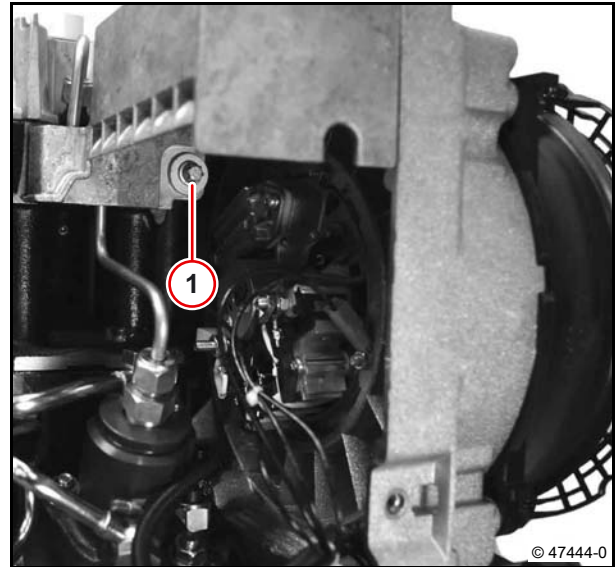


- Tighten screw (1).

 21 Nm

- Install the lubricating oil cooler.

 W 08-08-02



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A09 066	Blower jacket on crankcase / air duct	Torx screws		21 Nm
A09 098	Air duct to cylinder head		Observe assembly specification. Pre-tensioning value:	3 Nm
A09 098	Air duct to cylinder head		Observe assembly specification. Final torque:	21 Nm

6



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the air bearing



Standard tools:
– Rotation angle disc 8190



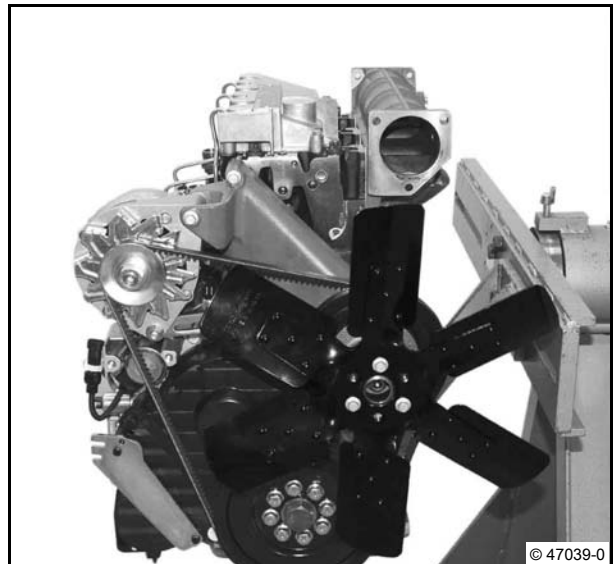
– W 12-02-01

Removing the fan mounting

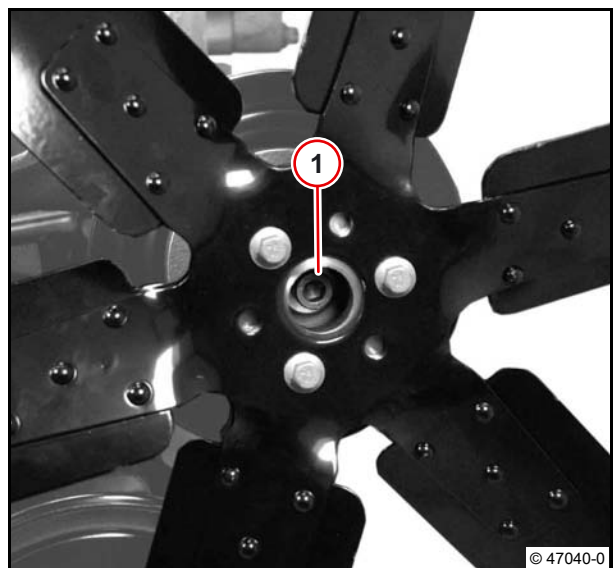
- Remove V-belt.



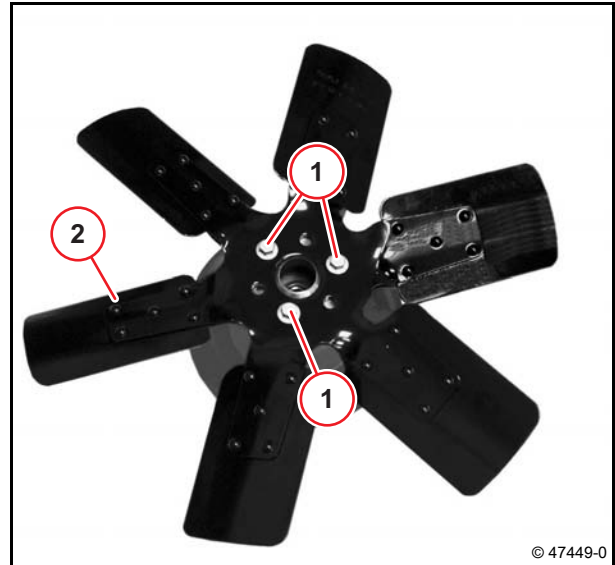
W 12-02-01



- Unscrew screw (1).
- Remove washer.
- Remove air bearing.



- Unscrew screws (1).
- Remove suction fan (2).
- Visually inspect the components.



Installing the fan mounting



Attention!

Note installation position: "Engine side" label faces engine!

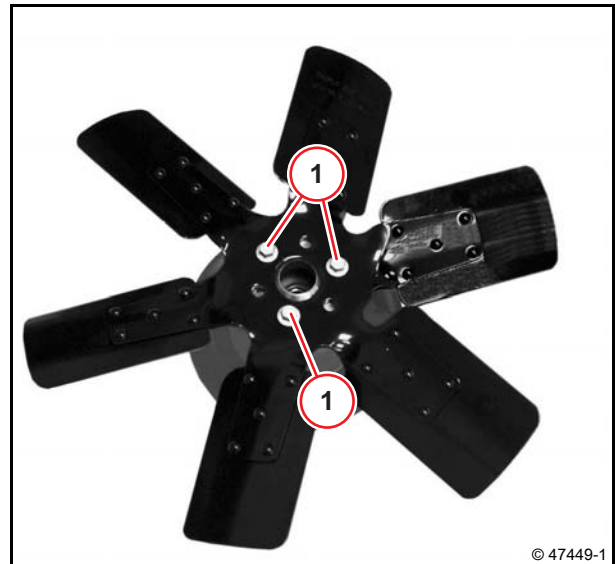
- Mount suction fan.
- Tighten screws (1).
- M8x22-8.8

22 Nm

or

– M8x20-10.9

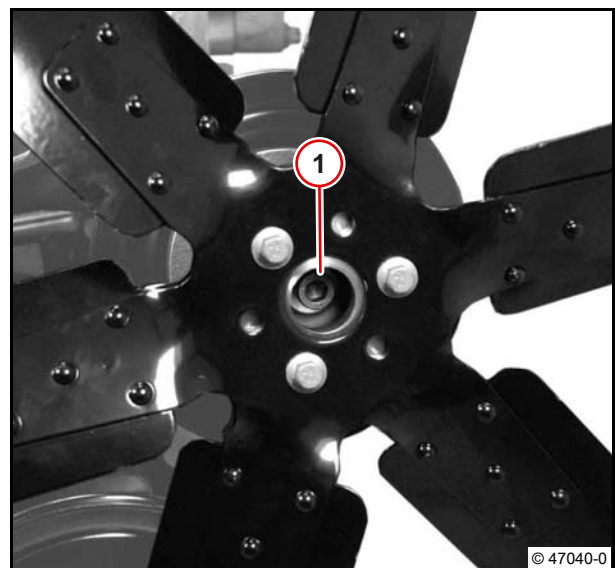
30 Nm



Attention!

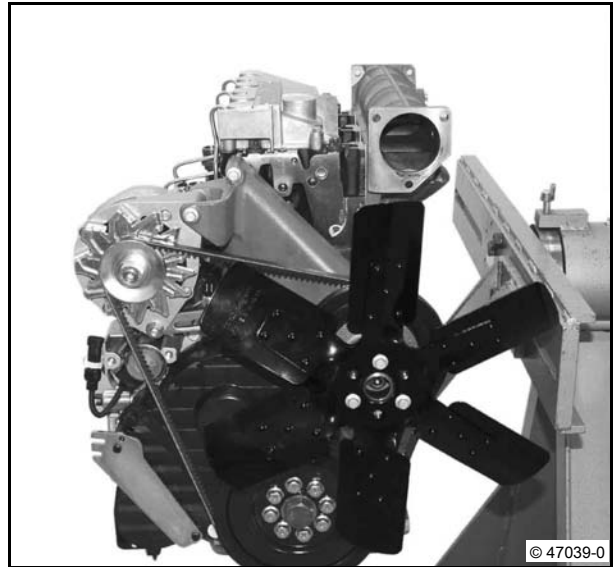
Note installation position: "Engine side" label faces engine!

- Mount air bearing.
- Mount disc.
- Tighten new screw (1).
- Stage 1:
 30 Nm
- Tighten screw (1) with socket wrench insert and rotation angle disc.
- Stage 2:
 120°



- Install V-belt.

 [W 12-02-01](#)



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A09 042	Suction fan on fan drive	M8x22-8.8		22 Nm
A09 042	Suction fan on fan drive	M8x20-10.9		30 Nm
A09 045	Air bearing on console	M10x110-12.9	Stage 1: Use new screw.	30 Nm
A09 045	Air bearing on console	M10x110-12.9	Stage 2:	120°



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the lifting magnet (Engine shutdown)



Standard tools

Special tools:

– Disassembly tool

110901



– W 12-02-01

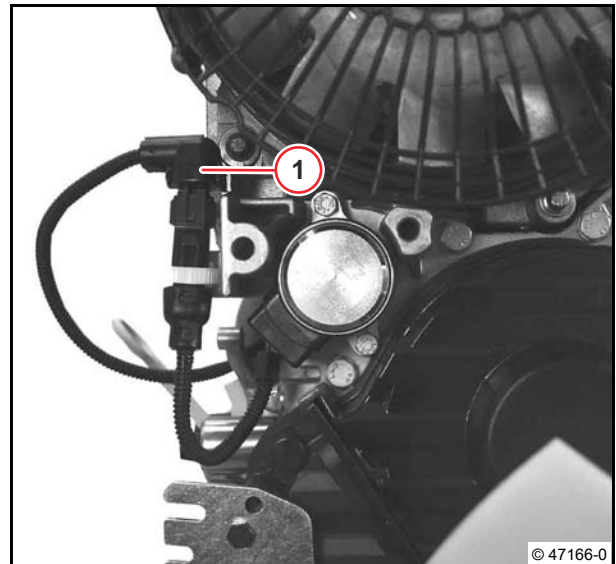
Remove lifting magnet

– Version with V-belt tensioning pulley

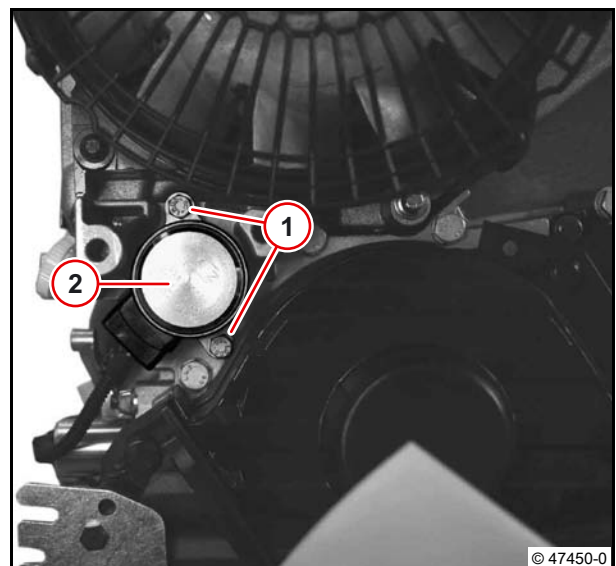
- Remove V-belt.

 W 12-02-01

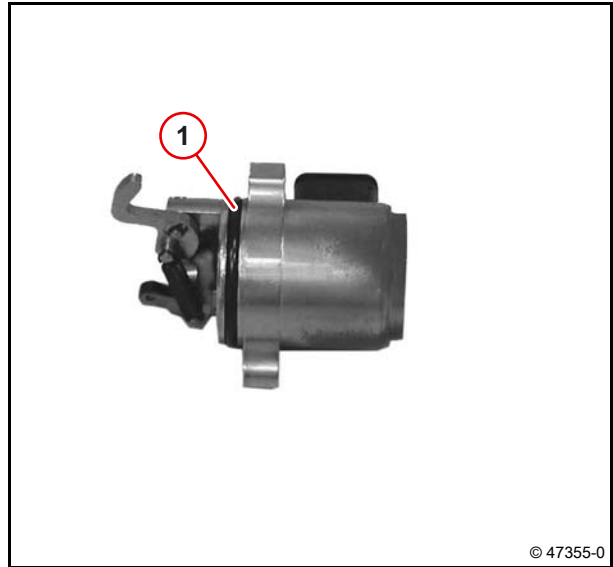
- Remove V-belt tensioning pulley.
- Unlock cable plug (1) and remove.



- Unscrew screws (1).
- Remove lifting magnet (2).



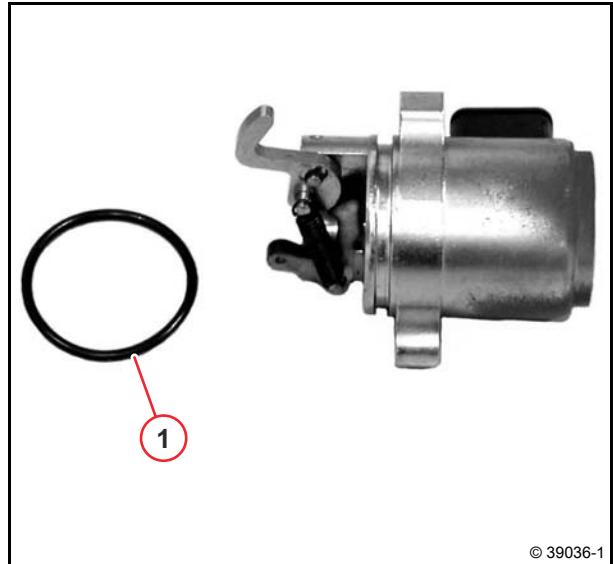
- Remove the O-ring (1) with the disassembly tool.
- Visually inspect the components.



6

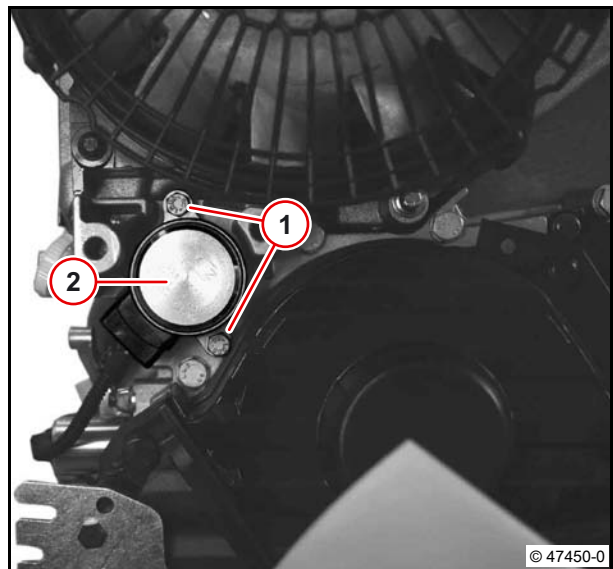
Install lifting magnet

- Insert new O-ring (1).



- Insert lifting magnet (2).
- Tighten screws (1).

 8.5 Nm



- Plug in the cable plug (1).

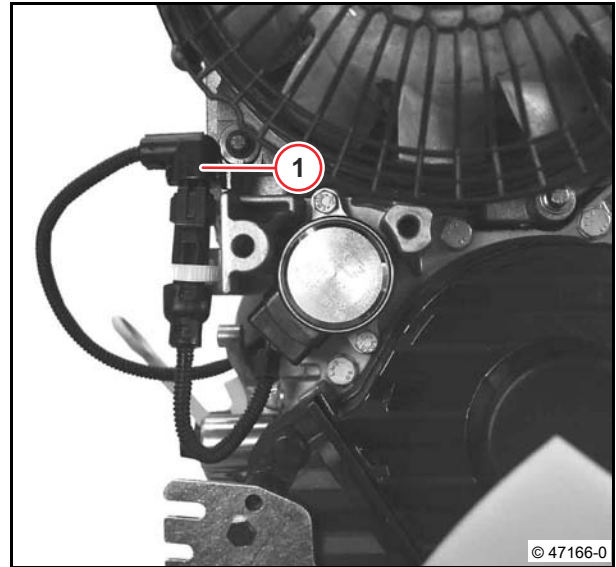


Ensure that the connection is perfect.

– **Version with V-belt tensioning pulley**

- Install V-belt tensioning pulley.
- Mount and tighten V-belt.

 [W 12-02-01](#)



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A05 041	Lifting magnet (engine shutdown) on front cover			8.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the V-belt pulley



Standard tools



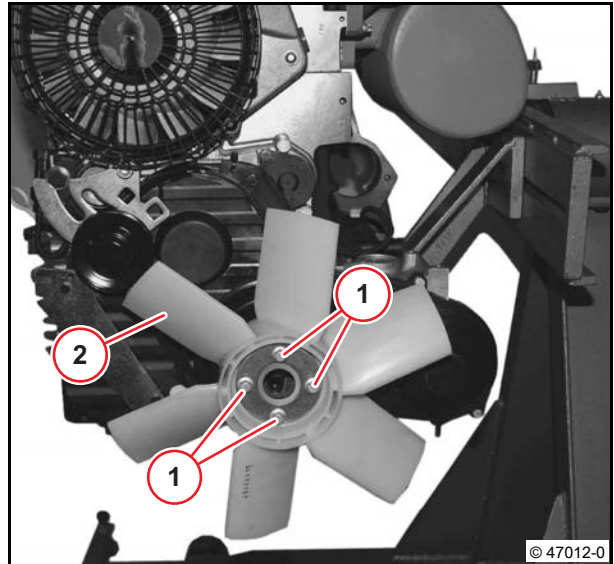
– W 12-02-01

Removing the V-belt pulley

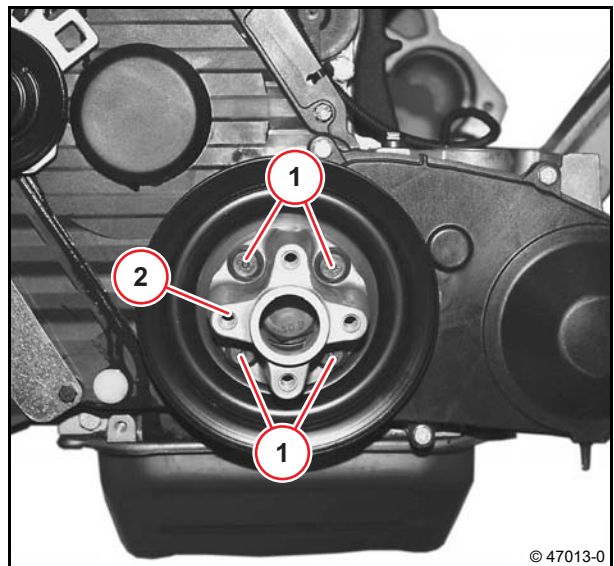
- Remove V-belt.

 W 12-02-01

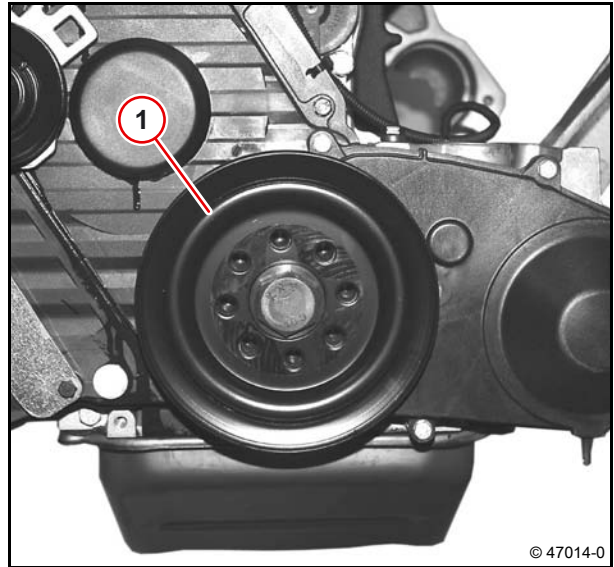
- Unscrew screws (1).
- Remove fan (2).




- Unscrew screws (1).
- Remove flange hub (2).

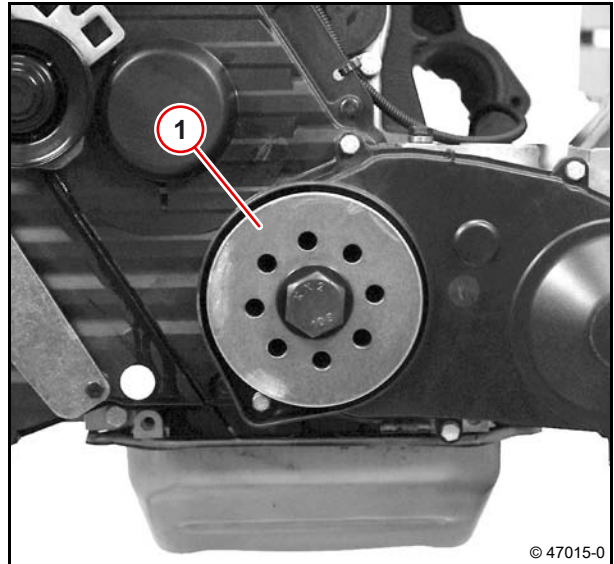


- Remove V-belt pulley (1).




- Remove centrifugal disc (1).
-  Note installation position.

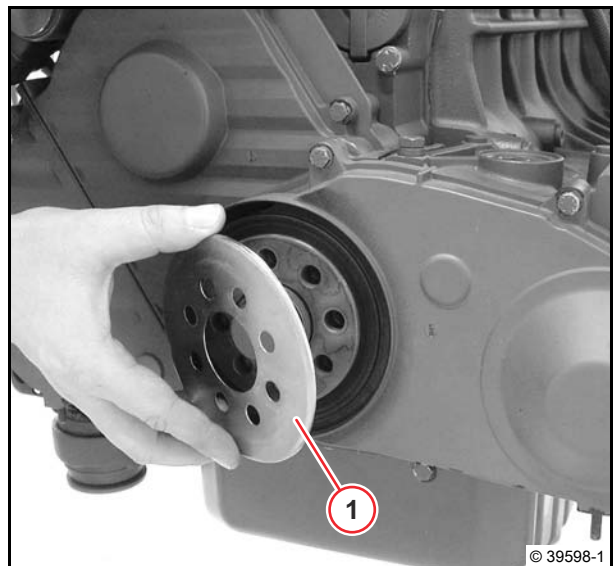
- Visually inspect the components.



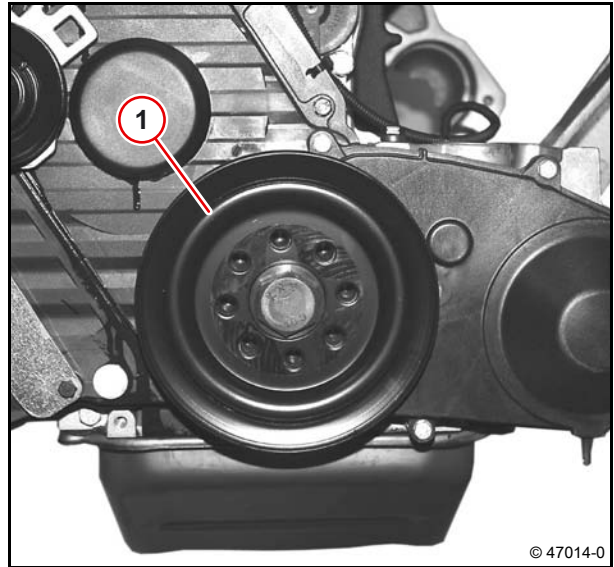
Installing the V-belt pulley

- Mount centrifugal disc (1).

 Note installation position.

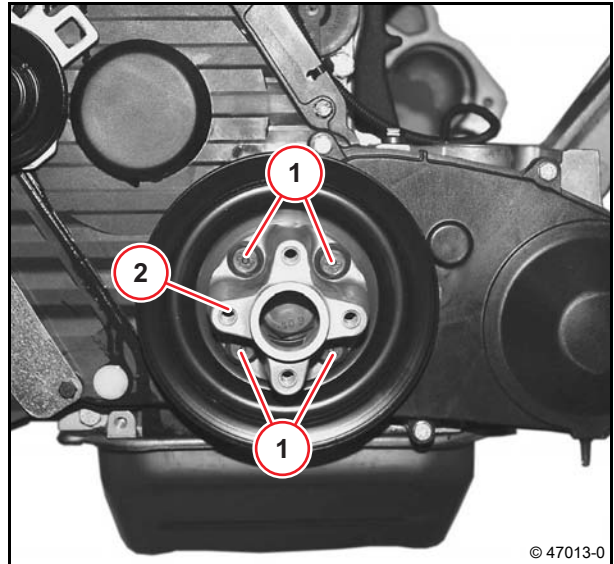


- Mount V-belt pulley (1).



- Mount flange hub (2).
- Tighten screws (1).

 43 Nm



Attention!

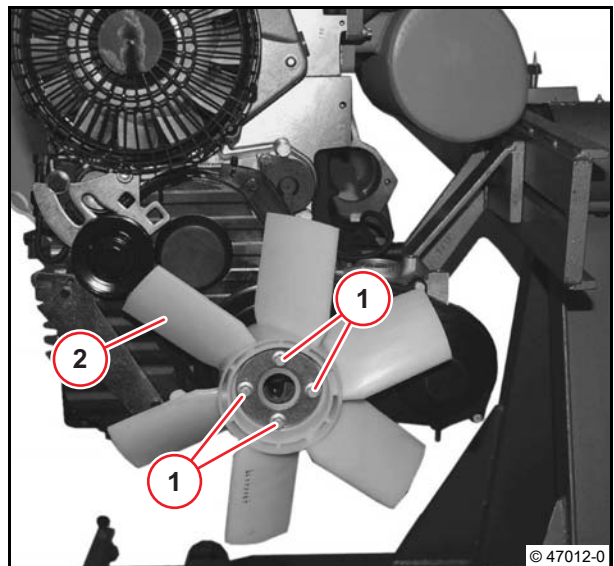
Note installation position: "Engine side" label faces engine!

- Mount fan (2).
- Tighten screws (1).

 30 Nm

- Install V-belt.

 W 12-02-01



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A09 042	Ventilator on flange hub	M8x40-10.9		30 Nm
A12 031	V belt pulley/flange hub on output flange	M10x30-8.8		43 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Renew V-belts, check V-belt tension



Standard tools:
– V-belt tension measuring
device 8115



Attention!

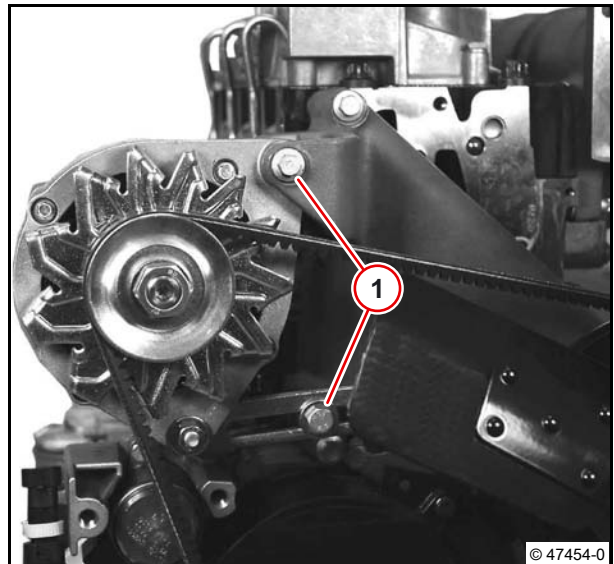
Only test / tighten / renew V-belts when the engine is not running.



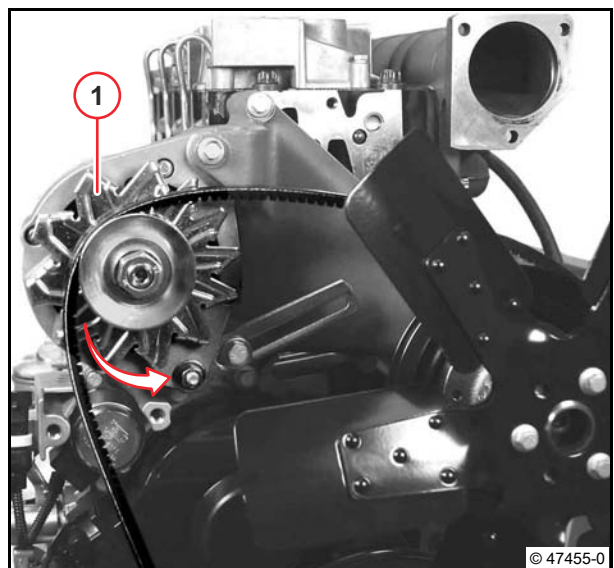
The V-belt tension of new V-belts must be checked after they have been running for 15 minutes.

Removing the V-belt

- Loosen screws (1).

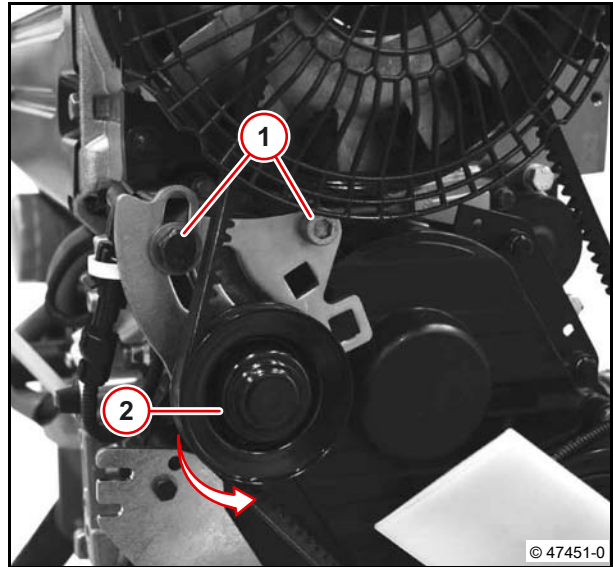


- Swing generator (1) in the direction of the arrow.
- Remove V-belt.



– Version with V-belt tensioning pulley

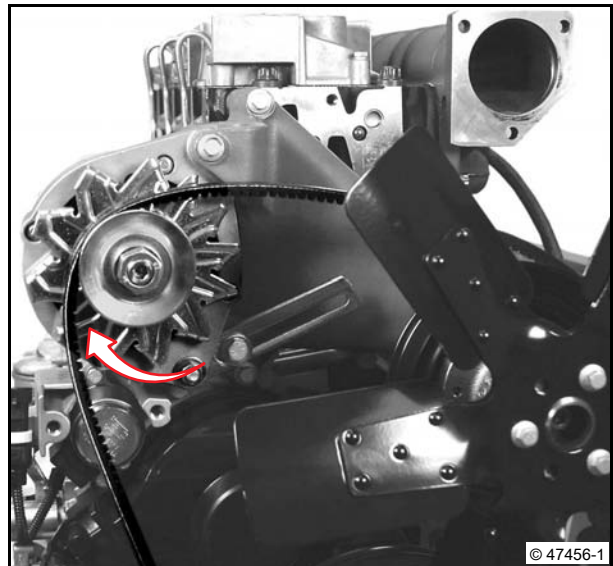
- Loosen screws (1).
- Swing V-belt tensioning pulley (2) in the direction of the arrow.
- Remove V-belt.



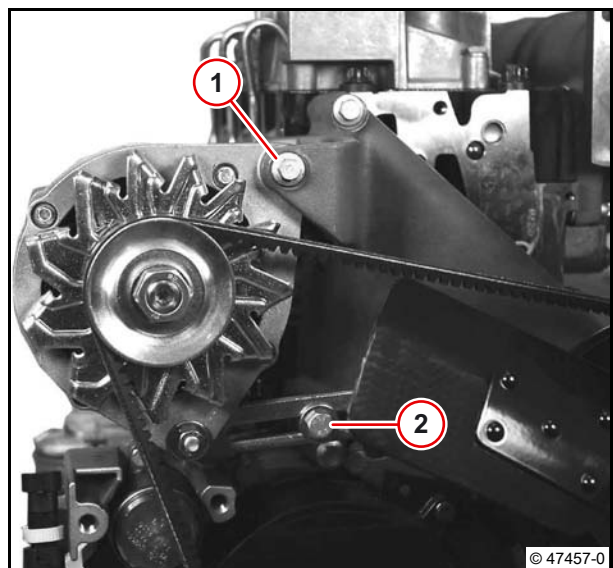
6

Installing the V-belt.

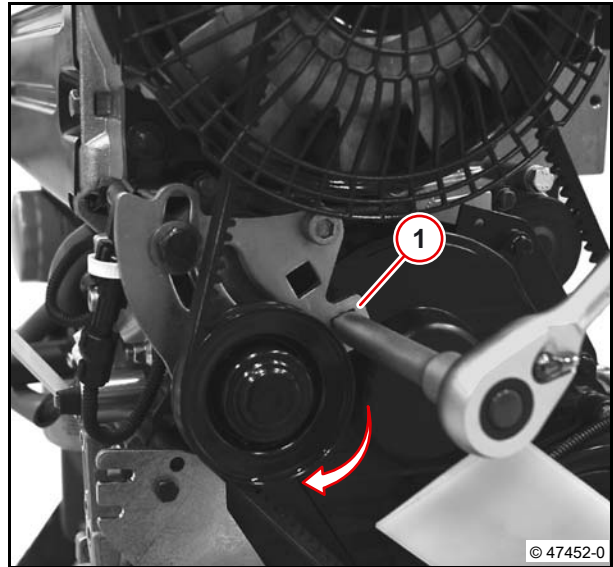
- Mount V-belt.
- Swing generator (1) in the direction of the arrow.



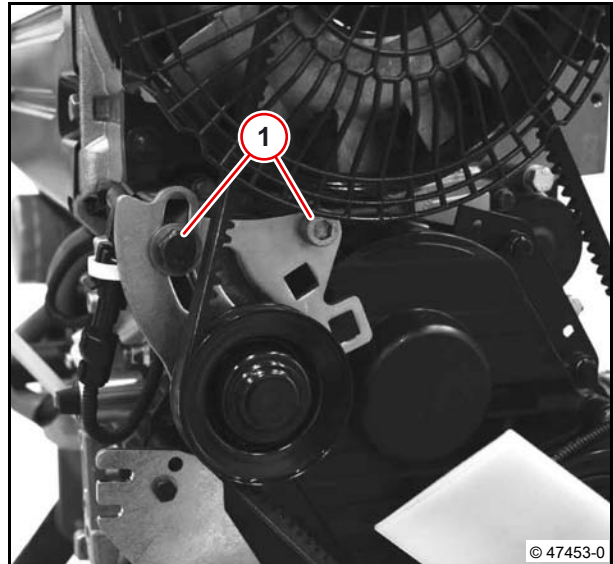
- Pre-tighten screw (1).
- Pre-tighten screw (2).



- Version with V-belt tensioning pulley
- Mount V-belt.
- Press clamping strap (1) in direction of arrow with a suitable tool.

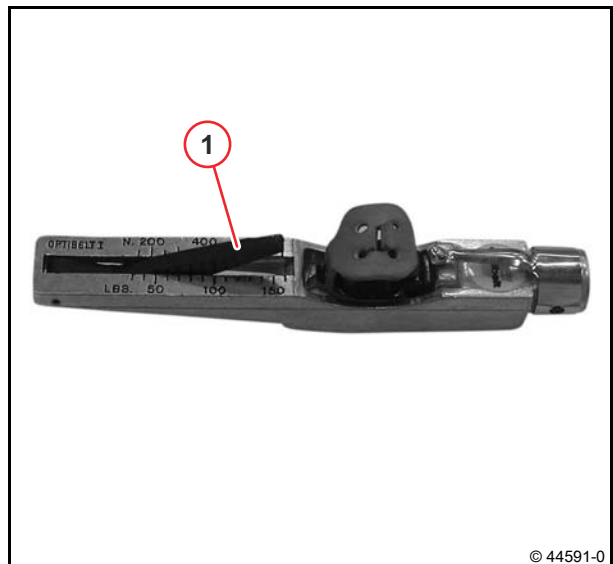


- Pre-tighten screws (1).



Check V-belt tension with V-belt tension measuring device

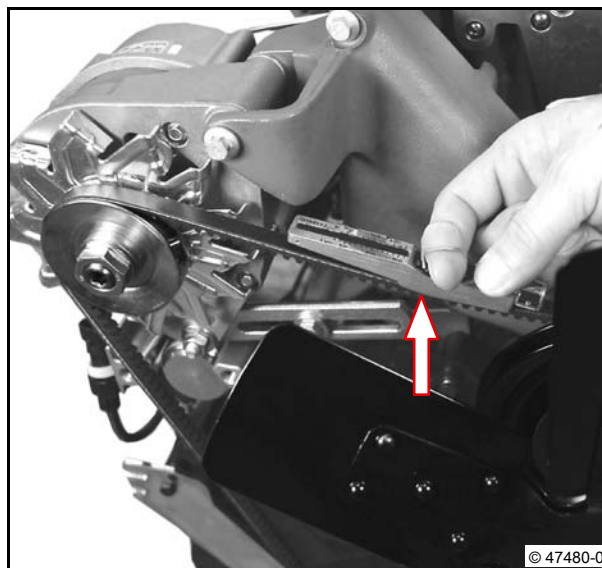
- Lower indicator arm (1) into V-belt tension measuring device.



- Mount V-belt tension measuring device on V-belt.



The V-belt must be between the guides (arrow).



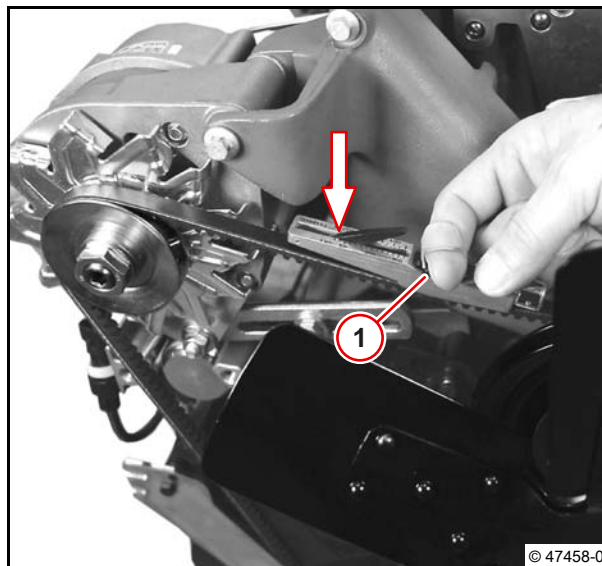
- Press the V-belt measuring device against the V-belt with the button (1) until you hear it click.
- Read measured value at the intersection (arrow) of the indicator arm and scale.

 $450 \begin{matrix} +50 \\ -50 \end{matrix} \text{ N}$



Note different units on the scale.

- If the nominal value is not reached, the tensioning process must be repeated.



- Tighten screw (1).

– M8

 31 Nm

- Hold locking nut (arrow).

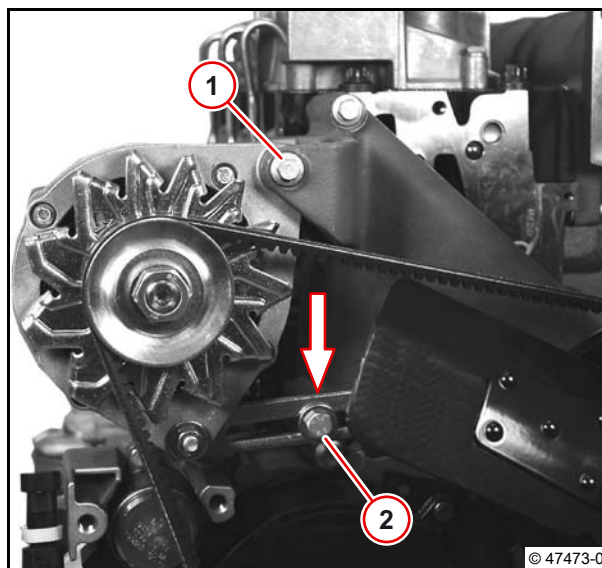
- Tighten screw (2).

 43.5 Nm



The V-belt tension of new V-belts must be checked after they have been running for 15 minutes.

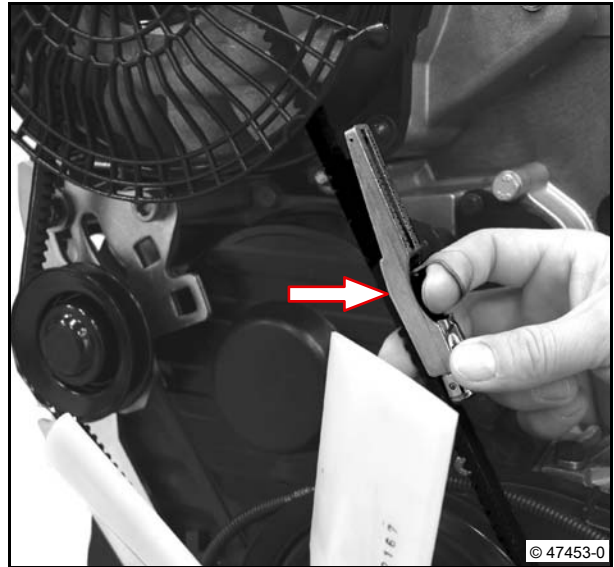
 $300 \begin{matrix} +20 \\ -20 \end{matrix} \text{ N}$



- Version with V-belt tensioning pulley
- Mount V-belt tension measuring device on V-belt.



The V-belt must be between the guides (arrow).



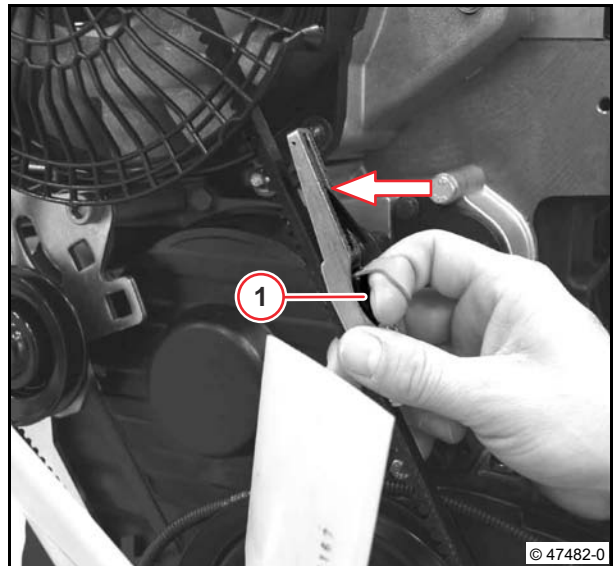
- Press the V-belt measuring device against the V-belt with the button (1) until you hear it click.
- Read measured value at the intersection (arrow) of the indicator arm and scale.

 450^{+50}_{-50} N



Note different units on the scale.

- If the nominal value is not reached, the tensioning process must be repeated.



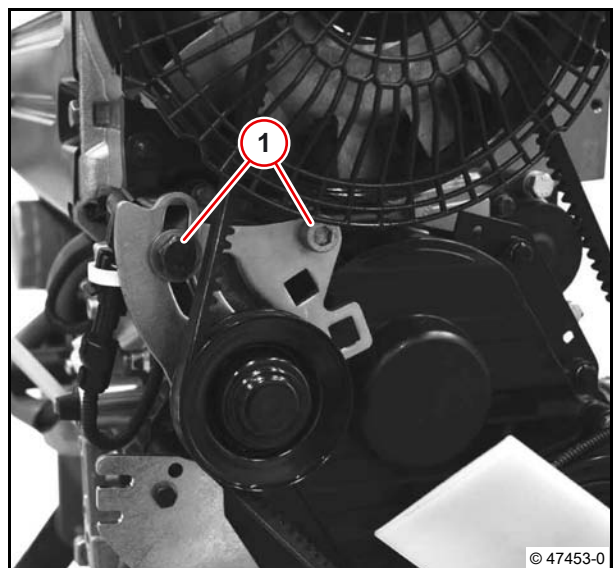
- Tighten screws (1).

 45 Nm



The V-belt tension of new V-belts must be checked after they have been running for 15 minutes.

 300^{+20}_{-20} N



Technical Data

Testing and setting data

ID no.	Name	Additional information	Value
P12 11	V-belt tension, individual V-belts AVX 10	First assembly	450 ⁺⁵⁰ ₋₅₀ N
P12 21	V-belt tension, individual V-belts AVX 10	Check after 15 minutes running under load	300 ⁺²⁰ ₋₂₀ N

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A12 041	V-belt tensioning pulley (holder) on front cover	M10x25-8.8		45 Nm
A13 012	Generator on console	M8x75-10.9		31 Nm
A13 015	Clamping bracket on generator	M8 M8x30-8.8 M8x35-8.8		22 Nm
A13 016	Clamping bracket on console	M10x25-10.9		43.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Removing and installing the flywheel



Standard tools:

- Self-made mandrin guide
- Rotation angle disc 8190

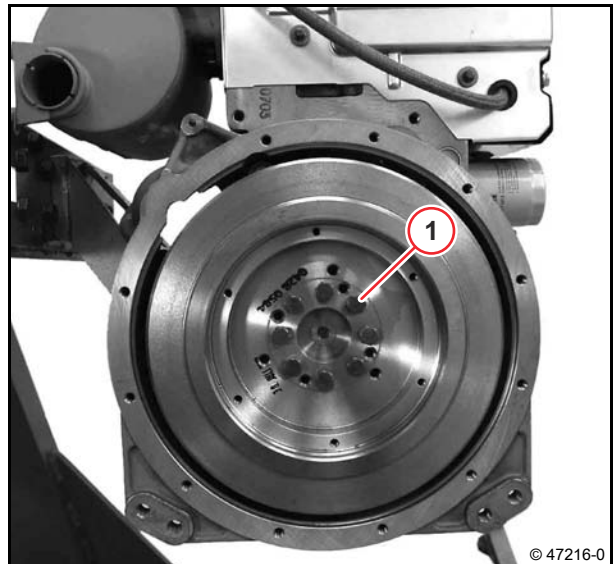
Removing the flywheel

- Block flywheel with suitable tool.
- Unscrew all screws (1).
- Screw two long screws into the threaded bores.



To improve the removal and installation of the flywheel.

- Remove flywheel.



- Visually inspect the components.



Installing the flywheel

- Screw two long screws into the threaded bores.



To improve the removal and installation of the flywheel.

- Insert self-made mandrin guide (1).

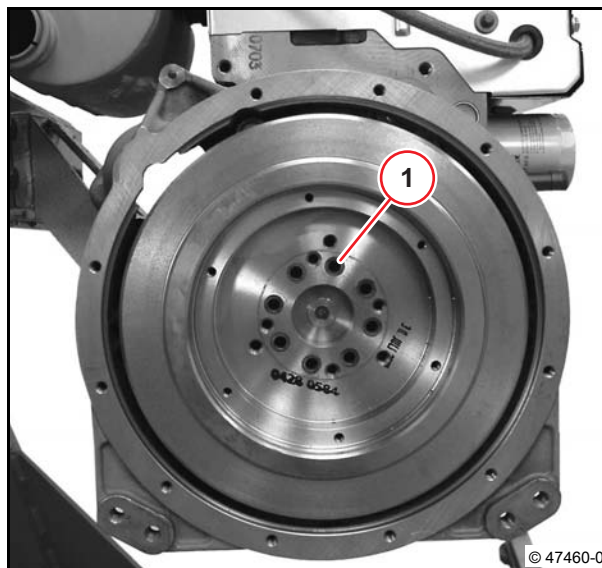


For example a pin bolt.

- Mount flywheel.



The bores in the flywheel must match the threaded bores in the crankshaft flange.



© 47460-0

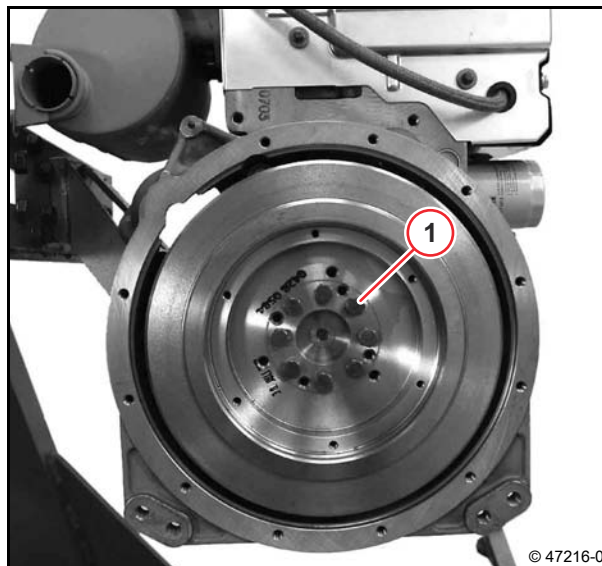
- Turn in new screws (1).



Attention!

Renew screws every time they are loosened.

- Remove self-made mandrin guide.



© 47216-0

- Tighten screws alternately.

– Stage 1:

30 Nm

– Stage 2:

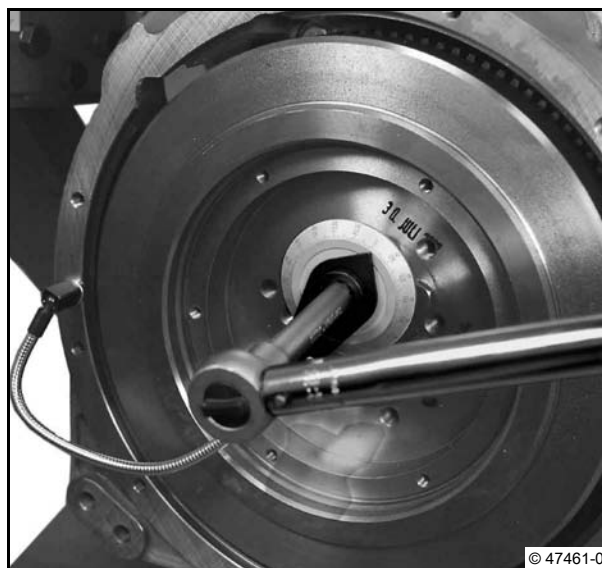
60°

– Stage 3:

30°



Block flywheel with suitable tool.



© 47461-0

Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A12 001	Flywheel on crankshaft		Stage 1: Use new screws	30 Nm
A12 001	Flywheel on crankshaft		Stage 2:	60°
A12 001	Flywheel on crankshaft		Stage 3:	30°



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the hydraulic pump



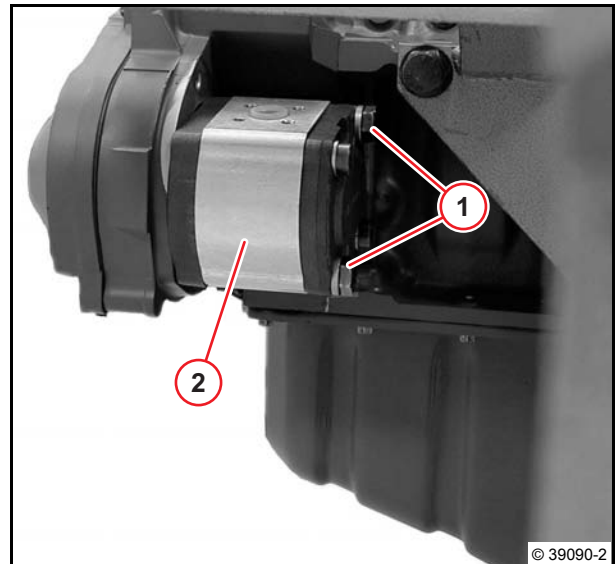
Standard tools



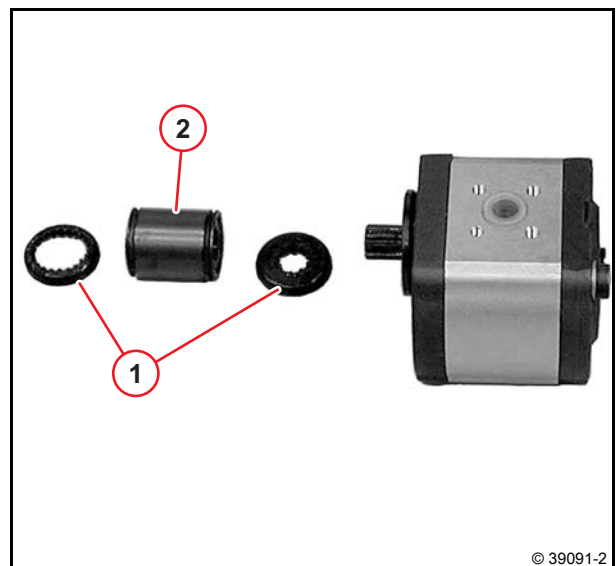
– Graphite grease G 500

Removing the hydraulic pump

- Remove the hydraulic pipes.
- Press in stoppers.
- Unscrew screws (1).
- Remove hydraulic pump (2).
- Remove coupling sleeve.

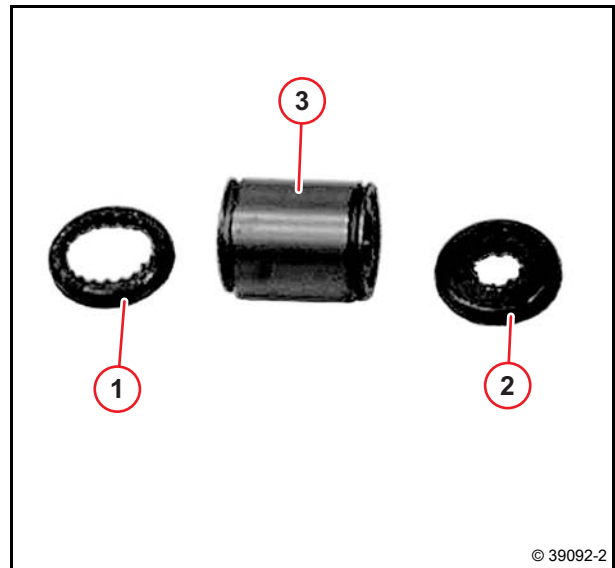


- Pull off the collars (1).
- Clean coupling sleeve (2).
- Check components for visible signs of wear.



Installing hydraulic pump

- Pull collar (1) onto coupling sleeve (3).
- Align cutting on the tothing of the coupling sleeve.
- Pull collar (2) onto coupling sleeve (3).
- Align cutting on the tothing of the coupling sleeve.
- Grease inner tothing of the coupling sleeve.

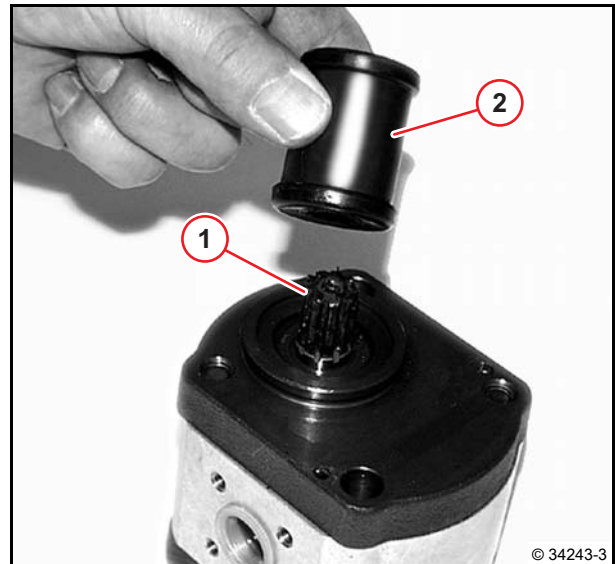


- Grease gear shaft (1).
- Push on coupling sleeve (2).



Note installation position.

Tothing of the coupling sleeve must engage with the gear shaft.

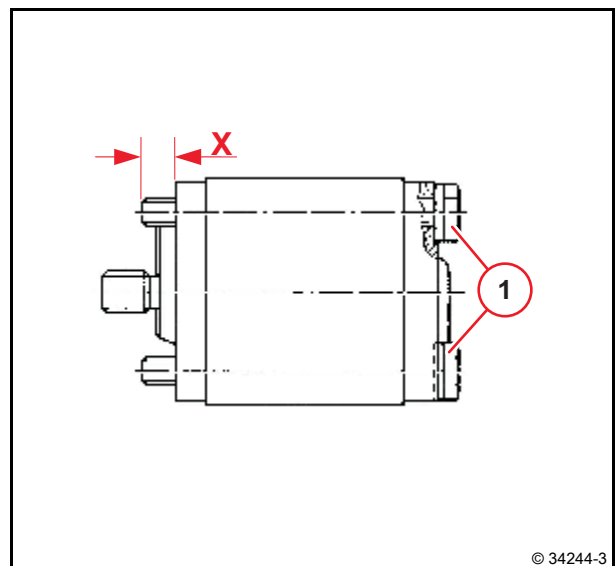


- Insert screws (1).
- Measure protrusion dimension X.



Maximum protrusion dimension X = 18 mm.

Use new screws or correct with washers under the head of the screw.



- Insert hydraulic pump (1) and coupling sleeve.



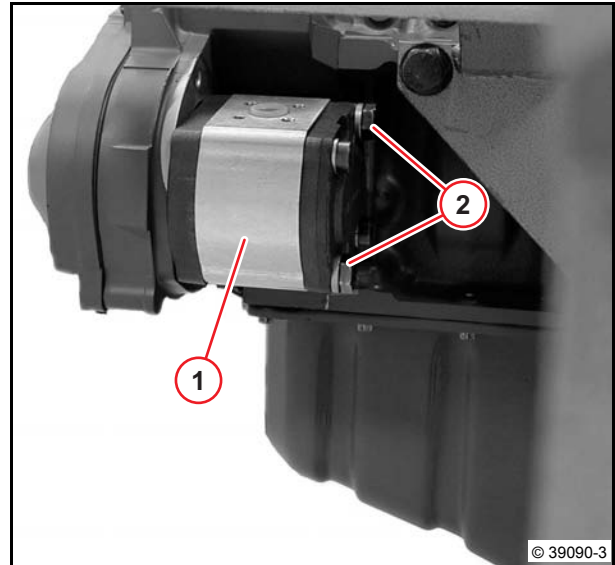
Toothings of the coupling sleeve must engage with the gear shaft.

- Tighten screws (2).



57 Nm

- Pull out stoppers.
- Insert hydraulic pipes.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A12 051	Hydraulic pump on hydraulic pump console			57 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.

Renew toothed belt and tensioning pulley (Hydraulic pump)



Standard tools



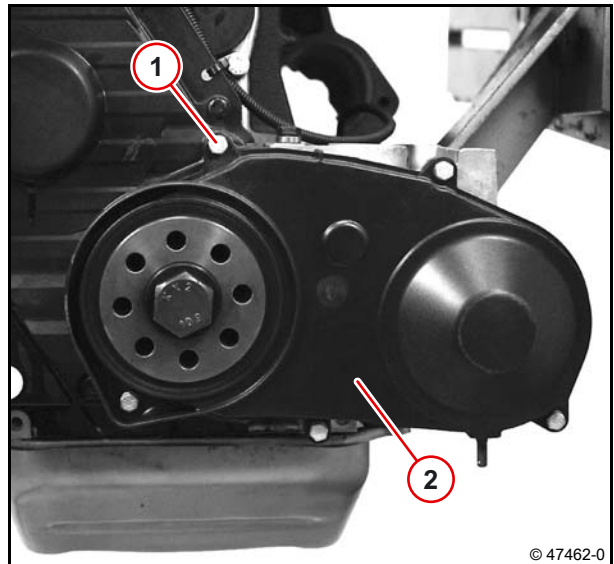
– W 12-01-04

Remove toothed belt and tensioning pulley

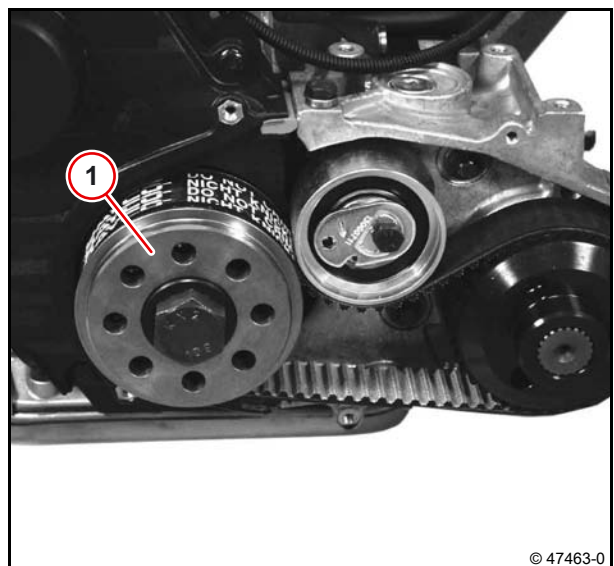
- Remove V-belt pulley.

 W 12-01-04

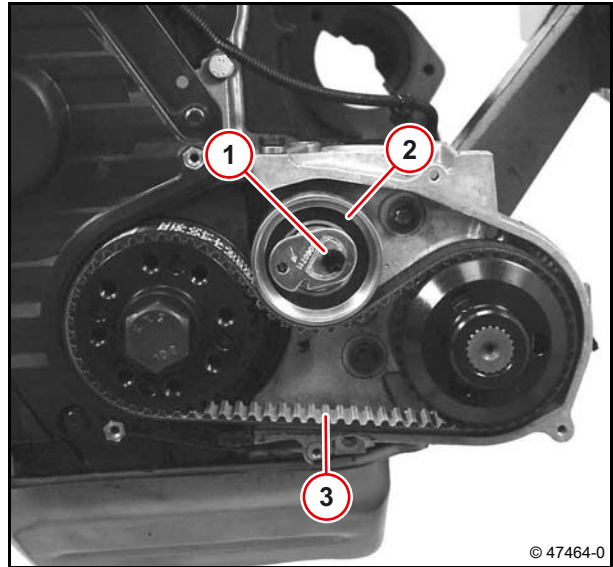
- Unscrew all screws (1).
- Remove protective hood (2).



- Remove adapter (1).



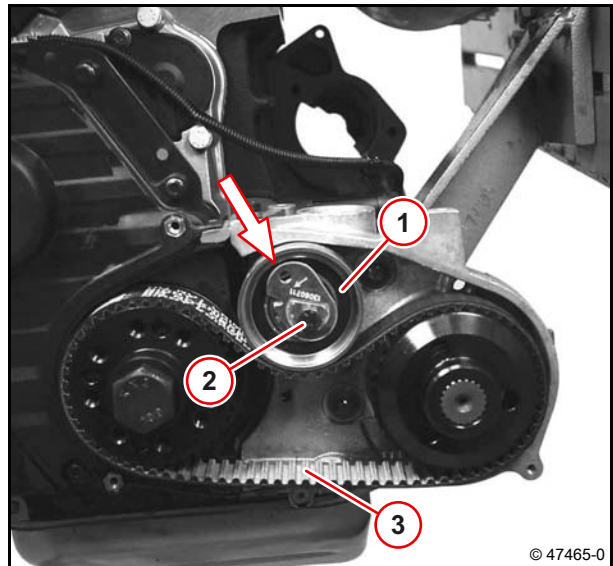
- Unscrew screw (1).
- Remove tensioning pulley (2).
- Remove the toothed belt (3).
- Visually inspect the components.



6

Install toothed belt and tensioning pulley

- Mount new tensioning pulley (1).
- Position setting eccentric (arrow) at 11 o'clock.
- Fasten screw (2).
- Mount new toothed belt (3).

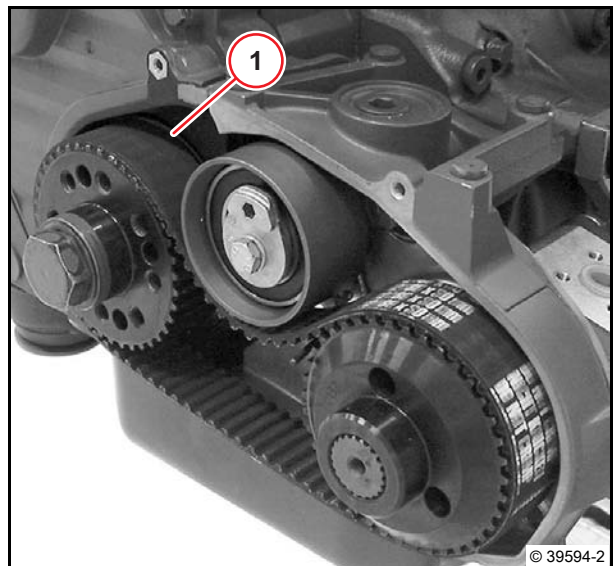


- Position toothed belt centrally on the toothed belt wheels.



Attention!

Note installation position.
The toothed belt may not rub on the console or the guide band (1)!



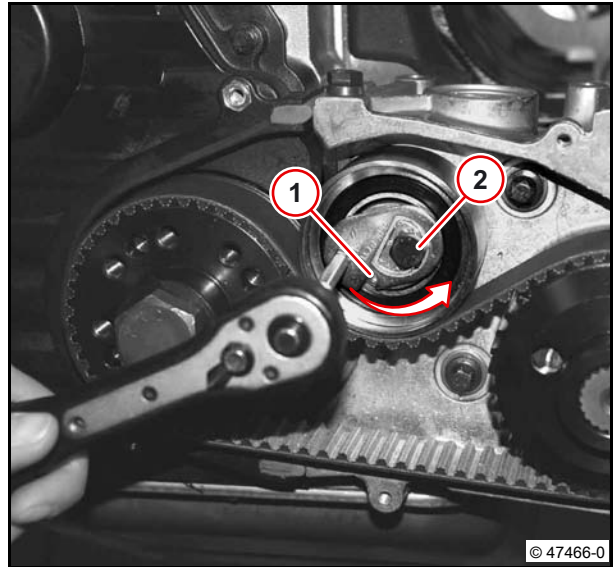
- Turn setting eccentric in the direction of arrow with hexagon socket.



Markings (1) must be in alignment with bulge.

- Tighten screw (2).

 21 Nm



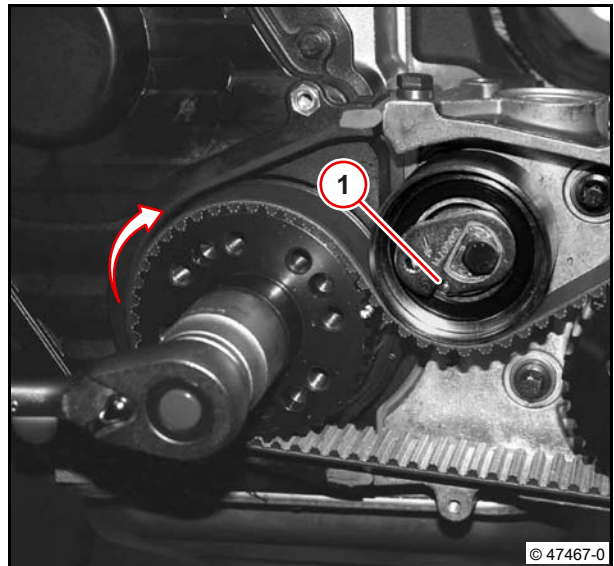
Check toothed wheel tension

- Turn crankshaft 2 revolutions in the direction of the arrow (direction of engine rotation).



Markings (1) must be in alignment with bulge.

If the markings are not aligned with each other, the toothed belt tension must be corrected.



Correct toothed belt tension

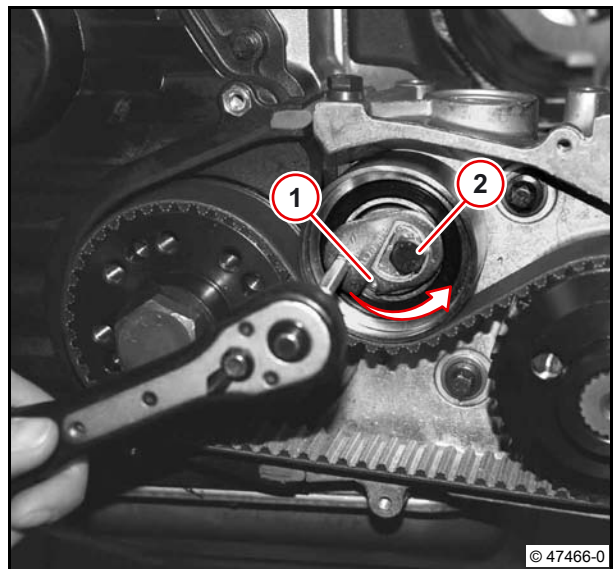
- Loosen screw (2).
- Pre-tighten screw (2).
- Turn setting eccentric in the direction of arrow with hexagon socket.



Markings (1) must be in alignment with bulge.

- Tighten screw (2).

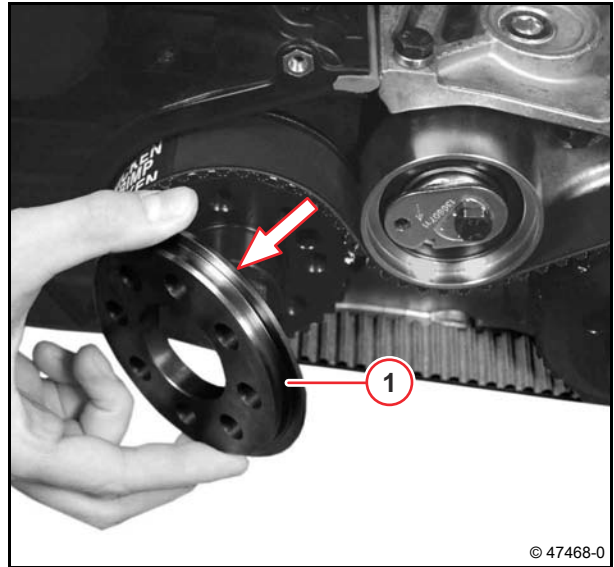
 21 Nm



- Mount adapter (1).



The flattened side (arrow) must face the toothed belt.



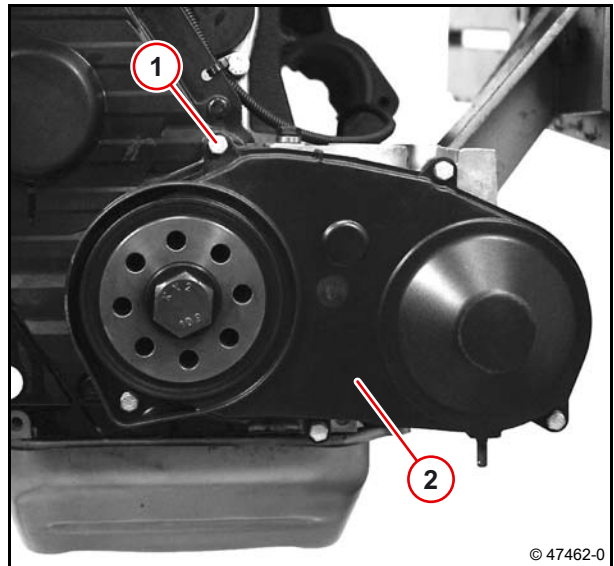
© 47468-0

- Mount protective hood (2).
- Tighten all screws (1).

 8.5 Nm

- Install V-belt pulley.

 W 12-01-04



© 47462-0

Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A12 052	Tensioning pulley on hydraulic pump console			21 Nm
A12 056	Protective hood on hydraulic pump console			8.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the generator



Standard tools



– W 09-11-01
– W 09-11-02
– W 12-02-01

D 2011 i
D 2011 i

Removing the generator

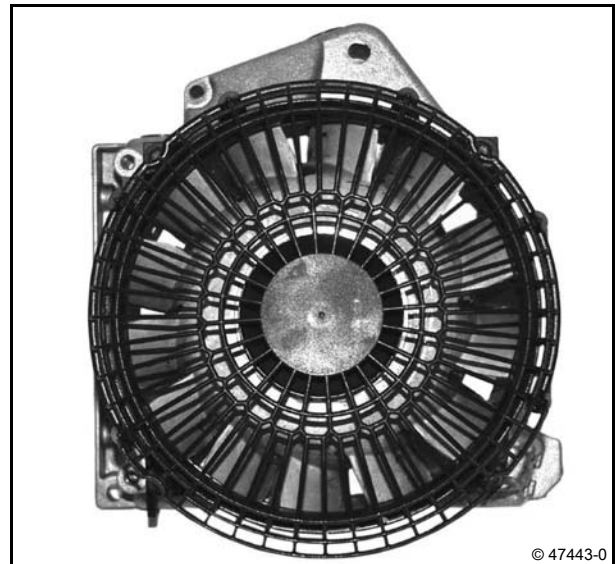
– D 2011 i, TD 2011 i

- Remove cooling blower.

 W 09-11-01

- Dismantling the cooling blower.

 W 09-11-02



– D 2011, TD 2011

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

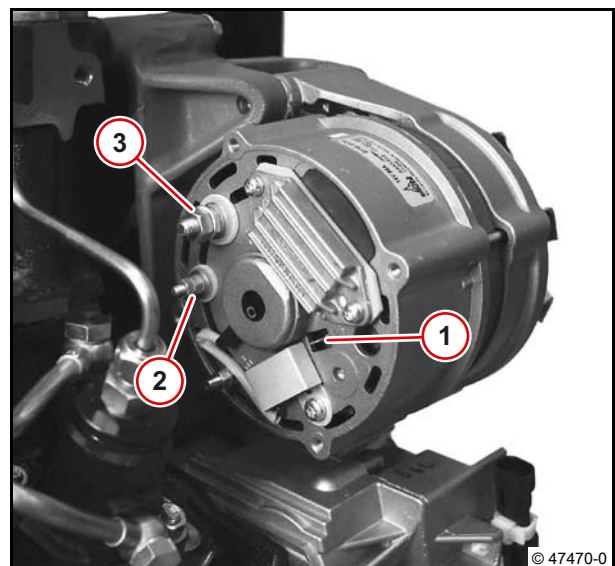


Note assignment!

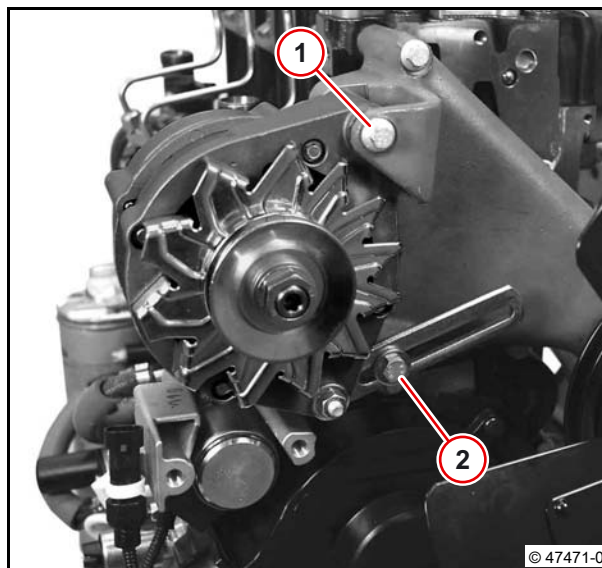
- (1) = terminal W
- (2) = terminal D+
- (3) = terminal B+

- Remove V-belt.

 W 12-02-01

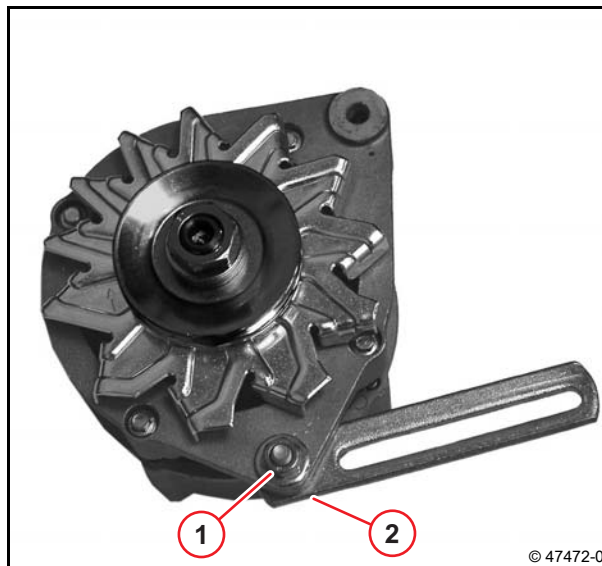


- Unscrew screw (1).
- Unscrew screw (2).
- Remove washer.
- Remove generator.



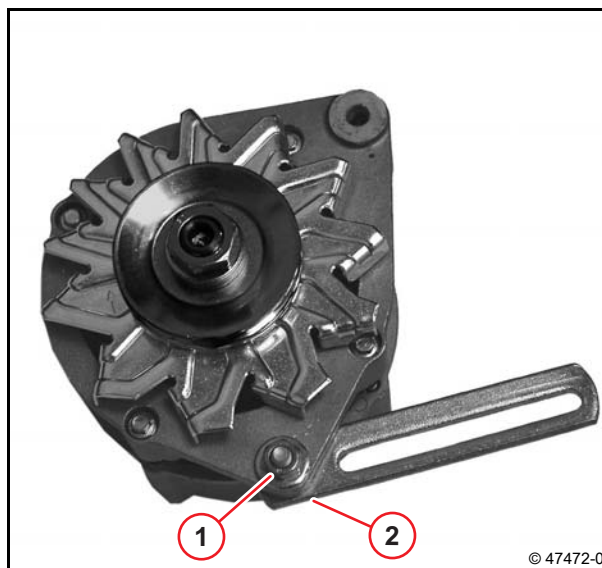
6

- Unscrew nut (1).
- Hold screw (2).
- Remove washer.
- Visually inspect the components.



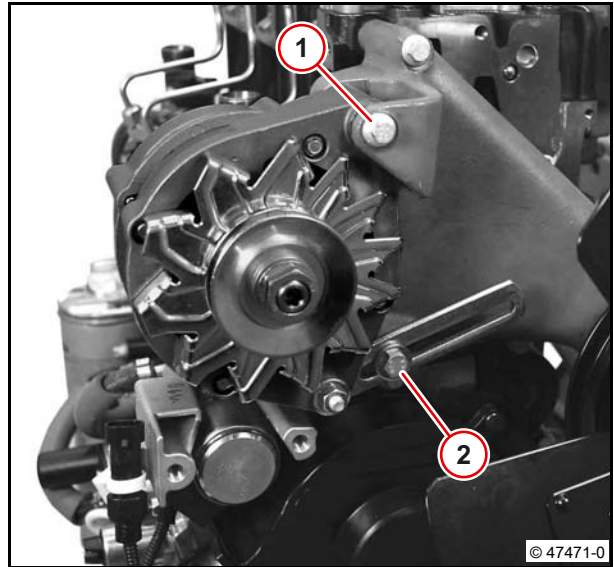
Installing the generator




- Insert screw (2).
- Mount disc.
- Screw on nut (1).

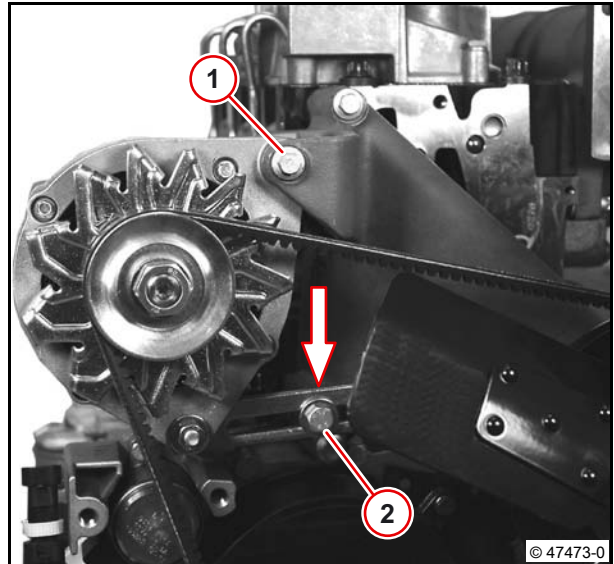


- Mount generator.
- Fasten screw (1).
- Mount disc.
- Fasten screw (2).
- Install V-belt.

 W 12-02-01



- Tighten screw (1).
 - M8
 34 Nm
 - M10
 46 Nm
- Hold locking nut (arrow).
- Tighten screw (2).
 22 Nm



- Remove cable from generator.



Note assignment!

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

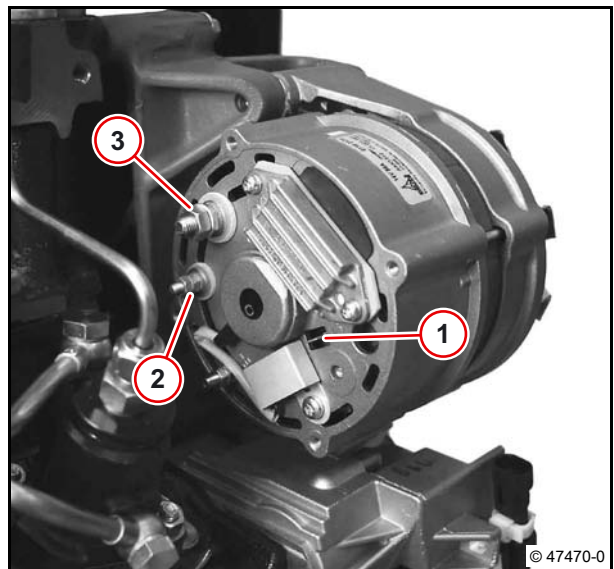
- (Position 2)

 3.5 Nm

- (Position 3)

 6.5 Nm

- Connect the battery's negative terminal.

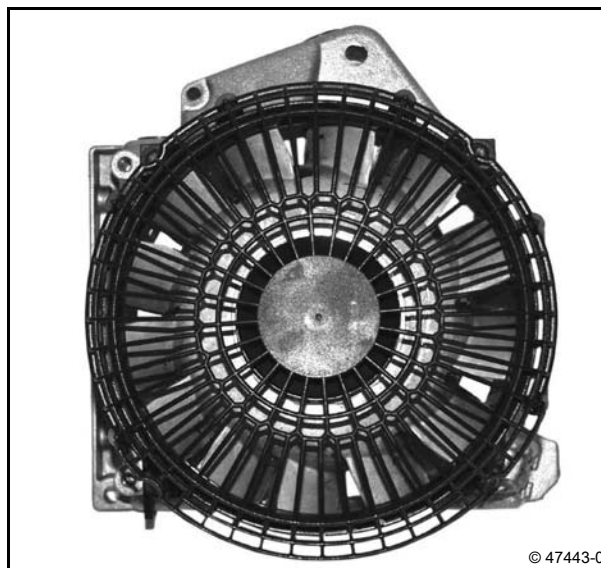


- D 2011 i, TD 2011 i
- Assembling the cooling blower.

 [W 09-11-02](#)

- Install cooling blower.

 [W 09-11-01](#)



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A13 012	Generator on console	M8x80-10.9		34 Nm
A13 012	Generator on console	M10x80-10.9		46 Nm
A13 015	Clamping bracket on generator	M8x30-8.8		22 Nm
A13 015	Clamping bracket on generator	M10x80-10.9		46 Nm
A13 016	Clamping bracket on console	M8x35-8.8		22 Nm
A13 017	Clamping bracket on front cover			45 Nm
A13 081	Charging current cable to generator B+			6.5 Nm
A13 082	Cable G1.D+ to generator	M5		3.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the starter

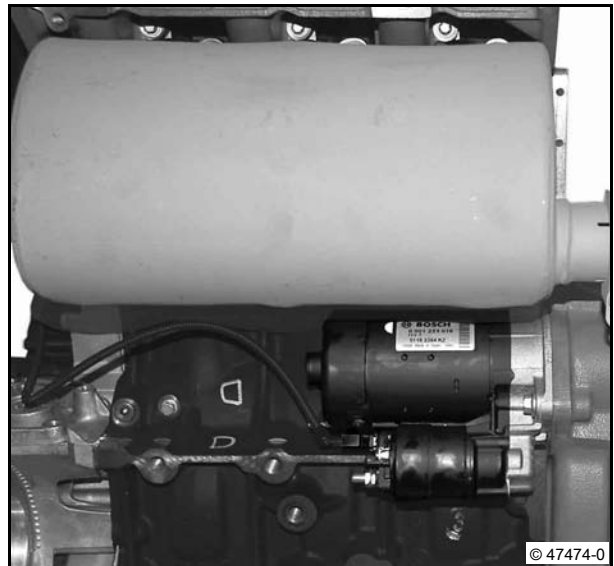


Standard tools

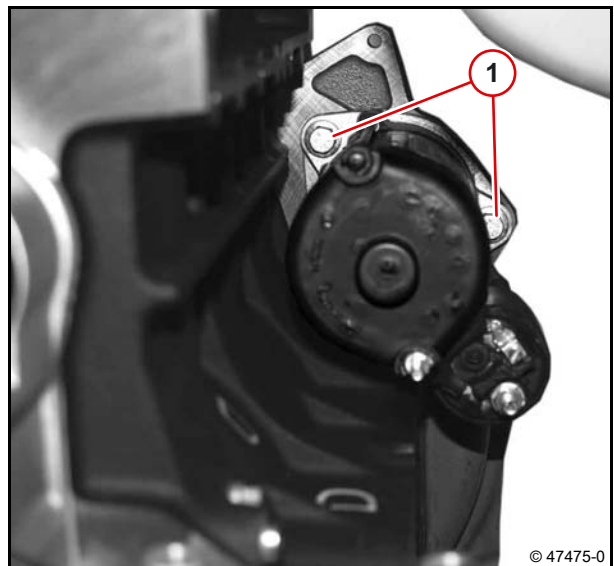
6

Removing the starter

- Disconnect the battery's negative terminal.
- Disconnect cables.



- Unscrew screws (1).
- Remove starter.



- Visually inspect the components.

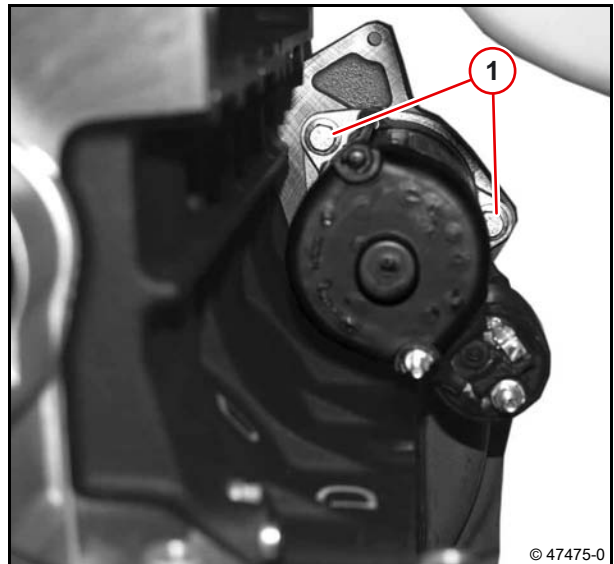


6

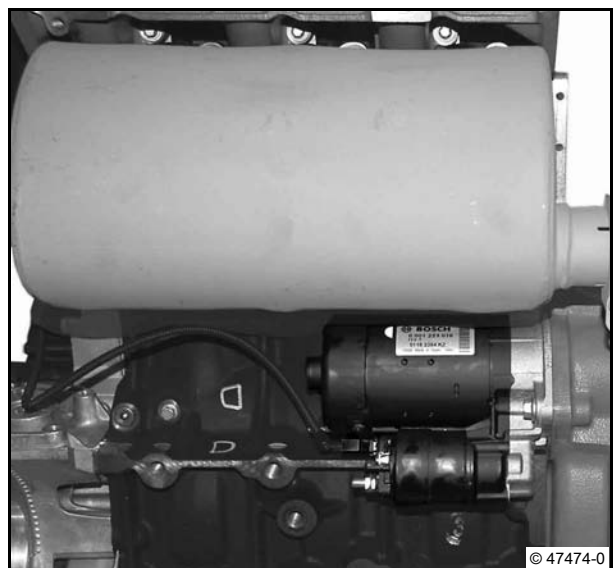
Installing the starter

- Insert starter.
- Tighten screws (1).

 43.5 Nm



- Connect cables.
 - see Technical Circular 0199-44-1163
- Connect the battery's negative terminal.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A13 001	Starter on crankcase			43.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the starter

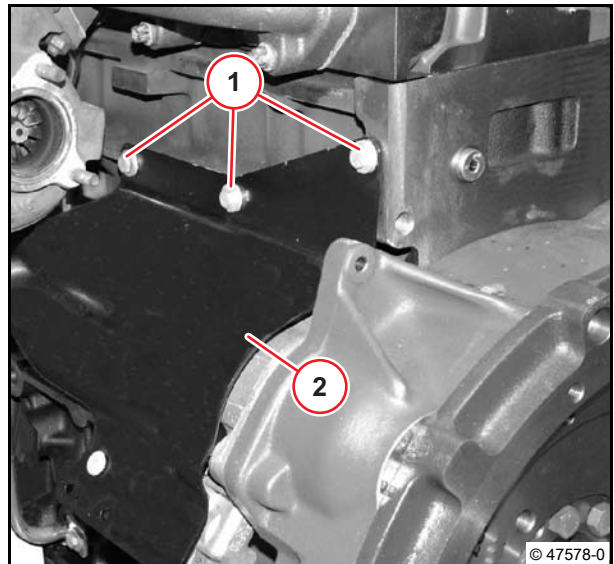


Standard tools

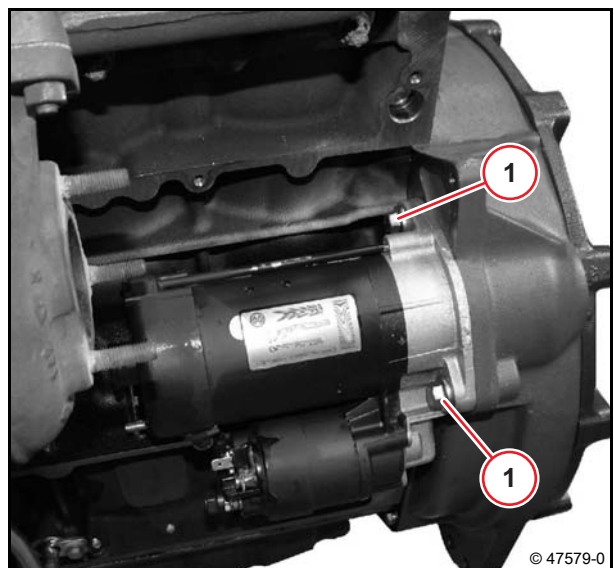
6

Removing the starter

- Disconnect the battery's negative terminal.
- Disconnect cables.
- Unscrew screws (1).
- Remove shielding plate (2).



- Unscrew screws (1).
- Remove starter.



- Visually inspect the components.

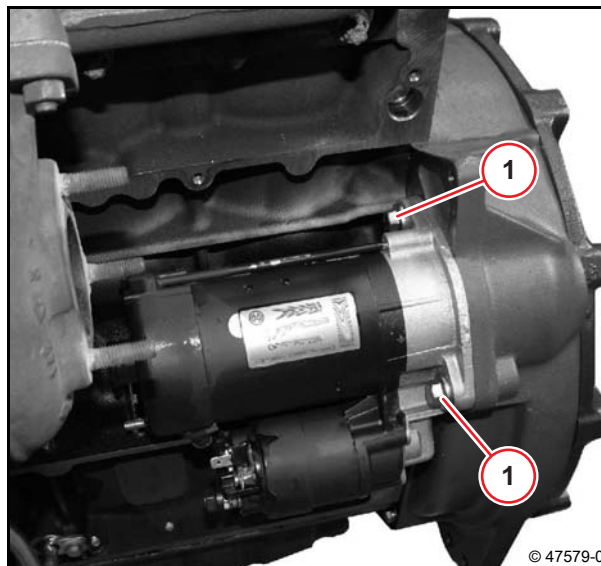


6

Installing the starter

- Insert starter.
- Tighten screws (1).

 43.5 Nm



- Mount shielding plate (1).
- Tighten screws (2).

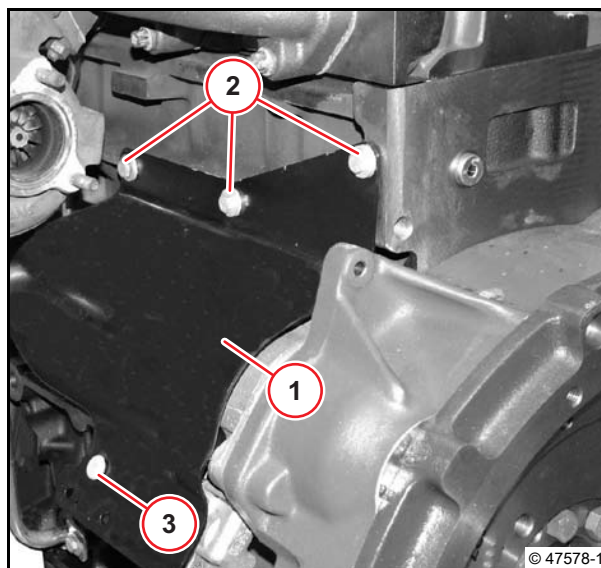


Make sure that the installation site of the rubber pad (3) is in perfect condition.

- Tighten screws (2).

 8.5 Nm

- Connect cables.
 - see Technical Circular 0199-44-1163
- Connect the battery's negative terminal.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A13 001	Starter on crankcase			43.5 Nm
A13 009	Shield on crankcase	M6x14-8.8		8.5 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the heating plugs



Standard tools

Special tools:

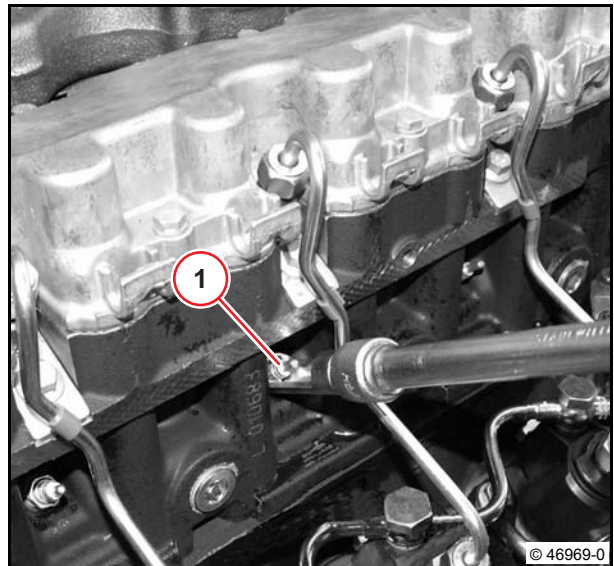
– Assembly tool

120440

6

Removing the glow plugs

- Disconnect the battery.
- Disconnect cables from heating plugs.
- Unscrew heating plugs (1) with assembly tool.



- Visually inspect the component.



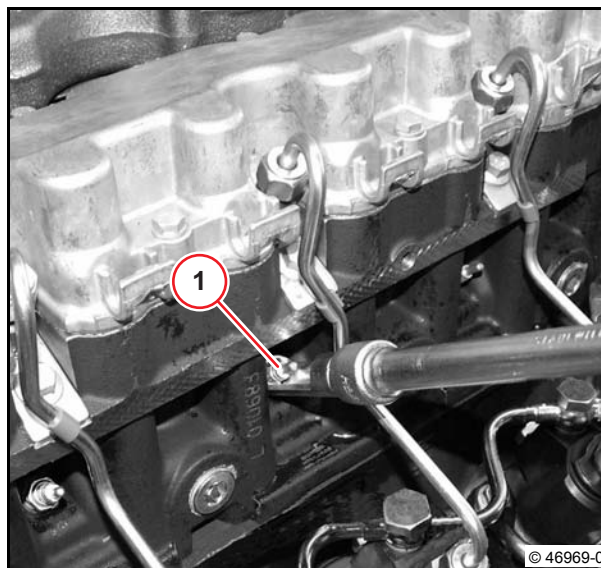
Installing the glow plugs

- Screw in heating plug (1).
- Tighten heating plug (1) with assembly tool.

 21 Nm



- Connect cables to heating plugs.
- Connect the battery.



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A13 032	Heating plug on cylinder head			21 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.



Removing and installing the glow plug

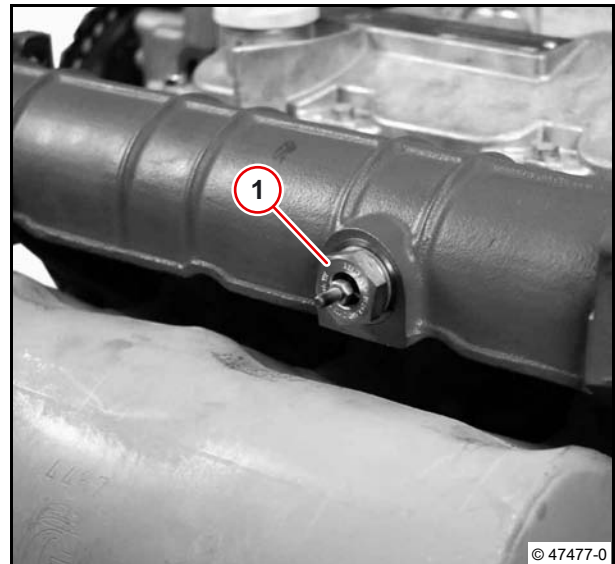


Standard tools

6

Removing the glow plug

- Disconnect cable connections.
- Unscrew glow plug (1).
- Remove sealing ring.

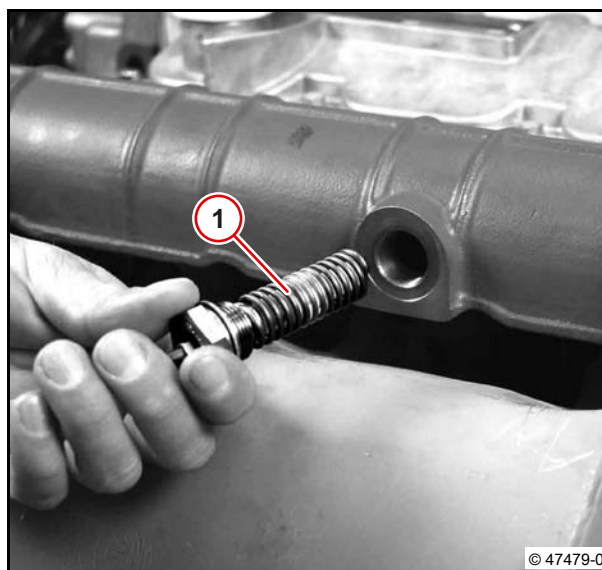


- Visually inspect the components.



Installing the glow plug

- Insert new sealing ring.
- Insert glow plug (1).

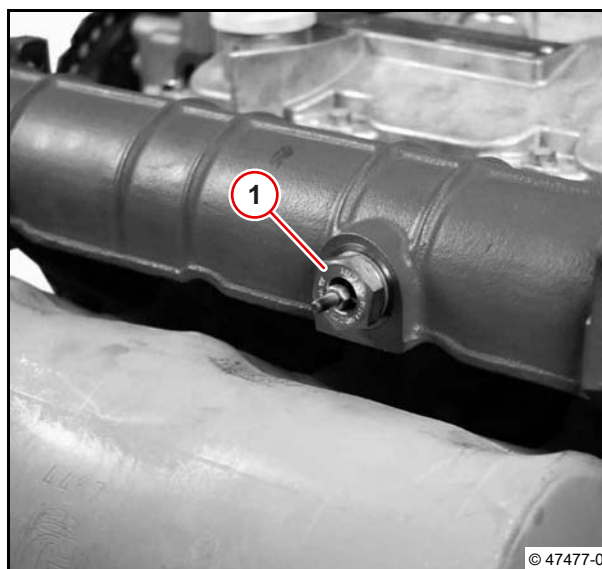


- Tighten glow plug (1).

 60 Nm

- Connect cable.

 4 Nm



Technical Data

Tightening specifications

ID no.	Name	Screw type	Notes / Remark	Value
A13 031	Glow plug in charge air line / intake pipe			60 Nm
A13 034	Cable connection to glow plug			4 Nm



For the tightening procedure according to torque using a torque wrench, a maximum variation of the tightening torque of +/- 10% is permissible.





7 Standard tools



Orders

The tools can be ordered directly, stating the order number, from:

WILBAER

Wilhelm Bäcker GmbH & Co.KG

Postfach 14 05 80

42826 Remscheid

Germany

Tel.: +49 (0) 2191 9339-0

Fax: +49 (0) 2191 9339-200

E-mail: info@wilbaer.de

Web: <http://www.deutz-tools.com>

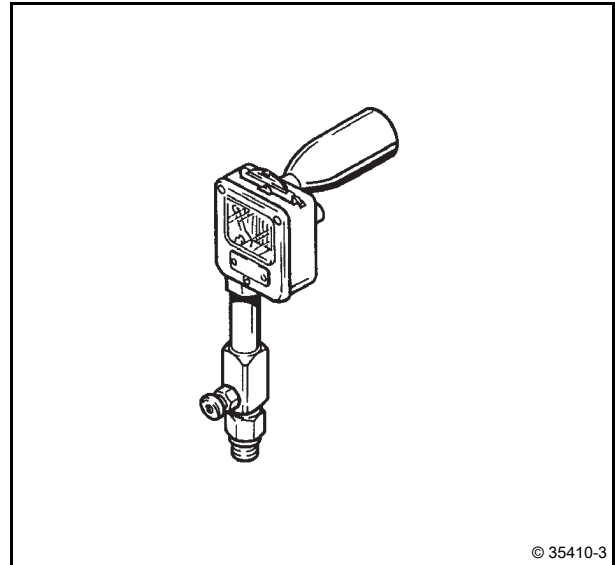
8005

Compression pressure tester

for diesel engines

10 - 40 bar

Checking compression pressure

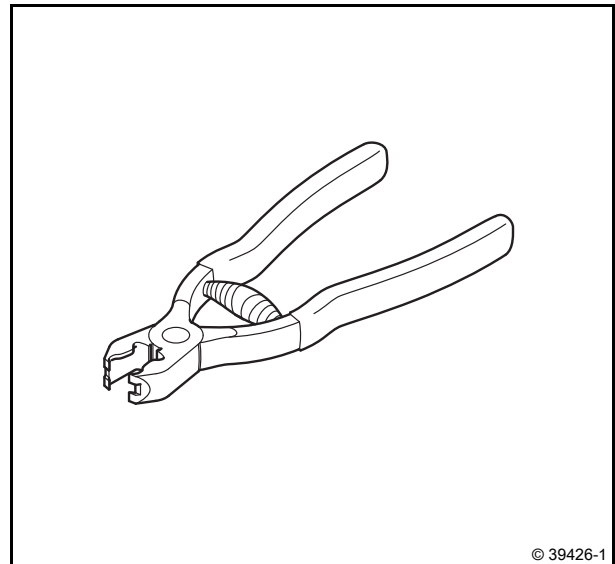


8011

Hose clip pliers

Loosen and fasten hose clips

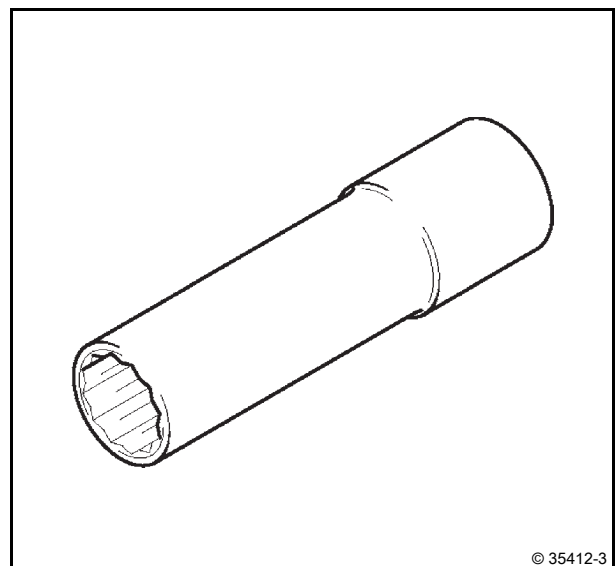
e. g. fuel return pipe



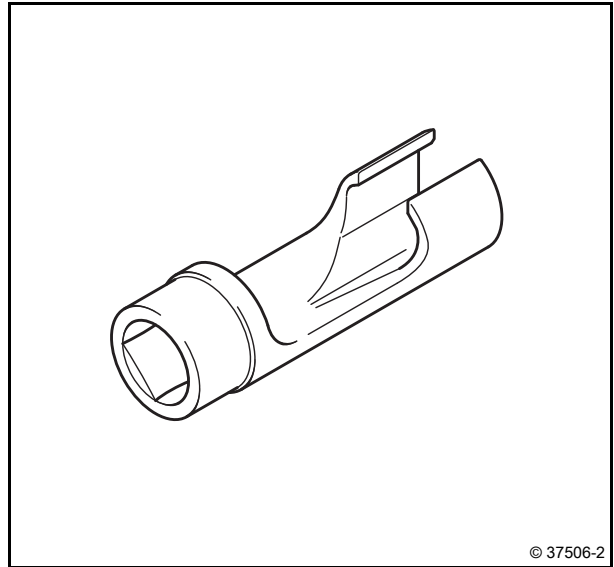
8012

Socket wrench insert

Wrench size 15, long



8018
Claw wrench
Wrench size 17,
Removing and installing injection pipes

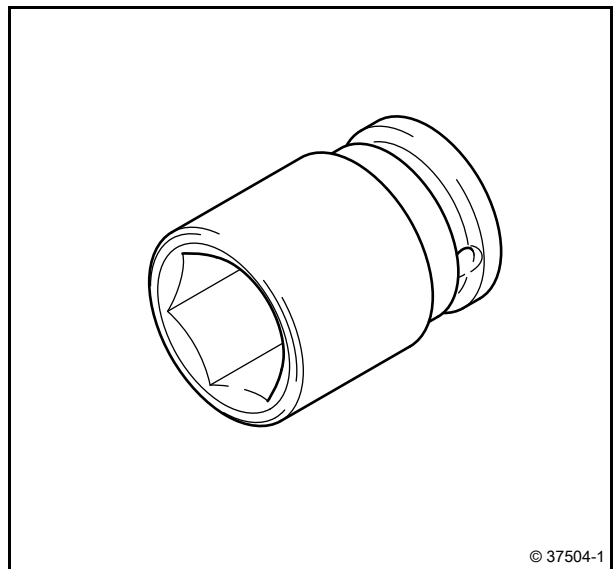


7

8027
Plier insert
Removing and installing the lifting magnet



8035
Socket wrench insert
Wrench size 22, strengthened version

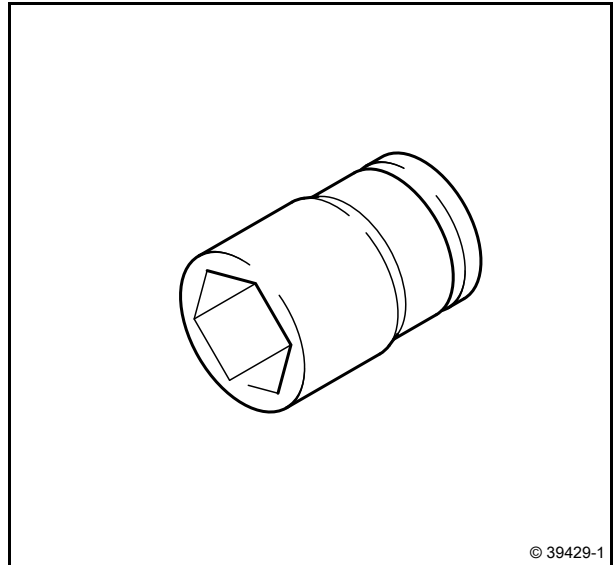


8036

Socket wrench insert

Wrench size 32,

(in conjunction with force multiplier 8049)



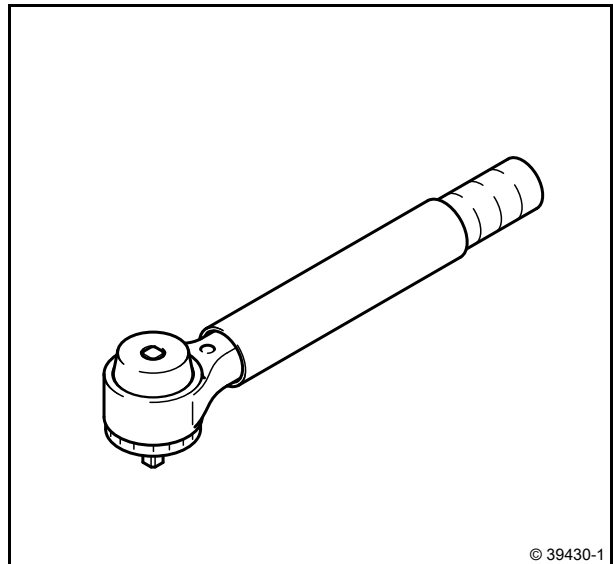
8049

Force multiplier

Removing and installing the centre screw

Tool kit, including socket wrench insert 8036

(in conjunction with holder 143420)

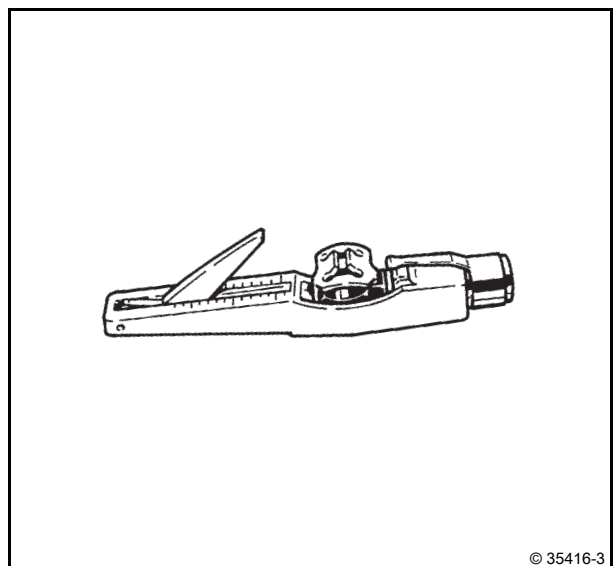


8115

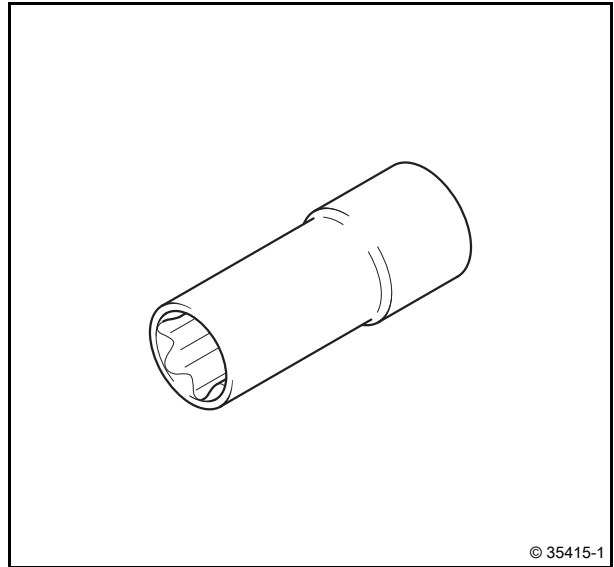
V-belt tension measuring device

150 to 600 N

Check V-belt tension



8116
Socket wrench insert
Torx - E18



8167
Cleaning brush
Cleaning exhaust channels



8170
Micrometre depth gauge
Measure the depth of the roller tappet



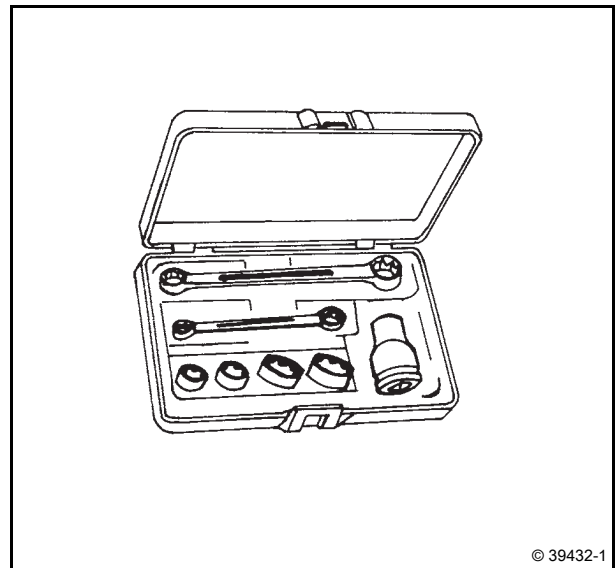
7

8189

Torx tool set

Contents of case:

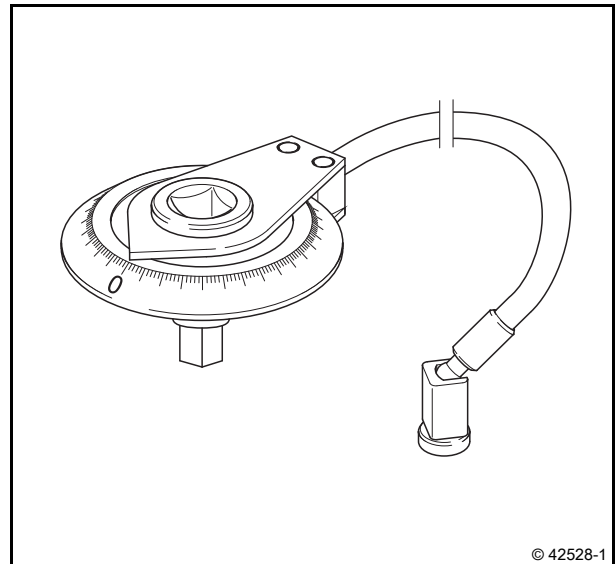
- Double-ended ring spanner E6/E8
- Double-ended ring spanner E10/E12
- Socket wrench insert E8 and E10 (1/4 inch)
- Socket wrench insert E10 and E12 (3/8 inch)
- Socket wrench insert E18 (1/2 inch)



8190

Rotation angle disc

with magnet (e. g. setting valve clearance)



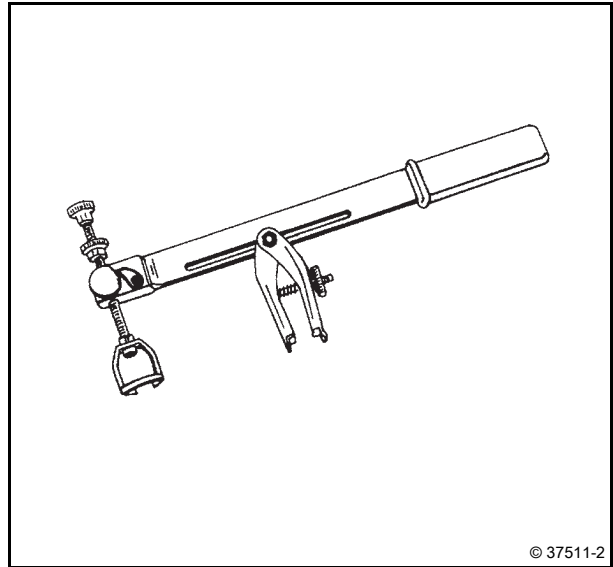
8198

Pricker

Removing rotary shaft lip seal

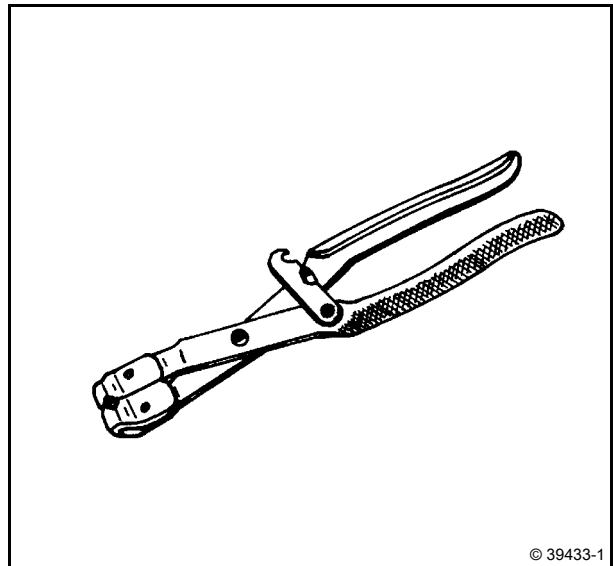


9017
Assembly lever
e. g. removing and installing valves

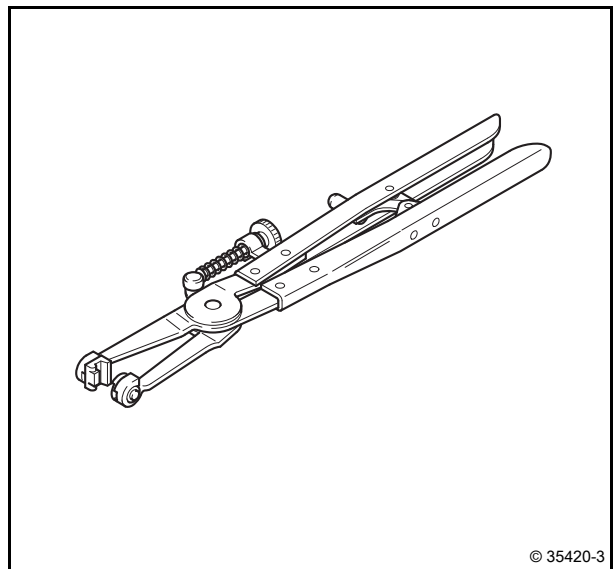


7

9088
Clamping tongs
Loosening and tightening hose clips



9090
Spring band pliers
320 mm
Tighten spring clamp





8 Special tools



Orders

The tools can be ordered directly, stating the order number, from:

WILBAER

Wilhelm Bäcker GmbH & Co.KG

Postfach 14 05 80

42826 Remscheid

Germany

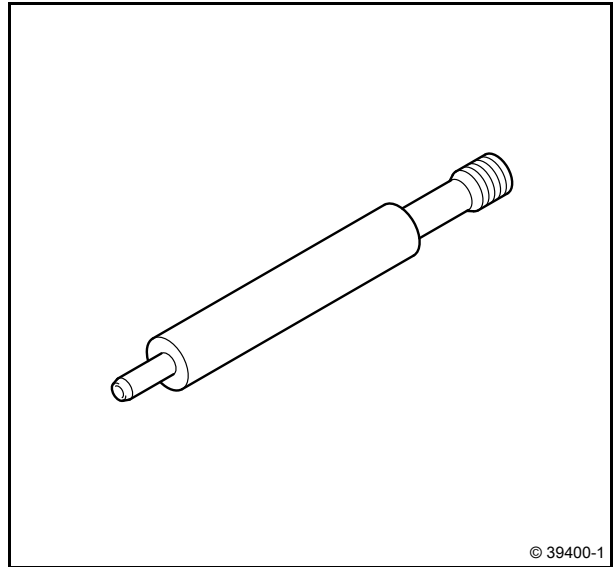
Tel.: +49 (0) 2191 9339-0

Fax: +49 (0) 2191 9339-200

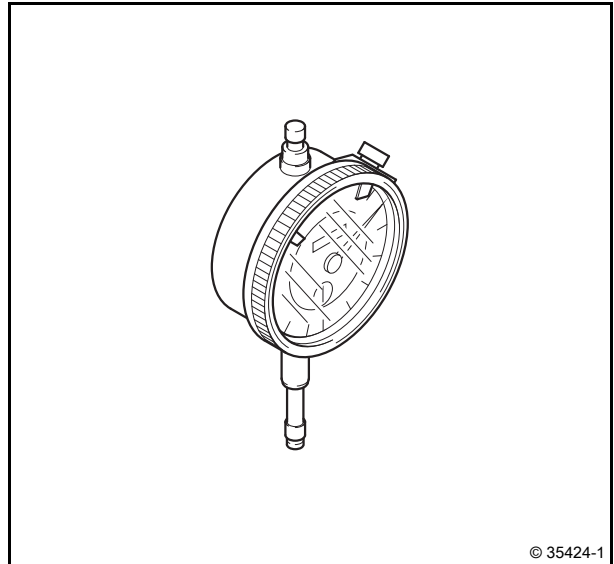
E-mail: info@wilbaer.de

Web: <http://www.deutz-tools.com>

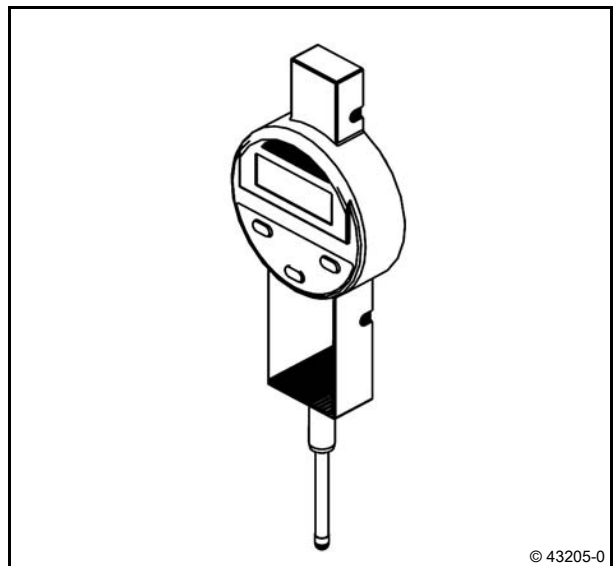
100120
Connector
(in conjunction with compression pressure tester 8005)



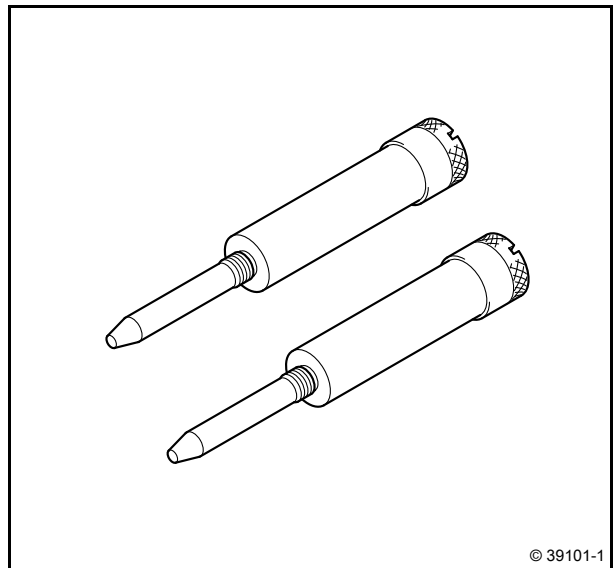
100400
Dial gauge with fixing wheel
Measuring range 0 - 10 mm / 0.01 mm



100410
Digital gauge
Measuring range 0 - 30 mm / 0.01 mm

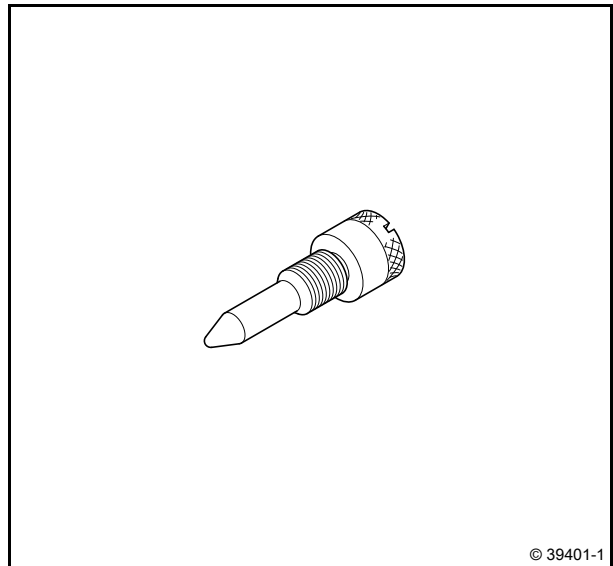


100700
Ajustable bolt
Crankshaft and camshaft lock

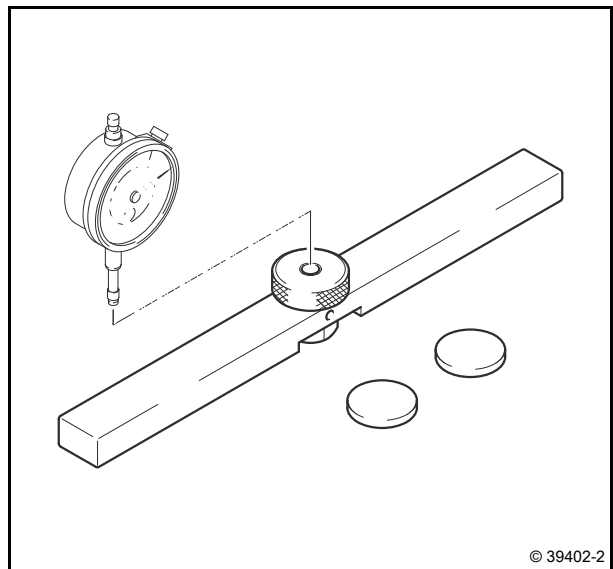


8

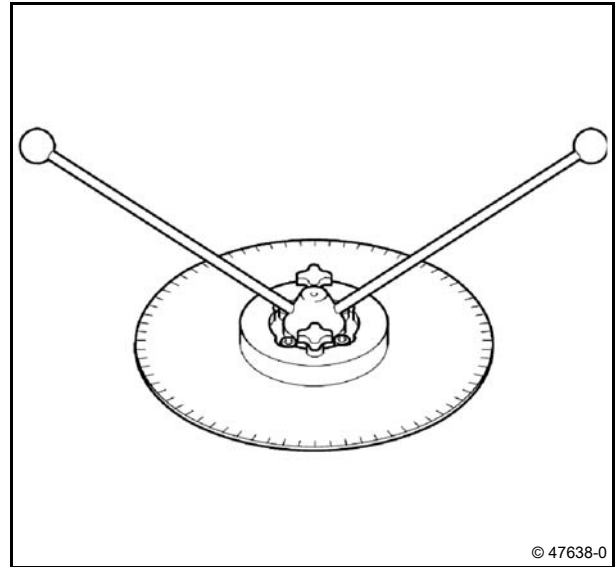
100710
Ajustable bolt
Control linkage lock



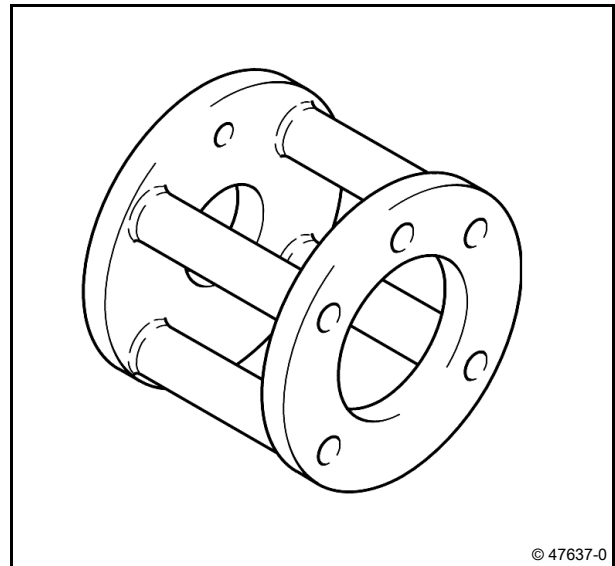
100750
Measuring device
Measuring bar with two shims
(in conjunction with 100400 and 100410)
Checking valve lag dimension
Checking piston projection



101020
Degree scale
for testing and setting the static beginning of injection



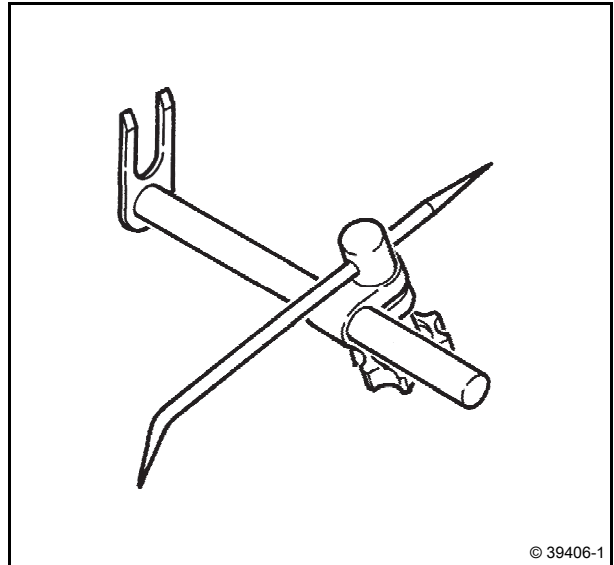
101030
Adapter
(in conjunction with degree scale 101020)



101100
Rig pin
Lock the steering link of the injection pump

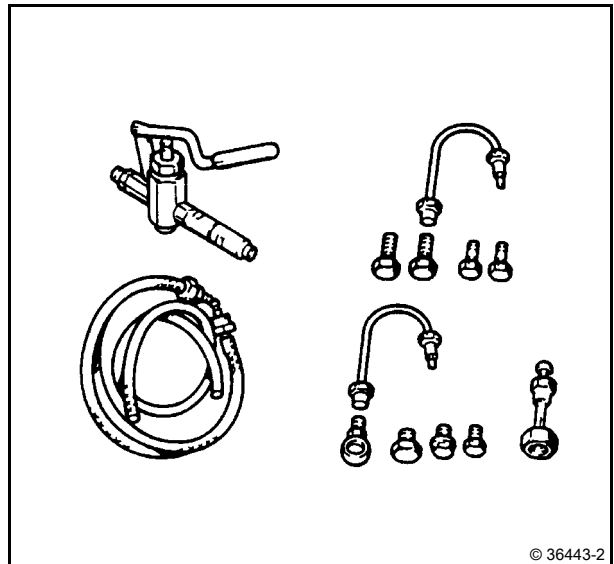


101300
Point for degree scale
for testing and setting the static beginning of injection

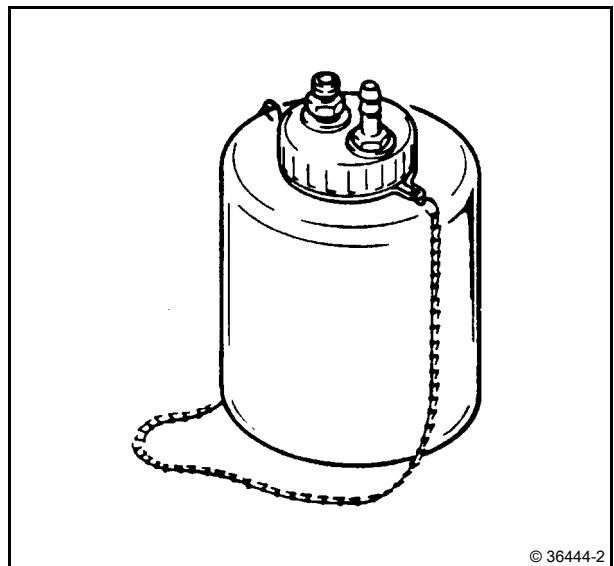


8

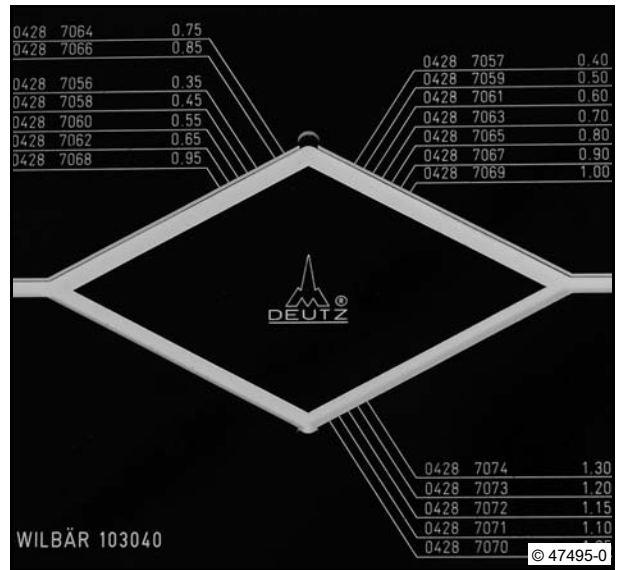
101500
High-pressure hand pump
for testing and setting the static beginning of injection



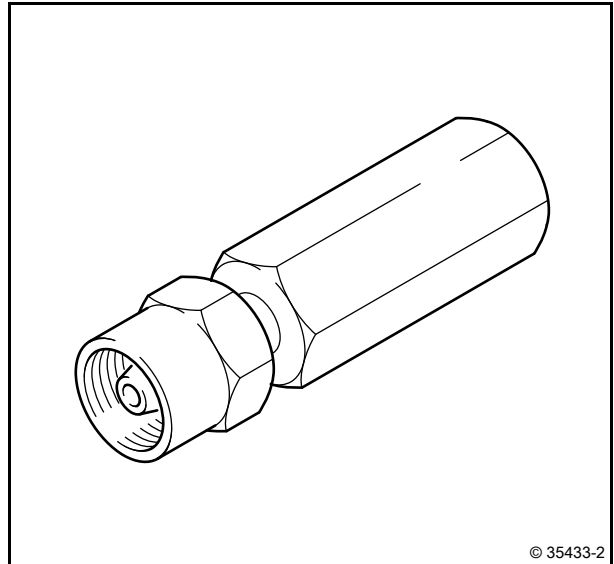
101510
Supply tank
(in conjunction with high-pressure hand pump 101500)



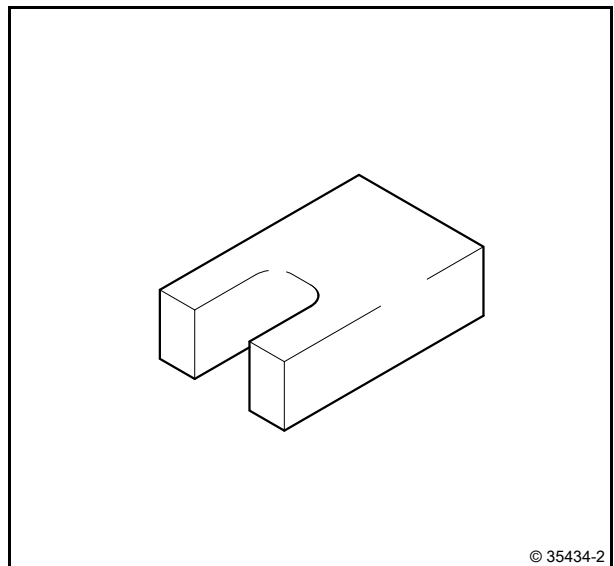
103040
Test template
Check shim thickness



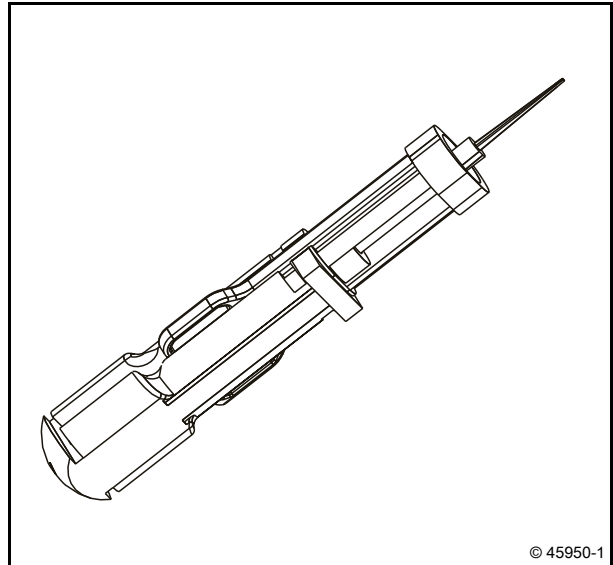
110090
Puller
(in connection with sliding hammer 150800)
Removing fuel injector



110110
Holder
Wrench size 11,
clamp the injection valve in the vice

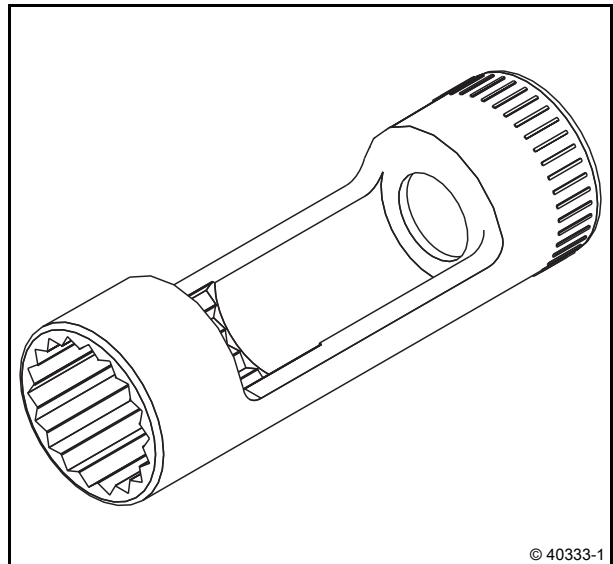


110901
Disassembly tool
(part of assembly case 110900)
Removing and installing the O-rings

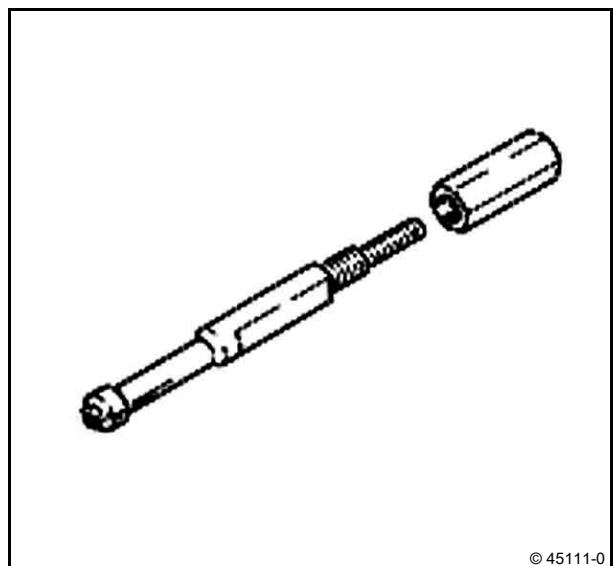


8

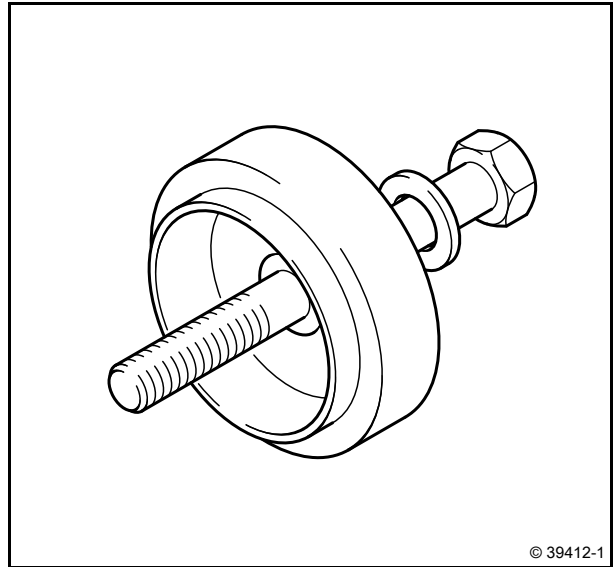
120440
Assembly tool
Removing and installing the glow plugs



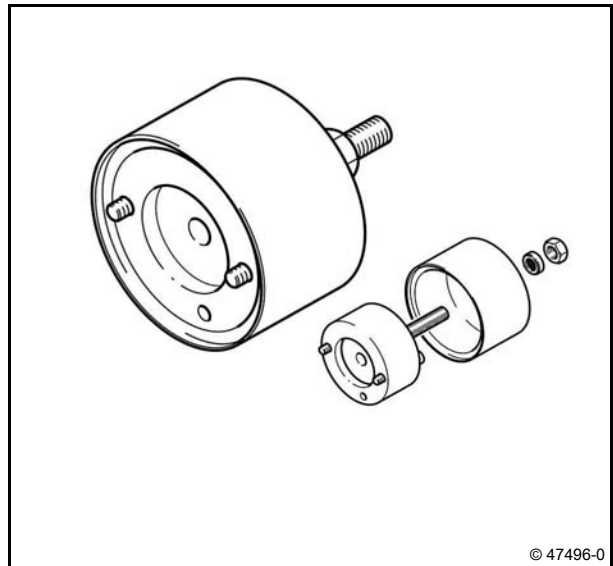
120660
Puller
(in connection with sliding hammer 150800)
Removing jammed fuel injector sealing ring



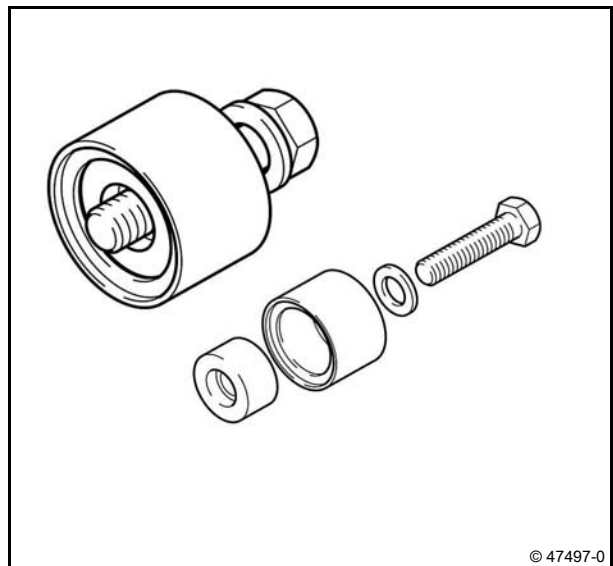
142050
Assembly tool
Install camshaft sealing ring



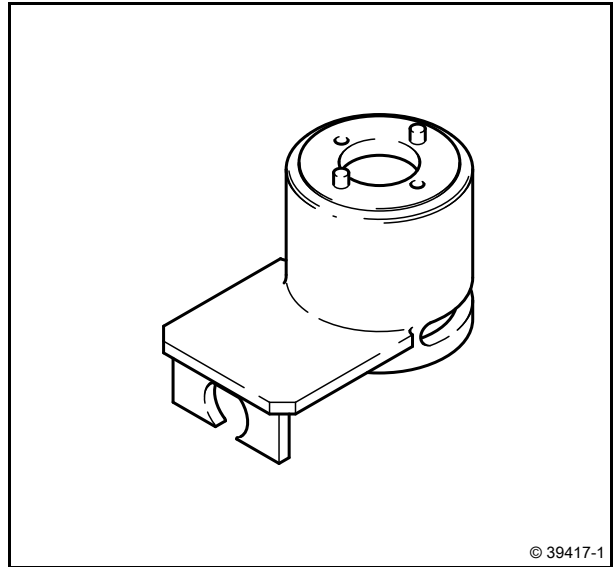
142680
Assembly tool
Installing crankshaft sealing ring
(flywheel side)



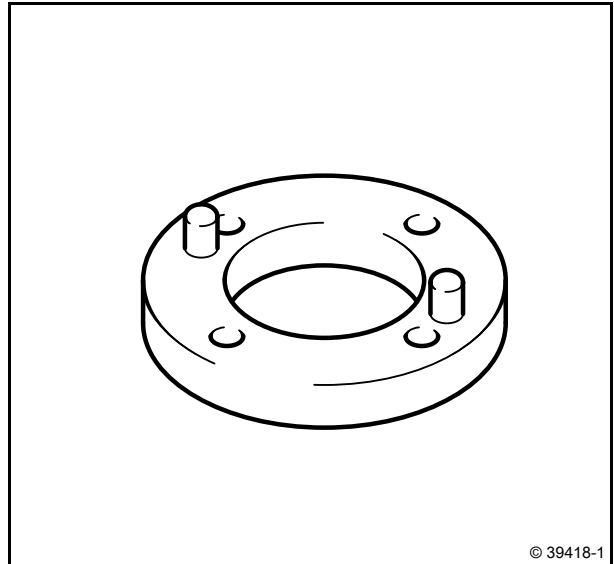
142690
Assembly tool
Installing crankshaft sealing ring
(opposite side to flywheel)



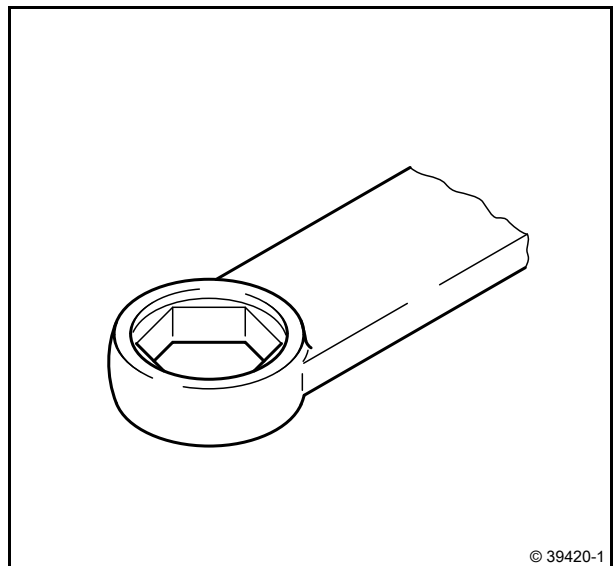
143420
Counter support
(in conjunction with force multiplier 8049 and socket wrench insert 8036)



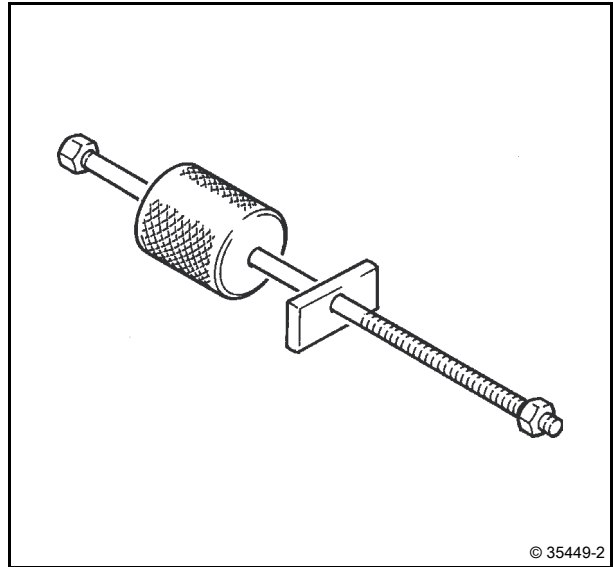
143430
Washer
(in conjunction with holder 143420)



144130
Counter support
Hold toothed belt wheel of the camshaft



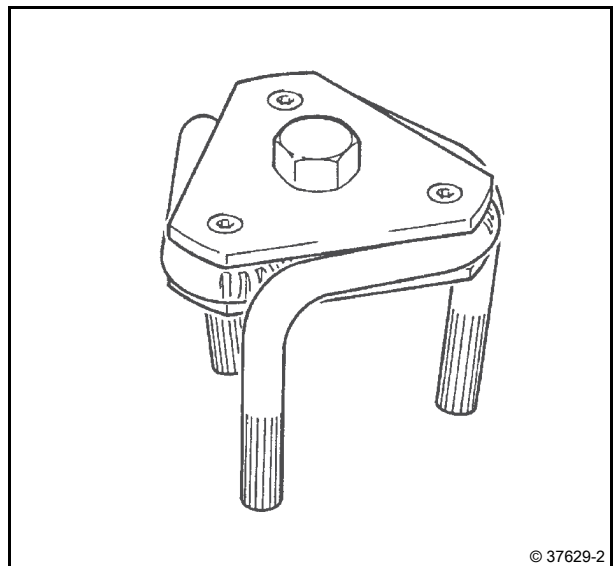
150800
Slide hammer
Removing fuel injector



151500
Separating tool
Removing metal sheet lubricating oil pan from crank-
case



170050
Special wrench
Unscrewing the filter cartridges



170160

Stoppers/caps

1 set of differently-sized stoppers and caps
Sealing openings on the fuel system

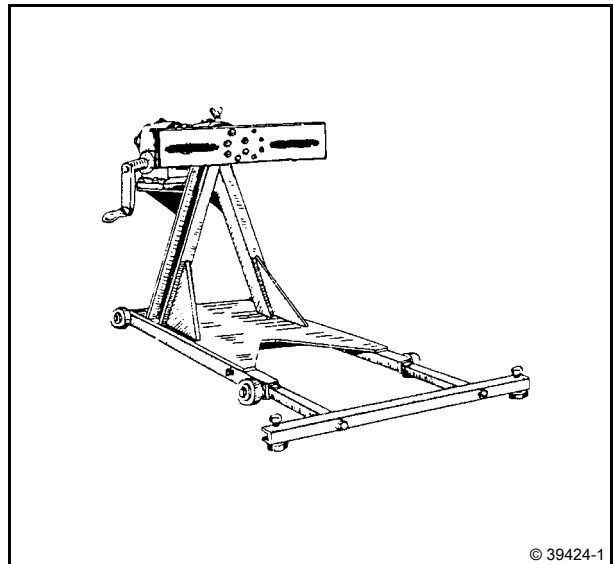


8

6067

Assembly block

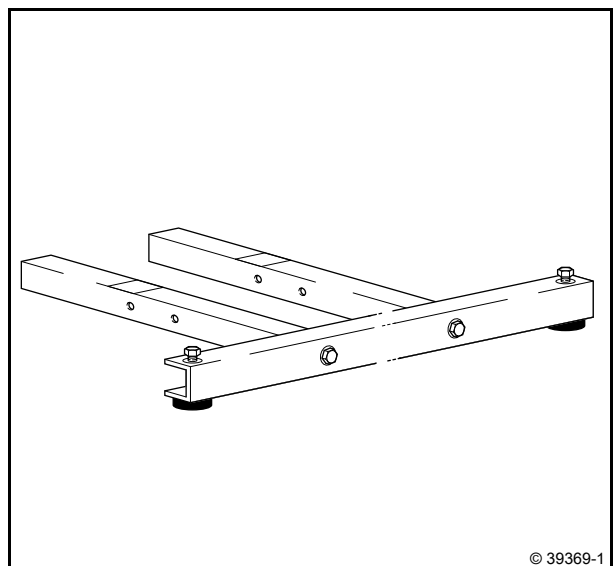
Engine clamping, one-sided



6067/114

Supporting bracket

(in conjunction with assembly block 6067)
Engine clamping, one-sided



6067/115
Clamping bracket
(in conjunction with assembly block 6067)
Engine clamping, one-sided

